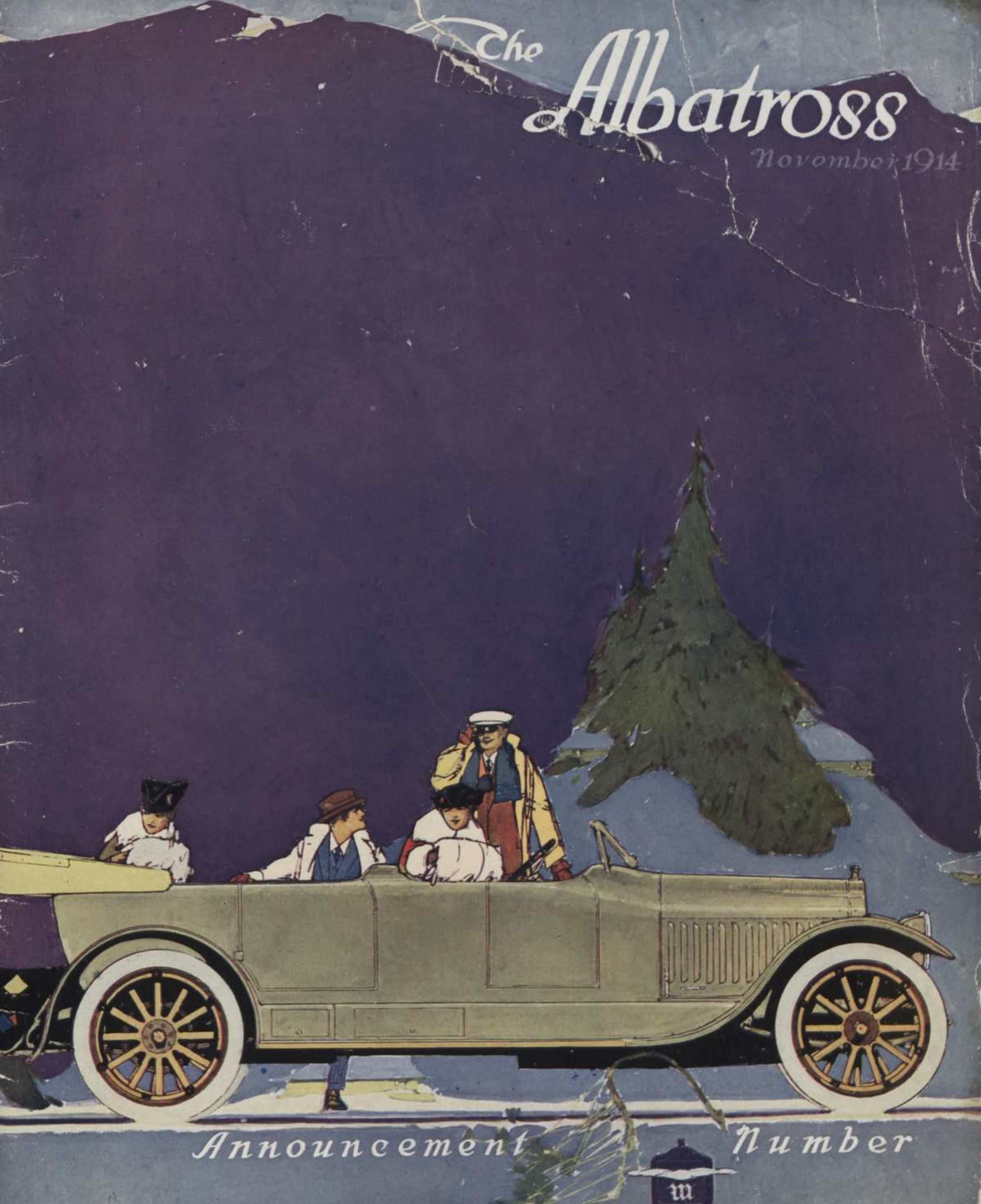
The Albatross

November 1914

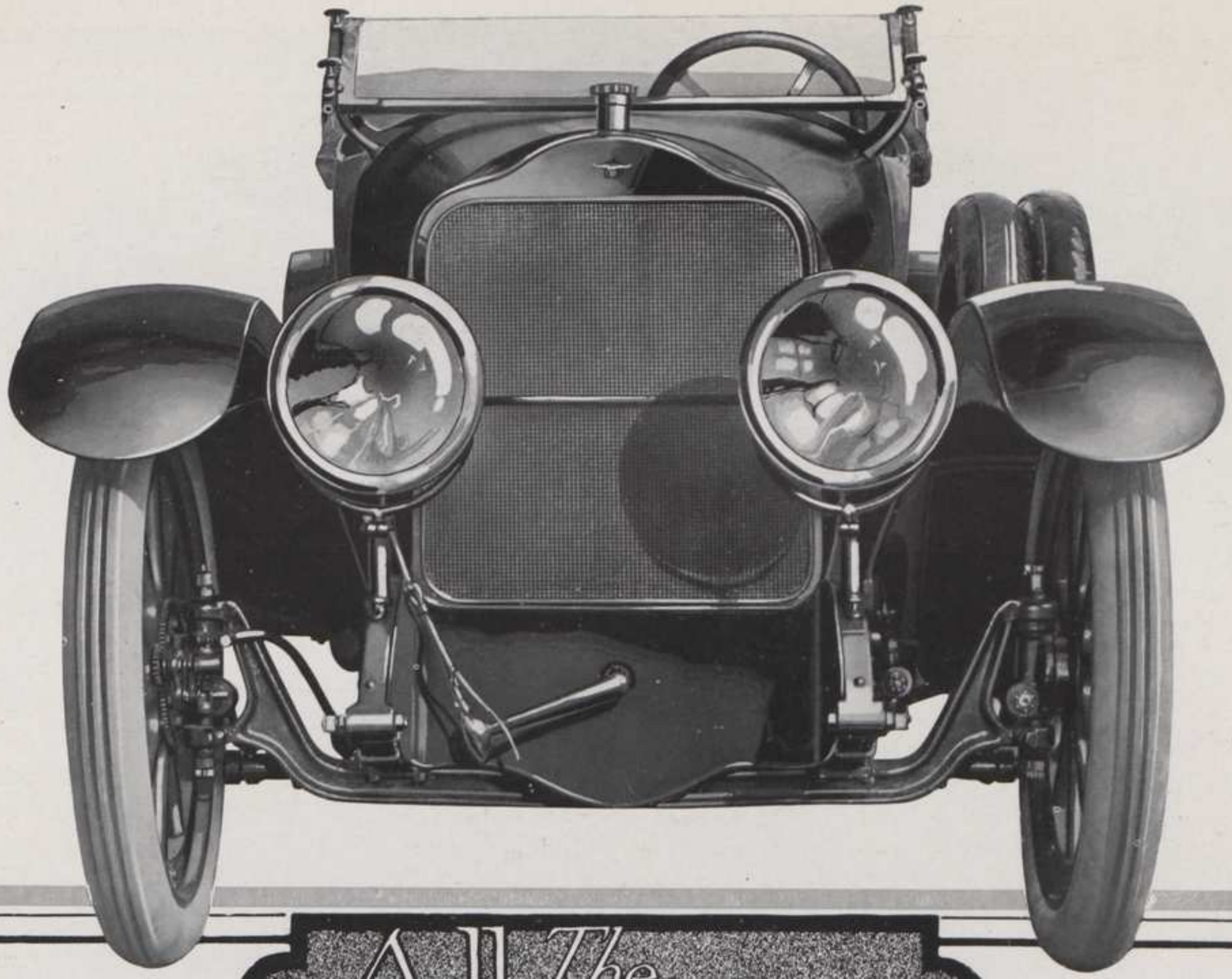


Announcement Number

The New White

THE new White Cars described in this issue establish a new standard of style and character in motor cars. The beauty of form, the richness of finish and equipment, and the correctness of fashion have been expressed so harmoniously and in such creative treatment as to portray the craftsmanship of the custom builder.

It is very unlikely that these body styles will be closely imitated in any but the highest priced cars. The custom-made appearance is one of the essential features, and the thoroughness required in executing the designs would be prohibitive in lower priced cars. The graceful never-ending curves of the White bodies will not lend themselves readily to low-priced quantity production.



Volume 3 — The Albatross — Number 26

NOVEMBER, 1914

Matching Mechanics with Beauty

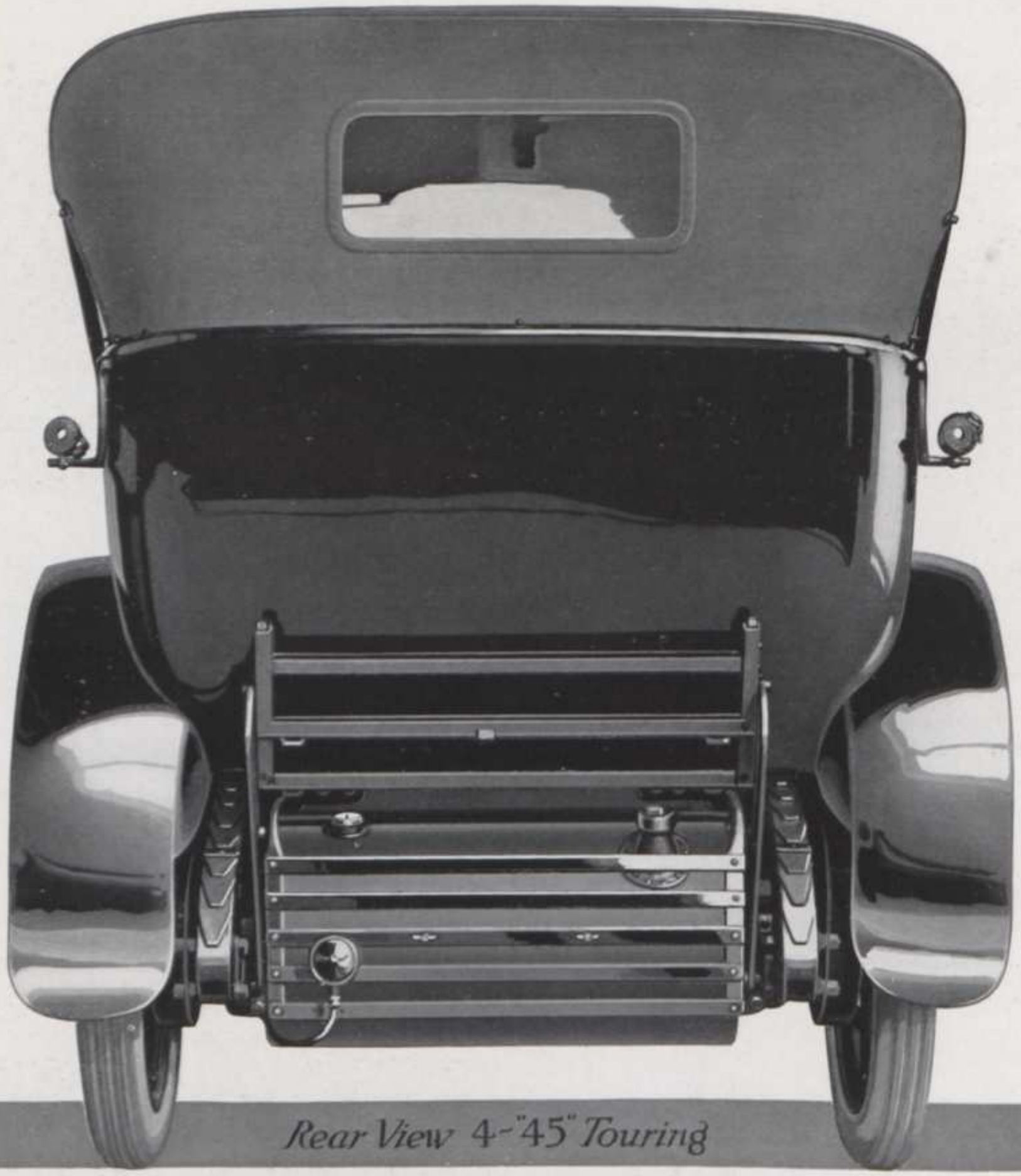
WE STAND before a motor car. The eye takes it all in. The gaze sweeps easily over it, from front wheels to rear. Here is the finally-perfect streamline body so much talked-of, so seldom found.

And what does "streamline" body mean? It means a body whose lines conform to the natural course or stream of air currents sweeping the surface of a moving object — the curves of grace and beauty and of least resistance.

There is grace, ease and a culturedly confident suggestion of power in the gentle line of the hood, leading to the dash, where even the windshield blends into the streamline. Then the gaze glides on —and we find ourselves looking at the rear of the car.

But the conventional back of the front seat — that stiff, often awkward arrangement — it should have bidden us pause. We turn our gaze — and there is no back of the front seat. It has been absorbed in a ripple of the streamline which produces a double cowl effect.

From the side of the car the beauty of this double cowl idea grows more and more upon us. What "go," what unbroken charm this double

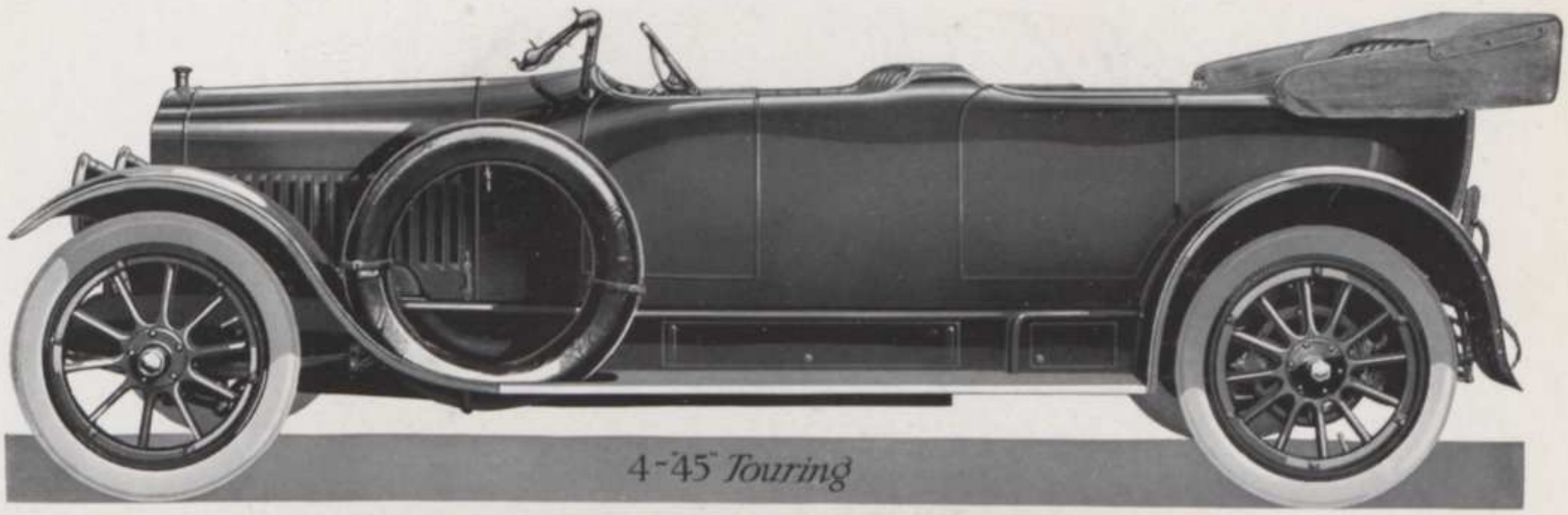


Rear View 4-"45" Touring

cowl gives the body! Here at last we find a car which seems to have been carved from a single piece — sculptured, if you will, by some master having the hand of Phidias and the mind of Pericles.

And where is the bulging upholstery that we have grown used to seeing as a border about the rear seat? There is none here. Just that clean, chaste elegance of the body, sweeping on in that unvarying, perfect line — the curve which Hogarth called "the line of beauty."

And the fenders and running-board — prosaic necessities of a motor car? They are here — but some artist has wrought their lines and has blent them with the car. Why, here is mastership indeed! So deftly and truly has that cunning sweep of fenders and running-board been drawn along the car that the wheels themselves melt



4-45 Touring

into the scheme of things and the spare tire furnishes another completing touch in what an artist would call a "composition."

Now from the rear we once more see what is meant by the finally-perfect streamline. Here the designer must have expressed his pride in his art, for here again that subtle line leads the eye on and over, refusing to let it pause upon a break or angle.

The secret of all beauty is the line — the sweeping line. The line of milady's neck and shoulder, the line of the wave lifted against the breeze, the line of the supple body of Apollo, the line of the tense back of Hercules — all these follow the same principle.

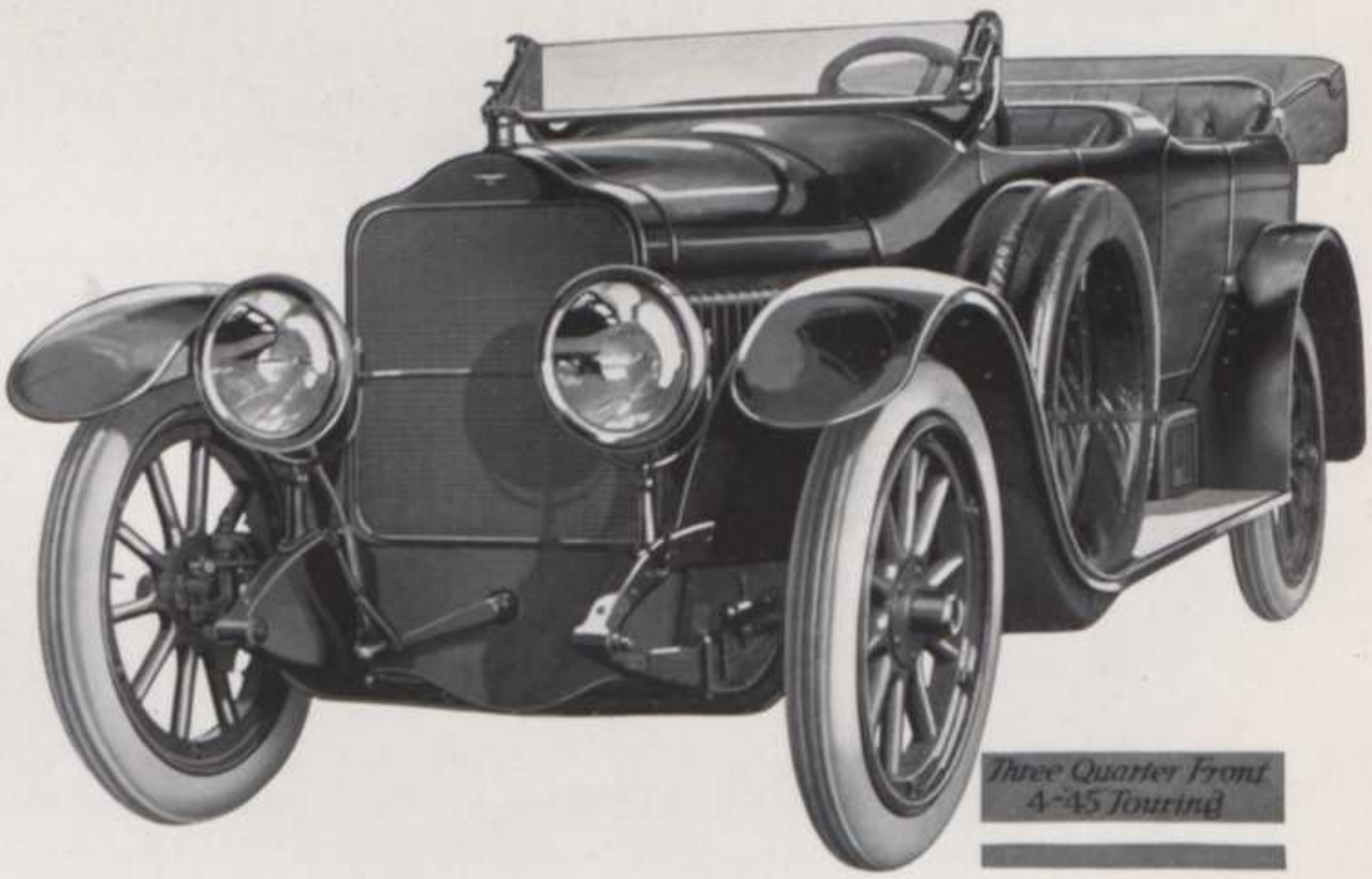
And here in this latest White Motor Car we find that mechanics have been matched with beauty. The unbroken line of faithful delivery of power and dependability of performance has been matched with this masterpiece of body-designing which forces the connoisseur in motor cars to stand in gratified admiration and grope for words to express his praise.

Men who can create such work are never content with its mere appeal to the eye.

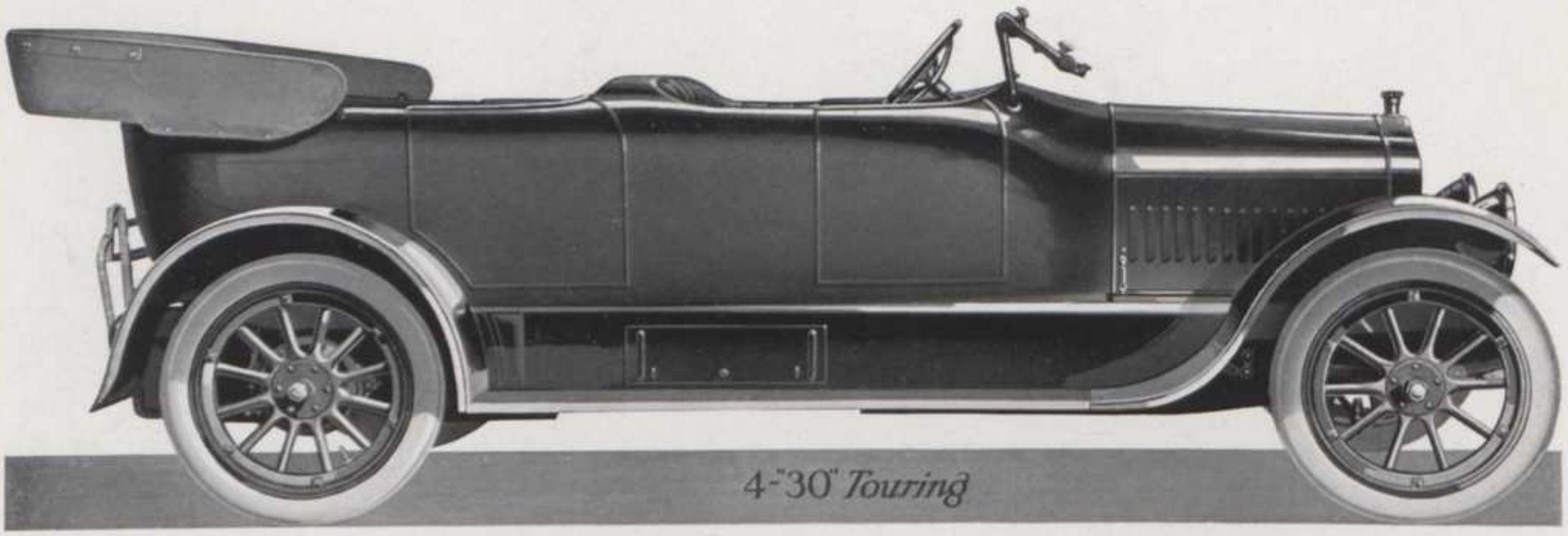
They go further and insist upon completeness in its appeal to and gratification of the mind.

Not only the pride but the comfort of the owner and driver of such a car must be given due consideration.

So we find the front door opening into a roomy compartment. The seats have the requisite pitch to provide that desirable sensation of sitting *in* the car and not *on* it. The upholstering is very



Three Quarter Front
4-45 Touring



4-"30" *Touring*

deep and luxurious. The leather is of finest quality with exclusive long-grain finish — the very choicest. And the tufting is in parallel lines — a very comfortable idea in itself.

The dash has been freed of all the attachments which once were considered popular, even if they were confusing. The oil sight-feed is there — inconspicuous, but always in sight.

In the driver's seat we find our back and sides cushioned in so that we know we belong to the car. The steering wheel reaches hospitably for our hands and we look out over that sweeping hood and feel much as the Kentuckian when he holds the reins over his finest thoroughbreds.

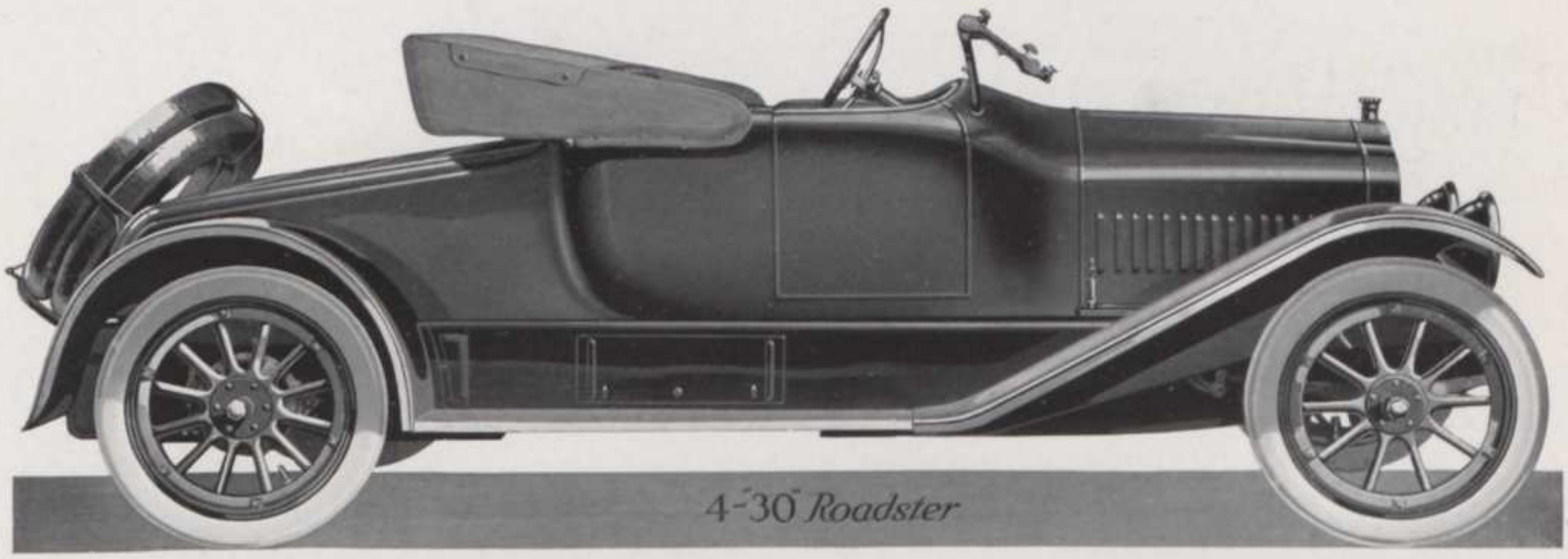
A small cylinder just below the wheel, on the steering post, holds the unified control. Simplicity itself — the control at our fingertips, literally. The starting and lighting switches are all contained in this compact little idea.

The rear compartment is another roomy one. The same deep upholstery, the same patient fineness of detail, the same persistent insistence upon having every fitting, every convenience, as excellent in quality and workmanship as our view of the exterior of the body has led us to expect.

Interior of Passenger Compartment "4-45" Touring Car

Here again we sit *in* the car. When we studied the outside we commented upon the absence of the bulging upholstery about the rear seat. Now we find our arm rest is here, hidden below the top line of the body, giving us the lazy ease we so much wanted.

White designers thought to good purpose concerning the use that may be made of the space behind and beneath the center cowl—the one which absorbs the conventional back of the front seat. (And, by the way, while we were sitting in front we found that the front seat had



4-30 Roadster

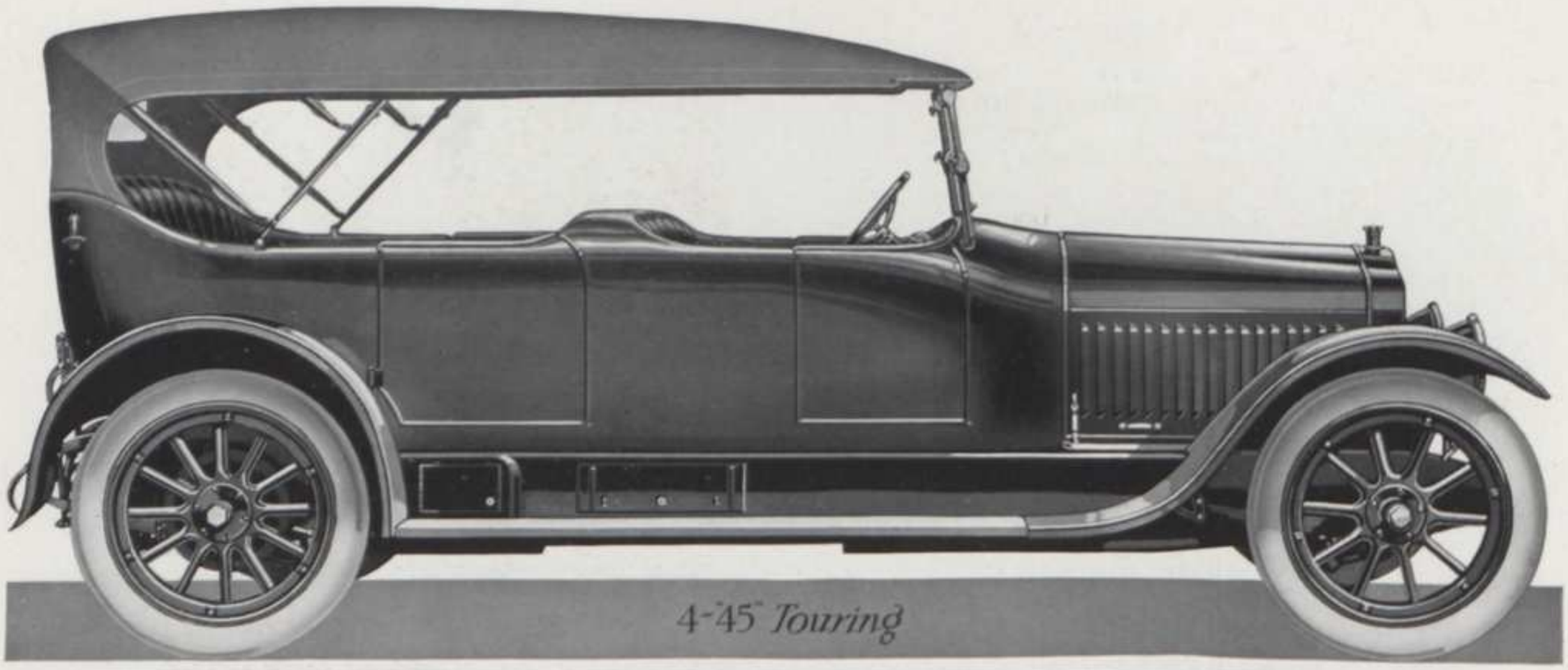
more back than ever, simply because it was properly built — low, roomy and comfortable to the last degree.)

In the seven-passenger "4-45," the two extra seats fold out of the way, under the center cowl. In the "4-30" the extra seat is removable, to be folded up and placed in one side of the compartment under the center cowl.

In the "4-45" and "4-30" this compartment room in the center cowl is made most ornamental. Little doors and large ones open into its divisions, suggesting where to place wraps, rugs, packages and so forth, making for that thorough neatness and cleanness which has been constantly suggested by the free lines of the body itself. The locks, catches, buttons, handles, pedals and all the minor elegances of the interior of the car are of special design, blending harmoniously into the scheme of things — so harmoniously, in truth, that, because they are what we expect and know will be there, they draw from us simply the passing attention which the makers of the car sought for them. Yet when we go back to them and study them we see that these details, like every other part of the car, have been thought out and fashioned to help express the whole idea.

So we come again to another study of the outside of the car, and now we look at the top. It is the White Monotop. A protection from the elements, surely, as a top should be. And yet it is another example of applying beauty to utility. It must have been designed and studied with the body of the car, to be so thoroughly a part of it. We see that it carries the streamline gently along also. It is not a blatant contrivance, all braces and angles, shouting to all the world that it is a top. It is a modest, graceful exemplification of how a master-designer can coax beauty into such materials.

Interior of Driver's Compartment "4-45" Touring Car



4-45 Touring

And we find that the same thoroughness which drew its lines has had a hand in its mechanical construction — in the development of its operation. One person handles it — puts it up or lowers it. And the experienced motorist is apt to say that not the least of its beauty is the fact that he can put it down as easily and readily as he can raise it.

Of the technical side of the latest White we need say little here. The man who goes through the White Factories, who sees the creation of the car from the ingots of steel and the sheets of aluminum, who observes even with the eye of a layman the precise care and watchfulness in every room and at every machine, gets a fresher view and a newer insight into what is meant by really manufacturing a motor car.

He learns then, if he never has known before, the basis of White quality. He gets a thought of why and how the White organization could produce this latest car, with its beauty of lines to match its mechanical integrity.

Even without this finally-perfect streamline body to hold his eye and send him fumbling through the chambers of his brain for adulatory adjectives he would be enthusiastic over the mechanical construction of the car itself.

And he would learn the secret of White leadership — patience, thoroughness and work. It seems to be a principle with the White organization never to bring out anything until time and use have tested and proven it to be fundamentally correct. Nothing is offered to the public until the men who *know* have pronounced it worthy of the White name.

So these latest White Cars show the combined work and prolonged, faithful study of a group. Expert designers, mechanical experts, metallurgical authorities, trained production men, field men in touch with the trend of public desire — all these have had their part.

And now, when it is all complete, when no detail is lacking, when nothing is untried or unproven, when every need is met, it is presented — a complete car — The Car of Forethought, not of Afterthought.

So we may step back again and enjoy another contemplation of this production which will be the last word in motor cars for a long, long while, and say, as we said in the beginning:

"We stand before *a motor car.*"

EQUIPMENT AND PRICES

ALL of the new White models are fully equipped. The touring models are fitted with the White Monotop, an improved type of one-man top that can be lowered by one person as easily as it is raised. The top is covered with English Burbank, with boot of the same material, and the side-curtains are of the quick-acting type, fastened within the top. The windshield is of special design, without filler-board, the glass being cut to conform to the arch of the body, and is of the rain-vision, ventilating type, with concealed joints. The equipment also includes a speedometer, set flush with the dash, trunk rack, tire holders, license brackets, concealed electric warning signal, full complement of lights with extension lamp, and power tire pump.

TIRES

The new cars are equipped with Silvertown cord tires. The tire sizes are — 32 x 4 inches on the "30," 36 x 4½ inches on the "45" and 37 x 5 inches on the "Six."

WHEELBASE

The wheelbase of the "30" has been lengthened five inches, and is now 115 inches; the "45" has a wheelbase of 132¾ inches, or 8¾ inches longer than the previous model, and the "Six" wheelbase is 140¾ inches, which is 8¾ inches longer than formerly.

COLORS

Five color options are offered as standard for the new series, allowing a wide range of choice for the expression of personal taste. These colors are "White" special maroon, "White" special gray (satin finish), "Cleveland" gray, Brewster green and Cobalt blue.

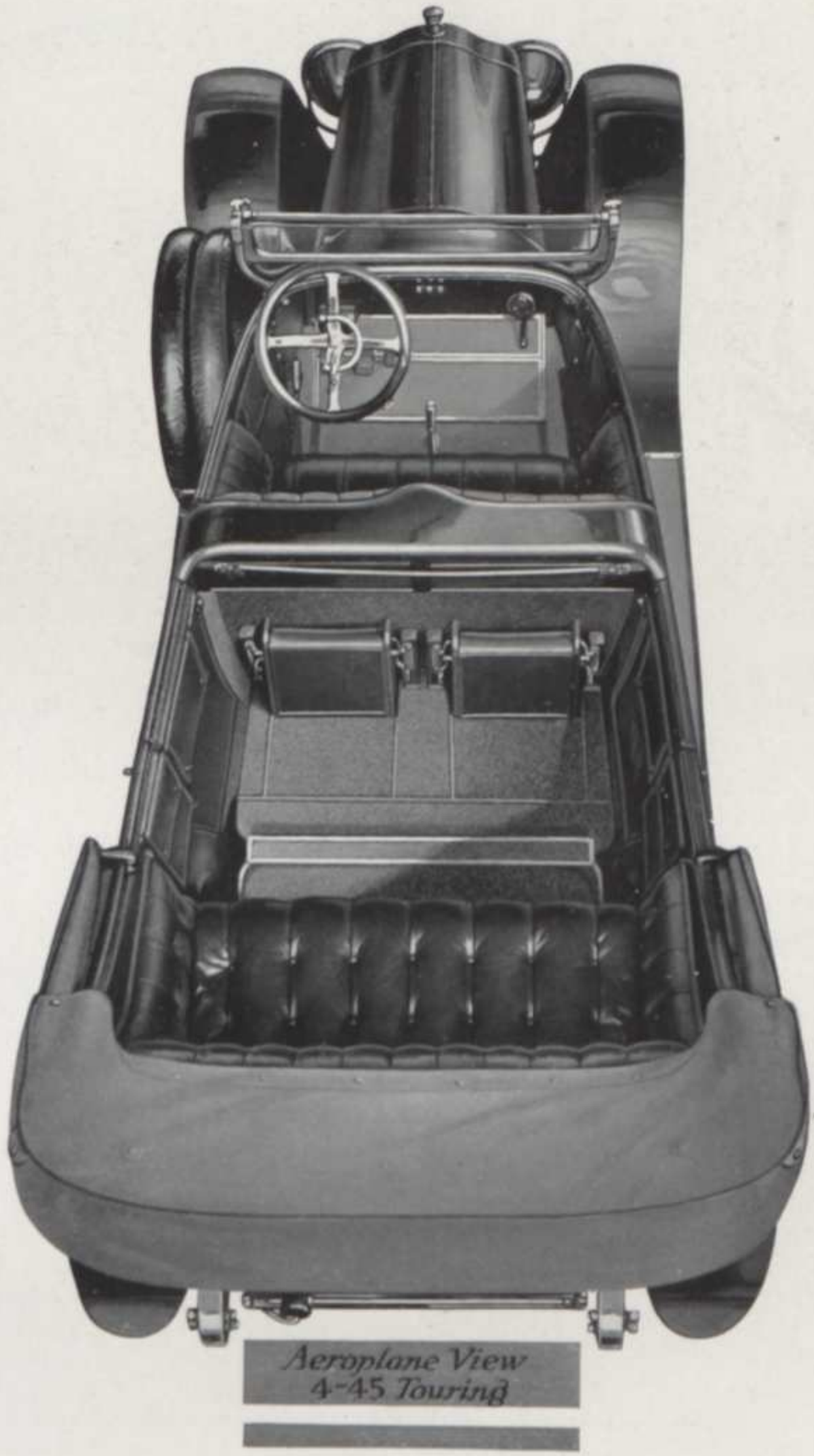
PRICES

The prices of the new models are as follows:

"4-30" Touring Car	$2700.00
"4-30" Roadster	2700.00
"4-30" Town Car	4200.00
"4-30" Sedan	4200.00
"4-45" Touring Car	3800.00
"4-45" Landaulet-Limousine	5200.00
"4-45" Limousine	5200.00
"4-45" Semi-Touring	5400.00

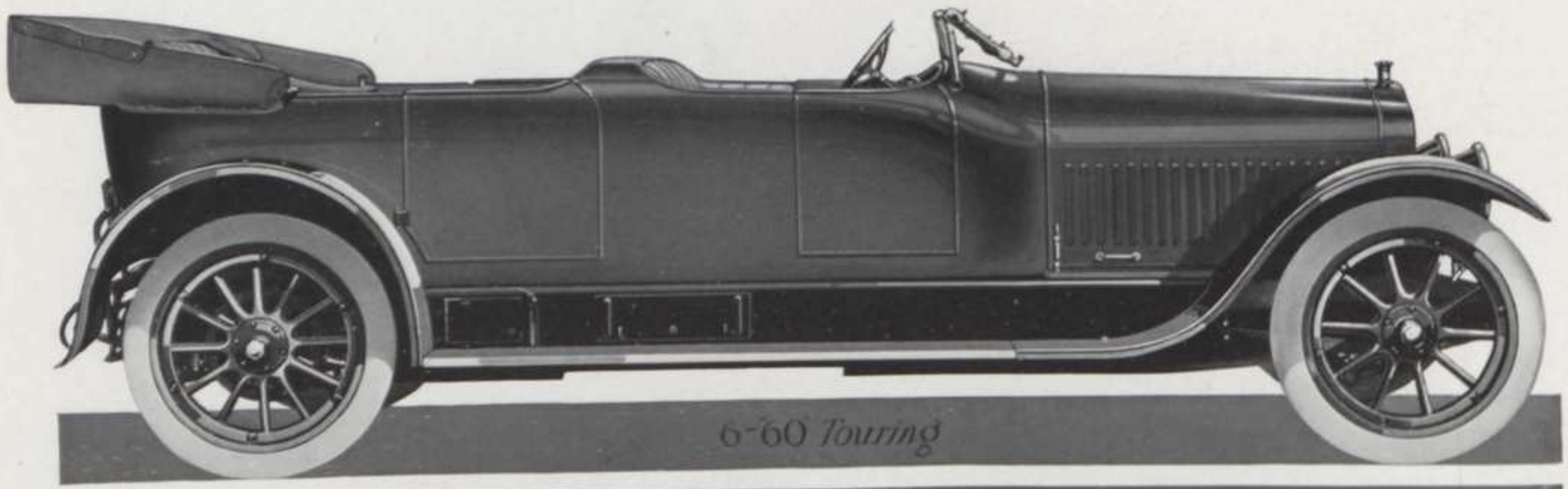
The "6-60" models are built to order only. The prices of the custom-built "6-60" models will be furnished upon request. The price of the "6-60" seven-passenger touring car, with standard body and equipment, is $5500.00.

All prices F. O. B. Cleveland.



Aeroplane View
4-45 Touring

This view shows the interior plan of the seven-passenger Touring models. Note how the extra seats fold completely out of the way when not in use—a simple lift brings them into position when needed.



6-60 Touring

THE NEW WHITE ENCLOSED CARS

THEY ARE EXAMPLES OF THE HIGHEST ART IN COACH BUILDING—REVELATIONS OF THE POSSIBILITIES FOR COMFORT AND LUXURY IN MOTOR CARS

THE five types of White Enclosed Cars will set an exclusive standard for style, elegance and unusual refinements of design and new features. These cars would dominate a convention of the finest cars that could be produced by the makers of the world. The Town Car and Sedan types will be furnished on the "4-30" chassis; the Limousine, Landaulet-Limousine, and Semi-Touring types on the "4-45" and "6-60" chassis.

Just as these cars are distinctive in exterior design so are they unusually elegant and well appointed in the interior. Our designers have procured many unusual fabrics for the upholstery and are able to advise a selection which will express individuality in accordance with the owners' tastes.

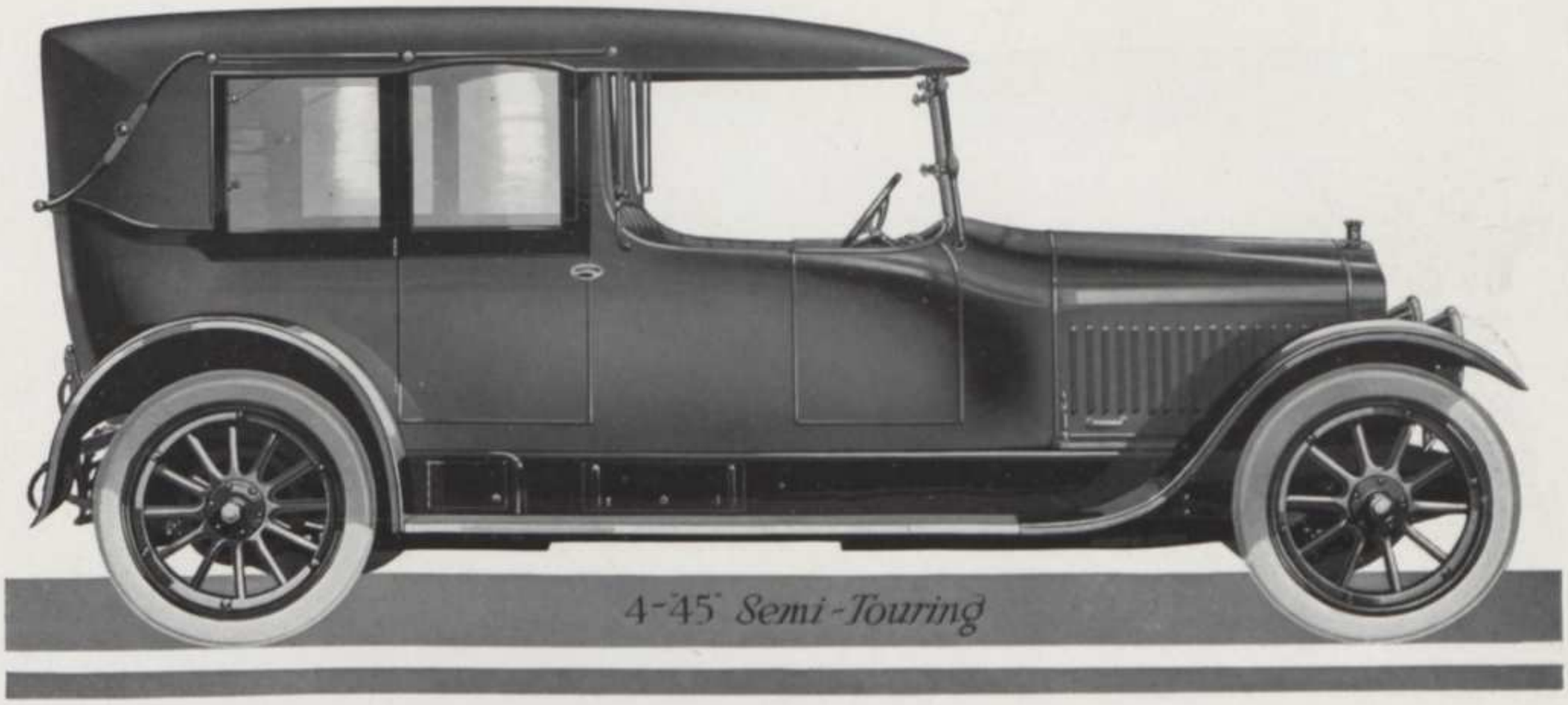
Instead of the usual elaborate use of cloth and braid for decorating the interiors, the upholstery is tastefully plain and elegant, jeweled with beautifully inlaid mahogany panel work in the doors and across the front of the passengers' compartment.

One would expect to find exquisite fittings in these cars and yet there is a surprise even here, for such beautiful and well selected fittings have never before been provided as part of the car. Such things as pretty cloisonne toilet articles in cases of polished mahogany, daintily inlaid and lined with soft ecrase leather; a high grade clock in a leather case with lock and key; telephone for instructing the driver; and in the Town Car, a small hammock to carry purchases during shopping trips, are some of the things which will especially appeal to women users. Men will find comfort in a smoking set consisting of an ash tray, match safe and electric cigar lighter.

The windows may be raised and lowered with almost no effort by simply turning a silver handle. The glass moves up or down smoothly and noiselessly. All of the cars are well lighted and the dome lights in the ceiling operate by an electric spring so that when the door is opened the interior is brightly lighted.

THE SEMI-TOURING CAR

The Semi-Touring Car is capable of almost magical transformation. Although it has the semblance of a closed body it needs only the lowering of the top to convert the seeming landaulet body into an open seven-passenger touring car. The top is made of Landau leather and is lined with the same material as is used in trimming the interior of the body. In this convertible car it is practical to use the same upholstery as in the regular types of closed cars. An original feature of the design is the concealed patent-frame window which, from the outside, gives the appearance of a frameless window.



4-45 Semi-Touring

The operation of opening the body is very simple. After lowering the windows into their pockets, the top is folded back in the same manner as the top of a touring car. This convertibility gives the owner two cars in one, and as a closed car it has the further advantage of light weight.

THE LIMOUSINE AND LANDAULET LIMOUSINE

The Limousine and Landaulet-Limousine have seating capacity for seven persons. The interior arrangement and appointments of the Limousine are identical with those of the Landaulet-Limousine. Whereas the former is strictly an enclosed car, the Landaulet-Limousine may be used either as an open or enclosed car. It makes a splendid appearance and is beautifully appointed. At first sight the extremely large windows lead one to mistake it for a Limousine but a closer inspection discloses the fact that the upper rear panel, from the quarter windows back, is made of smoothly fitting landau leather.

There are two indiscernable breaks in the roof of the body. When unfastened from the interior, the rear leather portion drops back while the part directly over the quarter window slides over on the front of the roof. This is much more satisfactory than the old clumsy way of folding back the entire landau roof. In addition, this design allows larger windows and eliminates the use of iron work on the exterior of the body. It is not necessary to tug or pull at a joint in order to drop the roof. By merely unfastening two nickel catches in the ceiling of the car the rear part of the roof may be folded back into position.

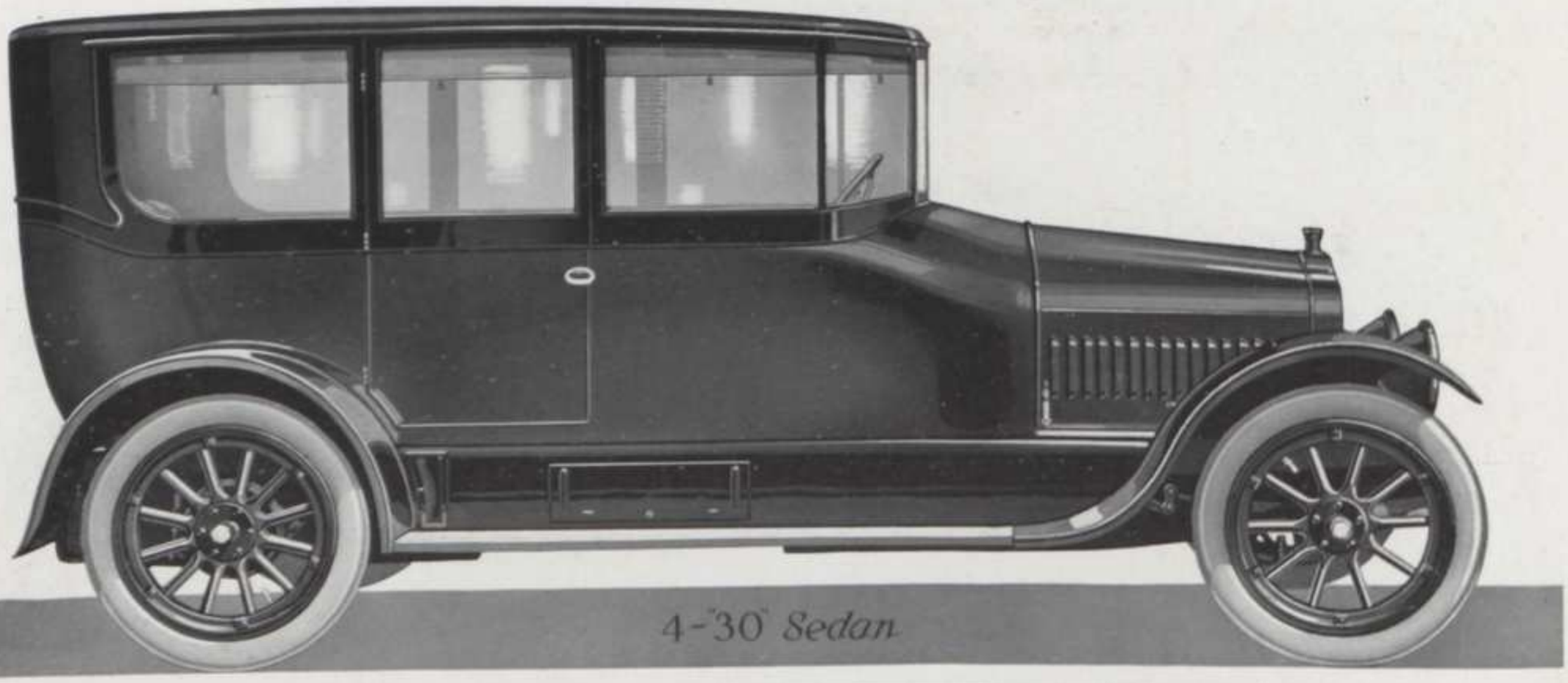
Equally as comfortable as any touring car seat is the chauffeur's seat. It is of very soft black leather of the finest hand-buffed quality, with generous parallel tufting. The windshield in front of the driver is in two parts. It affords a perfectly clear vision and is supported so strongly that it cannot rattle.

THE TOWN CAR

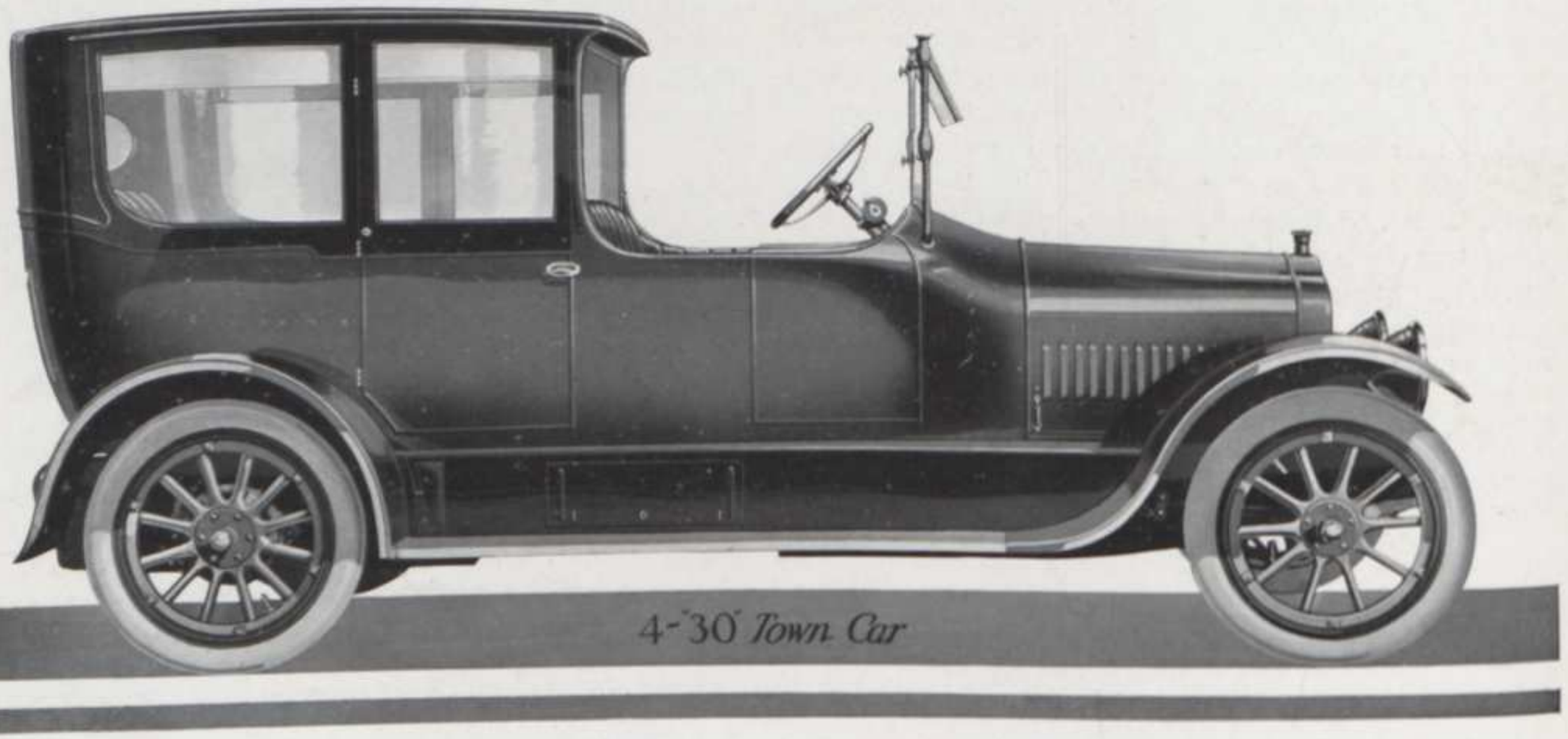
The Town Car is a moderate sized car of fashionable design, well adapted for every requirement of town service. There are four inside seats, two of which fold out of the way into a small alcove beneath a mahogany panel on the front wall. A feature of the exterior design is an extension roof which reaches forward as far as the top of the windshield. This extension, which is quickly detachable, is not only a protection to the driver during inclement weather but it permits of a decided change in the appearance of the car.

THE SEDAN

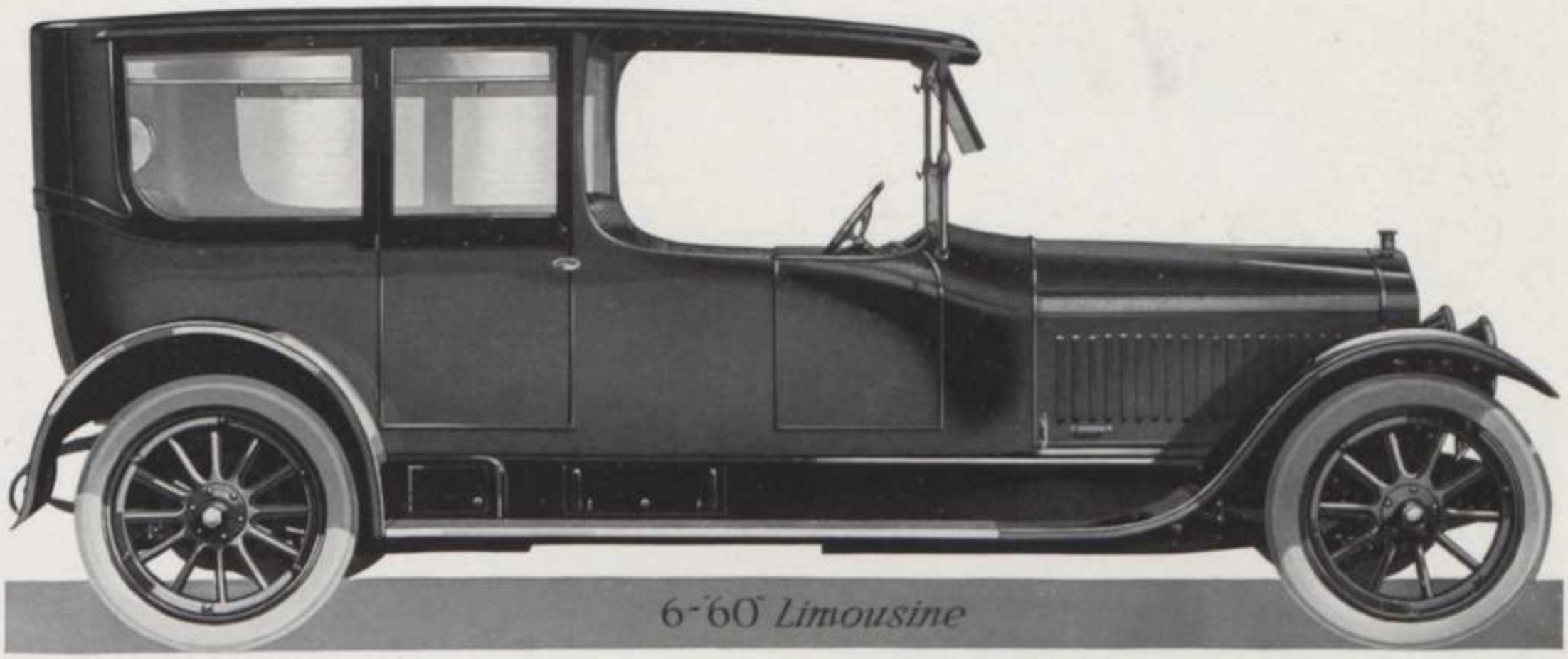
The Sedan is a very convenient enclosed car designed for broad utility. It is built for four passengers. Two are seated in a comfortable seat across the rear of the car, and there are two separate deep-cushioned chair seats for the driver and passenger in the forward part of the car. The door is located in the center of the body. While it is a perfect closed car the Sedan is ideal for business purposes when protection from the weather is needed. The interior being in a single compartment, a chauffeur is not required.



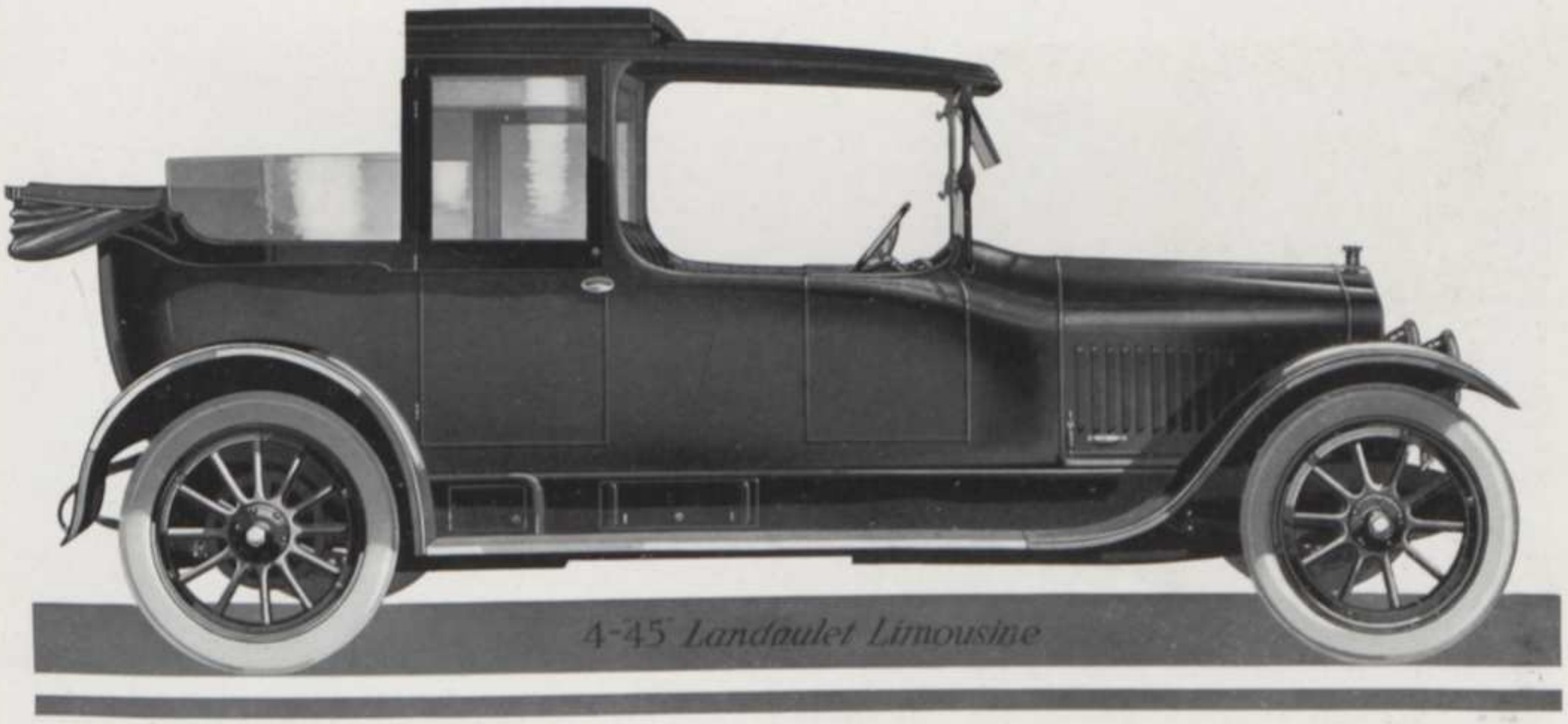
4-30 Sedan



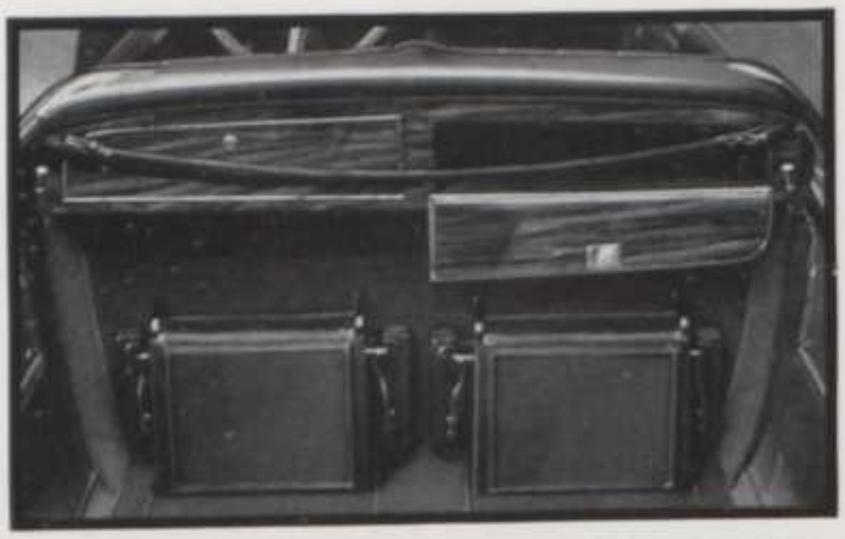
4-30 Town Car



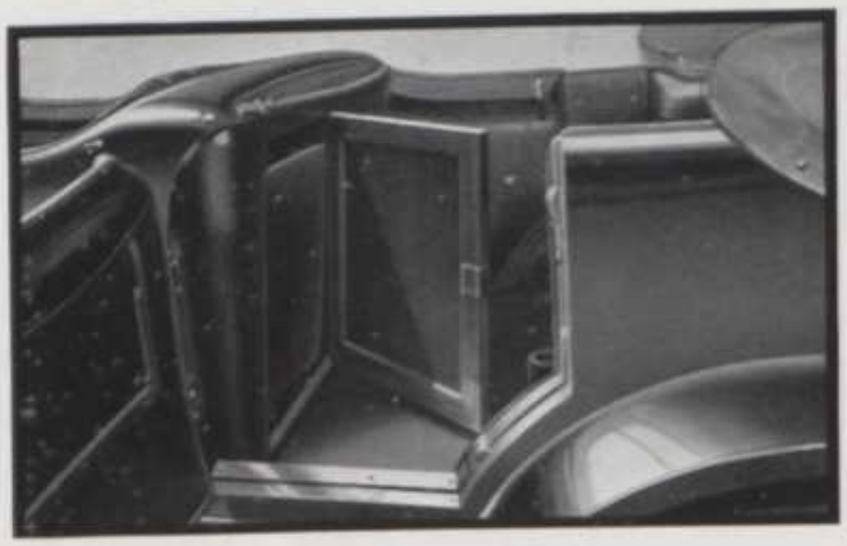
6-60 *Limousine*



4-45 *Landaulet Limousine*

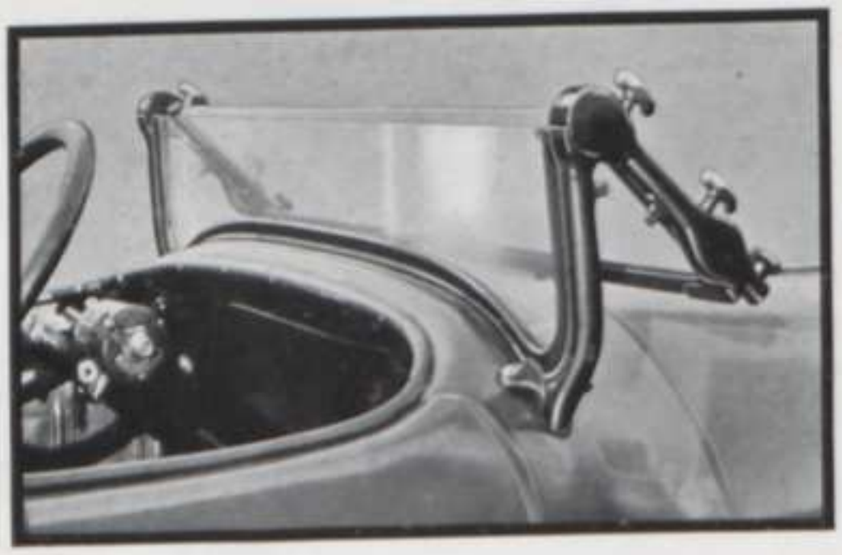


Compartments in center cowl "4-45" Touring Car



The extra seat is carried in one of the compartments in the center cowl "4-30" Touring Car

Unified control



Concealed-joint Windshield

UNUSUAL FEATURES

TWO SEPARATE COWLS

¶ The new design is featured by two separate cowls, and is entirely devoid of all angles, or even sharp curves. There is not a single straight line in the entire body. The top line of the hood and the upper line of the body are pleasingly merged in the front cowl in a gentle curve, and even the backs of the front seats, always awkward in appearance, are gracefully absorbed in the second cowl.

CONCEALED-JOINT WIND SHIELD

¶ The windshield is of special design, without filler-board, the glass curving to conform to the body, and is of the rain-vision, ventilating type, with concealed joints. It tilts slightly toward the rear, carrying out the sweeping appearance of the body lines.

LOW FRAME HEIGHT

¶ On the "Forty-five" and "Sixty" models, the chassis frame is dropped and the rear springs are underslung, giving a top-of-frame height on all three models of slightly less than twenty-five inches, which makes the new Whites among the lowest cars in frame height built in America. No sacrifice of road clearance has been made, however, in thus lowering the cars; the clearance of ten inches remaining the same as in previous models.

THE TONNEAU CHAIRS

¶ The problem of what to do with the extra tonneau seats when not in use has been solved in the new White models. These seats fold partly into the floor and partly into an alcove under the center cowl so that they are as completely out of the way as if they were not there. A slight pull will unfold and place them in their proper position, and a slight push folds them completely into the recess designed to receive them.

THE UPHOLSTERY

¶ The upholstery introduces a new standard for depth, treatment and materials. The seat-cushions of the "Thirty" are twelve inches deep, and in the "Forty-five" and "Sixty" are fourteen inches. Instead of the customary diamond-shaped, or criss-crossed tufting, the White cushions are built up in parallel tufts which make them more yielding and add to the symmetry of lines within the body. The leather is an exclusive long-grain pattern used in White Cars only.

VACUUM GASOLINE FEED

¶ One of the noticeable changes in the chassis of the new models is the use of a vacuum feed system of gasoline supply, whereby the gasoline tank is carried at the rear of the chassis instead of under the front seat, as was the case in previous models in which gravity feed was employed. The vacuum feed system is, however, fully as simple as the gravity feed, as no pressure is needed to force the gasoline to the carburetor, and it has the added advantage of being in a more convenient location for filling the tank.

CROWN AND BEAD FENDERS

¶ The harmony of the lines in the new Whites embraces the fenders as well as the body, top and windshield. They combine in a new design the beauty of the crowned surface with the strength of the beaded edge. The fenders are unusually large, being thirteen inches wide on the "Forty-five" and "Sixty," and twelve inches wide on the "Thirty." The crown is two and one-half inches. They are carried on improved supports of great strength and finished so that no rivets are visible.

TOLD IN PARAGRAPHS

UNIFIED CONTROL

¶ The starting and lighting switches are contained in a small, compact cylinder, mounted just below the steering wheel, on the upper side of the steering post, so that the driver can reach them without leaning forward. The electric signal button is located on top of the steering post, above the wheel.

CLEAN DASH

¶ The dash is absolutely clean except for the sight-feed glasses of the oiling system, the speedometer, which is flush with the dash, and the tell-tale for the starting and lighting battery. This arrangement does away with the complicated-looking instrument boards which are used on so many cars.

FRENCH WALNUT WOODWORK

¶ All surfaces inside of the body in the touring models are upholstered or leather-lined except the dash, door mouldings and the compartments beneath the center cowl which are of beautifully grained French walnut. No upholstery appears above the top line of the body, so that the finely finished edges of the body are left uncovered, revealing the cunning work of the body craftsman.

CHASSIS WIRING

¶ One of the difficult things accomplished in the new cars is the designing of all wires and conduits as part of the chassis, making it possible to remove the body as a unit without disturbing any of the electrical connections, oil sight-feed pipes and other attachments. Even in the limousines and other enclosed cars all body wiring leads to a junction box near the frame, and a few simple connections are all that are disturbed when removing a body.

TOOL BOXES

¶ Tool boxes with water-tight doors are built into the apron between the running board and the body, one on each side of the car. This location leaves the running board free and unobstructed.

WHITE MONOTOP

¶ The White Monotop can easily be put up or down by one man and besides being practical it is good looking. It seems to grow out of the body and be part of the design. The material used is drab colored English Burbank. The top is supported by hand forged slat irons faced with wood instead of the old style sockets and bows.

WHITE SPRING DESIGN

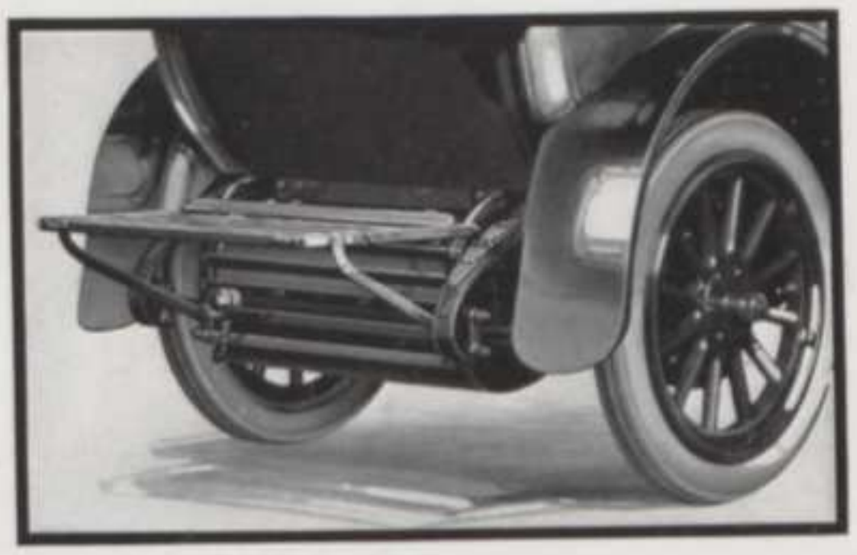
¶ Instead of the common practise of tapering the spring leaves from the center, each spring leaf is of uniform thickness so that, under load, the spring deflects into a straight line, and absorbs road shock with smoother action than any other type.

SHORT TURNING RADIUS

¶ The steering apparatus is cleverly designed to permit an unusually small turning radius. The turning radius, to the left, in the "4-45" is 26 feet 9 inches and in the "4-30" is 22 feet 6 inches. The turning radius to the right is even shorter. Both steering rods have ball and socket joints which make steering easy.

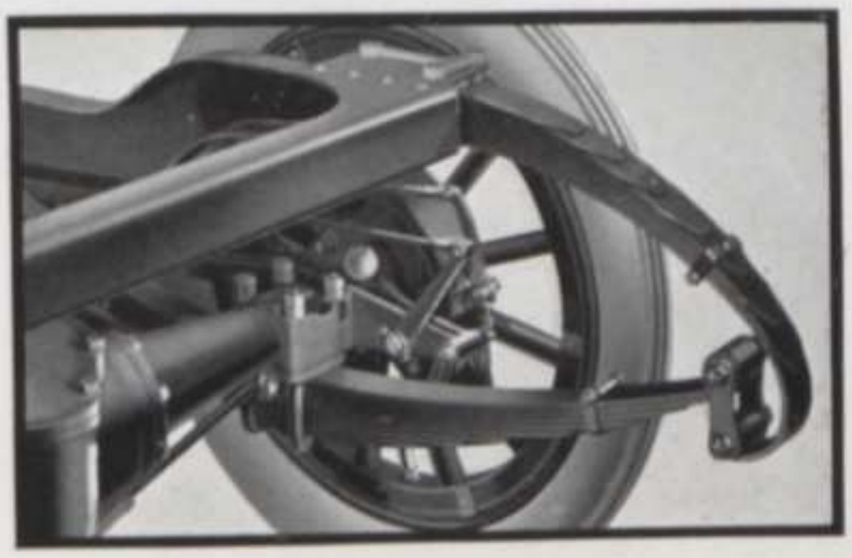
TRUNK RACK

¶ In the rear of the body is a strong trunk rack which can be opened or folded with one movement, a simple pull or push. When folded the rack is held in place by a spring catch. The rack is supported by the gasoline tank protecting guard, another detail of White construction that is deserving of more than casual comment.

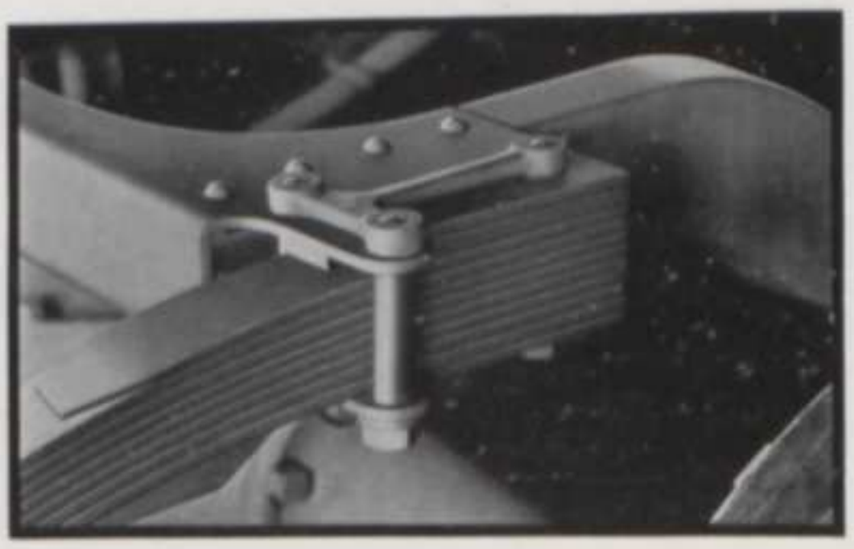


Single-fold truck rack

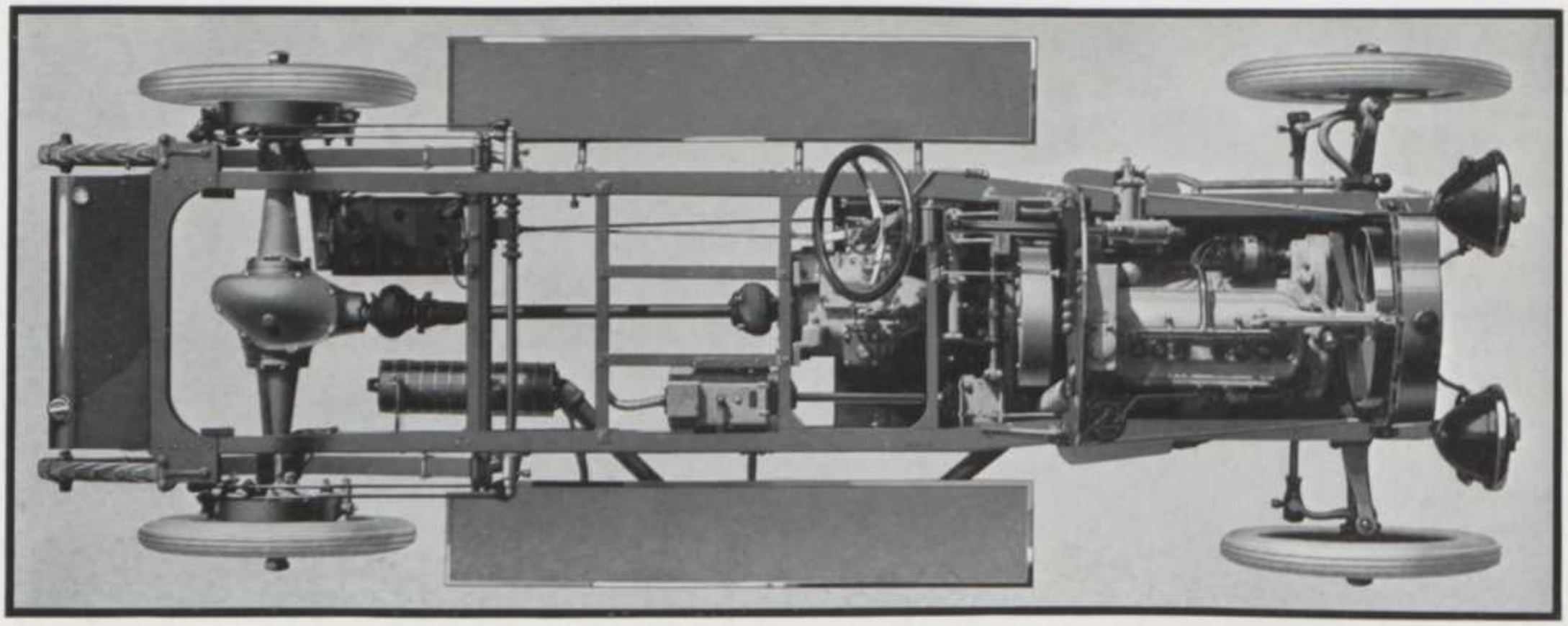
Concealed tool-box



Underslung rear spring construction



Spring hanging device, special White design



THE ANATOMY OF WHITE CHASSIS

A BRIEF DESCRIPTION OF THE SIMPLE DESIGN AND SUBSTANTIAL CONSTRUCTION OF WHITE CHASSIS —REASONS BEHIND THE WHITE REPUTATION FOR DURABILITY, EFFICIENCY AND ECONOMY

MECHANICAL leadership has been a White attribute for years. We have changed the proven mechanism of the White Chassis but little, because the opportunity was limited. The three chassis sizes as described here are uniform in design and differ only in the size and strength of the parts.

ENGINE: The long-stroke monobloc motor is continued in White Cars for the sixth season, without radical change. In the "4-30" engine the bore is 3¾ inches and the stroke is 5⅛ inches. The "4-45" engine has a bore of 4¼ inches and a stroke of 6⅜ inches, and the dimensions of the "6-60" are 4¼ x 5¾ inches.

The cylinders are cast in one block with the intake, exhaust and water passages as well as the manifolds, included in the cylinder casting. The incoming gases are heated by their proximity to the exhaust passages and the exhaust gases are cooled by contact with the manifold or incoming fresh gas. Each function therefore operates to the advantage of the other.

The valves are mechanically operated and interchangeable. The valve lifters are adjustable and are operated by a cam-shaft that is entirely enclosed within the crank case. The valve springs and stems are entirely enclosed to keep out dirt and grit.

MOTOR COOLING: The White cooling system is extremely efficient. The water jackets are unusually large and the radiator is designed to give the greatest amount of cooling surface. The possibility of strain upon the radiator is eliminated by a special form of mounting and a new design of brace. The fan is mounted on ball bearings and has an eccentric bushing which can be adjusted to increase or decrease the tension of the belt. The water is circulated by a gear-driven centrifugal pump.

CRANK CASE: The crank case is made of special aluminum alloy. It is hung by three-point suspension on the frame. In the upper part are carried all working parts of the motor, the lower part forming an oil well. A removable section in the lower part gives perfect access for inspection or adjustment of connecting rods. The timing gears are of the helical type, giving a smooth and quiet engagement. The crank shaft is forged from heat-treated nickel steel alloy and is of unusually heavy design. In the "6-60" and "4-45" motors there are three main bearings, one in the center and one at each end, while in the "4-30" there are two. End bearings in all White Motors are annular ball bearings and the center bearings are plain.

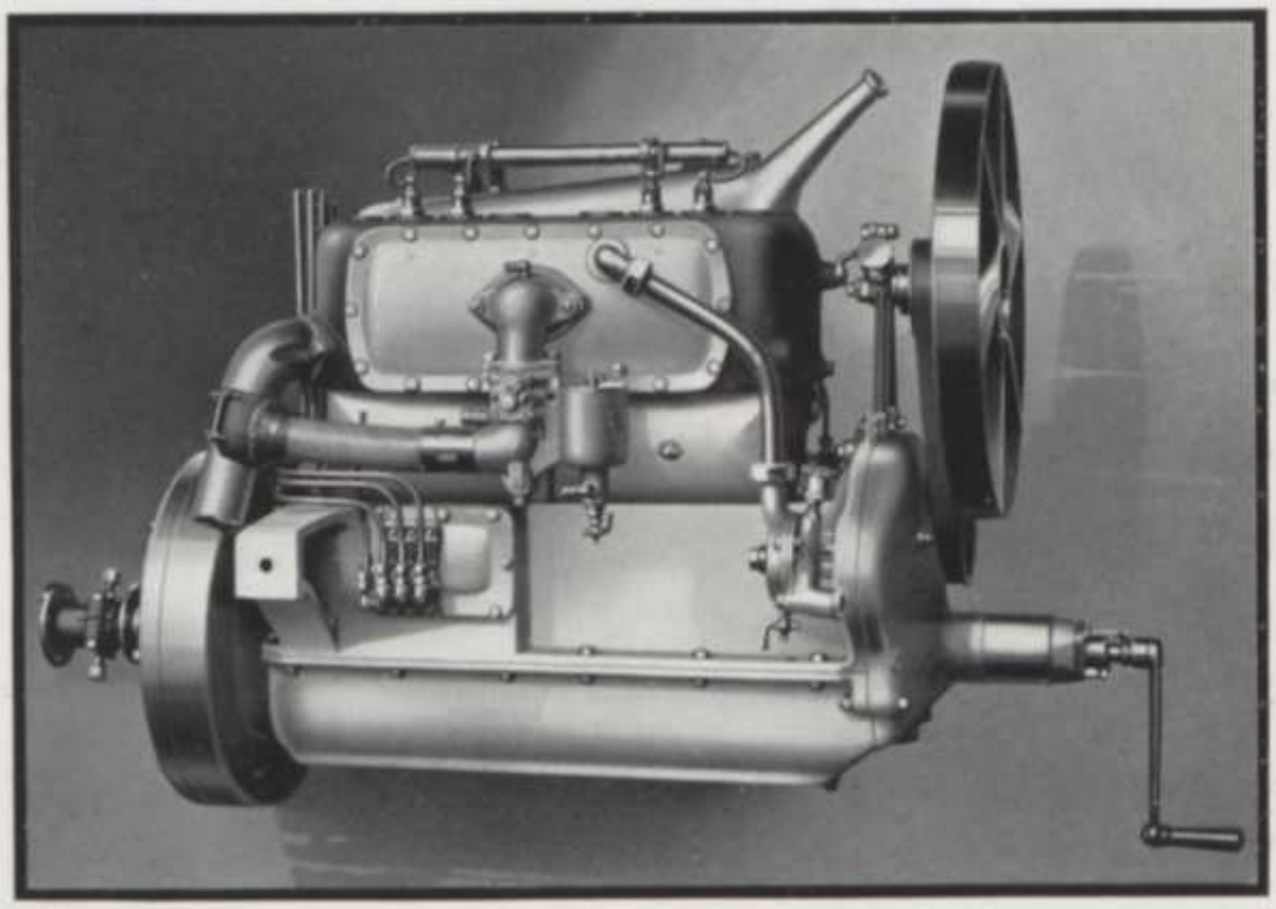
LUBRICATION: Oil is fed by a gear-driven pump to all crank shaft and connecting rod bearings. Proper lubrication of the motor is assured at all times and is never dependent upon the amount of oil in the crank case. Splash lubrication is also retained as an additional factor of safety. In addition to the direct feed to each main bearing, each connecting rod bearing is also lubricated by means of oil-ways drilled through the crank shaft.

Provision is made to insure an abundance of lubrication for the cam-shaft bearings and for the gears driving the cam-shaft, water pump and magneto. The oil reservoir is mounted on the dash under the bonnet and is fitted with a glass gauge to show the level of oil. The oil pump is located on the right side of the motor and is driven by gear from the cam-shaft. The oil passes from

the pump to a sight-feed indicator on the dash and is then fed to the main bearings. A simple means of adjusting the flow is provided at the pump.

IGNITION: The single ignition system on White Cars has been a great source of satisfaction to owners because of its extreme simplicity. A Bosch high-tension magneto is used, mounted on the left side of the engine and driven by a shaft operated from the timing gear case.

CARBURETOR: The carburetor is a special White design of the aspirating type. It has a graduated air valve which automatically supplies the correct mixture of fuel at all motor speeds. In order that warm air may be sucked in by the carburetor it is connected with a "stove" on the exhaust pipe. The carburetor is mounted high up on the side of the engine where it is quickly accessible for adjustment and cleaning if needed. It is so close to the water-jackets that the warmth of the circulating system aids in vaporizing the fuel, without using a special jacket.



Right Side of "4-45" Engine

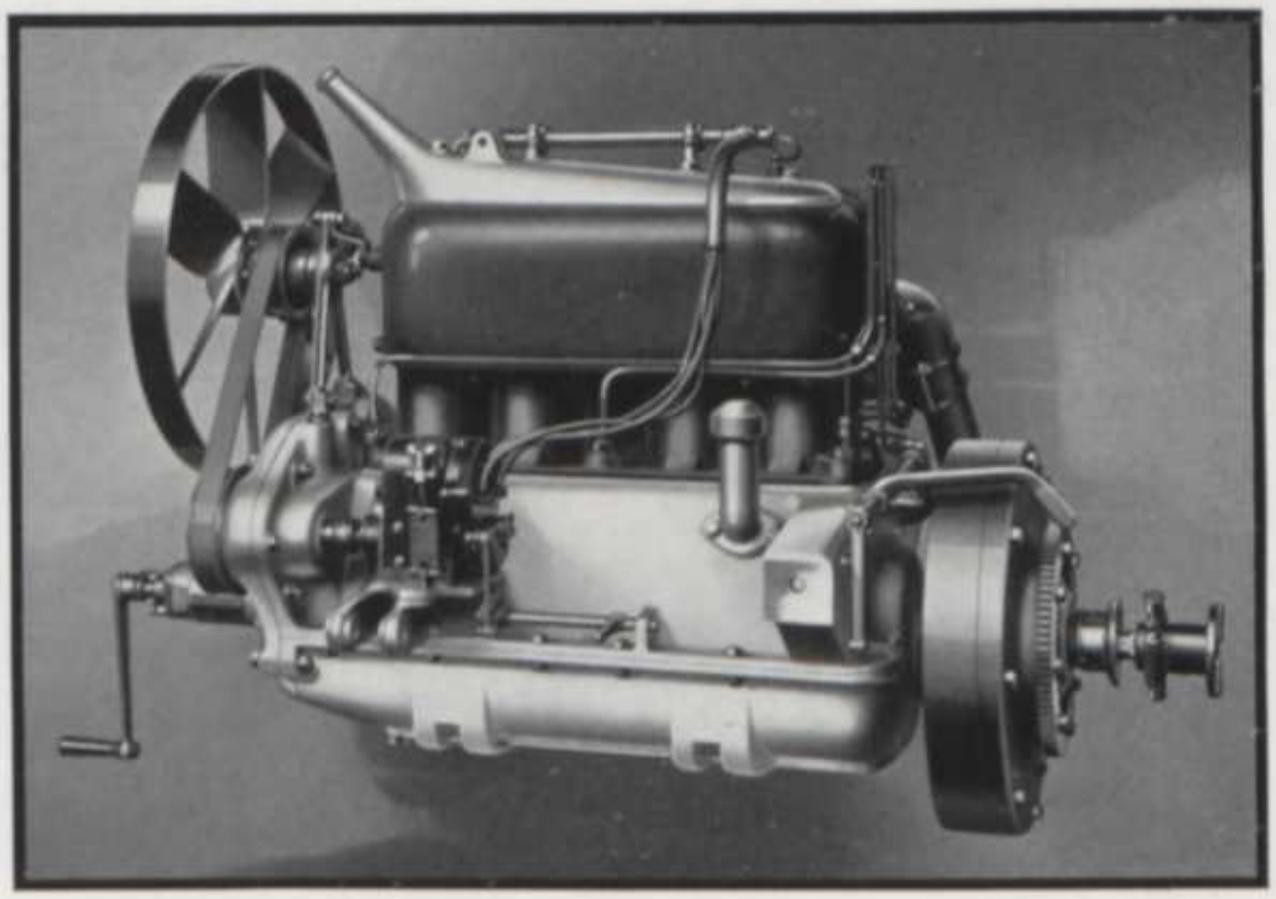
The throttle of the carburetor and the spark advance on the magneto are controlled by levers mounted above the steering wheel, but the throttle may also be operated by an accelerator pedal.

CLUTCH: The clutch is a single plate type of special White design. It runs in oil and operates with the utmost smoothness, permitting an easy, gradual engagement. The clutch plate is encased within the fly-wheel and is protected from all dirt, etc. To render gear shifting as easy as possible, there is a new clutch release and a new design of clutch brake acting upon a drum on the clutch shaft.

TRANSMISSION: No changes have been made in the White four-speed transmission. The gears are contained within a case which also forms an oil well. The case has a cover plate which is easily removed, giving ready access to all parts. The gears are made of heat-treated chrome alloy steel and the case in which they are contained is located immediately behind the clutch (amidships), and supported on cross members of the frame by three-point suspension. All gear shafts have annular ball bearings. Direct drive is effected when the control lever is in the fourth speed position on the "4-45" and "6-60." In the "4-30" third speed is direct drive. The cover plate of the transmission embodies a power tire pump which is driven from a gear in the transmission and operated by a small lever on the heel-board.

DRIVE: From the transmission to the rear axle the drive is accomplished by a propeller shaft having two universal and one telescopic joints. The universals are packed in grease and encased in heavy leather boots.

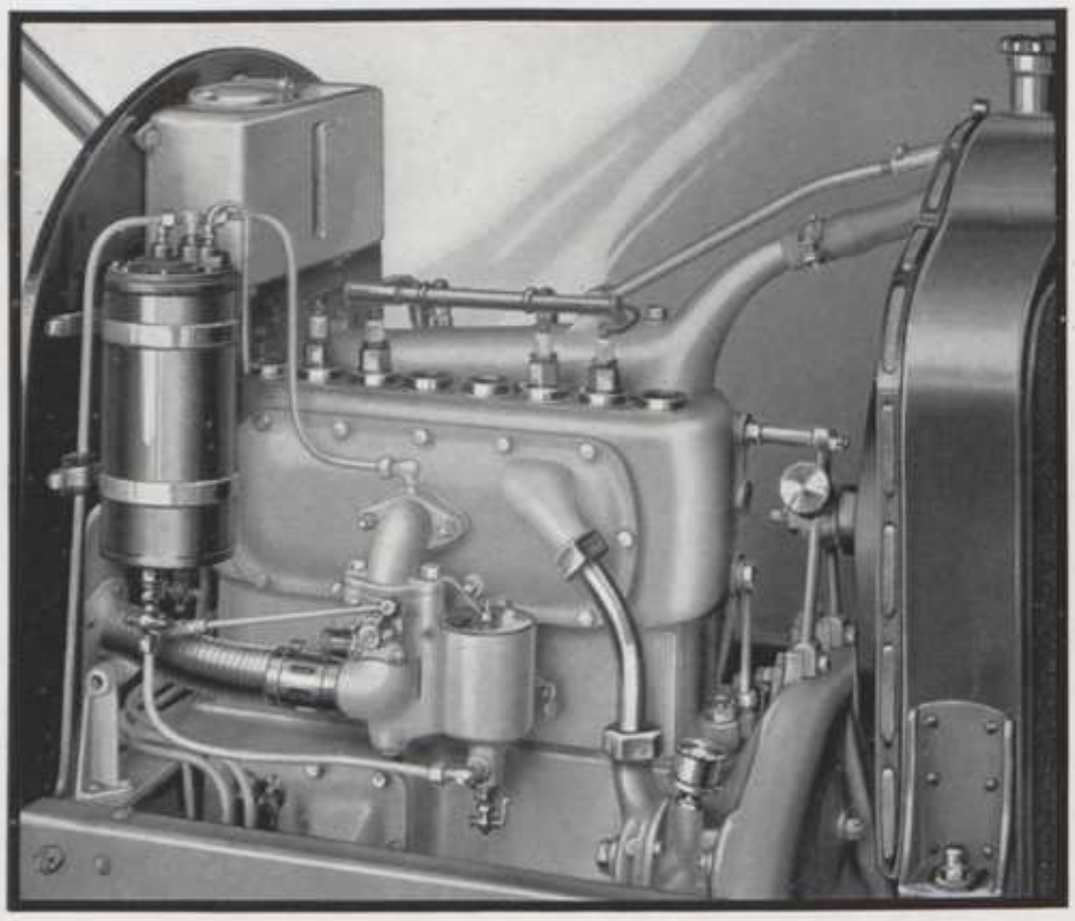
BRAKES: Unusually powerful brakes are provided on all models. They are extremely simple in both operation and adjustment. There are two brakes on each rear wheel, acting on wide drums of large diameter. The service brakes are of the external contracting type, fibre-lined and operated by a pedal. Emergency brakes are internal expanding, metal-to-metal, and are operated by a hand-lever. Both sets of brakes are built with improved equalizers to assure equal braking action on each drum.



Left Side of "4-45" Engine

AXLES: The front axle is a one-piece drop forging of I-beam section. It is made of high carbon steel, heat-treated. The front springs are semi-elliptic; the rear springs are ¾ elliptic. In the "4-45" and "6-60" the rear springs are underslung and in the "4-30" they are mounted above the axle. Artillery type of wheels are used, with annular bearings. The rims are quick detachable and demountable.

The rear axle is a special White design. A heavy truss, extending from end to end of the axle sleeves, supports both sleeves and the differential housing as well. All gears are accessible through a cover plate on top of the housing. The live axles are of chrome vanadium steel, heat-treated. A feature of the White rear construction is the design of the brake-band supporting arms as an integral part of the axle sleeves. Rear springs are carried on platforms which are also an integral part of the axle sleeves.



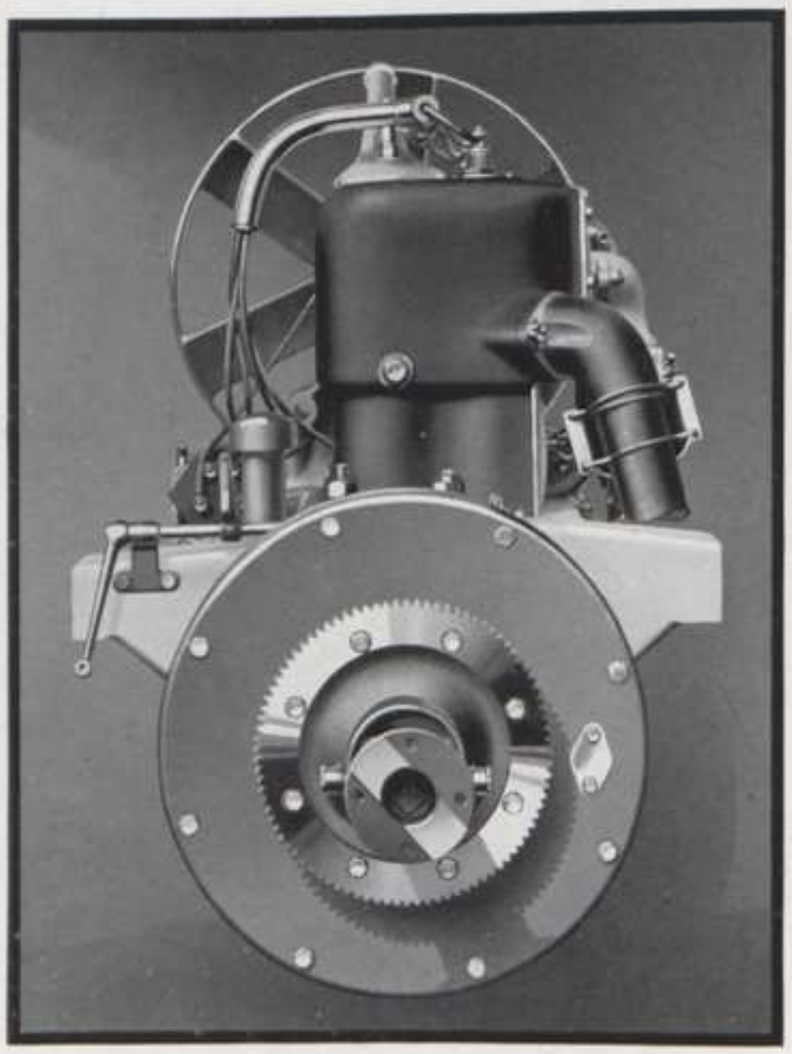
"4-30" Engine in the Chassis

STEERING: Steering gears on all models are of the worm and sector type, fitted with ball and thrust bearings. The gear is irreversible so that road shocks and slight deflections of the front wheels are not conveyed to the steering wheel. Simple adjustments are provided for taking up wear. The sector bearing has an eccentric bronze bushing which can be adjusted to take up wear in the worm.

STARTING AND LIGHTING: One of the interesting improvements is the location of the electric starting and lighting generator. It is mounted on a platform hung from the frame on the right side, a little back of the center of the car. The generator is coupled to a shaft extending forward to a point opposite the fly-wheel. The front end of the shaft is coupled to a friction clutch and the spinning of the engine is effected by silent chain drive from the friction clutch to the fly-wheel. The fly-wheel sprocket is not attached to the periphery of the fly-wheel but upon a fly-wheel casement which encloses the clutch.

The White Electrical Starting and Lighting System exceeds in efficiency and simplicity all other systems. It was designed for White Cars and not made to be applied indiscriminately to cars of every description. The starting system is entirely separate from the ignition system. Both functions of starting and lighting are performed by one mechanism, a motor-generator, which has but one moving part. Being permanently geared to the engine it requires no change in gear reduction when operating as a motor for cranking the engine or when operating as a generator for charging the battery and supplying current for the lights.

UNIFIED CONTROL: The entire control is centered in a single switch on the steering column where it is always at the finger tip. When the switch is closed the starting system assumes its duties without any further attention on the part of the driver and without the assistance of any regulating devices.



Rear End of "4-45" Engine

Closing the switch connects a nine-cell battery and puts the starting motor in operation, thus starting the gasoline engine. As soon as the engine is turning over at a speed in excess of a few hundred revolutions per minute, the generator being of a slow speed type, its voltage exceeds that of the battery and the battery is therefore charged at all speeds above this point, at a definite governed rate. The storage battery is "floated" on the line in such a manner that the motor changes to a generator and back again to a motor according as the electrical pressure rises or falls above or below that of the battery.

MOTOR CANNOT STALL: At engine speeds above a certain point the starting mechanism is a generator and below that point it becomes a motor, so that should the engine slow up to a point where it ordinarily would stall, the starting motor will automatically "pick it up" and continue the crank shaft in motion without any attention on the part of the driver.

In the LAND of FINISHING TOUCHES

LITTLE VISITS TO THE WHITE FACTORY—CHAPTER III

RED, orange, yellow, green, blue, violet — I saw them all. Racy red runabouts, orange oil-tank trucks, gleaming yellow delivery wagons, business-like green taxicabs, somber dark blue ambulances, and a delicate violet-hued town car for milady's social duties. And speaking of milady, no social butterfly gives more lavish care to her peach-blow complexion or to the softness of her cheek than these White "finishers," armed with their "fillers," "primers," paints and varnishes, devote to the gleaming exteriors of their four-wheeled mechanical beauties.

To the lover of color — either bright, warm hues or soft tints, sudden contrasts or delicate harmonies, these great shops where White Cars receive their final dress are an ever-surprising joy. An unlettered savage would revel in the brilliance and glow of the richer, brighter pigments, the trained artist in the tints and subtler harmonies of body color and upholstery.

You and I who semi-occasionally take an amateur brush and can in hand and endeavor to palliate the dinginess of some battered floor or weather-beaten chair with a single hurried coat of charitable varnish-stain or all-hiding enamel, have as little conception of the care and skill of these men as perhaps the savage mentioned a moment ago. Even the hospitable splendor of your mahogany sideboard, owes its luster to a less painstaking foundation.

When the graceful body is turned over to the tender mercies of the White beauty-parlor, the long silvery shell of aluminum is as trim and smooth as the most expert of "tailors in metal" can make it. When it comes out from the first of the finishing processes, the sheen and sparkle of the aluminum is lost beneath a dull, lifeless coat of drab-colored lead, as somber as the fog-hued "battleship grey" which hides a navy in war-time.

"It's difficult to realize," commented the foreman, as we watched the metal disappear beneath the paint, "that underneath the high polish of the finished car is hidden so unpromising a foundation as this gray 'rough stuff,' and yet this rough coat is necessary to give a proper surface to which the later coats can adhere.

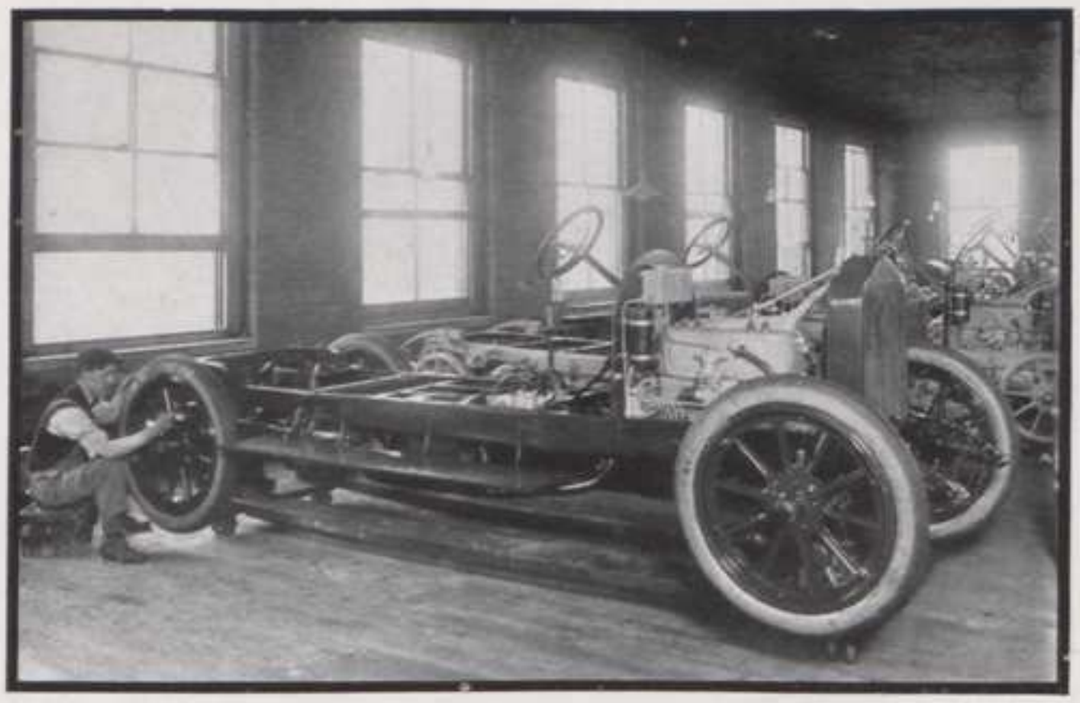
"That matter of adherence — of making the varnish coats cling tenaciously to the body beneath, is the big problem in every finishing room. Walk down any busy street and what do you see? Car after car on which the varnish is scaled away, or criss-crossed with fine hair-cracks, or dulled by exposure. We had the same trouble as the rest, back in the earlier years. We studied and sweated over it here and had varnish-makers the country over working their heads off, trying to solve the problem to our satisfaction.

"Then, suddenly, by a lucky experiment, we discovered the way out for ourselves right here in the plant. We tried the new process first on a few cars, and then, when it made good, we standardized it for all our cars. Today, of course, that improved process is one of the very important reasons why we can honestly make good on our "Keep Your Car" slogan. It's these next few coats that do the trick for us, and give a White finish, that decidedly unique ability to resist rain, sun, mud and grease."

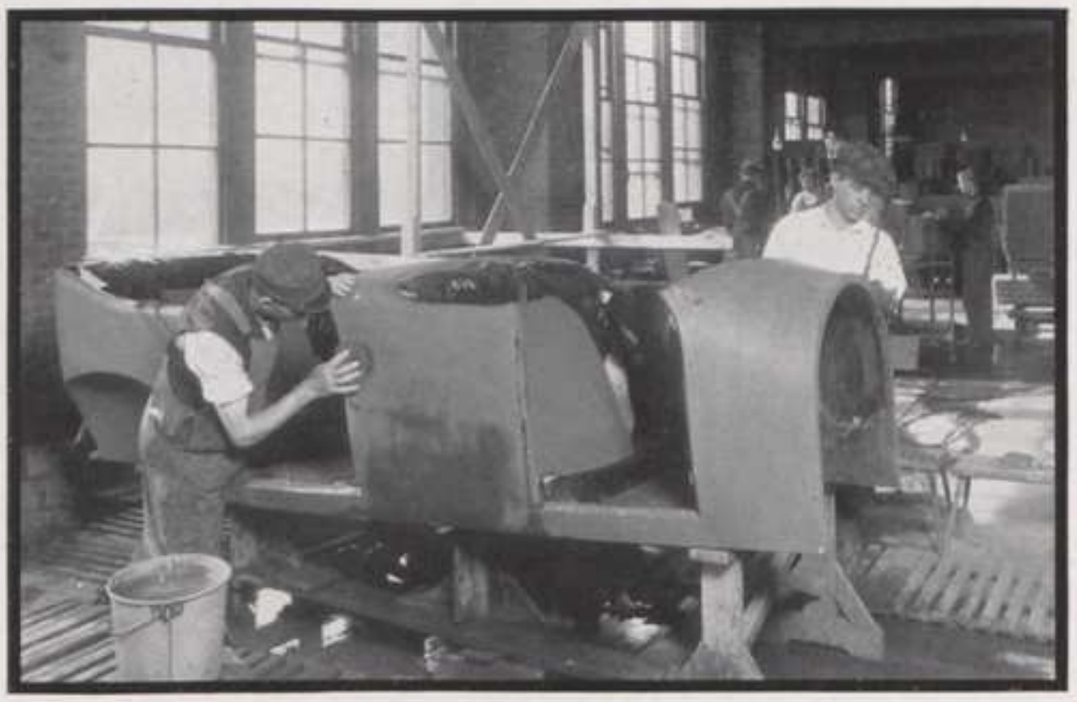
"Then what is this second coat?" I asked — "What gives it its stick-to-it-iveness?"

The foreman grinned quizzically. "If you knew how to mix titanium with steel — or if you knew Krupp's secrets — you could make a lot of money, couldn't you?" he replied. "I'm sorry," he continued, "but that's one of the few questions in the whole White Factory that we can't answer. That little trade secret is a mighty big asset to us, so we have to make an invariable rule not to tell anyone.

"You wont have to take it on faith, though," he added.



A chassis painter at work



Giving a body the 'rub-down'

"Ask any auto-refinisher if he gets as many Whites to refinish in the course of a year as he does of other makes — he can tell you."

Further down the room I caught the gleam of colors. "Here's the interesting part to visitors," my guide volunteered, "I never find anyone who doesn't enjoy watching the colors go on."

Our first glimpse of color was almost like a poster in its effect. Over a long-limbed chassis bent a busy painter, armed with a pliant brush, from which flowed a gleaming black coat. The whole chassis showed only three colors — jet black wheels, a gray frame and the silver flash of nickel fittings — all three thrown into splendid contrast by a blood-red work-tag that hung from the steering wheel.

Further on we came to a group of eight car bodies in the third stage of finishing. The gray rough-coat was hidden beneath the refined surface of those mysterious coats of which I had learned so much and yet so little.

Two of the cars were beginning to suggest their later beauty beneath a surface of deep maroon. Two were the green of late summer foliage. One was a long cylinder of jet. Near us stood a brilliant yellow runabout, and on the far side of the section, in silent disapproval, a feminine limousine of a soft plum-colored shade seemed to protest mutely at its vivid neighbor.

In this department a first, and later a second coat of rich pigment is applied, to give an opaque background for the transparency of the varnish which follows.

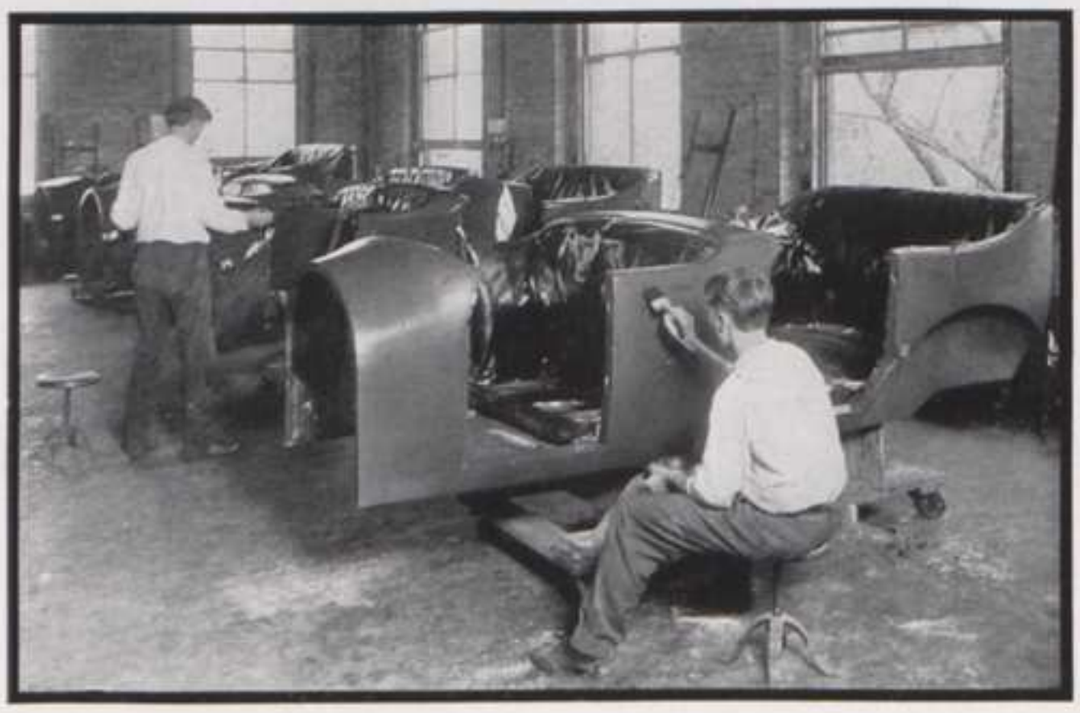
The foreman, who had left me for a moment to give some word of instruction to one of the workers, here returned to my side. "Don't overlook those fellows over there," he cautioned, pointing to a group who seemed to be massaging a car body. "Their work isn't beautiful or sensational, in fact, that rub-down is just as hard work for them as for a rubber in a Turkish bath, but it counts big when the car is finished.

"They go over each and every coat, as soon as it is properly dry, and smooth it down ready for the next one. When there's a 'Rush' order on, it certainly takes patience to wait for them, but they can't be hurried, any more than the men who apply the paint and varnish. It takes over a month to put a car through this department."

My face evidently showed my astonishment.

"Yes," he repeated, "over a month. Each coat takes a day to apply and harden properly and a night and a day to dry and another day for rubbing down. There's no 'finishing while you wait' in the White shop."

After this treatment, come the varnishers with their skilled brushes and cups of color varnish, carefully matched to the color coats beneath. Then for the first time the cars give actual promise of their final brilliance. Carefully — oh, so carefully these varnishers stroke their soft brushes over the smooth sides of the car, leaving a glistening, glassy surface. Every slight ridge in the wet varnish is caressed away with painstaking care — every hair line eliminated.



Carefully these finishers stroke their soft brushes

Then the body is set aside while the color varnish dries into a tough and clinging coat. When this coat is hard and dry the body is then ready for the fourth stage.

Over the color varnish goes a coat of smooth transparent varnish blended of materials selected for their "rubbing" qualities. For, when this coat is dry, the whole surface is rubbed down with thick soft felt soaked in a heavy brown oil

and then dipped into finely pulverized pumice stone powder. This treatment removes every slight trace of unevenness which remains after the careful brush-work and gives the familiar piano-like surface to the car. In fact, after the stage where the color varnish is applied, the finishing of a White Car is exactly the same as that given in the last stages of the highest grade of piano work. After the first coat of rubbing varnish has dried and been rubbed down, a second coat of rubbing varnish is applied and the whole process repeated.

Have you ever seen a "striper" at work? If you haven't there is still a treat in store for you. A "striper," let me explain, is the aristocrat of the paint shop. He is that steady-nerved, half-artist half-artisan who picks out the graceful outlines of doors and windows with narrow ribbons of gold, who throws the beauty of the solid surfaces of color into strong relief with dainty tracery of contrasting arabesques, or, with almost microscopic care, blazons the miniature coat-of-arms on the limousine door. A goldsmith, bending over a web-like pendant, demands no steadier hand to fashion his precious golden lace. A miniature-painter lays his dots of color on his ivory medallion with no more accurate artistry.

As befits a master-craftsman, the "striper" does not work in the open room with the other workers. All the coats that came before this were applied on an upper floor of the factory in spacious rooms, high above dust and grime, overlooking the green acres of Gordon Park. Even this freedom from dust, however, is not regarded as sufficient to protect the striping and the all-important final coat. The body when ready for these final stages, is carefully lifted to a waiting truck and borne to an elevator which delivers it to the floor above. There the dust-proof vault awaits it.

Putting the advertising value into Motor Trucks

This vault or chamber is a spacious room with only one entrance and that carefully built, so that when the door is closed no stray particles of dust can worm their way, uninvited, into this guarded sanctum. The tightly closed windows look down on the grassy lawn before the plant, six good floors below. Here high above the city's dust, a select group of workers give the car its final outer dress —a coat of enduring varnish blended of imported fossilized gums dug by brown-skinned natives from the pre-historic forests of New Zealand, cooked to carefully regulated temperatures in open cauldrons, cooled and cooked again, mixed to an exact formula with the proper "thinning vehicle" and finally pumped away into huge fifty-foot tanks to "age." Varnish, like wine, improves by long maturing. As a result, when this varnish is delivered to the White Factory it is as invulnerable to mud and oil, sun and rain, dust and grime, as human care today can make it.

Here in the filtered air of the dust-proof vault I stood and watched these workers apply this final coat of coats. And here one thing surprised me — until I realized the reason. I had expected to find an excess of care in the last room. Instead, I found the work going forward almost as before. But as I watched I realized the explanation — if every earlier stage has been given the maximum of care, no greater care can be given the last stage. Such was the case here — and when you have watched each step in the building of that pains-taking many-coated foundation and inspected the hard crystalline brilliance of the final coat, it is easy to understand why the White Car keeps its trim beauty longer than its less carefully dressed neighbors.

We swung out into another of the large rooms — a blaze of color greeted us, for we were now in the department where the commercial cars are finished. Here the shades ran to less subdued tones — more to those colors which would win attention in the busiest street. Here was the oil-tank mentioned in the first paragraph — a long cylinder of vivid orange which no crowd could hide, nor which, once seen, could ever be forgotten. Nearby stood a gleaming black car, bearing in flaming red, a trade-mark known in every quarter of the civilized world. In another group stood three trim delivery wagons — new members, I was told, of a great fleet operated by a famous Fifth Avenue house.

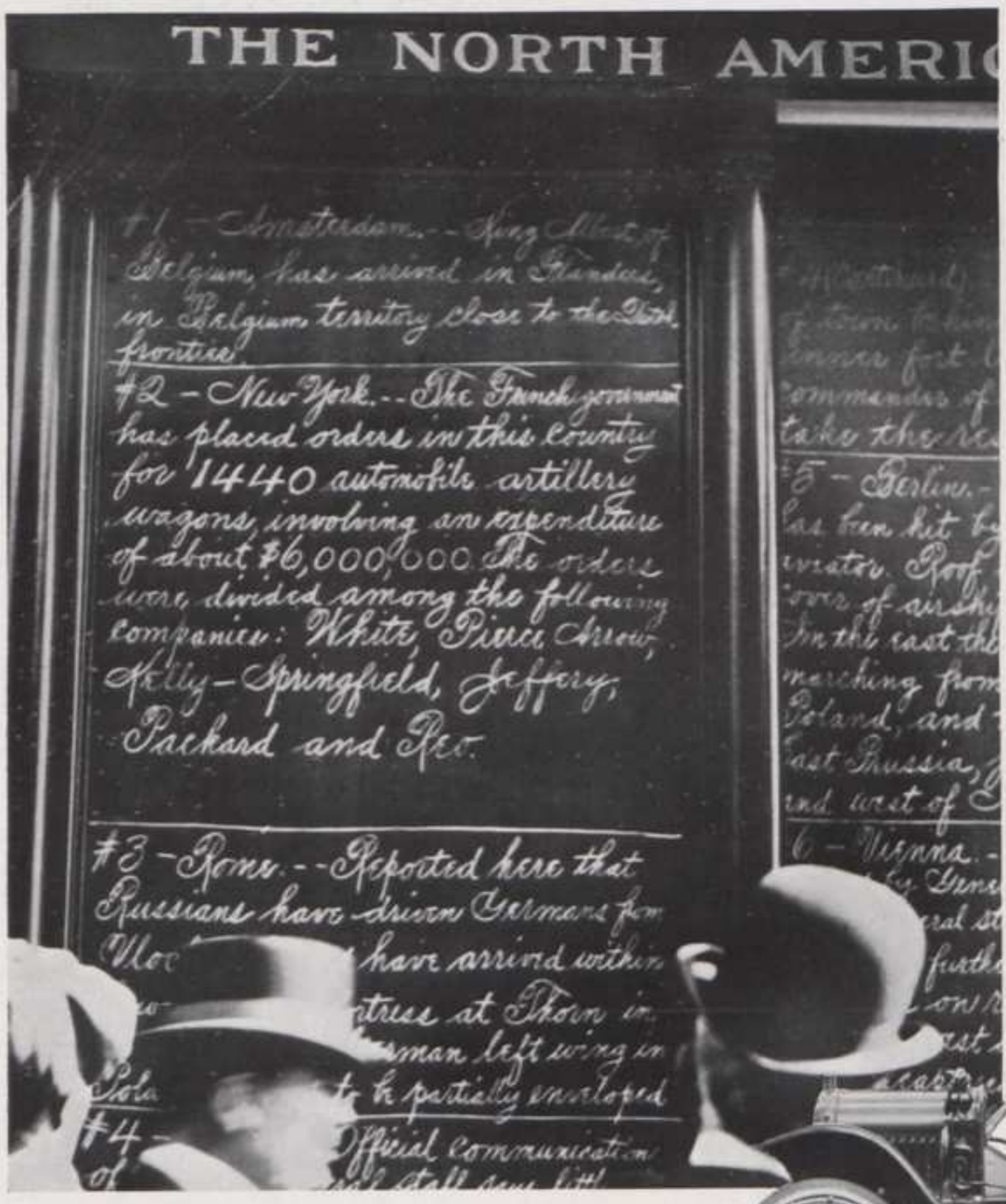
Here, as before, every move was studied, every detail scrutinized. No matter how critically I watched, I could detect no difference in the care given these work-a-day vehicles from that expended on the passenger cars that had preceded them.

We left the department and as we descended the broad flights to the lower floors, I turned to the foreman with a question which is insistently forcing itself before me, the further I explore into the White work-shops.

"It isn't the desire of the men in charge to have every detail absolutely right that surprises me," I said, "I can understand that. What I want to know is — How do you inspire every individual worker with that same desire? That is the really wonderful thing!"

EDITOR'S NOTE—The Welcome Stranger will continue the story of his Little Visits to the White Factory in the next issue.

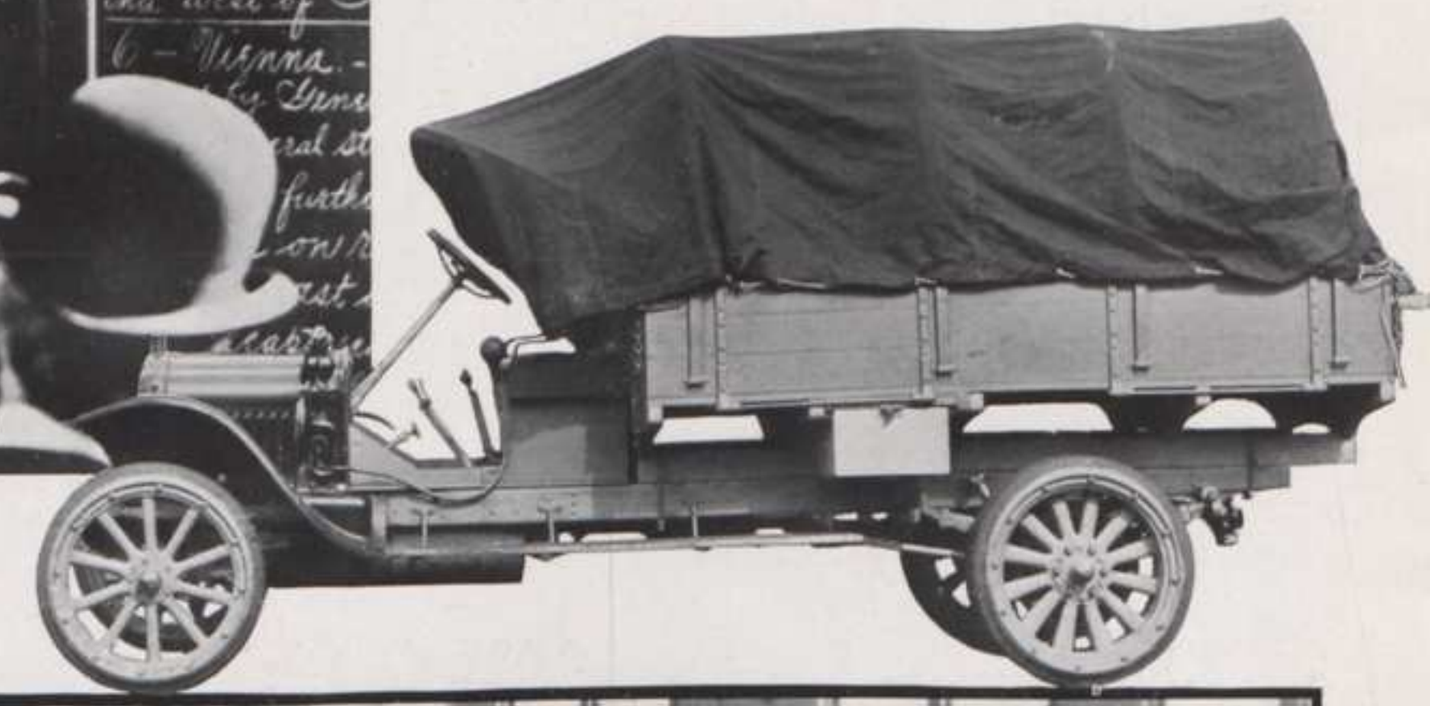
EUROPEAN GOVERNMENT BUYS SIX HUNDRED WHITE TRUCKS

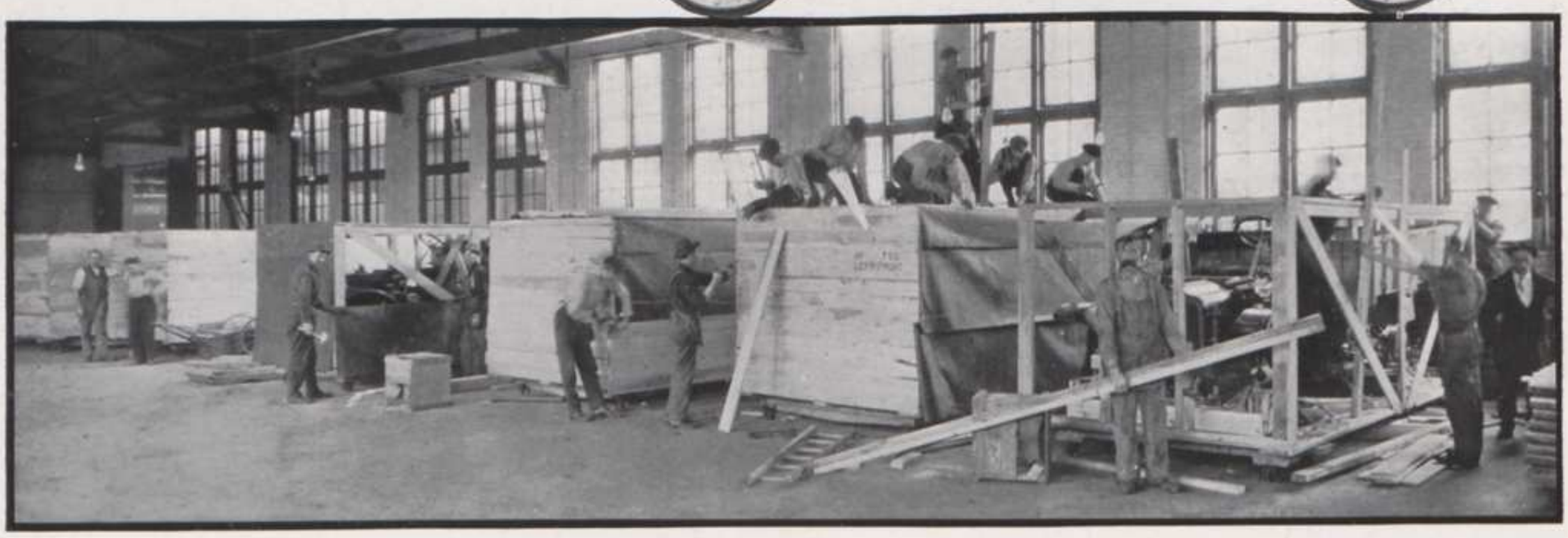


(Top) Newspaper bulletin announcing big truck purchase. (Center) One of the 600 White Trucks comprising the record order. (Bottom) Crating the trucks for shipment at the White Factory.

THE WHITE COMPANY RECEIVES LARGEST TRUCK ORDER EVER PLACED

THE purchase of 600 White Trucks by representatives of a European Government is the largest single order for motor trucks ever placed. Although orders were placed with other truck makers, The White Company received the first order placed, and for the greatest number of trucks.





SAFETY FIRST

IN BOSTON

BURSTING water mains are not so great a menace to life and property in the City of Boston since the water department installed a White Truck with a power appliance for quickly closing the heavy water main gates. Work which formerly required four men, laboring continuously for 45 minutes, can be done in ten minutes by using the power of the truck.

The device with which the truck is equipped, not only conserves the water supply and reduces the damage due to breaks, but it permits of rapid regulation of water volume at fires, lifts the limitations of physical endurance, facilitates the testing of gates and relieves the anxiety always attending derangement or damage to the water system.

In one of Boston's most important thoroughfares, lined with costly buildings, there is a water main which if completely broken apart, would allow the escape of 50,000 gallons of water each minute. Controlling this line are gate valves 36 inches in diameter which, in closing, require 307 turns of a gate wrench and services of four men for about 45 minutes. A few minutes delay sometimes means the loss of life and thousands of dollars. These gates, the largest in the city, can now be closed in ten minutes by one man and the White Truck.

The truck is required to respond to fire alarms and other emergencies where water must be controlled to prevent loss or damage. The calls are frequently overlapping. Crews are on duty day and night. Boston is 15 miles in greatest length and 9 miles wide. The runs vary from one block to the farthest end of the water system. Under the old scheme, when several gates had to be closed, the few men available at night were almost exhausted before shutting the last gate. By its ability to work continuously the truck enables the department to cope with any emergency.

The gate-closing device is mounted on the running board of the truck so that it can be used conveniently over a manhole. The power for operating the device is supplied from the regular transmission of the truck and is controlled by the lever on the side of the truck, easily accessible to the driver. In closing gates the forward speeds of the transmission are used. In opening gates the reverse is used. The gates are equipped with indicators informing the operator when the valve is seated or entirely opened.

The City of Boston uses twenty-one White Trucks in the Departments of Water, Police, Education, Park, Fire, Public Grounds, Bridge and Health.

ATTRACTIVE POSTERS ADVERTISE WHITE TRUCKS

BESIDES seeing White Trucks everywhere in the streets, one now meets them on billboards, along the most traveled thoroughfares. A very attractive poster design in good colors, is being used proclaiming the truth that The White Company is the largest manufacturer of commercial motor vehicles in America. These new White posters will be sure to please those interested in the movement for greater dignity and a higher art in billboard advertising in America.

Histories of WHITE TRUCKS *Number Six*

THE STORY OF TRUCK "A"

200,000 MILES IN FOUR AND ONE-HALF YEARS

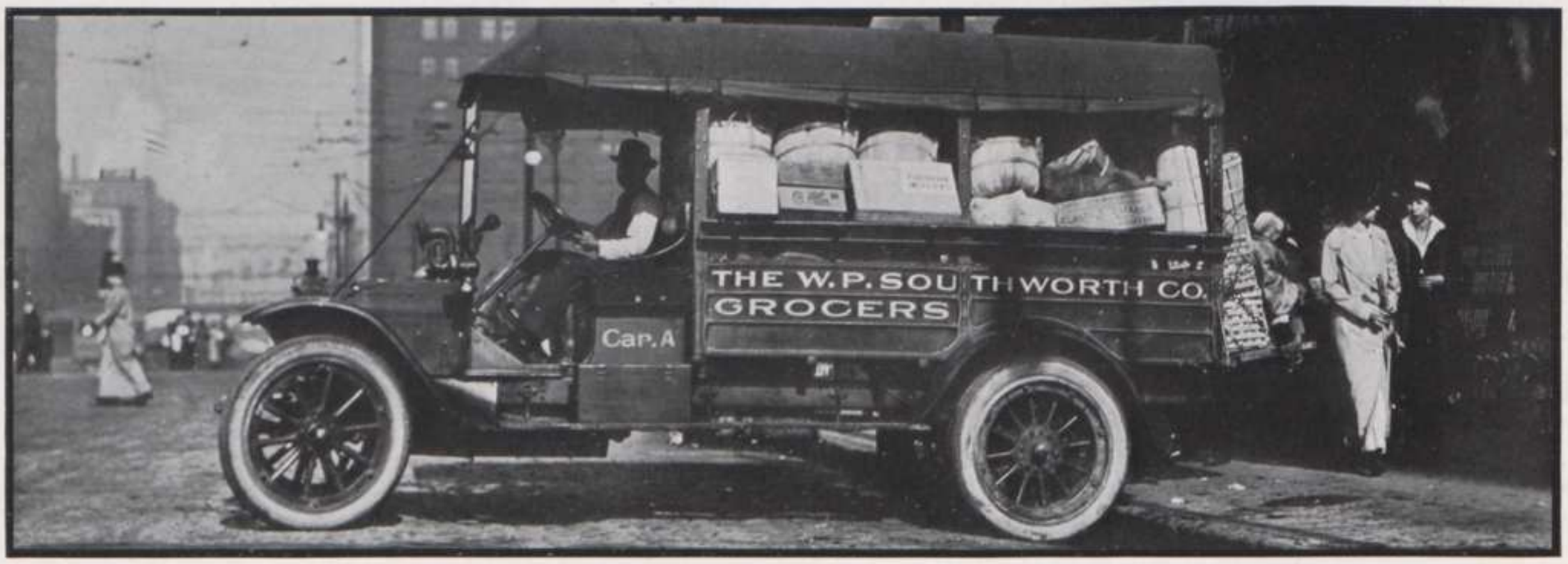
GOOD motor trucks, like good deeds, keep on going; at least, a White 1½-ton Truck owned by The W. P. Southworth Company, of Cleveland, shows no intention of quitting as it approaches the age when a motor truck is generally considered eligible for the "retired" list. And this truck, known as Truck "A" on the Company's books, has had no easy life, in fact a canvass of hard-working motor trucks might show that Truck "A" holds the record for distance traveled. Mr. O. S. Southworth says that the truck has traveled approximately 200,000 miles since he purchased it in May, 1910. If it had traveled around the globe instead of being confined to duty on Cleveland's cobble-stone pavements, it would have circled the earth eight times.

The W. P. Southworth Company operates three stores in Cleveland. The main store is downtown and the branch stores are each located about five miles from the main store in opposite directions. Many customers of the branch stores when down town will make purchases from the more complete stocks at the main store and these purchases are then hauled to the branch stores for delivery to the customers. For this work and for the general hauling of freight between its stores, warehouses and the freight depots — also for city and suburban deliveries — Southworth's use eleven motor trucks. Nine of their eleven trucks are Whites.

The remarkable record of Car "A," the first truck the Company ever owned, has naturally done much to convince the owners of the value of good motor trucks for doing the work which is beyond the limitations of horse-drawn vehicles. The Southworth fleet of White Trucks number one ¾-ton, seven 1½-ton and one 5-ton truck. The 5-ton truck is used continuously for hauling heavy bulk freight and because of its large capacity and the long mileage which it covers daily, accomplishes a very noticeable saving in the Company's hauling expense. This truck was purchased in December, 1911, and since it has been on the job every day, the Company's books show a record that is very creditable for economy of maintenance and upkeep.

But this is a story of the work of Truck "A" and there is more to tell. When this truck was put into service in May, 1910, it was turned over to the mercies of driver John Jedlicka, who, no doubt, is largely responsible for the fact that the truck still looks young and acts it after delivering 200,000 miles of service. John and the truck became fast friends from the start and they've been together ever since, which is another record breaker, we believe. A little figuring will show you that Truck "A" has covered somewhat over 100 miles a day but it doesn't do this in an ordinary working day. The truck goes on duty very early in the morning and works until late at night — drivers are changed at 3 o'clock in the afternoon.

How much longer will Truck "A" last is a question we cannot answer. The driver says, "She's as serviceable as the first day I drove her, four and one-half years ago, and every part is still in good condition." Such is the stuff White Trucks are made of.



A wireless equipped Motor Truck

THE time is in sight when business houses may be constantly in touch with their motor trucks just as the steamship owners can communicate with their ships, by means of wireless. In fact, this problem has already been solved by the Electrical Commission of the City of Baltimore. A White 1½-ton Truck owned by the Commission has not only been equipped with wireless apparatus but it also combines a vehicle for transporting repair crews and supplies and embodies a pumping station, a lighting plant and a repair shop.

The wireless equipment on this ingenious motor truck, unlike any other portable set, enables the crew to receive messages while the truck is in motion. The Commission is thus enabled to keep in constant communication with its trouble crew and all emergency calls can be handled with great dispatch before any severe damage is done.

The truck serves as a receiving station only. The antenna is suspended immediately under the roof of the car and is made of rubber insulated, copper wire, laced back and forth so that there are forty wires with a separation of one inch between. The aerial is thus inconspicuous and well protected.

A series of rigid tests proved conclusively that the equipment is entirely practical. A simple code of signals has been worked out which makes it unnecessary to employ trained wireless operators. The iron framework of the chassis serves as a counterpoise ground, thereby enabling the truck to "receive" while in motion.

During all the preliminary tests the truck has never failed to intercept any message sent to it within a radius of one hundred miles and even under the most unfavorable conditions, with the truck running at full speed and blanketed by tall buildings of steel construction, no difficulty was experienced in reading the messages.

The appearance of the truck gives no suggestion of its great utility in conduit maintenance. Nevertheless it is capable of pumping 12,000 gallons of water per hour from a flooded conduit and furnishes illumination for inspection and repairs and carries all the necessary tools and supplies.

Just in the rear of the driver's seat is mounted a gasoline centrifugal pump which, for the sake of economy, is not driven by the engine of the truck, but is connected to a four horse-power gasoline marine engine.

The suction of the pump is connected through a priming device to three three-inch brass gate-valves located one on each side of the body and one in the rear so that a hose connection can be obtained regardless of the location of the manhole, without violating any traffic regulations.

The pumping engine also operates a small dynamo which, in addition to furnishing ignition for the marine engine, also supplies sufficient current for illuminating the manholes. By the aid of the portable lamps, duct chambers may be examined for a distance of fifty feet if there is any trouble in the conduits. This remarkable motor truck is one of the fourteen White Trucks owned by the City of Baltimore.

New Haven's White Guardians of the Peace

POLICE SERVICE IS PROMPT IN NEW HAVEN

IF YOU need a policeman in New Haven he appears almost as suddenly as the genii of Aladdin's Lamp, or if the police department needs you there is no chance of getting away because the department is equipped with two speedy, always reliable White Police Patrols. The first White Patrol was purchased in May, 1912, and the second one was added one year later.

Chief Phillip T. Smith says, "Patrol No. 1 has covered upwards of 30,000 miles and has given excellent service and entire satisfaction. No. 2 has covered 15,000 miles and has given perfect service.

"In my opinion, judging from what I have seen of other makes used for patrol wagon and ambulance service, I am free to confess that I believe that the White ¾-ton chassis is the ideal machine for this work.

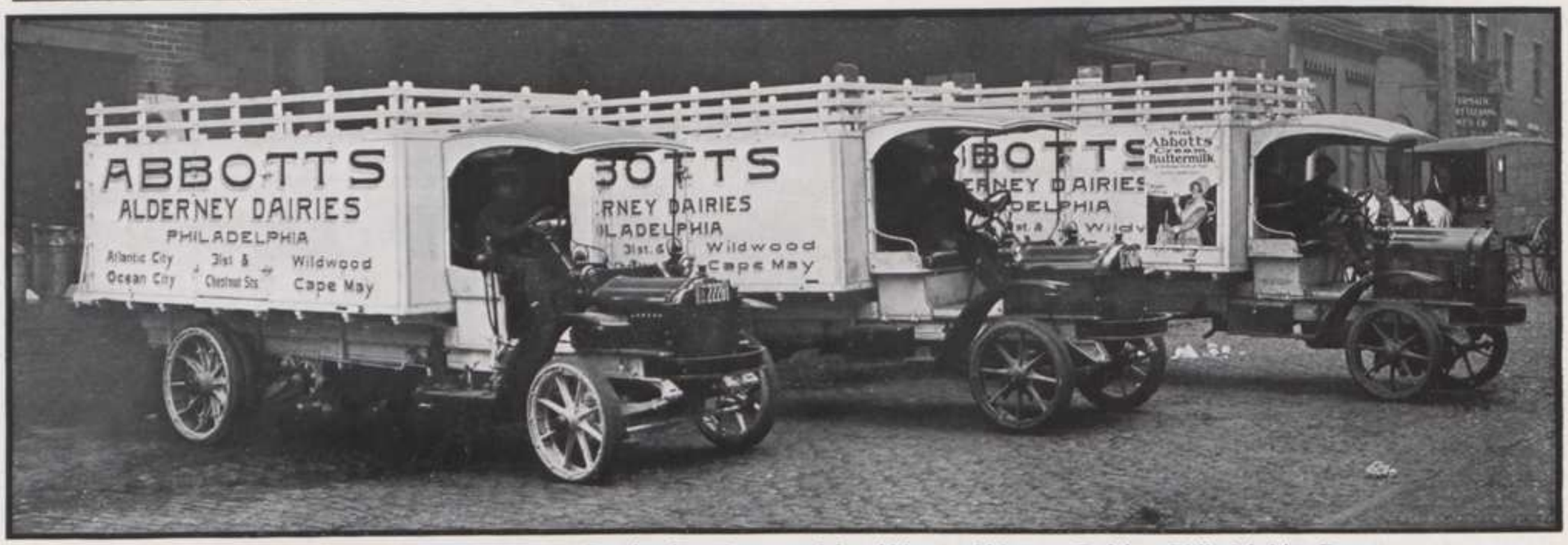
"I can only add that the best testimonial as to the worth and value of White Patrols for our service, is the fact that when we were in the market for a second machine the Board of Police Commissioners deemed it wise to place a repeat order for another White Patrol."

DRIVERS PREFER WHITE TRUCKS

THE Randolph Market, a large grocery and meat market in Chicago, operates a White 1½-ton Truck along with trucks of other makes. Each month a prize is awarded to the driver who keeps his car out of the repair shop and shows the best general results in operation.

The driver of the White Truck has won this prize for five consecutive months in spite of the fact that the truck has been run about 45,000 miles and has never been completely overhauled.

What White Trucks are doing



Part of a fleet of White Heavy Service Trucks owned by Abbotts Alderney Dairies, Philadelphia, Pa.

White 3-ton Truck owned by The Lakewood Lumber Company, Lakewood, Ohio

One of the fifteen White Trucks owned by Marshall Field & Company, Chicago, Ill.

Loading and delivering coal with one of the White Power Dumping Coal Trucks owned by The Zettlemeyer Coal Company, Cleveland, Ohio

SOME RECENT REPEAT ORDERS AND NEW ORDERS FOR FLEETS OF WHITE TRUCKS

(SINGLE ORDERS FROM NEW CUSTOMERS NOT LISTED)

*ABBOTTS ALDERNEY DAIRIES, Philadelphia, Pa.—Two White Trucks, making a total of 5.

*ADAMS EXPRESS COMPANY, Cleveland, Ohio—One White Truck, making a total of 3.

*ATLANTIC REFINING COMPANY, Philadelphia, Pa.—Thirteen White Trucks, making a total of 61.

*BELL TELEPHONE COMPANY OF PENNSYLVANIA, Philadelphia, Pa.—Two White Trucks, making a total of 29.

*BIWABIK TOWNSHIP, Minnesota—One White Truck, making a total of 2.

*BREWER & COMPANY, Chemicals, Worcester, Mass.—One White Truck, making a total of 3.

*JAMES BUTLER, INC., Grocers, New York City—One White Truck, making a total of 2.

*CITY ICE & COAL COMPANY, Baltimore, Md.—One White Truck, making a total of 2.

*COHEN BROTHERS, Department Store, Jacksonville, Fla.—One White Truck, making a total of 3.

*COLUMBIA STEAM DYE WORKS, Chicago, Ill.—One White Truck, making a total of 2.

*CONRAD-BAISCH-KROEHLE COMPANY, Furniture, Cleveland, Ohio —One White Truck, making a total of 2.

*CHARLES DEHN, Hauling Contractor, Cleveland, Ohio—One White Truck, making a total of 4.

*THE DELIVERY COMPANY, Hauling Contractors, Cleveland, Ohio One White Truck, making a total of 4.

*CITY OF DUBUQUE, Iowa—One White Truck, making a total of 2.

*ELK LAUNDRY COMPANY, St. Paul, Minn.—One White Truck, making a total of 3.

*LEO W. FISCHMANN, Grocer, Chicago, Ill.—One White Truck, making a total of 2.

*W. H, FREAR & COMPANY, Department Store, Troy, N. Y.—One White Truck, making a total of 2.

*FREDERICK & NELSON, INC., Department Store, Seattle, Wash. Two White Trucks, making a total of 7.

FREIHOFER BAKING COMPANY, Philadelphia, Pa.—Three White Trucks.

*GARDEN CITY BREWERY, Chicago, Ill.—One White Truck, making a total of 3.

*GEORGIA RAILWAY, LIGHT & POWER COMPANY, Atlanta, Ga. —Two White Trucks, making a total of 7.

*B. F. GOODRICH COMPANY, New York City—Two White Trucks, making a total of 18.

*GREAT NORTHERN PAPER COMPANY, Boston, Mass.—One White Truck, making a total of 2.

HAVERTY FURNITURE COMPANY, Atlanta, Ga.—Four White Trucks.

GEORGE A. HORMEL & COMPANY, Meat Packers, Austin, Minn. —Two White Trucks.

*P. J. HURSEN, INC., Undertakers, Chicago, Ill.—One White Truck, making a total of 6.

*INGMIRE & THOMPSON, Undertakers Supplies, Rochester, N. Y. One White Truck, making a total of 2.

*KAUFMANN BROTHERS, Department Store, Pittsburgh, Pa.— Eight White Trucks, making a total of 24.

*PETER G. KEMP, Coal, Brooklyn, N. Y.—One White Truck, making a total of 3.

*C. A. KUEHNLE, Decorator, Philadelphia, Pa.—One White Truck, making a total of 2.

*LA GRANDE LAUNDRY, San Francisco, Cal.—One White Truck, making a total of 2.

*LOS ANGELES BREWING COMPANY, Los Angeles, Cal.—One White Truck, making a total of 12.

*MANSION HOUSE ICE CREAM COMPANY, Cambridge, Mass.— One White Truck, making a total of 3.

*MOTOR TRANSPORTATION COMPANY, Hazleton, Pa.—Two White Trucks, making a total of 4.

*JOHN G. MYERS COMPANY, Department Store, Albany, N. Y.— One White Truck, making a total of 4.

*NEW JERSEY TOBACCO COMPANY, Newark, N. J.—One White Truck, making a total of 4.

*OWL LINEN SUPPLY COMPANY, Union Hill, N. J.—One White Truck, making a total of 2.

*FRANK PHILLIPS, Hauling Contractor, Cleveland, Ohio—One White Truck, making a total of 3.

M. H. PICKERING COMPANY, Furniture, Pittsburgh, Pa.—Two White Trucks.

*POCATELLO STREET CAR COMPANY, Pocatello, Idaho—Two White Trucks, making a total of 3.

POLK COUNTY, Tennessee, Highway Department—Two White Trucks.

POWERS MERCANTILE COMPANY, Department Store, Minneapolis Minn.—Two White Trucks.

*RICHLAND COUNTY, South Carolina—One White Truck, making a total of 2.

RIVERSIDE TAXI SERVICE COMPANY, New York City—Five White Taxicabs.

*SCHAFER BAKERY, Savannah, Ga.—One White Truck, making a total of 2.

*THOMAS J. SHEA COMPANY, Contractors, Boston, Mass.—One White Truck, making a total of 2.

*SOUTHERN EXPRESS COMPANY, Atlanta, Ga.—Four White Trucks, making a total of 8.

*SPEAR & COMPANY, Furniture, New York City—Two White Trucks, making a total of 13.

*STANDARD OIL COMPANY OF INDIANA, Chicago, Ill—Fourteen White Trucks, making a total of 45.

*STANDARD OIL COMPANY OF KENTUCKY, Louisville, Ky.—One White Truck, making a total of 6.

*STARK MILLS, Textiles, Manchester, N. H.—One White Truck, making a total of 3.

*STEWART DRY GOODS COMPANY, Baltimore, Md.—Two White Trucks, making a total of 6.

*SUPREME BAKING COMPANY, Los Angeles, Cal.—One White Truck, making a total of 16.

*CITY OF TACOMA, Washington, Fire Department—One White Truck, making a total of 2.

TERMINAL MARKET COMPANY, Philadelphia, Pa.—Five White Trucks.

*CITY OF TORONTO, Ontario, Fire Department,—Two White Trucks, making a total of 5.

TURKISH GOVERNMENT, Constantinople, Turkey—Two White Trucks.

*UNITED GAS IMPROVEMENT COMPANY, Philadelphia, Pa.—One White Truck, making a total of 2.

*UNITED STATES GOVERNMENT, Bureau of Mines, Pittsburgh, Pa.—Two White Trucks, making a total of 4.

*UNITED STATES GOVERNMENT, Department of Commerce, Washington, D. C.—One White Truck, making a total of 2.

*UNITED STATES GOVERNMENT, Post Office Department, Washington, D. C.—Seven White Trucks, making a total of 27.

*UNION LUMBER COMPANY, Steubenville, Ohio—One White Truck, making a total of 2.

*UNION OIL COMPANY, San Francisco, Cal.—One White Truck, making a total of 2.

WELSBACH STREET LIGHTING COMPANY of AMERICA, Philadelphia, Pa.—Three White Trucks.

*REPEAT ORDERS

The Albatross

PUBLISHED ONCE A MONTH BY

The WHITE COMPANY

MANUFACTURERS of GASOLINE MOTOR CARS, MOTOR TRUCKS and TAXICABS

Cleveland

BRANCH OFFICES OF THE WHITE COMPANY

NEW YORK	Broadway at Sixty-second Street
CHICAGO	2635-2645 Wabash Avenue
BOSTON	930 Commonwealth Avenue
SAN FRANCISCO	Market Street and Van Ness Avenue
PHILADELPHIA	216-220 North Broad Street
PITTSBURGH	Craig Street and Baum Boulevard
ATLANTA	63-65 Ivy Street
ST. LOUIS	3422 Lindell Boulevard
SEATTLE	1514 Third Avenue
MEMPHIS	278-280 Monroe Avenue
NEWARK	33-35 William Street
BUENOS AIRES	Alsina 718-724

Southwestern Representatives:
THE WHITE MOTOR CAR COMPANY, DALLAS, TEXAS
2025-2027 Commerce Street

Baltimore Representatives:
THE WHITE MOTOR CAR COMPANY, BALTIMORE MD.
Mount Royal and Guilford Avenues

Eastern Canada Representatives:
THE WHITE COMPANY, LIMITED, TORONTO, ONTARIO
14 Alexander Street

OVER 400 DEALERS IN ALL PARTS OF THE UNITED STATES

THE WHITE COMPANY MANUFACTURES MOTOR CARS in 30, 45 and 60 Horse-power Models — All Body Types

MOTOR TRUCKS in ¾-ton, 1½-ton, 3-ton and 5-ton Models — Special Body Types for All Lines of Business

POWER DUMPING TRUCKS and TRUCKS WITH TRACTOR WHEELS

TAXICABS and MOTOR BUSES in a Variety of Types for All Requirements

Both in Quantity and Value of Production the Largest Manufacturers of Commercial Motor Vehicles in America

Factory and Home Office:
ST. CLAIR AVENUE AT EAST 79TH STREET
CLEVELAND

THE NEW CARS

THE new models of White Cars are already the topic of the day in motor circles — because they are really something new and *better*. Perhaps people are tired of the "continuous performance" of the automobile merchants who are lying awake nights to give the public a five thousand dollar car for so many hundred and ninety-eight. This makes good comedy if one doesn't invest in it too heavily.

In the din of voices of those crying their bargains, the cause of quality in motor cars might seem to have been forgotten. It might seem as if the day was past when motor cars were built to last instead of to sell. It might be feared that the development of motor cars to an always higher standard was arrested because not "practical." But such is not the case and, as ever, the public's admiration for quality is greater than its pleasure in substitutions which make things cheap and easily obtained.

As one looks over every feature of the new White Cars one can only wonder at how every detail has been worked out to harmonize with the whole. And one wonders again why many of the interesting features of these new cars were not discovered long ago. One wonders why we have been content with the homely appearance of the back of the front seat as it used to be — why was not the White center cowl idea with its convenient compartments, thought of long ago; why has not a real stream-line body been produced before; why has such luxury and comfort in the interior finish of the body not been accomplished. One could wonder about the top, windshield, unified control and endless details — why has it remained for all of these things to be brought to perfection in a single car?

The answer must be that it is one of the rewards of a company, which insists upon nothing short of highest quality, that it can inspire its organization to create and adopt these advancements — just as six years ago White Engineers embodied in White mechanical construction the principles that are accepted throughout the industry today.

And now The White Company adds beauty and character of exterior design, which will mold the fashions of the future, to the mechanical perfection that enables you to "Keep Your Car."

REPEAT ORDERS

THE very gratifying feature of our truck business is the fact that much the greater part of it consists of repeat orders from satisfied customers. When a firm buys a White Truck it is practically certain that some day they will buy more White Trucks—perhaps their eventual purchases will amount to huge fleets—like the fleet of 212 White Trucks owned by the Standard Oil Companies; the fleet of 67 White Trucks owned by Armour & Company; the fleet of 54 White Trucks owned by Gimbel Brothers; the fleet of 44 White Trucks owned by the Bell Telephone Companies, etc. These, and scores of other large fleets of White Trucks owned by prominent firms in all lines of business have been built up gradually, and every addition to a fleet has been justified by the actual test of service. These firms continue to buy White Trucks because the longer they use them the more fully are they convinced of their superior qualities.

On page twenty-nine of this issue is a list of recent repeat orders and new orders for *fleets* of White Trucks. In this list of sixty-four sales all but ten are repeat orders and these ten are sales to new customers who bought fleets of trucks on the first order.

REPEAT ORDERS FROM FIRMS WHO KNOW MOTOR TRUCKS

THE great oil companies of America were one of the first big lines of business to use motor trucks extensively. Naturally, then, these companies are probably more familiar with the good and bad points of the various motor trucks than any other important line of business. These companies know motor trucks by long experience.

In June, 1913, the great oil companies operated a total of 150 White Trucks. In a little more than a year these same oil companies have increased their White Truck equipment to 350 trucks, an increase of one hundred and thirty-three per cent. The various Standard Oil Companies operate 212 White Trucks.

THESE FIGURES SPEAK FOR THEMSELVES

THE WHITE COMPANY IS THE LEADING MANUFACTURER OF MOTOR TRUCKS IN AMERICA

The LATEST WHITE

A CREATION NOTABLE FOR COMPLETE ARTISTIC AND MECHANICAL EXCELLENCE

A gentleman is not remembered because of his hat, his waistcoat, or the cut of his clothes—he is accepted and respected for himself.

The properly appointed home is remembered and admired because of its complete perfection, not because of one room or one chair.

To White mechanical excellence has been given the dignified gracefulness of an exterior in which many beautiful features are blended into an impressive completeness.

No one feature stands out above others in The White. The eye goes naturally from one to the other, but the mind receives and retains, first and last, the impression of a complete car.

For example, one will hardly notice that the conventional back of the front seat has been eliminated—absorbed by the finally perfect stream-line in the double cowl effect.

White leadership is a principle

The important and fundamental improvements in automobile construction and operation—the features that are exploited most widely today—have been basic principles in White Motor Cars for years.

In 1909 The White presented the first monobloc, long stroke, high speed motor—the very type which is today's sensation. In 1910 The White brought out the logical left-side drive with center control.

In 1911 The White instituted electrical starting and lighting, with the tremendous advantage of the non-stallable engine.

From time to time other important improvements have been brought out in White Cars. The White is replete with dominating ideas in mechanical construction and in the attributes of comfort and beauty.

The White is completely equipped, including mono-top, rain-vision ventilated windshield, speedometer, electric signal, trunk rack, Silvertown Cord Tires.

The White Cars are now exhibited by White dealers.

THE WHITE COMPANY
CLEVELAND

Manufacturers of Gasoline Motor Cars,
Motor Trucks and Taxicabs.

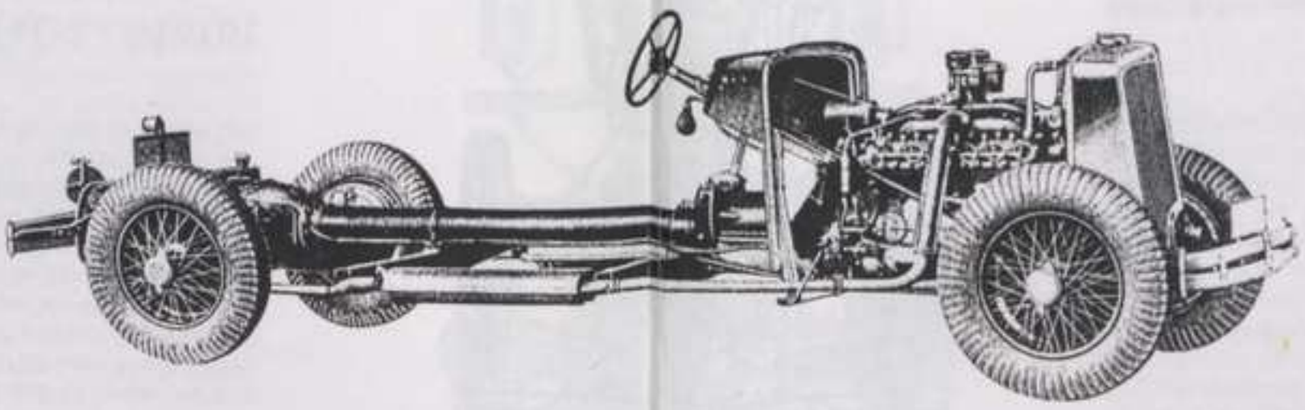
THE CAXTON COMPANY, CLEVELAND

TATRA
WERKE
-A.G.-

des Zwölfzylinders TATRA

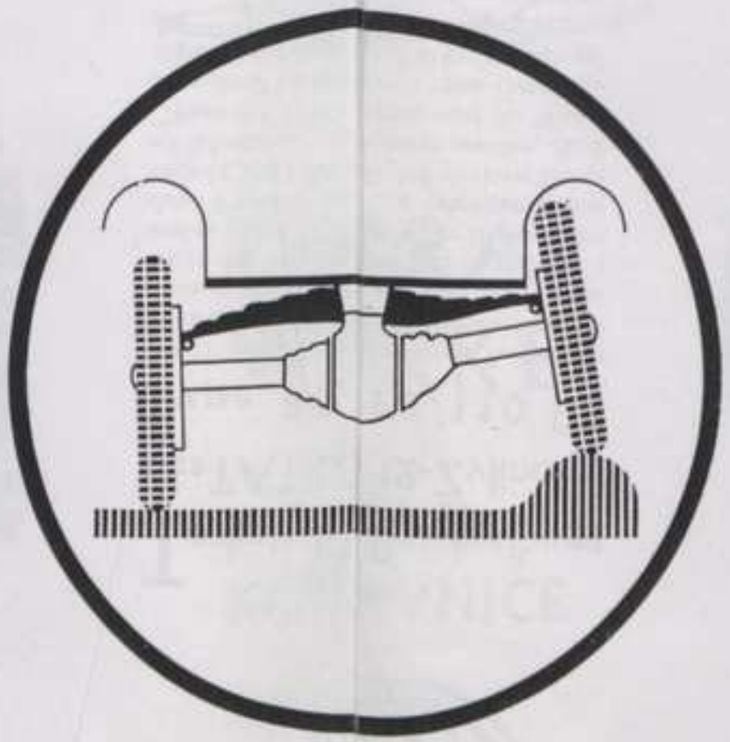
„TATRA"-werke a.G.

praq - Kopřivnice.



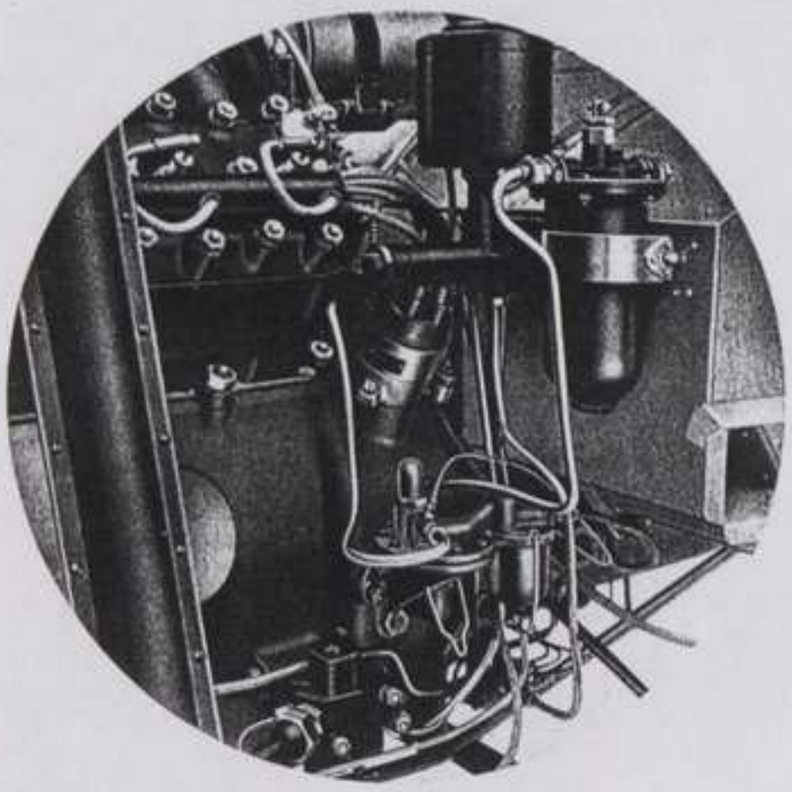
Rahmenloses Chassis

An Stelle des Rahmens wird ein Tragrohr von großem Durchmesser verwendet, welches den Motor und das Getriebe mit der Hinterachse verbindet. Die Karosserie-Querträger sind ebenfalls mit dem Chassis fest verbunden. Die Konstruktion bildet so ein festes, jeder Deformation widerstrebendes System, auf welches die Karosserie aufgeschraubt ist. Diese ist keiner derartigen Beanspruchung ausgesetzt, wie dies bei den Rahmenkonstruktionen, bei welchen während der Fahrt auf schlechten Straßen der Kühler, die Motorhaube und die Karosserie zueinander in dauernder, sichtbarer Bewegung sind, der Fall ist. Beim Tatra-Chassis bleiben sämtliche Organe einschl. des Kühlers gegenüber der Karosserie vollkommen in Ruhe und nur die einzelnen Räder, welche durch die Halbachsen geführt werden, passen sich der Fahrbahnoberfläche an.



Schwingende Halbachsen

Die Konstruktion der Halbachsen, insbesonders die der Vorderachse, hat eine weitere Vervollkommnung erfahren. Jedes Vorderrad ist durch je 2 Halbachsen in Parallelogrammform geführt, so daß die Neigung der Vorderräder beim Durchfedern stets dieselbe bleibt. Die Räder sind so durch Halbachsen, welche keiner Deformation unterliegen, geführt und nicht durch allseitig nachgebende Federn. Die Federn des 12-Zylinder-Wagens besorgen lediglich die Abfederung, nicht aber die Führung der Räder. Der Erfolg davon ist eine ruhige Fahrt und ein gutes Sitzen auf der Straße, auch bei größten Geschwindigkeiten.

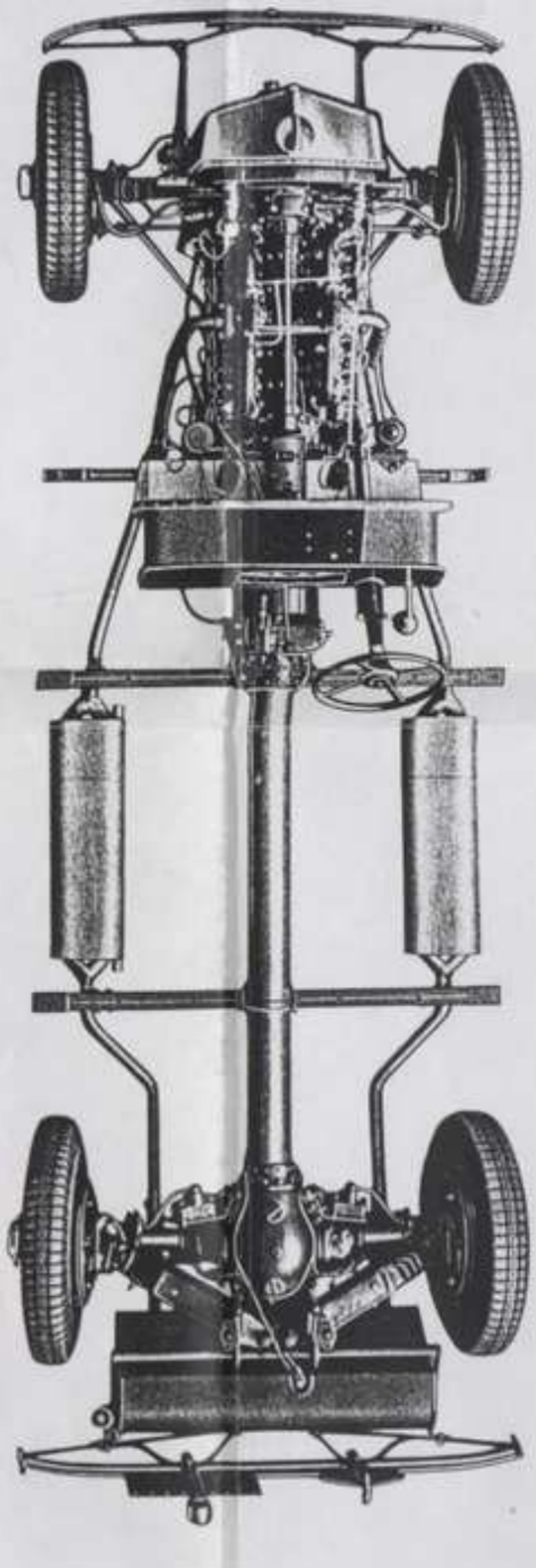


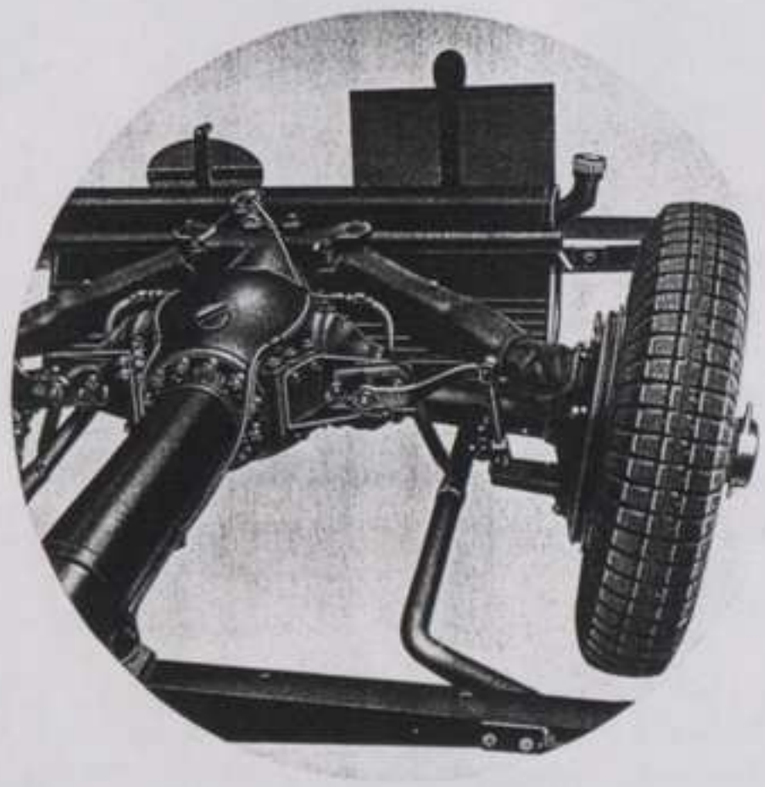
Technische Beschreibung des TATRA 12-Zylinders Type 80, 23/110 PS

Der 12-Zylindermotor mit einer Reihe dicht aufeinander folgender Explosionen deckt sich schon in praktischer Hinsicht mit der Arbeitsweise der Turbine oder des Elektromotors und es ist klar, daß der Motor dieser Klasse dem Wagen einzigartige Fahreigenschaften verleiht. Die Fahrt kann mit direktem Gange auf Schrittempo verlangsamt werden, durch Öffnen der Drosselklappe wird der Wagen blitzschnell beschleunigt u. seine Geschwindigkeit auf weit über 100 km/Stunden gebracht. Fahrten durch die Stadt, in Kurven und auf Bergen werden deshalb bei diesem Superluxuswagen in der Tat zum Genuß. Dabei bleibt der Motor vollkommen vibrationsfrei, insbesondere ist er frei von Torsionsvibrationen, welche immer im Verhältnisse zu der Länge des Motors wachsen. Deshalb verwenden auch die Tatra-Werke nicht den hinsichtlich der Erzeugung billigeren Reihen-Achtzylinder, sondern den weitaus kürzeren und dadurch widerstandskräftigeren „V"-Zwölfzylinder, dessen Drehmoment außer den bereits angeführten Vorteilen um volle 50% regelmäßiger ist. Die an der Länge erzielten Ersparnisse können für den Bau einer bequemen Karosserie ausgenützt werden.

Der Zwölfzylinder-Tatra-Motor

Der Sechsliter-Tatra ist ein wassergekühlter Zwölfzylinder-Benzinmotor von 75 mm Bohrung und 113 mm Hub. Die Bremsleistung beträgt über 110PS bei 23 Steuer-PS. Die ZYLINDER sind zu je 6 in zwei gußeisernen Blöcken unter 65° in V-Form angeordnet u. haben abnehmbare Aluminium-Zylinderköpfe. Die einzelnen Zylinder beider Blöcke stehen einander ohne Versetzung gegenüber und dient je ein Zapfen der Kurbelwelle zwei gegenüberliegenden Zylindern. Auf dem Pleuelstangenkopfe jedes rechten Zylinders ist *die Pleuelstange des linken Zylinders angelenkt. Entsprechende Ausnehmungen im Kopfe der Zylinder ermöglichen die Ausbildung* eines äußerst wirksamen Verbrennungsraumes, wodurch weiters die Umsetzung eines Höchstmaßes von Brennstoffenergien in Leistung erreicht wird. Das KURBELGEHÄUSE ist ungeteilt in einem Stück aus Aluminium hergestellt und stark verrippt. Die KURBELWELLE ist achtfach in Gleitlagern gelagert und in dynamischer Beziehung vollkommen ausgewuchtet. Die NOCKENWELLE ist in einem besonderen Gehäuse in der Mitte des Motors, oberhalb der Kurbelwelle gelagert. Ihr Antrieb erfolgt durch eine geräuschlose Kette mit Spannvorrichtung. Die Ventile werden durch kleine, schwenkbar gelagerte Hebel gesteuert. Nicht nur die Nockenform, sondern auch die Form der Auflageflächen der Hebel ist derart gelöst, daß das Öffnen und Schließen der Ventile geräuschlos erfolgt. Die SCHMIERUNG erfolgt durch eine doppelte Zahnradpumpe. Die erste Stufe dient ausschließlich zur Schmierung der Kurbelwelle und der Pleuelstangenbolzen. Die zweite Stufe der Ölpumpe drückt das Öl zur Nockenwelle und zu den Antriebsketten der Steuerung. Das überschüssige Öl fließt über ein großes Sieb und gelangt gereinigt zur Pumpe zurück. Das Sieb ist am unteren, leicht abnehmbaren Deckel befestigt. Außerdem ist noch ein Ölfilter für die Feinreinigung vorhanden. Das Öl wird von der Pumpe zu einem Dreiweghahn geführt, von welchem aus es beim Winterbetrieb direkt zu den Schmierstellen, beim Sommerbetrieb über den ÖLKÜHLER geleitet wird. Dieser ist als Röhrenkühler ausgeführt und befindet sich in der Spitze des Wasserkühlers. Die KÜHLUNG erfolgt zwangsläufig durch eine Wasserpumpe. Der Ventilator wird von der Nockenwelle aus mittels einer geräuschlosen Kette mit



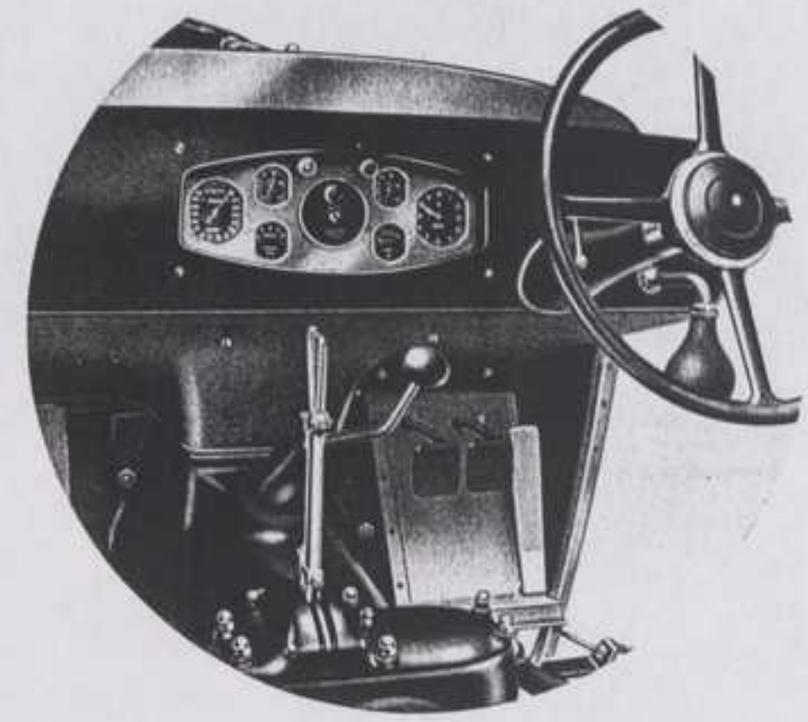


TATRA-WERKE

A. G.

PRAG

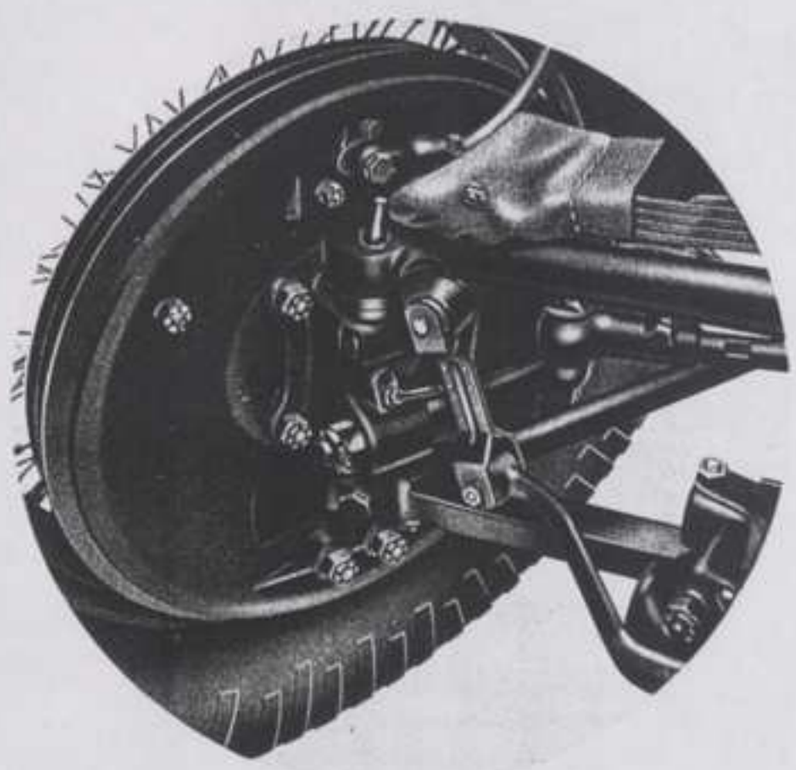
KOPŘIVNICE



automatischer Spannung angetrieben. VERGASER gibt es zwei; sie sind durch ein Gestänge verbunden. Der Brennstoff wird aus den Behältern durch eine am Motor befestigte Pumpe gefördert. Vor Eintritt in die Zylinder wird das Gemisch durch Auspuffgase vorgewärmt, wodurch eine weitere Elastizität des Motors, auch bei niedrigsten Drehzahlen erreicht wird. ZÜNDUNG: Batteriezündung. Es sind zwei Verteiler für je einen Block vorgesehen. Die Lichtmaschine, als Stromquelle, ist mit dem Ventilator durch eine leicht abnehmbare Welle verbunden und am rückwärtigen Ende des Motors befestigt. ANLASSER. Der elektrische Anlasser ist am Kurbelgehäuse gelagert. Eine Handkurbel ist ebenfalls vorgesehen.

Das Chassis

des 12-Zylinderwagens ist ein typisches rahmenloses Tatra-Rohrchassis mit vorderer sowie auch hinterer Schwenkachse. Die KUPPLUNG ist eine trockene, sehr elastische Zweischeibenkupplung. Der GETRIEBEKASTEN mit 4 Vorwärts-Geschwindigkeiten und einem Rücklauf hat geschliffene Zahnräder und ist deshalb im Laufe geräuschlos. Die dritte Vorwärtsgeschwindigkeit ist in direktem Eingriff, die vierte ist als Schnellgang ausgebildet. Der Schalthebel befindet sich in der Wagenmitte. Der ANTRIEB der HINTERRÄDER erfolgt ohne kraftraubende Gelenke. Die Hinterachse ist geteilt und besteht aus zwei Halbachsen, welche im Hinterachsgehäuse schwenkbar gelagert sind (Schwenkachse). Die Kraftübertragung erfolgt vom Getriebe aus durch eine feste Verbindungswelle über ein Stirnrad-Differential auf spiralverzahnte Kegelräderpaare. Die VORDERACHSE ist gleichfalls geteilt (Schwenkachse) und die Halbachsen sind an einem besonderen Gehäuse, an der Stirnseite des Motors, angelenkt. Die rechte und linke Halbachse bildet ein selbständiges, in vertikaler Richtung schwenkbares Parallelogramm, wodurch die Radneigung stets dieselbe bleibt und ein sicheres und verläßliches Fahren, auch bei hohen Geschwindigkeiten, erzielt wird. LENKUNG: eine äußerst leichtgehende Schraubenlenkung. Die Bewegung des Lenkrades wird durch ein Kegelradgetriebe auf eine waagrechte, parallel zur Vorderachse liegende Schraubenspindel übertragen, an welcher die Verbindungsstangen der beiden Räder direkt angelenkt sind. Die FEDERUNG der rückwärtigen Halbachsen erfolgt durch zwei VIERTEL-Auslegefedern, welche am rückwärtigen Teil des Hinterachsgehäuses schräg befestigt sind. Die Vorderachse wird durch eine am Gehäuse der Halbachsen befestigte Querfeder abgefedert. Außerdem sind auch Stoßdämpfer vorgesehen. BREMSEN. Es sind zwei voneinander unabhängige Bremsen vorgesehen, eine hydraulische Bremse mit zwei abgetrennten Bremskreisen (doppelte Sicherung) als Fußbremse, auf alle 4 Räder wirkend, und eine Getriebebremse als Handbremse. RÄDER. Drahtspeichenräder mit Niederdruckreifen 17 × 50. Der BENZINBEHÄLTER mit einem Inhalte von ca. 100 Liter ist am rückwärtigen Ende des Fahrgestelles befestigt.



Zur Ausrüstung des Wagens gehören:

2 bereifte Reserveräder samt Ueberzügen, eine elektrische Licht- und Starteranlage, elektrische Hupe, Handhupe, Uhr am Armaturenbrett, Tachometer mit Gesamt- und Tageskilometerzähler, Benzinstandmesser, Ölthermometer, Ölkontroller, Wasserthermometer, Suchscheinwerfer mit Innenbetätigung, 2 Kotflügellampen, zweiarmiger elektr. Scheibenwischer, elektr. Zigarrenanzünder samt Aschenbecher, elektr. Richtungsanzeiger, Rückblickspiegel, Stoplampe, verchromte Stoßstangen vorn u. hinten, Kofferbrücke mit Schutzleisten sowie alle zum Wagen gehörigen Reservebestandteile und Werkzeuge laut separatem Verzeichnis.

Technische Daten:

Zylinderzahl	12
Bohrung	75 mm
Hub	113 mm
Zylinderinhalt	6 l
Motorleistung	115 – 120 Ps
Radstand	3800 mm
Spurweite	1450 mm
Kleinster Bodenabstand	235 mm
Gewicht des kompletten Chassis	ca 1600 kg
Maximalgeschwindigkeit	über 130 km/St.
Benzinverbrauch	ca 25 l/100 km

In Fällen, wo wir nur das 12-Zylinder-Chassis liefern, entfällt von den Sonderausrüstungen:

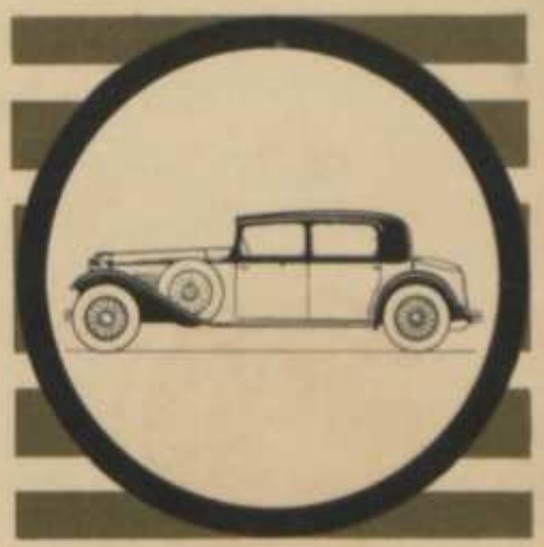
Gummistoffüberzüge für die Reserveräder, Suchscheinwerfer, elektr. Scheibenwischer, Zigarrenanzünder mit Aschenbecher, Rückblickspiegel, elektr. Richtungsanzeiger, Stoplampe, Schutzleisten bei der Kofferbrücke, die beiden Kotflügellampen.

ARMA VIRVMQVE CANO...

TAIKA

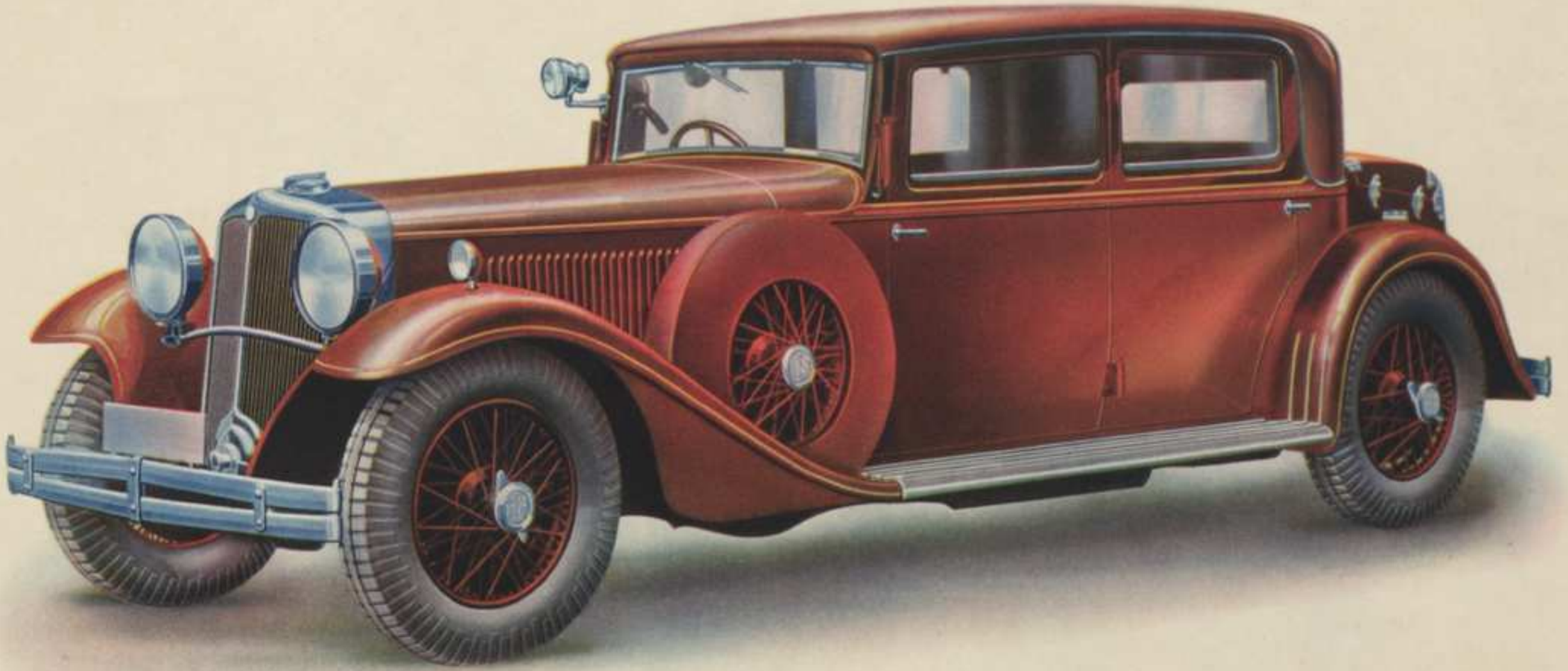
WAFFEN, MÄNNER UND KRIEGSSCHIFFE BESANG IN UNSTERBLICHEN VERSEN VERGILIUS, DER RÖMISCHE DICHTER, UND VERHERRLICHTE HIEMIT HEROISCHE SCHLACHTEN UND ERHABENE VORBILDER BEGEISTERTER FÜHRER.

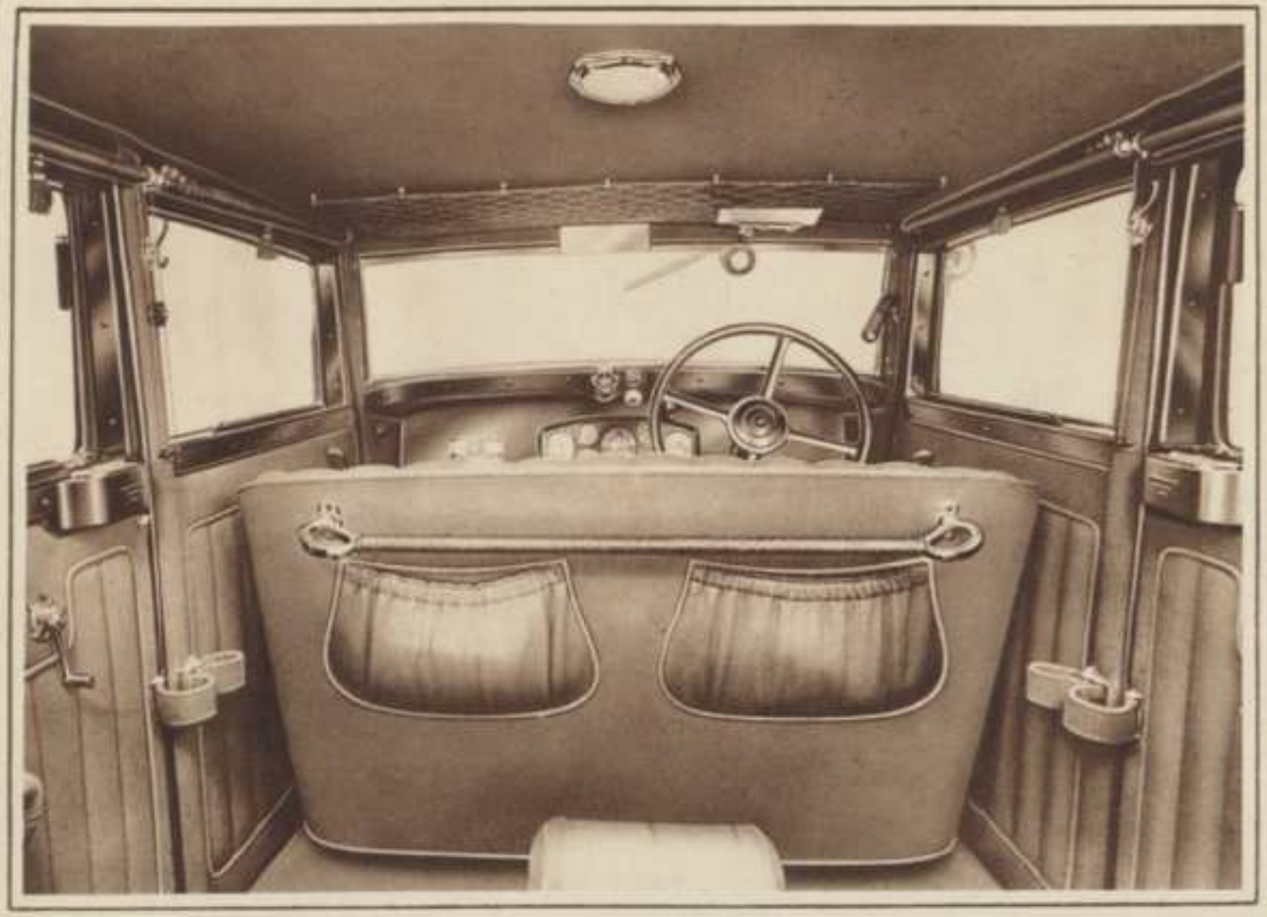
WENN ER ABER IN UNSEREN ZEITEN ZUR WELT KÄME, WEM MÖCHTE WOHL SEINE FLAMMENDE BEWUNDERUNG GELTEN? SICHERLICH WÜRDE ER SICH VOR DEM WUNDERSAMEN VOLLZUG DER TECHNIK UNSERES ZEITALTERS BEUGEN UND SICH AN DER STRENGEN STÄHLERNEN SCHÖNHEIT DER MOTORARCHITEKTUR UND AN DER EMPORRAGENDEN WOHLGESTALT DES MODERNEN WAGENS BERAUSCHEN, DAMIT ER DANN ENTZÜCKT VOR DEM ZWÖLFZYLINDERWAGEN **TATRA** STEHEN BLEIBEN KANN, DER JA SELBST FÜR SICH EIN BELEG STRENGER, EINFACHER UND WÜRDIGER ANMUT IST, INDEM ER, DANK SEINEM METALLENEN HERZEN, DAS MIT DER PRÄZISION EINER WISSEN-



SCHAFTLICHEN MASCHINE ARBEITET UND DANK DER EDLEN LINIENFÜHRUNG SEINES SCHÖNEN UMRISSES VOLLKOMMEN IST.

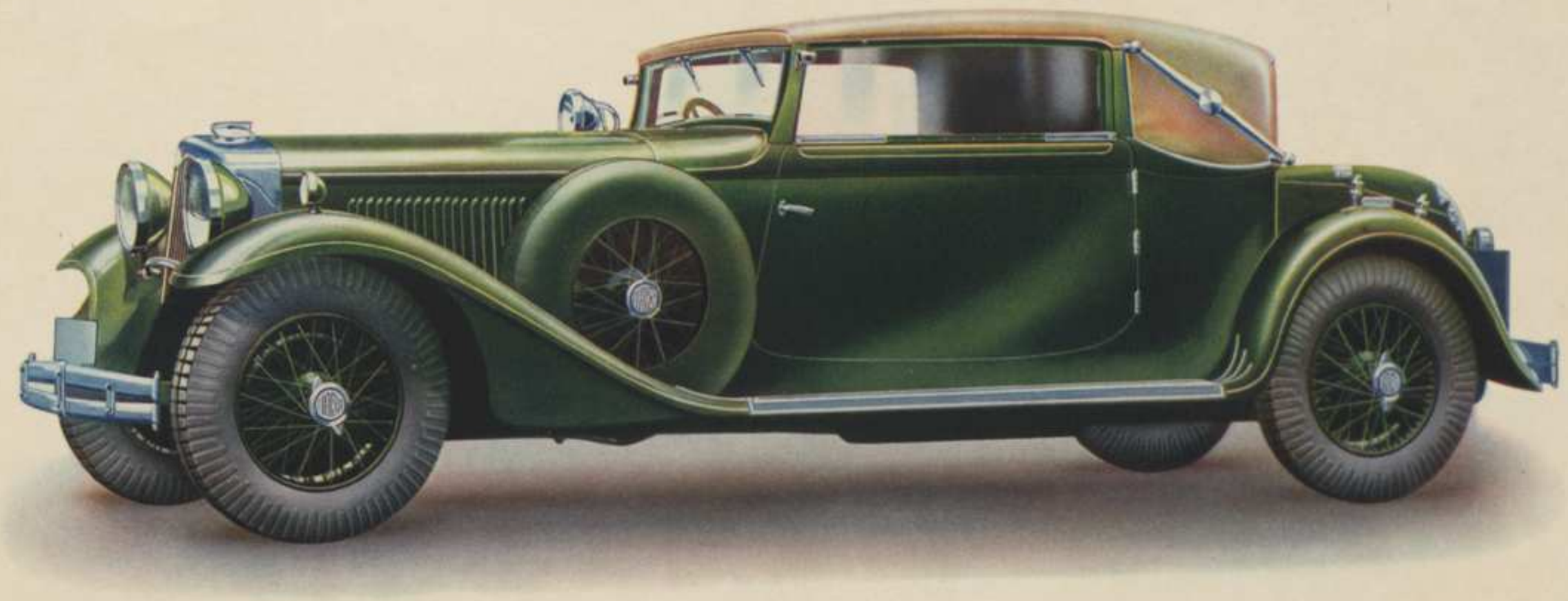
KEIN PRÄCHTIGES SCHIFF VERGANGENER ZEITEN TRUG SO STOLZ UND SCHWUNGHAFT SEINEN PATRIZIER AUF DEN GRÜNEN WOGEN DES SEES NEMI, WIE HEUTE DER ZWÖLFZYLINDER **TATRA** SEINEN BESITZER WEICH UND TROTZDEM FEST UMARMT. UND DREIHUNDERT DEMÜTIGER SKLAVEN KONNTEN NICHT SO PFEILSCHNELL ALLEN BEFEHLEN IHRES HERRN WILLFAHREN, WIE DAS GEHORSAME GEDÄMPFTE GEBRÜLL DER ZWÖLFZYLINDER DES TATRA-MOTORS





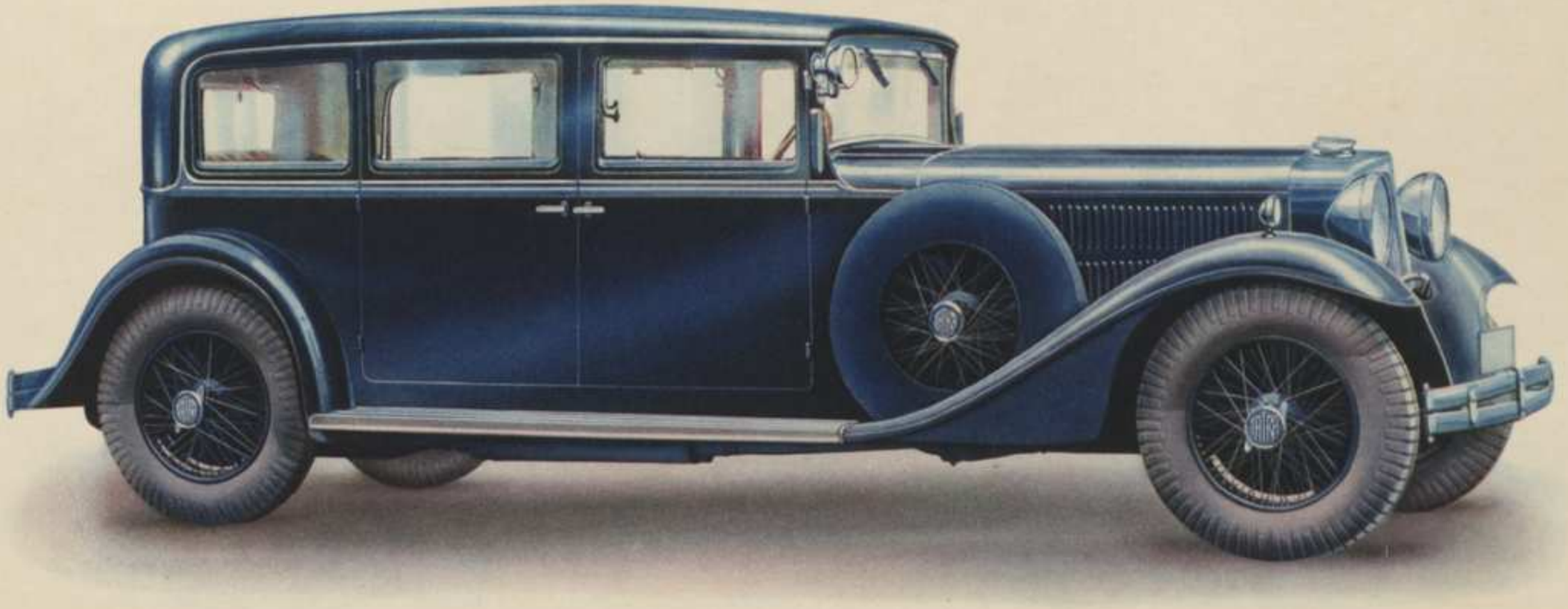
KAROSSERIEBESCHREIBUNG DER TYPE »80«.

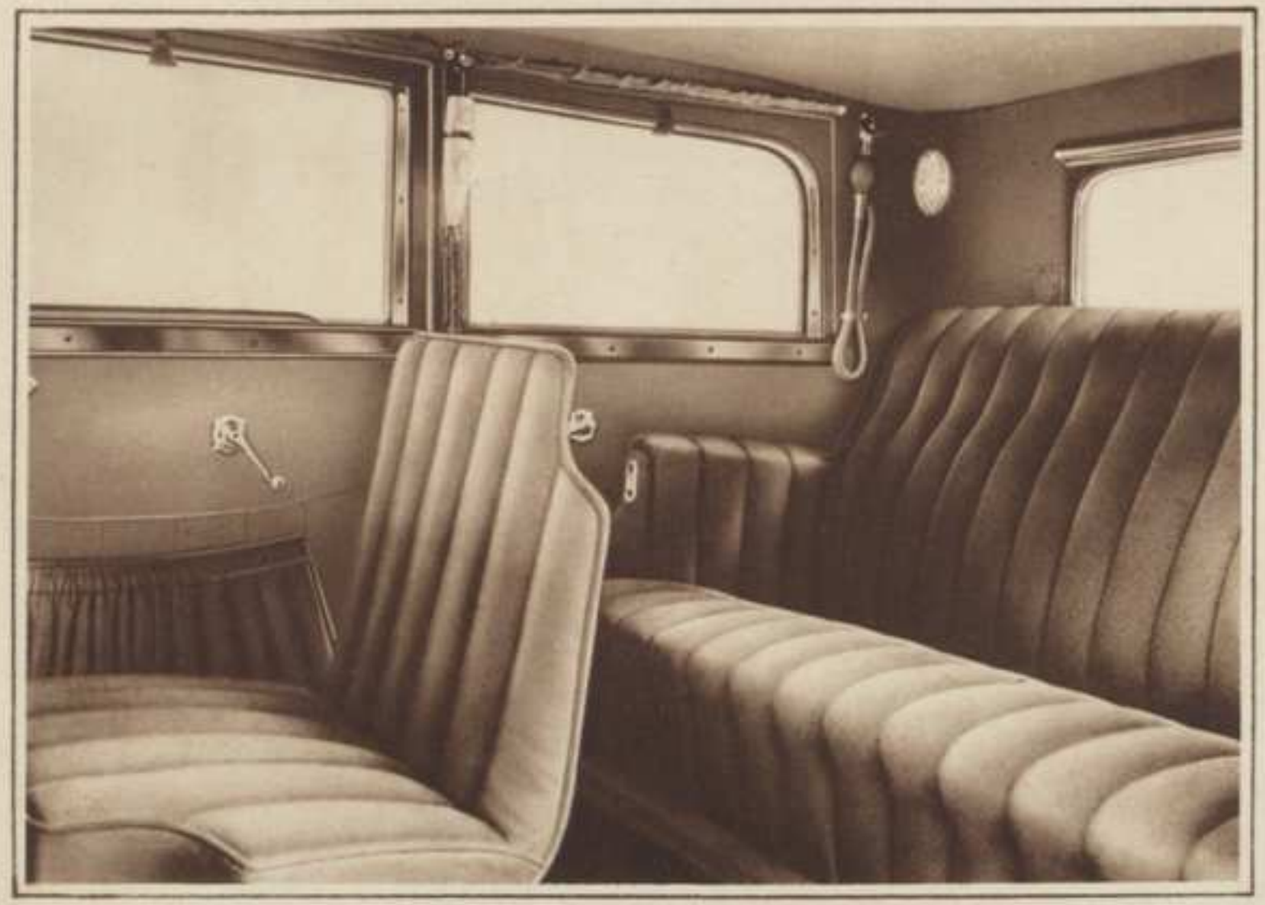
Die Karosserie ist 4 türig, **4 sitzig,** ohne Mittelwand, Polsterung in echtem Leder, Tuch oder Modestoff, Chauffeurfenster ist einteilig, mit einer Feststellschraube zum Öffnen. Sämtliche seitlichen Fenster sind mit Kurbelapparaten herablaßbar. Sämtliche Fenster sind mit splitterfreiem Glas verglast. Sonnenblendscheibe. Der Fond wird erleuchtet durch eine Deckenlampe und 2 Ecklampen. Fußboden mit Linoleum ausgeschlagen, darüber Wollteppiche. Verstellbare Fußrollen, Zeitungsnetz im Fond, Rouletten bei den rückw. Fenstern, Trittbretter mit Gummibelag. Die Karosserie ist blechverschalt und in Farbe nach Wunsch gespritzt. Die ganze Ausstattung des Wagens vornehm.



BESCHREIBUNG DES SPORTCABRIOLETS DER TYPE »80«.

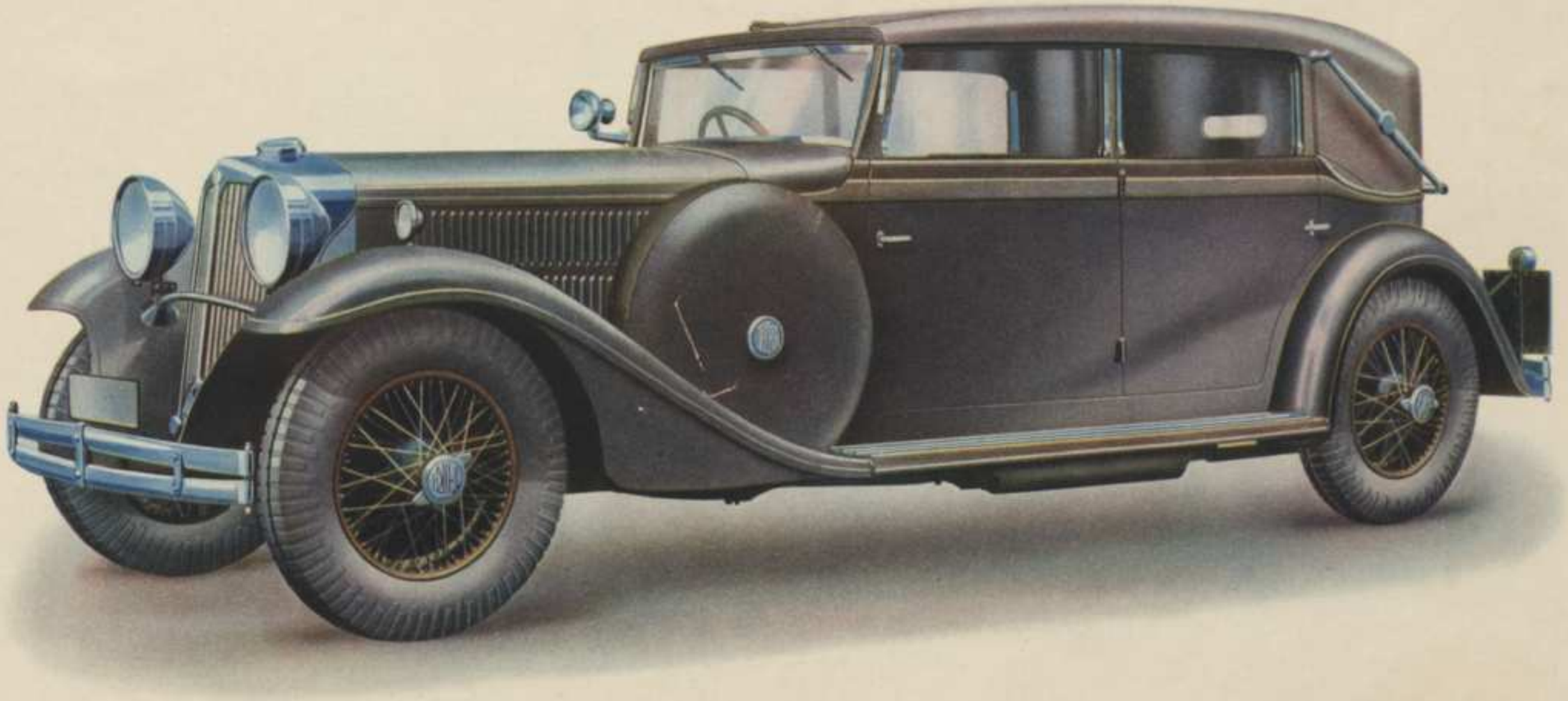
Die Karosserie ist 2 türig, bequem **4 sitzig,** das schräggestellte Chauffeurfenster ist einteilig, mit einer Stellschraube zum Öffnen. Die beiden Türfenster mit Kurbelapparaten herablaßbar. Sämtliche Fenster mit splitterfreiem Glas verglast. Polsterung in echtem Leder. Das zurücklegbare Verdeck ist mit wasserdichtem Gummistoff bespannt, innen mit passendem Stoff gefüttert, für das zusammengelegte Verdeck eine Hülle. Im rückw. Dachbogen eine Deckenlampe. Fußboden mit Linoleum belegt, darüber Teppiche. Verstellbare Fußrollen, Trittbretter mit Gummibelag. Frischluftheizung. Sämtliche blanken Beschläge verchromt. Die Karosserie ist blechverschalt, in Farbe nach Wunsch gespritzt. Die ganze Ausstattung äußerst vornehm.

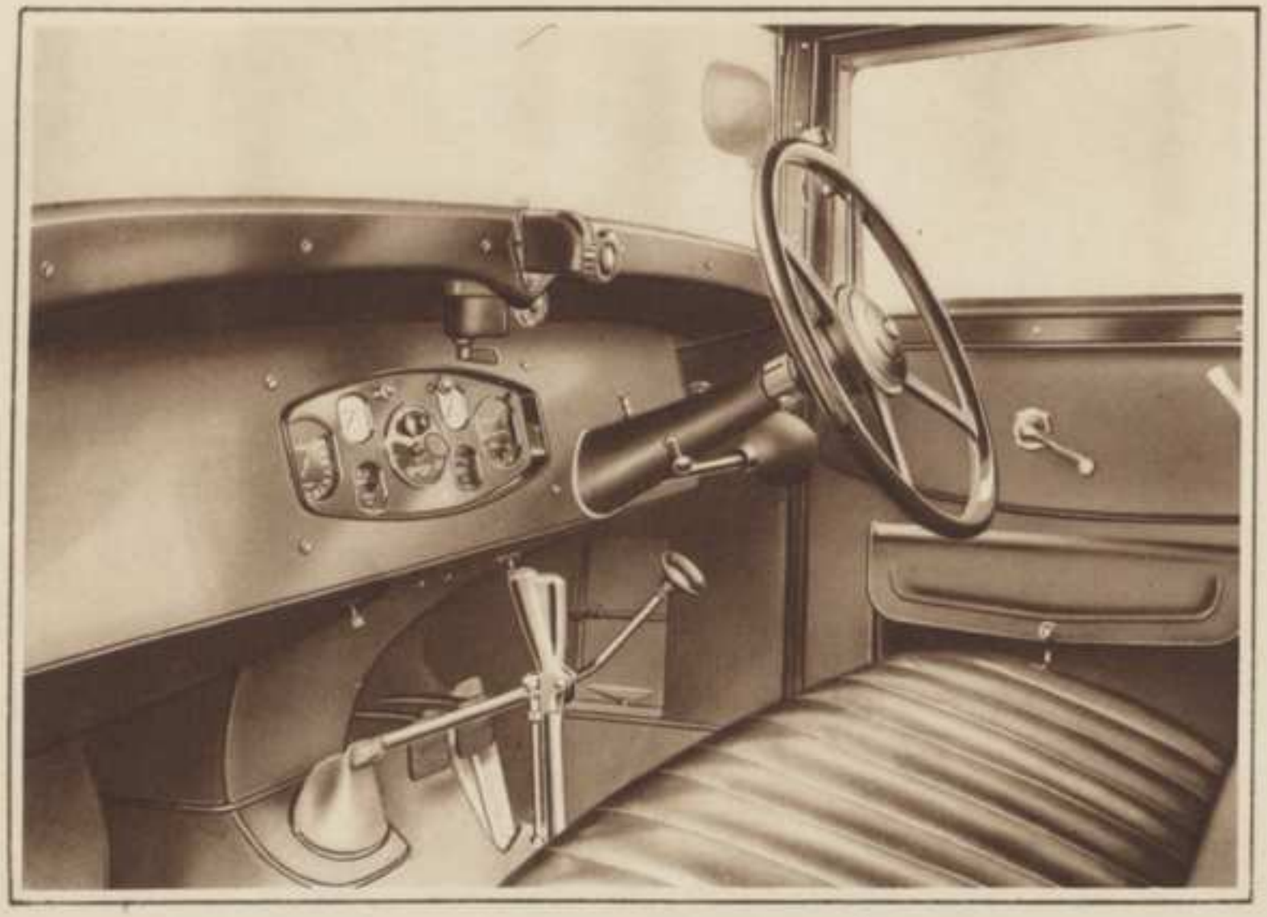




BESCHREIBUNG DER 6 SITZIGEN LIMOUSINE TYPE »80«.

Die Karosserie ist 4 türig, **6 sitzig,** mit einer Mittelwand. Die beiden Notsitze in Fahrtrichtung, Polsterung in echtem Leder, Tuch oder Modestoff, Chauffeurfenster ist einteilig, mit einer Feststellschraube zum Öffnen. Sämtliche seitlichen Fenster sind mit Kurbelapparaten herablaßbar. Die Scheiben in der Mittelwand sind verschiebbar. Die Verglasung sämtlicher Fenster erfolgt mit splitterfreiem Glas. Der Fond wird erleuchtet durch eine Decken- und 2 Ecklampen. An der Mittelwand ist eine Uhr. Fußboden mit Linoleum ausgeschlagen, darüber Wollteppiche. Verstellbare Fußrollen, Sprachrohranlage, Zeitungsnetz im Fond, Huthaken, Rouletten an sämtlichen Fenstern mit Ausnahme der Fenster des Chauffeurraumes, Trittbretter mit Gummibelag. Im Fond Frischluftheizung. Die Karosserie ist blechverschalt und in Farbe nach Wunsch gespritzt. Die ganze Ausstattung des Wagens vornehm.





BESCHREIBUNG DES CABRIOLETS TYPE »80«.

Die Karosserie ist 4 türig, **6 sitzig,** ohne Mittelwandfenster. Die beiden Notsitze in Fahrtrichtung, Polsterung in echtem Leder, Tuch oder Modestoff, Chauffeurfenster ist einteilig, mit einer Feststellschraube zum Öffnen. Die Türfenster sind mit Kurbelapparaten herablaßbar. Die Verglasung sämtlicher Fenster erfolgt mit splitterfreiem Glas. Der Fond wird erleuchtet durch eine Deckenlampe im rückw. Dachbogen. Das Verdeck ist in seiner ganzen Länge umlegbar, mit Gummistoff bespannt, innen mit passendem Stoff gefüttert. Im zusammengelegten Zustande wird das Verdeck in einer zur Farbe des Wagens passenden Hülle verpackt. Fußboden mit Linoleum ausgeschlagen, darüber Teppiche. Verstellbare Fußrollen, Trittbretter mit Gummibelag. Im Fond Frischluftheizung. Sämtliche blanken Beschläge sind verchromt. Die Karosserie ist blechverschalt und in Farbe nach Wunsch gespritzt. Die ganze Ausstattung des Wagens vornehm.

Locomobile

GASOLENE TOURING CARS

— Presented by —

The Springfield Automobile Co.,

AGENTS FOR

Steam, Electric AND Gasolene

Automobiles,

60 Main Street,

SPRINGFIELD, - MASS.

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CATALOGUE OF

Locomobile

Gasolene Touring Cars

MANUFACTURED BY

The Locomobile Company of America

BRIDGEPORT, CONNECTICUT

New York, 76th Street and Broadway
Bridgeport, Seaside Park

BRANCHES

Philadelphia, 249 North Broad Street
Boston, 15 Berkeley Street
Chicago, 1354 Michigan Avenue

MEMBER ASSOCIATION OF LICENSED AUTOMOBILE MANUFACTURERS

INTRODUCTION

THE gasolene automobile equipped with a four-cylinder vertical motor and sliding gear transmission has come to be recognized as the standard type of touring car. This general design has been in use for ten years by most of the Continental builders of automobiles, and all of them without exception use it now. In this country many of the manufacturers who for years championed the horizontal type of motor have been compelled to change their policy, and will build the front vertical type of motor for the first time during the coming season. Our position is the strongest of any American company, for when we began to build high-grade touring cars three years ago, we adopted the multi-cylinder vertical motor, the sliding gear transmission, the automatic carbureter and other important elements, realizing that a car thus equipped would eventually displace every other type. We have never built or experimented with any other form of gasolene car, our efforts having been devoted entirely to the development of the proper system; and as our experience in this direction exceeds that of any other American company, we believe that our car is entitled to greater consideration than any other of American make.

Our policy, formed at the outset and strictly adhered to throughout three years of most successful manufacture, has been to build cars equal even in the smallest details of design, material, and workmanship, to the very finest makes of France and Germany, but to design them for American conditions, and make them, for our roads, preferable to the foreign cars. That we have fully succeeded in carrying out this policy is proven by the splendid reputation which our product has gained. Our cars have given absolute satisfaction to owners and drivers wherever used, and should any prospective purchaser desire to correspond with Locomobile owners, we will gladly furnish a list of such persons residing in his locality.

The purchaser of a touring car is apt to be misled by a skilful demonstration and influenced unduly by such considerations as price and advertised horse-power. Select your touring car because of its intrinsic and lasting merit,

remembering that the best car is the most reliable one, the one always available for use, and which may be kept in its best running condition at a minimum of time and expense. *Such a car cannot be made cheaply or sold for a low price*, but it is economy to buy it.

Reliability can be obtained only by carrying out the proper design by the use of the most intelligently selected materials and by the most skilful and careful construction of each and every part. Locomobile cars are thus built, and may be depended on at all times absolutely.

During the coming season we will build four models 15-20 HP., 20-25 HP., 30-35 HP., 40-45 HP.; *all four cylinder cars with side entrance tonneau bodies.*

LOCOMOBILE, 15-20 HP.—20 HP. four-cylinder motor with magneto ignition and mechanically-operated valves. Pressed steel frame. Three-speed sliding gear transmission with direct drive on top speed. Double side entrance tonneau. Price, completely equipped, $2,800.

LOCOMOBILE, 20-25 HP.—25 HP. four-cylinder motor with jump spark ignition and automatic inlet valves. One-piece channel steel frame. Three-speed sliding gear transmission with direct drive on top speed. Double side entrance tonneau. Price, completely equipped, $3,700.

LOCOMOBILE, 30-35 HP.—35 HP. four-cylinder motor with magneto ignition and mechanically-operated valves. Pressed steel frame. Three-speed sliding gear transmission with direct drive on top speed. Double side entrance tonneau. Price, completely equipped, $5,000.

LOCOMOBILE, 40-45 HP.—45 HP. four-cylinder motor with magneto ignition and mechanically-operated valves. Pressed steel frame. Four-speed sliding gear transmission. Double side entrance tonneau. Price, completely equipped, $7,500.

In order to accommodate customers who do not care to wait for special cars, we have arranged to keep on hand certain standard bodies, ready for painting and finishing in accordance with the customer's wishes. For others who wish special cars, we can place any style of body on any chassis, finishing and equipping the same as may be desired. This plan effects a mean between the two extremes, namely, the American method of building a great many vehicles of the same style, color and equipment, and the European method whereby the manufacturer makes the chassis only and sells it to the customer, who has it equipped by his carriage builder in accordance with his wishes.

Our plant is located at Seaside Park, Bridgeport, Conn.—a short ride from New York City; and we urge all those interested in the purchase of high grade touring cars to visit our factory, where they may follow out every step of the construction and see for themselves the conscientious care which we exercise in every department of manufacture.

GENERAL FEATURES OF *Locomobile* CONSTRUCTION

Interchangeable Parts. All parts are made on jigs and special fixtures, and are gauged with great care; thus if it be necessary to replace any part at any time it will fit absolutely. In this respect the Locomobile has a decided advantage over the foreign-built car, in the construction of which interchangeability plays a subordinate part. French and German automobiles are made under the metric system, and American bolts and nuts are not available for casual repairs because they will not fit foreign threads; spare parts for them cannot be manufactured readily on American machinery, and it frequently takes unnecessary time and money to effect replacements. All of this is important to consider.

Not only are all small parts of the Locomobile made interchangeable, but the engine case, transmission case, and similar large components are built on box jigs, a method insuring proper uniformity. The idea of interchangeability is carried even further than this, for when the chassis is assembled the frame is placed underneath a drill carried by a jointed arm. Parts are located, clamped in position, and the frame holes drilled through the previously jig-drilled holes in the parts. Any one versed in manufacturing will appreciate that this is equivalent to jig drilling the chassis frame as well as all of the attached parts.

Securing of Parts. All nuts, bolts, and screws used in the Locomobile car are of special character; not ordinary bolts and nuts, such as may be bought at any hardware store, but are specially designed so as to give the greatest possible strength and are made of special material. All nuts and the ends of all bolts are case hardened. The system of nut, lock nut, and cotter pin for fastening is used throughout the car wherever needed. A single nut is used where a double nut would be an inconvenience and no advantage. Cotter pins are universally employed.

Forgings. Forgings are used throughout the Locomobile car wherever possible, because they are superior to castings of any kind and for the following reasons:

1. Forging stock is practically unlimited, which allows a proper selection of material for each part; castings are confined to a few compounds.

2. The possibility of imperfections in forgings is reduced to a minimum; castings are liable to have flaws.

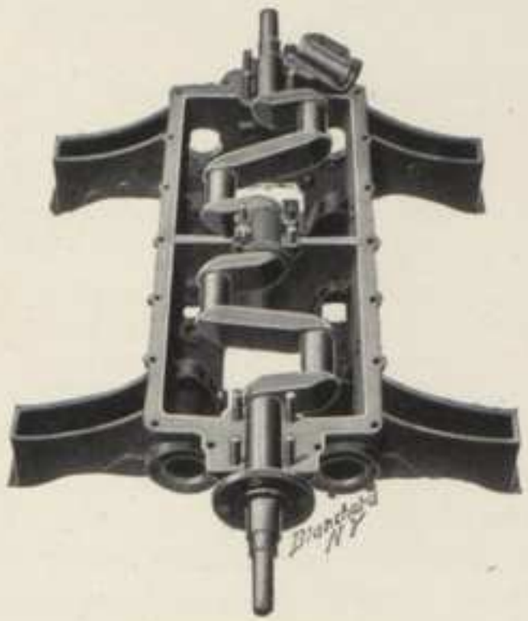
3. The forging, unless made of tool steel or hardened steel, will bend before it breaks. Castings have no such elasticity, and are

brittle, there being very little difference between the ultimate tensile strength and the elastic limit.

4. Forgings are more easily reproduced, and can always be repaired, whereas it is practically impossible to repair a casting.

Bearings. Locomobile bearings consist of highly-polished steel axles running in bronze journals. The advantages of such a form of construction are as follows:

1. There are no balls to crack and grind up the bearing.
2. There are no rollers to crack and cause trouble.
3. More simple than the ball bearing or the roller bearing.



Engine Base and Crank Shaft
Showing Construction of Locomobile Bearings

4. When properly made, as in the Locomobile, is practically frictionless, is very easily lubricated, and requires practically no attention.

5. A special feature of Locomobile engine and transmission bearings is the easy method of adjustment: in case of any slight wear it is necessary only to remove the bearing cap and take out thin strips or "shims" of copper from each side of the bearing until the proper adjustment is made, after which the bearing cap is replaced and bolted on. This method is very simple and convenient because it does away with the necessity for any filing and can be attended to by a novice without any danger of throwing the shaft out of line.

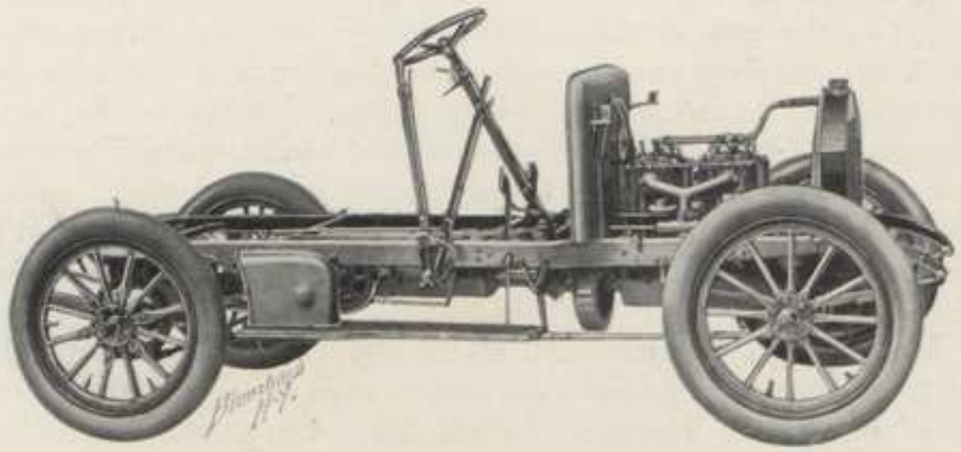
Large Oil Pipes. All oil feed pipes are of generous size. This is advantageous because the inside walls are apt to be coated with oil in a more or less gummy condition, and unless such pipes are of fairly good size, the oil cannot flow properly.

Grease Cups. There are only two grease cups requiring regular attention; these are of large size, located at each side of the car and entirely accessible.

Quartz Blast. All castings and forgings are subjected to a blast of granulated quartz having very hard cutting edges, with the result that such parts are given a smooth, clean, and perfect finish. Another advantage of this treatment is that it brings out any defects in the forgings or castings which would otherwise remain unsuspected.

Horse Power Rating. We use the Continental method of rating cars, and in order to be conservative we have always underrated the horse-power of our cars purposely.

CHASSIS CONSTRUCTION



Locomobile Chassis, Type E, 15-20 HP

Chassis Frame. The chassis frame is constructed of steel and carries all of the machinery and operating devices, the entire assemblage resting on four semi-elliptic springs secured by stout clips to substantial axles of the solid forged type.

Channel Steel Frame. We have retained our patented frame, which consists of two lengths of channel steel, bent and welded at the middle of the two ends, forming a rectangular one-piece construction of great strength and flexibility, the sides of which have full channel section between the springs, where the greatest strength is needed, and which taper to form at the ends so as to eliminate unnecessary weight. The engine and the transmission are carried on heavy steel false frames, the connections being made throughout by nut, lock nut, and cotter pin.

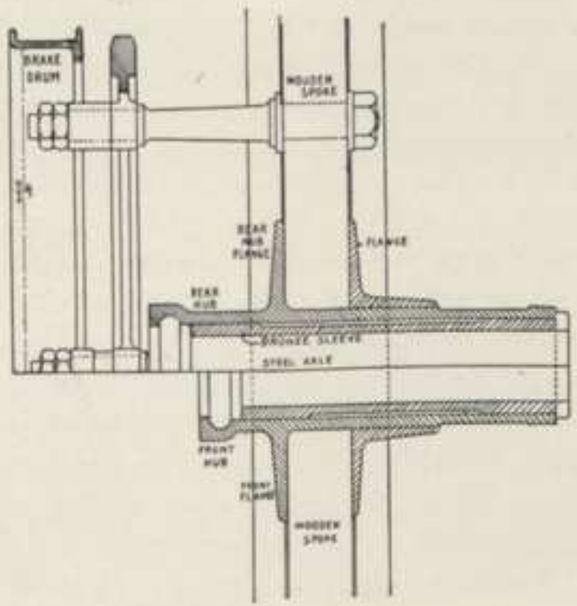
The channel steel frame has been used continuously since we began the production of high-grade gasolene touring cars, and has always given the most perfect results. It will be used on our 20-25 HP. car during the coming season.

Pressed Steel Frame. We have adopted a pressed steel frame of our own design which has been used on cars run for long periods of time over rough country roads, thus having been thoroughly tested under very severe conditions.

The motor is secured to the pressed steel side-members of the frame by flanges projecting from each side of the engine base, and the transmission case is strongly secured to stout flanged cross-members of pressed steel. The rear corners are braced with triangular gusset plates. The rivetting is done by hand throughout. The 15-20 HP., 30-35 HP., and 40-45 HP. cars are equipped with the Locomobile pressed steel frame.

Springs. Locomobile springs are of the semi-elliptic type; are made out of the very best material obtainable; are of unusual width and length; and are strongly secured to the axles. Each Locomobile spring is tested beyond any possible load which it will be called upon to carry. A part of this test is to bend the spring not only flat, but one-half inch beyond flat—in other words, reverse circle to which it is made.

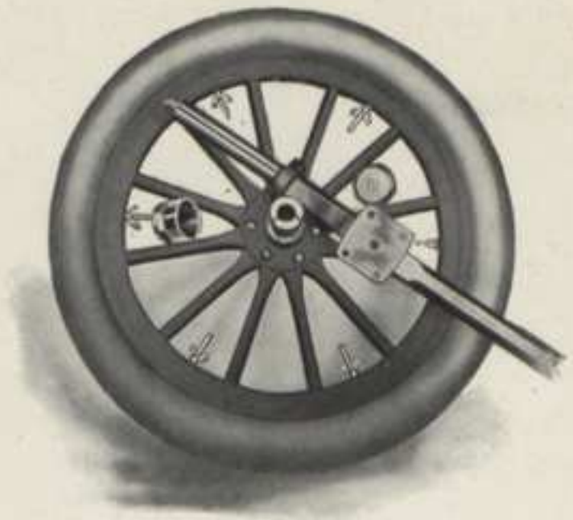
Axles. All Locomobile axles are forged from a special tough steel having high tensile strength and high elastic limit, with great flexibility. We have never had an axle break, a record which will



Locomobile rear wheel hub and sprocket support, and front hub construction. The front and rear axles are drop-forged and hand-welded in the middle. The rear axle ends and the front axle forks are integral with the axles.

impress every prospective purchaser. The solid rear axle is the best possible form of construction, and is specially suited to a heavy tonneau car intended to be run at speed over our rough American roads. It is simple and strong, and should it become sprung through any accident, can be straightened at the nearest blacksmith shop, whereas a divided rear axle lacks this very important advantage.

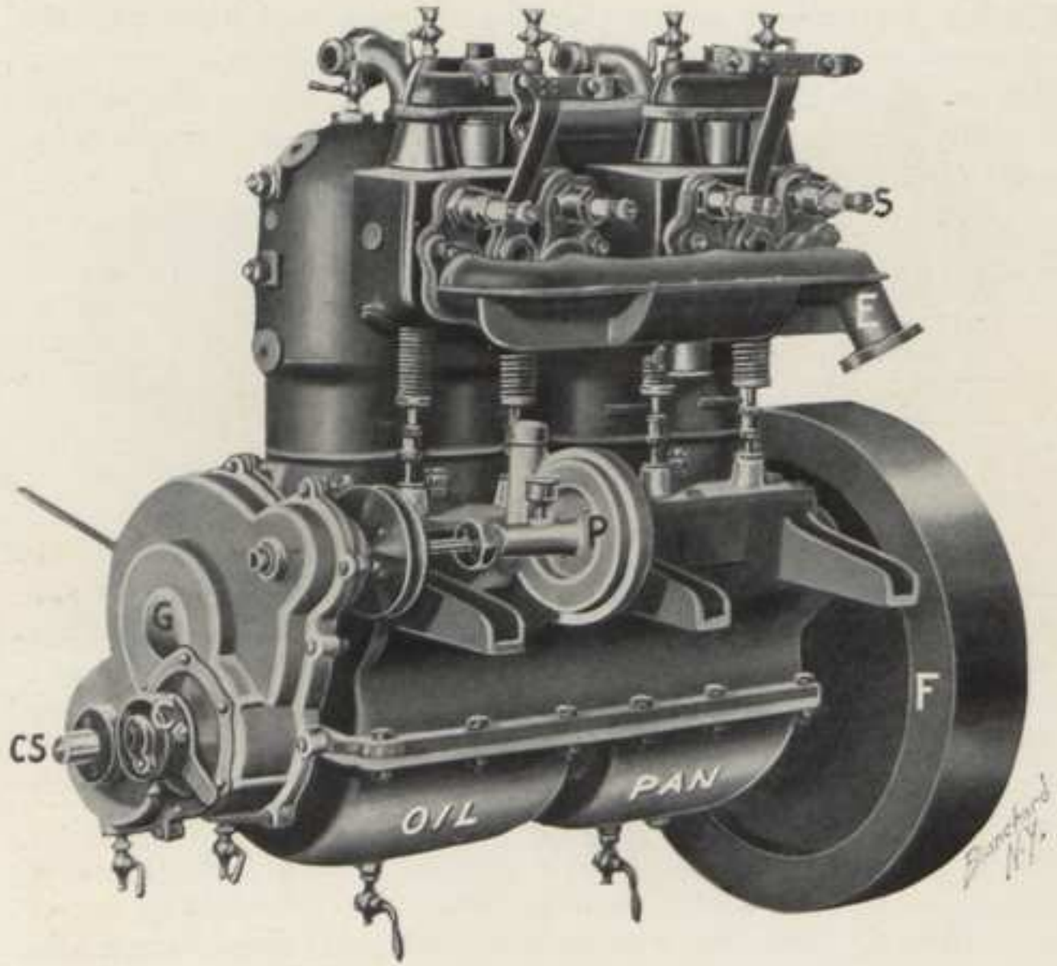
Wheels. These are of the artillery type, constructed of carefully-selected second-growth hickory. The bearings consist of phosphor bronze boxes forced into the hubs of the wheels. All axle bearings are integral with the axle, are ground to a finish and are of ample proportions. (For instance, the axle bearing on our 20-25 HP. car is 1½ inches in diameter and 8 inches long.) The hub cap is hollow and contains a considerable quantity of grease, provision being made for feeding it to all parts of the bearing.



Wheel, Axle, Axle Bearing, and Hub Cap of 20-25 HP. Locomobile

Tires. The tires used on Locomobile cars are of ample size, really larger than is necessary. As an example of this it may be stated that the Tire Association rated our 15-20 HP. car for a 3½-inch tire, but we voluntarily equipped this model with a 4-inch tire.

MOTOR CONSTRUCTION



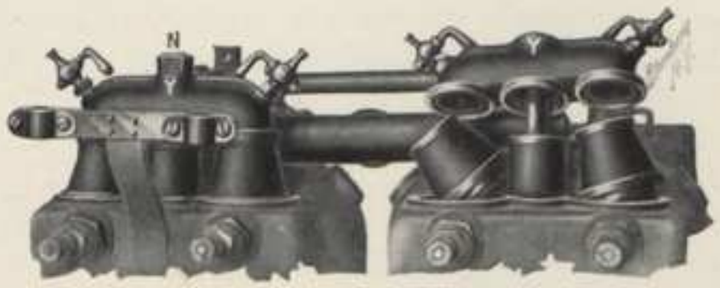
Motor of Type D Locomobile, 20-25 HP. Exhaust Side

S—Spark Plug
E—Exhaust
P—Pump
CS—Crank Shaft
F—Fly Wheel
G—Governor Case

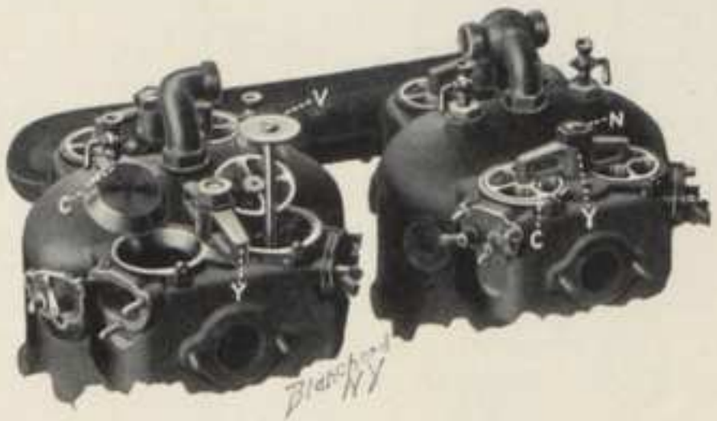
THE four-cylinder vertical motor is used exclusively, placed at the front of the car under an aluminum bonnet, the sides of which can be released conveniently and lifted so as to expose the machinery. All Locomobile motors are of the four-cycle type, using moderately high compression—about 80 pounds gauge.

The cylinders are cast in pairs with cylinder heads, water jackets, valve boxes, all in one piece. This form of construction makes the engine shorter and more compact than when separate cylinders and separate water jackets are used; and it reduces the number of parts and the number of joints, thereby preventing leaks in the water jackets and loss of compression through fine crevices. The pistons are of cast iron, ground to cylindrical form first, and afterwards ground to a taper at the upper ends to allow for the expansion due to great heat at this point. The piston rings are also of cast iron, four in number, and the entire surface of each is ground to a finish. The wrist pins are of special steel, hardened and ground, and are so designed that they cannot work loose from the pistons. Connecting rods are drop forged in "I" section and are connected to the crank shaft by large plain bearings. The crank shaft consists of a solid piece of steel, pressed out in rough form on an hydraulic forge, treated afterwards, subjected to nine finishing operations, passing from one machine to another and being inspected after each operation, until it is finally completed, with a brilliant polish and perfectly balanced. The crank-shaft bearings are three in number, made adjustable by thin copper shims, placed on each side of each bearing.

Inlet valves are very readily removed as may be seen from the illustrations.



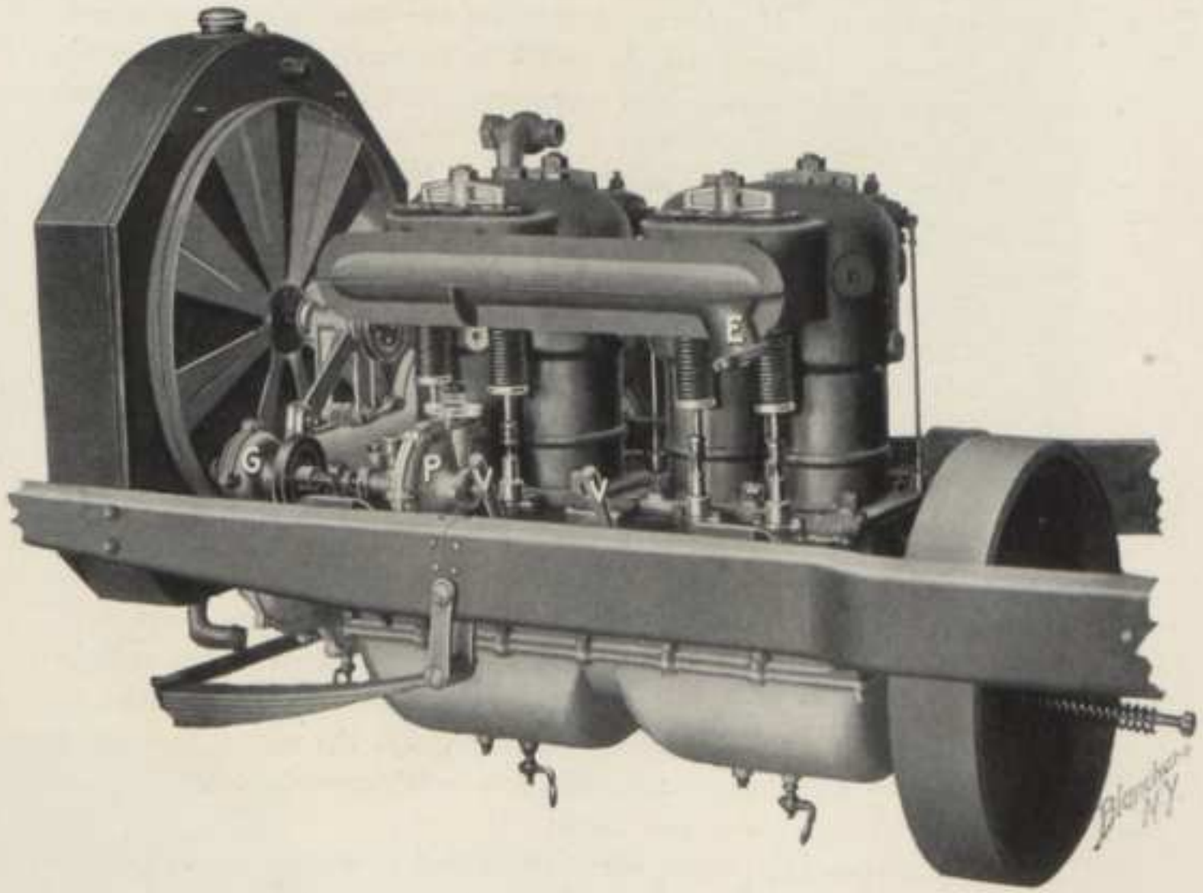
20-25 HP. Motor, showing ease with which inlet valves may be removed. Unscrew nut N to remove yoke Y



REMOVAL OF VALVES FROM 30-35 HP. MOTOR

Loosen the nut N and turn the yoke Y so as to permit the removal of valve-caps C, thus exposing valve V, which may be taken up and out of the valve boxes

All mechanically-operated valves are interchangeable, and special provision is made for their ready removal: a ledge is cast on each cylinder wall opposite the valve spring and on this is placed a tool (furnished with the car), by means of which the spring is compressed, the key removed, and the valve then taken out of the engine. The exhaust valves are special steel, cam rollers and cam shafts are hardened and ground, the latter being driven by a gear, protected and running in oil. Valve push rods are made adjustable and are so guided in their vertical motion that they cannot turn in their bearings.



Motor of Type H Locomobile, 30-35 HP. Exhaust Side

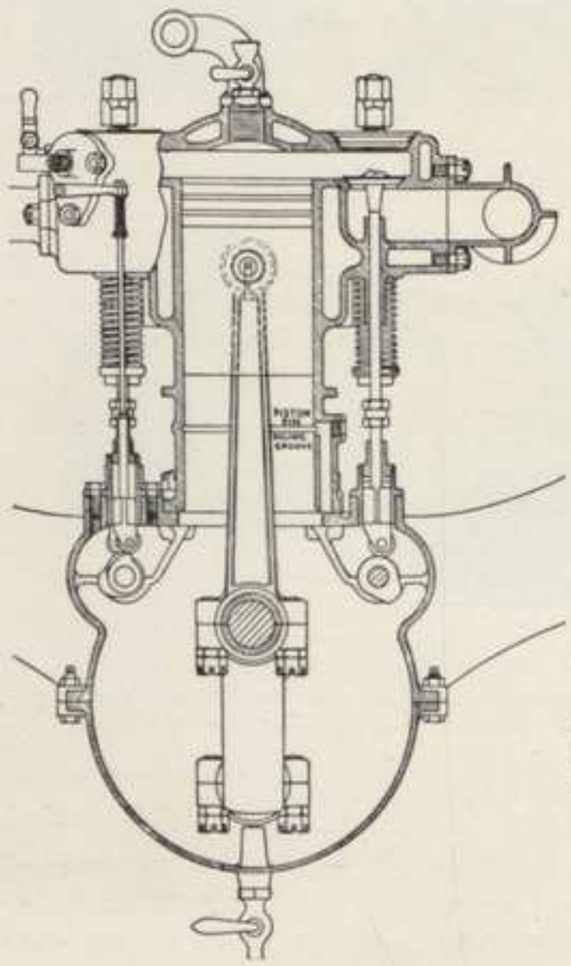
E—Exhaust G—Gear which drives pump
P—Pump VV—Vent Pipes for crank cases

Locomobile motors are designed to run at a moderate speed, 900 to 1,000 revolutions per minute, controlled by a throttle valve which is manipulated either by a hand lever or foot pedal, so that by opening or closing the valve the motor may be speeded up to 1,000 revolutions a minute or more, or slowed down to a few hundred revolutions per minute. A centrifugal governor acting on the throttle valve prevents the engine from racing when the clutch is thrown out, and it is thoroughly protected by a casing of aluminum, in which are also located the timing gears.

The muffler is located at the extreme rear and is very efficient, a long and large exhaust pipe assisting the action. When desired the muffler may be cut out from the front seat and the exhaust discharged into the atmosphere.

The crank case oil pan consists of an aluminum casting, having two spherical compartments partitioned so that the amount of oil in each is the same whether the car is ascending or descending a grade. From this oil pan the lubrication is splashed to the various parts of the motor, special provision being made for the lubrication of the wrist pins. Feed pipes of generous size lead to each crank case and the flow of oil through them is regulated by adjustable sight feeds placed on the dash-board. A vertical stand-pipe in each crank case determines the level at which the oil should be carried; the correct level can be tested at any time by opening a pet-cock at the bottom of the oil pan. Each crank case is ventilated and the vent-pipes, being provided with detachable caps, afford a very convenient method of introducing oil into the crank cases.

Every Locomobile motor when assembled is placed on the testing stand, where the conditions resemble those of actual service upon the road as nearly as possible; the engine draws gas from its own carbureter, and drives through its own clutch a dynamo of known efficiency. The horse-power of the motor thus can be obtained within a small fraction, and no engine is allowed to leave the Testing Department until it meets specifications which are in excess of our advertised horse-power. The readings of each motor when tested are preserved.



Vertical Section of Locomobile Motor.

This illustration gives a general idea of the construction of the motors in Types E, H and F.

JUMP SPARK IGNITION

Our experience with this form of ignition on four-cylinder cars has enabled us to bring it to a wonderful state of perfection, and we will equip our 20-25 HP. car with the jump spark during the coming season.

Current is obtained from two storage batteries of two cells each, furnishing sufficient electricity to run the car from 1,000 to 2,000 miles without recharging. When the starting plug is inserted in an orifice on the dash-board and either set of batteries switched on, the current passes to a conveniently-located commutator which is gear driven and provided with a removable cover which forms a protection against short-circuiting from mud or water. The commutator directs the current to the primary circuits of specially-constructed coils carried in a polished hard-wood box on the dash-board. The high-tension current is led to the spark plugs by special cables consisting of copper wire surrounded by pure rubber, rubber composition, and an outer surface of tough fabric. This forms a strong and flexible structure which prevents electrical leakage and short-circuiting. The cables are connected to the spark plugs by short pieces of brass chain which afford a proper conducting medium for the high-tension current and which eliminate a frequent source of trouble, snapping of wire terminals.

The spark plugs are of our design; are substantial in character; may be very readily taken apart for the purpose of cleaning; are provided with special insulation; and have the advantage of preventing short-circuiting if the points are covered with soot.

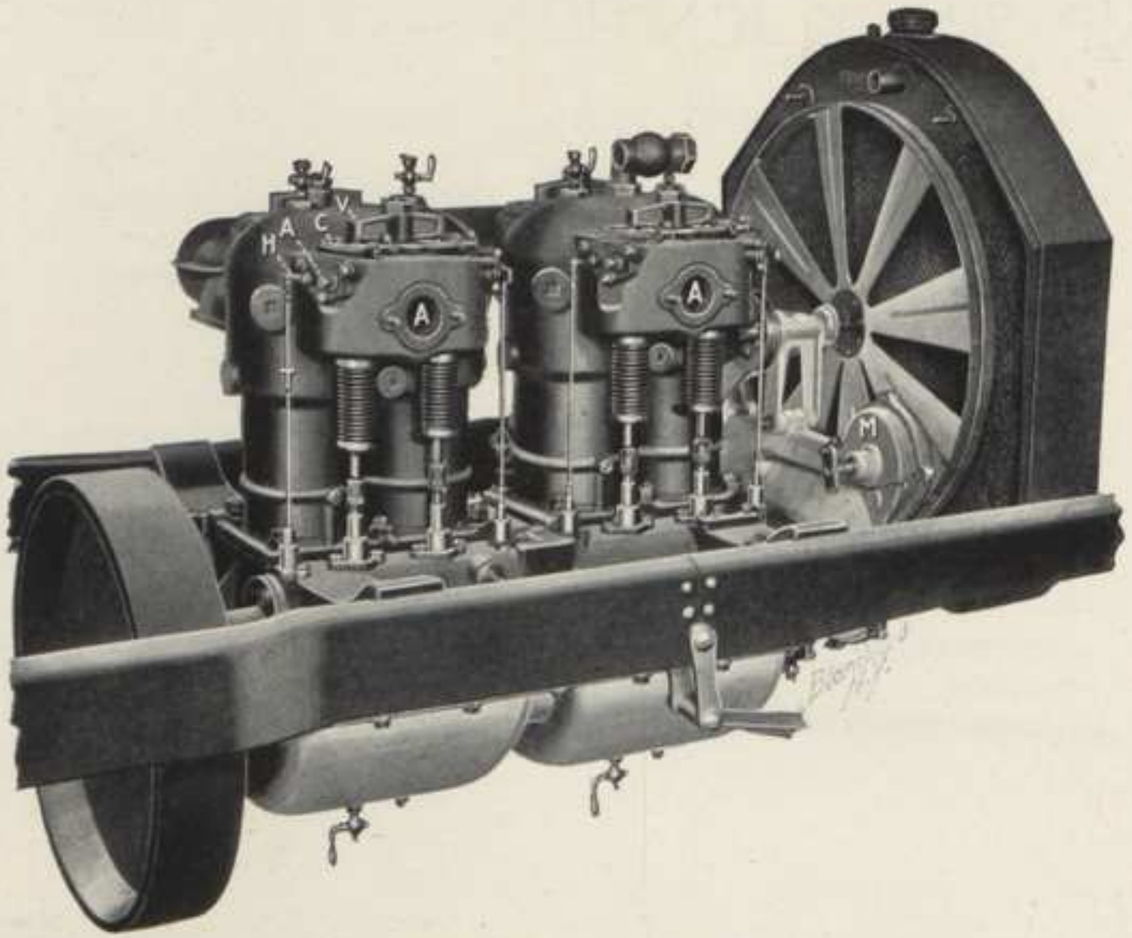
20-25 HP. Motor, showing how the flexible cables are connected to the Spark Plugs by short pieces of brass chain.

Construction of Spark Plug, showing Complete Plug at Right

MAKE AND BREAK IGNITION

In this form of ignition the current is obtained from a low-tension magneto positively driven by a gear running in a dust-proof compartment. The magneto shaft is in two parts, joined by flexible couplings of hardened steel, a form of construction which makes it possible to remove the magneto conveniently if desired. This system of ignition is very simple, effective and reliable, and in adopting it we have given the same close attention to details as in our jump spark ignition.

Low Tension Magneto
used on Locomobile Car, Types E, F and H



Locomobile Motor, Type H, 30-35 HP.

Admission Side. Showing details of Make and Break Ignition System.
Some of the pipes and other fittings have been removed for the sake of clearness

AA—Admission of Gas to Cylinders
M—Gear driving Magneto.
V—Valve Yoke
C—Valve Cap
A—Outside End of Anvil
H—Hammer Lever
T—Tapper Rod

Some of the occasionally stated disadvantages of the "make and break" system, together with the methods we use to overcome the same, may prove interesting:

1. Undue wear of the moving parts which actuate the make and break mechanism. This we avoid by hardening and grinding all of the wearing parts as well as making provision for taking up lost motion. The latter is accomplished by adjustable rods.

2. Complication and large number of parts necessary to operate the make and break mechanism. As a single example of the simplicity and compactness of the Locomobile "make and break" system, it may be stated that one cam shaft does three operations:

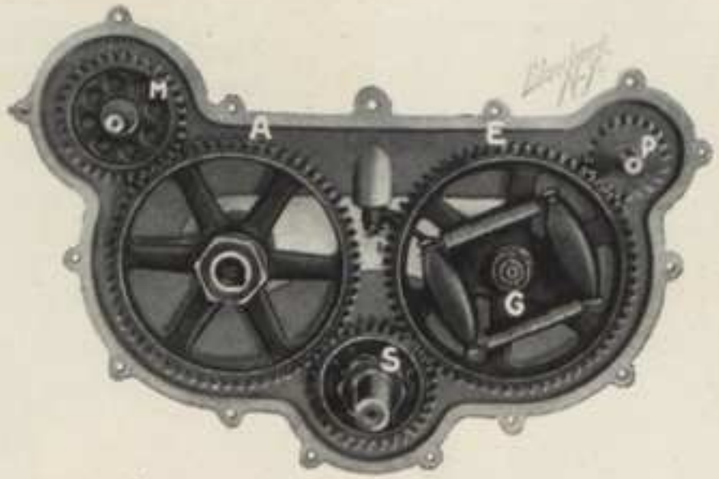
(*a*) Actuates the admission cams.

(*b*) Actuates the "make and break" cams.

(*c*) Advances or retards the time of ignition.

3. Wearing of "make and break" parts. In the Locomobile engine the anvil consists of a cylindrical rod, and if this becomes worn where the hammer strikes it, it is necessary only to turn this rod slightly, so that the hammer strikes a new part of the circumference. By this method the wear can be compensated for without having to renew any parts.

4. If motor is missing explosions, it is difficult to tell which cylinder is giving trouble. In our car we have provided each cylinder with a knife-blade switch mounted on an insulated arm, an attachment which makes it very easy to locate any cylinder which is not firing properly.



Arrangement of Gears on 30-35 HP. Motor—

S—Gear on Crank Shaft
G—Governor
E—Exhaust Cam Shaft Gear
P—Gear Driving the Centrifugal Pump
A—Admission Cam Shaft Gear
M—Gear Driving Magneto

Same arrangement of Gears on 15-20 HP. Motor and 40-45 HP. Motor

THE CARBURETER

We will continue to use the extremely simple Carbureter which we have placed on all of the gasolene cars we have built. It is of the constant-level, float-feed type, automatic in action, very accessible, and utterly reliable. Some of the good points are as follows:

1. The atomizer nozzle may be unscrewed and instantly removed, a feature of obvious convenience.

2. The gasolene tank is placed under the front seat and at such an elevation above the Carbureter that no matter how steep a hill is ascended, there is always ample head on the Carbureter and thus always a sufficient flow of fuel. This arrangement conceals the gasolene tank without making it inconvenient to replenish the supply, and obviates the necessity of any pressure feed.

3. A Strainer or Separator prevents dirt or water from getting into the Carbureter, and a valve permits such impurities to be drawn off at the bottom and outside of the float chamber.

4. An air mixing chamber whereby the temperature of the air supply to the Carbureter may be varied at will.

5. The Carbureter may be flooded by a device placed on the dash-board without having to lift the side of the bonnet.

COOLING SYSTEM

We have equipped our cars with the cellular type of radiator for two summers, and the results have been so satisfactory that we will continue to use it exclusively during the coming season. This system of cooling has much to recommend it, for the amount of water carried is very small; the efficiency of the radiator is very high; it is convenient to use; and imparts a very neat and attractive appearance to the vehicle. We have not been troubled with the ordinary difficulties arising from the use of the cellular radiator—namely, overheating, clogging and leaking; immunity from the first two troubles is doubtless due to the fact that we use a radiator of very generous size, and leaking has been prevented by securing our radiators in a manner which obviates any racking effect—the principal cause of leaking. The cooling water is circulated by a reliable centrifugal pump positively driven by a gear and can be removed very easily; a pressure gauge placed on the dash-board convenient to the eye of the operator indicates the manner in which the water is circulated—any falling off in the efficiency of the system due to any slight cause is shown at once on the gauge. The fan which draws cold air through the radiator is driven by a thick belt running in recessed pulleys.

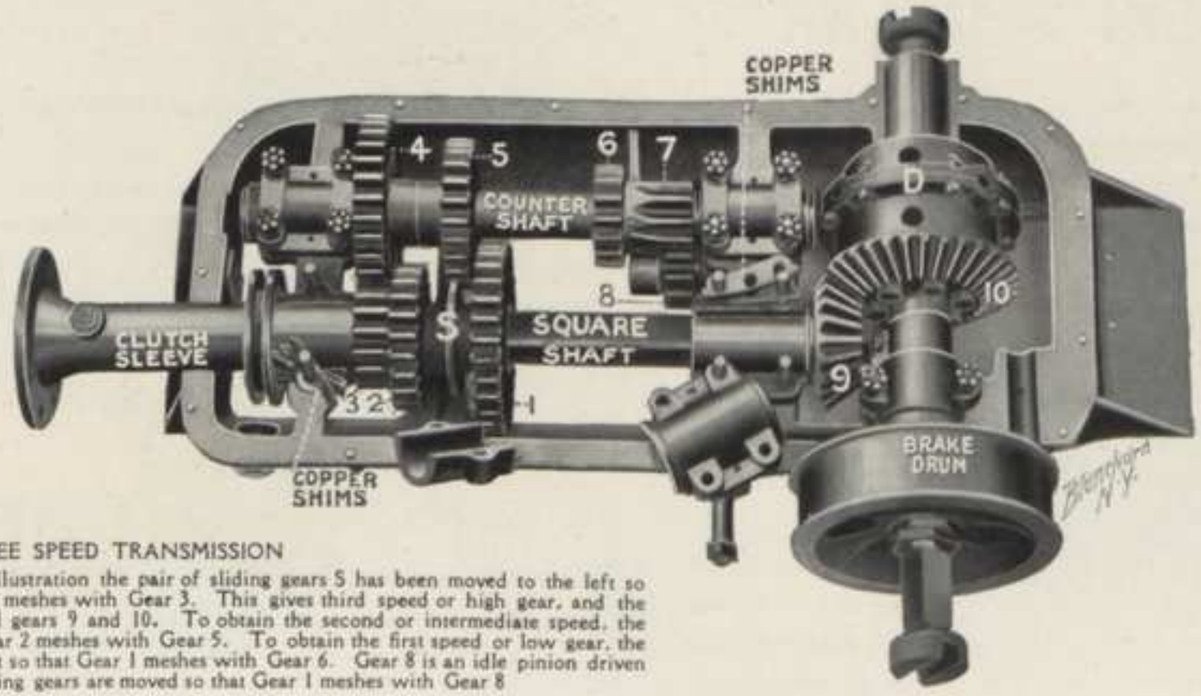
We have paid such close attention to the design and constructional details of this cooling system that customers have had no trouble; a statement which will interest drivers of gasolene cars who have had annoying delays on the road due to inefficient or improperly constructed water circulating systems.

Centrifugal Water Pump, showing internal construction.

TRANSMISSION

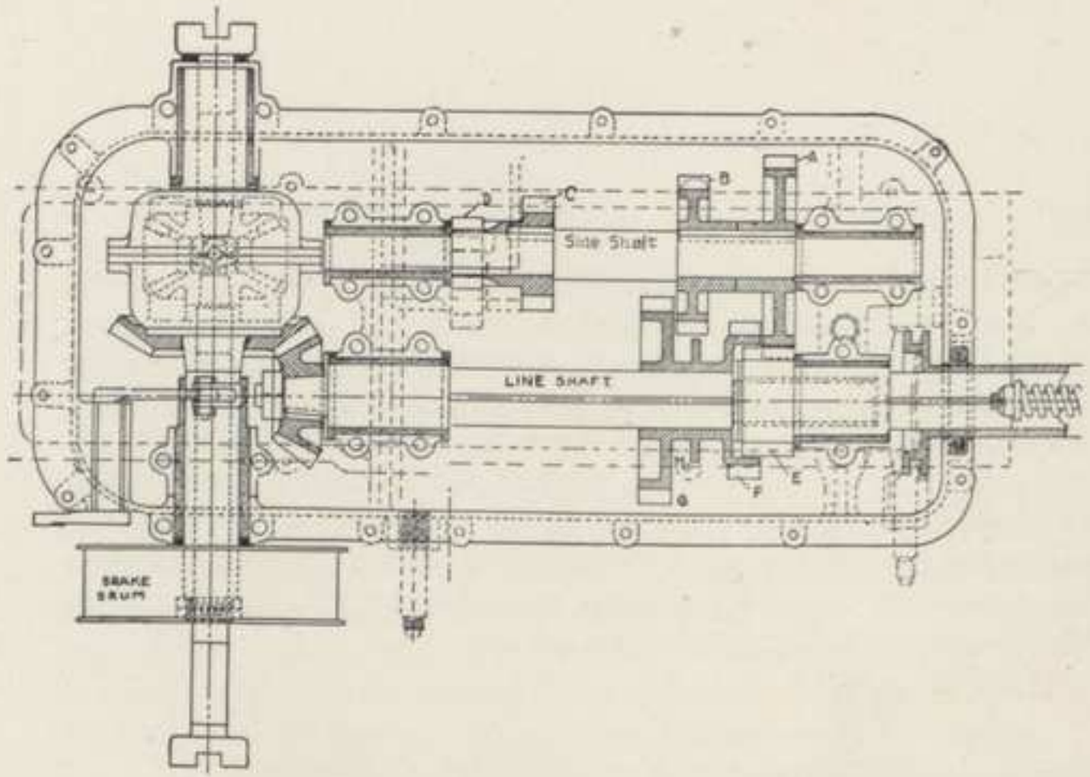
A cone clutch transmits the power from the engine to the transmission, and stout springs placed underneath the clutch leather permit it to engage gradually with the fly wheel so that the car starts slowly and smoothly. The clutch is so designed that there is no end thrust on the crank shaft or transmission gears. Power is transmitted through the gears to sprockets located at the ends of the differential shaft, which shaft contains the differential gear, and is provided with universal joints which compensate for any twisting of the frame when the car is being driven over rough roads. Heavy roller driving chains transmit the power from the front sprockets to the rear wheel sprockets and distance rods are provided to adjust the chains to the proper tightness.

It is highly important that the transmission case be very strong to withstand the stresses imposed by the rapidly revolving gears and shafts, and many cases have cracked because strength was sacrificed to weight or the casting made of some improper composition. After much investigation we produced two years ago a special bronze manganese case having an ultimate tensile strength of 85,000 pounds per square inch, and this material has always given perfect results. We have never had a failure from its use.

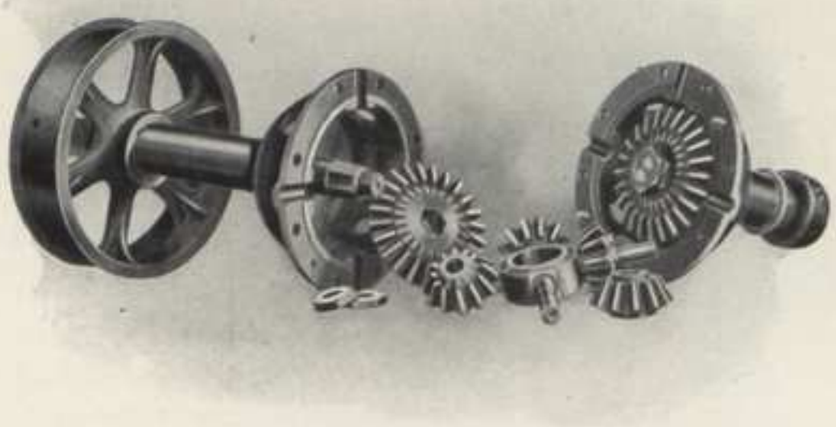


THREE SPEED TRANSMISSION

View taken from underneath. In the illustration the pair of sliding gears 5 has been moved to the left so that an internally-cut gear on Gear Wheel 2 meshes with Gear 3. This gives third speed or high gear, and the drive is direct from the engine to the bevel gears 9 and 10. To obtain the second or intermediate speed, the sliding gears are moved to the right until Gear 2 meshes with Gear 5. To obtain the first speed or low gear, the sliding gear is moved still further to the right so that Gear 1 meshes with Gear 6. Gear 8 is an idle pinion driven by Gear 7, and to obtain the reverse, the sliding gears are moved so that Gear 1 meshes with Gear 8



Horizontal Section of Three-Speed Locomobile Transmission



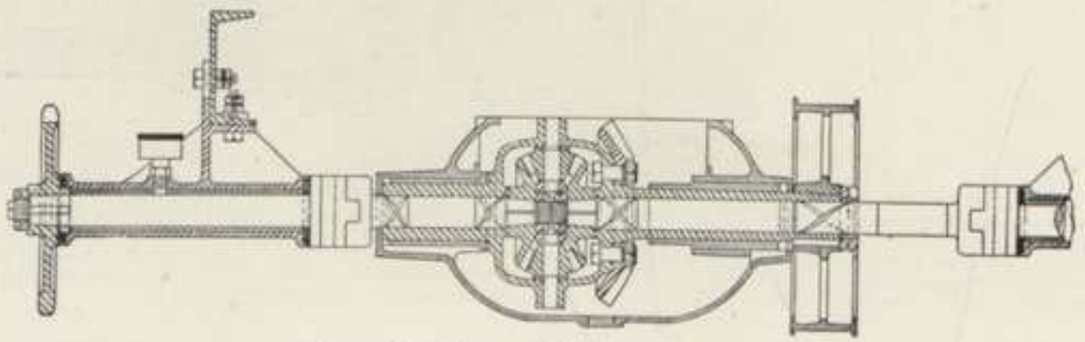
View Showing the Differential Gears Removed

A feature of the Locomobile case is the use of aluminum for the top and bottom covers; the central portion, which takes up the stresses caused by the gears and shafts, is constructed of the tough bronze described.

Gears must combine the quality of toughness with extreme hardness, and to obtain this combination is a metallurgical problem of no mean proportions. We have tested gears made from material supplied by most of the important mills in this country and have imported material as well. Our experiments have been thorough and complete, the results most satisfactory, and, while we do not care to make our details of manufacture public, we would state that many and many a Locomobile gear box has been run for 20,000 miles or more without giving any trouble and being in most excellent condition after such long service.

All transmission bearings consist of steel shafts hardened and ground running in special bronze journals made adjustable by shims.

The transmission case contains the system of sliding gears, the clutch-shifting mechanism, the differential gear, and the same lubricant oils them all. The case is dust-proof and stuffing boxes are placed where the jack shaft and clutch enter it.



Locomobile Differential Shaft Construction

THE STEERING MECHANISM

We have always used the greatest possible care in the design and construction of the steering-gear mechanism with the result that we never had a failure from this part of the car. We consider this an excellent example of the safety and substantial construction of the Locomobile.

Steering is effected by a hand wheel mounted on an inclined column and fitted with irreversible worm-gear mechanism, encased and supplied with lubricating grease. Should the worm-gears become slightly worn, the lost motion can be taken up by means of two eccentric bearings. The universal steering joint is packed in grease and protected by a leather boot. The connections throughout are made in the most approved manner, and as an example of this it may be stated that the steering arm at the base of the steering column is finished with an hexagonal taper and the steering connecting rod is finished with an hexagonal hole which fits over the end of the steering arm and is held firmly in place by a lock nut and cotter pin. An interesting feature is the use of a buffer spring in the steering connecting rod to compensate for the shock produced by rough roads.

Steering Gear Construction—
W—Worm Gear
S—Sector
E—Eccentric Bearing for the purpose of providing a means for taking up wear

OPERATING DEVICES

Locomobile cars have great power in proportion to weight; thus for all ordinary running the operator has merely to control the direction of the car by the wheel and the speed of the car by the throttle. The throttle valve may be manipulated by a lever placed on the steering column or by a pedal conveniently placed near the right foot. The spark is retarded by pulling up a ratchet lever on the steering column and advanced by depressing the same lever. Where make and break ignition is used a button on the steering wheel may be pressed in order to ground the current from the magneto. Two foot pedals are provided; the left one disconnects the clutch from the engine only, whereas the other is used to apply the Running Brake which is of the double-acting variety and located on the differential shaft. The Emergency Brakes are also double-acting, are of large diameter, and located on the rear wheels. These brakes are manipulated by a single ratchet lever placed at the right of the car. No matter which set of brakes is used, the clutch is withdrawn before the brakes take hold.

Locomobile LIGHT TOURING CAR, TYPE "E," 15-20 HP.

SPECIFICATIONS

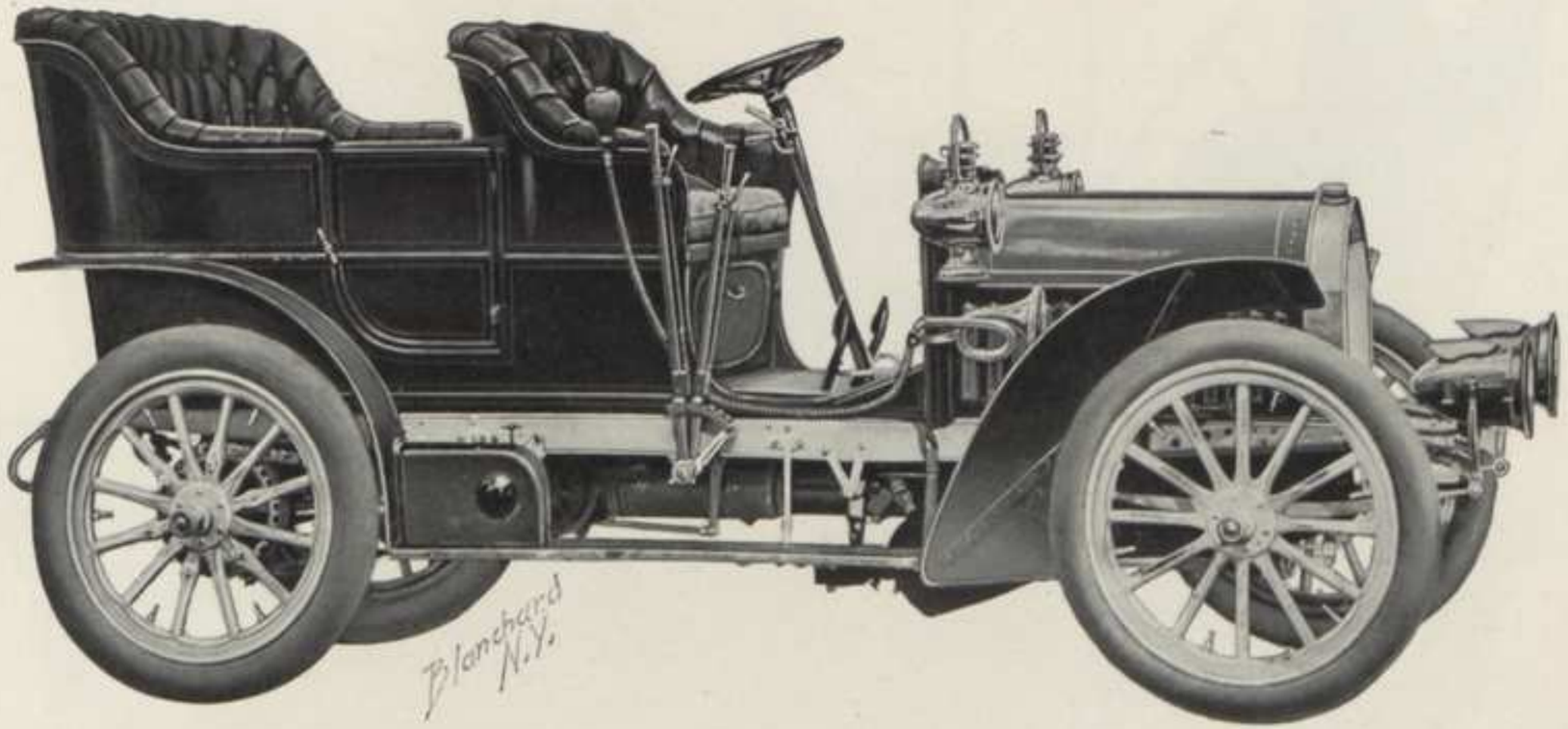
BODY	Side Entrance Tonneau.
MATERIAL	Selected and thoroughly seasoned wood.
SEATING CAPACITY	Four in addition to driver.
COLOR OF BODY	Optional.
COLOR OF CHASSIS	Optional.
WHEELS	Artillery type, 32 in. in diameter.
TIRES	Double tube detachable pneumatics.
SIZE OF TIRES	32 in. x 4 in. front and rear.
LENGTH OF SPRINGS	36 in. front, 44 in. rear.
WIDTH OF SPRINGS	1¾ in.
CHASSIS FRAME	Pressed steel.
MOTOR	4-cylinder vertical type, 20 HP.
CYLINDERS	3¾ in. bore, 4½ in. stroke, water cooled.
LUBRICATION	Mechanical. Sight feeds on dash-board.
IGNITION	Make and break, gear-driven magneto.
COOLING SYSTEM	Cellular radiator with fan.
PUMP	Centrifugal type, gear driven.
SPEEDS	Three forward, one reverse.
BRAKES	One foot brake, two emergency brakes.
WHEEL BASE	92 in.
LENGTH OVER ALL	11 ft. 9 in.
WEIGHT	1800 lbs. approximately.
FUEL CAPACITY	18 gallons.

GENERAL EQUIPMENT

(2) Acetylene Headlights, brass finish.
(1) Separate Generator for same, brass finish.
(2) Kerosene Side Lamps, brass finish.
(1) Rear Signal Lantern, brass finish.
(1) Tool Bag.
(1) Brass Horn with flexible brass tubing.
(1) Carriage Jack.
(2) Rubber Storm Aprons.
(2) Floor Mats.
(1) Tarpaulin to protect machinery from mud and water.

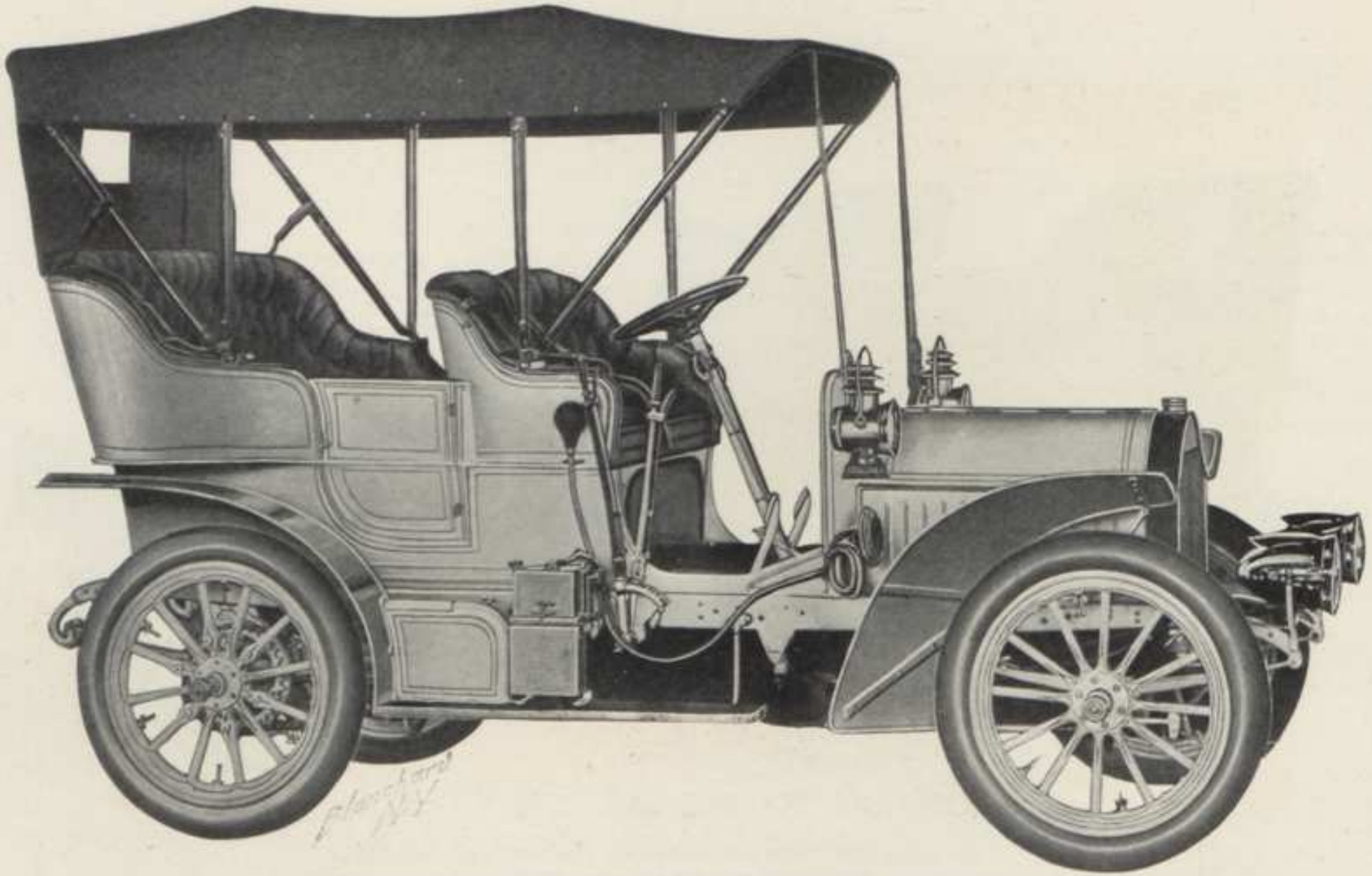
TOOL EQUIPMENT AND EXTRA PARTS

(1) Monkey Wrench, 10 in.
(3) Socket Wrenches.
(6) Set Wrenches for hexagonal nuts.
(1) Hub Cap Wrench.
(1) Combination Pliers, 6 in.
(1) Screw Driver, 4 in.
(1) Pet Cock Wrench.
(1) Tool for compressing valve spring.
(1) Oil Can with long spout.
(1) Tire Pump.
(1) Tire Repair Kit.
(2) Tire Hooks.
(1) Engine Valve complete.
(4) Valve Keys.
(1) Valve Spring.
(1) Right Igniter Group
(1) Left Igniter Group.
(1) Igniter Hammer.
(1) Igniter Anvil.
(4) Lava Bushings.
(6) Mica Washers.



LOCOMOBILE TOURING CAR, TYPE E, 15-20 HP.

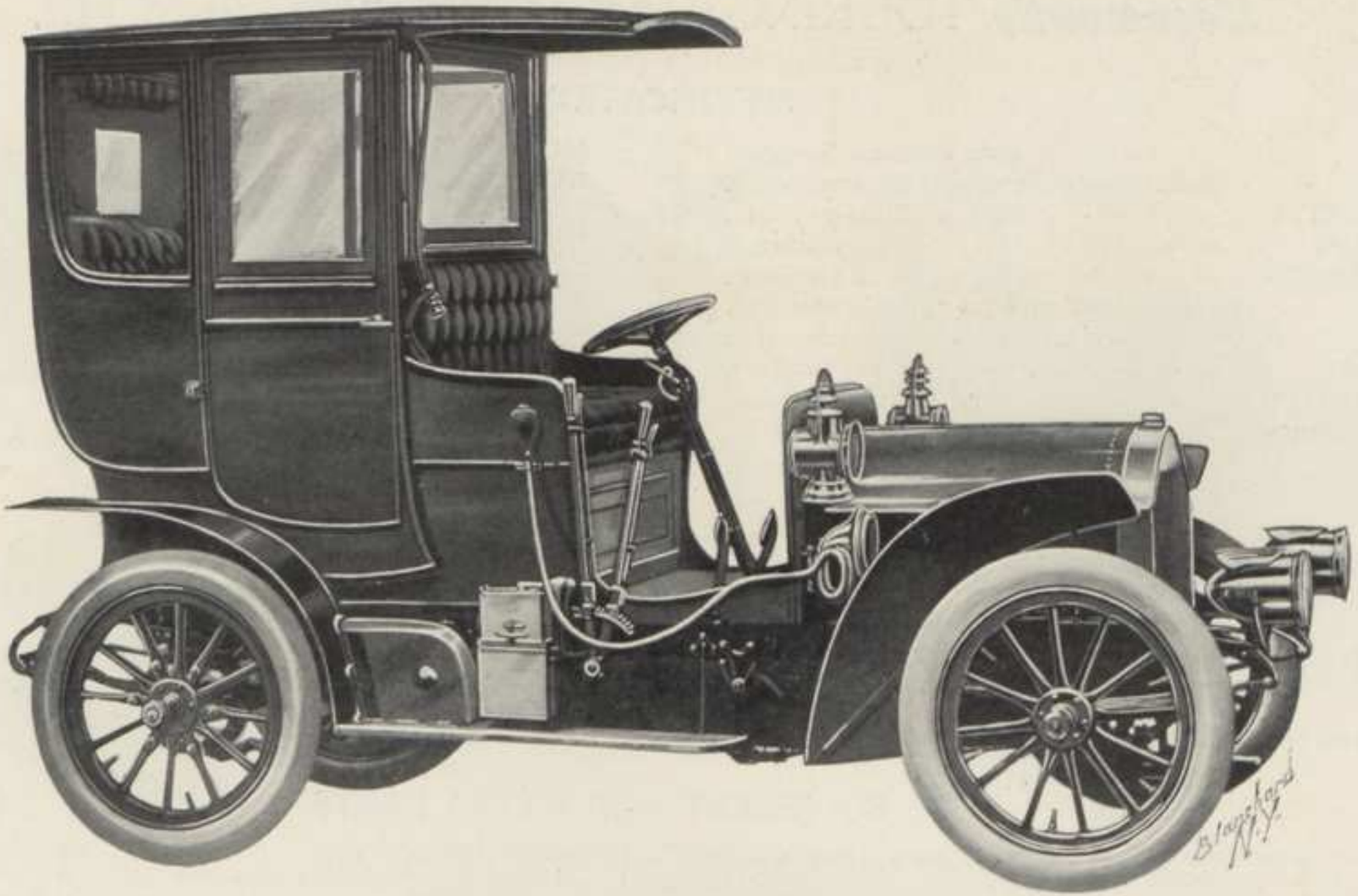
Price of Chassis, including general equipment, tools and extra parts, $2,550
Price of complete car, with complete equipment, $2,800



LOCOMOBILE TOURING CAR, TYPE E, 15-20 HP.

Price of Chassis, including general equipment, tools and extra parts, $2,550
Price of complete car, with complete equipment, $2,800

Tops are extra, varying somewhat in price. Any style of top can be attached. The top shown in this illustration is $125, attached and having either side or rear curtains.



LOCOMOBILE TOURING CAR, TYPE E, 15-20 HP.—COUPE ROCKAWAY BODY

Price of Chassis, including general equipment, tools and extra parts, $2,550
Price of complete car with complete equipment, $3,300

Locomobile TOURING CAR, TYPE "D," 20-25 HP.

SPECIFICATIONS

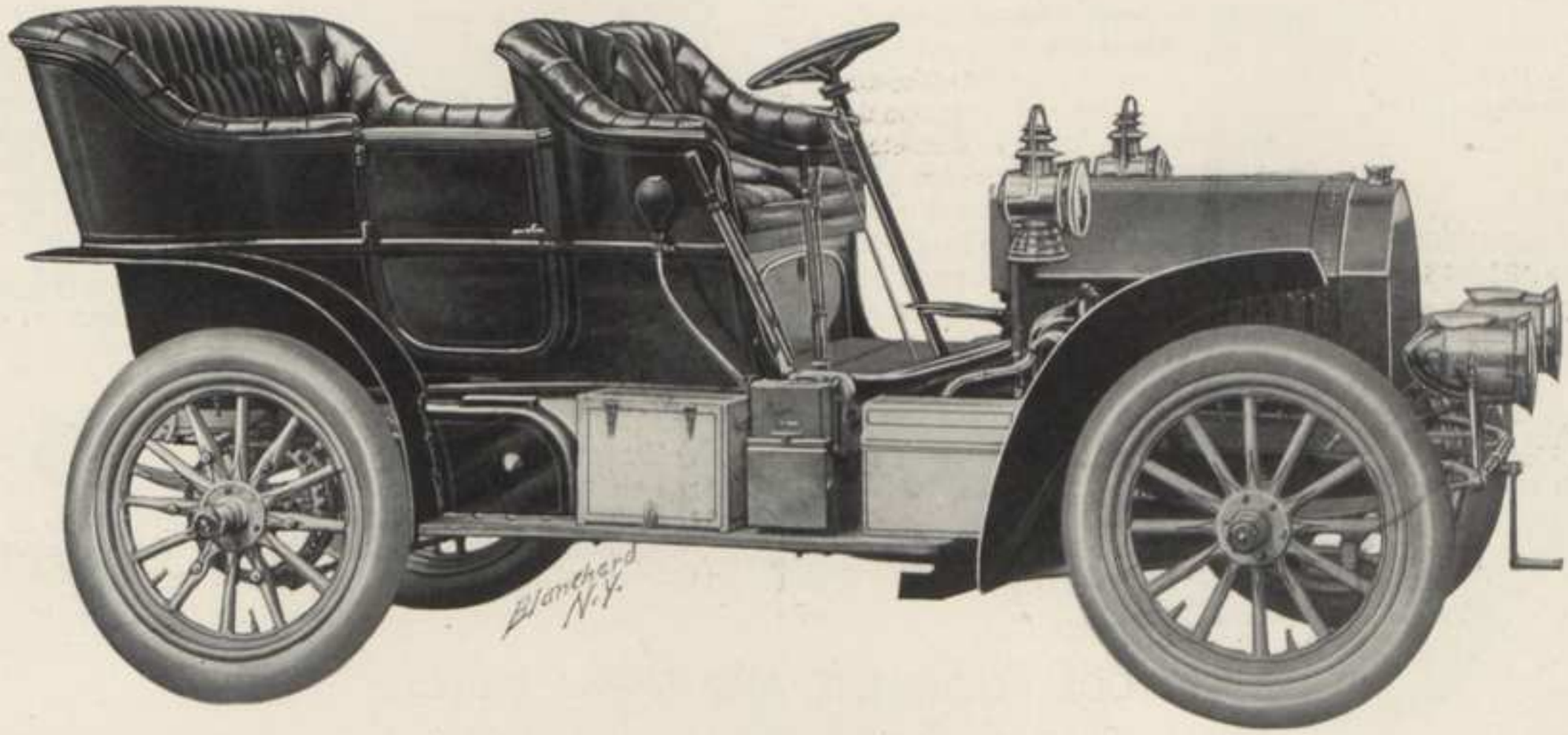
BODY	Side Entrance Tonneau.
MATERIAL	Selected and thoroughly seasoned wood.
SEATING CAPACITY	Six in addition to driver.
COLOR OF BODY	Optional.
COLOR OF CHASSIS	Optional.
WHEELS	Artillery type, 34 in. in diameter.
TIRES	Double tube detachable pneumatics.
SIZE OF TIRES	34 in. x 4½ in. front and rear.
LENGTH OF SPRINGS	36 in. front, 44 in. rear.
WIDTH OF SPRINGS	2 in.
CHASSIS FRAME	Channel Steel.
MOTOR	4-cylinder vertical type, 25 HP.
CYLINDERS	4 in. bore, 5 in. stroke, water cooled.
LUBRICATION	Gravity. Sight feeds on dash-board.
IGNITION	Jump spark system.
COOLING SYSTEM	Cellular radiator with fan.
PUMP	Centrifugal type, gear driven.
SPEEDS	Three forward, one reverse.
BRAKES	One foot brake, two emergency brakes.
WHEEL BASE	96 in.
LENGTH OVER ALL	12 ft. 2 in.
WEIGHT	2200 lbs. approximately.
FUEL CAPACITY	18¼ gallons.

GENERAL EQUIPMENT

(2) Acetylene Headlights, brass finish.
(1) Separate Generator for same, brass finish.
(2) Kerosene Side Lamps, brass finish.
(1) Rear Signal Lantern, brass finish.
(1) Tool Bag.
(1) Brass Horn with flexible brass tubing.
(1) Carriage Jack.
(2) Rubber Storm Aprons.
(2) Floor Mats.
(1) Tarpaulin to protect machinery from mud and water.
(1) Case for Lubricating Oils and Greases.

TOOL EQUIPMENT AND EXTRA PARTS

(6) Set Wrenches for hexagonal nuts.
(4) Socket Wrenches for hexagonal nuts.
(1) Wrench for large union nuts.
(1) Hub Cap Wrench.
(2) Monkey Wrenches (one 4 in. and one 10 in.)
(1) Combination Pliers, 6 in.
(1) Screw Driver, 4 in. size.
(1) Tool for compressing valve spring.
(1) Cold Chisel, ¾ in. width.
(1) Ball Pein Hammer, 10 oz.
(1) Oil Can with long spout.
(1) Tire Pump.
(1) Tire Repair Kit.
(2) Tire Hooks.
(1) Tool for removing admission valve from bonnet.
(1) Admission Valve Complete.
(2) Admission Valve Springs.
(2) Admission Valve Spring Cups.
(4) Admission Valve Bonnet Gaskets.
(4) Admission Valve Keys.
(4) Exhaust Valve Keys.
(1) Spark Plug Complete.
(2) Spark Plug Porcelains.
(4) Spark Plug Gaskets.
(3) Commutator Brush Springs.
(2) Starting Plugs.



LOCOMOBILE TOURING CAR, TYPE D, 20-25 HP.

Price of Chassis, including general equipment, tools and extra parts, $3,400
Price of complete car with complete equipment, $3,700

Tops are extra and vary somewhat in price. Any style of top desired by the customer can be attached

Locomobile TOURING CAR, TYPE "H," 30-35 HP.

SPECIFICATIONS

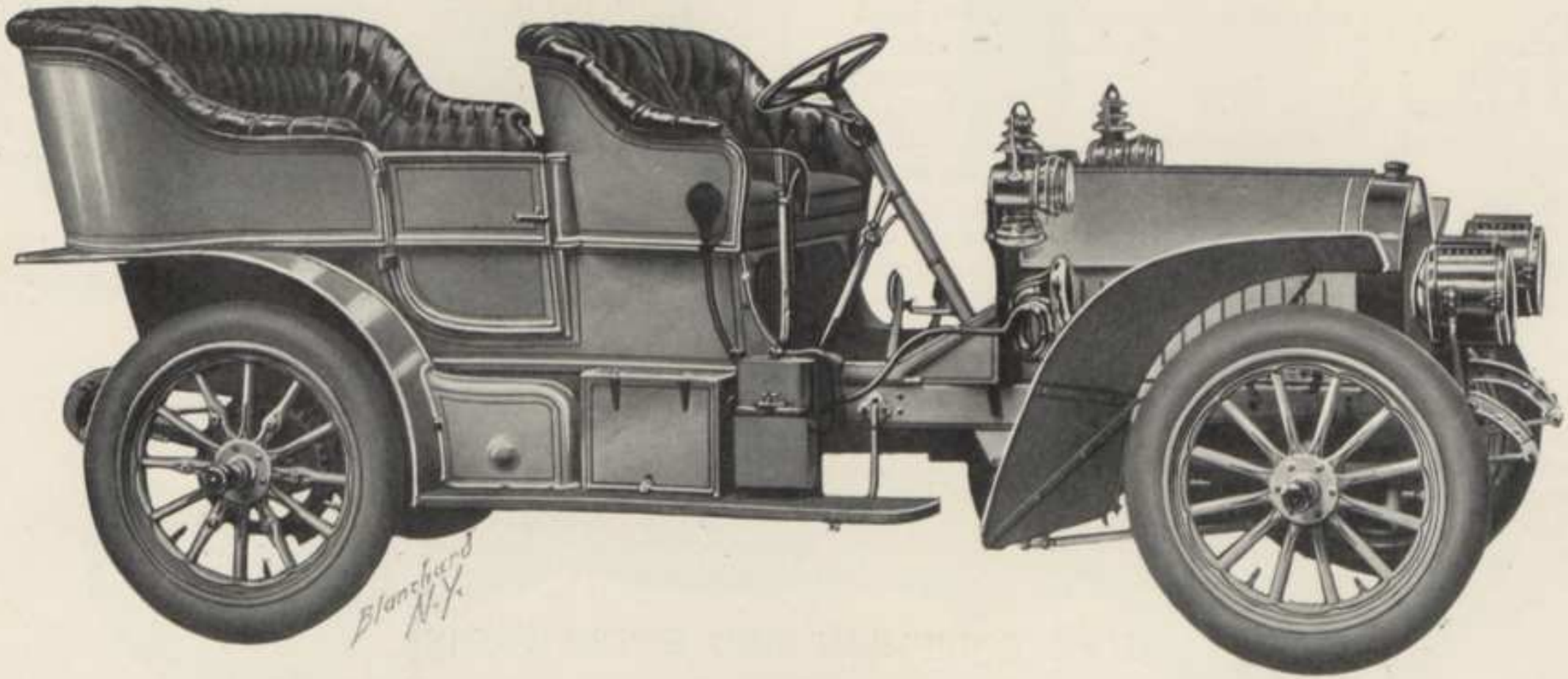
BODY	Side Entrance Tonneau.
MATERIAL	Selected and thoroughly seasoned wood.
SEATING CAPACITY	Six in addition to driver.
COLOR OF BODY	Optional.
COLOR OF CHASSIS	Optional.
WHEELS	Artillery type, 34 in. in diameter.
TIRES	Double tube detachable pneumatics.
SIZE OF TIRES	34 in. x 4½ in. front and rear.
LENGTH OF SPRINGS	40 in. front, 44 in. rear.
WIDTH OF SPRINGS	2 in. front and rear.
CHASSIS FRAME	Pressed steel.
MOTOR	4-cylinder vertical type, 35 HP.
CYLINDERS	4½ in. bore, 5½ in. stroke, water cooled.
LUBRICATION	Mechanical. Sight feeds on dash-board.
IGNITION	Make and break, gear driven magneto.
COOLING SYSTEM	Cellular radiator with fan.
PUMP	Centrifugal type, gear driven.
SPEEDS	Three forward, one reverse.
BRAKES	One foot brake, two emergency brakes.
WHEEL BASE	106 in.
LENGTH OVER ALL	13 ft.
WEIGHT	2700 lbs. approximately.
FUEL CAPACITY	24½ gallons.

GENERAL EQUIPMENT

(2) Acetylene Headlights, brass finish.
(1) Separate Generator for same, brass finish.
(2) Kerosene Side Lamps, brass finish.
(1) Rear Signal Lantern, brass finish.
(1) Tool Bag.
(1) Brass Horn with flexible brass tubing.
(1) Carriage Jack.
(3) Rubber Storm Aprons.
(2) Floor Mats.
(1) Tarpaulin to protect machinery from mud and water.
(1) Case for Lubricating Oils and Greases.

TOOL EQUIPMENT AND EXTRA PARTS

(1) Monkey Wrench.
(3) Socket Wrenches.
(6) Set Wrenches for hexagonal nuts.
(1) Hub Cap Wrench.
(1) Combination Pliers.
(1) Screw Driver, 4 in.
(1) Tool for compressing valve spring.
(1) Cold Chisel, ¾ in. width.
(1) Ball Pein Hammer.
(1) Oil Can with long spout.
(1) Tire Pump.
(1) Tire Repair Kit.
(2) Tire Hooks.
(1) Engine Valve complete.
(1) Valve Spring.
(1) Right Igniter Group.
(1) Left Igniter Group.
(2) Igniter Hammers.
(2) Igniter Anvils.
(6) Lava Bushings.
(12) Mica Washes.



LOCOMOBILE TOURING CAR, TYPE H, 30-35 HP.

Price of Chassis, including general equipment, tools and extra parts, $4,600
Price of complete car with complete equipment, $5,000

Tops are extra and vary somewhat in price. Any style of top desired by the customer can be attached

Locomobile TOURING CAR, TYPE "H," 30-35 HP.

SPECIFICATIONS

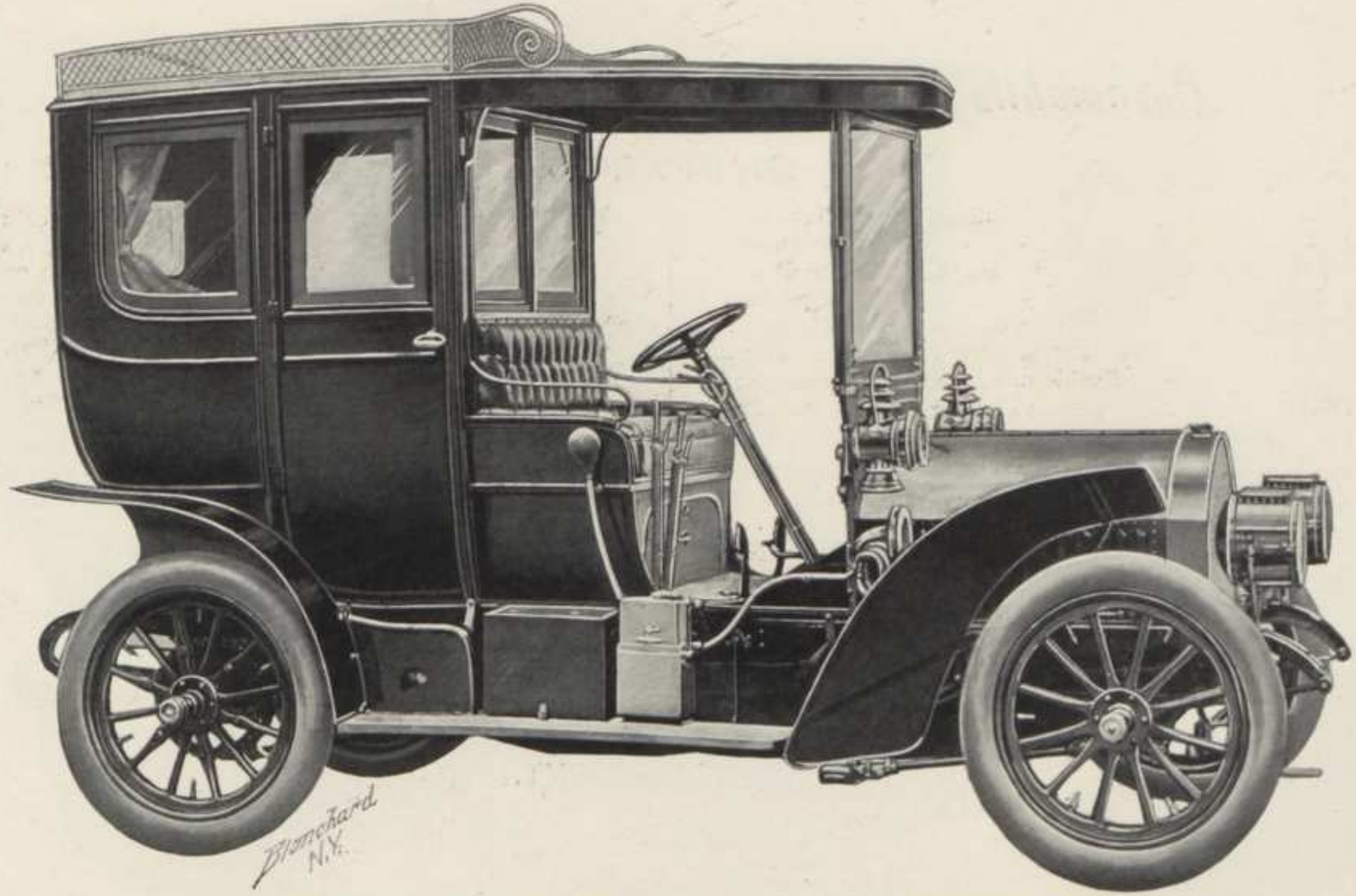
BODY	Side Entrance Tonneau.
MATERIAL	Selected and thoroughly seasoned wood.
SEATING CAPACITY	Six in addition to driver.
COLOR OF BODY	Optional.
COLOR OF CHASSIS	Optional.
WHEELS	Artillery type, 34 in. in diameter.
TIRES	Double tube detachable pneumatics.
SIZE OF TIRES	34 in. x 4½ in. front and rear.
LENGTH OF SPRINGS	40 in. front, 44 in. rear.
WIDTH OF SPRINGS	2 in. front and rear.
CHASSIS FRAME	Pressed steel.
MOTOR	4-cylinder vertical type, 35 HP.
CYLINDERS	4½ in. bore, 5½ in. stroke, water cooled.
LUBRICATION	Mechanical. Sight feeds on dash-board.
IGNITION	Make and break, gear driven magneto.
COOLING SYSTEM	Cellular radiator with fan.
PUMP	Centrifugal type, gear driven.
SPEEDS	Three forward, one reverse.
BRAKES	One foot brake, two emergency brakes.
WHEEL BASE	106 in.
LENGTH OVER ALL	13 ft.
WEIGHT	3000 lbs. approximately.
FUEL CAPACITY	24½ gallons.

GENERAL EQUIPMENT

(2) Acetylene Headlights, brass finish.
(1) Separate Generator for same, brass finish.
(2) Kerosene Side Lamps, brass finish.
(1) Rear Signal Lantern, brass finish.
(1) Tool Bag.
(1) Brass Horn with flexible brass tubing.
(1) Carriage Jack.
(3) Rubber Storm Aprons.
(2) Floor Mats.
(1) Tarpaulin to protect machinery from mud and water.
(1) Case for Lubricating Oils and Greases.

TOOL EQUIPMENT AND EXTRA PARTS

(1) Monkey Wrench.
(3) Socket Wrenches.
(6) Set Wrenches for hexagonal nuts.
(1) Hub Cap Wrench.
(1) Combination Pliers.
(1) Screw Driver, 4 in.
(1) Tool for compressing valve spring.
(1) Cold Chisel, ¾ in. width.
(1) Ball Pein Hammer.
(1) Oil Can with long spout.
(1) Tire Pump.
(1) Tire Repair Kit.
(2) Tire Hooks.
(1) Engine Valve complete.
(1) Valve Spring.
(1) Right Igniter Group.
(1) Left Igniter Group.
(2) Igniter Hammers.
(2) Igniter Anvils.
(6) Lava Bushings.
(12) Mica Washers.



LOCOMOBILE TOURING CAR, TYPE H, 30-35 HP.—LIMOUSINE BODY

Price of Chassis, including general equipment, tools and extra parts, $4,600
Price of complete car with complete equipment, $6,000

Locomobile TOURING CAR, TYPE "F," 40-45 HP.

SPECIFICATIONS

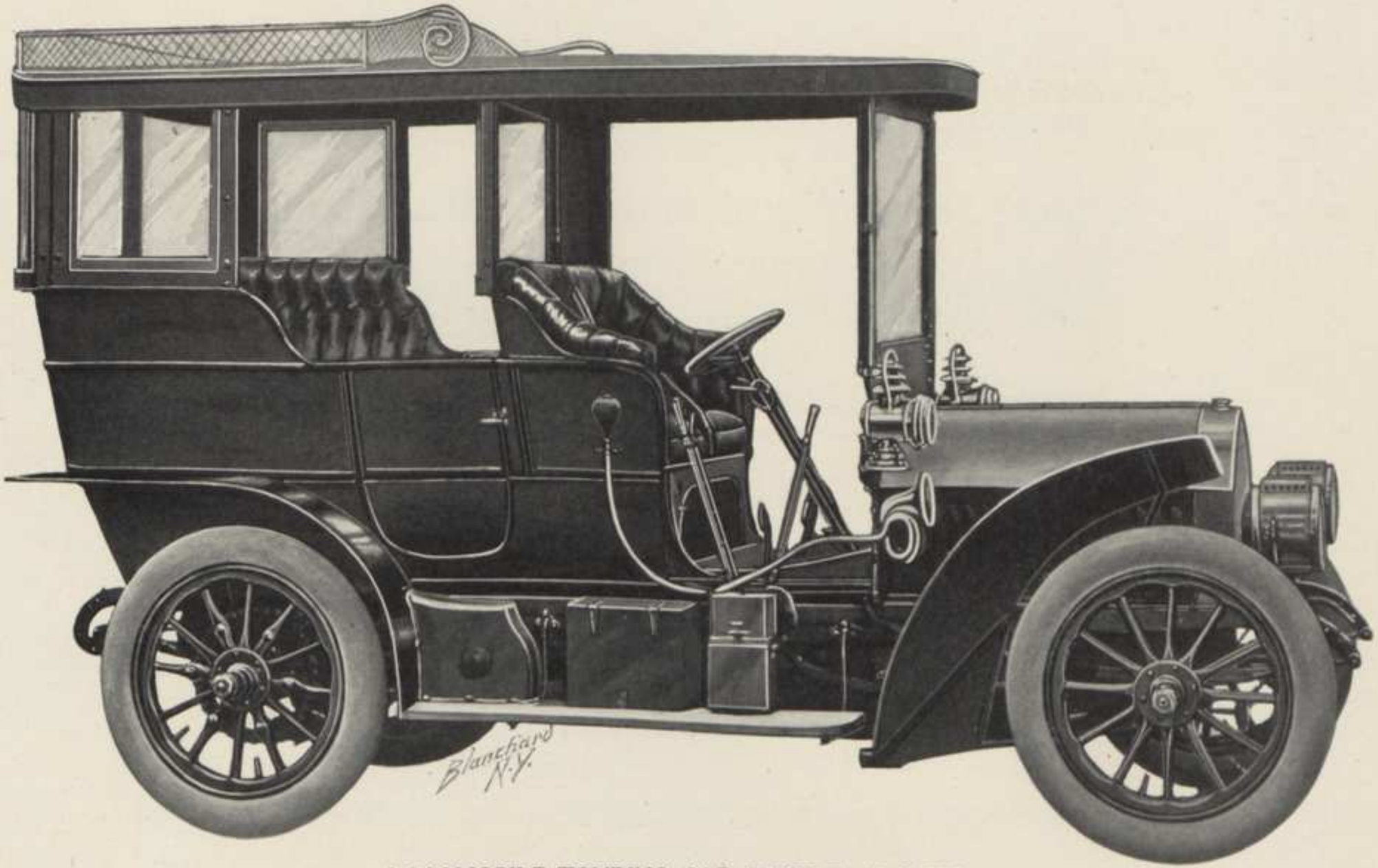
BODY	Side Entrance Tonneau.
MATERIAL	Aluminum.
SEATING CAPACITY	Six in addition to driver.
COLOR OF BODY	Optional.
COLOR OF CHASSIS	Optional.
WHEELS	Artillery type, 36 in. in diameter.
TIRES	Double tube detachable pneumatics.
SIZE OF TIRES	36 in. x 5 in. front and rear.
LENGTH OF SPRINGS	40 in. front, 48 in. rear.
WIDTH OF SPRINGS	2 in. front and rear.
CHASSIS FRAME	Pressed steel.
MOTOR	4-cylinder vertical type, 45 HP.
CYLINDERS	5 in. bore, 6 in. stroke, water cooled.
LUBRICATION	Mechanical. Sight feeds on dash-board.
IGNITION	Make and break, gear-driven magneto.
COOLING SYSTEM	Cellular radiator with fan.
PUMP	Centrifugal type, gear driven.
SPEEDS	Four forward, one reverse.
BRAKES	One foot brake, two emergency brakes.
WHEEL BASE	110 in.
LENGTH OVER ALL	13 ft. 7 in.
WEIGHT	3000 lbs. approximately.
FUEL CAPACITY	26 gallons.

GENERAL EQUIPMENT

(2) Acetylene Headlights, brass finish.
(1) Separate Generator for same, brass finish.
(2) Kerosene Side Lamps, brass finish.
(1) Rear Signal Lantern, brass finish.
(1) Tool Bag.
(1) Brass Horn with flexible brass tubing.
(1) Carriage Jack.
(2) Rubber Storm Aprons.
(2) Floor Mats.
(1) Tarpaulin to protect machinery from mud and water.
(1) Case for Lubricating Oils and Greases.

TOOL EQUIPMENT AND EXTRA PARTS

(1) Monkey Wrench.
(3) Socket Wrenches.
(6) Set Wrenches for hexagonal nuts.
(1) Hub Cap Wrench.
(1) Combination Pliers.
(1) Screw Driver, 4 in.
(1) Tool for compressing valve spring.
(1) Cold Chisel, ¼ in. width.
(1) Ball Pein Hammer.
(1) Oil Can with long spout.
(1) Tire Pump.
(1) Tire Repair Kit.
(2) Tire Hooks.
(1) Engine Valve complete.
(4) Valve Keys.
(1) Valve Spring.
(1) Right Igniter Group.
(1) Left Igniter Group.
(2) Igniter Hammers.
(2) Igniter Anvils.
(6) Lava Bushings.
(12) Mica Washers.



LOCOMOBILE TOURING CAR, TYPE F, 40-45 HP.

Price of Chassis, including general equipment, tools and extra parts, $6.700
Price of complete car with complete equipment, $7,500

The car shown in the illustration is equipped with special body and special top, and costs $8,000

National Association of Automobile Manufacturers

STANDARD WARRANTY

ADOPTED AUGUST 12, 1902

We Warrant *all goods furnished by us for sixty days following the date of their shipment, based upon the date of invoice covering the goods, this warranty being limited to the replacement in our factory of all parts giving out under normal service in consequence of defect of material or of workmanship.*

If the circumstances do not permit that the work shall be executed in our factory this warranty is limited to the shipment, without charge, of the parts intended to replace those acknowledged to be defective.

It is, however, understood that we make no warranty whatever regarding pneumatic tires or the batteries.

We cannot accept any responsibility in connection with any of our motor cars when they have been altered or repaired outside of our factory.

We are not responsible to the purchaser of our goods for any undertakings and warranties made by our agents beyond those expressed above.

We wish it distinctly understood that we make no warranty of our goods except as stated above, but desire and expect that customers shall make a thorough examination of our goods before purchasing.

No. of Carriage _____ _____

_____ *190* _____

SEVENTH EDITION.

"THEY START WITH A MATCH."

The GROUT

Steam Motor Cars

MANUFACTURERS

GROUT BROTHERS, Orange, Mass., U. S. A.

BOSTON OFFICE, 43 COLUMBUS AVENUE.

A FEW POSITIVE FACTS FOR THE MOST FASTIDIOUS

VERIFIED BY

THE AUTOMOBILE CLUB OF AMERICA.

GROUT RECORDS.

NELSON HILL CLIMBING CONTEST.	Long Island 100-Mile Consumption Contest	New York to Southport. 100-Mile-No-Stop Test.	PHILADELPHIA SHOW.	500-Mile Endurance Run from New York to Boston and Return. 3 cars.
FIRST PRIZE.	**FIRST PRIZE.**	**FIRST PRIZE.**	**FIRST PRIZE.**	**GOLD MEDAL.**
81 Vehicles entered, including every make of prominence in the United States and foreign.	Least fuel consumed of any steam carriage.	Blue Ribbon Winner.	Bronze Medal for best construction.	Three First-class Certificates.

First Automobile ever on top of Mt. Wachusett, near Fitchburg, Mass., 2,015 feet.

IN ENGLAND.

DASHWOOD HILL. A 6½ H. P. Grout beat every car on the hill with a rear tire badly punctured excepting 12 H. P.——.

WELBECK SPEED TRIALS. The Grout did a kilometre in 1 minute 28 2-5 seconds.

A FEW OF THE MANY TESTIMONIALS RECEIVED.

EX-SHERIFF JAMES H. CLARK

Who in his 83d year owns and operates a Grout Steam Wagon.

ORANGE, MASS., JAN. 12, 1903.

GROUT BROS.

GENTLEMEN:—In my 83d year I purchased one of your Steam Cars and have run same all one season without repairs of any kind. I take care of it myself, filling tanks, lighting up, etc. I have made several trips of fifty miles alone and feel perfectly safe. It is very easy riding and I enjoy it as much as anything in my possession.

Respectfully, JAMES H. CLARK.

NEWBURGH, N. Y., JULY 14, 1902.

GROUT BROS.

GENTLEMEN:—I reached here this noon without mishap, and with wagon in A 1 shape. We had one grade six miles long to climb, and it was a hill that they claim nearly every wagon needed a horse to help up. Our wagon made it finely. We have ridden 227 3-8 miles and find everything satisfactory thus far.

Yours truly, H. S. MUSTIN,
Supt. Susquehanna Valley Elec. Co.
Sidney, N. Y.

EVERETT, WASH., MAY 6, 1902.

GROUT BROS., ORANGE, MASS.

GENTLEMEN:—I have as fine a working machine now as you ever saw. Last evening I tested it in hill climbing. I tried a hill that I didn't expect to get to the top. About half way up, there was a deep, heavy mud. Here I expected the machine would stick fast, but it commenced to snort and puff and went through the mud and to the top of the hill as if it were a very small matter, and it surprised the natives to see the engine blow off steam while going through the deepest mud. I can keep the steam up to 200 pounds and climb almost any hill and have the same amount when I get to the top as when I started.

Yours truly, W. U. KNISELY.

SIDNEY, N. Y., AUG. 7, 1902.

GROUT BROS., ORANGE, MASS.

GENTLEMEN:—My wagon came over hills that blocked a 15 H. P.——(gasolene wagon) and made——take to a freight car. One place the road was washed away so that we had to come up the bed of the creek for a mile, and in another place we had to have four planks, so that we ran on two while they laid the others ahead for a track.

Other places we had mud so deep that the braces under the compensating gear made a regular furrow. Outside of putting in new glass we had no trouble, and my wagon is in good shape and running every day. I am trying to get some good photos to send you of portions of our route here from Newburgh, as I doubted, till after I tried it, if it were possible for a wagon to make the trip.

H. S. MUSTIN, SUPT.

JAN JOSE, CAL., DECEMBER 29, 1902.

GROUT BROS.

DEAR SIRS:—I received your carriage last May at Corning, where the celebrated Maywood Colony is located in Northern California. I rode it around all the small towns in that locality, then in June my wife and I started on a tour of California, which is over a thousand miles long, and cities and villages are not very near together, so that a break down would mean ten to twenty miles walk for help, some of the roads are very bad, not used enough to pay for fixing them.

I traveled through wheat fields with wheat standing to the top of carriage, and wheat if it had caught on fire would have been thoussands of dollars damage, then through dry creeks full of round stone three to six inches in diameter which is very trying to the best carriage, through sandy deserts where the best Winton carriages have been stalled, over mountain roads, through canyons and using the worst water possible, either full of lime or alkalie and at no time have I ever wanted more power than I have had at my command, and all this travel without any expense from break-downs and only a few punctures to tires which I could fix myself on the road. I consider my carriage one of the best, if not best, for hard, rough service. Yours very truly,

GEORGE W. LAMBERT.

NORTH ROCHESTER, N. H., DECEMBER 5, 1902.

GROUT BROS., ORANGE, MASS.

DEAR SIRS:—Replying to your favor of December 2d, would say that the machine which I bought of you last spring and have run all summer has given the very best of satisfaction. I do not think there is another steam machine made which would stand the usage which I gave this one, as I have used it almost entirely on very rough roads, and nearly every day with very little care.

Yours truly, L. C. SPAULDING.

BOSTON, DECEMBER 1, 1902.

MESSRS. GROUT BROS.

GENTLEMEN:—I have used one of your steam automobiles two seasons and am very much pleased with same. I have run it 2200 miles this season WITHOUT AN ACCIDENT. I have never been stalled on the road and have always arrived home on time as anticipated. I did not count the very slight trouble I have had with my tires, but as this is the second season I expected a little trouble after such constant usage as I have given it.

Last year in order to avoid a runaway horse I was obliged to run into a ditch speeding at ten miles an hour; I turned the lever and went over a log 8 inches in diameter, and directly into the bushes at full speed. Upon looking the machine over I found my fire still burning, not a bolt or screw loose and everything in perfect running condition, with the exception of my two front wheels, which were a little twisted, but not enough so but we were able to jump in and ride home twenty-two miles. Does not this speak well for the Grout Steam Car?

I consider it the strongest, most reliable and most durable automobile on the market today.

What little mechanical information I possess was picked up while using your machine. It is a constant delight and I would not part with it for any amount of money, if I could not get another. Yours very truly,

FRANK G. BUTLER.

28 Manchester Road, Brookline.

SHARON, PA., DECEMBER 26, 1902.

MESSRS. GROUT BROS., ORANGE, MASS.

GENTLEMEN: —I am pleased with your carriage which the Sharon Steel Co. purchased from you last summer. I have not seen anything yet for which I would exchange it. The appearance is neat and the workmanship is well done, the machinery being nearly perfect. As this is my business, I could soon detect its faults. I have taken it up some very steep hills and through the mud to the hubs. My wife says it will go anywhere. My wife has run it some, with my assistance, and expects to handle it herself next summer. The last run I had was from New Castle to Sharon, 25 miles, in two hours and thirty minutes, making three stops, one of fifteen minutes for water. Yours truly,

JOHN FAHNLINE,
Ass't Gen'l Supt.

DECEMBER 8, 1902.

MESSRS. GROUT BROS., ORANGE, MASS.

GENTLEMEN: —In reply to your inquiry would say that I consider your make of steam carriage the best that I have seen yet. In proof of the above, I sold a carriage that had done me good service for two seasons and bought one of yours in preference to any carriage I have ever seen. Find I can ride all day without getting tired, when other carriages would tire me out in one-half the distance. I find it thoroughly well made, good style and a bird on the road.

Very truly yours,

F. E. DODGE, Contoocook, N. H.

PORTLAND, ME., JULY 8, 1902.

MR. E. D. GARDNER, SOUTH BAY HOUSE,

SAYVILLE, LONG ISLAND, N. Y.

DEAR SIR: — Yours of the 7th to hand. I have used a Grout Automobile for nearly two seasons and find it at present very satisfactory. I have run the carriage about 1000 miles without "skipping a stitch."

There are two features in particular about the Grout Carriage that I believe the ——— does not possess. In the first place, I do not have to heat a piece of gas pipe in order to fire up. In the second place the fire is controlled from the seat, which obviates the necessity of getting out of the carriage in order to increase or decrease the fire. These I consider two very important features.

I have run one of this year's Grout Carriages a few miles and think it a very fine machine. If I were to buy another carriage this year, I know of not one that I would accept in preference to the Grout.

Yours truly,

T. B. DAVIS.

LANSING, MICH., MAY 19, 1902.

GROUT BROS.

SIRS: — I am growing more and more pleased with my carriage as I get used to running it. Every one says I have the nicest carriage in the city and I think so, too.

MISS M. A. FULLER,
318 St. Poe Street, W.

FITCHBURG, MASS., JANUARY 1, 1903.

MESSRS. GROUT BROS., ORANGE, MASS.

GENTLEMEN: —After many years' experience in the building of steam engines, and manufacture of general machines, I naturally contracted that irresistible desire of possessing one of the best attainable Auto Steam Carriages. For that purpose several years ago I visited your extensive automobile manufactory, with its unsurpassed facilities for the manufacture of the famous Grout Steam Vehicles. I have since made many visits to your works, accustomed courtesy being allowed unrestrained access to your entire business, giving my personal inspection to every detail in all of the various departments, comprising the make-up of the entire Automobile, from the selected raw material, numerous original and improved methods of manufacture, novel application of construction, and operation of your Steam Carriage, to the exquisite finishing touches, all of which combine in making your steam vehicles of the highest known standard, being easy of control, the greatest steamers, and hill climbers, with endurance for the longest runs, with least repairs and running expense.

All of these good and necessary qualities I am pleased to acknowledge in my new Grout Steam Touring Car.

Also would say that I have enjoyed seeing you take first prizes all along the line, for hill climbers, fuel and water contests, and long endurance reliability runs. Wishing you a "Happy and Prosperous Year."

Yours very truly,

CHARLES F. PUTNAM.

BRIGHTON, ONT., DECEMBER 19, 1902.

MESSRS. GROUT BROS., ORANGE, MASS.

GENTLEMEN: —I have your favor of the 16th. In reply I may say that I have used one of your Dos-a-Dos Steam Cars since Aug. 1st last, and same has given good satisfaction until laid up for the winter about a month ago. I have climbed all hills in this section we have tried with four passengers, and we have some pretty sharp hills in this section; we have run over some very sandy roads and have had no troubles to speak of. Have on it a set of Goodyear "puncture proof tires," but have one tire that has a couple of slight punctures, caused by running over some very sharp broken stones.

I must say that what pleases me most is the way I have been treated by the Grout Brothers, who have shown me every consideration; any little requests I have made have been attended to in a very prompt and cheerful manner, and if anyone contemplates purchasing a Steam Car they cannot do business with a more honorable firm. I remain,

Yours very truly,

J. H. MORROW.

PITTSFIELD, MASS., DECEMBER 8, 1902.

MESSRS. GROUT BROS., ORANGE, MASS.

GENTLEMEN: —I take pleasure in recommending your steam wagon as being one of the best I have ever had occasion to run. There are some features I consider superior to other makes, especially the hill climbing, as Berkshire county affords one of the best sections in New England for this test.

Yours very truly,

HARRY E. JEFFERS.

ADAMS, N. Y., JULY 9, 1902.

GROUT BROS., ORANGE, MASS.

DEAR SIRS: —I am pleased to acknowledge the receipt of machine and consider it in every way just what you represented. Am well pleased.

The young man whom you sent over to instruct me I wish to call your attention to especially, as I was more than pleased with him; he is in every way courteous and obliging and seems to thoroughly understand the machine.

Trusting you are receiving the reward due skill and genius, I remain

Very sincerely,

ALFRED GOSS.

FORT VALLEY, GA., OCTOBER 17, 1902.

MESSRS. GROUT BROS., ORANGE, MASS.

GENTLEMEN: —We had our first accident today with our Automobile. We broke the bottom half circular brace under the compensating gear, by its striking a stump in the road. Please send us one by first express. We are well pleased with our Automobile. We have astonished a great many people by hill climbing. We went out a few days ago to a very heavy sand hill (one of the worst in this section) and pulled it without stalling. This surprised everybody, as a good many had told us that it would be impossible for an Automobile to climb this hill. We believe we can climb any hill on the road in Georgia.

Yours truly,

J. L. FINCHER & SON.

ADVANTAGES OF THE GROUT SYSTEM.

"Time and tide wait for no man." The name of Grout in the Automobile world is symbolical of honor and integrity, combined with the best mechanical skill and ingenuity. A few of our Novel Features which stand out pre-eminent : **WE START WITH A MATCH.**

Absence of all vibration.

Freedom from smoke or smell.

Absolute safety.

Reserve of power, 6½ H. P. Engine is capable of exerting up to 10 H. P. when required. 12 H. P. to 20.

Rapidity of getting up steam, 5 minutes sufficing.

Extreme simplicity throughout both as to construction and management.

Highest possible efficiency with the Grout Patent Pilot and Burner we get a perfect combustion, burning with a pale blue flame over the whole area of the steam generator. Either Gasoline or Kerosene.

Silent running, it is as quiet as a bicycle.

Can be instantly started, stopped or reversed from driver's seat.

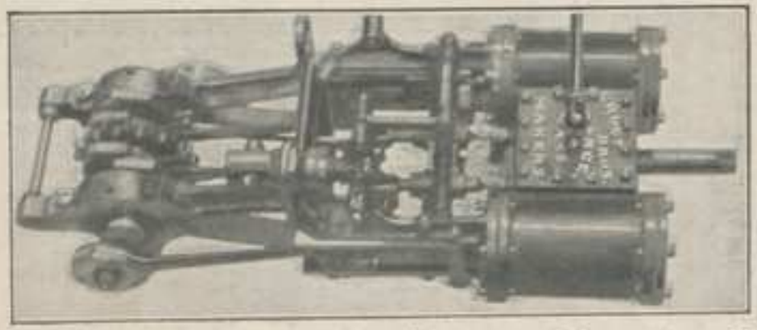
Can be left standing for one or twenty hours, steam being kept up, vaporizer kept hot and ready to start at a moment's notice.

Speed at the driver's control to 40 miles if desired, faster in special cars.

Economy of working about 1½c per mile. Our entire cost of running is cheaper than a gasoline car.

Very best of material and workmanship in every Grout Car.

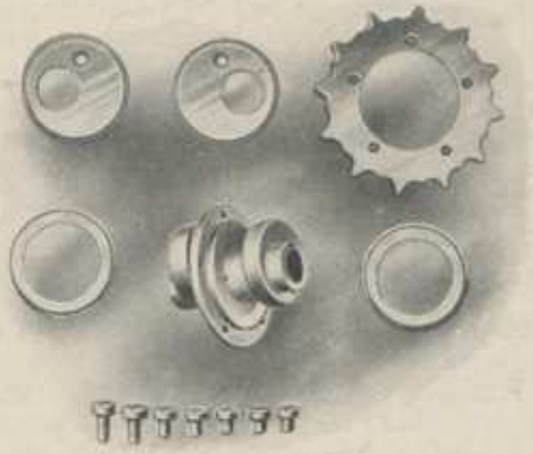
ENGINE.



NOTE.—Realizing that this subject is a most important one, we beg at this time to call your particular attention to the following facts:

1st. The first Grout car was built in 1896, and after eight years of continual experimenting combined with the most thorough and severe tests, we are now in a position to offer you our new improved 6½ and 12 H. P. interchangeable engine.

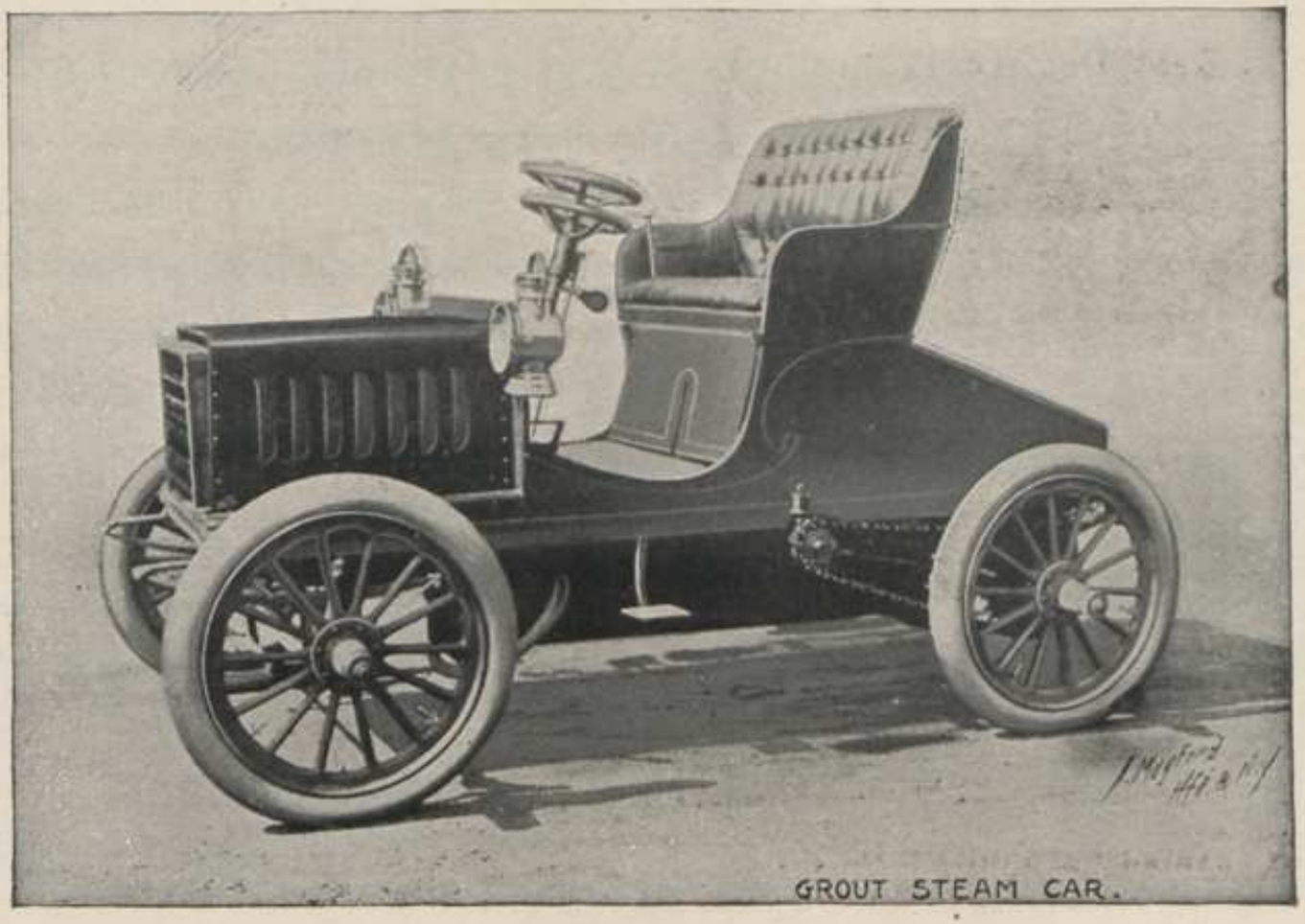
We make every engine we use. They are double cylinders, slide D valve, Stephenson Link, **Horizontal** and Vertical, cylinders of best Grey Iron, frame of Phosphor Bronze, other parts of best steel drop forgings, our eccentric being made of one solid piece, including sprocket. This has always been made of 13 separate pieces. This was our original idea and a perfect success. All parts are interchangeable and of the best possible workmanship.



13 PARTS

TO 1

MODEL K.



GROUT STEAM CAR.

Made with Tonneau for Five People.

DROP FRONT.

A Seat Devised Whereby Four People Can Ride Comfortably.

For the benefit of those who do not desire a tonneau, we have here a seat which either opened or closed adds to the beauty of our cars. The seat when down is about 12 inches below main one, and therefore does not obstruct the operator's view, and when closed gives all the appearance of a one-seated car. Same is upholstered in No. 1 hand buffed black leather.

Extreme height, 5 ft. 4 in.
" width, 5 ft. 2 in.
" length, 11 ft. 2 in.
Wheel base, 72 in.
Wheels (wood or wire) 30 in.
Tires, 3 in. Detachable.
Generator (cannot burn out) 7 H. P.

Engine, 6½ H. P.
Fuel tank sufficient for 50 miles.
Water tank sufficient for 35 miles.
(Condenser if desired).
Steam air pump.
Force draft.
New system of lubrication.

RUNABOUT. Model K.

This car embodies every feature which has proven advantageous to the steam car after the most thorough experimenting personally by ourselves. It is designed for long touring and for the roughest kind of work.

Engine 12 H. P., Horizontal type our own make, very powerful. Entirely encased and protected from dust.

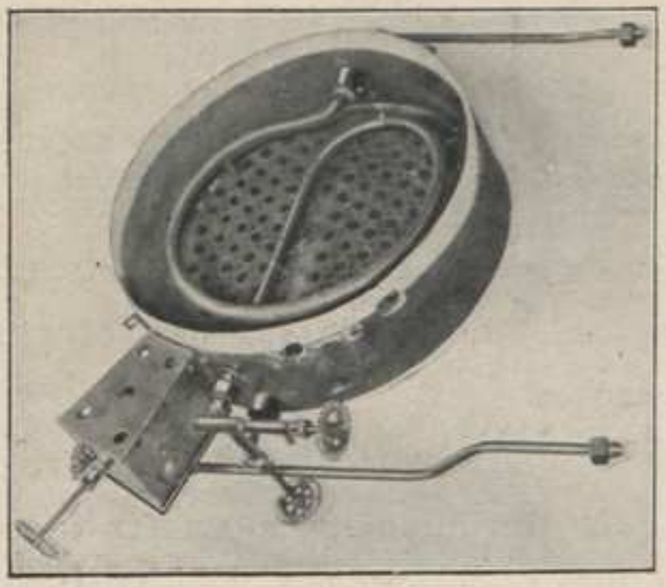
Generator 15 H. P., fire tube with our new safety device and patent draft.

Burner. Our own patent pilot and indestructable plates, which lights with a match and can be left standing for hours, keeping up steam and also keeping vaporizer hot and relights fire when turned on from seat. It is controlled from seat. Wheels 30 x 3, wood with double tube tires. Wheel base 86 inches. Regular 4 ft. 8 in. tread. Body of wood, 14 coats of paint and varnish, upholstered in leather and spring back and cushions, height of seat 24 inches, width of seat 43 inches, length of body 106 inches, width of body 34 inches.

Equipped with our patent wheel steerer and wheel throttle, patent down draft, counter shaft, side drive chains, air and water pump, which can be increased or decreased at will of operator, running from counter, indestructable water indicator, steam air and water pumps, also steam ram for filling tank with hose from brook or other source. Two powerful brakes on each rear wheel. Elegant springs, angle steel frame, with a condenser capacity for over 100 miles, without condenser about 35 or 40.

GENERATOR.

After making a very careful study of the different steam generators and realizing that it is an important feature of a steam car we have decided to continue with the fire tube type, having made the severest tests. Our generator contains special safety device and can not burn out. Has a reserve pressure of steam and does not necessitate the use of hand water pumps in taking hills. It is an excellent steamer. There are not tubes to plug up. Has sufficient water capacity to be left standing from two to three hours, under steam.



GROUT PATENT PILOT LIGHT.

BURNER.—Made of one piece steel stamped from dies, cannot burn out or burn back.

We have the simplest possible arrangement for starting; neither heated irons, torches, nor methylated spirits being necessary; WE START IT WITH A MATCH.

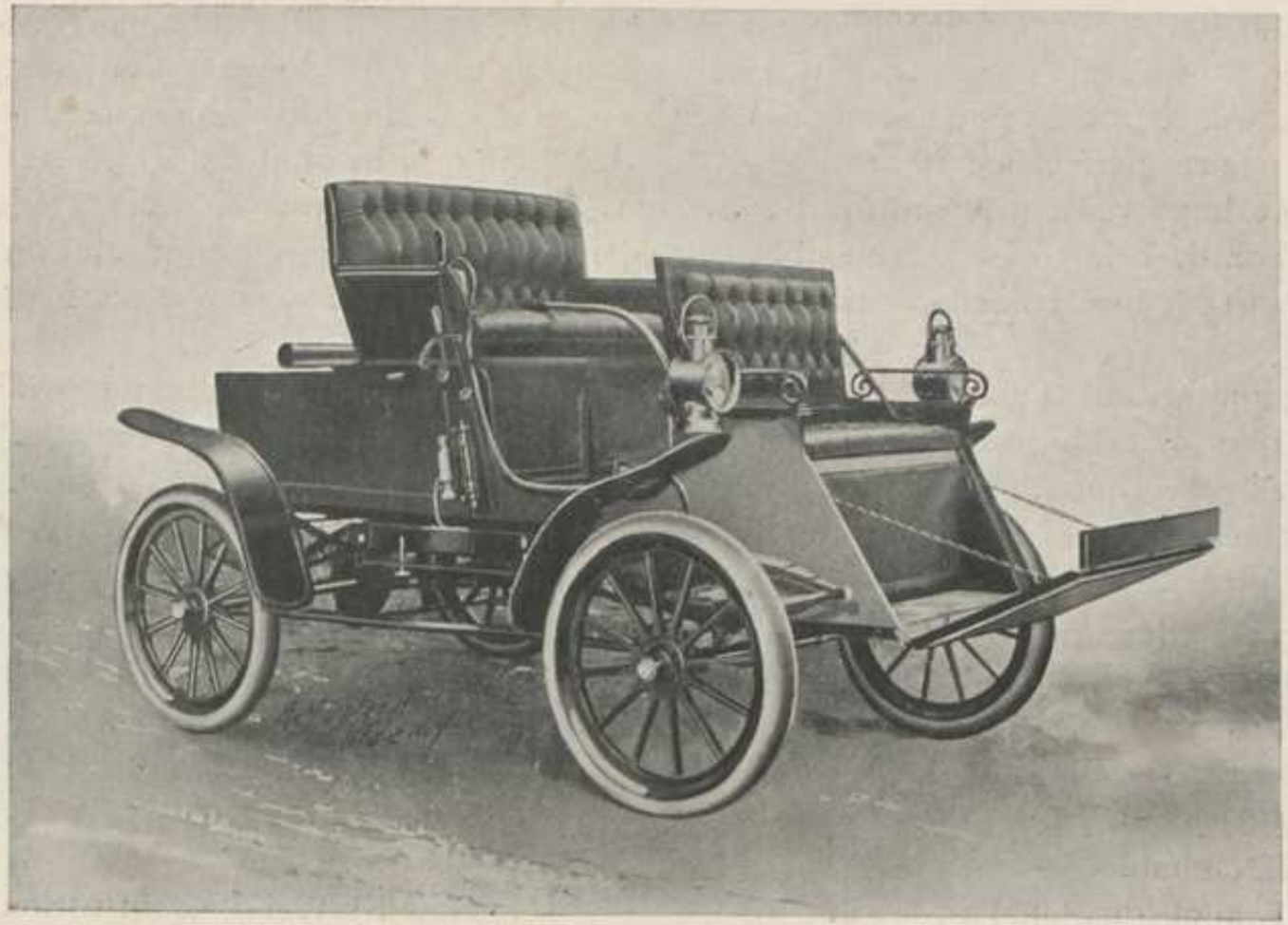
After the fires have once been set going (an operation of 3 to 5 minutes), all control is regulated from seat, enabling the operator to economize both fuel and water to a very appreciable extent.

By means of this arrangement the vehicle can be left standing for hours without attention, the pilot light alone maintaining the pressure on a very small consumption of gasoline, and when it is desired to continue the journey, one turn of the seat valve is all that is necessary for getting under way at once.

The advantages of this construction are as follows: 1. Ease of starting and subsequent manipulation. 2. Fire can not blow out under any circumstances. 3. Lighting-back eliminated. 4. Perfect vaporation at all times without petrol tube passing through boiler. 5. Maximum heating power derived from gasoline with consequent economy. Kerosene Burner it so ordered which is perfect in every respect.

MODEL J. Price $1200.00.

Drop Front Open.



A WORD TO THE TOURIST.

It has been our special aim, to build our many different models entirely up-to-date and thoroughly modernized in every particular, and to those who are enjoying the privilege of a month's outing over all sorts and conditions of roads, our new "Grand Tonneau" cannot help but appeal strongly. Simplicity and magnificence in itself is our best description; massive in construction, with enough horse power to travel sixty miles an hour, yet so simplified that a child can operate it, easily accessible and built to carry five people COMFORTABLY.

The body is of wood, upholstered throughout with our No. 1 best quality buffed leather, a very liberal wheel base (84 in.) which insures perfect safety at top speed. The boiler is in front under protected hood, and is fitted with our latest patent improved downward draft which carries all fumes to rear of car. The engine is placed horizontally under foot board, being easily accessible from driver's seat. The gasoline tank, which is of 15 gallon capacity, lies directly under front seat, and the water tank in the rear. The condenser is placed in front directly behind pilot.

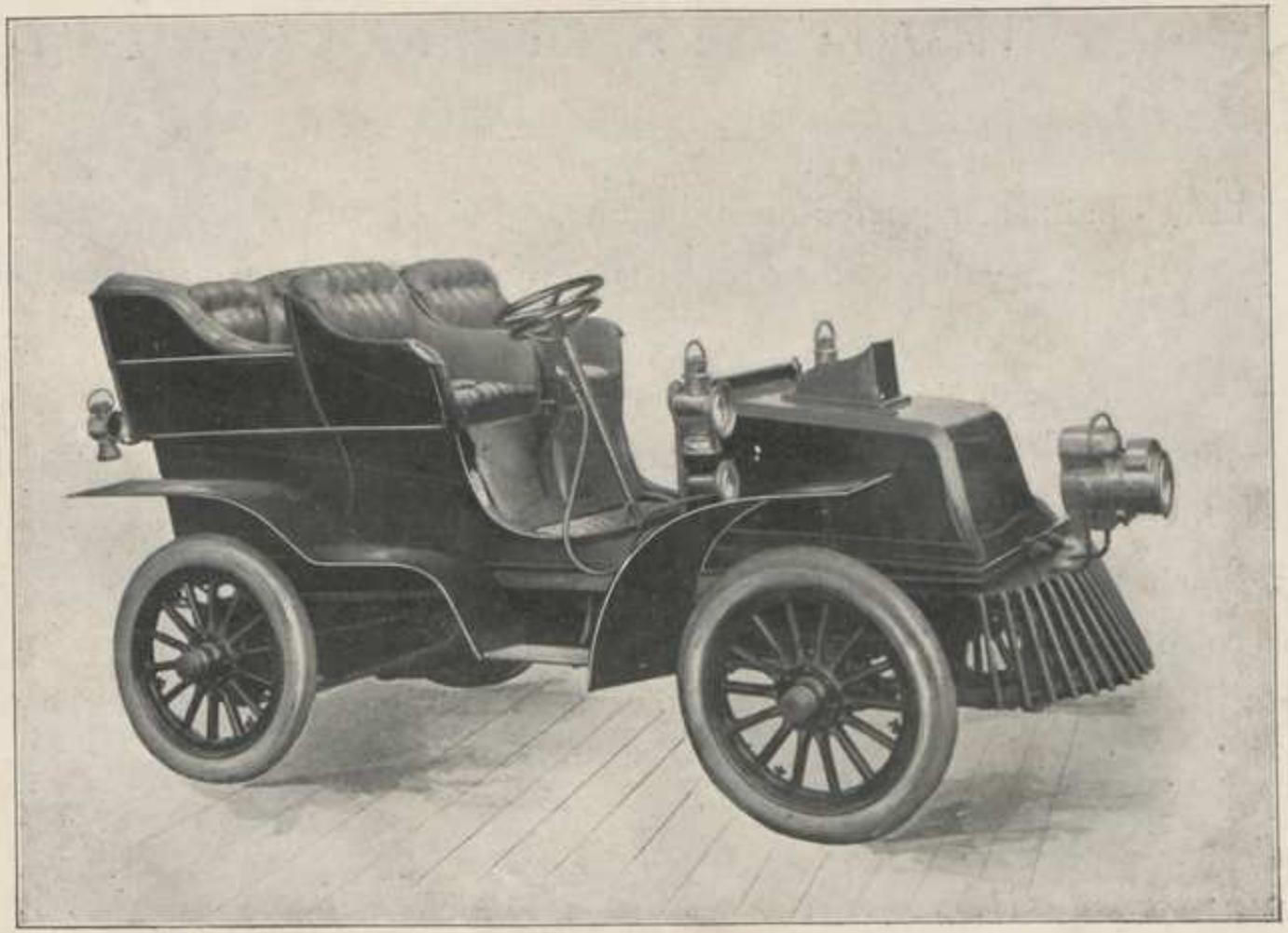
In submitting our Grand Tonneau to the public, we have foreseen the greatest difficulty experienced in running heavy cars, that of taking the hands from the steering wheel to control the throttle. The throttle on our Grand Tonneau is easily manipulated without taking hands from the steering wheel, and is worked on a rachet with 9 different speed notches. It can be brought to top speed and released instantly at the driver's option, which at all times gives perfect control of machine.

Extreme height 5 ft. 7 in.
Extreme width 5 ft. 8 in.
Extreme length 11 ft. 9 in.
Wheel Base 84 in.
Wheels (wood) 32 in.
Tires 4 in. Detachable.
Generator (cannot burn out) 15 H. P.
Engine 12 H. P.

Fuel Tank sufficient for 100 miles.
Water Tank sufficient for 100 miles.
Steam Air Pump.
Steam Water Pump.
Forced Draft.
Condenser.
New System of Lubrication.

TONNEAU. Price $2500.00.

Complete with Lamps and Tools.



GROUT STEAM TRUCK.

Most economical truck built, using kerosene oil for fuel.

Engine 12 H. P. Plain slide valve. Horizontal chain drive to counter-shaft. Two-side drive chain entirely encased.

Boiler, fire tube, 20 H. P., with our new system that prevents burning out.

Burner using kerosene oil, with pilot light, regulated entirely from seat.

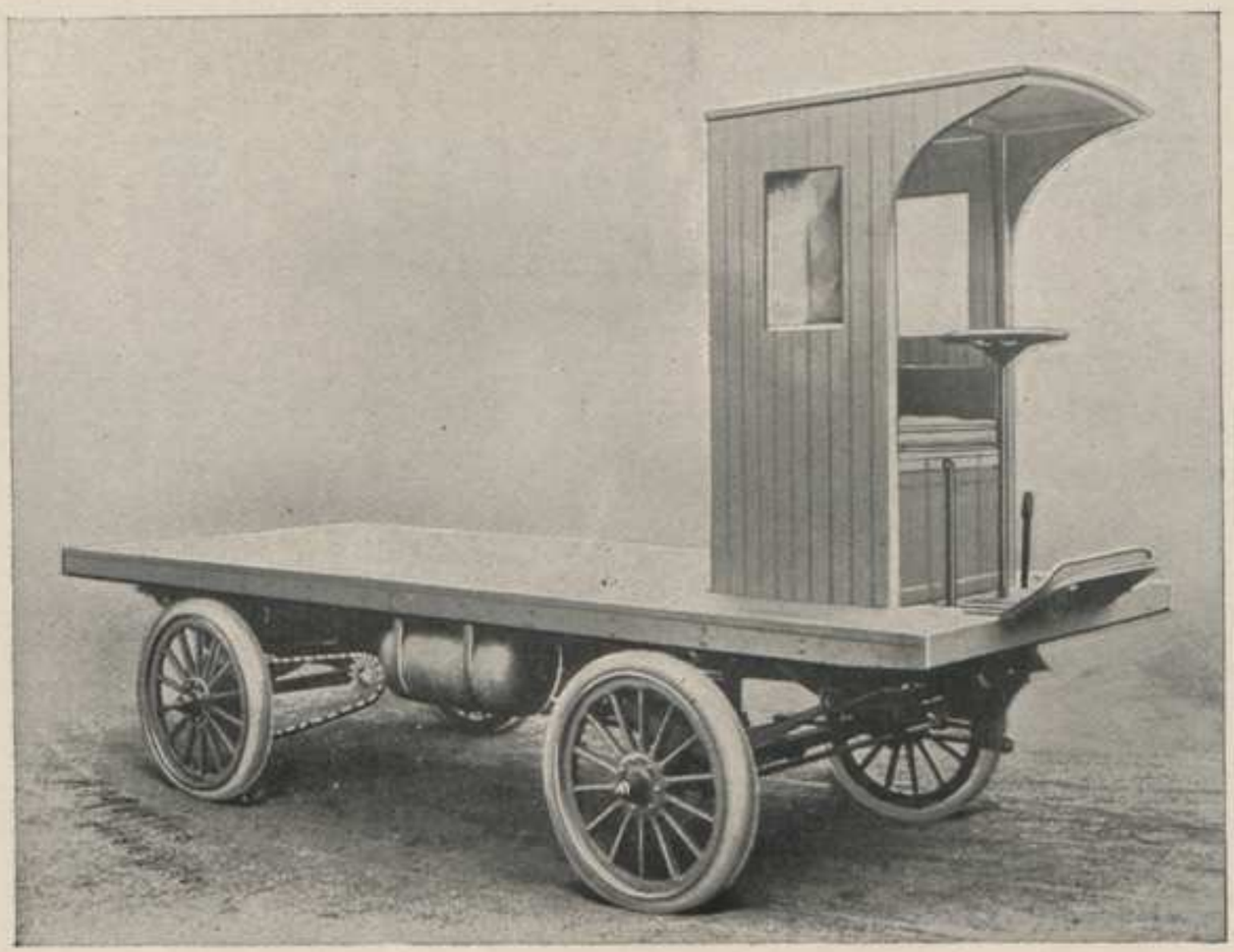
Tanks carry fuel 30 gallons, water 53 gallons.

Wheels 32 x 3½ inches. Solid tires, plain bearings, bronze bushed.

Size of floor space 10½ x 5½ feet back of pilot house, and each side of pilot house 17 inches. Can be designed to fit your work. Extreme length 14 feet. Height from ground to floor 3 feet. Wheel base 8 feet.

GROUT STEAM TRUCK.

Capacity 5000 Pounds.



GROUT STEAM DELIVERY.

Engine 10 H. P. Boiler 12 H. P.

Wheel base 84 inches. 30-inch wheels, 3-inch tires.

Water capacity 50 gallons. Fuel capacity 12 gallons.

Floor space 48 x 72 inches. Height 50 inches, height from ground 38 inches.

GREATNESS *and* SIMPLICITY IN ITSELF.

REALITY IN TWO HEMISPHERES.

OUR CARS DEFY COMPETITION.

UNDER ANY CONDITIONS WE INVITE COMPARISON.

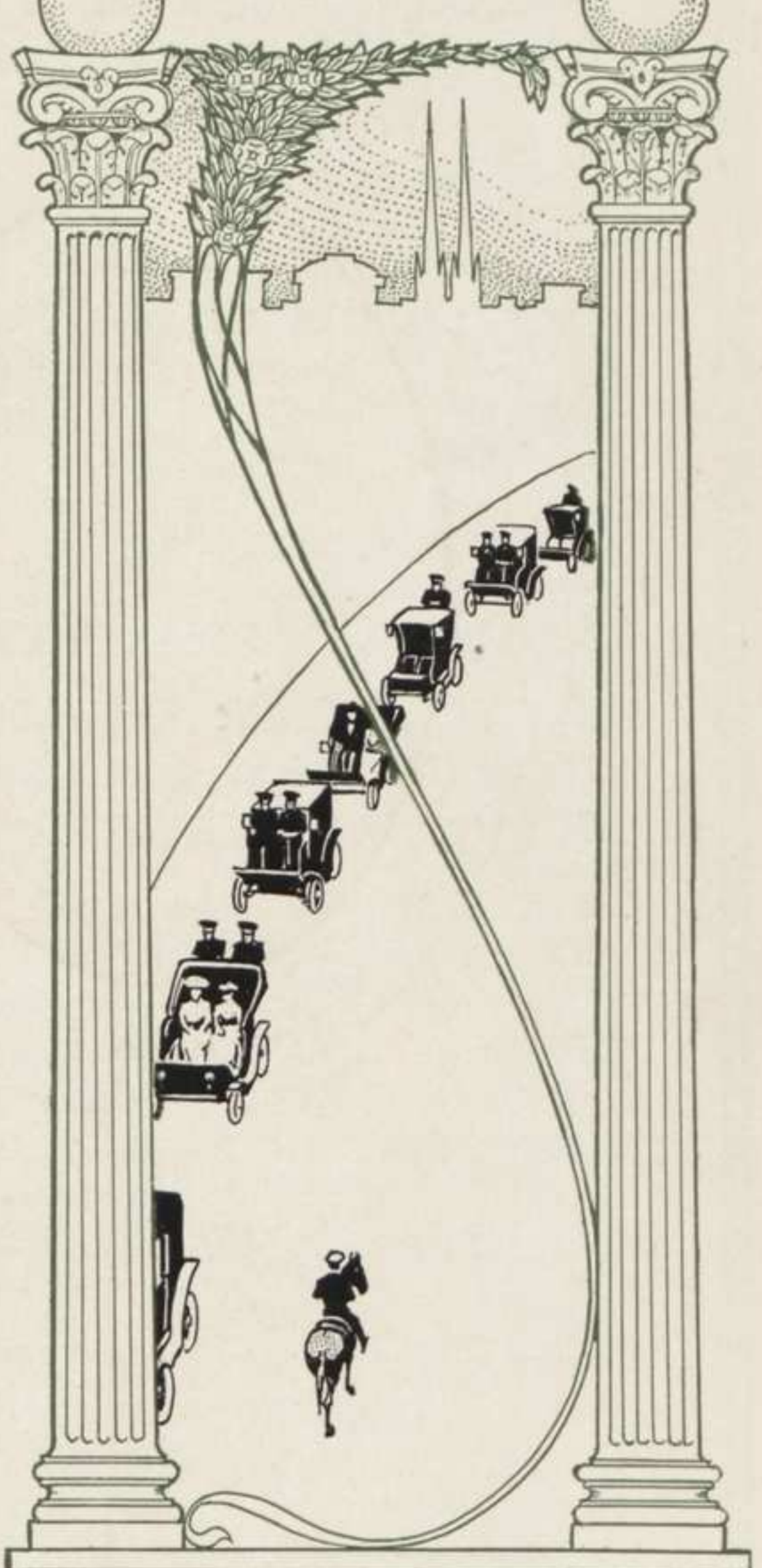
THREE THOUSAND PEOPLE OWN GROUTS.

Columbia

Electric Carriages

Presented
by

COLUMBIA ELECTRIC CARRIAGES



ELECTRIC VEHICLE COMPANY

HARTFORD, CONN

MEMBER ASSOCIATION OF LICENSED AUTOMOBILE MANUFACTURERS.

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Electric Vehicle Company

MAIN OFFICE AND FACTORY
HARTFORD, CONNECTICUT

Cable Address: "Automobile," Hartford • Codes: Lieber's, A. B. C. Fourth Edition and Western Union

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MILTON J. BUDLONG, President
WALTER G. HENDERSON, Treasurer
HARRY W. KYTE, Secretary

BRANCHES

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CHICAGO, Electric Vehicle Co., 1332-1334 Michigan Av.

BOSTON . . .	Columbia Motor Vehicle Co., 74, 76, 78 Stanhope St.
PHILADELPHIA .	Pennsylvania Electric Vehicle Company, 250 North Broad St.
WASHINGTON .	Washington Electric Vehicle Transportation Co., Corner 15th St. and Ohio Ave.
MEXICO CITY, MEX.	Charles L. Seeger, Primera Humboldt No. 12

COLUMBIA GASOLENE CARS and COLUMBIA ELECTRIC COMMERCIAL VEHICLES, made by the ELECTRIC VEHICLE COMPANY, are described in separate catalogues, which will be sent to any address on request.

Columbia

ELECTRIC CARRIAGES

CHIEF among reasons for the great and rapidly growing popularity of the electric carriage is its desirability as a substitute for the horse-drawn vehicle in many lines of usefulness. The gasolene car may be said to occupy a field not filled by previously existing means of conveyance, and if it is to be compared at all with earlier modes, may be more appropriately considered in its relation to long distance and rapid transit systems than with reference to its bearing upon questions growing out of the use of horses.

In cities and suburban districts and wherever charging facilities are to be had, COLUMBIA Electric Carriages abound in advantages unrivaled in any other automobiles, irrespective of make or motive power. They are unequaled for runabout work, for physicians, for ladies' own use and for all of the varied requirements of private carriage service.

The different models, as produced from time to time since 1895, have reflected a steady and consistent attention to improvements, and, without regard to consideration of labor or expense, embodied the latest and best appliances for securing the highest possible efficiency in combination with simplicity of operation and economy of maintenance; and each new design has set conditions which have appealed to the finest workmanship and brought out the best efforts of the most skilled artisans employed in the automobile industry.

Of the carriages catalogued herewith several are entirely new, including the Brougham, Landaulet, Hansom and large Victoria. The other models, perpetuated because of their unqualified success in the past, have been improved in every way possible, notably the Runabout and the Victoria-phaeton, which, without alteration of outward appearance, have been practically remodeled in their mechanical parts.

Columbia

THE TOWN CARRIAGES

THE progressive policy and methods followed by the ELECTRIC VEHICLE COMPANY from its inception have resulted in a broader and more varied development of the possibilities of electricity as a motive power for vehicles than has been achieved by any other manufacturer. This is perhaps most strikingly shown by the long-continued supremacy of the COLUMBIA town carriages, including Broughams, Landaus, Landaulets, Hansoms and Victorias, which for years have demanded and won a standing and recognition accorded to no other electric automobiles of contemporary manufacture.

These carriages are intended for private service only and are built from plans and specifications representing the expressed desires and requirements of an ultra-discriminating class of users. Many residents of New York and other large American cities, whose names are familiar throughout the world because of their wealth and social standing, members of the English nobility and of the highest Parisian circles, drive in their private Columbia carriages.

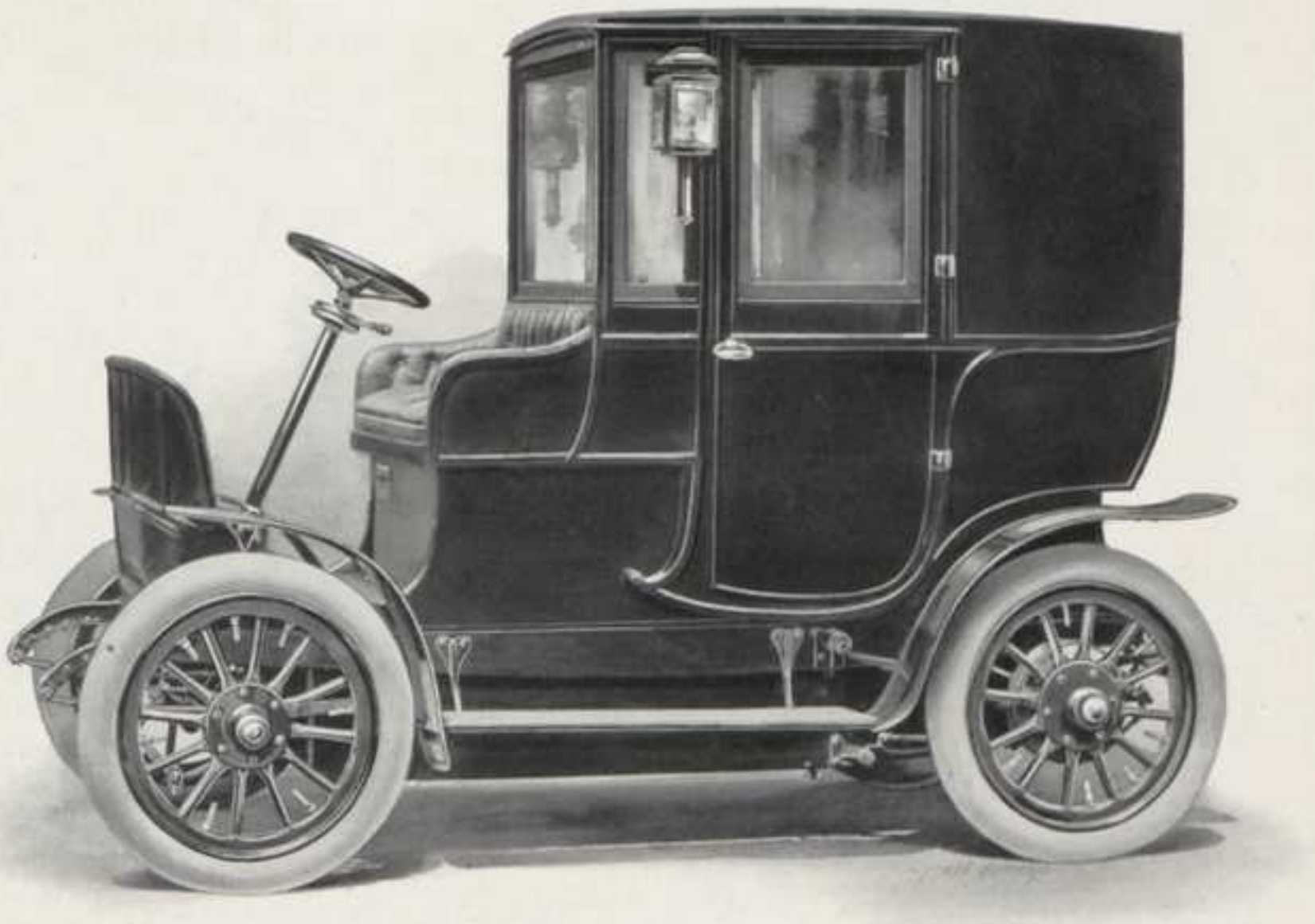
Each of these vehicles takes the place for town use of an ordinary carriage with three changes of horses, and is safer, faster, more convenient and more humane. As compared with automobiles employing other motive powers, it is easier to operate and more comfortable to ride in and is also free from all noise, odor and vibration.

The new Broughams, Landaulets and Hansoms illustrated and described in these pages, follow general lines recently adopted by leading European makers, but as regards artistic design, electrical and mechanical equipment and all fittings and appointments, they are superior to the best foreign built vehicles. Each is the lightest, fastest and most efficient carriage of its class yet produced and reflects only the best ideas of leading specialists in designing, engineering and carriage furnishing.

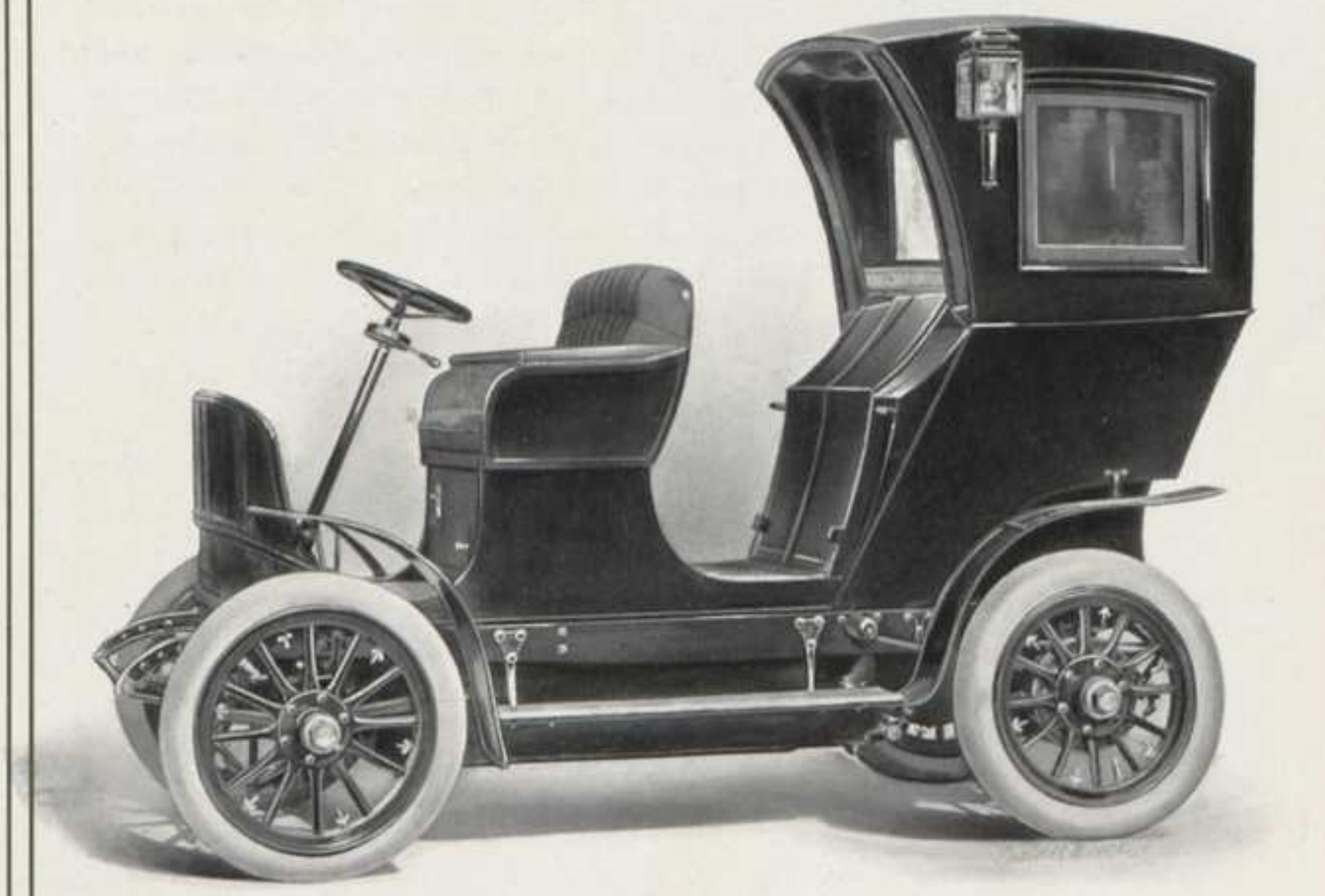
The Mark LXVIII Chassis

These new carriages, including the large Victoria, have the same running and operating parts, known as the COLUMBIA Mark LXVIII chassis, which is entirely independent of the carriage body.

For supporting the body the chassis has a frame of cold-pressed steel similar to those used on the best gasoline cars. The 32-inch wheels have twelve spokes each, bolted between flanges at the hubs, are entirely hand-made in our own shop, run on Timken roller



COLUMBIA ELECTRIC BROUGHAM



COLUMBIA ELECTRIC HANSOM

Columbia

bearings, and are the most substantial and enduring as well as the handsomest wheels ever used on automobiles. Michelin pneumatic tires in combination with a special form of spring suspension, give easy riding qualities never before obtained in any vehicle, self-propelled or horse-drawn. The motor of special design is connected to the driving axle by double reduction noiseless helical gearing. There are five separate forward speeds up to 18 miles per hour and three reverse speeds. The controlling apparatus is so made and adjusted that full headway is obtained from a standstill without the slightest jolting as the controlling lever is advanced through its five positions. Two powerful independently-operated brakes and a safety cut-out switch insure certainty of control under all conditions of driving. The battery of 44 cells of the latest exide type is carried in a single tray beneath the carriage body. We have demonstrated this to be the most perfect battery yet devised for vehicle use. It may be raised into position by a simple hydraulic lift and is held in place by automatic contact hooks. This battery arrangement is one of the most valuable of the many exclusive COLUMBIA features found in these carriages. In the general construction of the chassis, as well as in the body work of the new models, lightness has been obtained everywhere, but nowhere at the expense of strength. The increased speed, improved steering and control and the more practical and convenient location of the driver's seat constitute great advantages over the best electric carriages of earlier patterns.

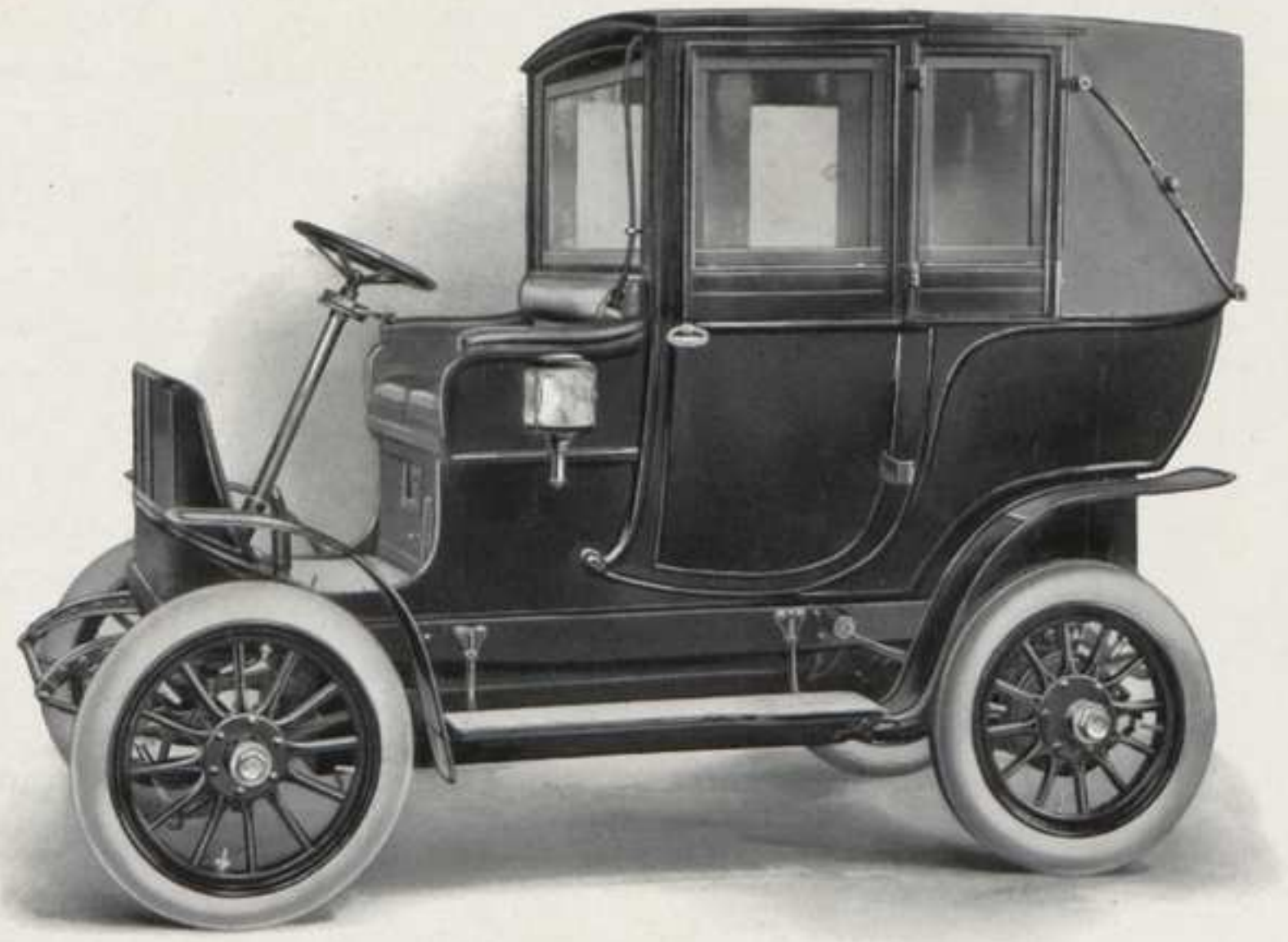
A complete technical description of the COLUMBIA Mark LXVIII chassis may be found in the ELECTRIC VEHICLE COMPANY'S *Bulletin No. 75*, which will be sent to any address on request.

In the body designs of these new carriages a certain individuality of line and treatment lends that touch of exclusiveness which cannot very well be described but which unmistakably distinguishes the private from the public or hired carriage. Each model not only has every late improvement which makes for reliability, comfort, convenience and safety, but a smartness in style and appearance found in no other carriage of its type.

The Brougham Mark XLVIII

The new COLUMBIA ELECTRIC BROUGHAM, illustrated on page 5, sets a new standard of construction for electric vehicles of the coach class. It is the most useful, substantial and luxuriously appointed of town carriages. It is good for all seasons, for all weathers. Whenever and wherever in town use a closed carriage is necessary this Brougham is preferable to all other

COLUMBIA ELECTRIC LANDAULET—OPEN



COLUMBIA ELECTRIC LANDAULET—CLOSED

Columbia

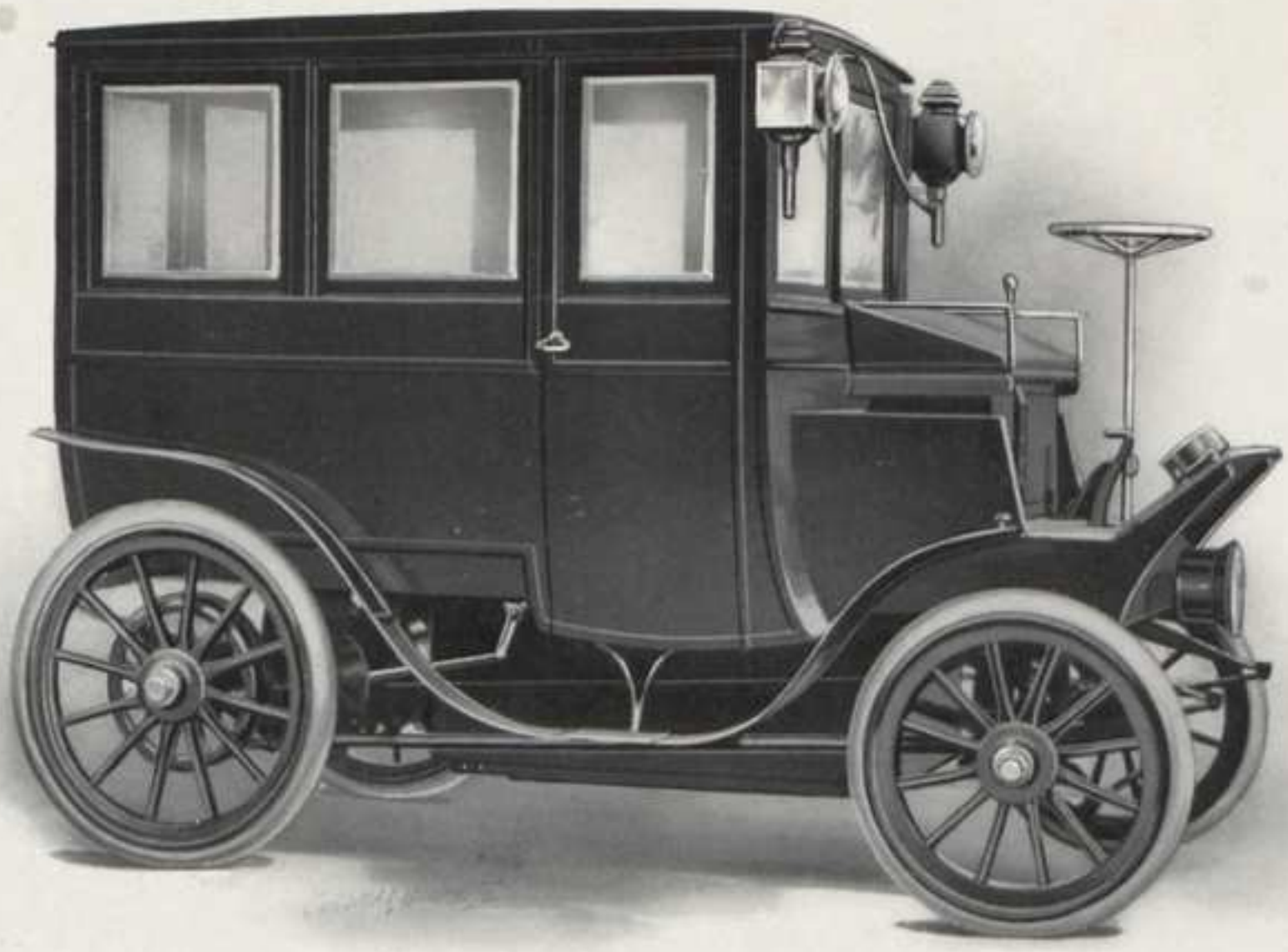
vehicles. The inside seats accommodate four persons. The forward seat is hinged and may be lowered when not in use, leaving a clear space. The interior is lined throughout with heavy, dark green broadcloth. The furnishings are all of the very highest grade of material and workmanship and include silk curtains, dome electric light, card case, memorandum pad, mirror, toilet case, umbrella holder, driver's electric signal, speaking tube connecting with the driver's seat, and, if desired, an electric cigar lighter. To these conveniences may be added an electric foot warmer for winter and an electric fan for summer. The electric side lamps and rear lamp are of the most approved patterns. The body is painted in rich combinations of green and black. All mountings are of nickel, and the entire finish down to the smallest details is of the most elegant description.

The Hansom Mark LXVIII

A radical departure from previous designs is shown in the COLUMBIA ELECTRIC HANSOM, illustrated on page 5. The standard Hansom type of body, always a favorite with many users of town carriages, is preserved in full, but the elevated seat for the driver at the rear, so long in vogue, is superseded by a forward seat similar to those used on other COLUMBIA town carriages. This change has been made out of deference to the expressed demand of a large number of patrons who prefer the conventional form of Hansom body but desire the added sense of security afforded by the safer and more convenient location of the driver. The body proper has a very broad seat, amply accommodating three persons. The door arrangement is of the latest approved pattern and the large swinging front window admits the secure closing of the compartment without obstructing the outlook of the occupants. The interior is trimmed in dark green broadcloth and is provided with all electric and other conveniences that are suitable to the style and purpose of the vehicle.

The Landaulet Mark LXVIII

The COLUMBIA ELECTRIC LANDAULET, illustrated on page 7, represents the latest development of one of the most popular styles of carriages. While the Brougham is always a closed vehicle the Landaulet can be quickly changed from a closed to an open one. This makes it a peculiarly convenient carriage for general town use. Closed, it practically takes the place of a Brougham; open, it is unexcelled for pleasure driving. There are inside seats for four persons. When the forward seat is not in use its supports may be pushed forward under the driver's seat, allowing the cushions to swing downward into a recess in the forward end of the compartment. The top is made of the finest



COLUMBIA ELECTRIC EIGHT-PASSENGER PRIVATE BUS

COLUMBIA ELECTRIC OPERA BUS

Columbia

materials and its connecting parts fitted with absolute accuracy. The trimming, painting, furnishings and appointments are similar to those of the Brougham, including the dome light, which has been made practical for the Landaulet through an ingenious arrangement of wiring which is not interfered with in lowering or raising the top.

The Victoria Mark LXVIII

Of all carriages those of the Victoria type offer the widest opportunity for artistic design, and the new COLUMBIA ELECTRIC VICTORIA, mounted on the Mark LXVIII chassis, presents a combination of graceful lines and harmonious proportions, which, in the opinion of leading experts, has never been equaled. It appeals at once to the æsthetic sense as well as to the sense of what is most desirable from the viewpoint of practical utility. The top is of the finest hand-buffed leather, extends well over the seat, and, with the large rain boot, gives perfect protection in stormy weather. This Victoria is suited to all uses of town service not requiring a closed carriage, and it is peculiarly well adapted to ladies' use. For park and boulevard driving and all purposes of sight-seeing and pleasure it is the most convenient, luxurious and perfectly appointed vehicle ever produced. The upholstering in dark green broadcloth is especially rich and elegant, and the painting is in harmonious shades of dark green.

The Eight-Passenger Private Bus

The COLUMBIA EIGHT-PASSENGER PRIVATE BUS, illustrated on page 9, is the most commodious and luxuriously furnished vehicle of its type. It is mounted on a modification of the Columbia Mark XXXV chassis, having two direct drive motors, four speeds up to 14½ miles per hour, two sets of brakes and a cut-out switch, underslung exide battery and wheels fitted with 3½-inch solid rubber tires. The side door entrances are of the Brougham type and the compartment is provided with side seats accommodating eight persons. There are extra folding seats forward permitting two additional passengers to be carried comfortably. The interior is provided with every convenience suited to the character of the vehicle and the color and style of the trimming and painting are at the option of the purchaser.

Columbia Electric Opera Bus Mark XI

For the opera, theatre, ball, or for other purposes requiring a closed carriage of extra seating capacity, the COLUMBIA ELECTRIC OPERA BUS, illustrated on page 9, is a most convenient vehicle. It seats six persons comfortably. The door at the rear is of ample proportions and easy of access. The windows are of heavy bevel plate glass and may be dropped, leaving full

COLUMBIA ELECTRIC SURREY

COLUMBIA ELECTRIC RUNABOUT

Columbia

openings. Interior furnishings include hat cords attached to the ceiling, electric lights, pockets, electric signal and speaking tube connecting with the driver's seat, and other conveniences. There are three forward and three reverse speeds, regular and emergency brakes and an emergency switch. The 36-inch front and 42-inch rear wheels are fitted with 3½-inch solid rubber tires. The battery of 44 exide cells is carried in one tray beneath the body.

The Surrey Mark XIX

The COLUMBIA ELECTRIC SURREY, illustrated on page 11, perpetuates a model which has given unlimited satisfaction in the past. Experience has shown it to be the most practical of four-passenger electric carriages designed for all-around use. The body design follows only artistic and harmonious lines and provides for every demand of use. The seats are very broad and easy of access. A canopy top, which may be securely closed by curtains, is furnished as an extra. There are two motors connected independently to the driving wheels by internal gearing. The wheels are 32 inches in diameter, the rear wheels being equipped with 3-inch solid rubber tires and the front wheels with 3-inch pneumatic tires. The battery, as regularly supplied, is carried in a compartment in the rear of the body. We also furnish the battery in underslung form carried in a single tray beneath the floor. The body is painted black with dark green panels and the running gear carmine with black striping. The trimming is in Bedford cord.

The Victoria-Phaeton Mark LXI

The COLUMBIA ELECTRIC VICTORIA-PHAETON was first offered to the public early in 1905 and speedily became the most sought after light electric carriage in the market. The entire production for the year was sold out on advance orders. The model illustrated on page 13 preserves the original outward design in full, but embodies important changes in the mechanism, the motor having been increased in size and all important driving parts strengthened and radically improved, giving increased power, noiseless action and perfect smoothness of running. During the 1905 season only one opinion was expressed regarding this carriage, namely, that it was the smartest, fastest, most up-to-date and the most reliable light electric carriage to be had. The improvements mentioned above place it still further in advance of all other vehicles in its class. By reason of its refined appearance, comfort, elegance and simplicity of operation it is especially appropriate for ladies' use. It is also particularly well suited to the requirements of physicians. For all purposes demanding a light conveyance for two persons it stands without a

COLUMBIA ELECTRIC VICTORIA-PHAETON

rival. Leading features include divided exide battery of 24 cells distributing the weight evenly over both axles; motor and all working parts attached to the body, thus having the benefit of the body spring suspension, and making it possible to run over rough surfaces at high speeds without injury to the mechanism; reduction gear and enclosed chain connecting the motor to the balance gear on the live rear axle, which runs in a tubular casing with all the parts of the mechanism housed to exclude dirt; three forward speeds up to 15 miles per hour and two reverse speeds. On the second backward notch of the controller the carriage develops its maximum pulling power though not its maximum speed—a very important consideration. The 30-inch wheels are fitted with 3-inch pneumatic tires, the rear wheels running on roller bearings and the front wheels on plain bearings. The double-acting brake on the rear hubs is so powerful that light pressure of the foot will bring the carriage to a quick stop on any grade. The hand-buffed leather hood is perfectly fitted, beautifully lined and reaches well forward. An ample rain-boot gives complete protection in stormy weather. The trimming is in the finest of dark green broadcloth and the painting in rich shades of green. All appointments and fittings are "de luxe" throughout.

The Electric Runabout Mark LX

The COLUMBIA ELECTRIC RUNABOUT, illustrated on page 11, has many of the advantages of the Victoria-Phaeton, inasmuch as the running gear, motive parts and control are of similar design and practically the same in construction. The Runabout also has the individual merit of being the lightest electric vehicle made with equal battery power, as well as the fastest, handsomest, most efficient and easiest operated. The

Columbia

general design has been worked out to give the simplest possible construction and the maximum of convenience in use and caretaking. The body lines are thoroughly artistic, combining to meet all of the requirements of comfort, utility and style. The divided exide battery of 20 cells is arranged exactly like that of the Victoria-Phaeton. The 30-inch wheels have 2½-inch pneumatic tires. A hand-buffed leather top is supplied as an extra. The body is painted green with black panels and the running gear dark green with light green striping.

We Guarantee all goods furnished by us for sixty days following the date of their shipment, based upon the date of invoice covering the goods; this guarantee being limited to the replacement in our factory of all parts giving out under normal service in consequence of defect of material or workmanship, without other responsibility on our part of any character.

If the circumstances do not permit that the work shall be executed in our factory, the said guarantee is limited to the shipment, without charge, of the parts intended to replace those acknowledged to be defective.

It is, however, understood that we make no guarantee whatever regarding pneumatic tires or batteries.

We cannot accept any responsibility in connection with any of our motor cars when they have been altered or repaired outside of our factory.

Dealers are solely responsible to the purchaser of our goods for all undertakings and guarantees made by them beyond those expressed above.

Partial list *of* prominent New York people who have purchased COLUMBIA ELECTRIC CARRIAGES and practically abandoned the use of horses for city service

BROUGHAMS

Howard Gould
H. H. Rogers
Rutherford Stuyvesant
Andrew Carnegie
Daniel G. Reid
Charles G. Gates
Herbert L. Terrell
L. L. Smith
Harry Payne Whitney
Grant B. Schley
Miss Helen M. Gould
E. Rollins Morse
Archer M. Huntington
Daniel Guggenheim
R. C. McKinney
S. R. Guggenheim
H. P. Goldschmidt
James Gayley
Thomas F. Ryan
August Belmont
Hugo Blumenthal
H. Morgenthau
Mrs. Simon Borg
Benjamin Guggenheim
Mrs. Robert Stafford
L. F. C. Rothschild
Ernest Ehrman
Col. O. H. Payne
J. T. Pratt
H. I. Pratt
Mrs. Emma Townsend Scott
Watson B. Dickerman
N. F. Brady
O. G. Jennings
James L. Breese
R. J. Collier
J. P. Schneider
Miss Martha Potter
Dr. W. B. James
Mrs. J. H. Berry
H. P. Wertheim

Allan W. Wood
Mrs. E. N. Gibbs
James H. Moore
Samuel Untermeyer
William H. Nichols
S. W. Bonsall
William Bunker
John Hays Hammond
James Hazen Hyde
Mrs. L. C. Phipps
Isaac Guggenheim
W. B. Dickerman
F. C. Jennings
Howard Gibb
W. E. Reis
James Everard
Mrs. Hattie King Hilton
Edward Steindler
E. H. Harriman
J. H. Hanan
O. H. Kohn
R. A. C. Smith
J. E. Childs
C. H. Dale
E. R. Thomas
Andrew Miller
Walter Luttgen
Newman Erb
Paul Warburg
C. T. Hutchinson
Frank Tilford
H. S. Wisner
F. M. Lupton
Mrs. Helen M. Berry
A. J. Cordier
George W. Jenkins
A. P. Heinze
Lew M. Fields
Geo. E. Schanck
Jas. G. Oxnard
Mrs. G. Tangeman

Partial List of New York Users—Continued

LANDAUS

H. O. Havemeyer
E. H. Harriman
W. Van Norden
Mrs. Grace Masury
Mrs. W. A. Engeman
Mrs. C. T. Barney
Arthur Curtis James
Mrs. J. A. Bostwick

VICTORIAS

Howard Gould
Mrs. Wm. Coolidge Stone
Mrs. Charles T. Yerkes
A. P. Heinze
Mrs. William C. Stone
E. Steindler
Mrs. L. C. Phipps
William I. Spiegelberg
Walter Luttgen

LANDAULETS

Andrew Carnegie
Mrs. H. R. Bishop
Arthur Curtis James
O. G. Jennings
Philip Lewisohn
Jefferson Seligman
C. C. Cuyler
Harry Payne Whitney
T. W. Whitridge
R. A. C. Smith
F. A. Keep
W. M. Barnum
W. B. Spader
Pliny Fisk
W. C. Fisk
H. O. Havemeyer
J. B. Thomas
E. T. Mostert
Robert Mather
George S. Scott
D. L. Einstein
J. D. Fletcher
James Speyer
E. L. Burrill
Mrs. C. J. Harrah
R. H. McCurdy
Frank Jay Gould

HANSOMS

John A. Hoagland
Benjamin Stern
Miss Emily B. Grigsby
James Hazen Hyde
Miss E. W. Bliss
Col. O. H. Payne
Grant B. Schley
Harry Payne Whitney
W. R. Coe
C. L. Blair

PRIVATE BUSSES

Andrew Carnegie
Robert Graves
Edwin Gould

NOTE—Complete information as to the electrical equipment and driving mechanism of Columbia Electric Carriages may be found in the special Bulletins issued by the Electric Vehicle Company for each type, which will be sent on request.

Chasmar-Winchell Press New York and Pittsburgh

ELECTRIC
VEHICLE COMPANY
COLUMBIA
AUTOMOBILES

Hand
Forge
Shop

Power
Forge
Shop

Electric Vehicle Company

Columbia Automobiles Electric & Gasolene

Surreys, Omnibuses, Wagonettes, Delivery Wagons, Runabouts (Electric and Gasolene), Broughams, Hansoms, Phaetons, Cabriolets, Victorias, Landaus, Opera 'Buses and Gasolene Tricycle Carriers

Operating and Selling Companies

State of New York:	New York Electric Vehicle Transportation Co., Sales and Showrooms, 541 Fifth Avenue, New York City.
State of Pennsylvania:	Pennsylvania Electric Vehicle Co., 250-256 N. Broad Street, Philadelphia.
State of Illinois:	Illinois Electric Vehicle Transportation Co., 173 Michigan Avenue, Chicago, Ill.
New England States:	New England Electric Vehicle Transportation Co., 541 Tremont Street, Boston, Mass.
District of Columbia:	Washington Electric Vehicle Transportation Co., Panorama Building, 15th St. and Ohio Ave., Washington.
State of New Jersey:	New Jersey Electric Vehicle Transportation Co., 100 Broadway, New York.
California Office:	Parrott Building, Market Street, San Francisco, Cal.
European Office:	54 Avenue Montaigne, Paris, France.
Mexico:	Mexican Electric Vehicle Co., Juan de Latran No. 7, Mexico City, Mexico.

In territory not represented by local companies, all communications should be addressed to

Electric Vehicle Company,

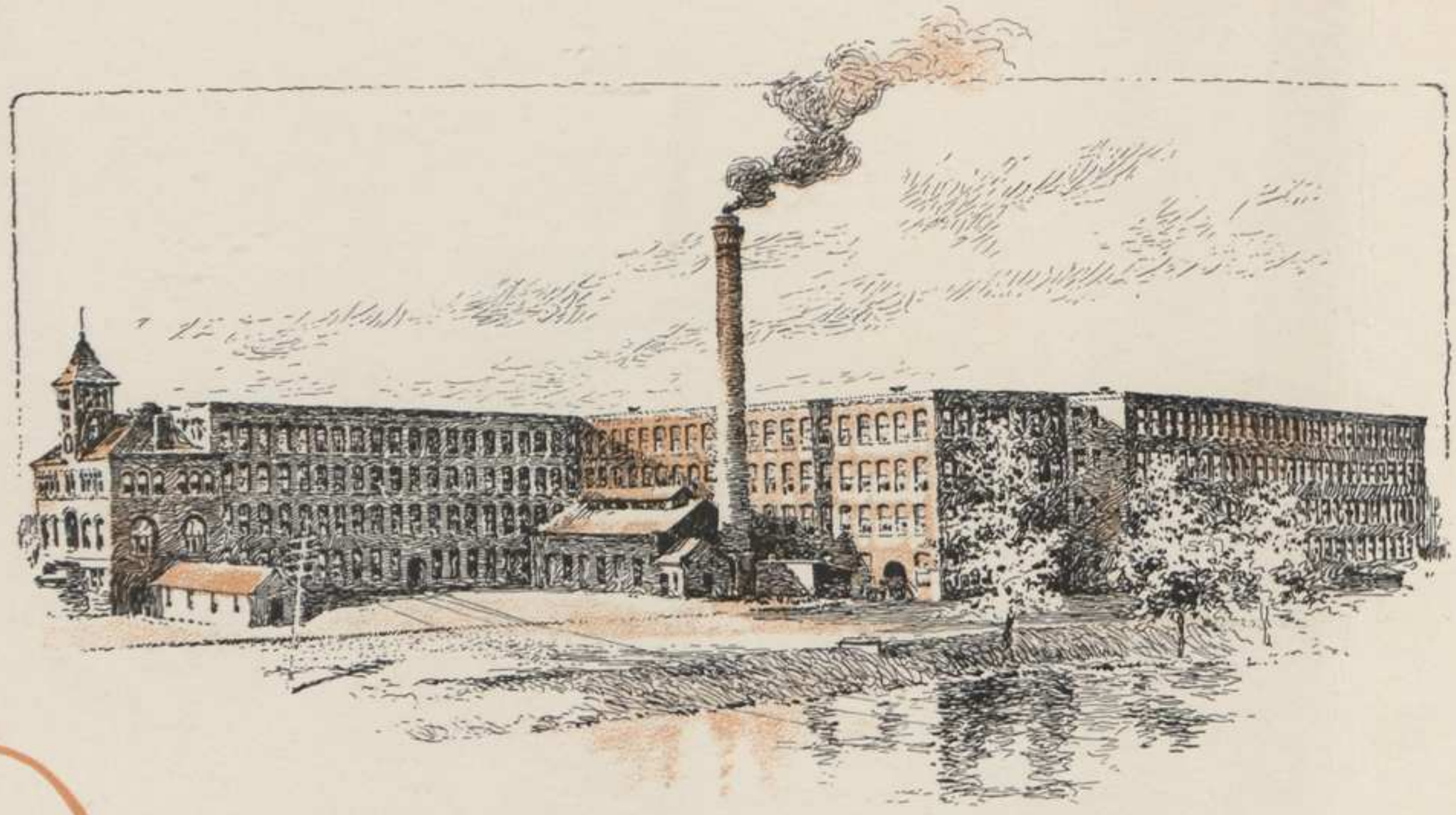
100 Broadway, New York, U. S. A.

Wheel Room

The vehicles described and illustrated in the following pages have been thoroughly tested in actual service. They embody the lessons we have been able to learn from having a large number steadily in commission in the hands of our customers for five years, as well as the results of our own testing, experiment and observation here and abroad. Our

our different factories alone over seventeen hundred men working exclusively on automobiles. Our business has been established and our factory in operation for five years and is now the most completely equipped automobile plant in the world. The engineers and experts in our employ have, therefore, had an experience more thorough and com-

Assembling Room



Wood-working Shop

claim for the reliable qualities and the superiority of our automobiles is based on the work they have done and the results they have given.

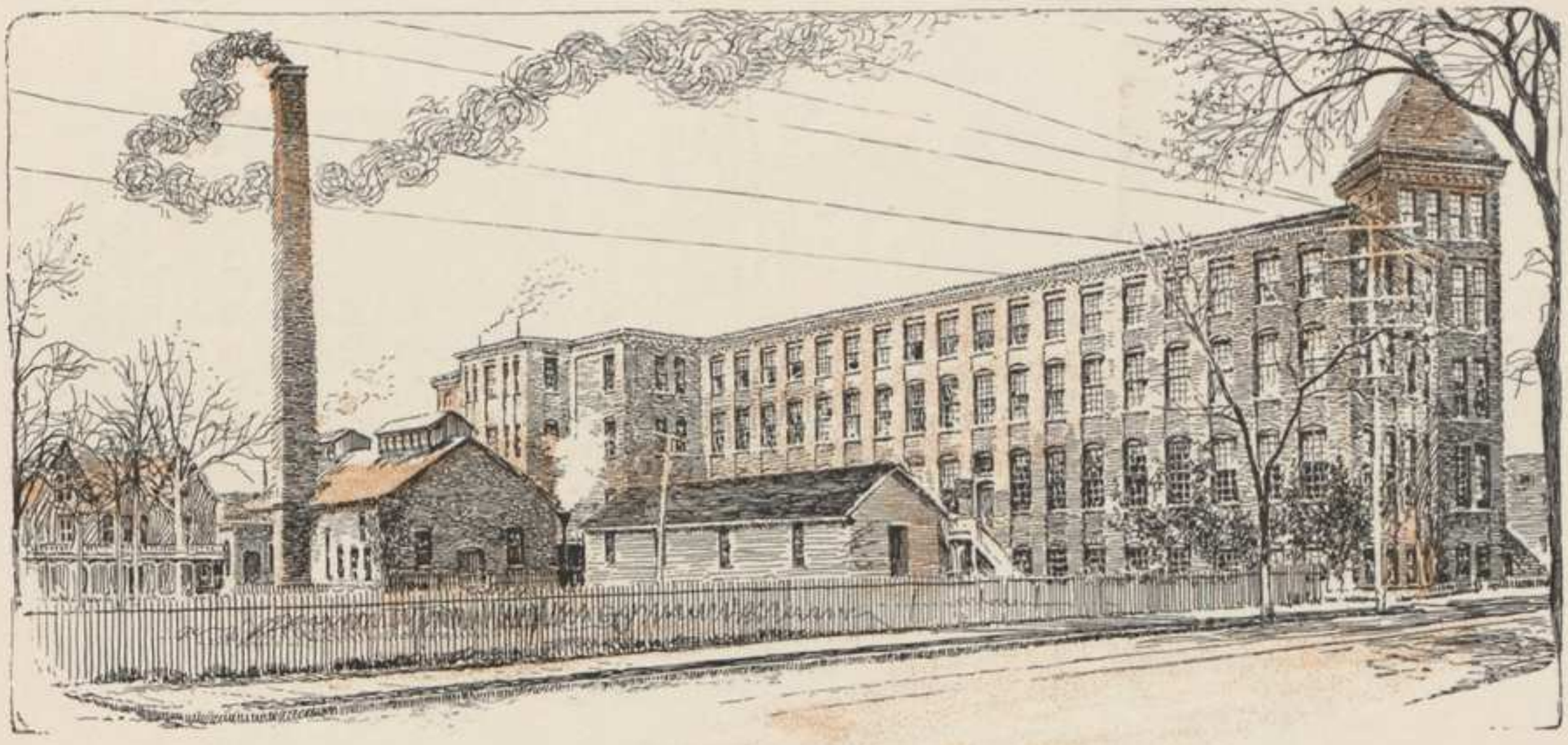
We have built and shipped to our customers a greater number of electric vehicles than produced to date by all the other firms in this country. We occupy nine acres of floor space, and employ in

our different factories alone over seventeen hundred men working exclusively on automobiles. Our business has been established and our factory in operation for five years and is now the most completely equipped automobile plant in the world. The engineers and experts in our employ have, therefore, had an experience more thorough and com-

Assembling Room

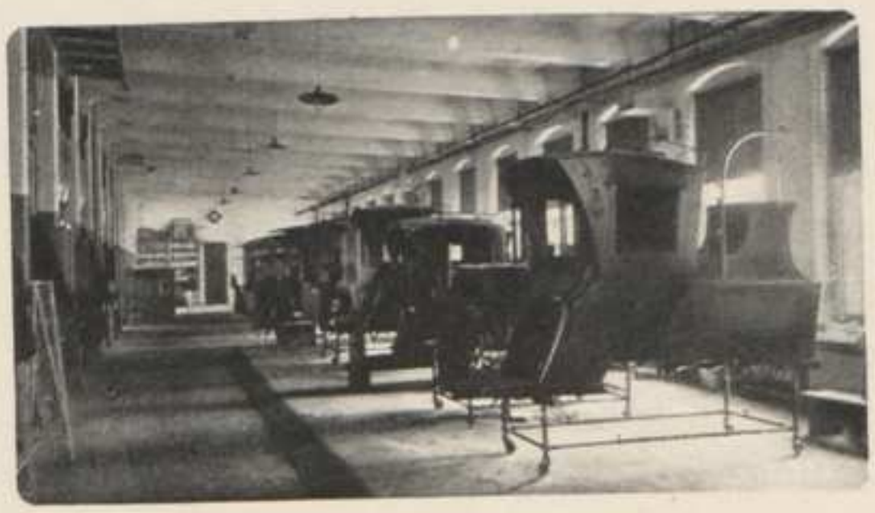
Forge Shop

prehensive, steadily in the same line, than could be obtained elsewhere. Five years is a long period in the automobile industry in this country, and few of those, besides ourselves, engaged therein to-day have had their factories in operation for one-half that period. We believe accordingly that we hold an unequaled advantage from the point



of view of the purchaser who desires nothing but what has been thoroughly tried and tested, on account of our long and practical experience.

In this catalogue the mileage as given for each electric automobile is that available on one charge of the battery which is supplied as standard. Where conditions justify, however, we are pre-



Rubbing Stand

Assembling Room

pared to furnish, if specified, for vehicles of the pleasure class, special batteries designed for long-distance work, from which considerably greater mileage can be obtained. Full information in regard to these and other classes of batteries will be furnished upon application.

Park XII Columbia Victoria

Mileage capacity on one charge, equipped with standard battery: 20.

Maximum speed, equipped with standard battery: 15 miles per hour.

Carrying capacity: 2 occupants.

Tires: 3-inch, pneumatic.

Wheels: wire; 28 inches diameter.

Alternative and long-distance batteries for this vehicle can be supplied. Information will be furnished upon application.

Mark XII

Columbia Victoria with Hood

Mileage capacity on one charge, equipped with standard battery: 20.

Maximum speed, equipped with standard battery: 15 miles per hour.

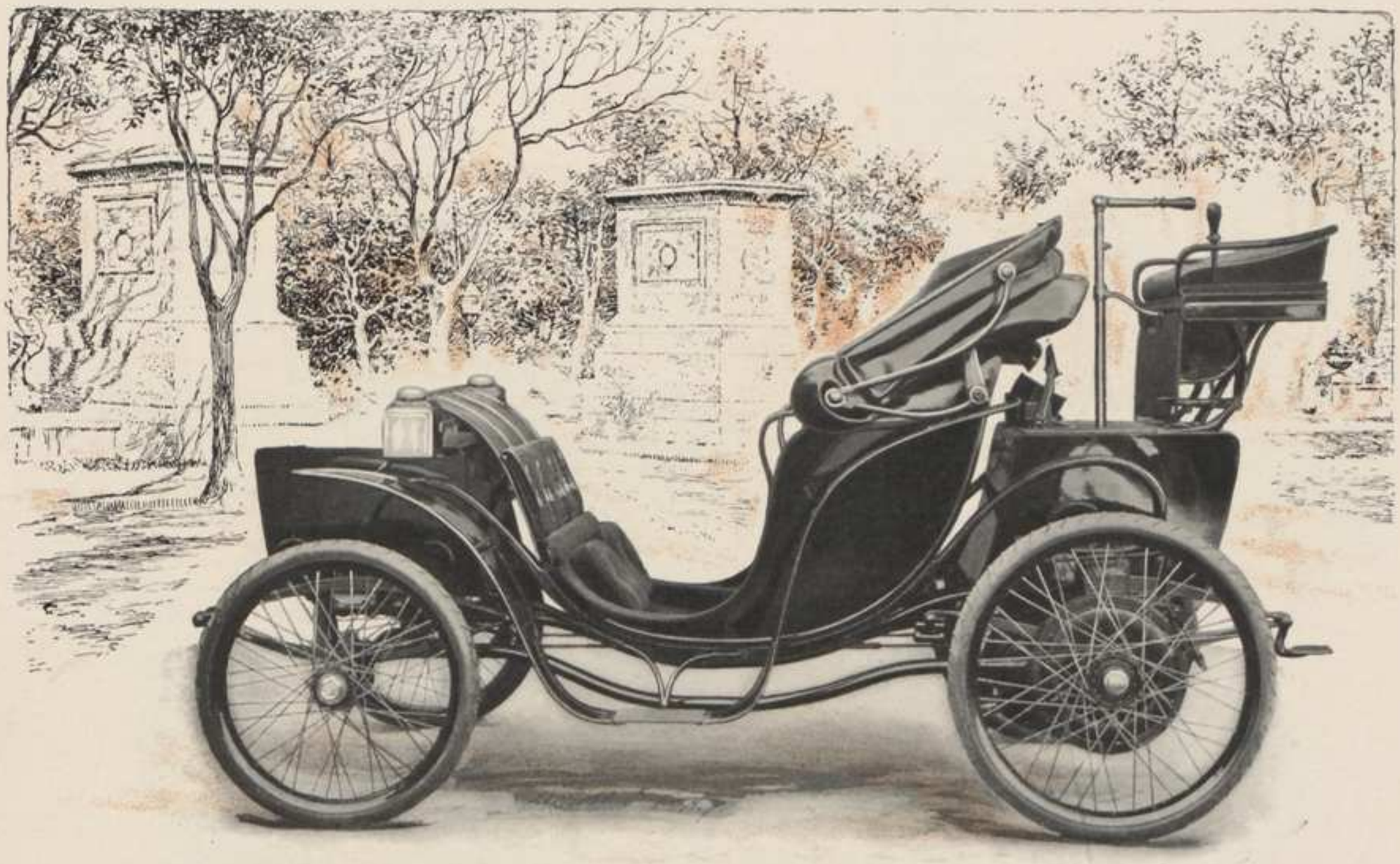
Carrying capacity: 2 occupants.

Tires: 3-inch, pneumatic.

Wheels: wire; 28 inches diameter.

This Victoria can be provided with a hood, as shown in the illustration, or with an English canopy top, when specified, at an extra charge.

Alternative and long-distance batteries for this vehicle can be supplied. Information will be furnished upon application.



Mark VI Columbia Victoria with Daumon

Mileage capacity on one charge, equipped with standard battery: 25.

Maximum speed, equipped with standard battery: 11 miles per hour.

Carrying capacity: 2 passengers, driver and attendant.

Tires: 3-inch, cushion pneumatic.

Wheels: wire; front 32 inches diameter, rear 36 inches diameter.

Mark XIX — Columbia Rear-boot Victoria

Mileage capacity on one charge, equipped with standard battery: 25.

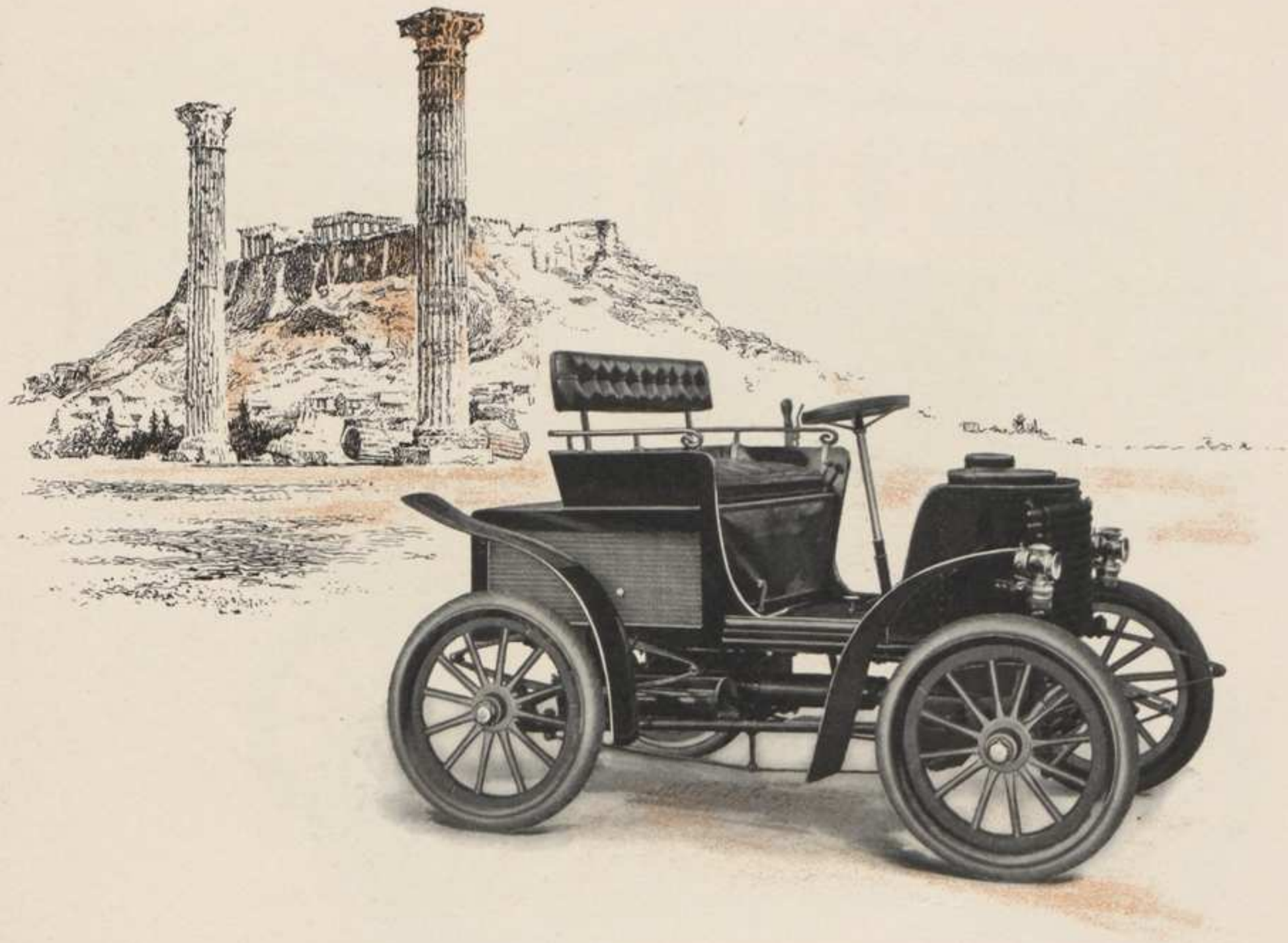
Maximum speed, equipped with standard battery: 12 miles per hour.

Carrying capacity: 2 passengers, driver and attendant.

Tires: 3-inch, pneumatic.

Wheels: wooden; 32 inches diameter.

Alternative and long-distance batteries for this vehicle can be supplied. Information will be furnished upon application.



Mark VIII Columbia Gasolene Runabout

Mileage capacity on one filling of gasolene tank: 100.

Mileage capacity on one filling of water tank: 100.

Maximum speed: 20 miles per hour.

Carrying capacity: 2 passengers.

Tires: 3-inch, pneumatic.

Wheels: wooden; 28 inches diameter.

Mark XI

Columbia Brougham de Luxe

Mileage capacity on one charge, equipped with standard battery: 25.

Maximum speed, equipped with standard battery: 11 miles per hour.

Carrying capacity: 3 passengers, driver and attendant.

Tires: 2½-inch, solid rubber.

Wheels: wooden; front 36 inches diameter, rear 42 inches diameter.

Mark XI Columbia Public Cab, with Underslung Battery

Mileage capacity on one charge, equipped with standard battery: 25.

Maximum speed, equipped with standard battery: 11 miles per hour.

Carrying capacity: 3 passengers, driver and attendant.

Tires: 2½-inch, solid rubber.

Wheels: wooden; front 36 inches diameter, rear 42 inches diameter.

Park XVI Columbia Straight-front Brougham

This vehicle is also built with an extension front.

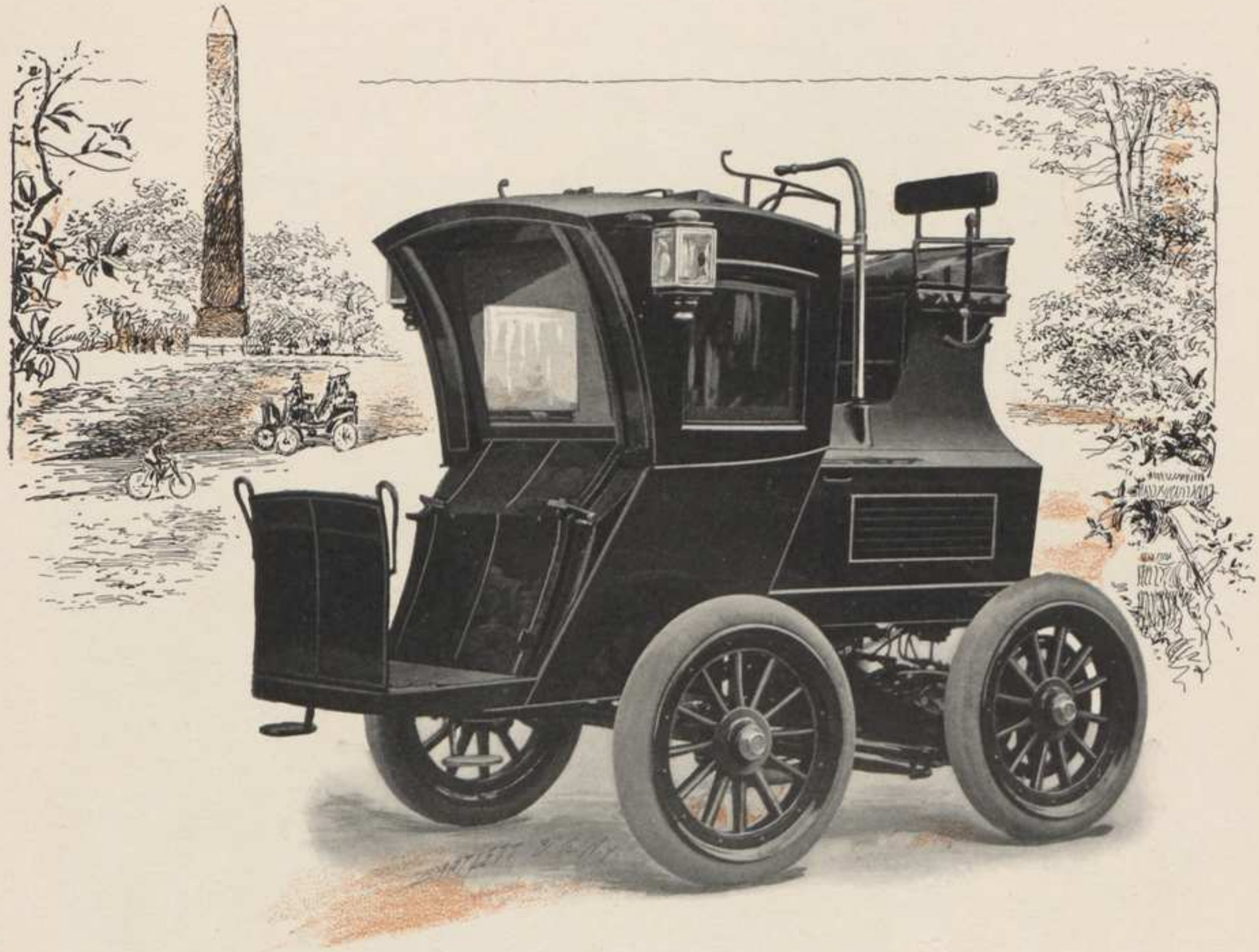
Mileage capacity on one charge, equipped with standard battery: 25.

Maximum speed, equipped with standard battery: 11 miles per hour.

Carrying capacity: straight-front Brougham, 2 passengers inside, driver and attendant on front seat; extension-front Brougham, 4 passengers inside, driver and attendant on front seat.

Tires: straight-front Brougham, 4-inch, pneumatic; extension-front Brougham, 5-inch, pneumatic.

Wheels: wooden; 36 inches diameter.



Mark XVII Columbia Hansom

Mileage capacity on one charge, equipped with standard battery: 25.
Maximum speed, equipped with standard battery: 11 miles per hour.
Carrying capacity: 2 passengers and driver.
Tires: 4-inch, pneumatic.
Wheels: wooden; 36 inches diameter.

Park XI Columbia Six-passenger Omnibus

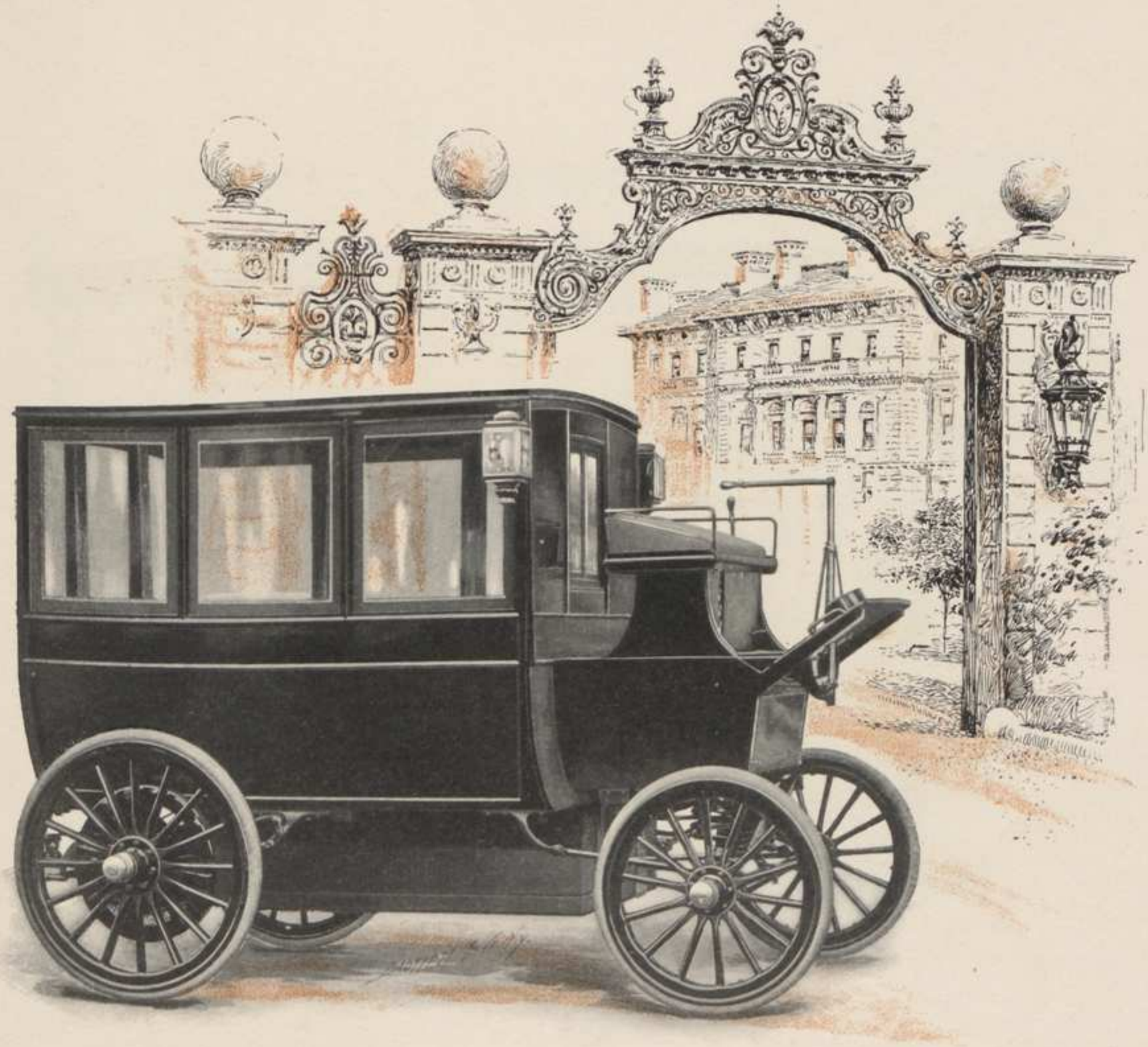
Mileage capacity on one charge, equipped with standard battery: 25.

Maximum speed, equipped with standard battery: 10 miles per hour.

Carrying capacity: 6 passengers inside, room on front seat for driver and one passenger.

Tires: 2½-inch, solid rubber.

Wheels: wooden; front 36 inches diameter, rear 42 inches diameter.



Park XI Columbia Eight-passenger Omnibus

Mileage capacity on one charge, equipped with standard battery: 25.

Maximum speed, equipped with standard battery: 10 miles per hour.

Carrying capacity: 8 passengers inside, room on front seat for driver and one passenger.

Tires: 2½-inch, solid rubber.

Wheels: wooden; front 36 inches diameter, rear 42 inches diameter.

Park XI

Columbia Wagonette

Mileage capacity on one charge, equipped with standard battery: 25.
Maximum speed, equipped with standard battery: 10 miles per hour.
Carrying capacity: 11 passengers and driver.
Tires: 2½-inch, solid rubber.
Wheels: wooden; front 36 inches diameter, rear 42 inches diameter.

Park VII Columbia Gasolene Tricycle Carrier

Mileage capacity on one filling of gasolene tank :
75.

Mileage capacity on one filling of water tank : 20.

Maximum speed : 12 miles per hour.

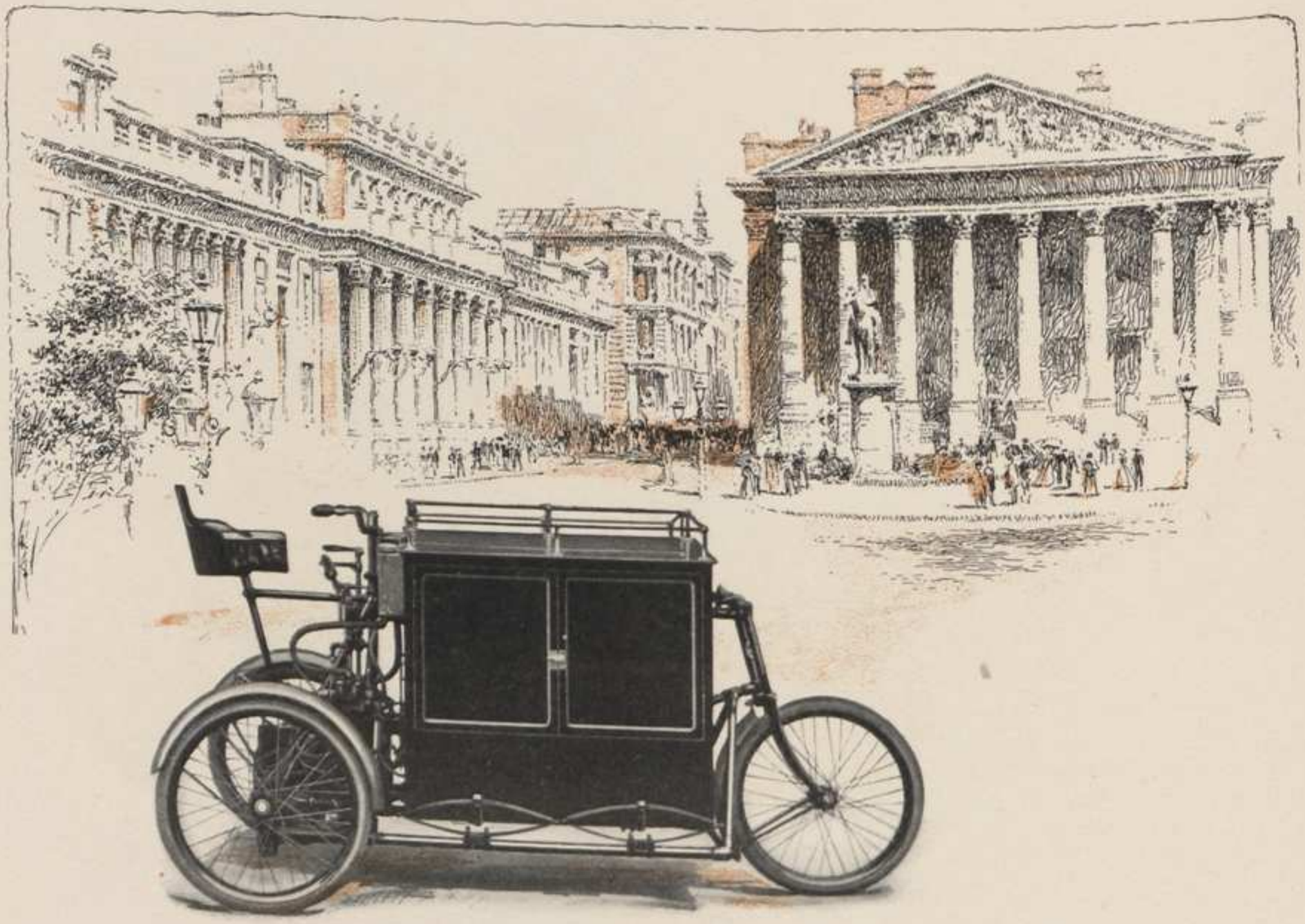
Carrying capacity : 500 pounds of merchandise and driver.

Tires : 2½-inch, pneumatic.

Wheels : wire ; 28 inches diameter.

Uncovered platforms for this vehicle, as shown in the illustration, can be supplied as an extra, if specified. Information will be furnished upon application.

This vehicle, with Standard equipment, is shown on the following page.



Mark VII

Columbia Gasolene Tricycle Carrier

Mileage capacity on one filling of gasolene tank :
75.
Mileage capacity on one filling of water tank : 20.
Maximum speed : 12 miles per hour.
Carrying capacity : 500 pounds of merchandise and driver.
Tires : 2½-inch, pneumatic.
Wheels : wire ; 28 inches diameter.

BARTLETT
& COMPANY
THE
ORR
PRESS
NEW
YORK

LES GRANDES USINES DE LA FRANCE

LES AUTOMOBILES

DELAUNAY-BELLEVILLE

42, CHAMPS-ÉLYSÉES - PARIS

USINES DE L'HERMITAGE - SAINT-DENIS (Seine)

PUBLICATIONS GORCE, 44, RUE DE BONDY, PARIS

Les Automobiles Delaunay-Belleville

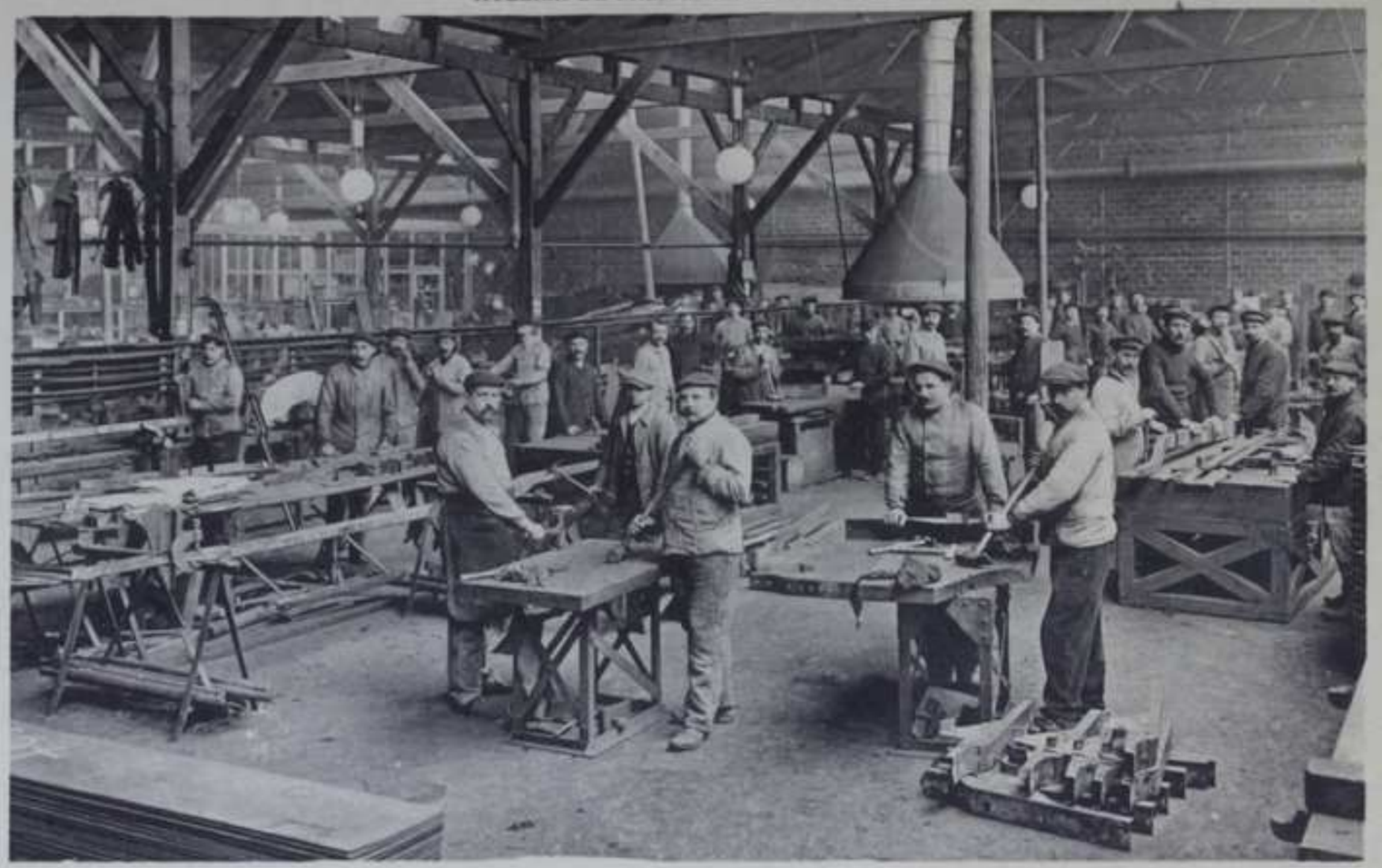
USINES DE SAINT-DENIS

On a beaucoup médit, en France même, de l'industrie française. On l'a représentée tributaire de l'Etranger pour les matières premières, battue en brèche sur les marchés où elle avait été si longtemps maîtresse, contrainte de baisser pavillon devant la perfection de la concurrence. Que sais-je encore de pénible ? Tout cela n'était pas seulement inconsidéré, c'était encore parfaitement inexact.

Le fait que les marques étrangères, pour acclimater leurs produits dans les pays exotiques aussi bien que sur le marché européen, sont contraintes de les présenter sous des dehors se rapprochant de ceux qui distinguent notre production nationale ; encore, ce souci, que manifestent tous les jours de multiples industriels des pays voisins, de créer en France des succursales de leurs établissements à seule fin de plus aisément provoquer une confusion dans l'esprit des acheteurs, témoignent bien que le renom de l'industrie française est toujours considérable dans l'Univers.

On ne saurait, en effet, imiter que ce qui est parfait, et tenter d'exploiter, au profit de moins avouables fabrications, celles dont le renom est indiscutable, ajoute à la valeur et à la réputation de celles-ci.

ATELIER DE PRÉPARATION DES CADRES



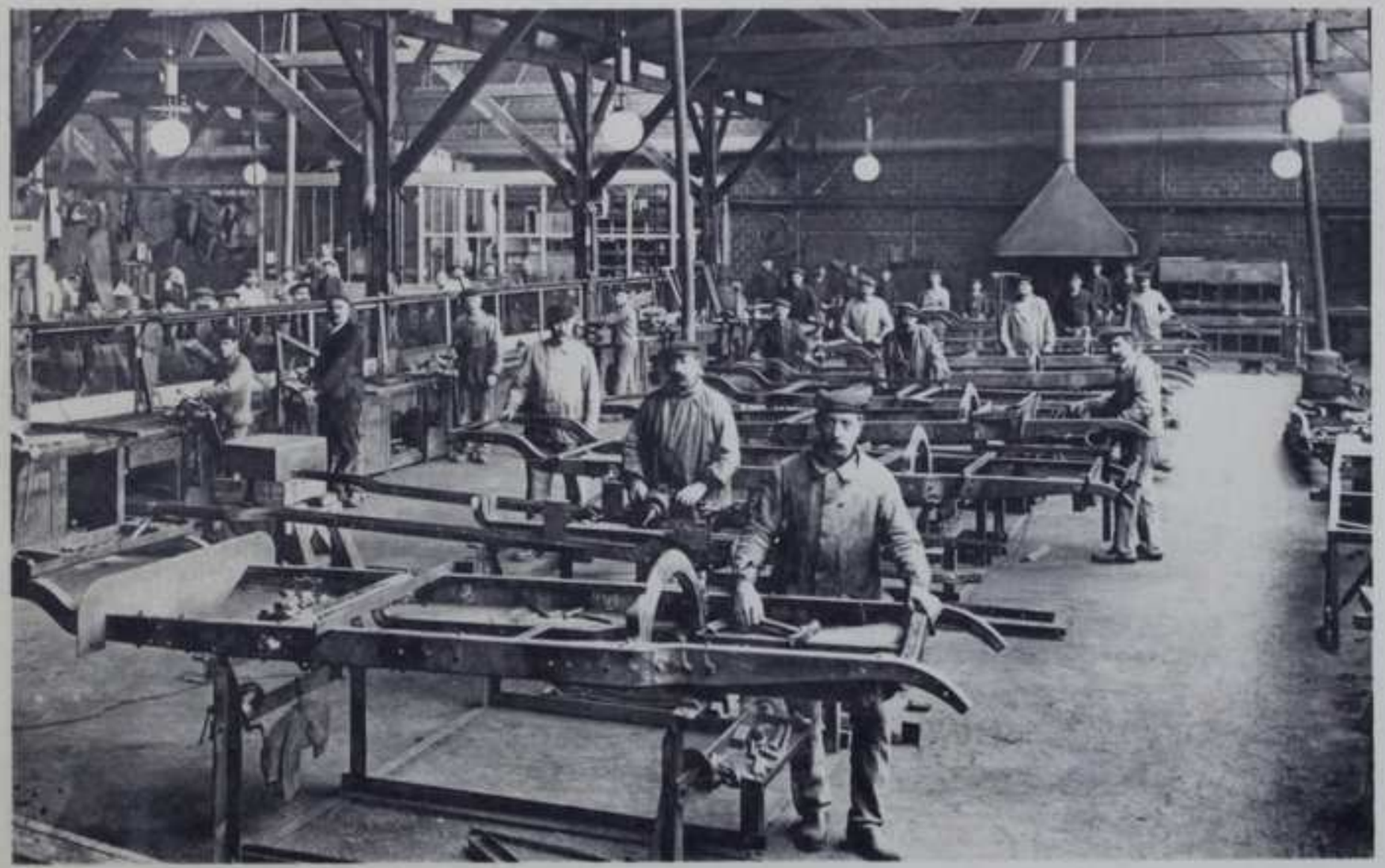
Mais à côté de ces preuves indélébiles que le simple raisonnement fournit, il en est d'autres qu'une enquête raisonnée dans les milieux industriels français, est capable d'apporter à la conscience de la nation, un moment troublée par les fantaisistes affirmations des pessimistes de rédactions.

Cette enquête, nous l'avons effectuée un peu dans toutes les branches de notre industrie. Parcourant, objectif en main, les plus grandes de nos usines, nous avons fixé les manifestations quotidiennes de l'activité créatrice du pays, tandis que nous puisions dans les statistiques la certitude absolue que nous demeurons les premiers et les plus recherchés fournisseurs du Globe. De ce travail sont nés les opuscules vulgarisateurs auxquels nous ajoutons aujourd'hui ce nouveau chapitre. Ainsi, peu à peu, s'est évanouie la légende de notre abaissement, en même temps que reprenait corps, dans l'esprit de chacun, ce sentiment de légitime fierté qui contribua si puissamment, en raison de la foi qu'il nous donnait en notre valeur, à l'exaltation nouvelle du patriotisme français.

* * *

Nous avons déjà parlé de bien des choses : Nos petits livres ont décrit l'industrie du chemin de fer, celle des constructions navales, tout au moins en ce qui concerne les propulsions des navires et les blindages de nos cui-

ATELIER D'ASSEMBLAGE DES CADRES



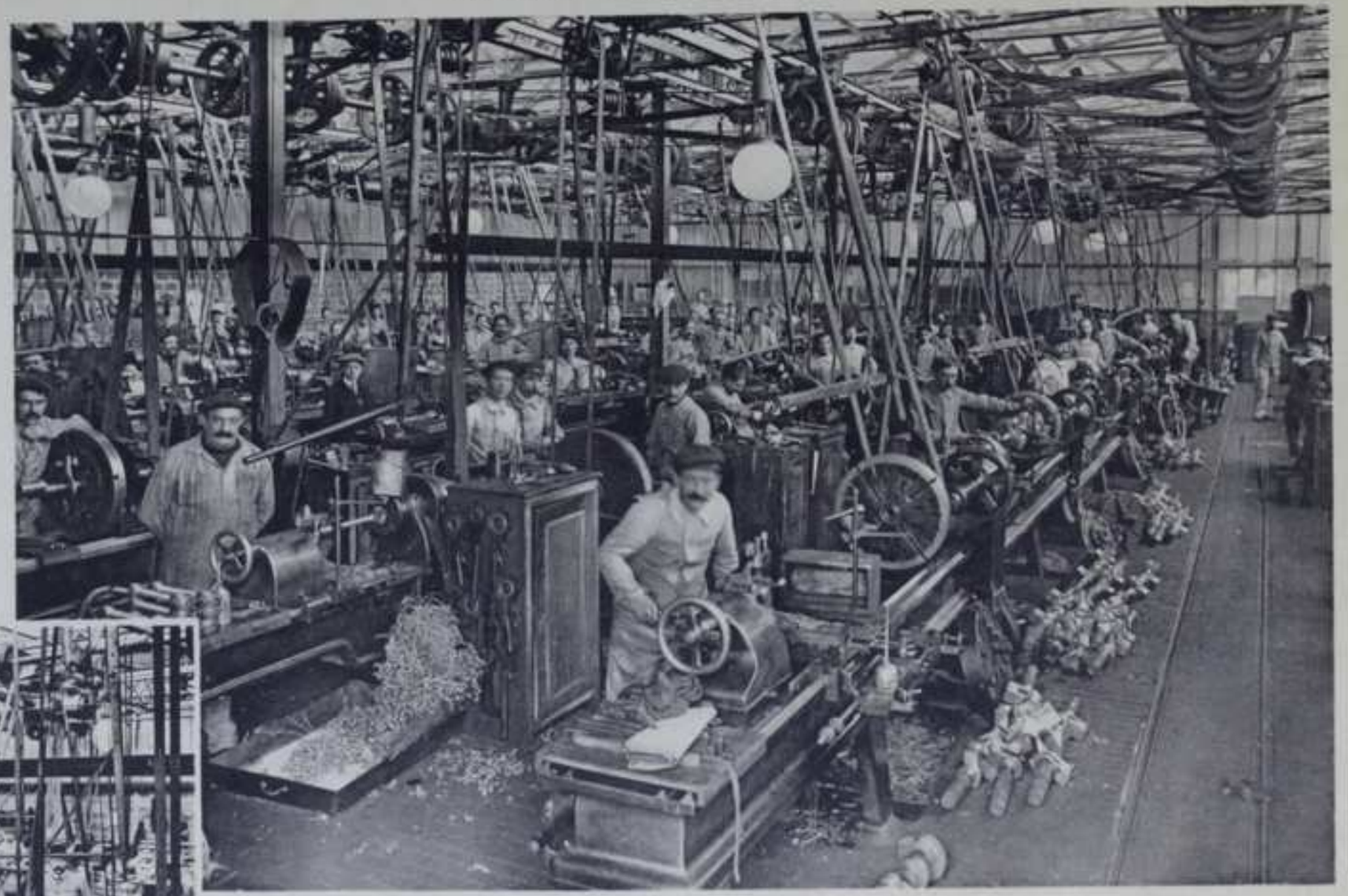
rassés. Effleurant des questions de défense nationale, nous avons ensuite montré ce que l'on pouvait voir de la fabrication des projectiles ; puis, pénétrant dans les temples de l'art aussi bien que dans les ateliers où se réalisent les merveilles du confortable, nous avons enseigné comment se matérialisent les instruments des propagateurs de la divine harmonie et les bonbonnières roulantes emmi les capitonnages, de quoi s'épanouit la beauté de cette autre gloire française qu'est la femme.

Nous parlerons aujourd'hui de l'automobile proprement dite.

Car parmi toutes les industries dont nous avons le droit de nous enorgueillir, celle de l'automobile tient une place prépondérante. Comme l'aviation, elle devait faire chez nous des progrès rapides et constants, étant donné que la pratique des sports qui veulent de l'audace, du sang froid, du coup d'œil, de la décision et de l'agilité, passionne au plus haut degré nos natures aventureuses.

Et, à la vérité, à peine en quelques années, c'est de chez nous que sont venus tous les perfectionnements qui ont conduit à l'adoption définitive et générale de la locomotion par moteurs. Précisément, le dernier salon de l'automobile, où nombre de fabrications étrangères avaient tenu à exposer leurs modèles les plus perfectionnés aux côtés de ceux qui émanaient de nos constructeurs, a révélé toute l'étendue de notre supériorité en cette matière. Toutes les faveurs de l'étranger furent aux marques françaises parce qu'elles

VUE D'UN DES ATELIERS DE TOURS



présentaient des avantages écrasants au multiple point de vue de l'élégance, de la solidité, de la souplesse, de la rapidité et de l'économie. Il nous plaît de constater cet engouement. Mais le constater ne suffit pas ; il nous faut également le justifier.

Cette justification apparaitra évidente quand on aura parcouru cet opuscule que nous avons établi grâce à la complaisance de la Société Anonyme des *Automobiles Delaunay-Belleville*, chez qui nous sommes allés quérir

ATELIER DE TOURS

les photographies illustrant cet ouvrage et dont l'exposition fut, plus que tout autre, l'objet de l'attention des visiteurs du salon.

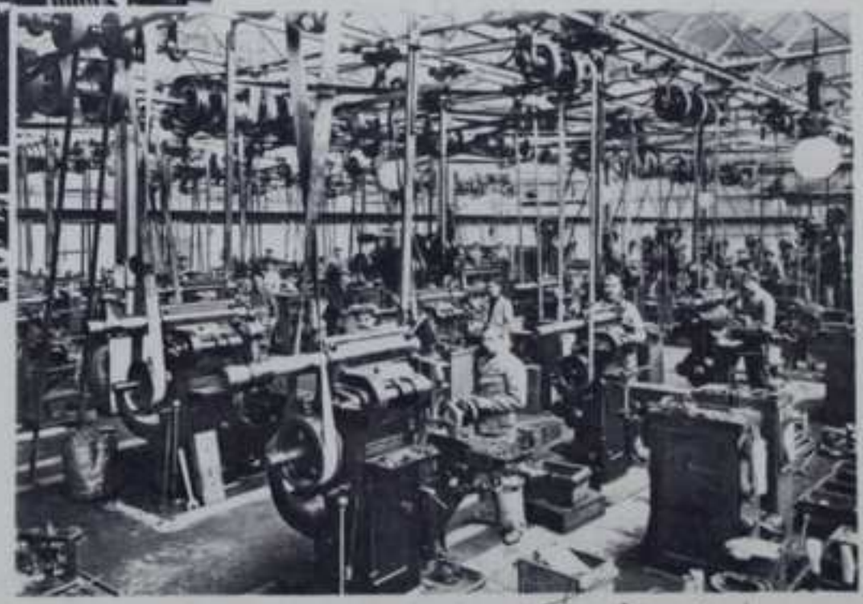
* * *

C'est à Saint-Denis, sur le domaine de l'Ermitage, tout proche des bâtiments où les

ATELIERS DES MACHINES A TAILLER LES ENGRENAGES

Ce qu'est l'usine *Delaunay-Belleville*, nos photographies l'expriment admirablement. Imaginez de vastes ateliers, hauts, clairs, larges, disposés chacun selon les obligations de la spécialité à laquelle ils sont destinés et pourvus de tout ce que le génie de l'homme a prévu de plus perfectionné dans le dessein d'obtenir de parfaites et homogènes constructions, et vous aurez l'image de cette petite ville industrielle. Au surplus, ne décrit-on pas par le menu un outillage comme celui

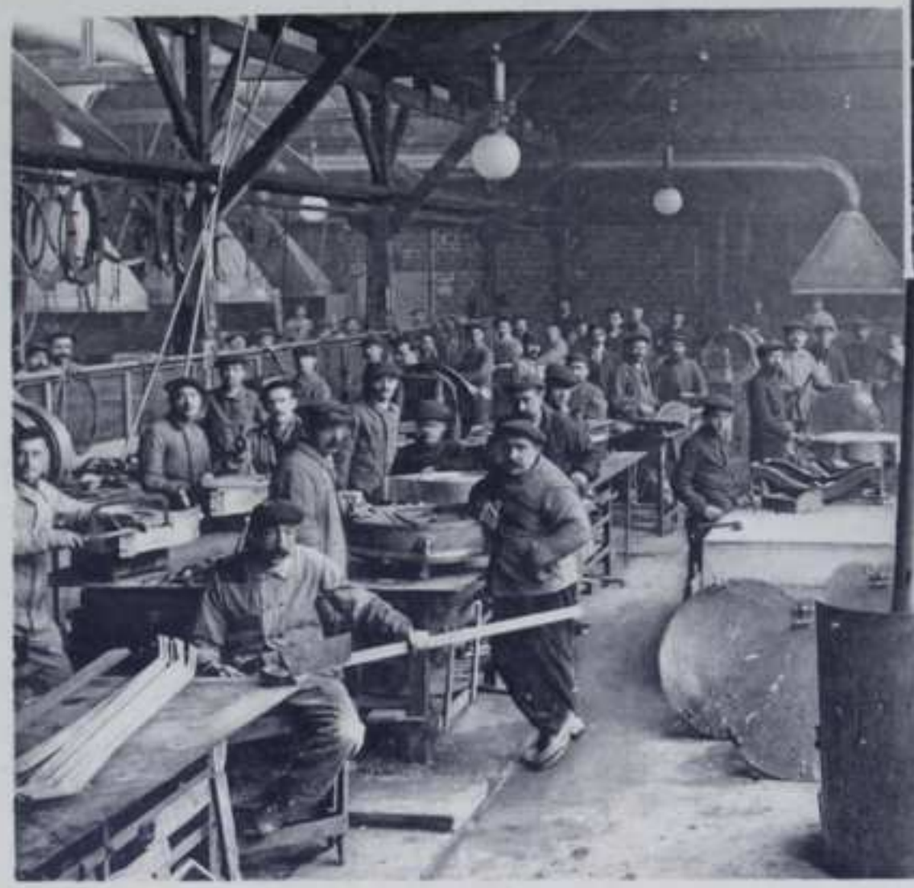
Etablissements *Delaunay-Belleville* construisent les générateurs qui ont établi leur réputation mondiale — générateurs dont nous nous occuperons certainement quelque jour — que s'élève l'usine modèle d'où sortent ces châssis uniques en raison de la diversité des qualités dont ils témoignent.



VUE D'UN ATELIER DE Traisage

assemblé chez *Delaunay-Belleville ;* mais on en admire la multiplicité, la précision, l'emploi, le but et les résultats. Aussi bien ces forêts de courroies, ces champs de tours, de perforeuses, de fraiseuses ; ces fours où sont cémentées les grosses pièces ; ces procédés pour « décaper » les pièces sorties des fours ; ces appareils de vérifications ou d'essais expliquent eux-mêmes, leur utilité et précisent suffisamment par leur nombre l'importance

ATELIER DE CHAUDRONNERIE



ATELIER DE FABRICATION DES RADIATEURS

de la fabrication à laquelle ils sont appelés à concourir, pour qu'il ne soit pas nécessaire d'insister sur leurs nécessités respectives.

Ce qu'il est mieux de dire, c'est l'usinage des pièces avec lesquelles on édifie l'auto ; ce sont les opérations successives qui conduisent à la réalisation des voitures à moteurs.

Mon Dieu ! le procédé est classique ; il ne diffère que dans les détails. Et les détails, nous le verrons tout à l'heure, c'est le triomphe

VUE D'ENSEMBLE DES ATELIERS DE CHAUDRONNERIE

des automobiles *Delaunay-Belleville*. Pour l'ensemble voici la marche suivie : Les longerons du châssis sont emboutis et assemblés sur place. Plus loin on leur ajoute les ressorts et les essieux ; puis on les pourvoit de roues. Le châssis préparé reçoit alors la partie mécanique proprement dite qui comprend : le moteur et l'embrayage, le changement de vitesse, le pont arrière, la direction et les divers accessoires qui dépendent de ces organes.

Nous ajouterons que chacun de ces groupes donne lieu à des essais particuliers ayant pour but d'en assurer le fonctionnement rationnel, et lorsque l'ensemble est réalisé, il est procédé sur route à des essais généraux qui permettent la mise au point définitive de la voiture.

Cette mise au point n'est d'ailleurs qu'une garantie supplémentaire, tant les soins apportés chez *Delaunay-Belleville* à la fabrication des pièces séparées et les vérifications successives

ATELIER DE FABRICATION DE RÉSERVOIRS A ESSENCE

ATELIER D'USINAGE DES CARTERS

dont elles sont l'objet, évitent les surprises finales. Mon confrère Mortimer Mègret a pu, en effet, avec un châssis 15 chevaux 6 cylindres, accomplir le voyage de Paris à Poitiers, soit 320 kilomètres, d'une seule traite et sans s'être livré, au préalable, à la formalité de la mise au point.

« Comme mise au point, raconte-t-il, j'eus à embrayer à l'octroi de Suresnes ; j'eus à prendre la quatrième vitesse au bout du pont ; à la sortir de son cran à Tours pour faire de l'essence ; et à la replacer au repos à Poitiers où j'arrivai ravi, après trois heures et quart de route. »

Cette confession dit l'excellence de la fabrication française *Delaunay-Belleville*, les qualités routières de la voiture et par suite, elle donne à comprendre que le défunt Edouard VII qui était un grand touriste devant l'Eternel ; que S. M. le Tzar de toutes les Russies dont on sait le goût pour les excursions sûres et rapidement conduites ; que le pratique Roosevelt

FOURS A CÉMENTER

et la poétique souveraine Amélie qui régna sur le Portugal, aient, le cas échéant, confié à des voitures Delaunay-Belleville le soin d'assurer leur service.

* * *

Et cela nous conduit à examiner de près les raisons mécaniques qui ont fait la vogue des voitures Delaunay-Belleville. Leur forme, tout d'abord, est séduisante à l'œil. Elles sont allongées, bien assises, heureusement complé-

MONTAGE DES MOTEURS

UN COIN DE L'ATELIER DE SABLAGE - NETTOYAGE DES PIECES

tées par un capot élégant ; on devine qu'elles ont été dessinées pour la ville, ce qui n'empêche pas qu'elles réalisent, en même temps, les plus heureuses voitures de tourisme qui soient.

Nous prendrons pour type de description la six cylindres que lança Delaunay-Belleville et qui a, dès son apparition, classé ses constructeurs comme les plus appré-

ATELIERS D'AJUSTAGE

ciables de l'industrie automobile. Son moteur est une toupie qu'on voit mais qu'on n'entend pas tourner : il ralentit comme seul le sait faire un six cylindres, fait des reprises comme une machine à vapeur. C'est le modèle parfait de l'automobile destinée à sortir victorieuse des encombrements de voitures et qui se faufile entre elles, les suit roues à roues, bondit devant les chevaux sur un coup de pédales sans faire plus de bruit qu'un battement d'ailes ; mais c'est aussi le modèle idéal de l'automobile des routes accidentées ; qui démarre dans les côtes avec autant de fougue que dans les paliers. Et puis quel souci du commode, du pratique, de la simplification ! L'adoption de la magnéto à bougies y a débarrassé des désagréments que procurait le rupteur et du bruit qu'occasionnait la rupture : par suite plus de complications de réglage ; simplification de l'arbre à cames qui commandait l'allumage ; possibilité de placer toutes les soupapes sur un seul côté du moteur et de les commander par un seul engrenage. Par là le constructeur a gagné un peu de légèreté, un peu de meilleur marché, beaucoup de silence.

Chez Delaunay-Belleville pas de régulateur encombrant et sonore ; un carburateur qui est le comble de la simplicité et dont la disposition ingénieuse réduit au minimum la consommation ; enfin un système de graissage qui laisse loin derrière lui tous ceux employés dans les autres marques.

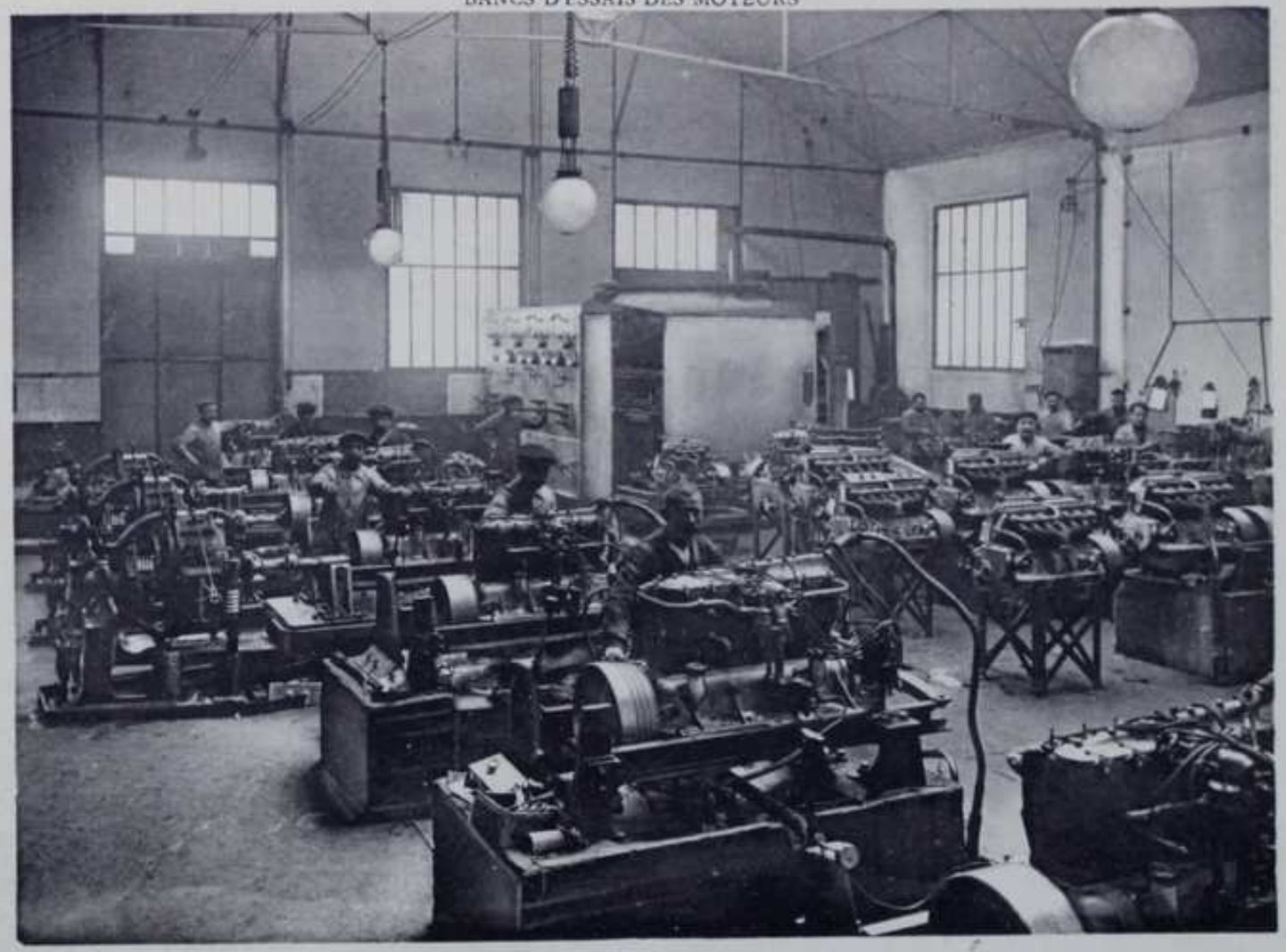
Les caractéristiques de ce système sont nécessaires à rappeler : l'huile refoulée par une pompe qu'actionne constamment le moteur, comme le sang est refoulé par le cœur, parcourt tous les organes du moteur ; elle traverse

le vilebrequin, les coussinets, les têtes de bielles ; elle monte à l'intérieur des bielles pour graisser les pieds cachés dans les pistons. Elle met à la surface de tout roulement une garniture grasse ; elle l'y force, l'y enfonce pour ainsi dire. De ce fait, les roulements ont une douceur extrême et leur usure est à peu près nulle.

Ce système était appliqué de longue date par la Maison Delaunay-Belleville aux machines à vapeur dont elle a doté notamment la marine. Son perfectionnement ne pouvait porter en conséquence que sur un détail ; les organes utiles à vérifier de la pompe de circulation d'huile sont maintenant d'un accès très facile. Le filtre et le régulateur de pression peuvent être démontés en un instant et sans aucune difficulté.

Toutes ces commodités indiquent bien que si les voitures Delaunay-Belleville ont été conçues dans le bureau de l'Ingénieur, elles ont été complétées par l'expérience du routier.

BANCS D'ESSAIS DES MOTEURS



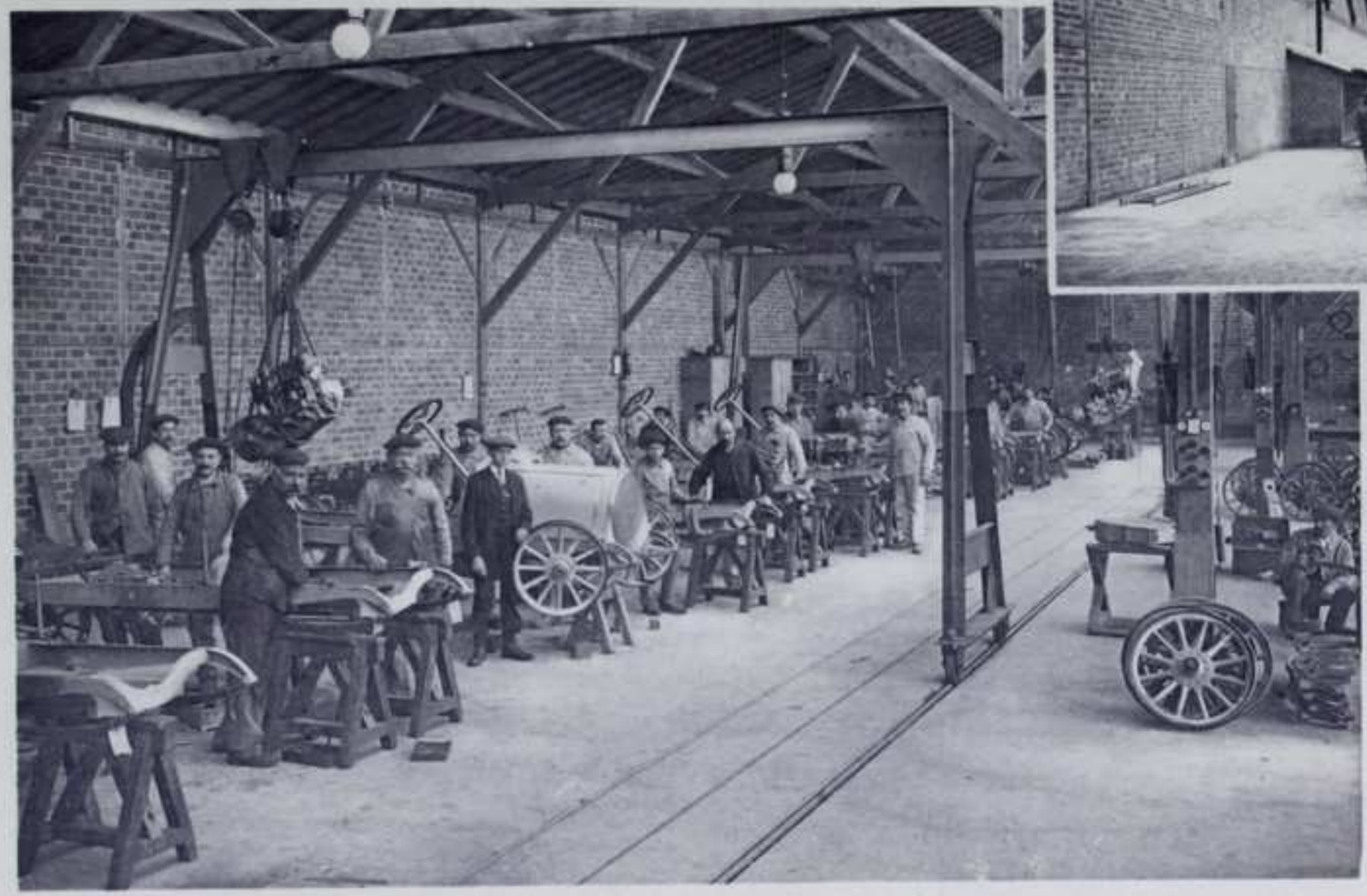
Un ingénieur, en effet, a pu imaginer de commander la magnéto par un accouplement merveilleux permettant un réglage extrêmement précis du point d'avance et le routier a pu concevoir la façon expéditive et sûre dont la magnéto est fixée au châssis, ce qui en permet le démontage immédiat.

Dans le même ordre d'idée, voyez la façon dont est réalisé le dispositif de ventilation et l'installation de la canalisation électrique si habilement placée à la portée du conducteur que, sans l'aide d'aucun outil, le démontage peut être

pratiqué — avec une seule main s. v. p. — en l'espace d'une minute seulement.

N'est-ce pas également un routier qui a découvert le joint instantané de canalisation d'eau ? Incontestablement. Il se révèle, au demeurant, partout le routier : Dans les dispositions de l'embrayage, dans la complexion de la boite de vitesse, très ramassée, très solide, très silencieuse, parce que ses arbres étant courts, ne fléchissent

VUE EXTÉRIEURE DES ATELIERS DE MONTAGE



UNE VUE INTÉRIEURE DE L'ATELIER DE MONTAGE

et, partant, ne vibrent pas ; dans l'établissement du pont arrière ; dans l'accouplement des roues directrices dont la barre réglable sur l'un de ses côtés permet de rétablir séance tenante le parallélisme parfait des roues ; dans les freins également qui sont accessibles réellement, ceux d'arrière étant réglables commodément et présentant cet avantage que le chauffeur peut rattraper l'usure de leurs segments sans être contraint de démonter les roues.

Ainsi a été réalisé ce principe : que si la voiture automobile doit être finie avec délica-

ATELIERS DE MISE AU POINT

tesse, elle doit pouvoir être confiée, non pas seulement à des mécaniciens, mais à des inexpérimentés et courir, cependant, sans y mourir, à travers les flots de poussière et les lacs de boue.

* * *

Des preuves palpables de cette solidité, de cette endurance, de la pratique de ces dispositions ont été fournies d'ailleurs par des expériences péremptoires. Nous disions tout à l'heure l'étonnement de notre confrère Mortimer Mégret, accomplissant sans réglage préalable un voyage direct de Paris à Poitiers, précisément sur un châssis 15 chx 6 cyl. et arrivant à l'étape fixée sans avoir eu un seul instant à intervenir pour un quelconque arrangement de la mécanique. Un autre sujet de surprise fut la façon qu'eut de se comporter dans la coupe du Prince Henri la 15 chevaux 6 cylindres qui, livrée quelques jours avant que soit courue cette épreuve, à un sportsman russe de Saint-

UNE AUTRE VUE DES ATELIERS DE MISE AU POINT

MOSCOU - DEVANT LA CLOCHE BRISÉE

Pétersbourg, fut lâchée par son propriétaire à la suite des voitures dotées de moteurs spéciaux, sans qu'on l'ait essayée le moins du monde. Pourtant la Delaunay-Belleville leur tint tête brillamment : elle égrena sur la route bon nombre de voitures spéciales qui n'avaient pu, elles, bien que préparées de longue date, soutenir la lutte ; et à quelques semaines de là elle se classait merveilleusement dans la coupe du Tzar qui se courut à St-Pétersbourg.

DEVANT L'ÉGLISE SAINT-JEAN

Et puis, que de commodités diverses ? La plus évidente a été certainement réalisée par Delaunay-Belleville pour la simplification de la mise en marche. Jusqu'ici on mettait en marche à la main. La mise en marche à la main est une opération sale : c'est aussi une opération dangereuse, puisqu'une explosion prématurée peut casser l'avant-bras de l'opérateur. C'est, enfin, une opération un peu ridicule, puisque l'opérateur est obligé de courber l'échine afin d'atteindre sa manivelle de barbarie et que, s'il est vêtu d'un pardessus, ainsi qu'il sied en hiver, il est contraint à deux petites manœuvres à la fois simultanées et contraires que voici : d'une part, il est obligé de fermer complètement les jambes pour serrer entre elles les pans de son vêtement, de peur qu'ils ne soient accrochés par la manivelle, et, d'autre part de les ouvrir, grandement, afin de se camper d'aplomb !

Le moteur à explosions ne peut, en effet, se mettre seul en marche sous l'effort du fluide qui l'alimente, pour cette raison impérative que ce fluide n'existe encore pas au moment où commence la mise en marche ! Ce sont les premiers mouvements du moteur qui provoquent dans la tuyauterie d'aspiration l'arrivée du gaz. Il faut donc que

A L'ENTRÉE DU SALON DE MOSCOU

ces premiers mouvements soient eux-mêmes déterminés par une force — jusqu'ici la force humaine. La force humaine ne peut-elle avoir une remplaçante ? Oui, assurément. " Mettons, ont pensé Delaunay-Belleville, à la disposition du moteur, une pompe qui lui permettra de comprimer de l'air, et un réservoir qui lui permettra d'en faire provision ; en un mot, installons un accumulateur d'air comprimé où le moteur fera lui-même réserve de l'énergie nécessaire à sa mise en marche, et nous aurons là une source de démarrages élégants. "

LE TZAR DE RUSSIE ET LA FAMILLE IMPERIALE

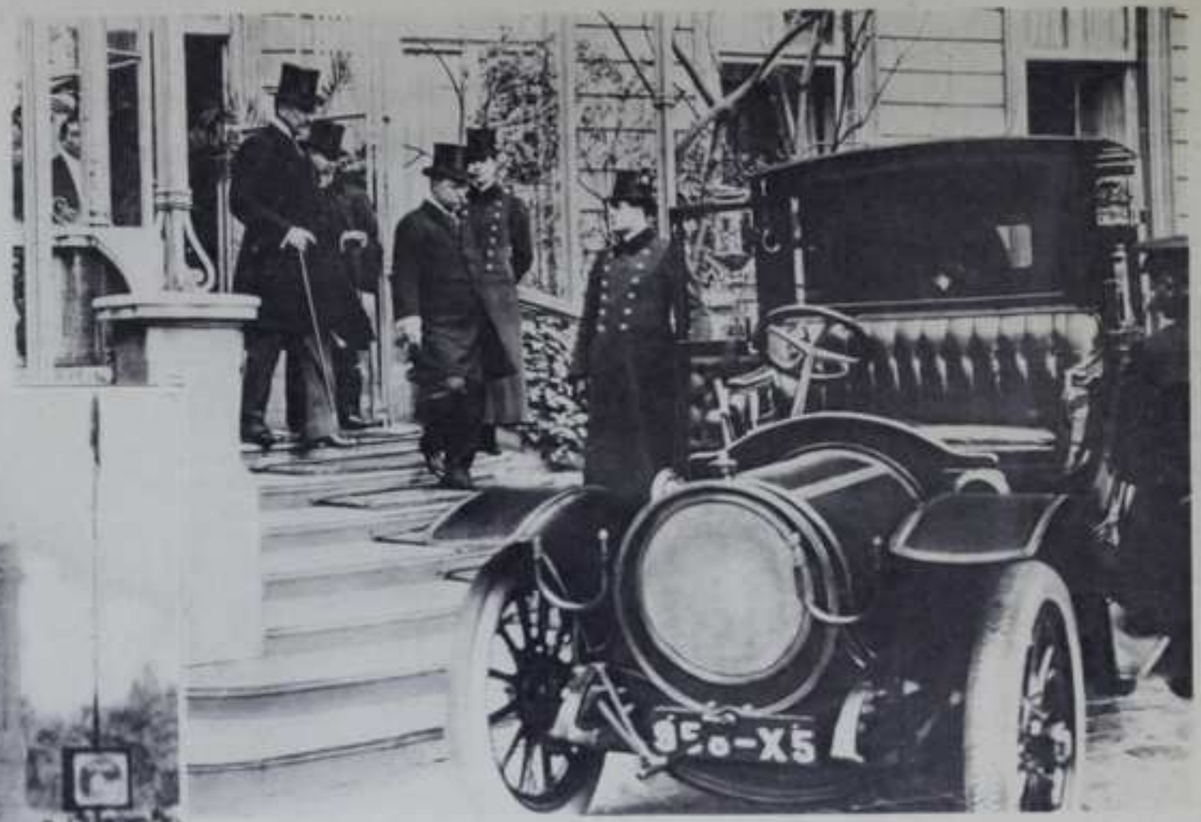
LA REINE AMÉLIE DE PORTUGAL

De cette pensée est né le *Démarreur Barbey*, dont Delaunay-Belleville se sont assurés le monopole exclusif et qui est construit en entier dans les Usines de St-Denis.

Le Démarreur Barbey se présente sous la forme d'un petit moteur horizontal à cylindres opposés ; il s'installe entre les mains d'avant du châssis. C'est un bloc complètement indifférent à l'eau, à la poussière ou à la boue. Il joue deux rôles. Il est *pompe*, en ce qu'il accumule dans le réservoir l'air nécessaire ; c'est alors le moteur de la

voiture qui l'entraine. Il est *moteur*, en ce que, sous l'effort de l'air comprimé que renferme le réservoir, il fait tourner le moteur de la voiture pour le mettre en route. La durée de ses fonctions est d'ailleurs fort courte ; la plupart du temps il se repose et, par conséquent, ne consomme ni énergie ni huile. Particularité essentielle : le Démarreur Barbey se monte *sur toutes les voitures*, de quelque marque qu'elles soient ; il se monte toujours *sans qu'on ait la moindre modification à apporter au mécanisme existant* et s'il

LE ROI EDOUARD VII DEVANT LE GRAND PALAIS



supprime, d'une part, le ridicule que provoquait la manœuvre de la manivelle, il permet encore, grâce à un dispositif spécial de gonfler les pneumatiques sans effort. Pour tout cela et pour tout le reste précédemment décrit, Delaunay-Belleville synthétisent bien l'art le plus sûr du constructeur. Et ils s'affirment les *premiers* de l'automobile aussi bien par l'ampleur de leur trafic que par le fini de leurs modèles et la perfection de leur installation. C'est pourquoi nous leur avons demandé de nous permettre de démontrer sur leur nom et parce que celui-ci nous fournissait à cet égard une indiscutable argumentation, que dans cette branche particulière de l'industrie, c'est encore, c'est toujours la France qui est à la tête des nations.

Publications GORCE, 44, Rue de Bondy — PARIS
TÉLÉPHONE 439.34

Automobile

AIBA

SOCIÉTÉ DE CONSTRUCTIONS MÉCANIQUES ET AUTOMOBILES

47, Rue Rouget de l'Isle

SURESNES

(SEINE)

TÉLÉPH : 43

1920

ALBA 1920

CHASSIS 10/12 HP

Cylindres.	4
Alésage	65
Course	130
Voie	1m25
Empattement.	2m90
Largeur du châssis	0m75
Largeur totale	1m40
Emplacement de carrosserie	2m50
Entrée de carrosserie.	1m80
Longueur totale	3m95
Poids du châssis	700 kgs.
Roues amovibles bois	760×90

Graissage sous pression commandé par pompe.

Magnéto haute tension.

Carburateur automatique.

Refroidissement par thermo-syphon.

Ventilateur commandé par courroie.

Embrayage cône garni de Raydo.

Changement de vitesse à trois vitesses par deux balladeurs levier coulissant.

Transmission à deux joints de cardan à rotules.

Poussée et réaction par les ressorts.

Deux freins sur roues.

Direction à vis et roue complète.

Démarrage et éclairage électrique.

Les Prix ci-dessous sont garantis pour toutes les commandes prises avant le Ier Janvier I920.

Torpédo 4 places, capote, pare-brise, 4 suspensions Houdaille, démarrage, éclairage et klaxon électrique, 5 roues détachables garni de pneumatiques..... Frcs.... I6.000.

Même désignation que ci-dessus, mais avec éclairage acétylène et cornet avertisseur..... .....Frcs..... I4?000.

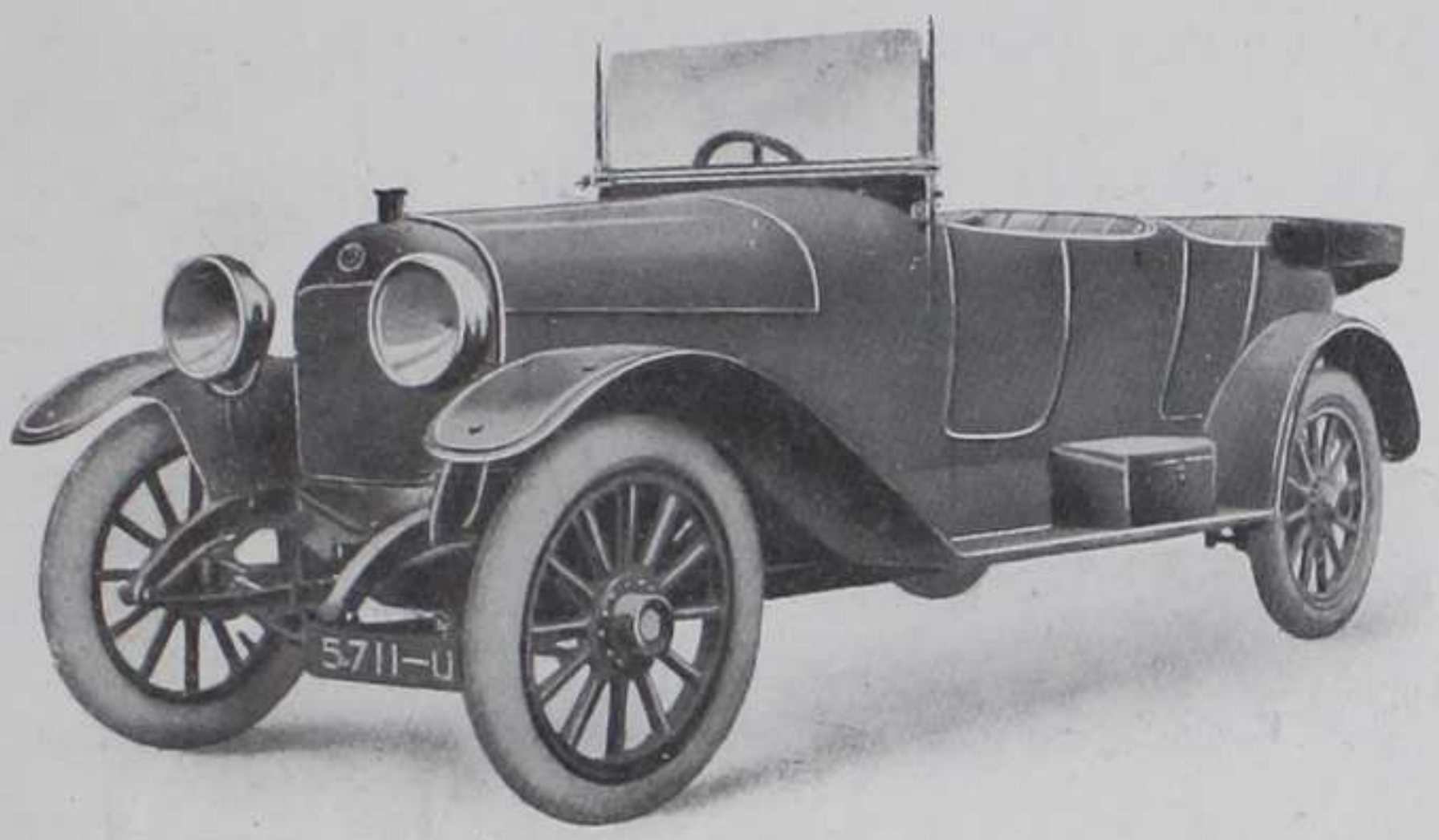
Même désignation que ci-dessus, mais sans les suspensions Houdaille...Frcs..... I3.000.

Déduction pour voiture livrée sans roue de secours..... Frcs..... 500.

:-:-:-:-:-:-:-:-:-:-:

VOITURES CARROSSÉES

CARROSSERIES DE SÉRIE



Châssis tel qu'il est décrit d'autre part avec carrosserie Torpedo 4 places, capote, pare-brise, phares, lanternes, Klaxon, porte-roues, plaques de police .. .. Frs. 17500

Châssis tel qu'il est décrit d'autre part avec carrosserie Torpedo 2 places, capote, pare-brise, phares, lanternes, Klaxon, porte-roues, plaques de police . .. . Frs. 17000

Châssis tel qu'il est décrit d'autre part avec conduite intérieure, 2 places, glace avant inclinable, glaces sans châssis, plafonnier, porte-roues, plaques de police.. .. .. Frs. 18000

Châssis tel qu'il est décrit d'autre part avec conduite intérieure, 4 places, glace avant inclinable, glaces sans châssis, plafonnier, porte-roues, plaques de police.. .. .. Frs. 19500

CONDITIONS DE VENTE

Le présent Catalogue ne constitue pas offre. Tous nos châssis et voitures sont vendus et payables un tiers à la commande, le solde à la livraison à nos usines. Les expéditions sont faites aux risques et périls des destinataires ; nous déclinons toute responsabilité au sujet des arrivages incomplets ou en mauvais état.

La date de livraison n'est donnée qu'à titre d'indication, tout retard ne peut donner lieu à des dommages-intérêts. Toutefois, si le retard excédait trois mois, le client pourrait exiger l'annulation de sa commande et le remboursement du versement effectué sans aucun dommages-intérêts, sauf un intérêt de 6% l'an sur les sommes versées au jour de leur remboursement. Toute voiture avant la livraison peut être essayée par la personne qui l'a commandée ou par un tiers désigné par elle. Si l'essai n'est pas réclamé, le propriétaire est réputé considérer comme bon, l'essai auquel nous nous sommes livrés.

Nos châssis sont garantis pendant 6 mois contre tous vices de construction, à dater de la livraison. Cette garantie est limitée au remplacement pur et simple dans nos ateliers de la pièce défectueuse sans indemnité d'aucune sorte. En aucun cas nous n'acceptons les frais quelconques faits en dehors de nos ateliers.

Toutes les réparations sont payables au comptant. Les retours des pièces à réparer sont faits en port dû.

Les prix de nos marchandises s'entendent toujours pour livraison à nos usines, l'emballage port et douane sont à la charge de l'acheteur.

Huit jours après une mise en demeure de prendre livraison faite par lettre recommandée et restée infructueuse, le client sera considéré comme ayant annulé son ordre et perdra de ce fait les sommes versées d'avance.

Nous conservons la faculté d'apporter à nos moteurs ou voitures en cours d'année, les modifications que nous estimons utiles, sans effet rétroactif.

Etant données les difficultés que nous avons rencontrées à obtenir des livraisons régulières de pneumatiques et les variations continuelles des cours, nous nous réservons la faculté de livrer nos châssis ou voitures sans pneumatiques, alors même que les commandes auraient été enregistrées par nous avec pneumatiques. Le prix de nos châssis sont établis en supposant maintenus les prix des pneumatiques, à la date où notre catalogue a été remis.

Nous traitons avec des concessionnaires qui font leurs transactions à leurs profits, risques et périls.

Pour les expéditions, nous couvrons les voitures avec des bâches pour les protéger pendant le trajet, sauf avis contraire de la part du client ces bâches sont facturées au cours du jour, depuis leur départ, jusqu'à leur rentrée à l'usine.

De convention expresse, le Tribunal de la Seine est seul reconnu compétent pour toute difficulté pouvant survenir entre nos clients et nous.

SPECIFICATION

OF **12-14** H.P.

ADAMS

TWO-CYLINDER CARS.

ALL BRITISH LABOUR & MATERIAL.

PEDALS TO PUSH—That's All.

MADE BY

THE **ADAMS**

Manufacturing Company, Ltd.,

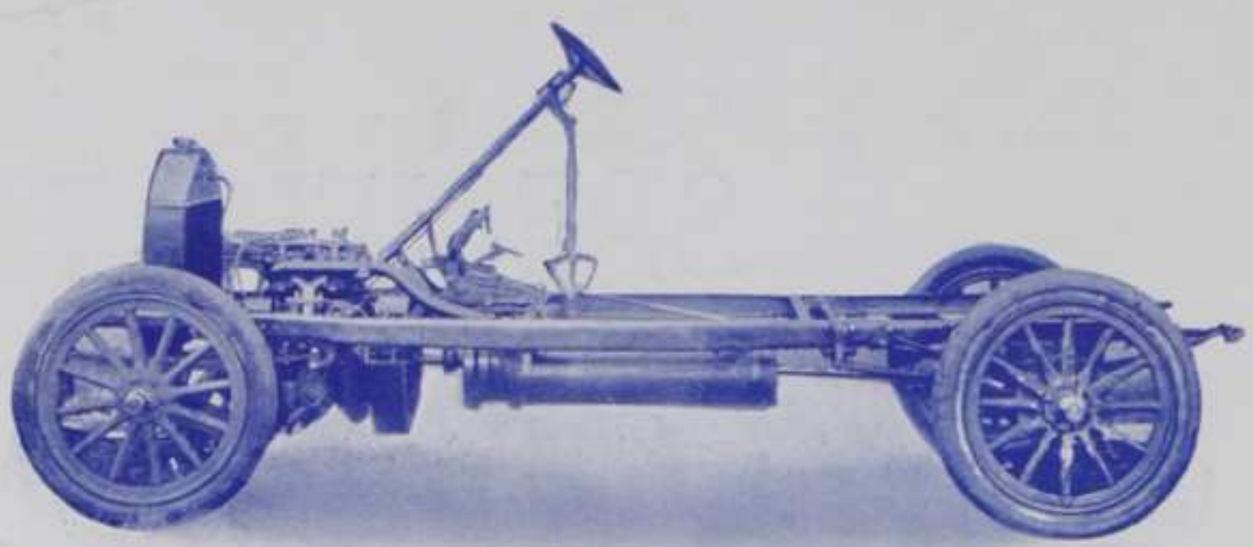
Works: BEDFORD.

Offices: 147, Queen Victoria St.,
LONDON.

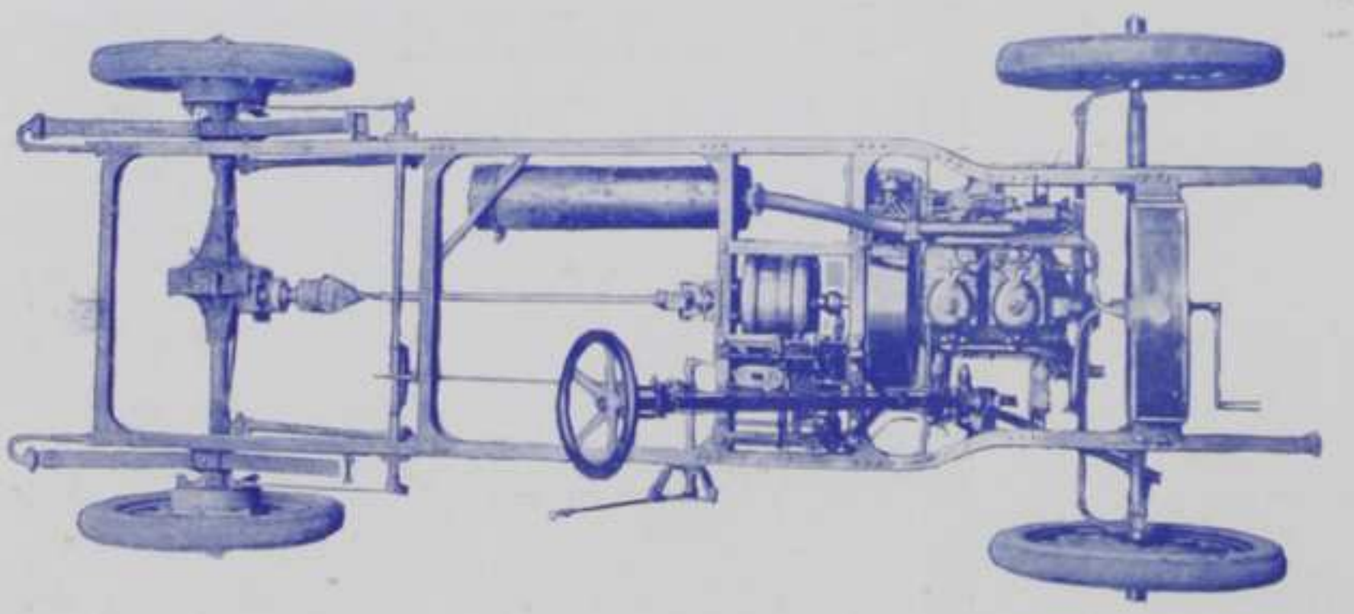
Telegraphic Address: "ADMOCAR, LONDON."
" " "ADMOCAR, BEDFORD."

Telephone No.: 7123 CENTRAL.
" 2 P.O. BEDFORD.

Adams 2=Cylinder 12=14 H.P. Chassis.



Elevation.



Plan.

Specification and General Particulars

OF

ADAMS

12=14 H.P. 2=Cylinder 1907 Type Car.

Chassis.

Length.—Wheel base, 8 feet 6 inches ; overall length, 11 feet 9 inches approximate.

Track.—4 feet 2 inches, overall width, 5 feet 6 inches approximate.

Approximate Weight.—Of standard chassis, 12 cwt.

Chassis Frame.—Pressed steel.

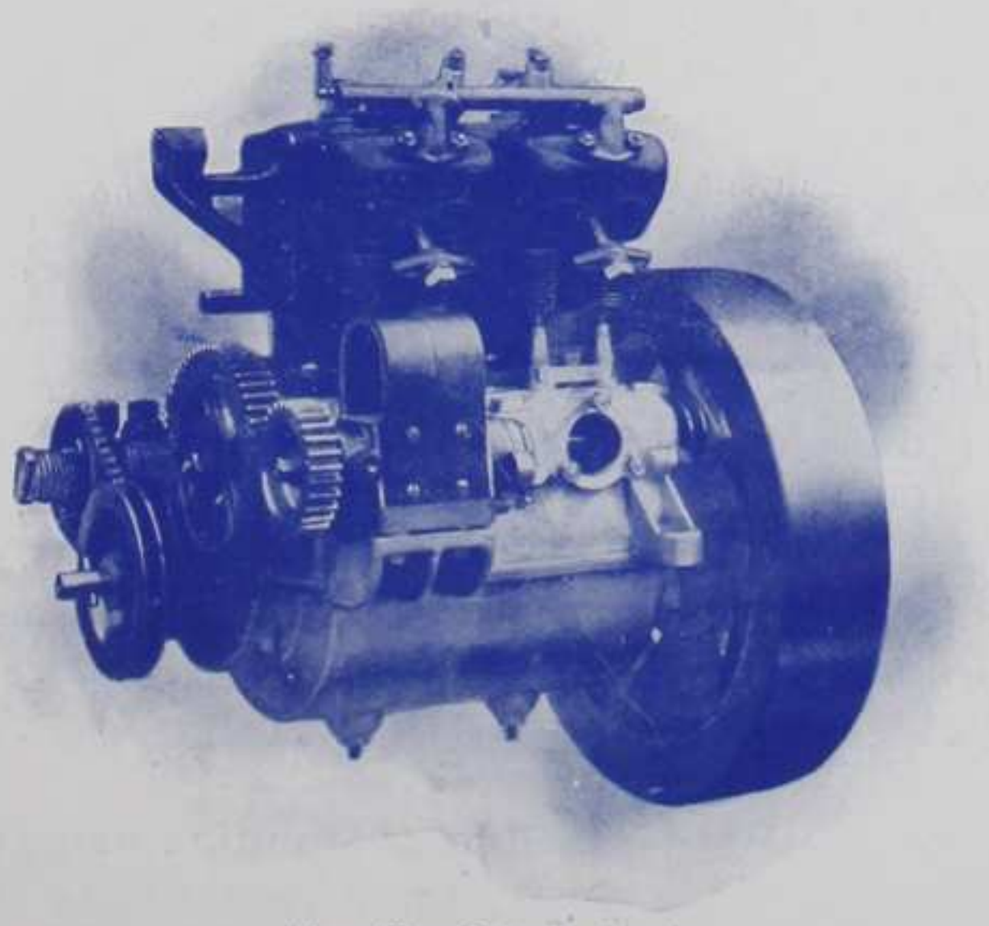
Axles.—All of drawn steel tube stayed with steel rod. Front axle with drop forged forked swivels.

Axle Bearings.—Front, conical roller bearings. Rear, ball bearings.

Springs.—34 inch front. 38 inch rear.

Wheels.—Artillery type; equal size to take tyres 760 × 90 m/m heavy.

Engine.—Two cylinder, vertical bore 105 m. ; stroke 120 m/m. Large water jackets. Mechanically operated valves all on one side. All valves easily accessible and interchangeable. Develops 15 B H.P at 1,000 R.P.M. Massive fly wheel forming fan Extra long engine bearings.

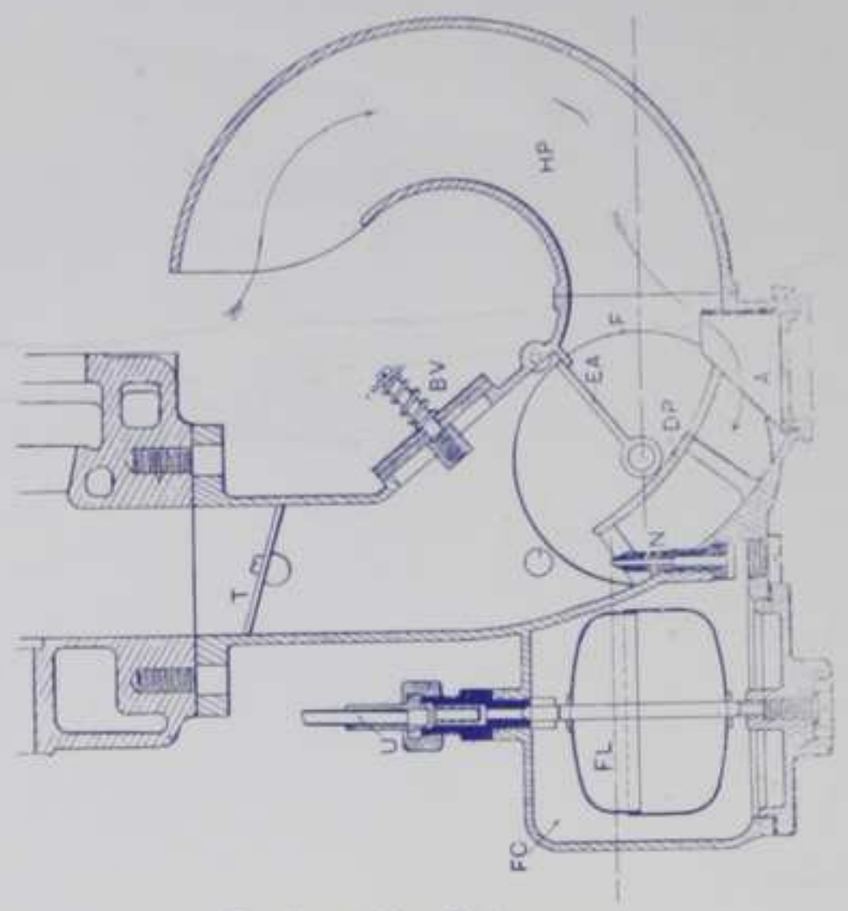


Adams Two Cylinder Engine.

Adams Manufacturing Co., Ltd.,

147, QUEEN VICTORIA STREET,
LONDON, E.C.
Works : BEDFORD.
Telephone : No. 7123 Central.
2 P.O. Bedford.

Carburettor.—"Adams' Manufacturing Co.'s" patent, giving positive regulation of mixture at all loads and speeds of engine. The simplest automatic carburettor, and entirely different in principle from all others. The speeed of the engine is controlled entirely by hand or foot operated throttle.



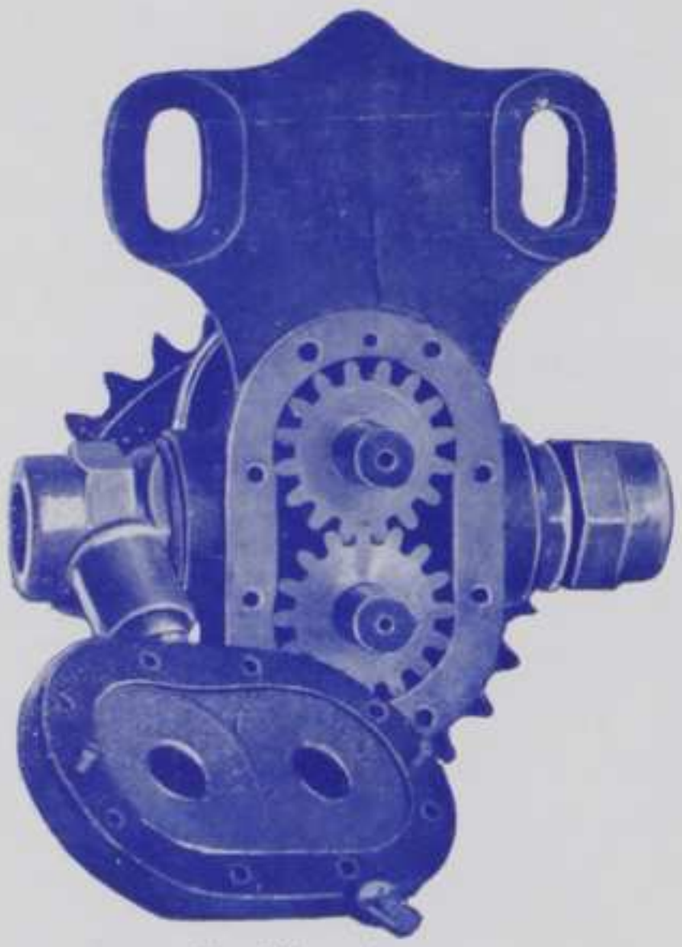
Section of the Carburettor.

A. Adjuster for ordinary air supply
BV, Back-fire valve
DP, Division plate separating air passages
EA, Extra air shutter
FC, Float chamber
F, Flywheel on extra air shutter spindle
FL, Float
HP, Hot air pipe
N, Petrol nipple
S, Shutter spring
SA, Shutter spring tension [adjuster
T, Throttle valve
TL, Throttle valve lever
SC, Shutter case
U, Union pipe to petrol tank

Ignition.—Three systems: High tension plug with accumulator and coil, low tension magneto or high tension magneto. All cars can be fitted with two systems when required, at a slight extra cost.
Each system controlled by its own lever at steering wheel.

Engine Control.—Single throttle lever placed either just under the steering wheel or operated by right foot

Radiator.—Mounted on front of chassis. Made of copper tubes with copper stamped radiating discs, and forms radiator and tank in one.



The Water Pump.

Water Pump.—Positive geared pump, ensuring positive water circulation with any speed on engine or any temperature of water.
Extra water tank fitted for hot climates.

Lubrication.—"Adams' Manufacturing Co.'s" patent system of forced lubrication; is entirely independent of the driver, and supplies the correct quantity of oil required at all speeds of the engine, varying with the speed. No taps to be turned on or attended to in any way.

Silencer.—Black sheet iron. No back pressure, no noise.

Petrol Tank.—Capacity 8 gallons. Placed in convenient position under front seat.

Clutch.—Steel band, fibre-lined, working on cast-iron drum. Easily adjusted, very simple, gradual and effective. Controlled by pedal.

Gear Case.—Patented. Arranged with three speeds forwards and reverse. Consists of six gear wheels, all *externally cut* and *always in mesh*. The whole enclosed in an oil-tight, cast-iron circular box. Direct drive on top speed. Gear box complete only about 12 inches in diameter and 7 inches in width.

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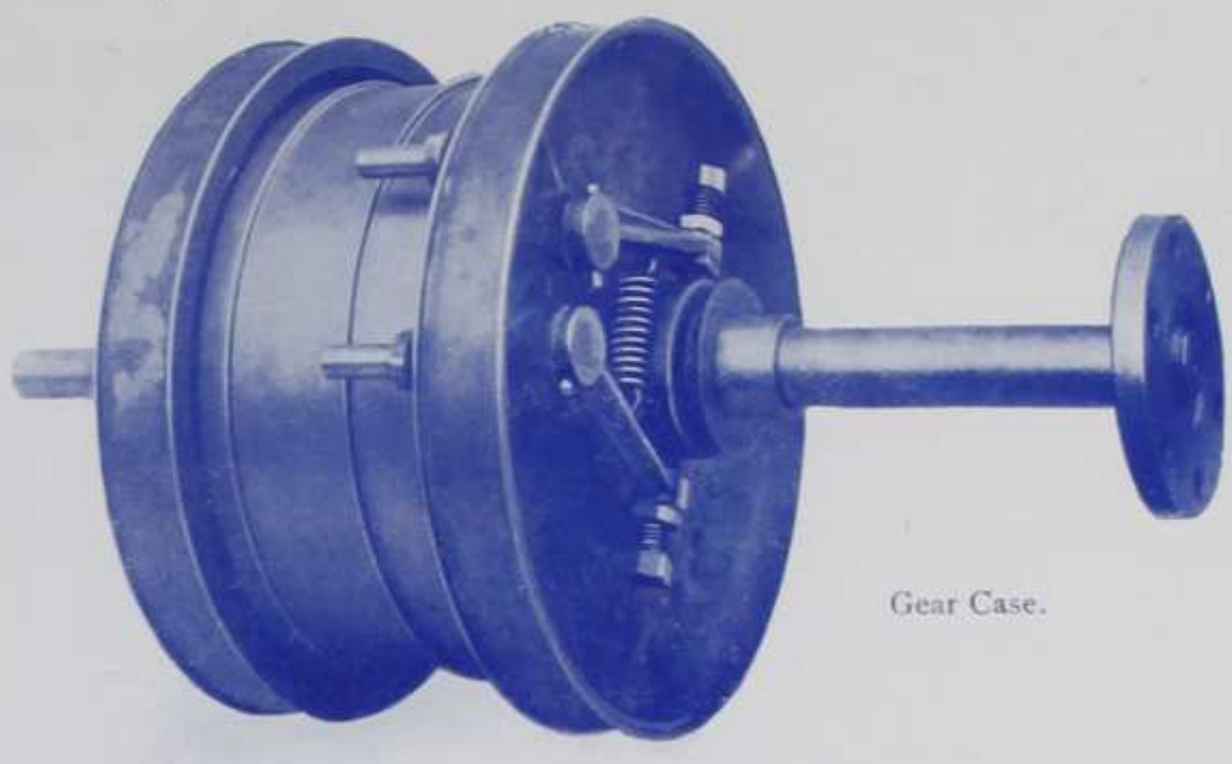
Pedal Gear.



Gear Case.

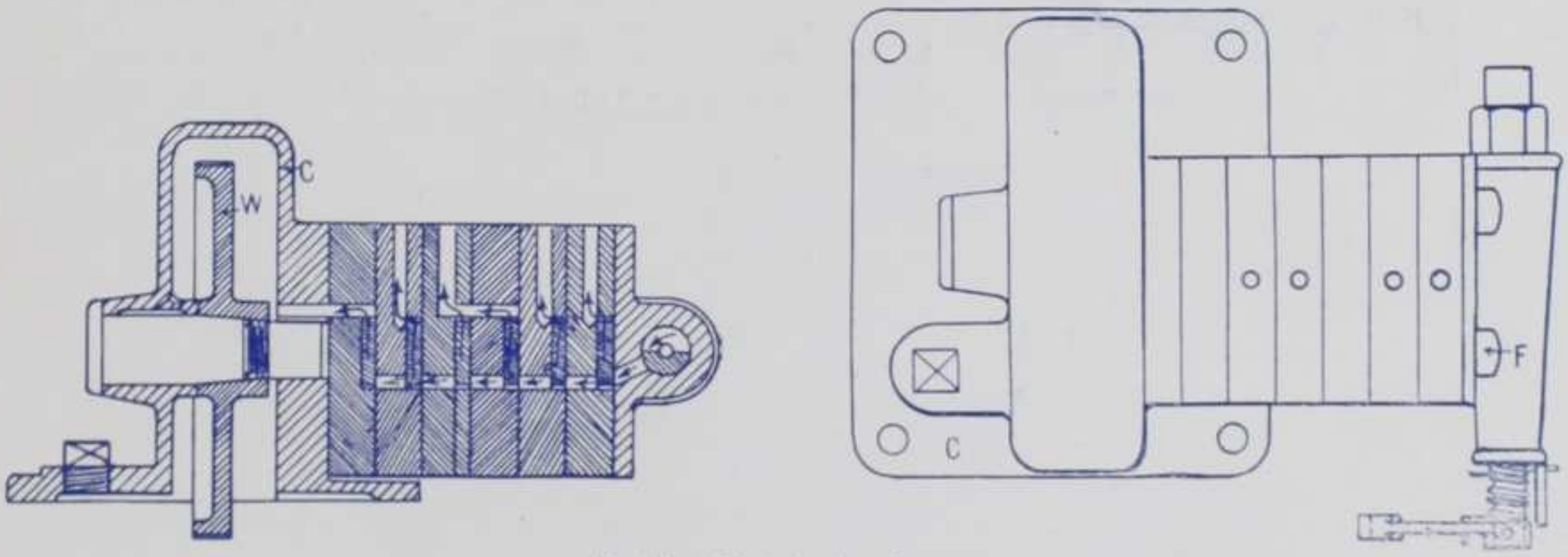
Speed Change Control.—First and second speeds forward by pressing one foot lever. Third or high speed forward by pressing another foot lever. Brake and reverse by pressing a third foot lever. The break lever acts as a reversing lever as soon as the car has come to a stop.

Brakes (Three in number),—

First: Two internal gun metal shoes working inside cast-iron drums bolted to rear wheels and operated by conveniently located hand lever.

Second: Band brake on engine shaft operated by foot lever and acting as a reverse after the car has come to a stop. This brake and reverse combined permits "see-sawing" the car back and forth in traffic, or making a sudden start backwards as quickly as the foot can be applied to a pedal. All brake bands have a positive release to free them.

Third: Foot pedal holding car from going backwards down hill.



Details of Lubricating Pump.

C, Casing fixed over Camshaft.

F, Screws fixing Pump. Arrows show direction of Oil flow: Pump runs very slowly; Valve connected to Throttle, so that Engine cannot be started unless oil is turned on.

W, Worm wheel.

Steering.—Irreversible worm and wheel with ball joint connection. All parts subject to wear are case-hardened steel.

Rear Axle.—Live type on ball bearings.

Tyres.—760 × 90 m/m of approved make.

Wings.—Steel coated with lead and carefully painted.

Adams Manufacturing Co., Ltd.,

147 QUEEN VICTORIA STREET,
LONDON, E.C.

Works: BEDFORD.

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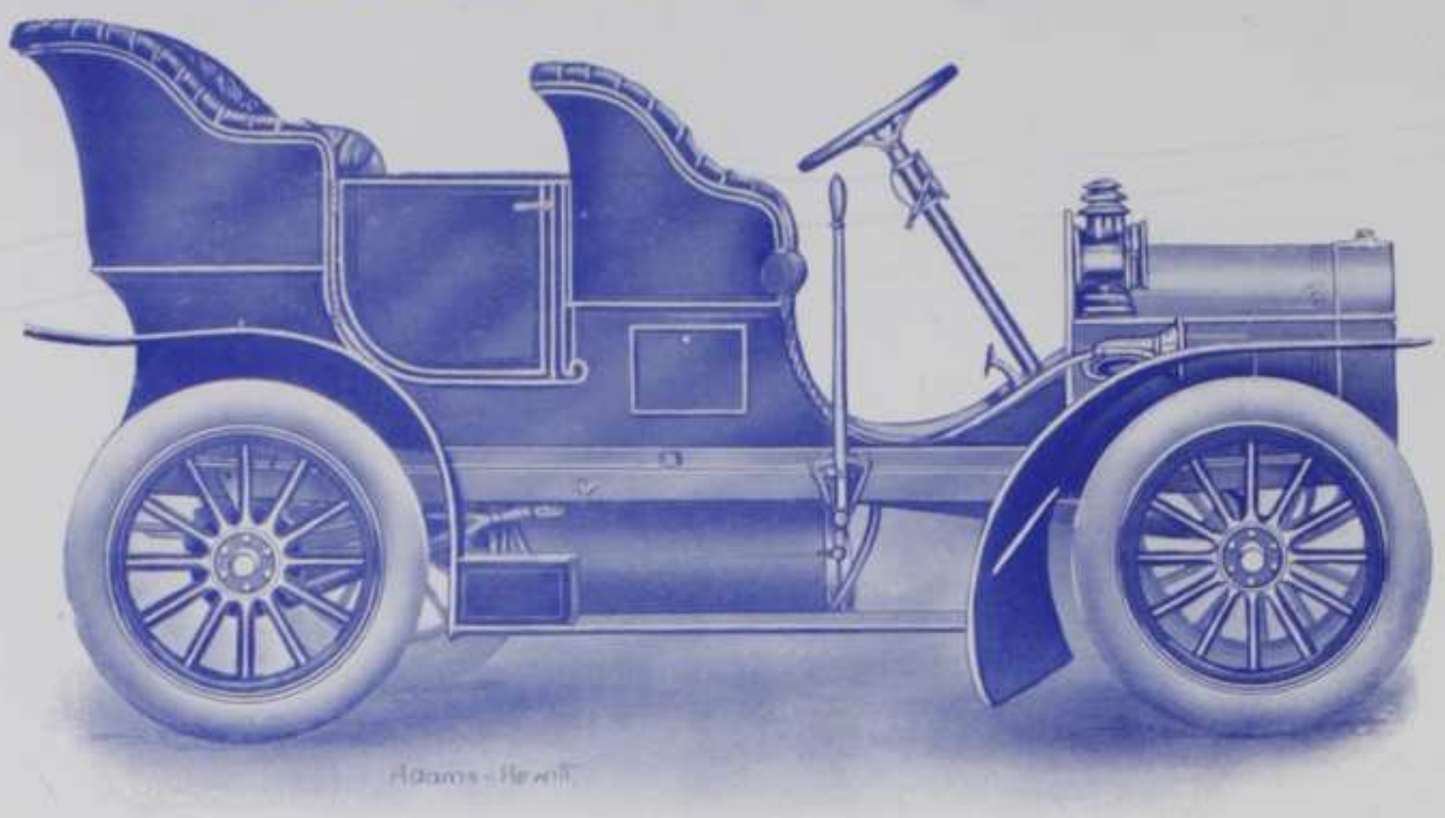
Types.

TYPE "T2"—4-SEATED SIDE ENTRANCE DOUBLE PHAETON BODY.



Fitted with long rubber covered step between wings. Handsome bonnet with radiator in front.

Painting and Upholstering.—In standard colours. Special colours to suit buyer at slightly increased price and slightly postponed delivery. Upholstering in genuine leather.

Price (complete with lamps, tools, and horn).—**£290.** Extra for High Tension Magneto, **£20**

Extra for waterproof cape cart hood, **£20.**

TYPE "L."—LANDAULETTE.

This body presents a very smart and graceful appearance, having been designed with a view to producing a motor carriage, which, while embodying every comfort and convenience, shall at the

Adams Manufacturing Co., Ltd.,

147, QUEEN VICTORIA STREET,
LONDON, E.C.
Works: BEDFORD.
Telephone: No. 7123 Central.
2 P.O. Bedford.

same time, not look unsightly. The arrangement is on the most up-to-date and approved lines, having good wide entrance doors, and comfortable seating accommodation inside for two passengers, and a driver's seat in front which is to a great extent, protected from the weather.

The upholstering is in best leather, and very comfortably padded.

The interior is fitted up with an umbrella rack, and pockets for the accommodation of note-books, card case, etc., a vesta case and mirror in the centre in front of passengers.

It is also fitted with electric light.

This body is finished in the best style and can be painted in any standard colour. Special colours can also be supplied at a slightly increased price and slightly postponed delivery.

Price—£375. Extra for High Tension Magneto **£20**.

ACCESSORIES.

Two carriage side lamps, one tail lamp, one horn, one set of tools including the following :

- 1 1½ lb. Hammer.
- 1 Screw Driver.
- 1 10-inch Billings' Patent Adjustable Spanner.
- 1 Pair Combination Pliers.
- 1 Set of Three Combination Spanners.
- 1 Oil Syringe.

Guarantee.—We guarantee to replace in our factory, free of charge, if returned to us carriage paid, any part manufactured and supplied by us, found within three months after delivery to be defective in material or workmanship, or not in accordance with description. Our responsibility in case of claim arising on any account being limited to replacing defective parts or to taking the goods back.

Terms of Payment.—One third of the amount with order, and the balance on receipt of the Company's advice of readiness for delivery. Delivery at Company's Works. When required elsewhere, transport charged at cost.

General Notes.—

(1) All vehicles are thoroughly tested on the road before being despatched from our works.

(2) We keep in stock for immediate delivery a full series of all parts of our vehicles that are liable to wear out or be damaged by accident. When ordering, the instructions given in our catalogue should be closely followed, and the number of the vehicle quoted.

(3) Customers' cars are only driven by our staff at the owner's risk and responsibility.

(4) We shall be pleased to give intending purchasers a trial run on our cars on receipt of a few days' notice.

(5) The prices and particulars quoted in this specification are subject to alteration without notice.

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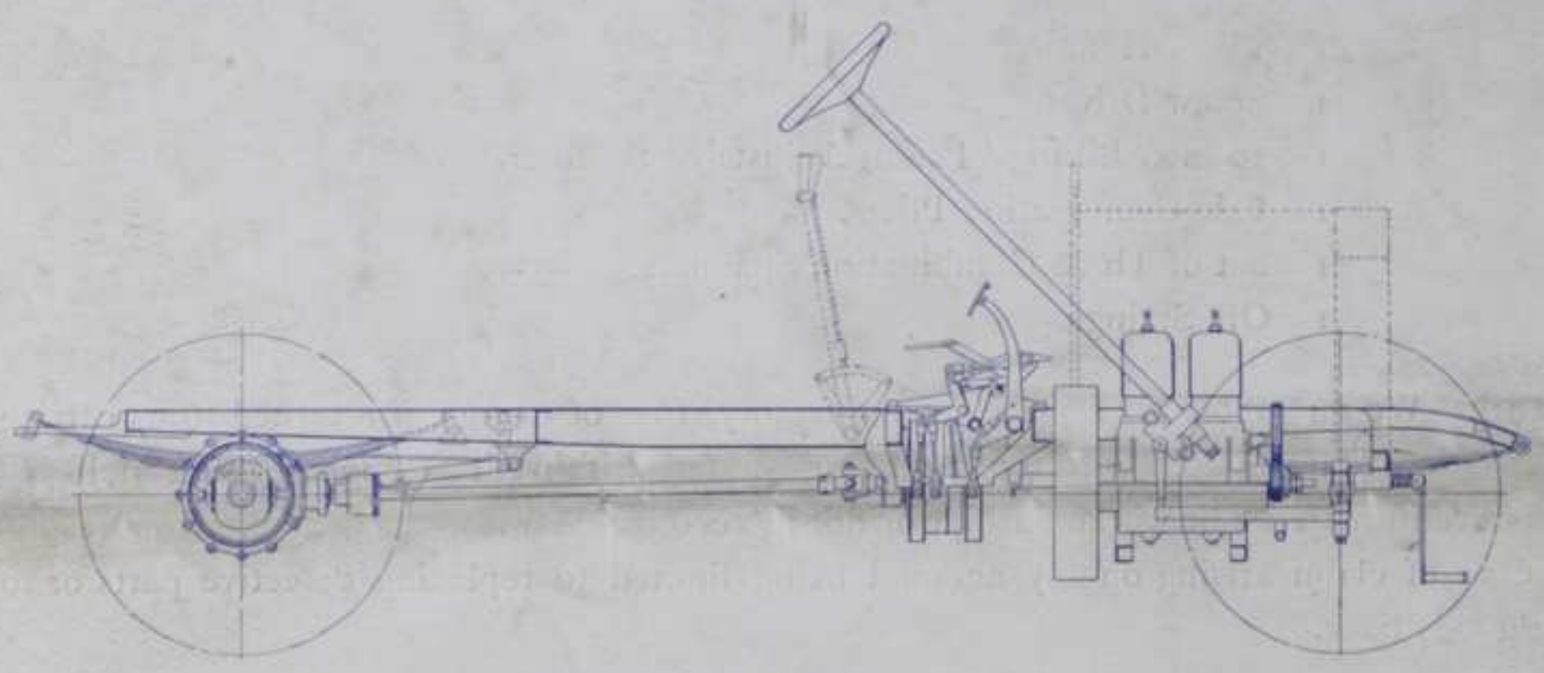
Telephone : No. 7123 Central.
2 P.O. Bedford.



Chassis of Adams 2-Cylinder 12-14 H.P.

ADAMS MANUFACTURING Co., Ltd.,

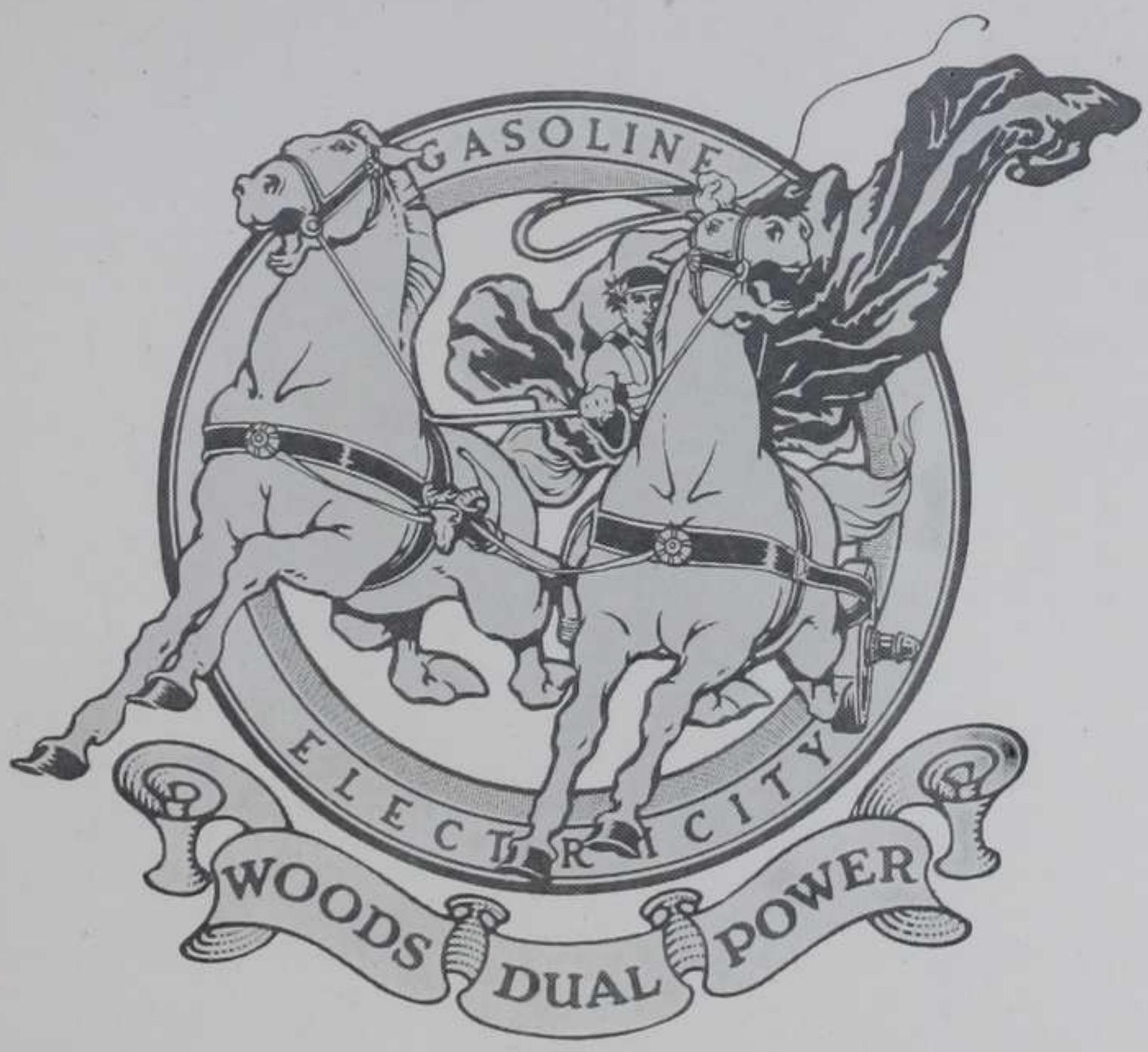
LONDON and BEDFORD.

SPENCER, EVANS & CO., 16 & 17, WHITEFRIARS ST., E.C.

3478

Woods

DUAL POWER



WOODS MOTOR VEHICLE COMPANY

TWENTY-FIFTH STREET AT CALUMET
AND COTTAGE GROVE AVENUES

CHICAGO · ILLINOIS

DEALERS IN PRINCIPAL CITIES

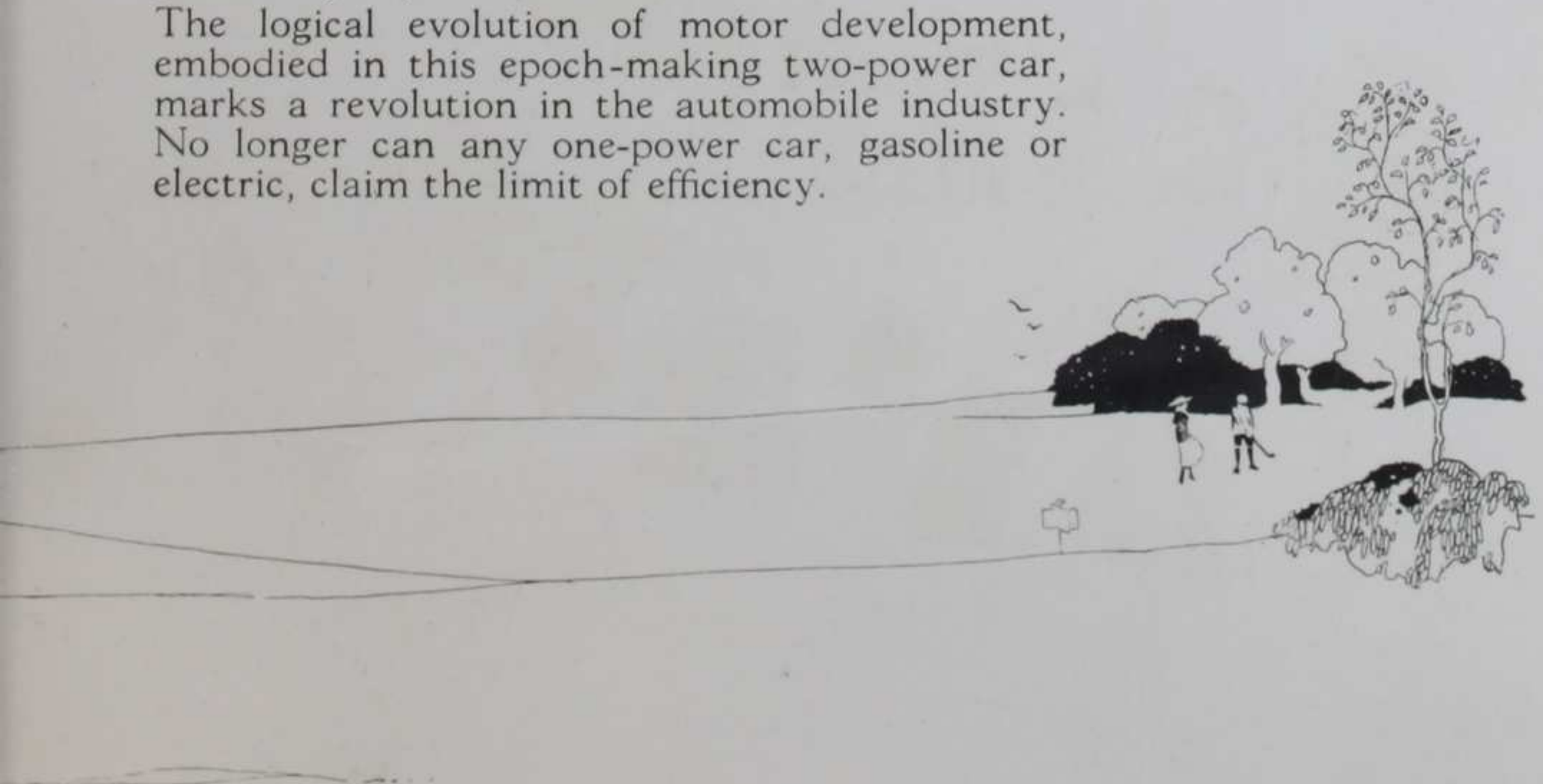
WONDERFUL gas cars have been made and wonderful electric cars have been made, but the glory of combining the two into one triumphant car must be awarded to the Woods engineers.

This ingenious combination creates the most astonishing results. The Woods Dual Power is more than a gas car — more than an electric. It has all of the advantages of each—none of their disadvantages. It can be run as a gas car or as an electric. But when the combination of these two powers is used, then comes all that can ever be hoped for in an automobile.

A self-charging, non-stalling, two-power car with unlimited mileage, adequate speed, and greatest economy.

It is surprisingly marvelous—not because it contains absolute departures in engineering practice—but because it combines all the better principles of two great divisions of automobile manufacture, previously separate units.

The logical evolution of motor development, embodied in this epoch-making two-power car, marks a revolution in the automobile industry. No longer can any one-power car, gasoline or electric, claim the limit of efficiency.

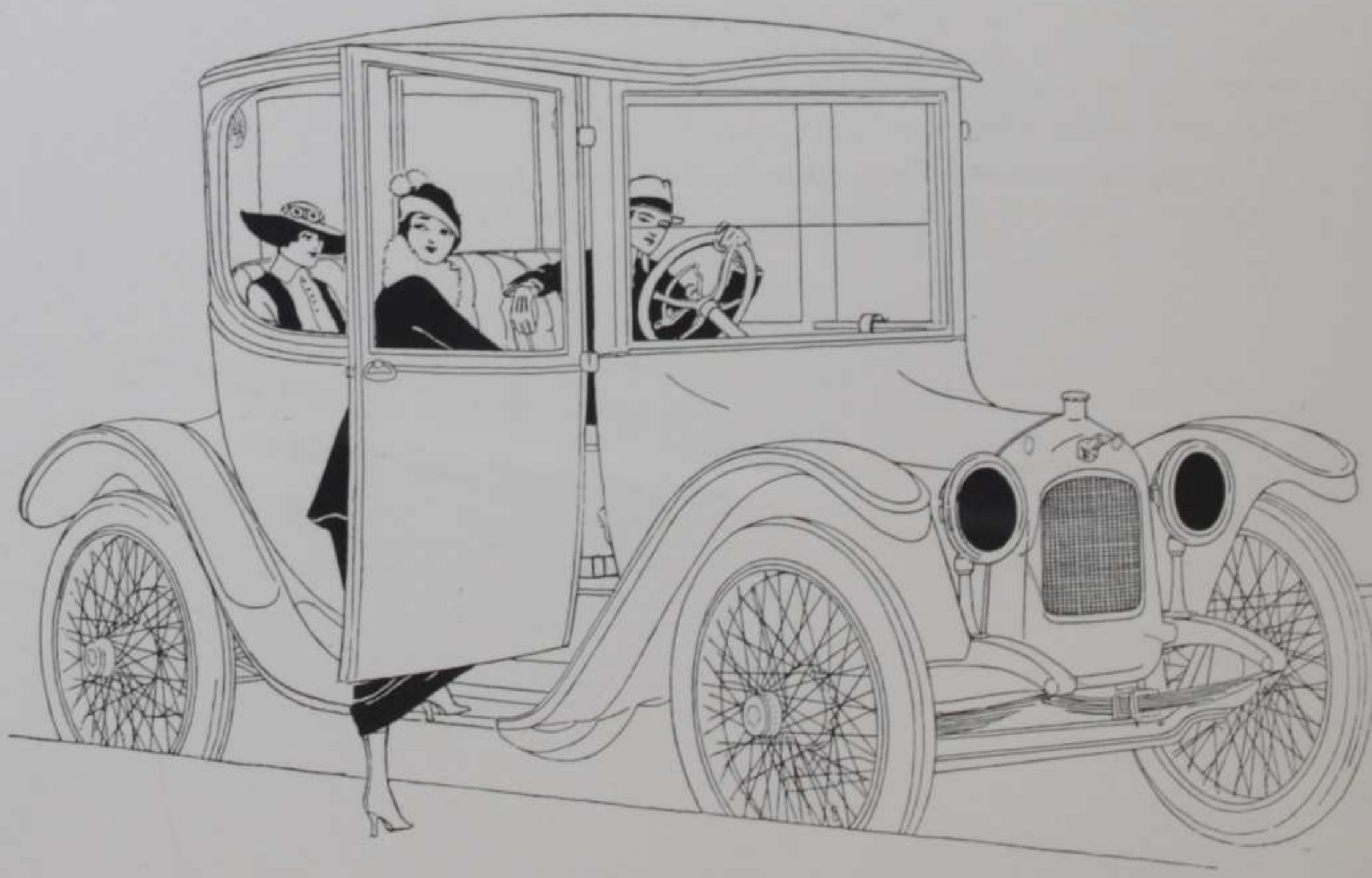


The Woods Dual Power is an automobile operated and controlled by the combined forces of electricity and gasoline.

It makes an electric with unlimited mileage and 40% greater speed; makes a gas car without gears, levers, clutch pedals, or any complicated parts, a double power unit with direct drive to the wheels, reducing jars, jolts and vibration to a minimum.

Picture a car with instantaneous acceleration, finger control of starting and stopping; an unlimited number of speeds; operations reduced; cost of maintenance lessened; efficiency and utility increased; outside charging plants eliminated.

Then add ease of control, noiseless movement, easy riding, refinement, luxurious appointments. —And, best of all, contentment of mind — the thought that power is continuous — a constant stream of unfailing, smooth-flowing power. Here in the Dual Power is speed, power, simplicity,



economy, and efficiency, each in a degree never before possible in any type of automobile.

Two small finger levers on the steering wheel control the entire operation of the car—starting, braking, stopping. One regulates the electric current, the other the gasoline.

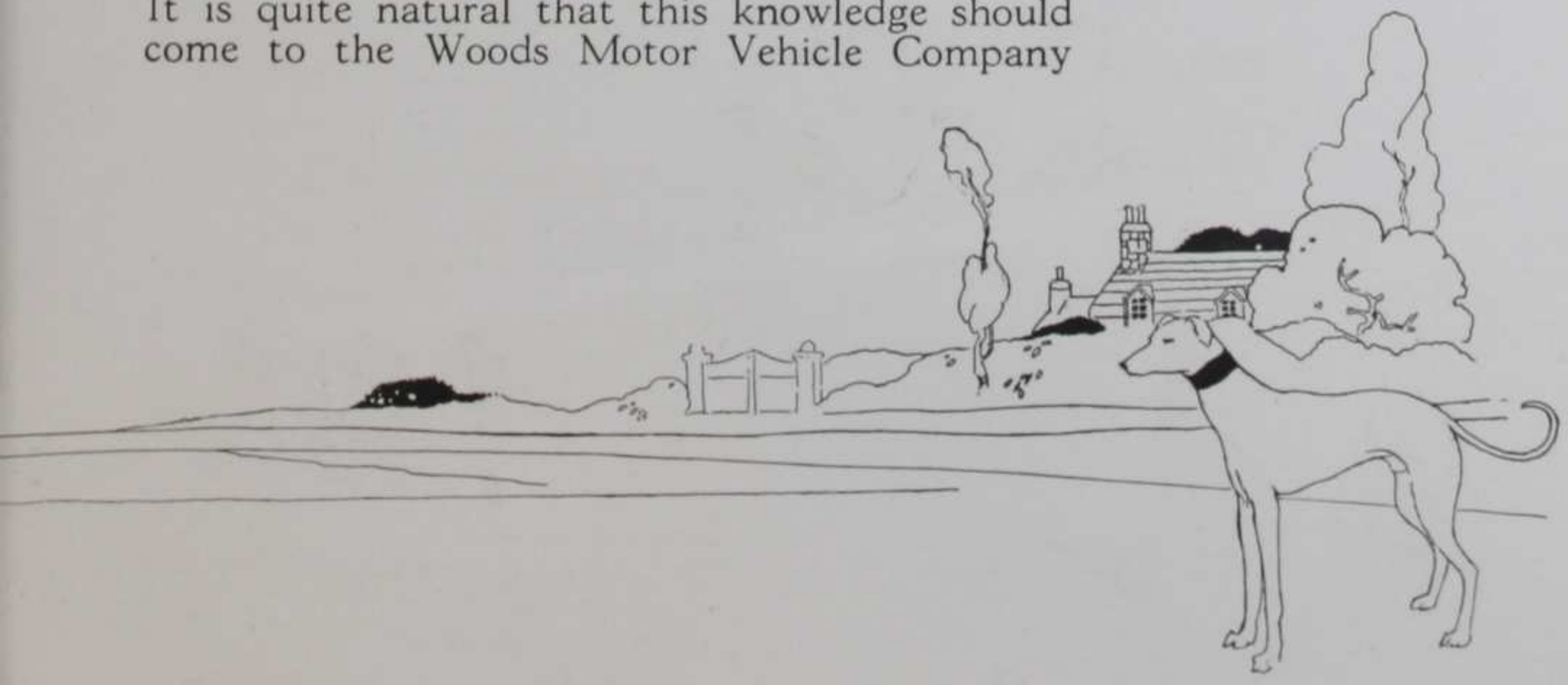
Here is a car with no waste of power—all is used for propulsion or for generating electricity. The result is utter independence of electric charging stations and a most sparing use of gasoline.

The Dual Power gives you, in combination, an indispensable all-season town car and the most reliable car for touring; in all a triumphant car that completely eclipses all previous motor achievements.

No one-power car can combine its simple efficiency, reliability, ease of control, serviceability, economy of up-keep.

The demand for a two-power automobile has long been recognized by Woods Engineers. This car was conceived as a result of the knowledge of the deficiencies of the electric and gas cars as individual types. In the Woods Dual Power the good features of each type have been combined into one and their disadvantages eliminated.

It is quite natural that this knowledge should come to the Woods Motor Vehicle Company

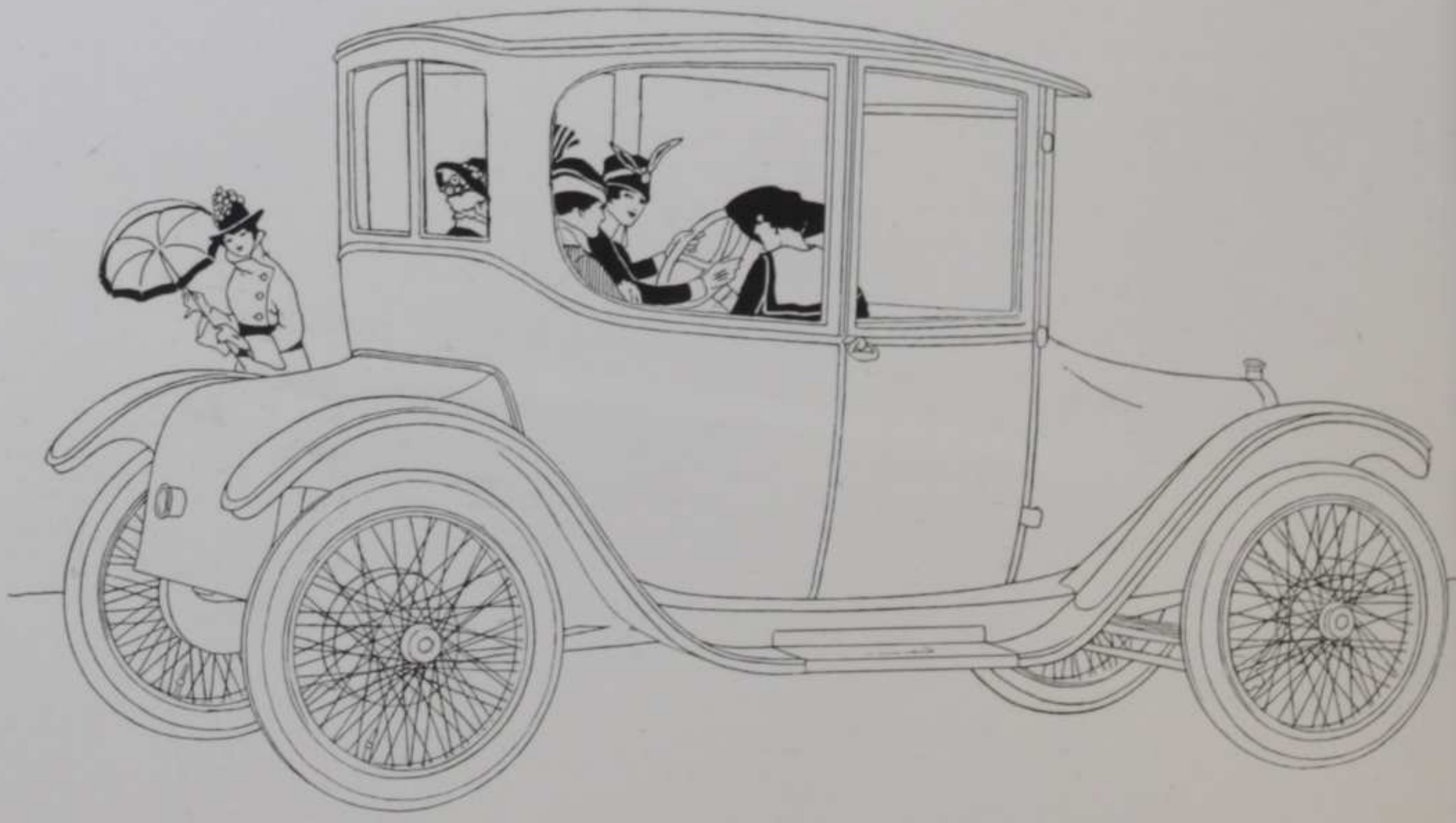


because its experience began with the inception of the motor car industry.

The evolutionary development of the Woods Electric, celebrated as the masterpiece of coach building and mechanical supremacy, the rapid advance of the gas car in which we have valuable experience, the application of electric equipment to gasoline cars, is well known. These conditions have created a popular interest and growing demand for a combination of these two mighty forces in a dual power car.

Always abreast of the times, the Woods Company has again scored a triumph in being the first to develop and perfect a two-power car controlled by both gasoline and electricity.

The performance of this car in starting, accelerating to any speed within the limits of the car, method of retarding speed, simplicity of operation and control have been demonstrated during the last two years.

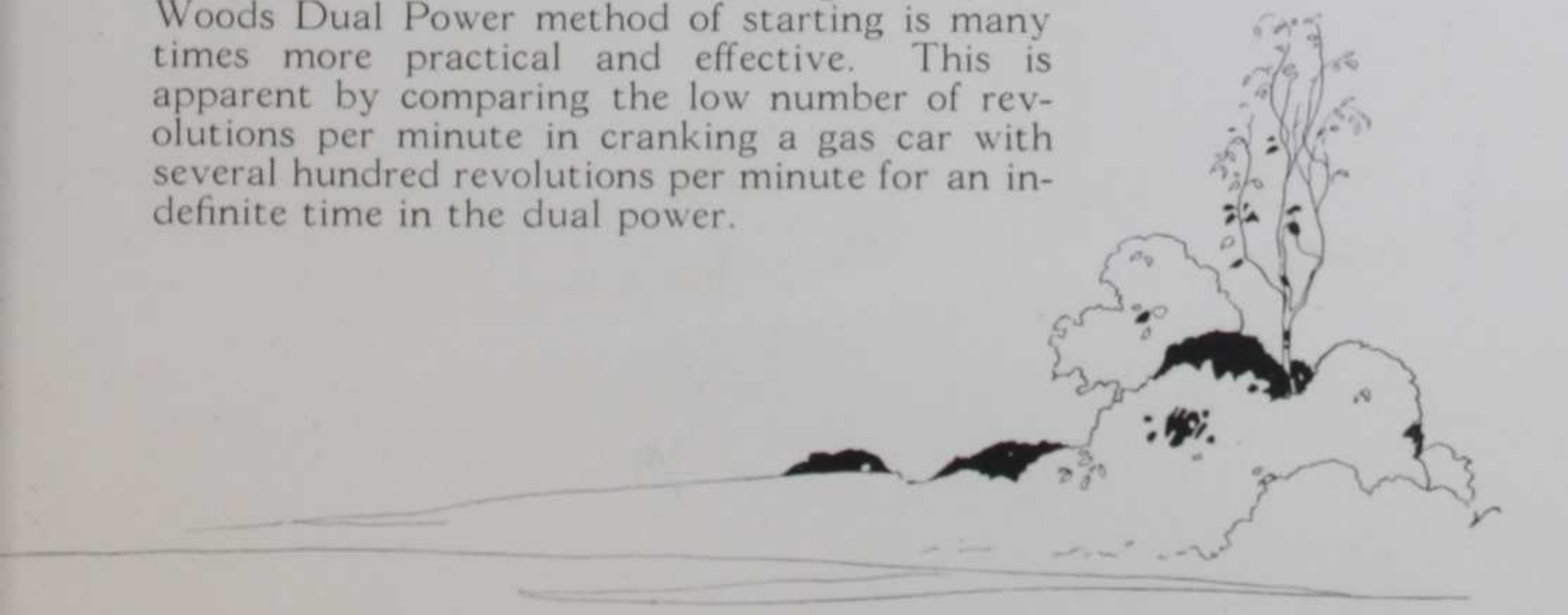


Its intrinsic merit and the mechanical and economic advantages of its equipment are apparent. Our own perfect faith in this car is evidenced by the fact that we have discontinued the building of a straight electric car and that our entire energies and wonderful facilities have been concentrated upon the Woods Dual Power.

The car starts as an electric by a simple movement of a finger-controlled lever on the steering wheel which operates a rheostat, the means for connecting the battery to the motor and increasing the speed as the lever is advanced. The operation of this one lever will drive the car twenty miles per hour on electric power alone.

While retaining all the best features of the electric, the battery is charged or discharged at will or automatically while the car is running, reducing maintenance expense and making it possible to travel any distance, storing electricity or using it for power as required.

With the electric lever at any advanced position, the first movement of the gasoline lever instantly starts the gasoline motor. While wonderful starting devices have been used on gas cars, the Woods Dual Power method of starting is many times more practical and effective. This is apparent by comparing the low number of revolutions per minute in cranking a gas car with several hundred revolutions per minute for an indefinite time in the dual power.

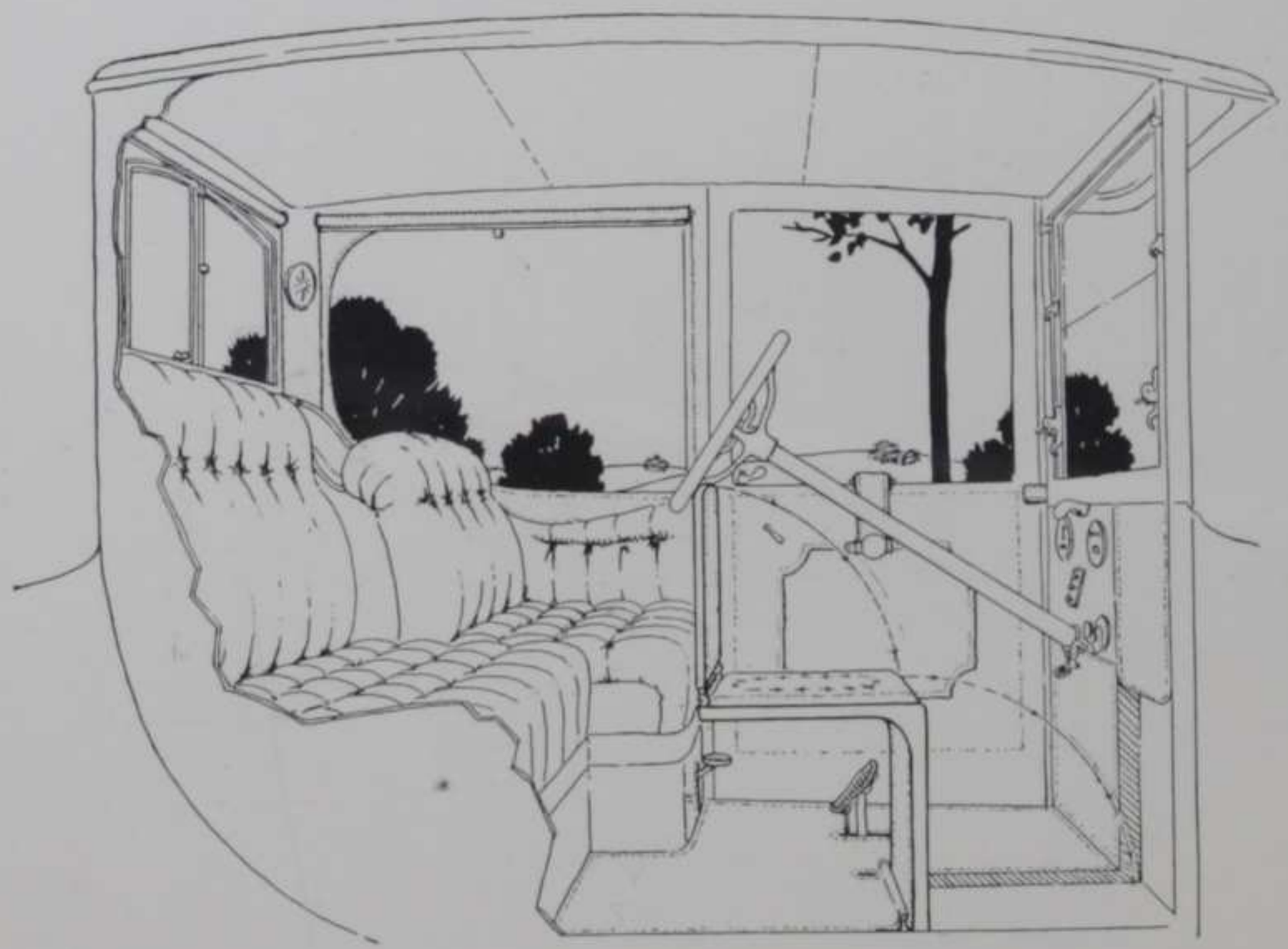


As the gasoline lever is moved forward it causes the car to be operated more on the gas and at a certain point it will run as a straight gasoline car, neither charging nor discharging the battery. A still further movement of the gas lever will cause the electric motor to become a generator and charge the battery.

While the two power elements employed in the operation of this car are electricity and gasoline, one supplementing and augmenting the other, it may be run on gasoline power alone. Thus we have a gas car with no clutches to throw in, no gears to change, with fuel consumption minimized and yet with the electric's simplicity and luxury.

Two small levers on the steering wheel control the entire driving of the car. Either lever may be operated by a slight movement of the finger.

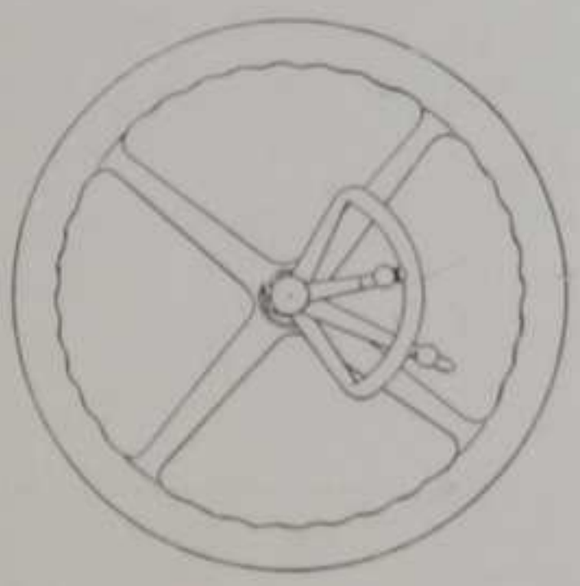
The longer lever controls the electric current and the shorter lever controls the gasoline motor. Thus we have dual power, or two power units combined into one. The extended movement of the two levers to their limit will give a speed of about thirty-five miles an hour.



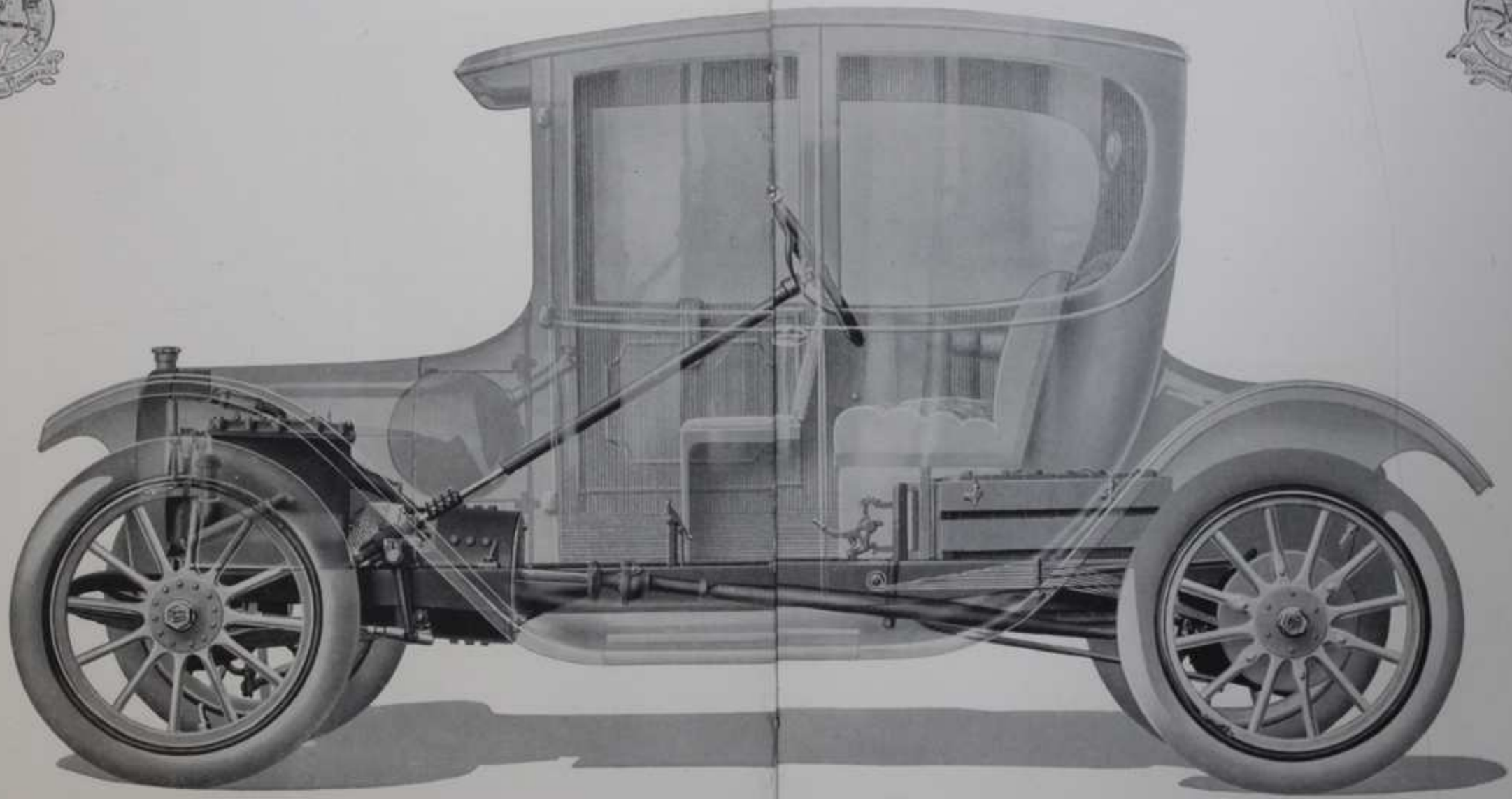
You have perfect control at all times, start instantly, run on any one of an unlimited number of speeds, re-charge the battery while running, brake, stop—all operations either with the movement of a finger on two small levers of the steering wheel or the simple movement of the foot brake pedal. This means the elimination of clutch pedals and gear shifts so that the driver may relax and drive with perfect ease—simplicity itself.

Every detail affecting comfort and convenience has been provided. The body is hung low to make the car ride steadily. The step is low and the door is high and wide to afford ease of entrance. The interior is large and roomy. Ample provision is made for four passengers. The rear seat accommodates three persons. The driver's seat is advanced six inches, allowing elbow room and great freedom in the operation of the steering wheel located on the left hand side. In the right front of the car is a disappearing chair which may be raised to position for a fourth passenger without in any way obstructing the view of the driver.

The upholstery is deep, soft, luxurious, and exceedingly comfortable.



Woods Dual Power, Model 44



Phantom View of Woods Dual Power Showing Salient Features and Simplicity

SPECIFICATIONS FOR WOODS DUAL POWER, MODEL 44

Electric Motor-Generator: Especially wound to develop characteristics required. The liberal proportion of all parts insures quick starting with a minimum of wear.

Gasoline Motor: Four cylinders 2½-inch bore x 3½-inch stroke. Moderate speed guaranteed to develop 14 horsepower. Designed for the service required, having large bearing surfaces and very heavy crank shaft, reciprocating parts being made as light as possible, all of which are carefully balanced to obtain smoothness in operation.

Ignition: Atwater-Kent Type K-2 Automatic Spark Advance System.

Cooling System: Thermo-syphon system with honeycomb type of radiator.

Lubrication: The lubrication of the engine is effected by gear pump, which elevates the oil from the lower chamber to a compartment around the valve tappets from where it flows to the various bearings. Ample lubrication of the connecting rods and pistons is provided.

Gasoline Tank: One piece, located under cowl. Capacity, nine gallons. Gravity feed.

Battery: Woods Special Exide Battery, 24 cells, 11 plates each, of our own approved design and assembly.

Chassis Framing: "U" shaped side members with channel section cross members welded by oxy-acetylene process.

Springs: Front springs half elliptic, Rear spring Cantilever. The high quality of material and skilled workmanship, as well as design, insure the easy riding qualities for which our cars have always been noted.

Wheel Base: 110 inches.

Tread: Standard 56 inches.

Tires: Silvertown Cord 34 x 4.

Wheels: Artillery with No. 52 Stanweld detachable rims.

Axles: Front axle one piece, drop forged I-beam section of special analysis steel and properly heat-treated. All steering knuckles and axle forgings are of steel particularly selected for the work required.

Rear axle — semi-floating type, wheels mounted on driving shafts of special analysis steel which float on Bock roller bearings. Axle tubes are made of swaged steel tubing which flange on the inner **end** and are bolted to the axle housing

which surrounds a complete unit containing the Baush Hour Glass type of Worm Gear. The brake shaft bearings mounted in this axle are self-lubricating. The axle is trussed to obtain the maximum strength with minimum weight.

Control: Two finger levers on the steering wheel. The outer lever controls the electric equipment and the inner lever, the gasoline equipment.

Brakes: A foot lever provides a powerful dynamic and mechanical brake. See page 21 for full description.

Speed: Maximum speed 35 miles per hour.

Body: Of aluminum panel construction, coupe design. Very wide doors, the glass windows of which may be lowered. The front and rear windows may also be opened. The design of the front window, being of wind shield type so arranged that both upper and lower halves may be adjusted to any angle. See page 11 for seating arrangement.

Trimming: Of exclusive design: Whipcord black and white; leather trimming optional. Painting, blue or green, with wheels in light straw-color.

Equipment: On an illuminated instrument board visible from the driver's seat: Woods Special Ampere Hour Meter and Ammeter Combined. Stewart-Warner Magnetic Speedometer with odometer trip attachment. Three-gang light switches.

On the front dash: Gasoline gauge and robe rail. A full complement of tools in a kit in a compartment back of driver's seat.

A compartment under the rear hood to carry a casing and inner tube not visible from the outside of the car.

A power air pump, mounted on the right hand side of the engine.

An electric motor-driven warning signal. The headlights are equipped with auxiliary bulbs for dim operation.

Price: $2650.00 F. O. B. Chicago.

Extra Equipment: Wire wheels, $25.00; slip covers, $25.00.

Special Cars: We cater to the individual taste of our patrons and will supply cars in special color effects with any kind of obtainable trimmings, in fact, a made-to-order car at $100.00 additional to the list price.

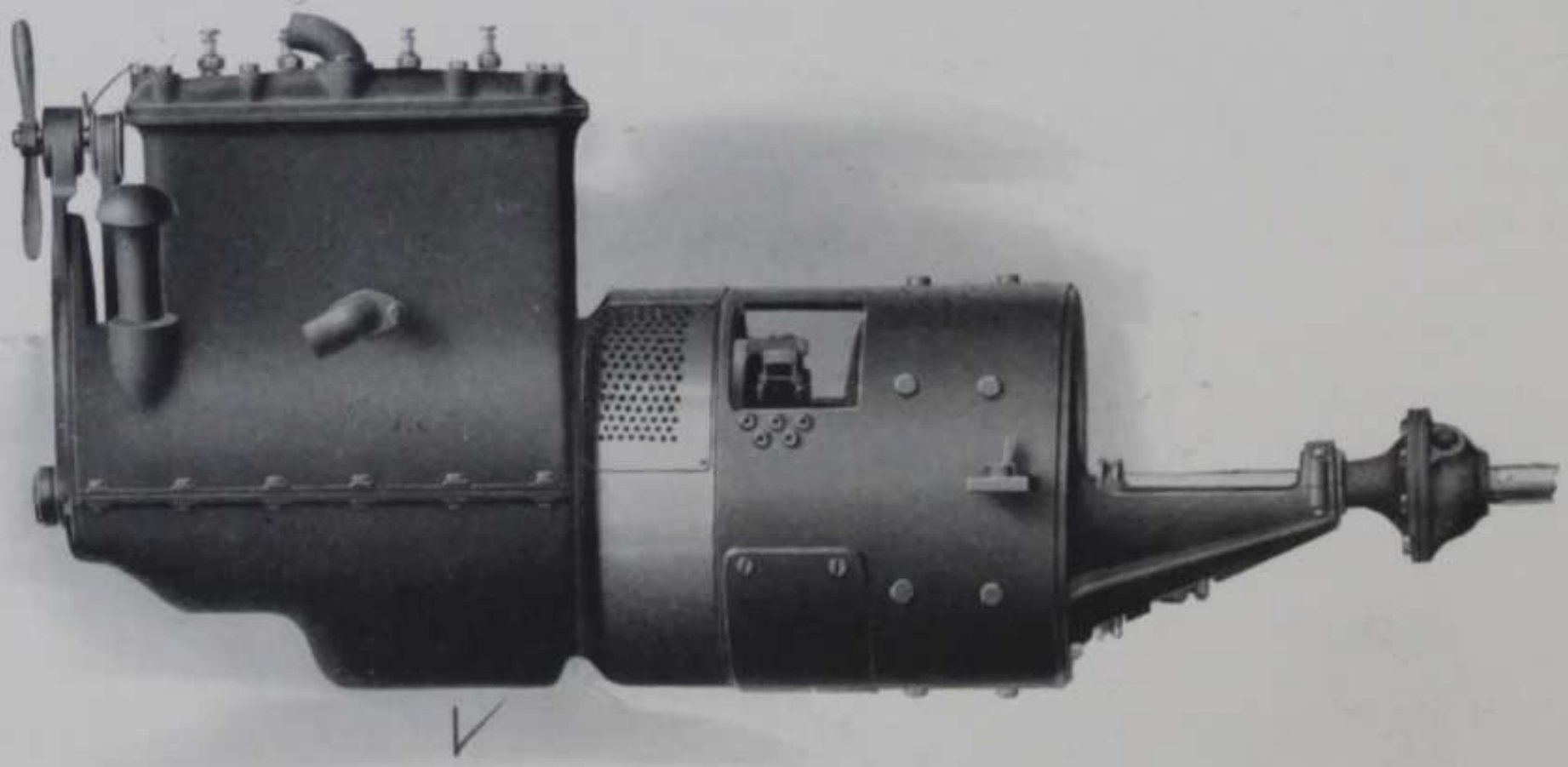
The Woods Motor Vehicle Company reserves the right to make changes or improvements at any time without incurring any obligation to install same on cars previously sold.

$2400

The lines of the car are graceful. Everyone agrees that the design is pleasing to the eye, that the car is comfortable to sit in and consequently easy riding. The bodies are built and fashioned throughout in the Woods factory. The finest coach builders in this country are to be found in our employ. Woods body work is celebrated as the masterpiece of coach building. In beauty, in elegance, in mechanical excellence, in smooth riding, easy control, economy of operation, Woods cars are supreme.

The power plant of the Woods Dual Power consists of a small gasoline motor and an electric motor generator combined into one unit mounted on a three-point suspension. The movement of a finger lever on the steering wheel connects the Gasoline Motor to the Electric Motor Generator which cranks the gasoline motor and develops power which is transmitted through the armature shaft of the electric motor and the propeller shaft direct to the rear axle.

The customary high powered gasoline motor used in so many automobiles is extravagant in the consumption of gasoline but necessary in negotiating hills and roads where a large amount of power is required, although this service repre-



sents less than 5% of the total mileage. Such a gas motor is most efficient when delivering its maximum horsepower resulting in more miles per gallon of gasoline, but under ordinary conditions where a great amount of power is not required it is less efficient and consumes more gasoline per mile.

This is not the case with the Woods Dual Power as its gasoline motor is always operating at its highest efficiency because it is always developing its maximum horsepower, relying upon the electrical equipment to assist in negotiating hills and roads where a greater amount of power is required. The gasoline motor of the Woods Dual Power is large enough for the required performance, small enough to obtain the greatest economy and the method of transmitting the power to the rear wheels insures the greatest efficiency.

It is impossible to stall the Woods gasoline motor because it always develops its maximum horsepower on the speed in which it is running and the additional amount required is furnished by the battery through the electric motor, which makes it absolutely impossible to stall the gasoline motor. Any condition which would cause "stalling" in an ordinary gas car, like overloading the motor, would simply cause the gas motor of the Dual Power to develop its maximum power after which a reduction in speed of the motor would take place. Then the electric motor immediately and automatically comes to the assistance of the gasoline motor and furnishes additional power as required.

Remember that when the gasoline motor is supplying all of the power to operate the car the armature in the electric motor is running at exactly the same speed as the gasoline motor and the electric motor is therefore, without any move-

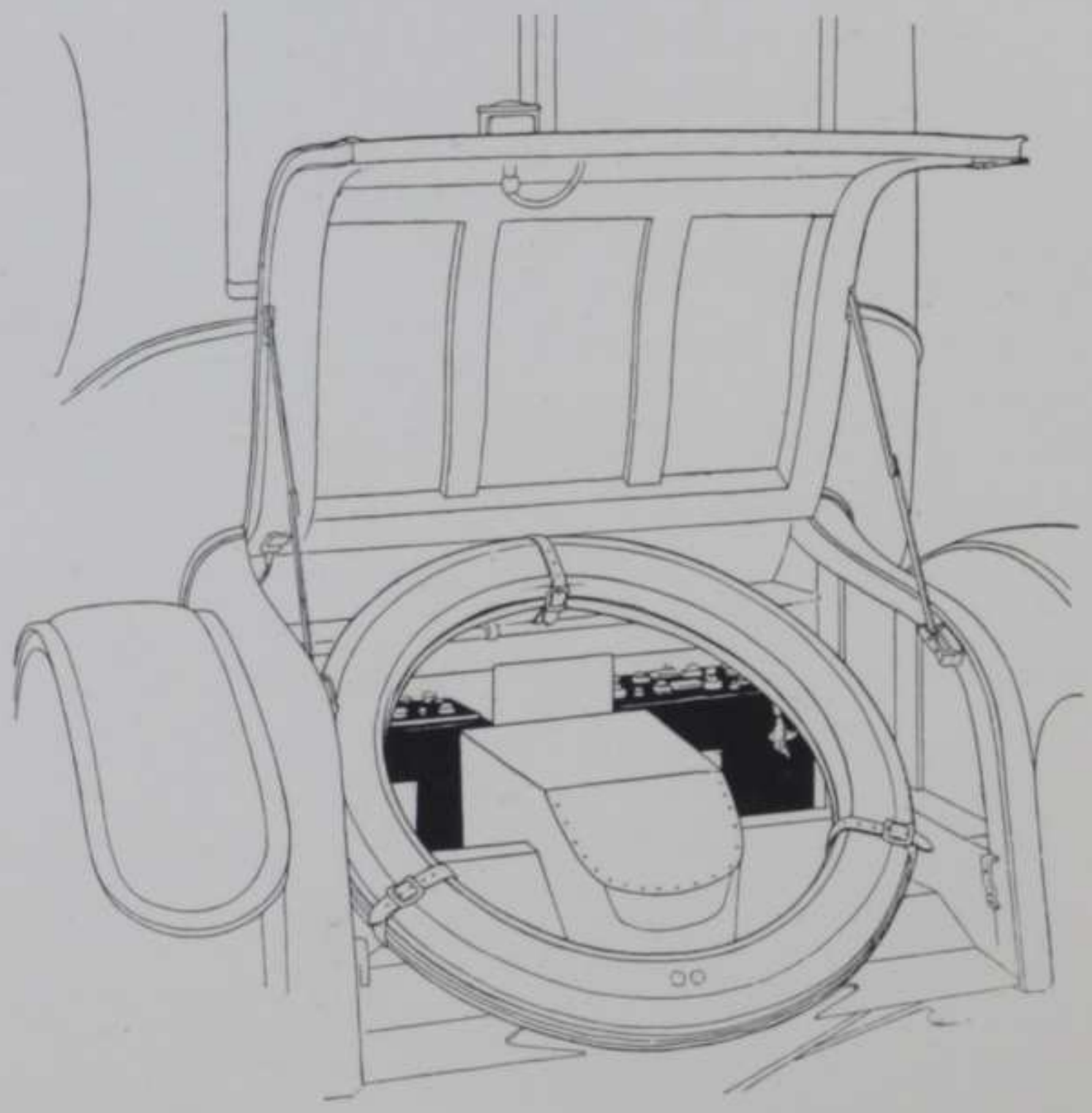
ment of the levers, ready at all times either to run the car independently as an electric car or to assist the gasoline motor to run the car or to serve as a dynamic brake to stop the car.

A very interesting article covering the subject of how to get the maximum efficiency from a gasoline motor has been issued by us. Copy will be mailed to those interested.

This car is equipped with Woods Special Exide battery consisting of 24 cells of eleven plates each. This is a special type designed to meet the unusually high standard of efficiency insisted upon by the Engineering Department of the Woods Motor Vehicle Company.

The battery is designed especially for the service required, guaranteeing greater life and lower maintenance cost.

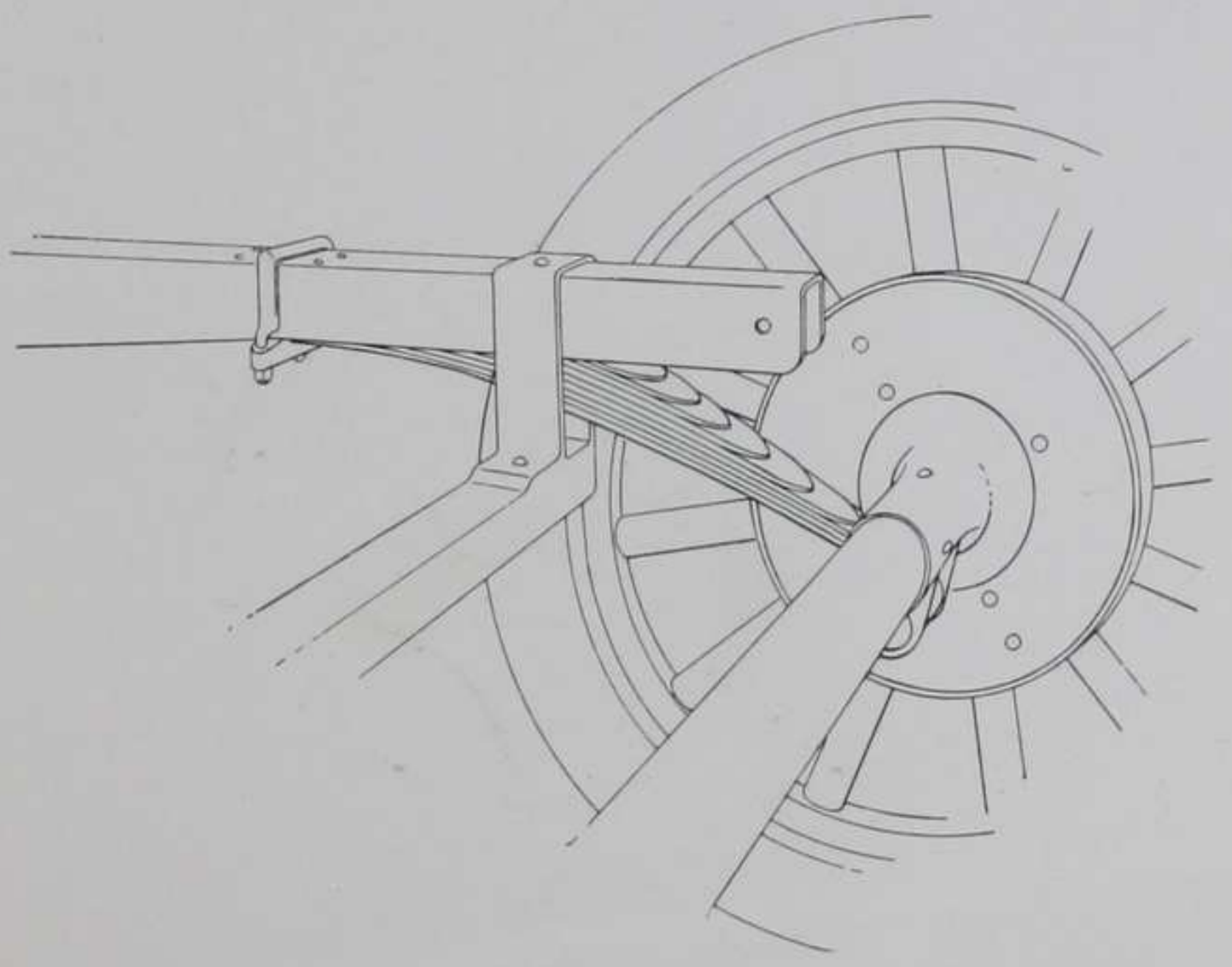
With a slight variation of the relative position of the two levers on the steering wheel the battery may either be charged or discharged at will on



any speed from ten miles an hour up to twenty-eight or thirty miles an hour.

The charging of the battery does not by any means require constant, but only casual attention on the part of the driver and it is always within his control. An indicator on the dash shows the exact condition at all times and also shows whether current is being delivered to or from the battery. Thus it is possible for the state of the battery to be kept within the safety or normal zone, avoiding both gassing and sulphating. The charging and discharging may be done within this zone without regard to rate and with no appreciable harm to the battery. It is the opinion of battery experts that the life of the battery will be several times greater than it ever has been in an electric car.

Dynamic braking may be effected at any speed above six miles per hour by retarding the electric lever. This causes the electric motor to run as



an electric generator driven by the gasoline motor or by the momentum of the car. The power thus generated is used for charging the battery. As the amount of power to drive the generator is increased the greater will be the power required of the gasoline motor or from the momentum of the car and in either case the effect of retarding the car acts as a most effective brake. Retarding the gas lever cuts off the gas and therefore prevents the gasoline motor from maintaining the momentum of the car. The combined result of retarding both levers may be obtained by a simple movement of the foot brake pedal without interfering with either of the finger levers on the steering wheel.

This foot brake pedal as it is advanced farther applies the mechanical brake to the rear wheels in addition to the dynamic brake. The full effect of the dynamic brake is obtained before the mechanical brakes are applied and in emergencies we have the effect of both the dynamic and rear wheel brakes. A detailed description of the braking and charging method as employed in the Woods Dual Power Car is given in a special article, copy of which will be mailed upon application.

The electric equipment is more simple and contains less parts than in the ordinary electric car. There is really no more electric equipment on the Woods Dual Power than on a gas car, but the units are larger and instead of simply turning the engine over a few times for starting it actually operates the car up to a speed of twenty miles an hour, and for a distance of thirty miles or more without regenerating.

Reversing is done entirely electrically by simply placing the left foot on a lever projecting from beneath the heel board. This closes the switch of the magnetic clutch, making it impossible to have current on the clutch when the car is reversed. The electric lever on the steering wheel is then operated in just the same manner as in going forward, or the same result may be obtained by releasing the foot brake pedal, the speed being regulated by the distance the lever or pedal is moved.

Economy is proved from the dollars and cents standpoint. All mechanism is operated under the most favorable conditions, power being transmitted from the two-power unit direct to the rear wheels, thus reducing to a minimum the wearing of working parts. The consumption of gasoline and oil is greatly reduced. The outside charging plant and the cost of current are entirely eliminated, thus effecting a very large saving in maintenance. An enormous amount of time is saved as the car starts instantly, is self-charging and non-stalling. Altogether, in the Woods Dual Power you are offered an irresistible car—one that has no rival in beauty, elegance, and luxurious appointment, a car beyond competition from the mechanical standpoint.

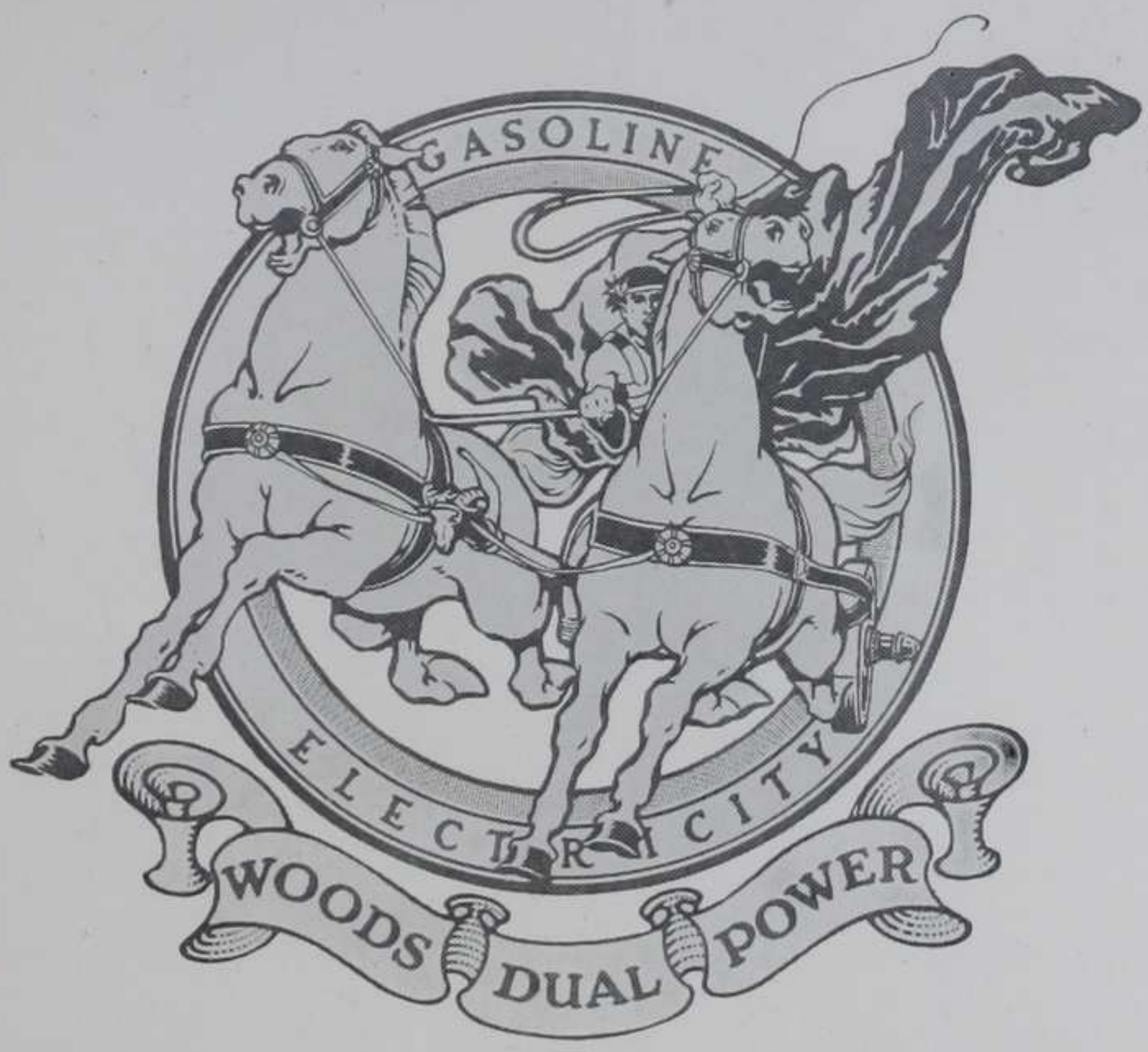
It is at once the car of luxury, the car of service, the car that is always ready, always dependable, the car that is self-regenerative, touching the very bottom of power economy.

Those interested in details of mechanical construction should consult the nearest dealer or write direct to the manufacturer. Special literature is issued covering all phases of the car. Please feel free to ask questions.

Rogers & Company
Chicago - New York

Woods

DUAL POWER



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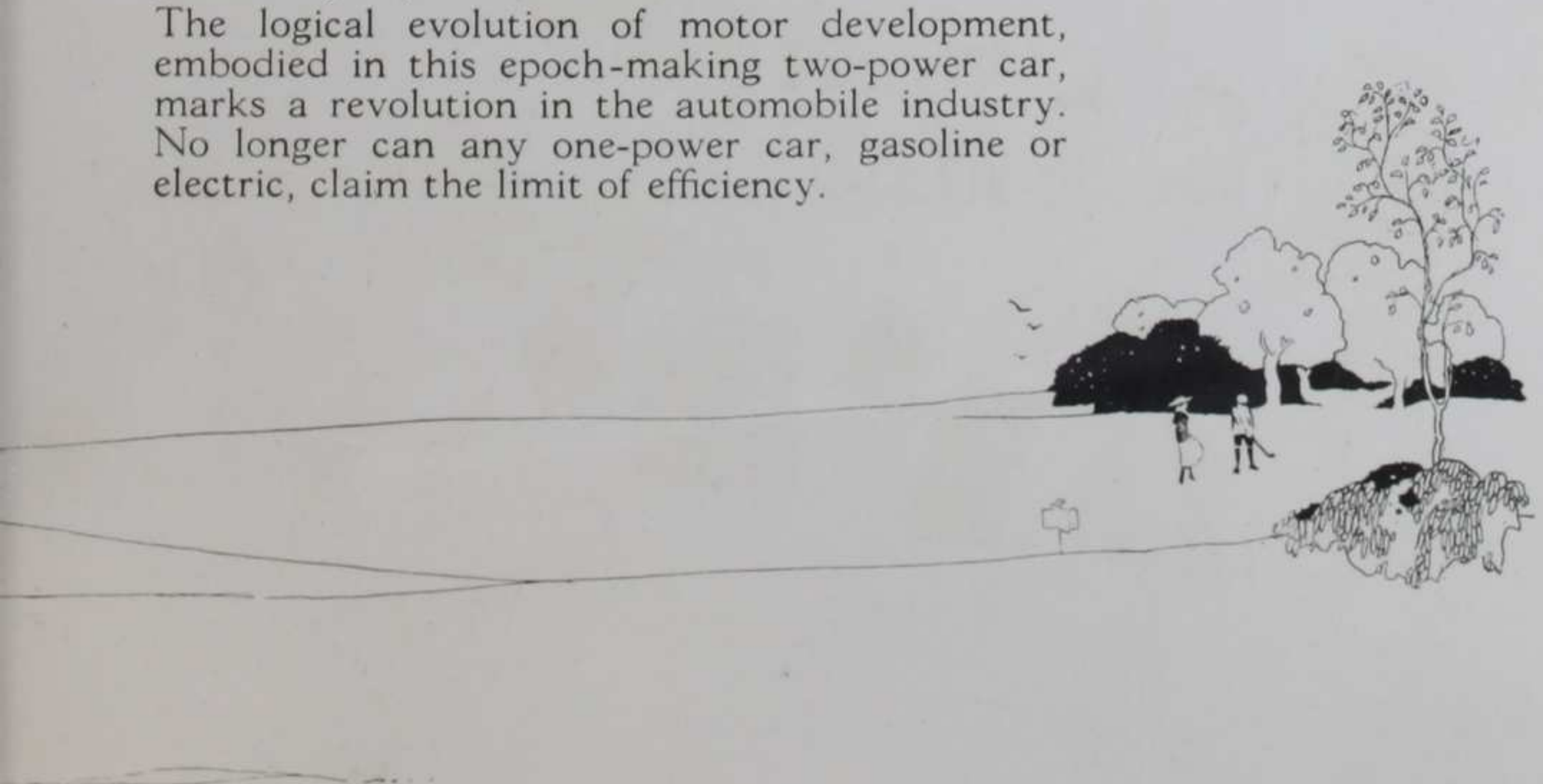

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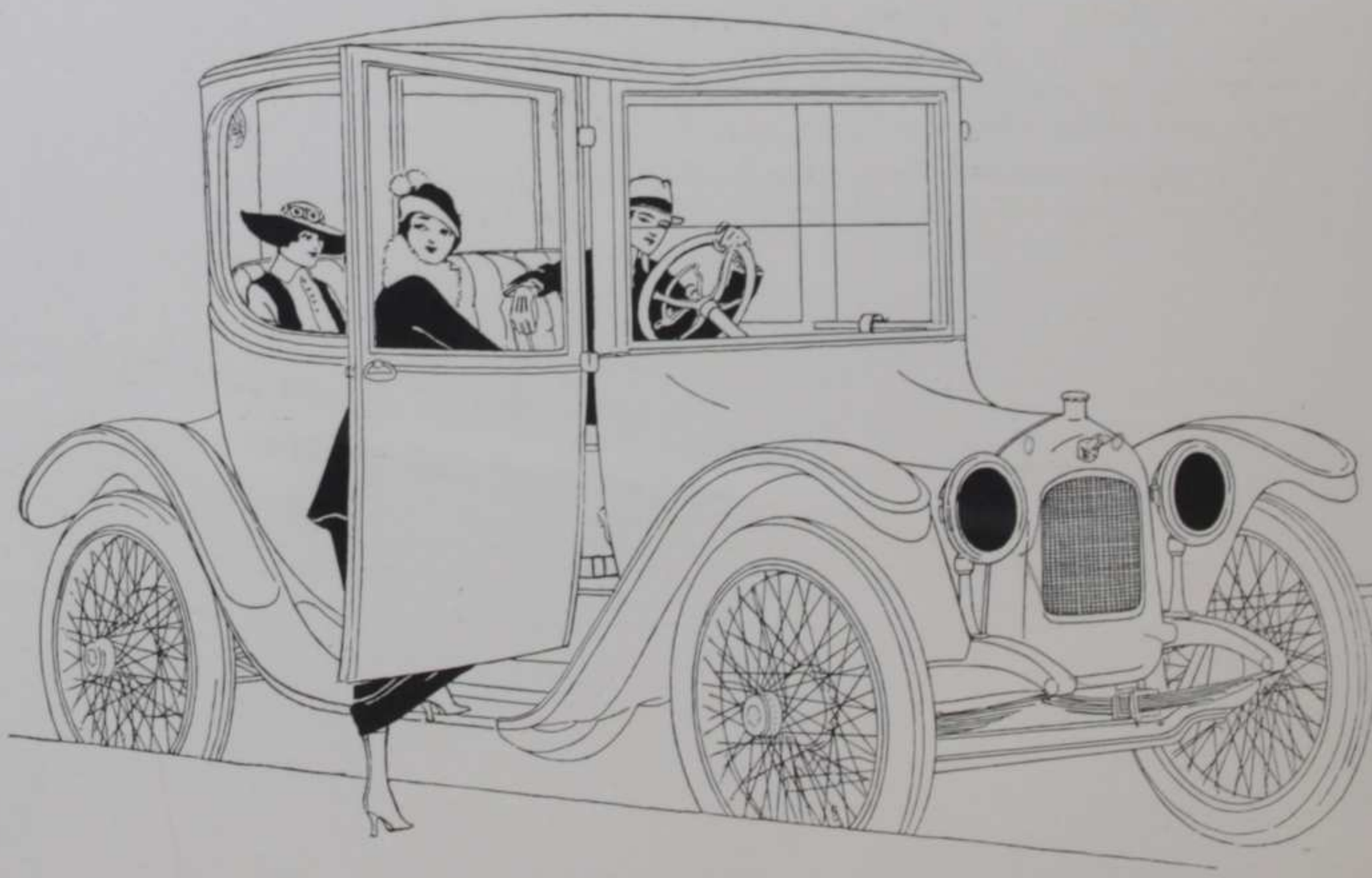

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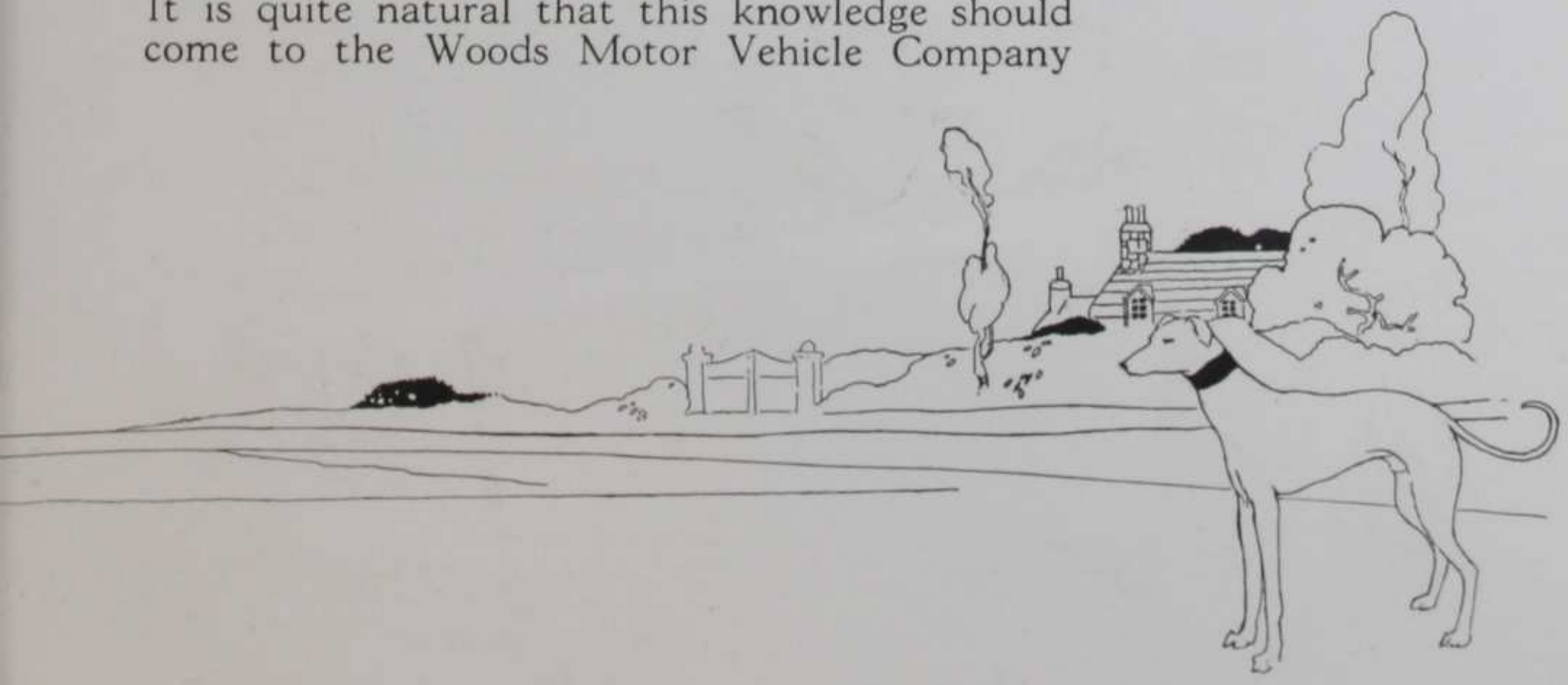

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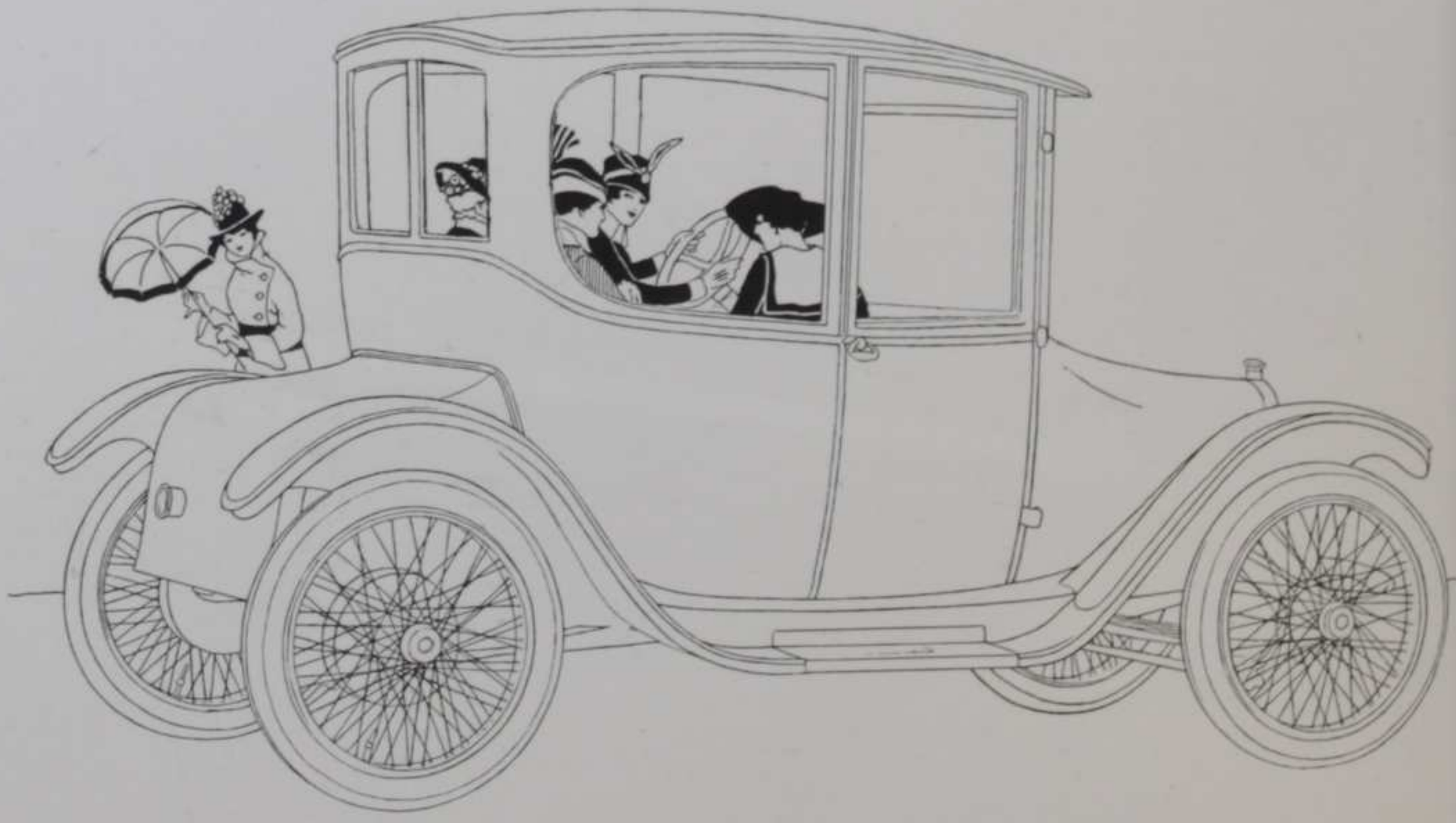

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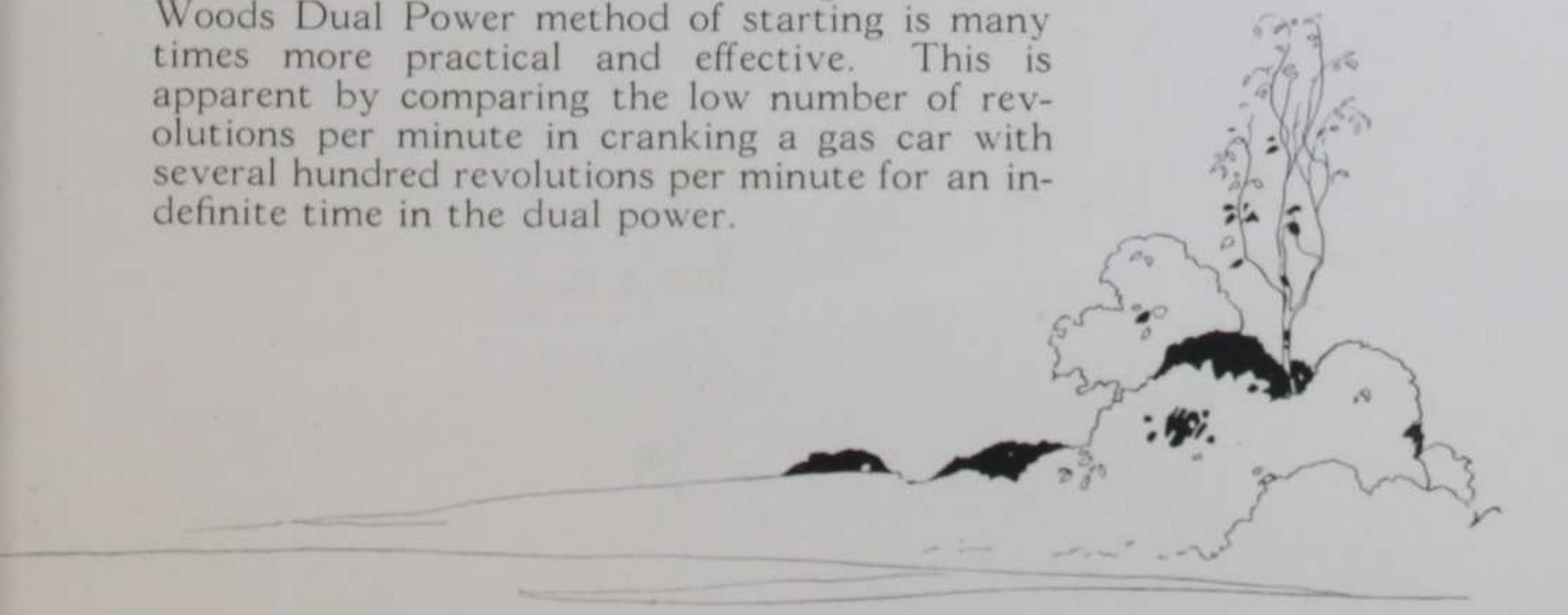
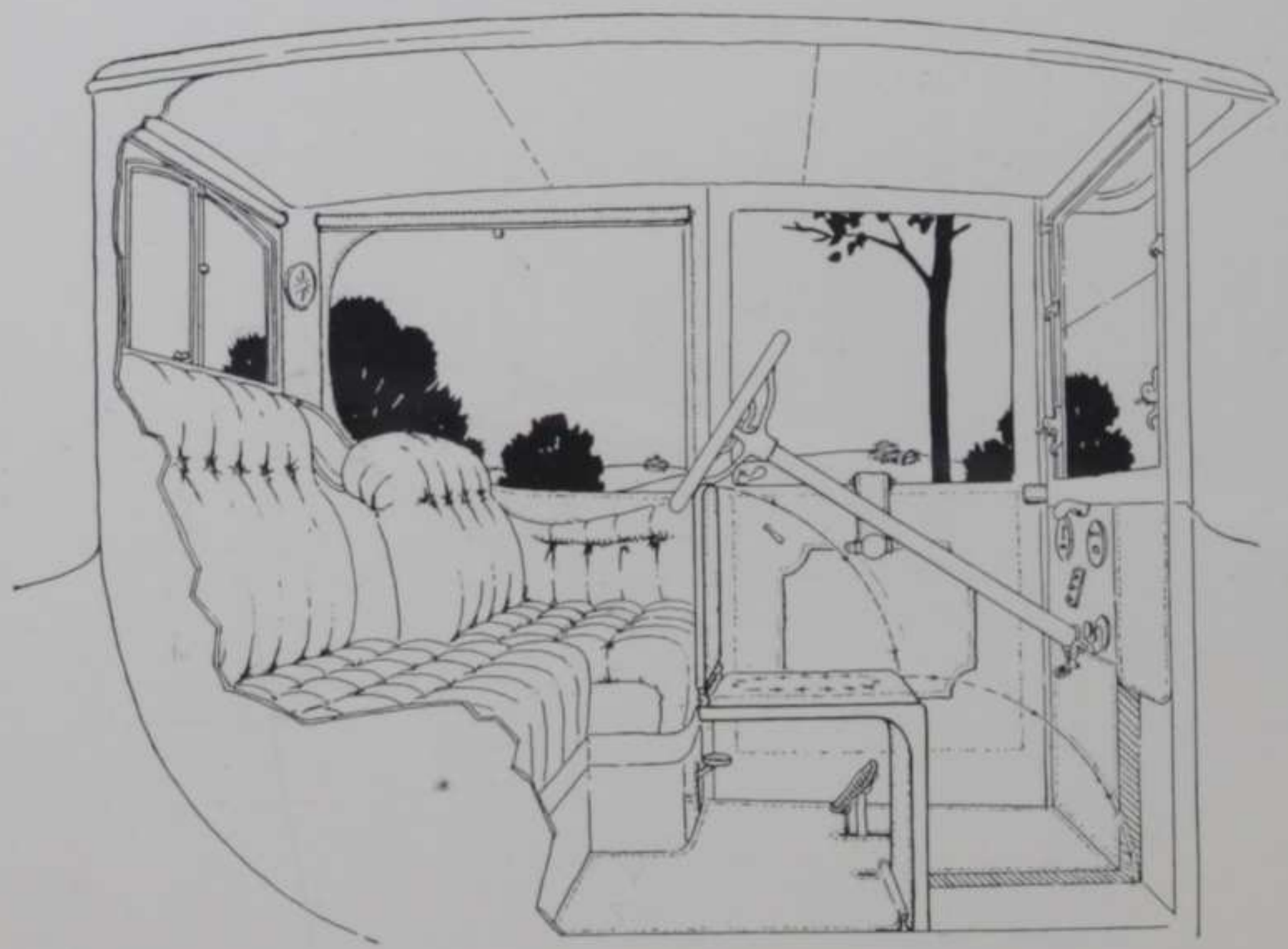


As the gasoline lever is moved forward it causes the car to be operated more on the gas and at a certain point it will run as a straight gasoline car, neither charging nor discharging the battery. A still further movement of the gas lever will cause the electric motor to become a generator and charge the battery.

While the two power elements employed in the operation of this car are electricity and gasoline, one supplementing and augmenting the other, it may be run on gasoline power alone. Thus we have a gas car with no clutches to throw in, no gears to change, with fuel consumption minimized and yet with the electric's simplicity and luxury.

Two small levers on the steering wheel control the entire driving of the car. Either lever may be operated by a slight movement of the finger.

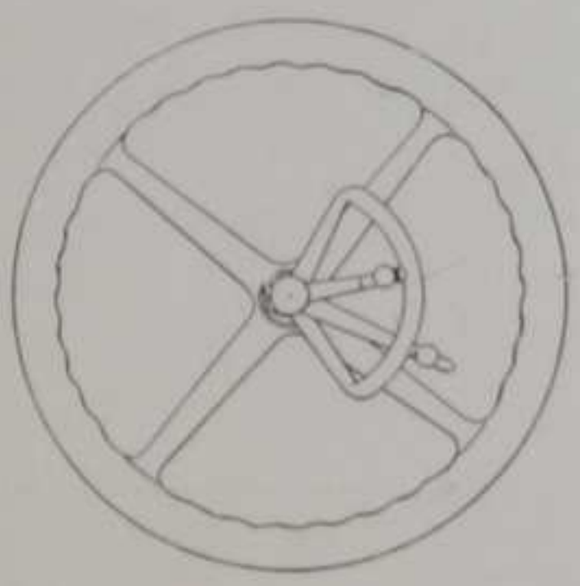
The longer lever controls the electric current and the shorter lever controls the gasoline motor. Thus we have dual power, or two power units combined into one. The extended movement of the two levers to their limit will give a speed of about thirty-five miles an hour.



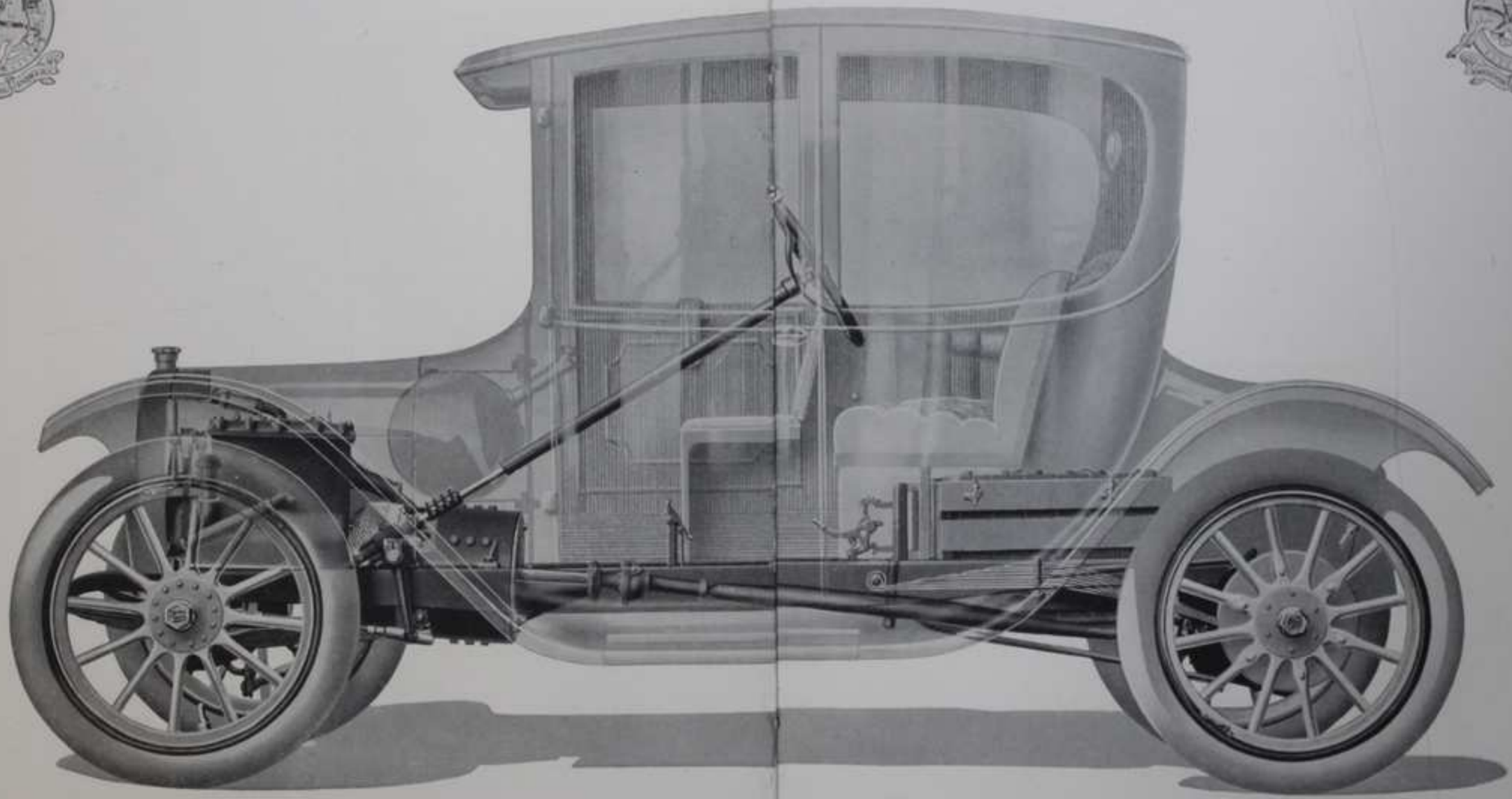
You have perfect control at all times, start instantly, run on any one of an unlimited number of speeds, re-charge the battery while running, brake, stop—all operations either with the movement of a finger on two small levers of the steering wheel or the simple movement of the foot brake pedal. This means the elimination of clutch pedals and gear shifts so that the driver may relax and drive with perfect ease—simplicity itself.

Every detail affecting comfort and convenience has been provided. The body is hung low to make the car ride steadily. The step is low and the door is high and wide to afford ease of entrance. The interior is large and roomy. Ample provision is made for four passengers. The rear seat accommodates three persons. The driver's seat is advanced six inches, allowing elbow room and great freedom in the operation of the steering wheel located on the left hand side. In the right front of the car is a disappearing chair which may be raised to position for a fourth passenger without in any way obstructing the view of the driver.

The upholstery is deep, soft, luxurious, and exceedingly comfortable.



Woods Dual Power, Model 44



Phantom View of Woods Dual Power Showing Salient Features and Simplicity

SPECIFICATIONS FOR WOODS DUAL POWER, MODEL 44

Electric Motor-Generator: Especially wound to develop characteristics required. The liberal proportion of all parts insures quick starting with a minimum of wear.

Gasoline Motor: Four cylinders 2½-inch bore x 3½-inch stroke. Moderate speed guaranteed to develop 14 horsepower. Designed for the service required, having large bearing surfaces and very heavy crank shaft, reciprocating parts being made as light as possible, all of which are carefully balanced to obtain smoothness in operation.

Ignition: Atwater-Kent Type K-2 Automatic Spark Advance System.

Cooling System: Thermo-syphon system with honeycomb type of radiator.

Lubrication: The lubrication of the engine is effected by gear pump, which elevates the oil from the lower chamber to a compartment around the valve tappets from where it flows to the various bearings. Ample lubrication of the connecting rods and pistons is provided.

Gasoline Tank: One piece, located under cowl. Capacity, nine gallons. Gravity feed.

Battery: Woods Special Exide Battery, 24 cells, 11 plates each, of our own approved design and assembly.

Chassis Framing: "U" shaped side members with channel section cross members welded by oxy-acetylene process.

Springs: Front springs half elliptic, Rear spring Cantilever. The high quality of material and skilled workmanship, as well as design, insure the easy riding qualities for which our cars have always been noted.

Wheel Base: 110 inches.

Tread: Standard 56 inches.

Tires: Silvertown Cord 34 x 4.

Wheels: Artillery with No. 52 Stanweld detachable rims.

Axles: Front axle one piece, drop forged I-beam section of special analysis steel and properly heat-treated. All steering knuckles and axle forgings are of steel particularly selected for the work required.

Rear axle — semi-floating type, wheels mounted on driving shafts of special analysis steel which float on Bock roller bearings. Axle tubes are made of swaged steel tubing which flange on the inner **end** and are bolted to the axle housing

which surrounds a complete unit containing the Baush Hour Glass type of Worm Gear. The brake shaft bearings mounted in this axle are self-lubricating. The axle is trussed to obtain the maximum strength with minimum weight.

Control: Two finger levers on the steering wheel. The outer lever controls the electric equipment and the inner lever, the gasoline equipment.

Brakes: A foot lever provides a powerful dynamic and mechanical brake. See page 21 for full description.

Speed: Maximum speed 35 miles per hour.

Body: Of aluminum panel construction, coupe design. Very wide doors, the glass windows of which may be lowered. The front and rear windows may also be opened. The design of the front window, being of wind shield type so arranged that both upper and lower halves may be adjusted to any angle. See page 11 for seating arrangement.

Trimming: Of exclusive design: Whipcord black and white; leather trimming optional. Painting, blue or green, with wheels in light straw-color.

Equipment: On an illuminated instrument board visible from the driver's seat: Woods Special Ampere Hour Meter and Ammeter Combined. Stewart-Warner Magnetic Speedometer with odometer trip attachment. Three-gang light switches.

On the front dash: Gasoline gauge and robe rail. A full complement of tools in a kit in a compartment back of driver's seat.

A compartment under the rear hood to carry a casing and inner tube not visible from the outside of the car.

A power air pump, mounted on the right hand side of the engine.

An electric motor-driven warning signal. The headlights are equipped with auxiliary bulbs for dim operation.

Price: $2650.00 F. O. B. Chicago.

Extra Equipment: Wire wheels, $25.00; slip covers, $25.00.

Special Cars: We cater to the individual taste of our patrons and will supply cars in special color effects with any kind of obtainable trimmings, in fact, a made-to-order car at $100.00 additional to the list price.

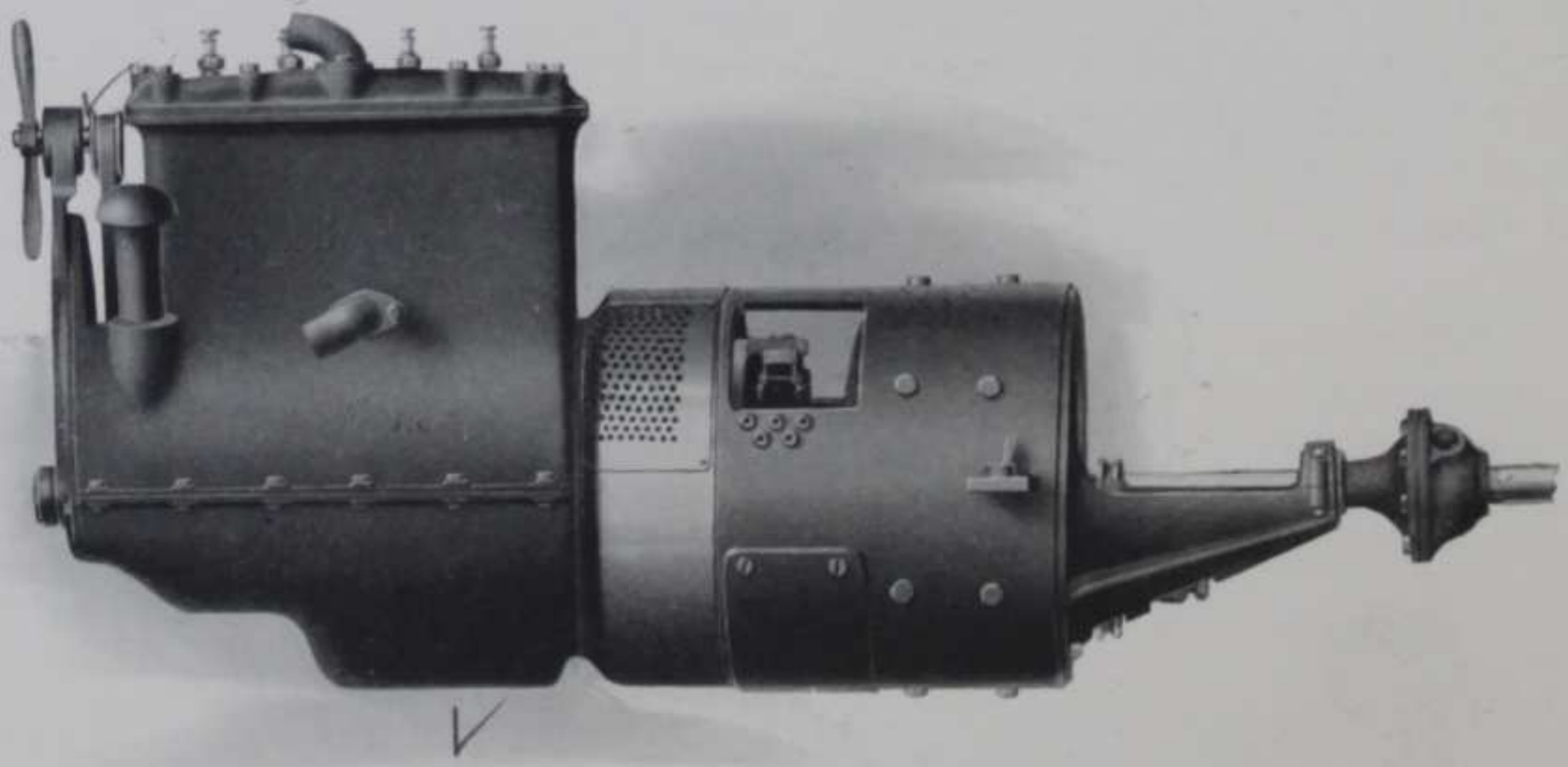
The Woods Motor Vehicle Company reserves the right to make changes or improvements at any time without incurring any obligation to install same on cars previously sold.

$2400

The lines of the car are graceful. Everyone agrees that the design is pleasing to the eye, that the car is comfortable to sit in and consequently easy riding. The bodies are built and fashioned throughout in the Woods factory. The finest coach builders in this country are to be found in our employ. Woods body work is celebrated as the masterpiece of coach building. In beauty, in elegance, in mechanical excellence, in smooth riding, easy control, economy of operation, Woods cars are supreme.

The power plant of the Woods Dual Power consists of a small gasoline motor and an electric motor generator combined into one unit mounted on a three-point suspension. The movement of a finger lever on the steering wheel connects the Gasoline Motor to the Electric Motor Generator which cranks the gasoline motor and develops power which is transmitted through the armature shaft of the electric motor and the propeller shaft direct to the rear axle.

The customary high powered gasoline motor used in so many automobiles is extravagant in the consumption of gasoline but necessary in negotiating hills and roads where a large amount of power is required, although this service repre-



sents less than 5% of the total mileage. Such a gas motor is most efficient when delivering its maximum horsepower resulting in more miles per gallon of gasoline, but under ordinary conditions where a great amount of power is not required it is less efficient and consumes more gasoline per mile.

This is not the case with the Woods Dual Power as its gasoline motor is always operating at its highest efficiency because it is always developing its maximum horsepower, relying upon the electrical equipment to assist in negotiating hills and roads where a greater amount of power is required. The gasoline motor of the Woods Dual Power is large enough for the required performance, small enough to obtain the greatest economy and the method of transmitting the power to the rear wheels insures the greatest efficiency.

It is impossible to stall the Woods gasoline motor because it always develops its maximum horsepower on the speed in which it is running and the additional amount required is furnished by the battery through the electric motor, which makes it absolutely impossible to stall the gasoline motor. Any condition which would cause "stalling" in an ordinary gas car, like overloading the motor, would simply cause the gas motor of the Dual Power to develop its maximum power after which a reduction in speed of the motor would take place. Then the electric motor immediately and automatically comes to the assistance of the gasoline motor and furnishes additional power as required.

Remember that when the gasoline motor is supplying all of the power to operate the car the armature in the electric motor is running at exactly the same speed as the gasoline motor and the electric motor is therefore, without any move-

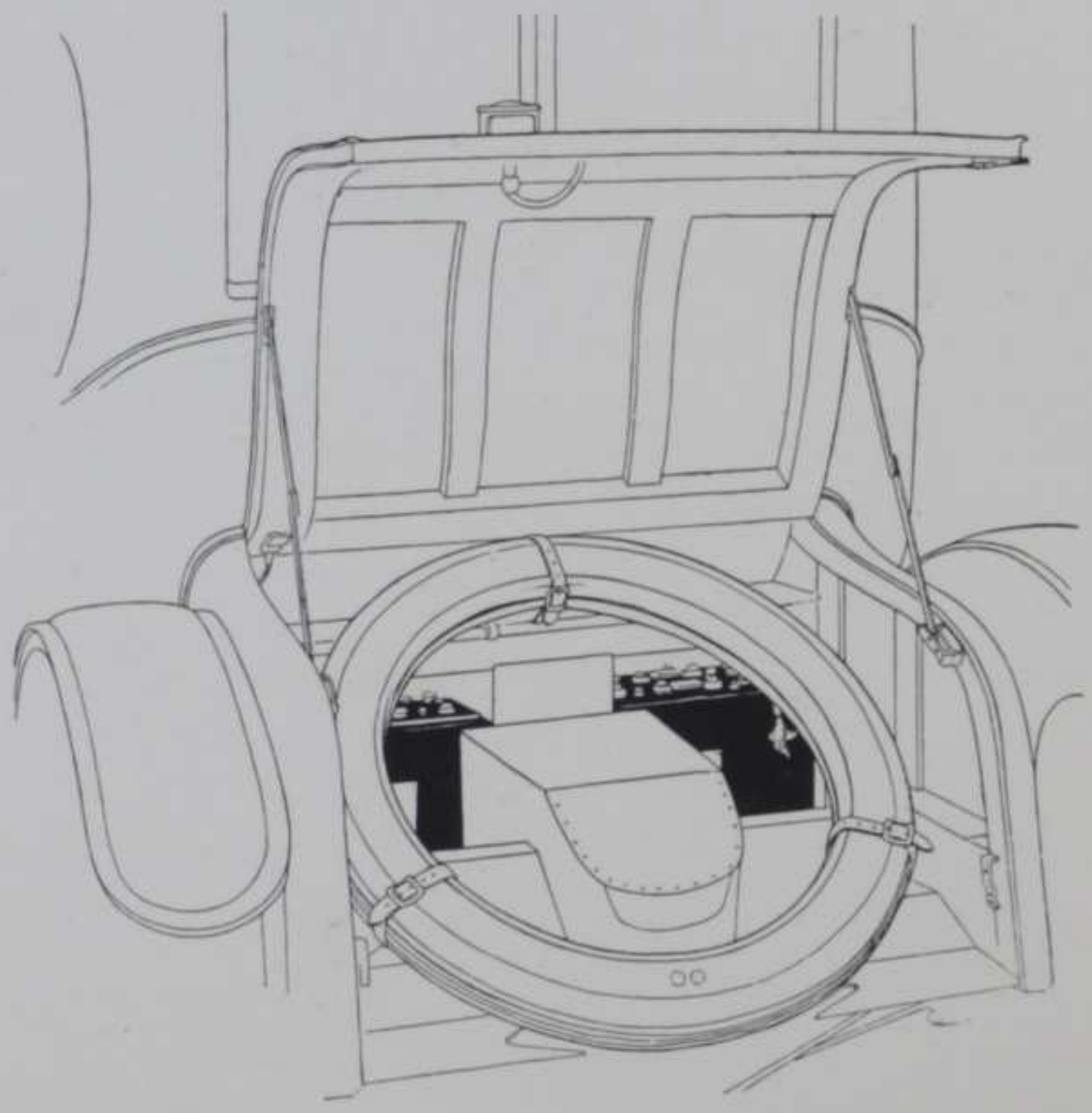
ment of the levers, ready at all times either to run the car independently as an electric car or to assist the gasoline motor to run the car or to serve as a dynamic brake to stop the car.

A very interesting article covering the subject of how to get the maximum efficiency from a gasoline motor has been issued by us. Copy will be mailed to those interested.

This car is equipped with Woods Special Exide battery consisting of 24 cells of eleven plates each. This is a special type designed to meet the unusually high standard of efficiency insisted upon by the Engineering Department of the Woods Motor Vehicle Company.

The battery is designed especially for the service required, guaranteeing greater life and lower maintenance cost.

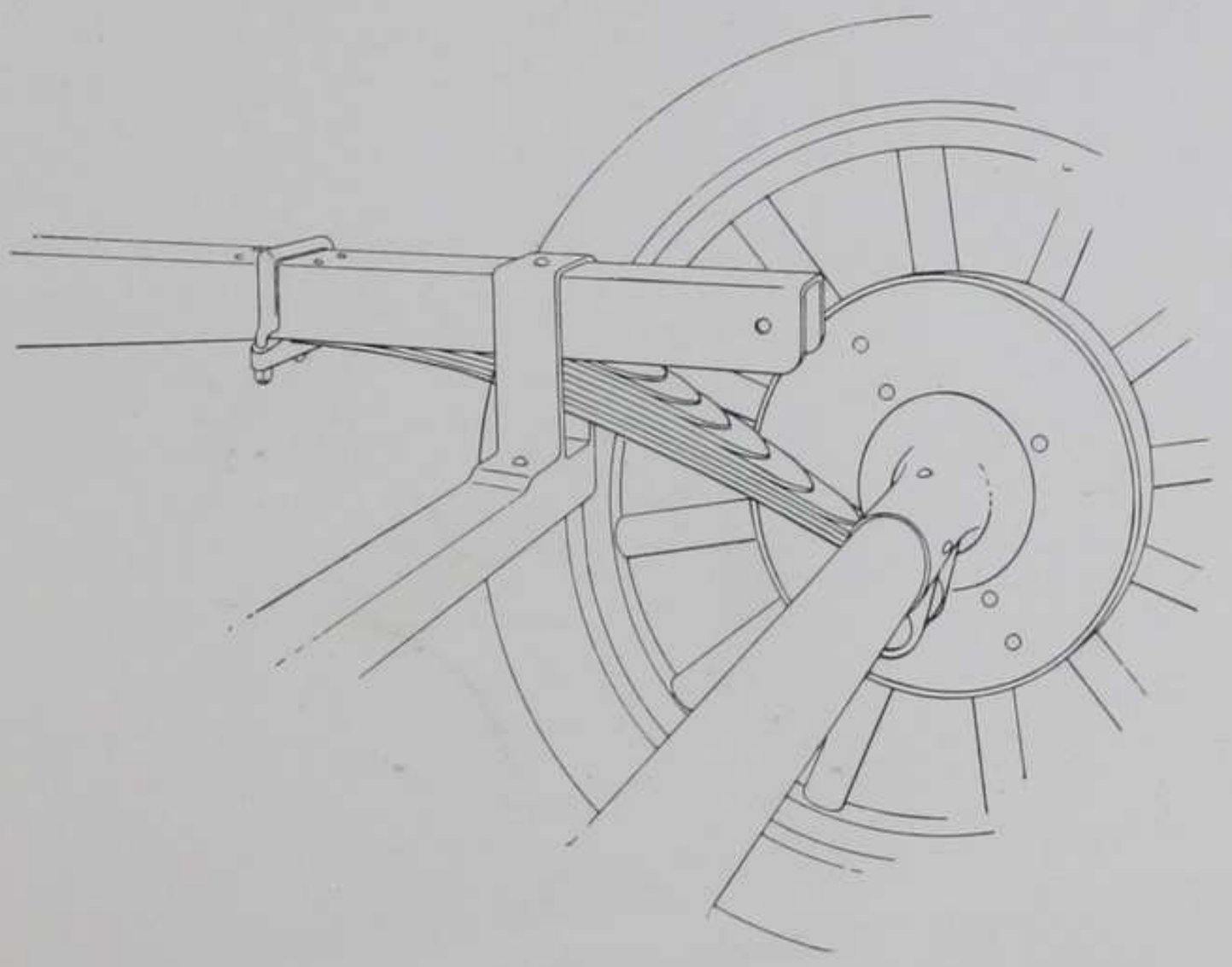
With a slight variation of the relative position of the two levers on the steering wheel the battery may either be charged or discharged at will on



any speed from ten miles an hour up to twenty-eight or thirty miles an hour.

The charging of the battery does not by any means require constant, but only casual attention on the part of the driver and it is always within his control. An indicator on the dash shows the exact condition at all times and also shows whether current is being delivered to or from the battery. Thus it is possible for the state of the battery to be kept within the safety or normal zone, avoiding both gassing and sulphating. The charging and discharging may be done within this zone without regard to rate and with no appreciable harm to the battery. It is the opinion of battery experts that the life of the battery will be several times greater than it ever has been in an electric car.

Dynamic braking may be effected at any speed above six miles per hour by retarding the electric lever. This causes the electric motor to run as



an electric generator driven by the gasoline motor or by the momentum of the car. The power thus generated is used for charging the battery. As the amount of power to drive the generator is increased the greater will be the power required of the gasoline motor or from the momentum of the car and in either case the effect of retarding the car acts as a most effective brake. Retarding the gas lever cuts off the gas and therefore prevents the gasoline motor from maintaining the momentum of the car. The combined result of retarding both levers may be obtained by a simple movement of the foot brake pedal without interfering with either of the finger levers on the steering wheel.

This foot brake pedal as it is advanced farther applies the mechanical brake to the rear wheels in addition to the dynamic brake. The full effect of the dynamic brake is obtained before the mechanical brakes are applied and in emergencies we have the effect of both the dynamic and rear wheel brakes. A detailed description of the braking and charging method as employed in the Woods Dual Power Car is given in a special article, copy of which will be mailed upon application.

The electric equipment is more simple and contains less parts than in the ordinary electric car. There is really no more electric equipment on the Woods Dual Power than on a gas car, but the units are larger and instead of simply turning the engine over a few times for starting it actually operates the car up to a speed of twenty miles an hour, and for a distance of thirty miles or more without regenerating.

Reversing is done entirely electrically by simply placing the left foot on a lever projecting from beneath the heel board. This closes the switch of the magnetic clutch, making it impossible to have current on the clutch when the car is reversed. The electric lever on the steering wheel is then operated in just the same manner as in going forward, or the same result may be obtained by releasing the foot brake pedal, the speed being regulated by the distance the lever or pedal is moved.

Economy is proved from the dollars and cents standpoint. All mechanism is operated under the most favorable conditions, power being transmitted from the two-power unit direct to the rear wheels, thus reducing to a minimum the wearing of working parts. The consumption of gasoline and oil is greatly reduced. The outside charging plant and the cost of current are entirely eliminated, thus effecting a very large saving in maintenance. An enormous amount of time is saved as the car starts instantly, is self-charging and non-stalling. Altogether, in the Woods Dual Power you are offered an irresistible car—one that has no rival in beauty, elegance, and luxurious appointment, a car beyond competition from the mechanical standpoint.

It is at once the car of luxury, the car of service, the car that is always ready, always dependable, the car that is self-regenerative, touching the very bottom of power economy.

Those interested in details of mechanical construction should consult the nearest dealer or write direct to the manufacturer. Special literature is issued covering all phases of the car. Please feel free to ask questions.

Rogers & Company
Chicago - New York

AUTOMOBILES
RENAULT

LES AUTOMOBILES RENAULT
SONT EXPOSÉES
53, AVENUE DES CHAMPS-ÉLYSÉES
PARIS

Roger Lucebert.

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15, RUE GUSTAVE-SANDOZ. BILLANCOURT
PARIS

Adresse Télégraphique :
RENOFER-BILLANCOURT

CET ALBUM N'A PAS LA PRÉTENTION DE PRÉSENTER AUX LECTEURS UNE DESCRIPTION DÉTAILLÉE, ET UNE ÉNUMÉRATION COMPLÈTE DE NOS MODÈLES. CE SONT QUELQUES FEUILLETS RASSEMBLÉS POUR DONNER UN SIMPLE APERÇU DE NOS USINES ET DE NOTRE PRODUCTION

LES *USINES RENAULT* ont été créées en 1898, par M. *Louis RENAULT.*

Le graphique que nous publions montre d'une façon saisissante leur développement ininterrompu et la place qu'elles occupent à l'heure présente dans l'Industrie.

Chaque période de ce développement marque en même temps qu'un accroissement de production, une amélioration des procédés industriels.

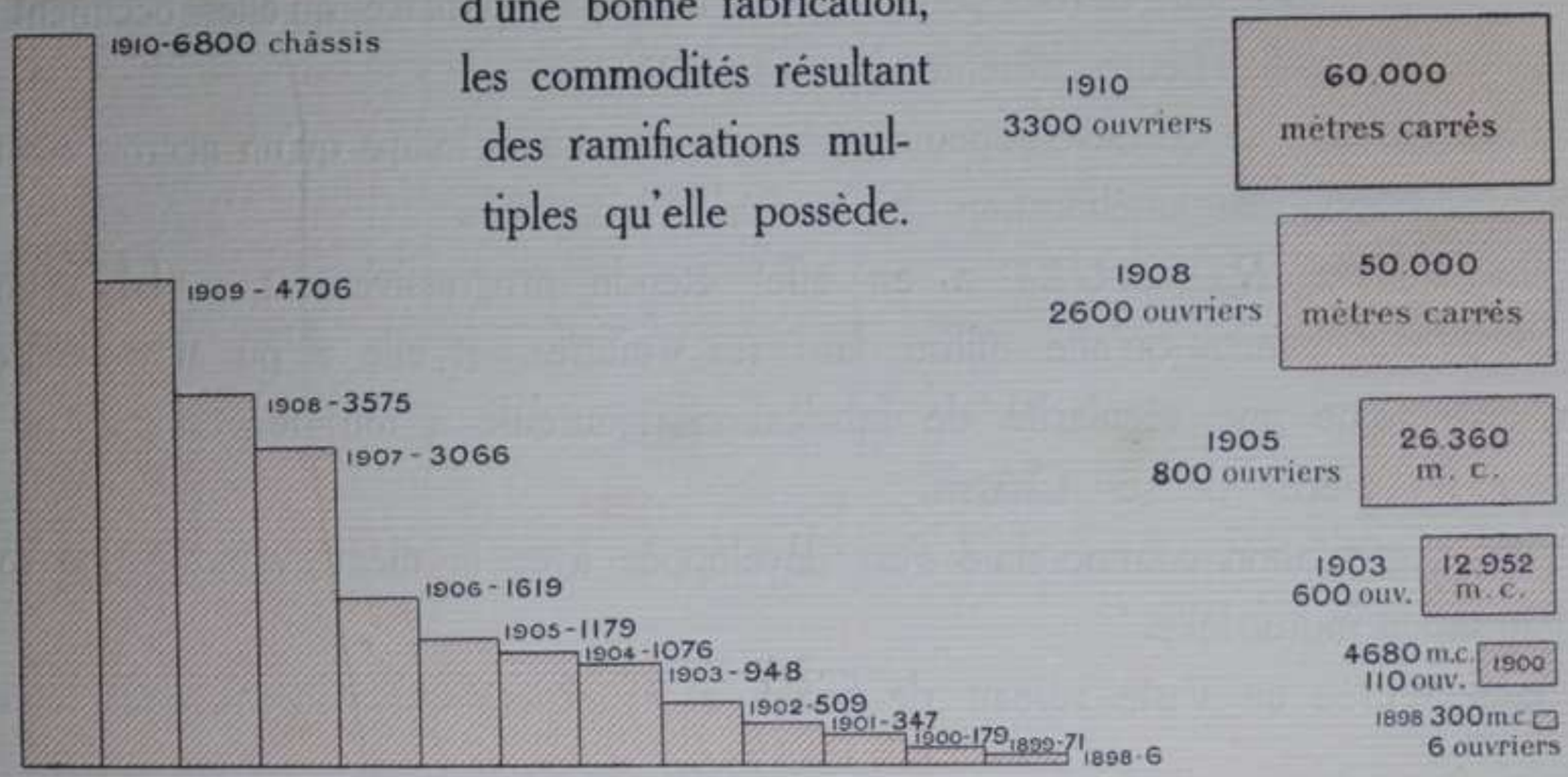
La Maison *RENAULT* a en effet étendu progressivement sa fabrication à tous les éléments qu'elle utilise dans ses Voitures, et elle a pu ainsi assurer par elle-même une régularité de fabrication rigoureuse à tous les organes et à toutes les pièces de ses Châssis.

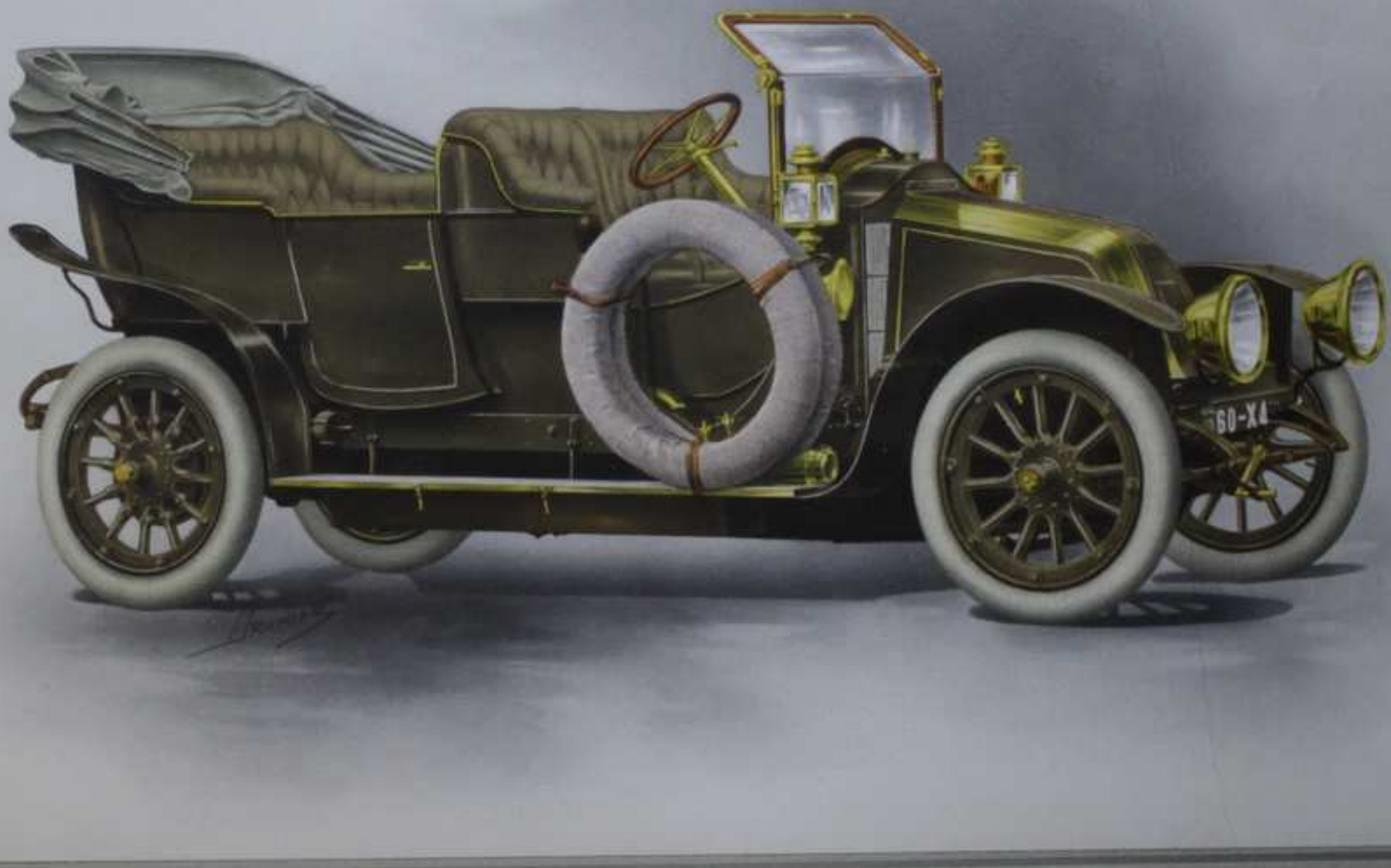
Son organisation commerciale s'est développée avec la même rapidité que son organisation industrielle.

Elle a créé un vaste réseau de filiales et d'agences qui assurent, dans toutes

les régions du Monde entier, la livraison des Châssis, leur réparation et l'approvisionnement rapide en pièces de rechange.

C'est ainsi que la Maison *RENAULT* donne à sa Clientèle, outre la garantie d'une bonne fabrication, les commodités résultant des ramifications multiples qu'elle possède.

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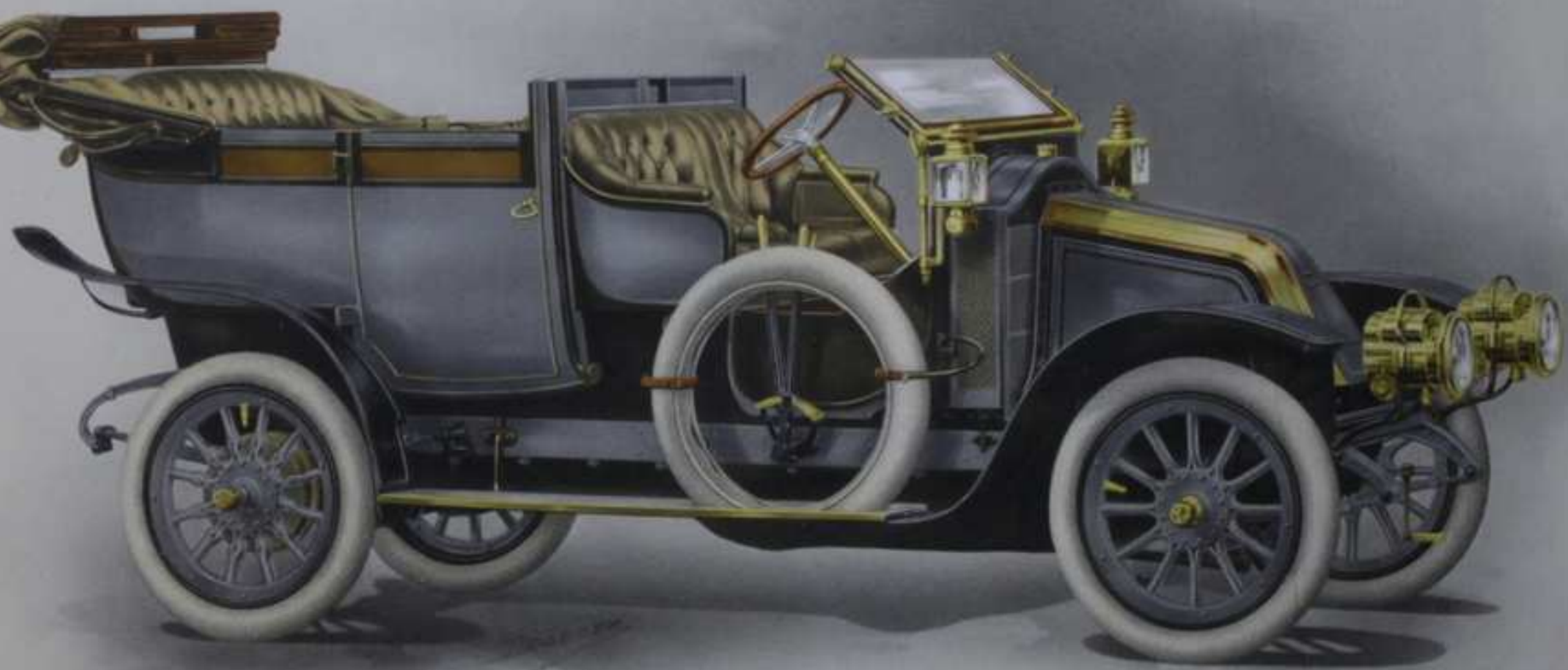

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N° VI

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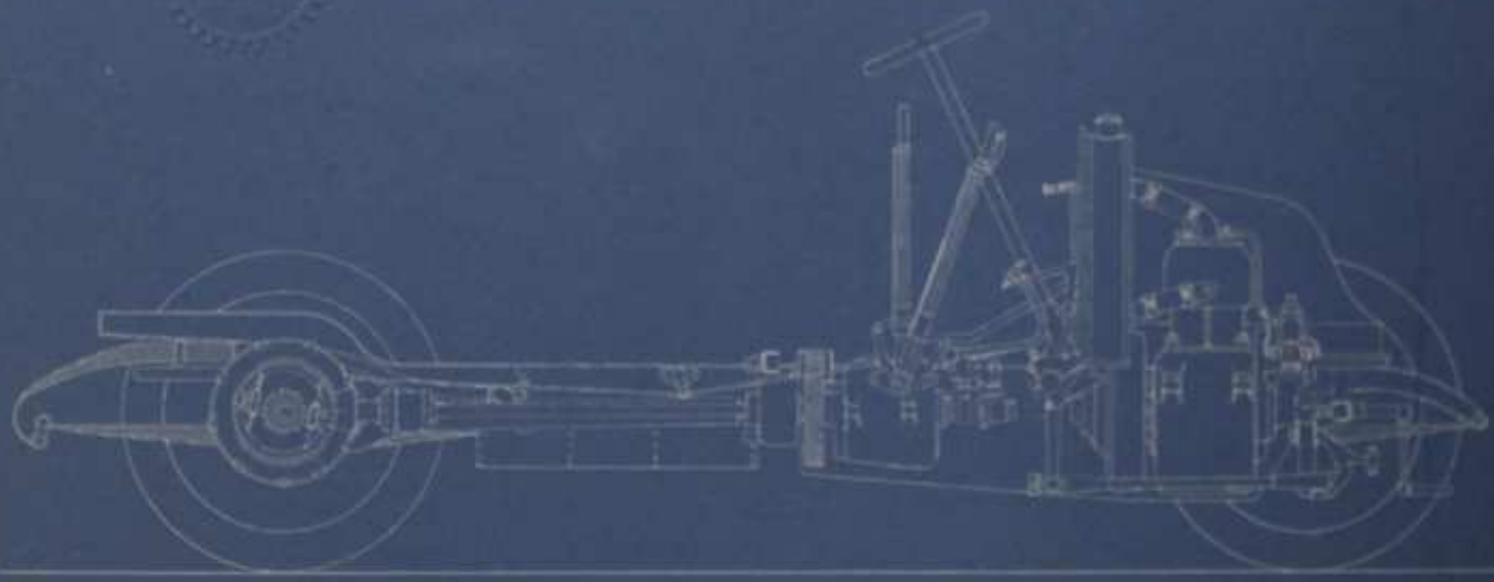
AUTOMOBILES RENAULT

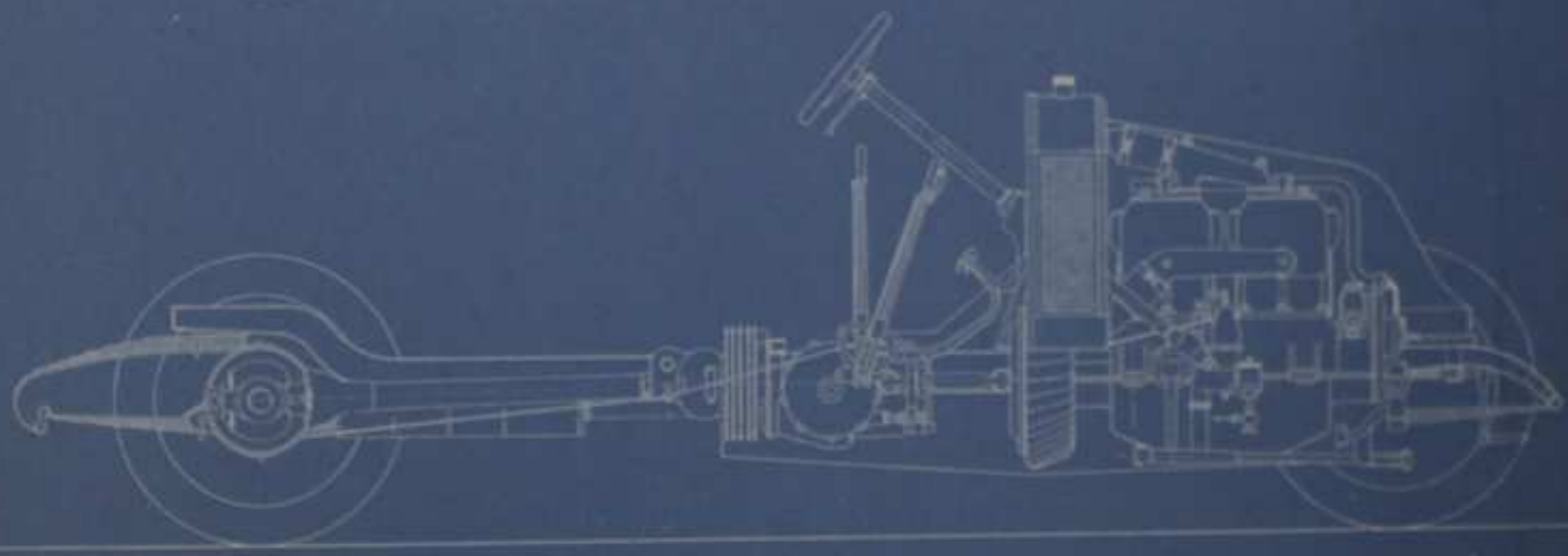
SCHÉMA
D'UN CHASSIS 2 CYLINDRES



AUTOMOBILES RENAULT

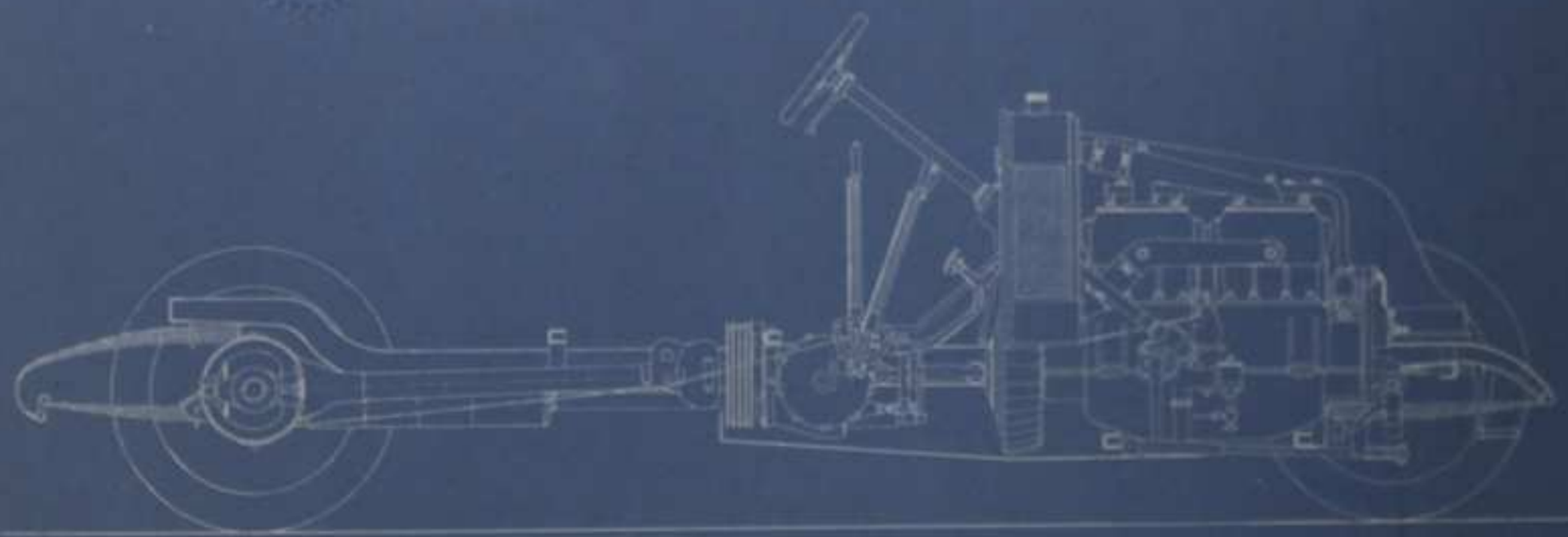
SCHÉMA

D'UN CHASSIS 4 CYLINDRES



AUTOMOBILES RENAULT

SCHÉMA
D'UN CHASSIS 6 CYLINDRES



LA Voiture *RENAULT* a sa physionomie et sa personnalité.

Ses grands traits caractéristiques ont été esquissés sur ses premiers exemplaires et sa réalisation actuelle n'est que le plein épanouissement de principes posés dès 1898.

A cette époque, en effet, les premières Voitures *RENAULT* étaient établies, et déjà elles mettaient en application le brevet *RENAULT*, de changement de vitesse avec prise directe, et la transmission par cardan et pignon d'angle qui furent le premier acheminement de la construction automobile vers la recherche du rendement élevé et de la marche silencieuse.

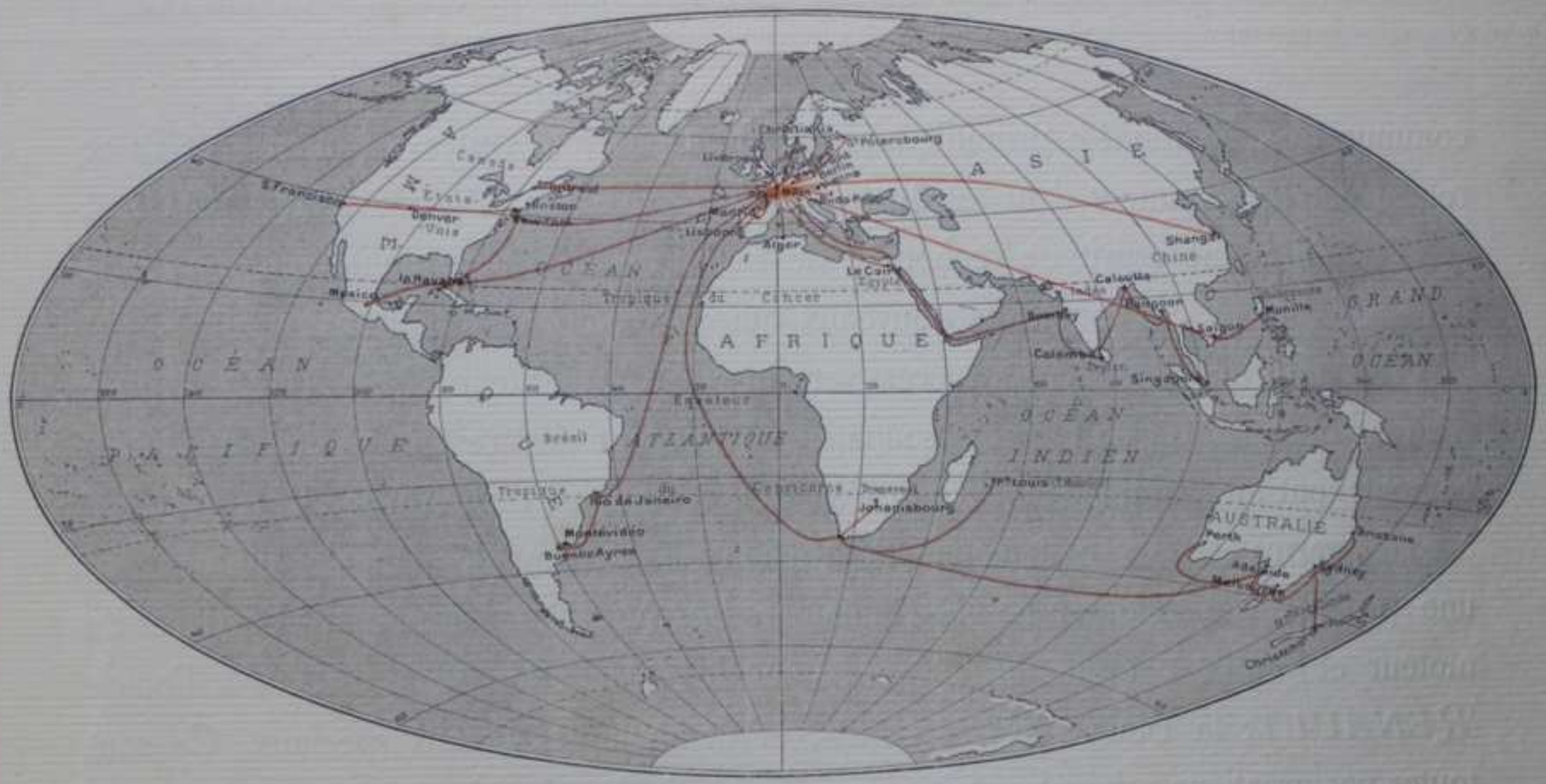
Le refroidissement par thermo-siphon et l'avant du moteur complètement dégagé, indiquaient nettement le but poursuivi : unir la simplicité de fonctionnement à l'accessibilité de tous les organes. Les châssis actuels comportent encore ces dispositifs essentiels.

Ils ont, sans aucun doute, été modifiés et améliorés progressivement par l'expérience ; leur réalisation actuelle n'a peut-être même plus rien d'apparemment

commun avec le modèle primitif, mais les principes sont restés les mêmes et ils se retrouvent constamment dans les évolutions successives de la Voiture *RENAULT.*

C'est ce même esprit de recherche de simplicité et d'accessibilité qui a présidé à l'établissement des dispositifs nouveaux qui ont complété les premiers.

C'est ainsi qu'ont été créés successivement : le Carburateur *RENAULT* à prise d'air additionnel, réglée par une soupape fonctionnant sans ressort, et dont les déplacements sont amortis par l'adjonction d'un frein à liquide; l'Embrayage *RENAULT* à cônes garnis de cuir et à cercle de friction scié suivant des lamelles qui assurent une progressivité rigoureuse; le Radiateur *RENAULT*, disposé à l'arrière du moteur et ventilé par une turbine fixée sur le volant; les Amortisseurs à liquide *RENAULT;* la Bougie *RENAULT*, et de multiples détails spéciaux. Ce sont toutes ces créations originales, faites avec un esprit de suite rigoureux, et suivant des principes directeurs bien établis, qui ont fait la véritable personnalité de la Voiture *RENAULT* et qui lui ont valu les qualités qu'on lui reconnait unanimement.



SOCIÉTÉS REPRÉSENTANT LA MAISON RENAULT A L'ÉTRANGER :

ANGLETERRE :
Renault Frères Limited, 19, Newman Street, Oxford Street.
LONDRES

ALLEMAGNE :
Renault Frères Automobil, Aktien-Gesellschaft, 23, Mohrenstrasse.
BERLIN

ESPAGNE :
Sociedad Anonima Automovil de los Automoviles Renault Frères,
23, Arenal. MADRID

ÉTATS-UNIS :
Renault Frères, Selling Branch, NEW-YORK.
CHICAGO, SAN-FRANCISCO.

AGENCES ET SOUS-AGENCES DANS LES PRINCIPALES VILLES DU MONDE

DRAEGER, IMP.

A
TRAVERS
LE DESERT
AVEC LES 6 ROUES
RENAULT

4VCH 1214 F / 185 €

A TRAVERS LE DÉSERT AVEC LES SIX-ROUES RENAULT

Vue générale de Touggourt.

LE TOURISME AU DÉSERT

DU SUD-ALGÉRIEN AU SUD-TUNISIEN EN AUTOMOBILE

El Oued, 28 Décembre 1923

BISKRA, oasis nostalgique, sourire ambigu du désert, on vous abandonne à regret. Cependant vous donnez le désir d'aller plus avant dans le sable parce que vous avez fait goûter la caresse pénétrante et un peu farouche du Sud... Plus loin c'est Touggourt, dernière étape du voyage par chemin de fer, point de départ des caravanes d'où nous irons voir si le désert, à peine accueillant au méhari se laissera asservir par la roue...

Touggourt s'offre de très loin — comme un mirage — ses murs bas et ses palmiers accrochés à l'horizon. De près, c'est d'abord une vaste plaine sablonneuse bordée de maisons plates, le quartier des Ouled-Naïls, d'où s'évade un bruit de musique nasillard. La ville vient ensuite et semble écouter, attentive et distante, l'agitation rythmée des danses et la joie puérile des courtisanes qui la baignent, dans le soir, d'une atmosphère de volupté.

A la gare, nous trouvons les fameuses voitures Renault, avec lesquelles nous allons franchir la région des dunes de Touggourt à Tozeur, but principal du voyage.

Nous regardons avec étonnement ces confortables véhicules, avec leurs sièges larges, leurs beaux bandages neufs jumelés et leurs six roues. M. Schwob, ingénieur de la Maison Renault, accompagné de M. Fey, de la Société des Transports automobiles industriels et commerciaux nous les présente avec orgueil. Il nous dit ses essais concluants, mais oublie de nous faire savoir la part qu'il a prise à la réalisation du beau projet de la Compagnie Transatlantique et de la Maison Renault.

Le lendemain, à l'aube, départ. Nous sommes émus en montant dans ces voitures. Comment vont-elles se comporter, arriveront-elles ce soir avant la nuit au terme de notre première étape, El Oued, bourg perdu en plein désert ?

Alors, c'est l'enchantement qui commence, la randonnée à travers l'immensité, loin des villes de tourisme, loin de tout, en pleine mer de sable. C'est une mer, en effet, qui se déroule devant nous, avec ses vagues que nous avons déjà contemplées de notre wagon, mais dans laquelle nous nous lançons sur notre esquif à six roues. Les vagues se succèdent, dunes blondes dorées de lumière, séparées par la distance d'une lame à l'autre sur un flot houleux, avec ses creux, ses bosses, ses ombres et ses précipices derrière les crêtes.

L'une derrière l'autre, les deux voitures abordent chaque dune, et tandis que de la voiture de derrière nous voyons celle qui nous précède, tanguer, rouler, disparaître, monter, redescendre, nous éprouvons la sensation d'être balancés doucement, sans secousses, en wagonnet de montagnes russes. C'est amusant et inattendu quand même, car l'on s'étonne de voir chaque mamelon franchi sans effort, l'un après l'autre.

Cependant derrière nous les dunes s'amoncellent. Les moteurs ronflent sans chauffer, et, bercées en cadence tant les monticules

Aux environs de Dzioua.

se succèdent régulièrement, les voitures avalent le chemin de sable au grand étonnement de notre guide, vieil Arabe en burnous bleu, silencieux, dont le costume et le long fusil sont imprévus sur ces cars prêts à conduire des voyageurs à Longchamp.

Le temps passe. Nous marchons depuis 5 heures, sans fatigue. Après un déjeuner à l'ombre d'une dune, nous repartons à travers le même paysage monotone, d'une incomparable beauté cependant, par la simple magie de la lumière et des ombres. De loin en loin, sur une éminence, une guémira, construction servant de point de repère, dit pathétiquement l'héroïque conquête du désert par des hommes de France.

Dans le sable, des carrés de murs blancs entourés de jardins de palmiers et une foule bigarrée qui fait la haie... Nos voitures arrivent dans le bourg de Guémar, au milieu des acclamations et des salves de tromblon. Toute la population nous attend le long des murs, sur les terrasses, et le caïd, magnifique dans un burnous rouge, sur un cheval blanc à longue queue, nous précède au galop.

Il nous conduit devant le bâtiment de la Zaouïa des Tidjania, dont le marabout nous fait les honneurs.

On repart dans le soir, entre une double rangée d'Arabes tandis que les femmes risquent leur visage dans l'ouverture des maisons et que des bambins musclés courent éperdument derrière les voitures.

Dans le crépuscule mauve, nous arrivons à El Oued où un camping pittoresque a été préparé.

La nuit est venue. Le ciel est clair, émaillé

Une Ouled Naïl.

d'étoiles, moins nombreuses que sous notre ciel de France, mais qui semblent suspendues dans l'azur au lieu de parsemer de points d'or le fond d'une voûte arrondie. Et la lune, très blanche, derrière nous, allonge sur le sable l'ombre bleue de nos tentes, tandis que sur une crête se détache la silhouette démesurée d'un Arabe immobile.

Au puits de bou Ksissia.

Tozeur, 1er Janvier 1924.

Dormir sous la tente n'est pas désagréable. Le sommeil y semble plus reposant que dans l'atmosphère de Paris et le réveil, sans lourdeur, est une transition exquise entre l'apaisement de la nuit et l'agitation heureuse du jour qui vient. L'aube, au désert, a des teintes opalines qu'aucune lumière n'a jamais vaporisées sur nos ciels, et contrairement à ce que l'on croirait, du coucher du soleil à son lever, la fraîcheur — le froid presque — s'appesantit sur le sol déjà givré par la clarté lunaire.

Dispos, nous prenons gaiement possession de notre domaine et du paysage. Les jardins de palmiers se mordorent dans la lumière et le minaret de la grande mosquée, jailli derrière des murs blancs, semble faire attendre à nos oreilles, ataviquement accoutumées, l'aspersion sonore des cloches matinales. Le soleil, une agitation de burnous bariolés, des musiques aigres et monotones, des méharas accroupis qui regardent d'un air dédaigneux et hautain des étalages de dattes, d'oranges et de graines, rappellent à la réalité nos âmes occidentales.

Journée de repos. Le matin, décoration par le commandant du Cercle d'El Oued, du marabout qui nous accueillit la veille à Guémar. L'après-midi, promenade en caravane, joie des galops éperdus dans la plaine sans obstacles, des montées de hautes dunes

Les arcades à El Oued.

en quelques bonds brutaux et de la marche au pas sur les crêtes, en face de la désolation du Souf, transmuée en splendeur par la lumière.

Le soir, un grand feu sera allumé après le dîner devant la tente salon, et des Ouled-Naïls danseront pour nous devant un cercle d'Arabes affalés, sur la masse desquels passent tour à tour de larges ombres projetées et la lueur rougeâtre des flammes vacillantes.

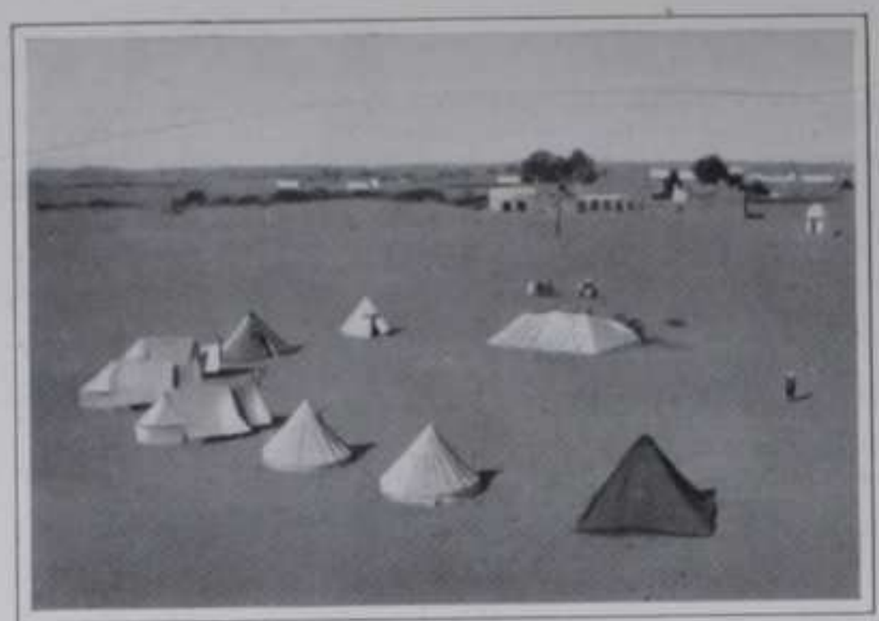
* * *

Au matin, un ronflement de moteurs précipite nos préparatifs de départ... Et nos deux voitures s'en vont de nouveau vers les dunes qui seront gravies avec la même aisance que celles, parfois moins rudes, de la première étape.

Quelques jardins de palmiers, de rares guémiras, un bordj, et tout autour, à perte de vue, l'étendue désertique tachée de touffes sombres. Rien de plus pendant des heures sous le ciel pâle, presque gris à force d'être lumineux. Parfois cependant on croise une caravane de chameaux chargés de fardeaux, ou qui balancent, comme des poupées d'étoffes, des hommes et des femmes voilées juchés sur la bosse oscillante.

Le terrain devient plus accidenté. Puis les vagues de sable s'apaisent insensiblement. Alors les voitures roulent plus vite sur un sol dur et cahoteux et se rapprochent d'un immense miroir luisant étalé très loin en face de nous.

C'est le chott Djerid dans lequel se mirent des oasis et qui s'allonge à perte de vue comme un lac immobile. Nous le longeons bientôt et pendant des heures, sur une véritable route dont la largeur n'a plus de limites, les voitures vont à une vitesse étonnante. L'immense



1. Le camping à El Oued — 2. Femmes à la fontaine, à Touggourt. — 3. Mendiant aveugle. — 4. Les plongeurs de Témacine se réchauffent auprès d'un foyer. — 5. L'arrivée à Nefta. — 6. La cuisson du « méchoui ».

«... Ksabi, aux rochers de turquoise sertis dans les dunes de couleur chair...»

lac vient mourir contre les roues, mais tandis qu'à quelques mètres il a l'aspect d'une eau dormante, tout près l'on voit qu'il n'est fait que de sable blanc mêlé de sel et de magnésie.

A l'étendue jaune et vallonnée du sable a succédé la plaine morne, désolée, que rien de tache, lugubre presque dans sa blancheur miroitante de mer morte, figée par un cataclysme apocalyptique : un vrai paysage lunaire, fantastique, dans lequel se serait affolée l'imagination d'un Edgar Poe.

Cependant, c'est d'une incomparable beauté tragique, et la course le long du chott Djerid est une des plus belles choses du voyage.

Enfin, voici des palmiers, des murs, des maisons, un oued entouré de végétation, et que traverse un pont. C'est l'oasis de Nefta, « La Perle du Djerid », proche voisine de Tozeur.

On n'est plus en Algérie, mais en Tunisie. Sur les maisons carrées, s'arrondissent, de loin en loin, des coupoles blanches qui rosissent dans le soir. Il semble que l'on approche de l'Orient, et cette impression s'accentuera au fur et à mesure que nous pénétrerons dans l'intérieur de la Tunisie.

Des cavaliers s'avancent : un détachement de spahis envoyé à notre rencontre pour nous rendre les honneurs et nous faire escorte.

La nuit venue nous a privés de la réception préparée à Tozeur, avec musique et fantasia !

Tozeur est une des oasis tunisiennes qui méritent le plus une visite. Après le désert de sable et la désolation magnifique du Chott, sa végétation, ses chemins creux sous les palmes, ses fontaines, donnent l'illusion d'un éden. S'il suffit à la lumière d'Afrique d'une étendue désolée pour faire de la beauté, quels miracles de splendeur n'accomplira-t-elle pas avec des arbres, des minarets, des coupoles et des jardins.....

Louis DANEY,
du *Figaro*.

Vue générale de Ghardaïa.

LE M'ZAB

Le touriste qui se propose de « faire du Sahara », en traversant l'Erg, de Touggourt à Tozeur, — trajet accidenté et plein de difficultés, que les Six-Roues Renault semblent avoir aplani sans lui ôter son caractère, au point qu'il reste l'impression d'assister au déroulement d'un film — ne peut quitter Touggourt sans pousser une pointe vers le M'zab.

C'est si près, maintenant, le film est si joli et les fauteuils des cars si confortables ! Pourquoi ne pas tourner encore la manivelle, un démarreur électrique y suffit et le ronron du moteur est moins fastidieux et bruyant que celui du projecteur.

Amenons donc le touriste au cinéma : salle en plein air, entre les murs de l'horizon changeant, plafond d'azur et d'or ; sur la pellicule impalpable des paysages vivants, de roc, de sable, de limon, mais qui parfois semblent morts. Au programme : Voyage en enfer par Témacine, Ourgla et Ghardaïa.

La Confédération du M'zab groupe sept villes, flore pittoresque et inattendue d'un sol subitement pétrifié par le soleil torride pendant quelque cataclysme.

Ghardaïa, Beni-Isguen, Bou-Noura, Melika, El-Atef, Berrian et Guerrara abritent dans leurs maisons cubiques, autour de minarets rudimentaires, cinquante mille M'zabites au profil d'Assyriens, — d'Assyriens gras, mués en Auvergnats que la crise des logements aurait chassés de la dernière boutique de « bougnats ».

D'origine berbère, parait-il, parlant un dialecte proche du Kabyle, ils appartiennent à une secte, les Ibadites, tenue pour hérétique par les autres Musulmans. Tant par leur type, leur origine que

Beni-Isguen.

Barbiers indigènes.

par leurs pratiques religieuses et leurs mœurs, ils forment, au milieu des autres groupes ethniques de l'Afrique du Nord, un peuple à part, tenace et laborieux, instruit, rusé, commerçant et pacifique.

Une malédiction pèse sur eux depuis qu'ils ont sur la conscience le meurtre d'Ali, gendre de Mahomet. Ils ne s'en portent pas plus mal pour cela : ces obèses n'ont point le sentiment du martyre.

La chose eut lieu en 650, à la bataille de Nahrouan. Après ce vilain coup, les compagnons du meurtrier, très proprement écrasés du reste, ne purent rester dans l'orthodoxie. Ils se répandirent dans le Maghreb en propageant le schisme. Bavards mais travailleurs, — constatation paradoxale, — ils devinrent puissants et fondèrent Tiaret, capitale d'un empire qui pendant deux siècles menaça d'asservir le nord de l'Afrique. Cette prospérité ne pouvait durer. Tiaret fut détruite au X^e^ siècle ainsi que l'oasis de Sedrata, qu'ils créèrent ensuite près d'Ouargla où ils avaient arrêté leur retraite vers le Sud.

Ils n'eurent plus qu'à fuir encore. Cette fois ils jugèrent qu'on ne les reprendrait plus : ils mirent l'enfer entre leurs ennemis et eux.

Dans le désert torride, le Tadmayt, où il n'y avait ni eau, ni terre végétale, ils creusèrent des puits et portèrent l'humus à dos de chameau. Ce fut alors la miraculeuse éclosion d'une forêt de palmiers et des sept villes saintes.

Le M'zab est maintenant, avec l'Aurès, un des coins les plus curieux et les plus pittoresques de l'Afrique.

En partant de Touggourt, les Six-Roues prennent la piste des

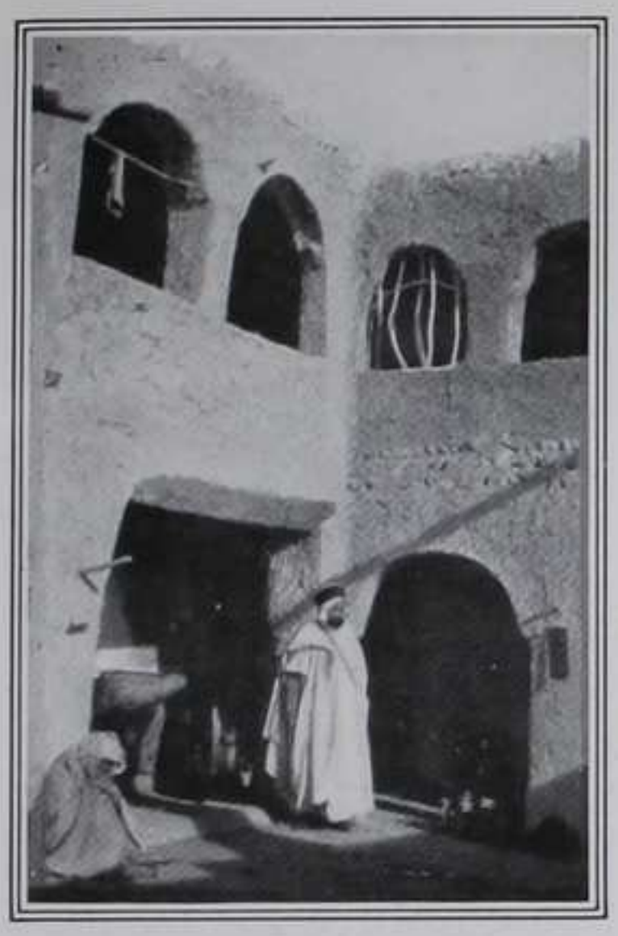
Un puits dans le M'zab

caravanes, sans doute dans l'espoir chimérique d'étonner les chameaux. C'est la marche rapide à travers le sable, l'amusante ascension des dunes gravies sans secousses et bientôt devant soi, une petite ville fauve sous le ciel bleu : Témacine.

Témacine, jadis entourée d'un fossé aujourd'hui comblé, donne l'impression d'une ville fortifiée. Vues de près, les maisons n'ont cependant rien de la forteresse, bâties qu'elles sont sur des fondations de troncs de palmiers formant matelas entre le sable mouvant et la construction. Toute la ville est ainsi faite et toutes les maisons carrées se ressemblent, ce qui n'empêche pas cependant l'habitation du caïd Abd-el-Kader d'être une chose exquise avec son jardin de palmiers et le miroir de son petit lac. Ce lac fit, paraît-il, les délices d'une jolie naïade de chez nous qui dut faire tourner bien des têtes avant d'aller elle-même « tourner » au Sahara, et davantage depuis.

C'est à Témacine que l'on trouve les « r'tass », fameux plongeurs dont nous avions entendu parler. Ils ne sont plus que quatre ou cinq et cherchent à faire des élèves. Leur situation est enviée cependant et ils constituent une caste privilégiée, mais le métier est dur. Qu'on en juge : après avoir reçu de multiples et étranges bénédictions, accompagnées de signes cabalistiques et d'impositions des mains, le plongeur s'introduit dans le puits étroit. Avant de disparaître sous l'eau, il fait de longues aspirations, puis en s'aidant des parois, descend à plus de 50 mètres de profondeur, ce qui représente une pression de 5 kilos au centimètre carré. De chaque plongée l'homme rapporte du limon, et sous l'eau il nettoie et approfondit le puits qui fertilise les palmeraies. Aussi chaque plongeur a le droit de prélever le plus beau régime de dattes dans le jardin arrosé par le puits qu'il entretient. Malgré cela, les aspirants successeurs sont peu nombreux. On comprend la réserve des amateurs, lorsque l'on regarde au sortir de l'eau, ces hommes nus, au corps squelettique, en train de grelotter

.: « Nous croisons une caravane... »



devant le foyer allumé près du puits. La méthode de Lalyman, — notre amphibie national — a cependant du bon pour former la jeunesse, mais sans doute ces plongeurs-là en pratiquent-ils une autre ou abusent-ils des immersions : « Tant va la cruche à l'eau... »

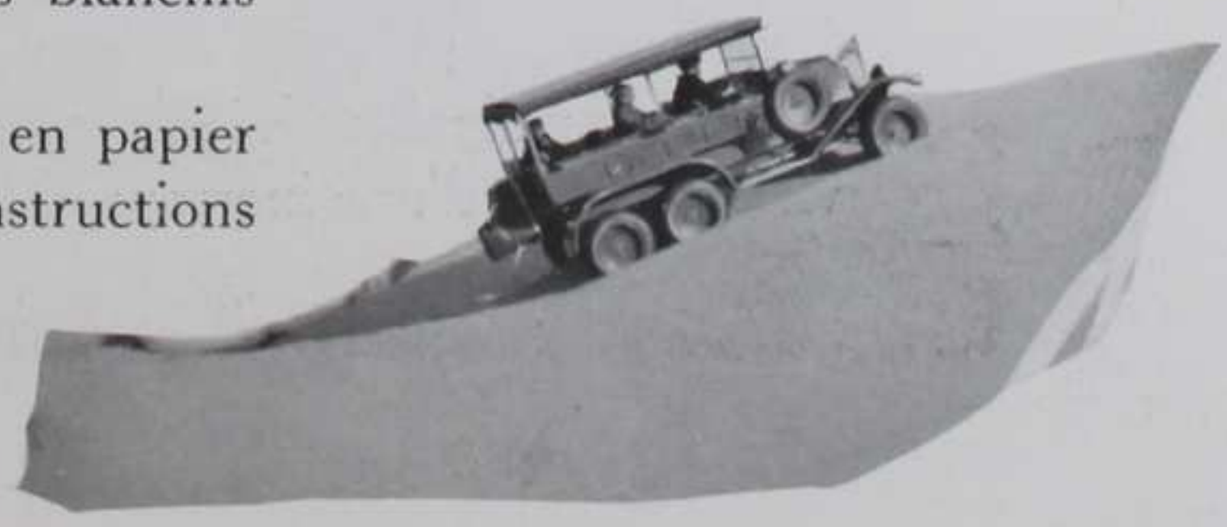
En quittant Témacine on passe au puits de Hassi-Mahmar, petit bourg isolé et triste dans la lumière. Là, nous croisons une caravane de chameaux au milieu de laquelle se désarticulent de gentils chamelons qui n'ont pas encore l'air dédaigneux et la démarche balancée de vieille ingénue d'une de nos scènes subventionnées, mais semblent s'exercer déjà au cabotinisme officiel. Ils s'occupent à peine de nous, comme si nous avions payé pour les regarder. Le troupeau s'éloigne et fait sur les crêtes une longue ligne onduleuse posée sur de multiples tiges grêles.

Intérieur de la mosquée de Ghardaïa.

L'aspect du sol change, les voitures s'en aperçoivent à peine. Elles tanguent maintenant sur des pierres roulées, noires et brillantes, pareilles à de la houille. Par instants, ce chemin noir est coupé de dunes jaunes et les Renault semblent s'égayer soudain de faire un peu de steeple et de ne plus broyer du noir.

Enfin, voici de nouvelles dunes, plus hautes et plus ramassées, des palmiers et un joli village ombragé. C'est N'Goussa qui nous envoie au passage, comme dans un sourire, une haleine de fraîcheur. Sur une haute colline, un poste optique semble signaler l'approche d'Ouargla. Des pères blancs et des officiers nous y accueillent devant le grand bordj, face aux portiques blanchis à la chaux.

Ville étrange, avec ses minarets en papier d'emballage dirait-on, et ses constructions



« Un peu de steeple..

El Oued, la ville aux mille coupoles.

qui évoquent l'Egypte. Un monument à Flatters rappelle pieusement la glorieuse conquête française. Puis la place indigène grouillante et colorée nous situe de nouveau en pleine Afrique, la mosquée de Lella Aza et, par places, près des palmiers, des cases arrondies comme des tortues posées sur le sol, dans lesquelles on porte des présents pour les morts : c'est l'Islam toujours et les pères blancs, comme les officiers même, semblent là participer de son âme. Le soir au clair de lune la ville avec sa ceinture magnifique de palmiers sombres, qui font deviner les nappes souterraines de l'Oued-Mya, offre un aspect décoratif de conte oriental.

Hélas ! le lendemain l'enchantement va cesser.

En quittant Ouargla, on traverse une région de falaises érodées par le vent et d'oueds desséchés. Par des sentiers abrupts, les Renault grimpent sur un plateau aride où elles rouleront pendant plus de sept heures sur une vague piste faite de cailloux coupants. C'est le désert morne, sans végétation et les quelques oiseaux qui trouent le ciel livide ou se posent sur la roche, ont l'air perdus sur ce plateau et jettent des cris de détresse.

Les voitures sautent, trébuchent sur les pierres qui de grises deviennent noires comme du charbon et sont patinées par l'exsudation résultant des changements brusques de température du matin au soir.

On approche du M'zab. Nous allons, frôlant des roches éclatées, au bord de ravins profonds, le long de couloirs bordés de dalles feuilletées, au milieu d'un effroyable chaos. Le soleil se couche et met une impalpable pluie de sang sur ce paysage dantesque. C'est une vision d'enfer d'une incomparable beauté et d'une lugubre grandeur.

Le marché de Ghardaïa.

Tout à coup, après une descente brutale, en lacets, on débouche sur un ravin aride, isolé de toutes parts, au fond duquel ont été bâties les cinq premières villes du M'zab.

C'est d'abord Beni-Isguen, juchée sur un piton, au milieu de palmiers, sur laquelle nous tombons d'abord du haut des falaises. Puis laissant à droite Mélika, également dressée sur un sommet rocheux, comme toutes les villes du M'zab, nous arrivons à Ghardaïa qui semble, de loin, une pyramide de craie. De plus près ce n'est encore qu'un immense escalier de maisons plates montant vers le minaret.

Toutes les villes, dans cette vallée, sont construites sur le même modèle, en escalier sur des mamelons dont la mosquée constitue le sommet. Entourés de remparts, elles disent les assauts que les M'zabites eurent à subir et leur défiance, bien compréhensible, dictée par l'expérience.

Après la traversée pénible que nous venons de faire, dans une région d'épouvante et de désolation, Ghardaïa est un paradis et l'on admire la volonté des habitants de cette Genève de l'Islam qui ont fait sortir du rocher des palmeraies et une ville unique, véritable ruche aux alvéoles blanches inondées de lumière.

On se promène avec une sorte de joie quiète sur la place du marché, dans le dédale des rues, sous les palmiers et autour de petits terre-pleins consacrés à la prière qui font des carrés blancs sur la verdure claire, dans les cimetières gais garnis de poteries vernissées vertes et brunes. Le minaret de la mosquée, qui semble fait de quatre longues perches réunies par un pisé rudimentaire, a un aspect imprévu dans le soir qui accentue sa blancheur et son apparente asymétrie.

Une place à Beni-Isguen.

On entend le grincement des cordes sur les poulies des puits d'où, inlassablement, des bourricots tirent de l'eau pour arroser les jardins. Et ce bruit, caractéristique du M'zab, dit l'incomparable ténacité des horticulteurs M'zabites qui ont fait un éden dans un enfer.

Nous ne pouvons quitter la ville sans aller dans un café maure voir danser Mériem, la jolie Ouled-Naïl pour laquelle les hommes font des folies. Précédée de son joueur de rhaïta qui marche à reculons, elle trottine à pas menus dans l'engoncement de ses jupes. Ses bras souples ondulent au rythme de la flûte et sa jolie petite tête de poupée brune oscille lentement et mime une extase que ses ardents yeux noirs font prometteuse, infiniment. Les mâles silencieux l'observent. Parfois l'un d'eux se lève et va placer un billet dans le cheich du joueur de flûte. Un autre y met une offrande plus forte, puis un troisième, et c'est au plus généreux que, ce soir, Mériem ouvrira ses bras bruns et se donnera, très chastement, sur sa couche rudimentaire posée sur le sol.

De Ghardaïa, on remonte sur le plateau qui conduit à Laghouat et l'on tourne vers le Nord-Est sur une piste aride menant à Guerrara. Chemin monotone, dans le sable, où l'on somnole au ronflement des moteurs et où les secousses trop amorties ne parviennent pas à vous tenir en éveil.

Cependant, aux portes de Guerrara, comme pour nous donner un spectacle imprévu, le désert s'est mis en colère. Et vraiment c'est curieux, ce changement d'humeur lorsque l'on est accoutumé aux heures dolentes et accablées de la solitude saharienne.

Entre Dzioua et Touggourt.

Dans les défilés rocheux de la Saoura.

Le ciel, pur jusque-là, s'est peu à peu couvert et la température a baissé brusquement. A notre stupeur, quelques gouttes d'eau chaude, la pluie, tombent sur nous. Puis le vent commence à souffler soulevant par places une poussière jaunâtre. Des tourbillons se forment bientôt, le sable dans une ronde folle monte vers le ciel obscurci. La lumière est lugubre. Le vent souffle plus fort. Des vagues de sable balayent toute la ville où nous venons d'arriver, non sans peine. Les gens et les bêtes affolés cherchent un abri. Enfin de l'horizon s'avance avec une effrayante rapidité un mur marron qui brise tout sur son passage : le raz formidable, terrible. C'est un fracas assourdissant. Le vent gémit dans les palmeraies et les arbres semblent hurler leur géhenne. Le pulvérin terrestre pénètre partout, aveugle, étouffe. Il faut se coucher, en s'enveloppant la tête si l'on n'a pas de refuge, sans quoi ce peut être la mort. Des caravanes dans le désert ont été disloquées, les gens séparés et désorientés risquant de se perdre et de succomber.

Le phénomène dure une heure. Le calme revient, le soleil renaît et sans les débris de palmes jonchant le sol, les arbres tordus et les destructions apparentes, on croirait que rien ne s'est passé, que la nature a conservé son indolence.

Guerrara est entourée de remparts. Nous tentons en vain de visiter ses mosquées. Nous nous contentons de flâner sur la place où a lieu le marché aux enchères. Toute la population est là, assise autour de la place. Au milieu circulent les vendeurs. Des crieurs indiquent les prix des objets proposés, comme à la salle des ventes. Le Cadi les enregistre soigneusement. Un bonhomme circule au milieu de la foule, à cheval sur le baudet qu'il essaie de vendre en clamant le dernier prix offert.

Nous pouvons tout à notre aise étudier le type des Mozabites qui déambulent solennellement dans la foule avec une démarche

« De gentils chamelons se désarticulent... »

pesante et majestueuse. Grands, gros, importants, ils semblent porter avec satisfaction sur leurs épaules massives leur large facies glabre, d'un blanc graisseux, encadré d'une barbe courte, et au centre duquel s'étale un nez aplati, sous de gros yeux bouffis qui ne regardent pas franchement. Braves gens au demeurant, attachés à leur pays, qu'ils ne quittent que pour aller faire du commerce ailleurs, mais où ils reviennent dès qu'ils le peuvent, pour cultiver à grands frais et à grands efforts cette glèbe ingrate qui accueillit leurs pères.

De Guerrara à Touggourt c'est encore, au début, le même paysage de conte d'Edgar Poe. Rocaille noire, puis rougeâtre, et sable jusqu'au bordj misérable de Dzioua, perdu dans le bled.

Après Dzioua jusqu'à Touggourt, la région prend un caractère purement saharien : falaises striées et déchiquetées, tables rocheuses sur des piédestaux dont le galbe est donné par l'érosion du vent, quelques rares buissons. Par places sur ces buissons nous remarquons de vieux chiffons accrochés par les Arabes des caravanes qui doivent, paraît-il, les retrouver au retour... si leurs femmes leur sont restées fidèles ! L'un de nous, le misérable, prépare des drames en les enlevant.

Avant d'arriver à Touggourt, nous retrouvons les jolies petites dunes blondes avec, sur les plus hautes, des tombeaux de marabouts. Voici les palmiers, une masse sombre de maisons, de la vie, du mouvement : Touggourt.

Notre excursion au M'zab a pris fin. Désormais, grâce aux alertes Six-Roues Renault, cette région curieuse est accessible en peu de temps aux touristes qui ne regretteront certes pas le voyage.

Louis DANEY.

« Nous retrouvons les jolies dunes blondes... »

Pour la première fois des automobiles arrivent à Gao — 2 Février.

LA PREMIÈRE TRAVERSÉE DU SAHARA PAR LES AUTOMOBILES A ROUES

25-31 Janvier 1924.

LES Six-Roues Renault avaient à peine conquis leurs titres de noblesse saharienne dans les grandes dunes du Souf et sur les rochers du M'zab qu'une mission de plus grande envergure devait les leur confirmer.

Sous l'impulsion de M. Gradis, administrateur de la Compagnie Générale Transsaharienne, la liaison rapide entre le Sud-Oranais et le Soudan était à l'étude. Depuis quelques semaines, le lieutenant G. Estienne en collaboration avec son frère M. René Estienne, s'inspirant des résultats obtenus par la mission Niéger avant la guerre, avait reconnu un itinéraire sensiblement rectiligne allant de Colomb-Béchar, point terminus de la ligne de chemin de fer venant d'Oran, à Tessalit, sentinelle avancée dans la steppe soudanaise.

La mécanique permettait, en effet, de simplifier le problème en supprimant une variable : l'eau. Laissant à l'est les hautes dunes du

Grand Erg occidental, la mission se proposait en passant par trois têtes d'étapes à peu près équidistantes : Adrar, Ouallen, Tessalit, de traverser le Tanezrouft et de longer le massif montagneux des Iforras avant d'atteindre le coude du Niger.

Non seulement la traversée rapide du Sahara central devait prouver que le Soudan n'était plus une colonie lointaine et abandonnée dont on ne pouvait parler qu'en évoquant un voyage interminable, mais elle était encore une démonstration pleine de promesses au double point de vue aviation et voie ferrée. Encore fallait-il disposer d'un matériel susceptible de vitesse sur les pistes et ne reculant cependant devant aucun obstacle au cours des reconnaissances : double condition convenant fort bien aux Six-Roues.

C'est ainsi que trois Renault arrivaient à Colomb-Béchar le 19 janvier. Vivres, armes, outillage et rechanges se répartissaient entre chacune d'elles. Les réservoirs, bien garnis d'essence, portaient leur rayon d'action à 900 kilomètres sans ravitaillement, des couchettes sommaires permettaient aux sept voyageurs un semblant de repos, le raid devant se poursuivre nuit et jour, enfin — pour mieux résister au froid nocturne du désert — des panneaux transformaient les voitures en conduites intérieures.

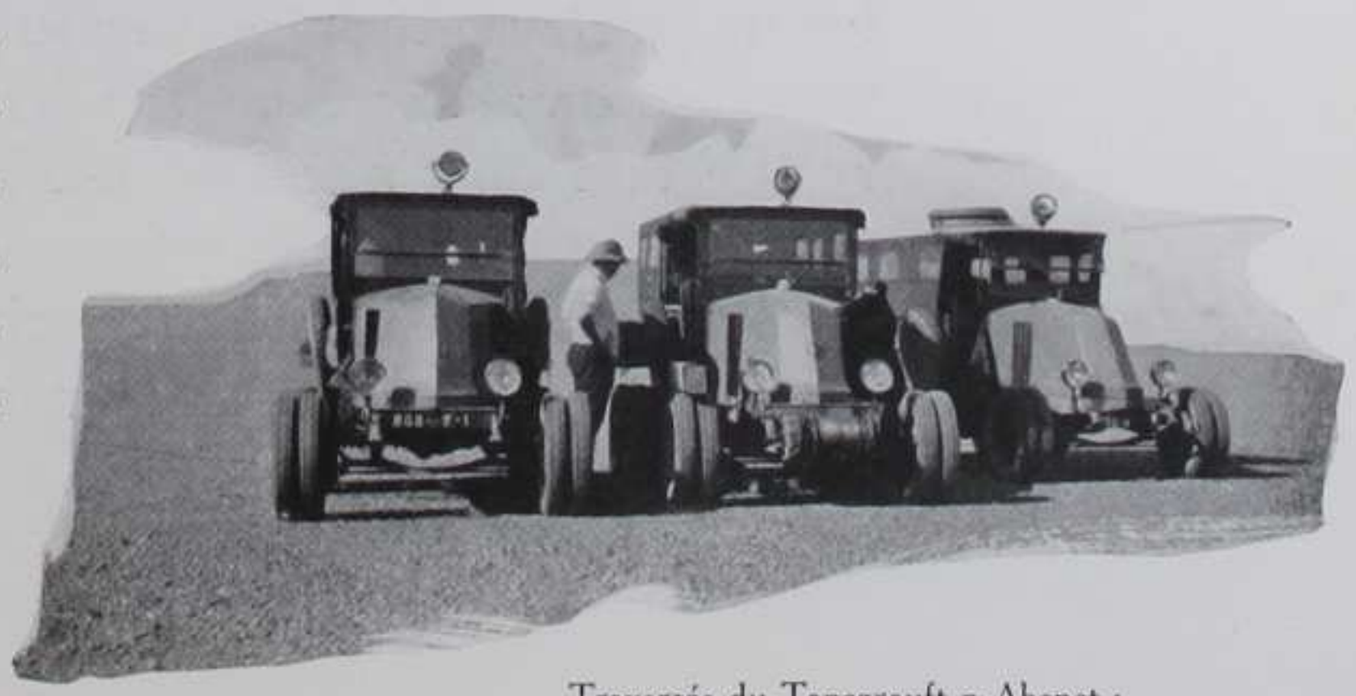
Dans la soirée du 24, près des murs blancs d'une maison arabe que le clair de lune rendait livides, quelques ombres s'agitaient autour des trois autos, coupant et recoupant les faisceaux éblouissants des phares pointés vers le sud. M. Gradis, animateur de la mission qui à minuit devait partir pour le Soudan, s'entretenait avec les frères Estienne, géographes et guides de l'expédition, tandis qu'avec les mécaniciens Liaume, Liocourt et Durand, ardents et décidés, je vérifiais une dernière fois les voitures avant le grand départ. A minuit, s'illuminant les unes les autres, les Six-Roues quittaient discrètement Colomb-Béchar endormie.

Bientôt, elles dépassaient l'oasis aux ombres dentelées, et s'engageaient sur une piste sablonneuse et précaire rejoignant l'Oued

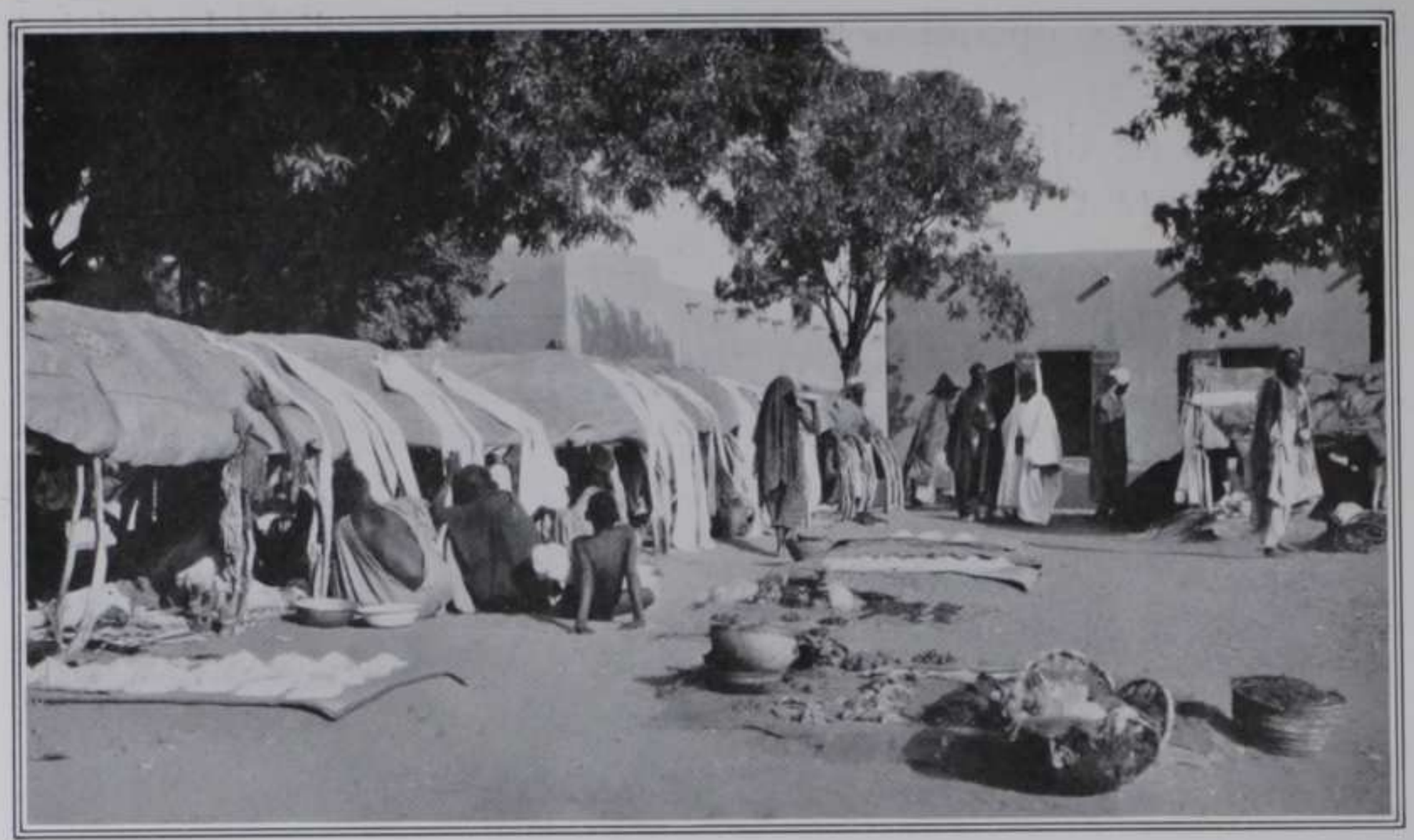
Saoura, « rue de palmiers », dont les ondulations relient In Salah à Figuig.

Touffes de drinn et d'artha, buissons d'alenda, rocailles, fossés et talus tentent mais en vain de nous décourager. Sous la poussée nerveuse des quatre roues motrices, nous fonçons sur les obstacles sournoisement hostiles et les passons avec aisance. Le châssis se cabre au passage des oueds ravinés, d'un coup de reins puissant il en escalade les rives abruptes et, derrière nous, les pierres dérangées de leur immobilité éternelle reprennent en protestant sourdement leur équilibre et leur sommeil. Sans arrêt nos machines attaquent et triomphent de la piste récalcitrante qui, par vengeance nous enveloppe d'une poussière épaisse et sombre que les cylindres aspirent avec indifférence. Nous débouchons à l'aube dans les gorges sauvages d'Igli où la rencontre d'un parti de pillards marocains, échappés du Tafilalet, est toujours à redouter.Du sentier étroit et rapide, au tracé cabalistique, se détachent parfois des rochers qui bondissent et rebondissent pour aller prévenir le ravin de notre irruption imprévue. Lentement, au milieu du terrain tourmenté, les voitures serpentent avec prudence ; les roues, les unes après les autres — celles de droite ignorant ce que font celles de gauche — s'appuient délicatement sur les plus gros blocs pour les mettre en confiance et les franchissent, comme en une incessante partie de saute-mouton, avant de continuer leur chemin d'un petit air dégagé.

La vieille redoute, crénelée, délabrée, juchée sur un rocher déchiqueté, a encore grand air : des enfants qui s'y amusent accourent vers nous sans paraître surpris et se suspendent joyeusement à nos voitures, heureux du passage de ces grands jouets inattendus. Quelques ascensions, un peu de montagnes russes dans les dernières dunes du Grand Erg et l'élégance de Béni-Abbès apparaît au milieu de



Traversée du Tanezrouft-n-Ahenet :
à hauteur d'Ouallen, le 27 Janvier à 14 heures.



Gao : Le Marché.

l'immense vallée de la Saoura. Eclatante de blancheur la longue redoute aux arcades sans nombre se découpe, comme une dentelle délicate, sur la falaise encadrée de palmiers près desquels se blottit le vieux « ksar » aux teintes passées.

Plus loin, avançant comme les éperons de croiseurs gigantesques, nous apercevons les plateaux chaotiques sur lesquels s'alignent les « redjem », bornes kilométriques du désert, jalonnant la direction d'Adrar. La nuit tombe quand, après avoir suivi toutes les fantaisies du terrain, nous abordons le couloir de montagnes sombres qui bordent la Saoura, couloir bien défendu par des bancs de galets énormes et sans cohésion, encombrés d'arbustes secs et rabougris. Nous y progressons posément à la clarté des projecteurs qui portent des ombres brutales exagérant encore le décor diabolique : révolte du rocher menaçant qui se dresse de tous côtés en curieux pour mieux assister à une chute définitive dans les ravins, chute possible à chaque instant et toujours évitée.

Le 26 janvier, au petit jour, nous sortons enfin de ces gorges

inhospitalières à Foum-el-Kheneg pour aborder la région du Touat aux nombreuses palmeraies reliées les unes aux autres par des pistes poudreuses sur lesquelles nos « jumelés » soulèvent des panaches de poussière majestueux comme des éclatements d'obus. A l'horizon nous devinons le fortin d'Adrar où le Lieutenant Gierzynski, fidèle aux traditions des postes de l'Extrême-Sud nous accueille comme de vieux amis, à 14 heures. Entourés d'indigènes dont les guenilles dorées par le soleil ont leur beauté, près du fossé de la redoute aux murs percés de mille meurtrières, nous soignons avec sollicitude nos Six-Roues à peine revenues de leurs émotions. Un nouvel effort leur est bientôt demandé : au soleil couchant la mission franchit les fragiles " foggaras " (1) encerclant la kasbah et s'enfonce dans la grisaille vers Taourirt, dernière oasis à hauteur de laquelle elle passe vers minuit, sans la distinguer.

La caravane automobile avance dans l'obscurité à bonne allure ; régulièrement, à de longs intervalles, elle s'arrête ce qui donne aux conducteurs l'occasion d'échanger quelques impressions sur la monotonie d'un voyage nocturne dans le bled pendant lequel, préoccupé de la direction, on suit d'un regard hypnotique le sillon sans fin des anciennes reconnaissances.

Les premières lueurs du jour nous révèlent le néant absolu où nous avançons rapidement sans rien apercevoir qu'un plan infini de sable fauve encerclé par la couronne vacillante des mirages. Spectacle imposant et curieux mais sans beauté réelle, tout au moins pour des automobilistes. Peut-être faut-il pour comprendre la grandeur du désert le parcourir philosophiquement, avec humilité, au pas lent des caravanes, dans la lumière étincelante, accablé par le silence formidable et im-

(1) Canaux souterrains amenant un mince filet d'eau aux palmeraies.

Bourem : les pileuses de mil.

pressionnant qui enlève tout désir de parler ou de faire un geste inutile. Au cours d'un tel voyage, en tête à tête continuel avec soi-même, n'ayant pour tout bagage que ses pensées et ses souvenirs, on trouve certainement des joies supérieures dans la réflexion et la rêverie. Mais en automobile la préoccupation du lendemain disparaît ou presque ; il suffit de changer d'échelle, de ne plus compter que par jours et par centaines de kilomètres et de ne pas s'impatienter. Quant au silence, n'en parlons plus : la chanson monotone et rassurante des moteurs combat avec entêtement sa souveraineté et son prestige.

Depuis longtemps, nous ne voyons plus ni bêtes, ni oiseaux, ni insectes, les rares brins d'herbe desséchés, seule manifestation de la vie, ont progressivement disparu. Les « sebkhas » d'un blanc métallique éblouissant se font plus rares, les falaises en miniature que l'on rencontre encore, bien polies par la brise, semblent s'enliser dans le sol qui, las d'être meurtri et rongé tend vers un nivellement parfait : la vie minérale meurt à son tour. Et le vent, ce grand pillard, n'a plus de proie : de colère il souffle rageusement sur cette désolation, mais en vain, la terre n'a plus rien à lui laisser voler. C'est le « bled el ateuch », le pays de la soif.

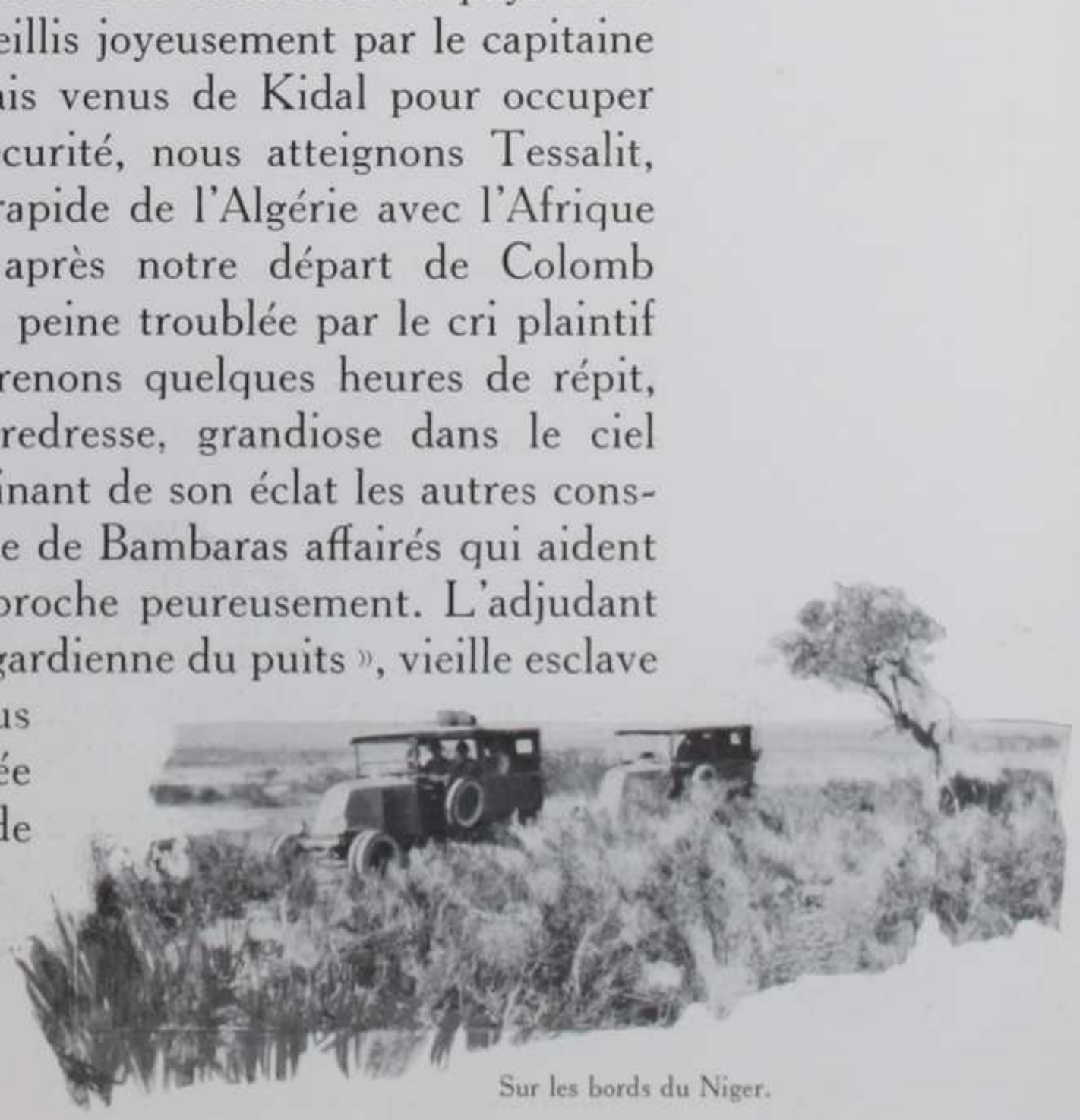
A l'infini, autour de nous le « reg », mosaïque de graviers et de sable verni, étend son tapis d'or : à l'ouest, très loin, l'erg Ech Chech, où chaque jour se dépense obscurément, en missions périlleuses, la bravoure de nos compagnies sahariennes aux prises avec les razzieurs berbères. Tout d'un coup, dans la matinée du 27 janvier, nous voyons se détacher à l'horizon, seul relief dans cette immensité, le massif de l'Aseg'Rad où se cache le puits d'Ouallen. Vers midi, à hauteur d'une crête ébréchée derrière

Gao : le Tombeau de l'Askia Mohammed.

laquelle, à quelques kilomètres, se trouve la kasbah abandonnée, nous nous arrêtons pour laisser souffler quelques instants nos fidèles « dix chevaux » dont le ronronnement régulier n'a pas cessé depuis des heures.

L'étape suivante nous conduit dans le Tanezrouft-n-Ahenet, « désert dans le désert », chef-d'œuvre de sécheresse et d'aridité dont l'accès est interdit, sous peine de mort, à toutes les caravanes. 525 kilomètres nous séparent de Tessalit. Toute une nuit et toute une journée encore à rouler droit devant nous, étape pendant laquelle nous n'aurons comme distraction que les lignes imaginaires du Tropique et de la frontière du Soudan. Rencontrant de hautes dunes, majestueuses, calmes, énigmatiques, nous nous y infiltrons sans difficultés tandis que, par coquetterie sans doute, les « sifs » aux couleurs changeantes « fument » au souffle discret de la brise en soulevant une gaze de sable impalpable qui volète sur les crêtes voisines. Comme une île lointaine, aux dernières clartés du jour nous devinions le massif bleuté de l'Adrar des Iforras : nous touchions au pays noir.

Le 28 janvier, à 22 heures, accueillis joyeusement par le capitaine Guénard et ses tirailleurs sénégalais venus de Kidal pour occuper le point d'eau, par mesure de sécurité, nous atteignons Tessalit, réalisant ainsi la première liaison rapide de l'Algérie avec l'Afrique occidentale française, 94 heures après notre départ de Colomb Béchar. Dans la nuit silencieuse, à peine troublée par le cri plaintif et lamentable des chacals, nous prenons quelques heures de répit, pendant lesquelles s'élève et se redresse, grandiose dans le ciel transparent, la Croix du Sud, dominant de son éclat les autres constellations. Rôdant autour du groupe de Bambaras affairés qui aident à nous ravitailler, un spectre s'approche peureusement. L'adjudant Bord me le présente : « Antinéa, la gardienne du puits », vieille esclave nègre de quatre-vingt ans ou plus — qu'en sait-elle ? — plus délabrée que les ruines du poste, paquet de



Sur les bords du Niger.

Les troupeaux de moutons : l'une des principales ressources de la région du Niger.

rides et de loques, unique habitante de Tessalit. Antinéa, nom magique, quelles dérisions évoqueras-tu en moi, maintenant !

A trois heures du matin, sur un clapotis de sable, au milieu de touffes et de rochers feuilletés, d'arbustes rachitiques et de gommiers dégingandés, les voitures repartent en tanguant. De rares branches mortes piquées en terre symbolisent la piste qui doit nous conduire au Niger. Près d'In Emzel, le sol d'argile s'est craquelé : ce ne sont que bosses et crevasses profondes disparaissant dans les broussailles grèges. Quelle est la profondeur de cette zone sur laquelle la sécheresse a produit les effets d'un tremblement de terre ? Faute de guide pouvant nous servir d'interprète tamacheq, nous ne le saurons pas ; quels renseignements peut-on espérer d'hommes silencieux, énigmatiques, méfiants, aux gestes divers larges, vagues, incompréhensibles ?

S'obstiner sur une telle voie où la végétation arrête le regard à vingt pas, c'est condamner pour l'avenir tout trafic rapide : nous sommes ainsi conduits à rechercher un tracé plus direct et plus découvert. A partir d'In Tanaout, le lieutenant Estienne décide d'entreprendre alors une reconnaissance complémentaire qui durera,

Dans la brousse entre Gao et Ansongo : les mimosas épineux.

il est vrai, 400 kilomètres, au cours de laquelle il découvre, étudie et précise une route naturelle : le long ruban de sable de l'Oued Tilemsi qui recoupe à Tabankort une bonne piste descendant de Kidal à Bourem. Vingt-quatre heures d'allées et venues ont diminué l'approvisionnement d'essence, un ravitaillement s'impose, il nous faut retourner à Tessalit. Revenant sur nos propres traces, nous parcourons à nouveau la brousse soudanaise, la steppe aride et desséchée sur laquelle planent lourdement de grands vautours gris dont les ombres se promènent lentement sur le sol. Des gazelles affolées en troupeaux fugitifs bondissent et vont se perdre dans les mirages clignotants qui vibrent à l'horizon. La chaleur sèche est étouffante, le sol brûlant. A la nuit, nous retrouvons Tessalit, les tirailleurs à la large face réjouie, grands enfants à l'âme simple, très honorés de faire le plein d'essence en qualité de premiers garagistes du Sahara.

A l'aube du 31 janvier nous reprenons le départ pour inaugurer, en quelque sorte,

En route vers Gao.

la route du Tilemsi au cours de laquelle d'un geste hiératique quelques bergers Touaregs, au visage voilé par le litham bleu, viennent gravement nous saluer près de Tabankort. Hommes racés, minces, souples et musclés, fièrement drapés de cotonnades écharpées par les épines.

Un regard d'envie pénétrant, inflexible va droit aux mousquetons, la seule chose désirable pour le nomade qui, bien souvent, doit se contenter de sagaies ou de sabres insuffisants pour résister avec honneur, alors que tout espoir est perdu, aux winchesters modernes des pillards mauritaniens qui hantent ces immensités.

Vers onze heures du soir, nous touchions au Niger où l'adjudant Guyard, chef du poste de Bourem, nous accueillait dans son château fort... en pisé. Pour cette randonnée de 2.400 kilomètres, moins de sept jours avaient suffi, dont deux furent consacrés à la reconnaissance du Tilemsi. Colomb-Béchar n'était plus qu'à 119 heures du Niger.

Pierre SCHWOB.

Une termitière dans la steppe soudanaise.

DU NIGER A LA MÉDITERRANÉE

UN lever de soleil éclatant nous révèle Bourem : fortin mauve perché sur un mamelon de sable doré au pied duquel coule le Niger d'un bleu intense, admirable symphonie de couleurs où le vert cru des prairies jette sa note aigrelette. Une autruche, avec prétention, promène gravement sa tête microscopique tandis que, familière, une gazelle lasse de lutter obstinément front contre front, cornes enchevêtrées, avec une antilope, vient me proposer de lutter avec elle. Sur la terrasse, entre d'épais créneaux, de belles Sénégalaises portant leurs enfants attachés sur le dos, écrasent le mil de leurs bras musclés, dans des mortiers de bois. Leur respiration profonde et sifflante, admirablement rythmée, leurs chants résignés s'unissent tour à tour au murmure des graines balancées par les vanneuses et au son mat des pilons qui battent la mesure pour donner un ensemble musical d'une douceur extrême. Dans l'ombre violette de la redoute une jeune femme targui au teint clair, fine et distinguée comme une pointe sèche de Helleu, chante naïvement et s'accompagne de l' « am'zad »,

le violon monocorde des nomades en faisant l'admiration d'une négrillonne aux cheveux gras chargés de parures en coquillages.

Tant de scènes colorées ne peuvent nous retenir : plus loin, le long du fleuve, Gao et sa splendeur passée nous appellent, Gao « avec la mosquée à sept tours et aux quatorze coupoles de turquoise, avec les maisons aux frais patios, les jets d'eau, les jardins irrigués, tout emplis de grandes fleurs rouges et blanches (1) ». Une région inhospitalière, contraire à tout ce qu'on peut imaginer du Soudan, nous en sépare encore : marigots, broussailles, mimosas épineux aux exhalaisons d'orangers ; toute une flore cuirassée de piquants nous cingle au passage méchamment. Des chapelets de coloquintes vertes et jaunes s'étirent en tous sens sur le sol entre les buissons d'acacias, de palmiers nains, de retem aux branches noueuses et sans feuilles.

Le 2 février, nous arrivons à Gao au milieu de la foule bon enfant ne cachant ni son enthousiasme ni son étonnement : réception spontanément joyeuse et délirante comme n'en ont plus chez nous même les souverains tout puissants. L'hospitalité la plus large et la plus courtoise des administrateurs MM. Castel et Mourgues, leurs longues causeries sur ce pays qu'ils aiment tant et où leur activité se dépense loin de tout, au prix de nombreuses épreuves, nous retenaient quelques jours. Cependant, les dernières étapes approchaient. Descendant le Niger, la mission rencontrait de nombreux villages, aux huttes hémisphériques tendues de nattes brillantes, dont la population confiante accourait et nous criait au passage le « fofo » de bon accueil. A Ansongo, M. Munier, colonial convaincu, nous faisait les honneurs de son jardin, retraite charmante

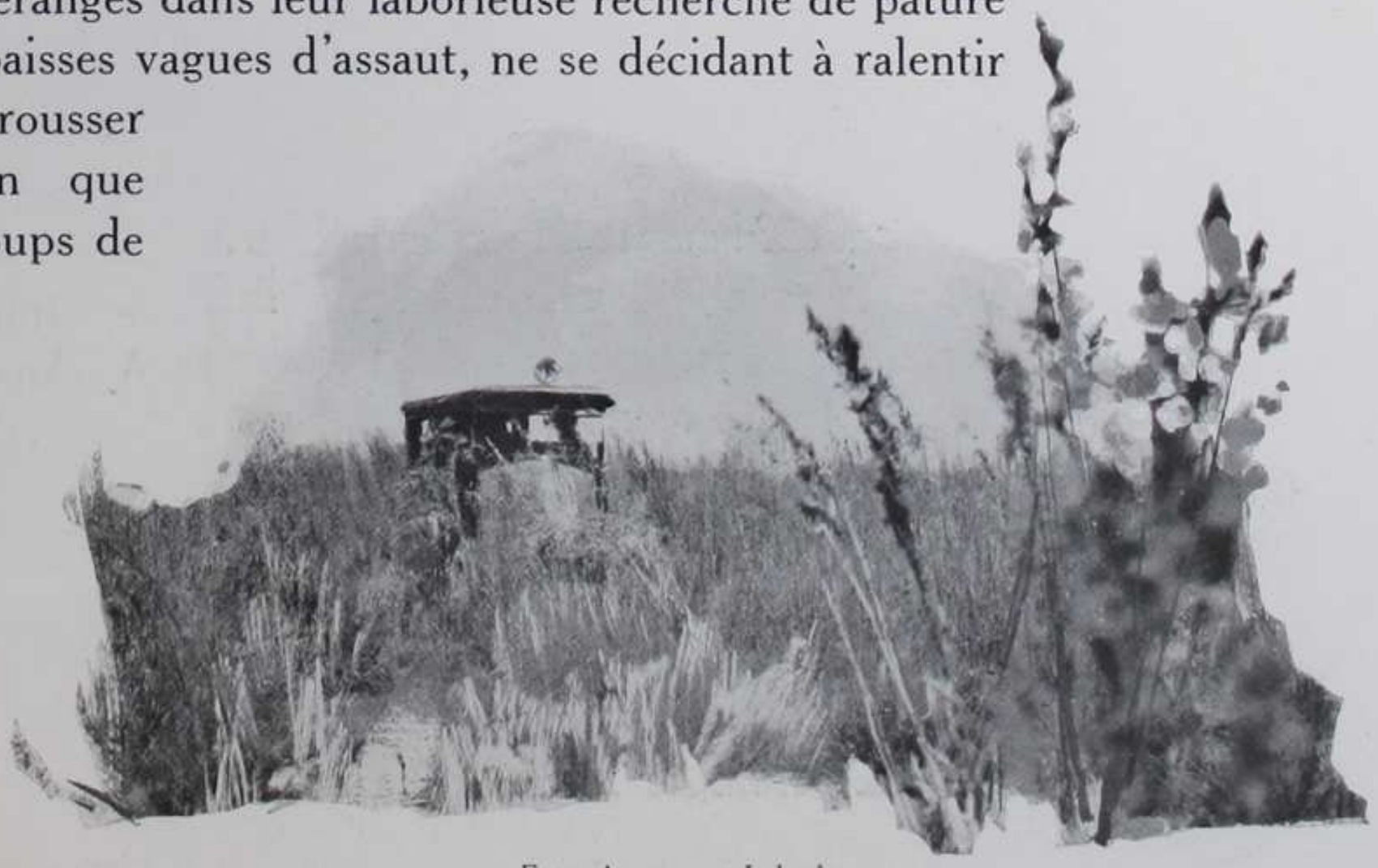
Gao : femmes allant à l'eau

(1) *L'Atlantide*, P. Benoit.

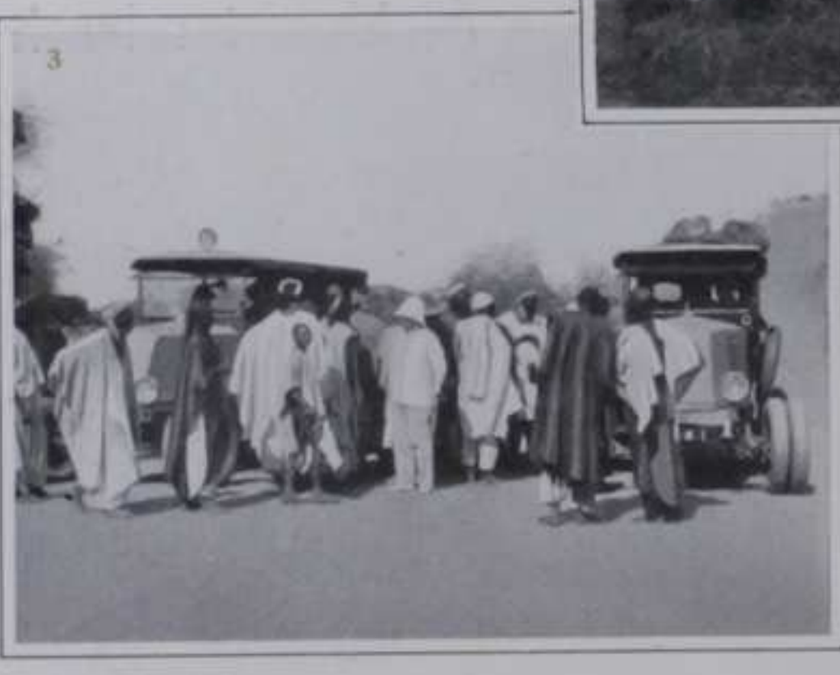
évoquant un conte des Mille et une Nuits. Sur une terrasse des crânes d'hippopotames, grimaçants, sardoniques, contemplent le Niger couvert de reflets et de miroitements au milieu desquels émergent deux immenses rochers de pierreries ; les pirogues, faisant eau de tous côtés, remontent le courant très doucement sous la poussée des perches et des pagaies vers Bourem, Bamba et Tombouctou. Dans le calme du soir des enfants, tels des pantins d'ébène, rangés face à face, trépignent et bondissent, simulant en un tam-tam endiablé les défis et les combats de leurs ancêtres. Séjour délicieux s'il n'était pas gâté par le « cram-cram », minuscule oursin végétal aux piquants acérés et par des myriades de moustiques.

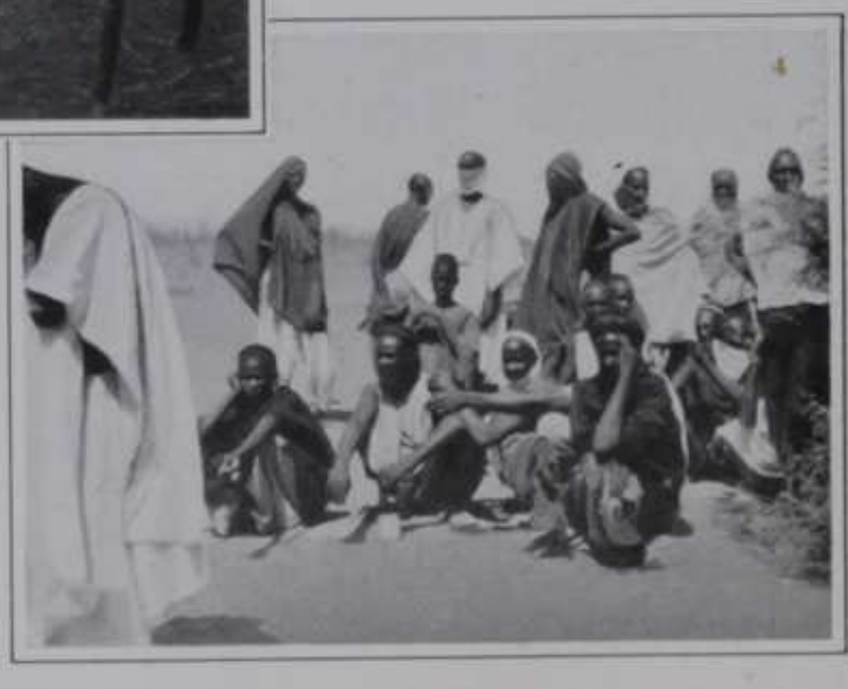
Continuant en direction de la Nigéria, nous contournons des termitières massives au cœur desquelles tout un peuple actif d'insectes vit avec agitation ; une chaleur accablante monte du sol sablonneux, couvert d'épines, par bouffées. Au loin, nous apercevons les rapides de Fafa, aux remous écumants : nous sommes à la saison des crues et sous les hautes eaux qu'entraîne un courant irrésistible, les rochers apparaissent à peine. Des troupeaux de moutons et de chèvres avides de sel en affleurements, se le disputent gloutonnement. Quelques kilomètres encore au cours desquels des bœufs à bosse, à moitié sauvages, dérangés dans leur laborieuse recherche de pâture nous chargent en épaisses vagues d'assaut, ne se décidant à ralentir leur attaque et à rebrousser piteusement chemin que sur la menace de coups de klaxon répétés.

Le 7 février, dans l'après-midi, nous atteignions au but du voyage : Labezinga, modeste village de huttes,



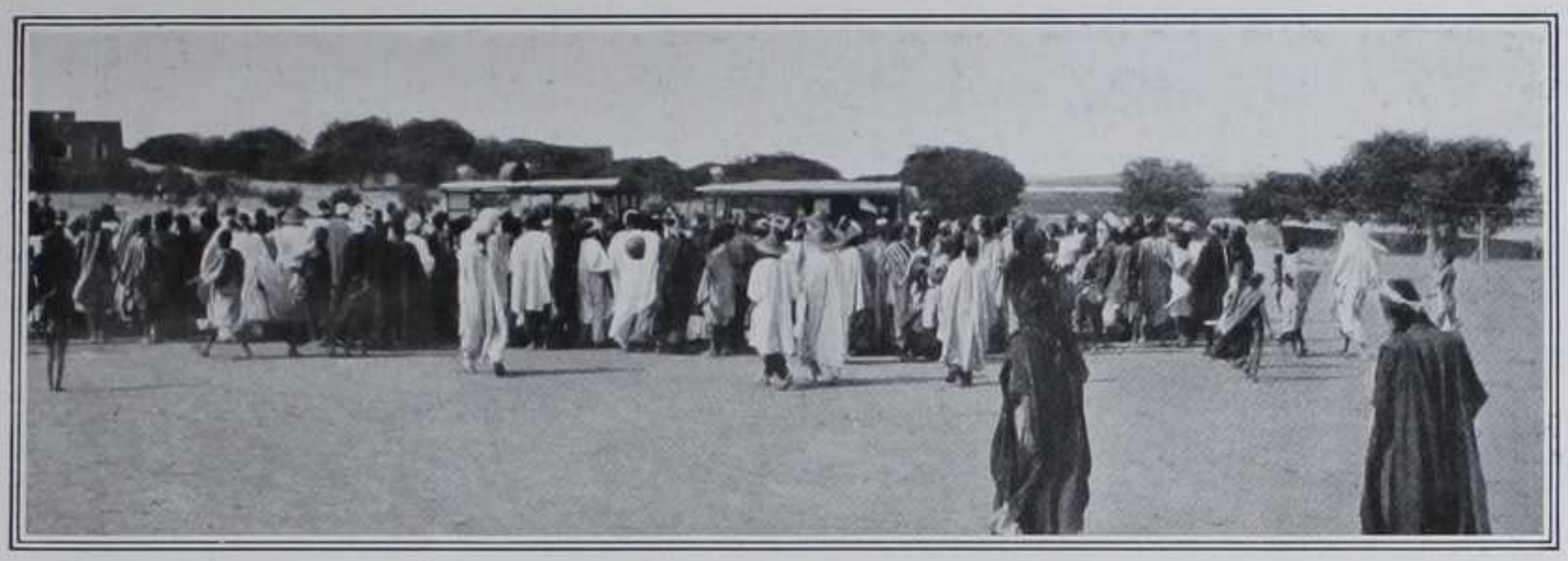
Entre Ansongo et Labezinga.





1. Le jardin d'Ansongo : la terrasse aux crânes d'hippopotames. — 2 « et de maisons rappelant celles de l'ancienne Égypte.. » — 3. L'arrivée à Ansongo, 6 Février. — 4. Les indigènes de Fafa.

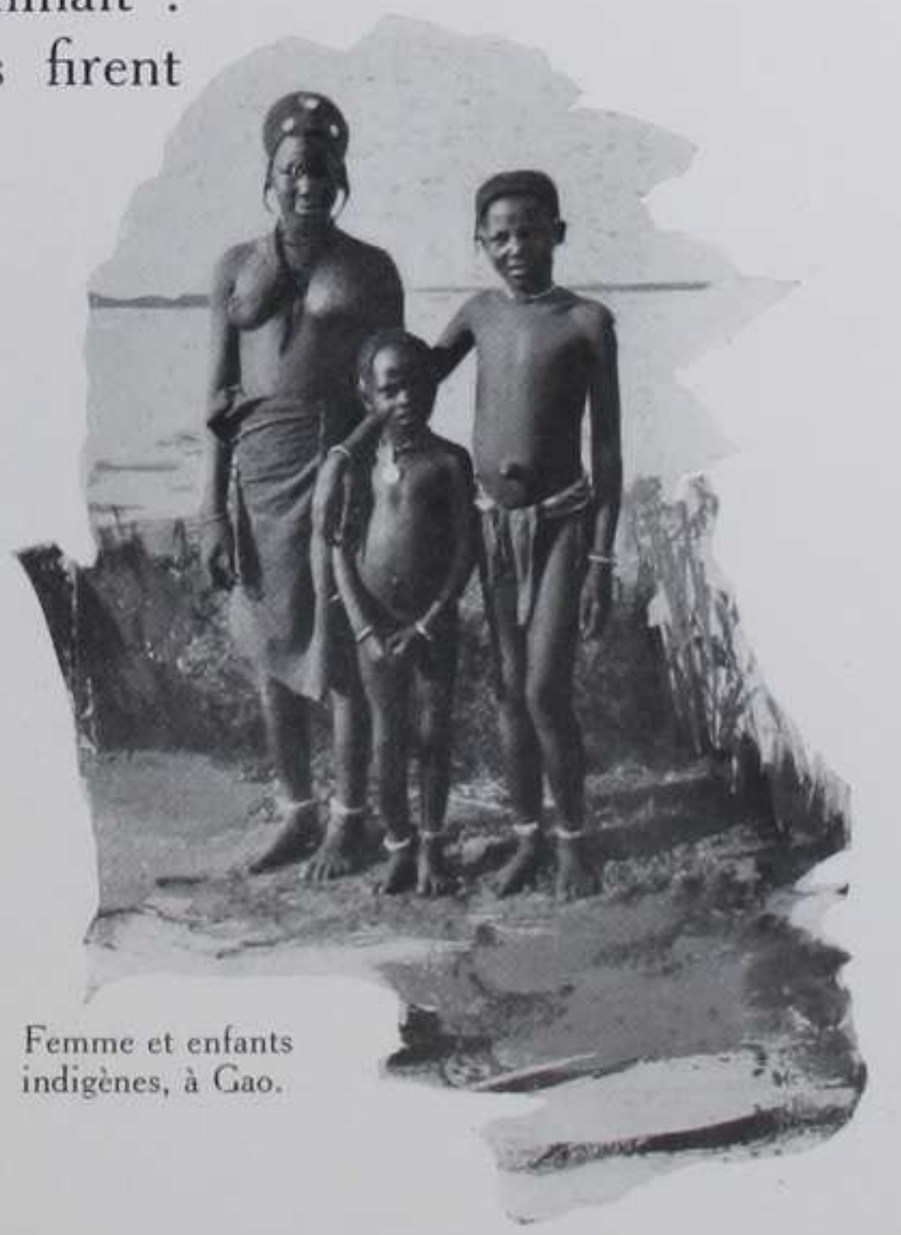
Dans l'oasis de Figuig.



« Elles suscitent une vive curiosité... »

ignorés de tous les atlas, où nous rencontrons la dernière antenne de la « Piste du Sud », dont l'importance est considérable et sur laquelle des automobiles ordinaires circulent aisément. Voie d'échanges commerciaux encore timides, par laquelle se troquent les troupeaux de bétail du Soudan et les cotonnades de la Nigéria provenant des manufactures anglaises, cette piste en passant par Niamey et Dosso va rejoindre un réseau routier à Sokoto, puis se prolonge jusqu'à Zinder dans le Niger français ; se ramifiant vers le Sud, elle descend vers Kotonou en traversant le Dahomey dans toute sa longueur. Il faut donc voir en elle l'origine d'une grande voie de communications qui relierait directement le golfe de Guinée à la mer Méditerranée. Sur une telle piste bien nivelée, soigneusement bordée de pierres, le rôle des Six-Roues se terminait : c'est pourquoi, après quelques kilomètres elles firent demi-tour pour reprendre le chemin de Gao.

Est-il possible de traverser Gao sans évoquer les descriptions enchanteresses qu'en fit Pierre Benoît ? Sans doute, ce n'est plus la capitale du puissant empire sonrhay sur lequel régnait le grand Askia Mohammed dont le tombeau d'argile crevassé, imposant, lourd, géométrique, orné de branches sèches, noueuses et tordues comme des bras suppliants domine de



Femme et enfants indigènes, à Gao.

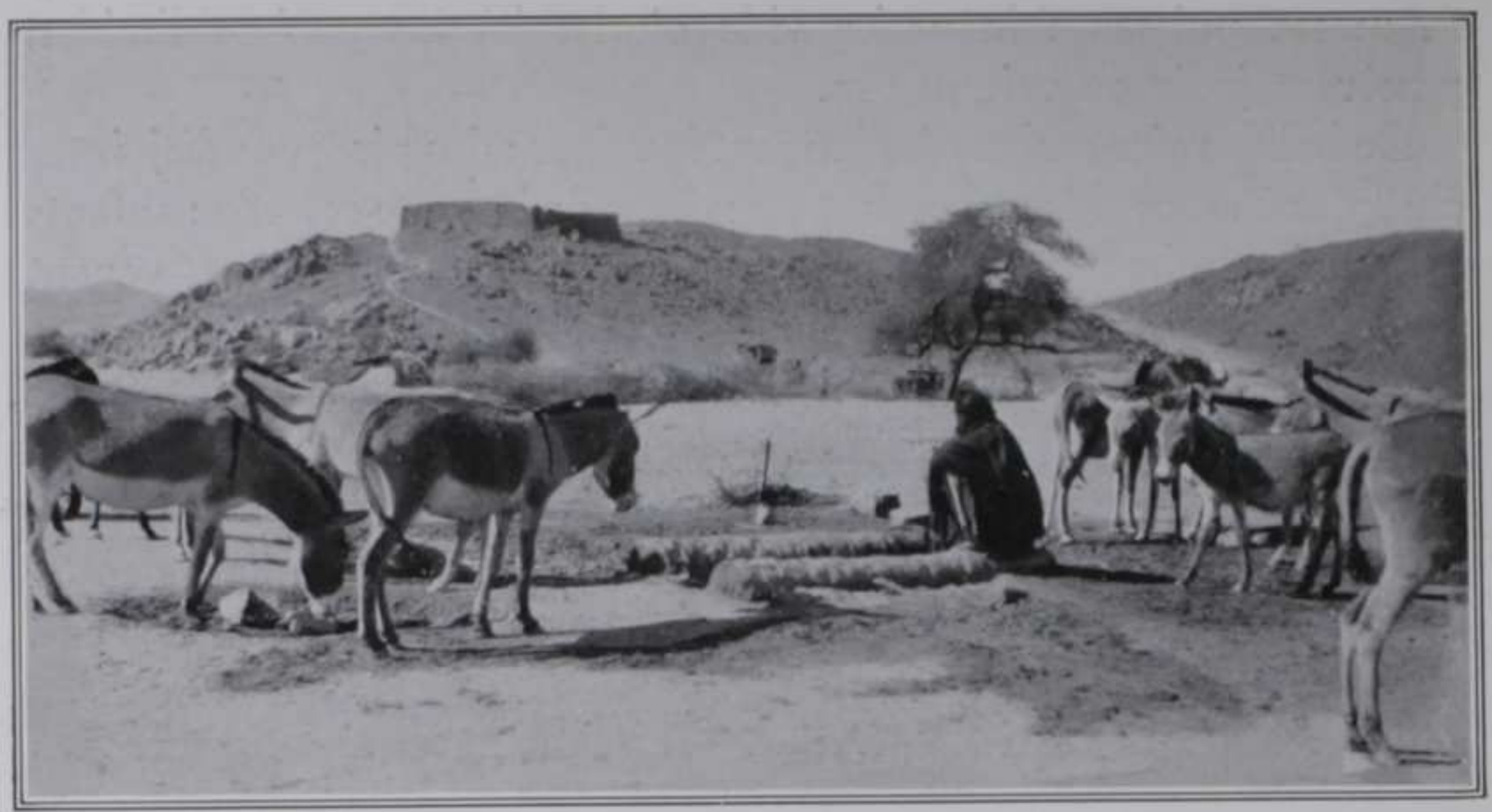
1. La " Piste du Sud " conduisant à la Nigéria et au Dahomey. — 2. Marchande de noix de kola.
3. Chefs de tribus indigènes. — 4. Les habitants de Gargouna viennent à la rencontre de la mission.
5. Dans les touffes à hauteur de l'Adrar Tachtaït.

sa masse puissante la petite ville où les Touaregs Aouillimiden passèrent jadis en vainqueurs.

De belles voies ombragées longent le Niger ; des pirogues disjointes chargées à en couler y abordent au milieu de la foule colorée : enfants vifs et rieurs, bedonnants comme des Bouddhas, vierges nues venant à l'eau, le « canari » d'argile sur la tête, femmes aux « boubous » rayés, serrés à la taille, vieillards étiques et désarticulés à la poitrine recouverte de gris-gris, tirailleurs oisifs déambulant à l'aventure avant de rejoindre leurs cases, cylindriques comme de grandes boîtes à pastilles. Autour d'une mosquée minuscule, répondant à l'appel du muezzin, quelques fidèles agenouillés se prosternent, se relèvent, baisent le sol et prient, mécaniquement, avec ostentation mais, semble-t-il, sans conviction profonde.

Le long des constructions aux murs épais, en briques de terre séchées, sans fenêtres, dont les frontons ajourés et les décrochements témoignent d'un réel souci d'architecture, vont et viennent, la lance à la main, de grands diables de Mauritaniens au profil de faunes ou de vieux boucs, l'œil malin et cruel, les cheveux embroussaillés, la barbe soyeuse ; chaque jour sur la place du marché animée et bruyante, ils ont partie liée, aux dépens des nègres abêtis, avec les nomades Touaregs dont l'allure fière et dédaigneuse trahit l'ancien conquérant. Là se concentre toute la vie de Gao : sous les arcades se vendent, après des discussions interminables, cotonnades, lithams, sandales et armes ; à l'ombre des acacias devant les marchands accroupis, s'allongent les éventaires

A Tessalit.

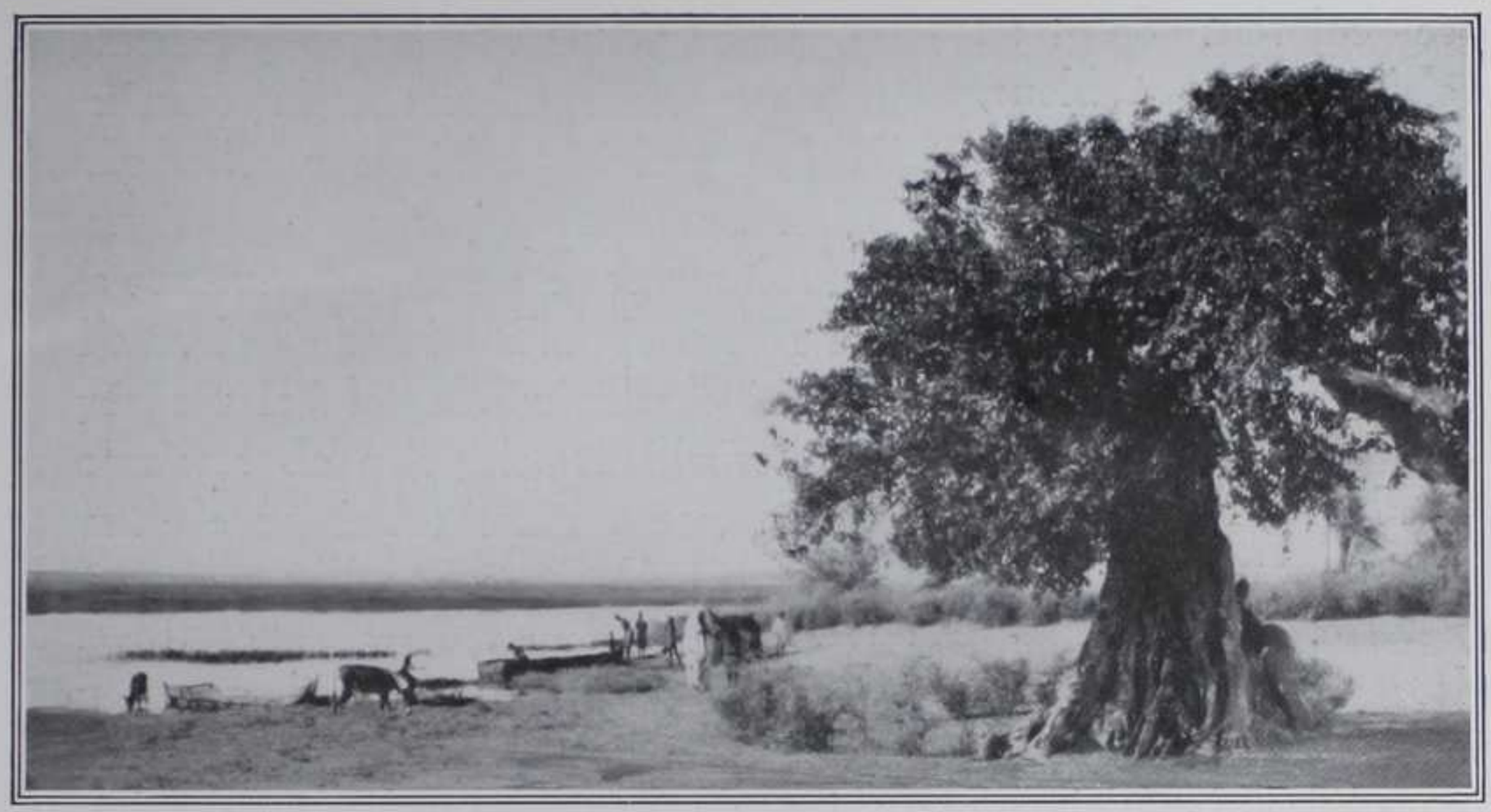


Le puits de Tessalit.

encombrés de calebasses, de tas réguliers d'épices, de barres de sel, de vieilles pierres égyptiennes trouvées dans des tombeaux — mode de Tout-Ankh-Amon où ne te retrouve-t-on pas ? La bimbeloterie y fait fureur et chacun achète avec gravité une pacotille qui fait sourire, dont les pièces de choix sont des miroirs sur le verso desquels figurent le panorama de l'Exposition de 1889 ou l'effigie du tzar Nicolas II. Les marchandes de noix de kola, beautés professionnelles au sourire aguichant, drapées dans des tuniques blanches, une corbeille bien campée sur la hanche, les bras chargés de bracelets se promènent l'œil prometteur à la recherche du riche marchand de troupeaux qui, chez le rôtisseur, leur offrira une brochette cuite à point.

Le bruit des discussions, les cris des enfants ne s'éteindront plus que le soir à

Chaos dans l'Adrar des Iforas.



Le Niger à Gao.

l'heure où le coassement des grenouilles perdues dans les ajoncs montera crescendo dans le grand calme du crépuscule, au moment où la dune de Koïma mauve et rose s'estompera avant de fondre dans la grisaille. Alors, les nuages bleuissants s'incendieront une dernière fois avant de se grouper et d'étendre sur l'horizon un immense rideau de velours, qui ne se lèvera plus que sur la splendeur d'un ciel profond veillant sur le beau rêve des terrasses endormies.

Le 12 février, nous quittons Gao et, remontant directement vers le nord en direction de Tabankort nous retrouvons bientôt le désert de la vallée du Tilemsi couverte de sable blanc, jonchée d'arbres brisés, grillés, éclatés, tordus comme des damnés, paysage rappelant la détresse et la désolation des champs de bataille ravagés. Les pierres sombres, vernies, aux arêtes déchiquetées semblent, sur les faibles mouvements de terrain, autant de justiciers impassibles guettant avec confiance l'arrivée d'événements dont ils sont maîtres ; parfois, plus accueillantes, elles

Dans le Tanezrouft...

se colorent de tons clairs, verts et bleus, pour distraire notre attention et nous faire tomber dans les embûches cachées derrière chaque touffe herbeuse des Iforras.

« Sur le " reg ", mosaïque de sable et de gravier, n'apparait aucun relief, aucune végétation... »

Plus à l'ouest, empruntant un nouvel itinéraire, nous évitons à la fois de grand massif de dunes traversé lors du premier voyage et l'ennui de suivre passivement nos anciennes traces. Nous débouchons alors dans d'immenses sebkhas encadrées de falaises escarpées, du haut desquelles nos voitures semblent des jouets de pygmées. Sur un terrain de hammada, feuilleté, soulevé, éclaté en tranches minces sous l'action alternative de la chaleur du jour et du froid de la nuit, nous avançons en crevant les croûtes fragiles qui craquent et se brisent avec un son mat, sous le poids des voitures.

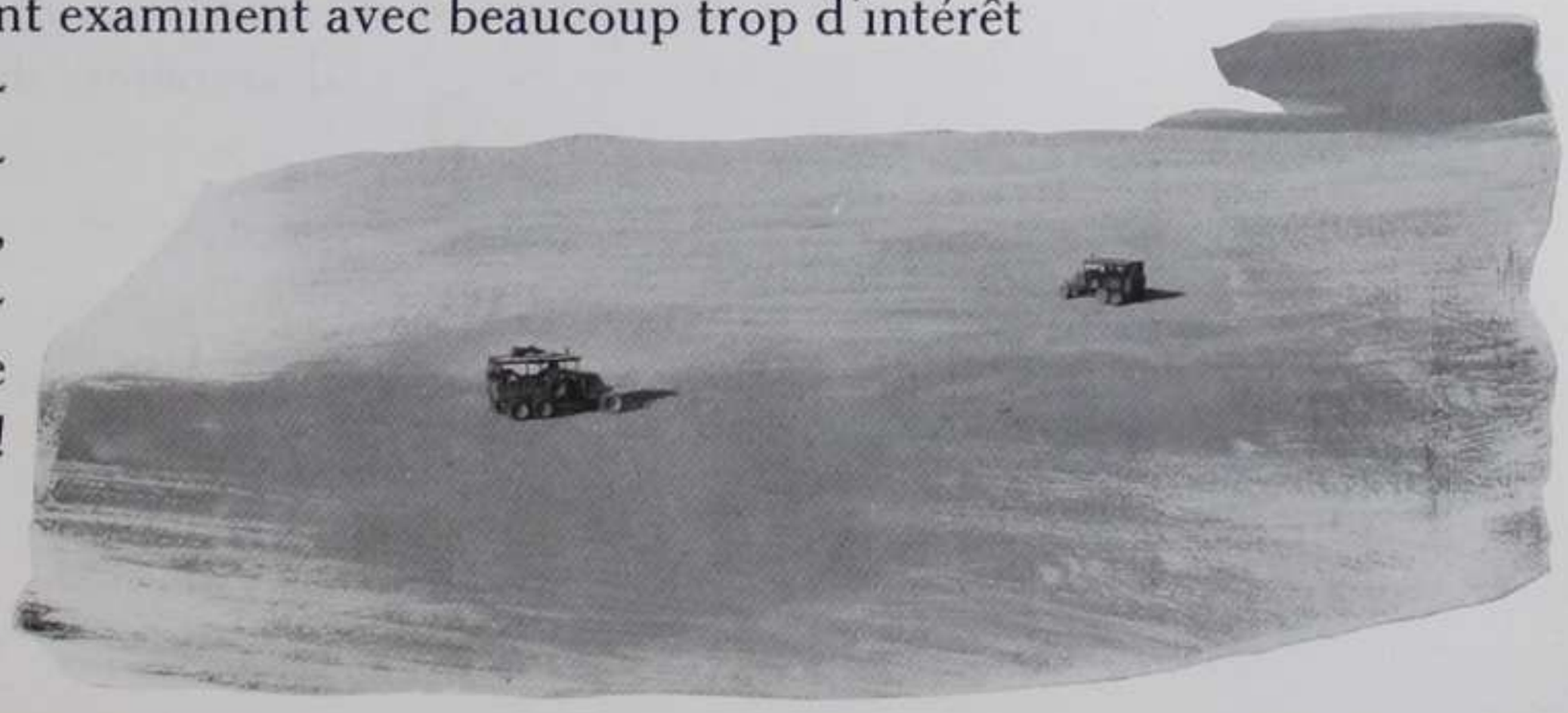
Dans la solitude hallucinante du reg, qu'inévitablement nous avons retrouvé, nous rencontrons les restes d'un homme et d'un méhari tués par le désert, seuls, ignorés de tous, momifiés et tannés par le vent et le soleil. Plus loin, une caravane entière, morte de soif, jalonne la direction du puits d'Ouallen : les premiers squelettes bien allongés sur le sol, témoignent de l'espoir et de la piété des survivants qui, de kilomètre en kilomètre, meurent à leur tour un à un, désespérés, dans une attitude exprimant la détresse et la souffrance. Sur la mer de sable figée, immobile, silencieuse, s'allongent avec persistance les mirages au-dessus des vibrations frissonnantes de l'air

Les bornes kilométriques du désert.

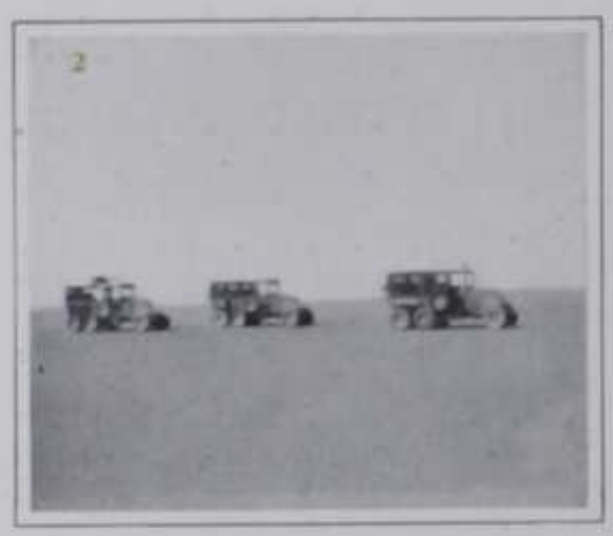
chaud : illusions de fôrets dont la mince lisière sombre se détache sur un tapis de neige, illusion de falaises brunes et de bateaux en rade, illusions de lacs idéalement frais et purs.

Nous approchons enfin, dans la soirée du 18 février, de la kasbah d'Ouallen dont les quatre murs délabrés désignent le point d'eau ; quelques méharistes faisant partie d'une expédition, descendant du Tidikelt, y ont précédé le lieutenant Dugrais qui nous fait annoncer, pour le lendemain, sa visite en compagnie de notables Touaregs.

Le 20 à la nuit, pour la première fois depuis Tessalit, nous voyons des palmiers : Zaouïet Reggan nous accueille et, fatigués par dix-sept heures consécutives de volant, nous trouvons avec plaisir le sable d'une habitation d'argile, aux couloirs compliqués, pour nous reposer. Au petit jour, la pièce aux profondes meurtrières de terre irradiant la lumière comme un vitrail, résonne aux appels d'un tam-tam dont nous sommes honorés à peine réveillés. Le marabout de Reggan, dont l'influence morale s'étend jusqu'au Soudan, a une haute réputation de sagesse et de sainteté ; noblement, il assiste aux folies d'un vieux fou grimaçant, gesticulant comme un diable, piétinant rageusement, sautant de tous côtés en hurlant « Amako, amako » sans arrêt. Des « harratines », ex-esclaves noirs, l'accompagnent en tapant sur un tambourin et scandent cette danse de Saint-Guy avec des cymbales. Toute la population de la confrérie religieuse, heureuse de cette attraction imprévue, commence à s'agiter et semble prise à son tour de cette hystérie furieuse dont quelques pièces de monnaie ont raison. A ce moment, nous nous apercevons que le saint homme de marabout et son intendant examinent avec beaucoup trop d'intérêt les merveilles de nos modestes bagages : avec dignité, mais sans se froisser, ils se les laissent retirer aimablement des mains, une autre fois ils iront plus vite !



Une immense "sebkha"



1. Intérieur de la Kasbah d'Ouallen. — 2. En route vers le Nord. — 3. Les deux puits d'Ouallen. 4. « Où quelques méharistes viennent à notre rencontre... ». — 5. « Les restes d'une caravane morte de soif... ». — 6. « s'échelonnent en jalonnant la direction du puits... ».

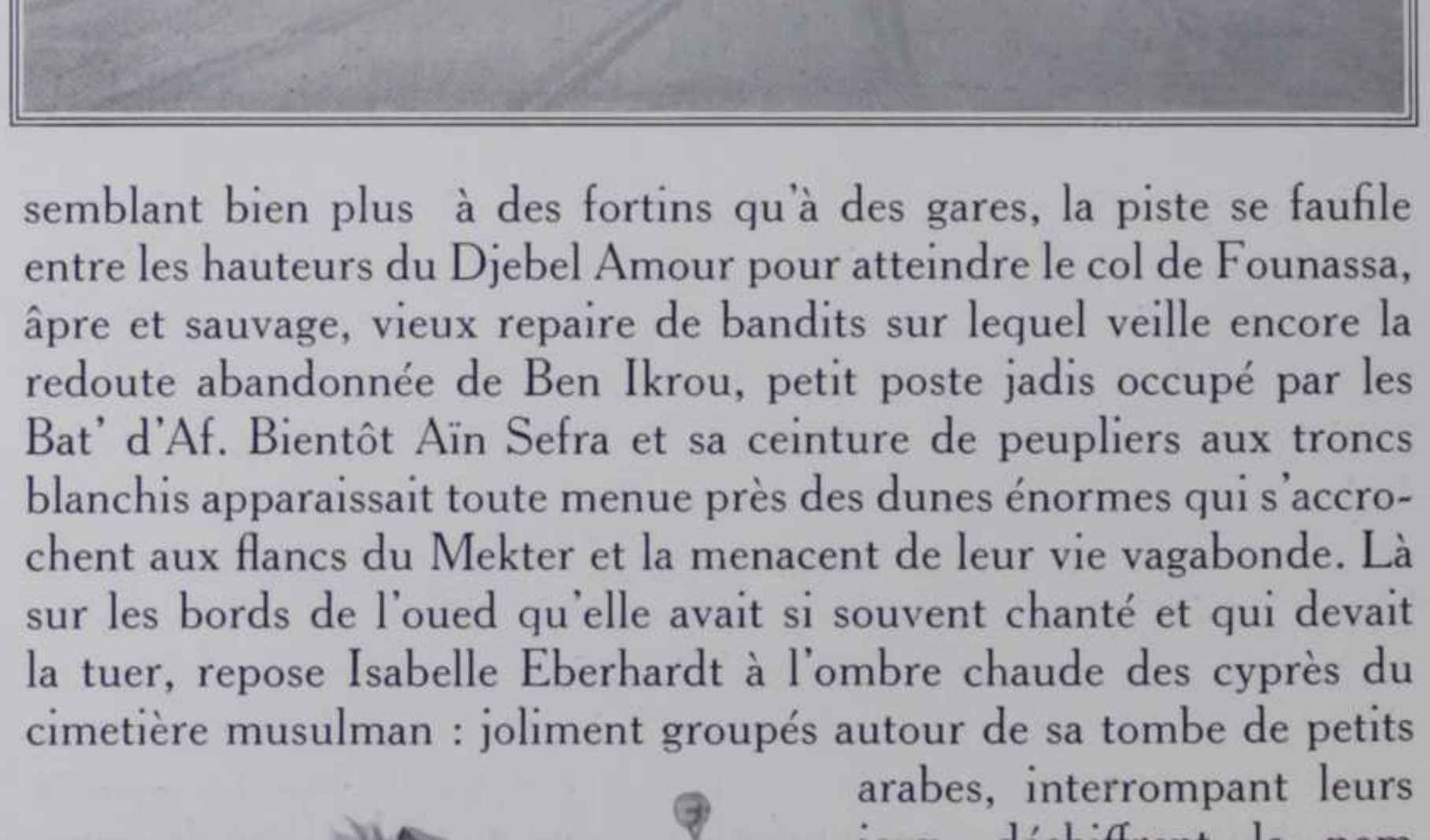
Les lacets entre Mascara et Oran.

Nous remontons ensuite par Adrar aux séguias chuchotantes, Ksabi aux rochers de turquoise sertis dans les dunes de couleur chair, Beni-Abbès dont les tristes ruines de l'Ermitage évoquent le sacrifice du Père de Foucault. Près de Taghit, nous dépassons des caravanes nonchalantes et des troupeaux de moutons, dont l'échine laineuse se dore au contre-jour, qui doucement remontent vers Colomb Béchar. Le 1er mars, vers midi, nous reconnaissions sa mosquée encore lointaine et débouchant de l'oasis nous apercevions, venant à notre rencontre, le commandant Depommier entouré d'un groupe caracolant de cavaliers superbes ; les félicitations d'un tel officier qui, passionné de la grande cause coloniale, a consacré sa vie à parcourir le Sahara, nous touchent profondément au retour d'une démonstration qui contribuera peut-être à rendre moins pénible la vie de nos pionniers du Sud.

Ce jour devait voir la dislocation de la Mission Gradis qui, dans le même cadre, cinq semaines auparavant, s'apprêtait à partir au Niger. Poursuivant leur randonnée en se proposant d'atteindre Alger, nos Six-Roues repartaient le surlendemain en direction de Béni Ounif, voyage sans grandes difficultés au cours duquel, telles de jeunes poulains lâchés hors de leur écurie, elles s'amusaient à des pointes de vitesse après chaque acrobatie que de nombreux oueds les obligeaient à faire.

Dans l'oasis marocaine de Figuig, serpentant autour des palmiers plantés au milieu de la route, nous entrions dans le village aux terrasses étagées, par une brèche qui en force l'accès. Figuig, paradis de verdure, « mer de palmiers », d'où jaillit, comme une colonne de topaze le minaret de Zenaga. Longeant la ligne de chemin de fer, jalonnée par des cubes de maçonnerie res-

Un cratère érodé entre Ouallen et Taourirt.



En route vers le Nord.

semblant bien plus à des fortins qu'à des gares, la piste se faufile entre les hauteurs du Djebel Amour pour atteindre le col de Founassa, âpre et sauvage, vieux repaire de bandits sur lequel veille encore la redoute abandonnée de Ben Ikrou, petit poste jadis occupé par les Bat' d'Af. Bientôt Aïn Sefra et sa ceinture de peupliers aux troncs blanchis apparaissait toute menue près des dunes énormes qui s'accrochent aux flancs du Mekter et la menacent de leur vie vagabonde. Là sur les bords de l'oued qu'elle avait si souvent chanté et qui devait la tuer, repose Isabelle Eberhardt à l'ombre chaude des cyprès du cimetière musulman : joliment groupés autour de sa tombe de petits arabes, interrompant leurs jeux, déchiffrent le nom gravé sur la pierre et s'en vont songeurs...

Le marabout s'intéresse à la mécanique

Par Mécheria et le Kreider nous remontons vers Saïda, petite ville de province où l'on retrouve à nou-

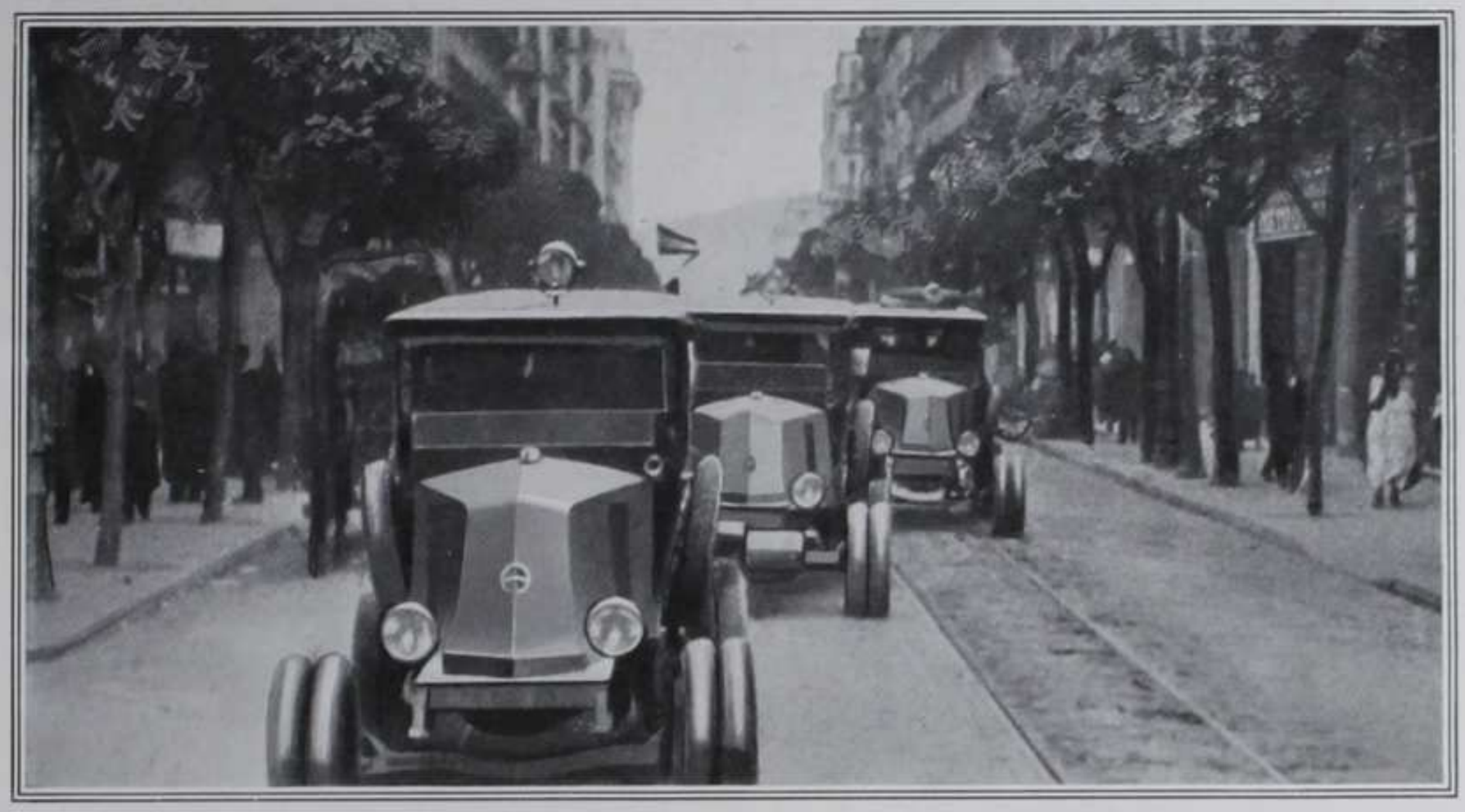
Cous-cous offert par le marabout de Zaouïet-Reggan.

veau les nuées de gamins, cireurs professionnels, et les « meskines » tenaces, nés mendiants. De Mascara à Dublineau, d'admirables routes en lacets bordées de cactus descendent des montagnes pelées, le long des ravins. Une plaine couverte de champs fertiles, parsemés de coupoles et de tombes de marabouts, nous sépare encore d'une chaîne de montagnes violettes, derrière laquelle se trouve Oran. Dans la journée du 7 mars, les Six-Roues remontaient le fameux boulevard Seguin, rendez-vous de tous les Oranais. La formule « du Niger à la Méditerranée » n'était plus un vain mot.

Une dernière étape nous séparait encore d'Alger. Nos voitures grises de poussière et de boue, en parcouraient le ruban blanc à l'ombre des eucalyptus qui bordent la plaine du Chélif. Par Relizane, Orléansville et Duperré, elles arrivaient au pied du massif du Dahra-Zaccar aux flancs duquel, tel un nid d'aigle, s'accroche Miliana. A l'approche du but final, nos moteurs « tirent » plus nerveusement que

La montée sur les plateaux rocheux bordant l'oued Saoura.

1. Devant la redoute d'Adrar. — 2. Sur la tombe d'Isabelle Eberhardt. — 3. Le "Ksar" et la palmeraie de Beni-Abbès



« Notre arrivée rue de l'Isly... »

jamais : nous traversons en trombe Blida et arrivons aux portes d'Alger, à Mustapha, le 10 mars. La longue descente à travers les villas européennes, les échappées sur la rade illuminée et sur l'or de la kasbah nous récompensent des fatigues de notre long voyage.

Notre arrivée, rue de l'Isly, provoque l'étonnement de la foule élégante et sur la place du Gouvernement, près de la vieille mosquée de la Pêcherie, les Arabes eux-mêmes, paresseusement allongés sur les nattes des cafés maures, daignent nous accorder un lent regard, hommage flatteur de la part d'hommes qui, trop habitués à vivre « au ralenti » ne peuvent croire à la vitesse de ce raid transsaharien.

Pierre SCHWOB,
Ingénieur aux Usines Renault.

L'arrivée à Oran sur le Boulevard de Séguin — 7 Mars.

19e CORPS D'ARMEE

Territoire d'Aïn-Sefra

CERCLE

DE

COLOMB

AFFAIRES

N°

OBJET :

Colomb-Béchar, le 24b Janvier 192 4

Le Chef de Bataillon DEPOMMIER

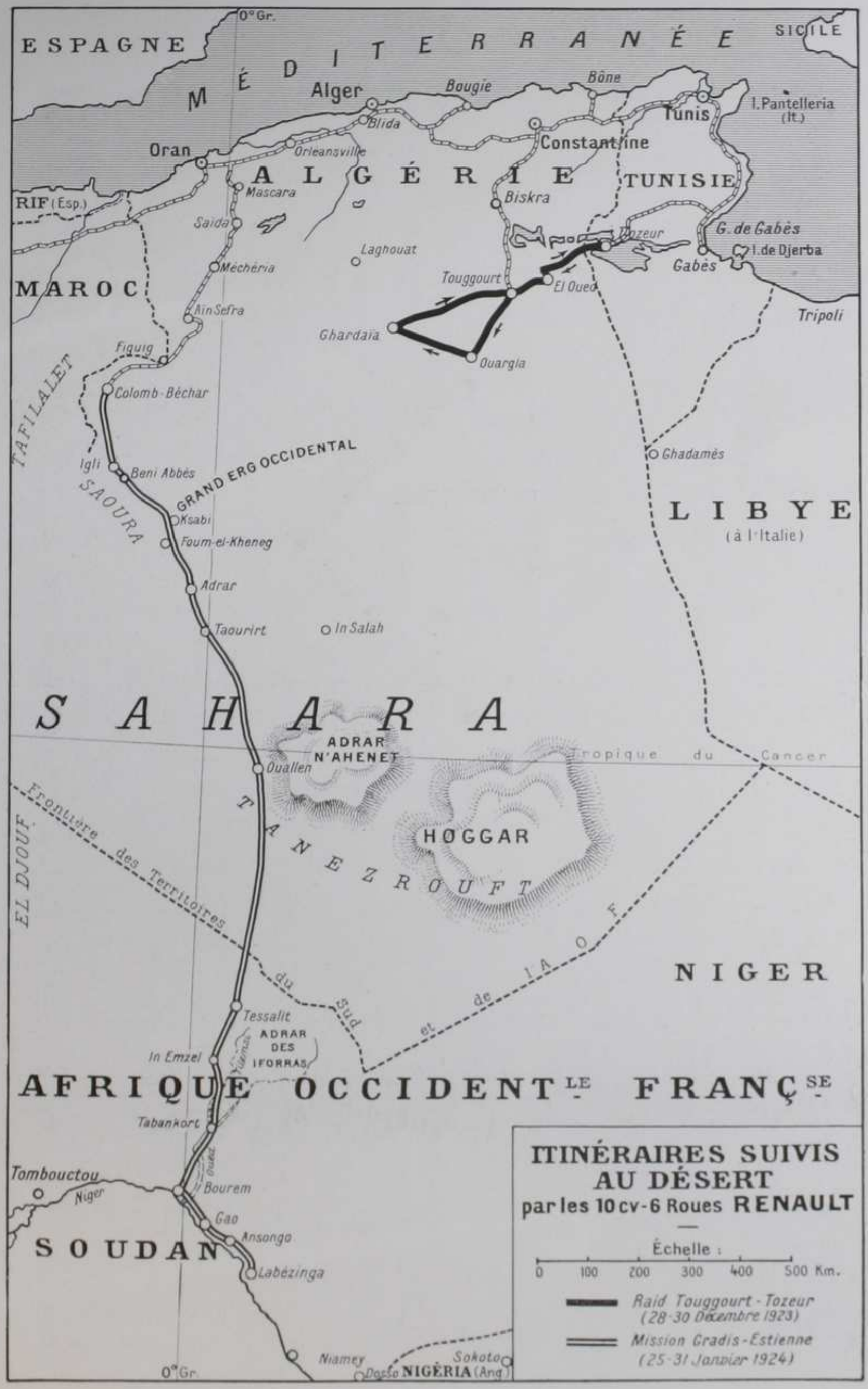
Commandant le Cercle de Colomb et le Groupe des Compagnies Sahariennes à M

Le Chef de Bataillon DEPOMMIER Commandant Supérieur du Cercle de COLOMB-BECHAR, atteste que la Mission GRADIS, composée de Trois voitures RENAULT a quitté COLOMB-BECHAR, en direction du Sud, le Vingt-cinq janvier Mil neuf cent vingt-quatre à Zéro heure.

CERCLE DE COLOMB Commandant Supérieur BECHAR

Arrivé à Bouarfa le 31 Janvier à Onze heures quarante cinq minutes Soir 1 our (23H45) Le Chef de Bataillon

Arrivé à Zeddalif le 29 Janvier 1924 à 22 h 30'
Repart le 30/1/24 à 8 h
Arrivé à Bouarfa à 3 h Repart pour Igli à 8 h
Arrivé à Igli le 31 Janvier 1924 à 2 h 30'
Zeddalif le 1er Bataillon
Le adjudant chef


ESPAGNE
MÉDITERRANÉE
SICILE
0° Gr.
Alger
Bougie
Bône
Tunis
I. Pantelleria (It.)
Blida
Oran
Orleansville
Constantine
ALGÉRIE
TUNISIE
Mascara
Biskra
RIF (Esp.)
Saida
Tozeur
G. de Gabès
I. de Djerba
Laghouat
Méchéria
Gabès
MAROC
Touggourt
El Oued
Ain Sefra
Tripoli
Ghardaïa
Figuig
Ouargla
TAFILALET
Colomb-Béchar
Ghadamès
Igli
Beni Abbès
GRAND ERG OCCIDENTAL
SAOURA
LIBYE
(à l'Italie)
Ksabi
Foum-el-Kheneg
Adrar
Taourirt
In Salah
SAHARA
ADRAR N'AHENET
Tropique du Cancer
Ouallen
HOGGAR
TANEZROUFT
EL DJOUF
Frontière des Territoires du Sud de l'A.O.F.
NIGER
Tessalit
ADRAR DES IFORRAS
In Emzel
AFRIQUE OCCIDENTALE FRANÇAISE
Tabankort
Tombouctou
Niger
Bourem
Gao
Ansongo
SOUDAN
Labézinga
Niamey
Sokoto
Dosso
NIGÉRIA (Ang.)
0° Gr.
ITINÉRAIRES SUIVIS AU DÉSERT
par les 10 cv-6 Roues RENAULT
Échelle :
0 100 200 300 400 500 Km.
Raid Touggourt - Tozeur (28-30 Décembre 1923)
Mission Gradis-Estienne (25-31 Janvier 1924)

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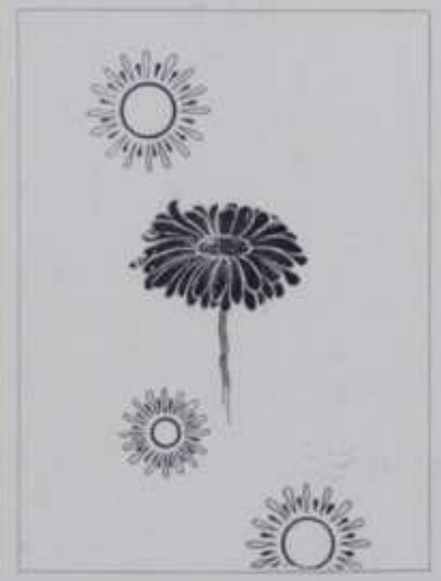

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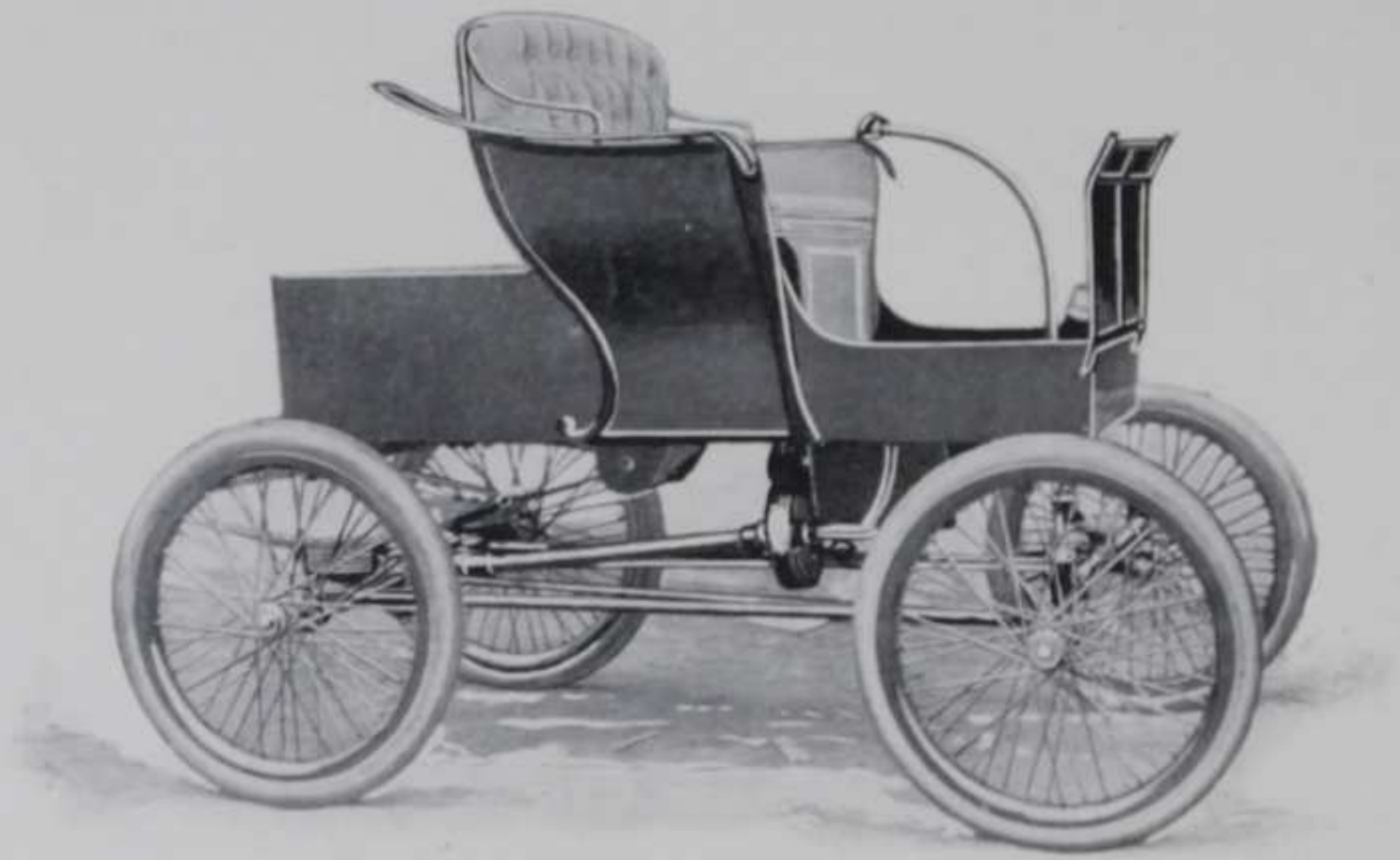

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GEAR—Century construction, tubular; track, 56 in.; wheel base, 66 in.

WHEELS—Century construction; steel wire spokes; wood rims; ball bearings; pneumatic tires 32 in. x 2½ in. front, 32 in. x 3 in. rear.

MOTOR—Century electric motor, 2½ H.P., capable of 100 per cent. over load.

TRANSMISSION—Century method, spur and bevel gears.

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METER—Combination volt-ammeter.

BRAKE—Band brake, operated by foot lever.

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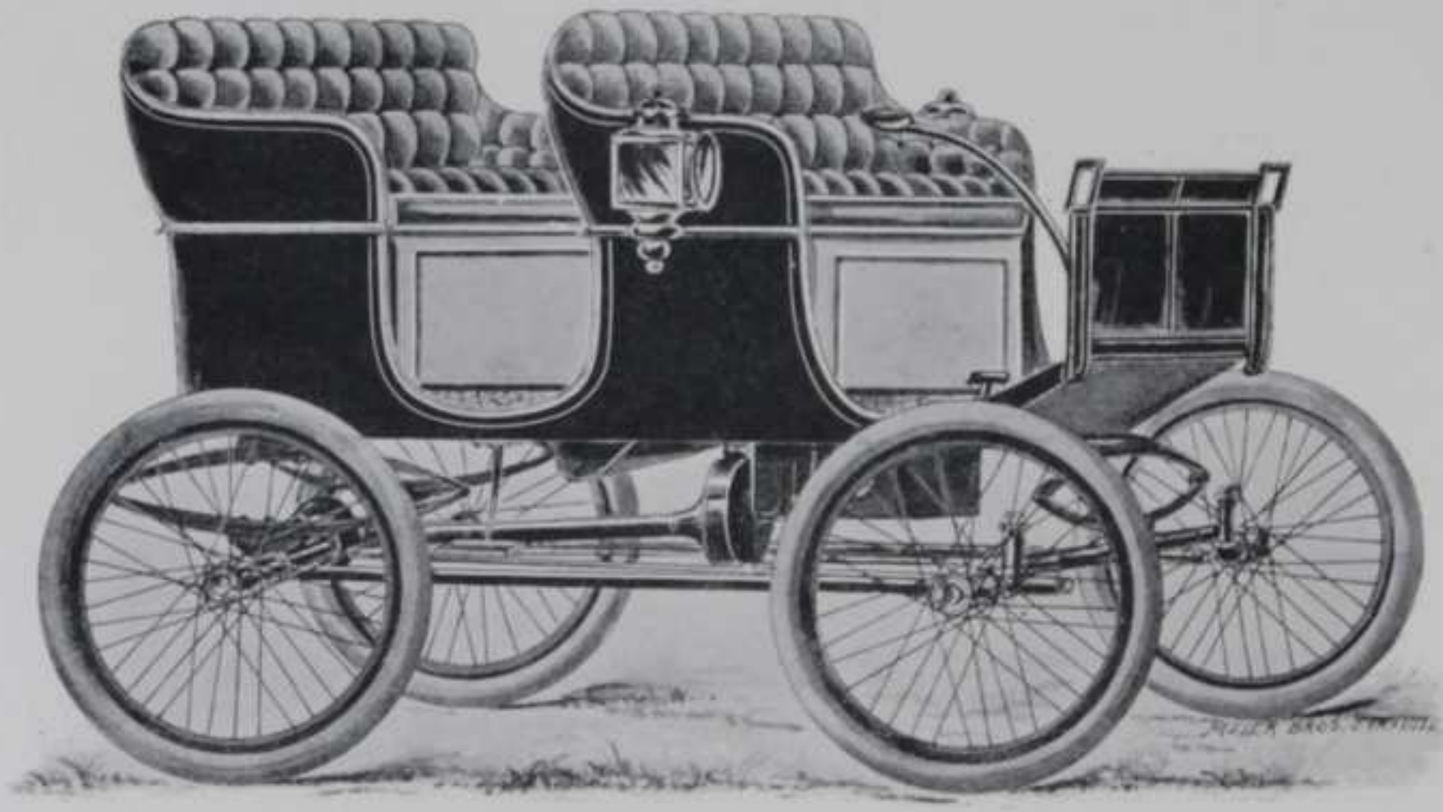
SPEED—4, 8 and 12 miles an hour.

TOOLS—All vehicles are fitted with bell, oil can and wrenches. We furnish as extras, on which we will be pleased to quote prices according to specifications, top, headlight, lamps, etc.



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GEAR —Century construction, tubular; track, 56 in.; wheel base, 84 in.

WHEELS —Century construction; steel wire spokes; wood rims; ball-bearings; pneumatic tires, 32 in. x 3 in. front and rear.

MOTOR —Century electric motor, 4 H.P., capable of 100 per cent. over load.

TRANSMISSION —Century method, spur and bevel gears.

BATTERY —42 cells.

METER —Combination volt ammeter.

BRAKE —Band brake, operated by foot lever.

STEERING —Century combination steering and motor controlling lever.

SPEED —4, 8 and 12 miles an hour.

TOOLS —All vehicles are fitted with bell, oil can and wrenches. We furnish as extras, on which we will be pleased to quote prices according to specifications, top, headlight, lamps, etc.

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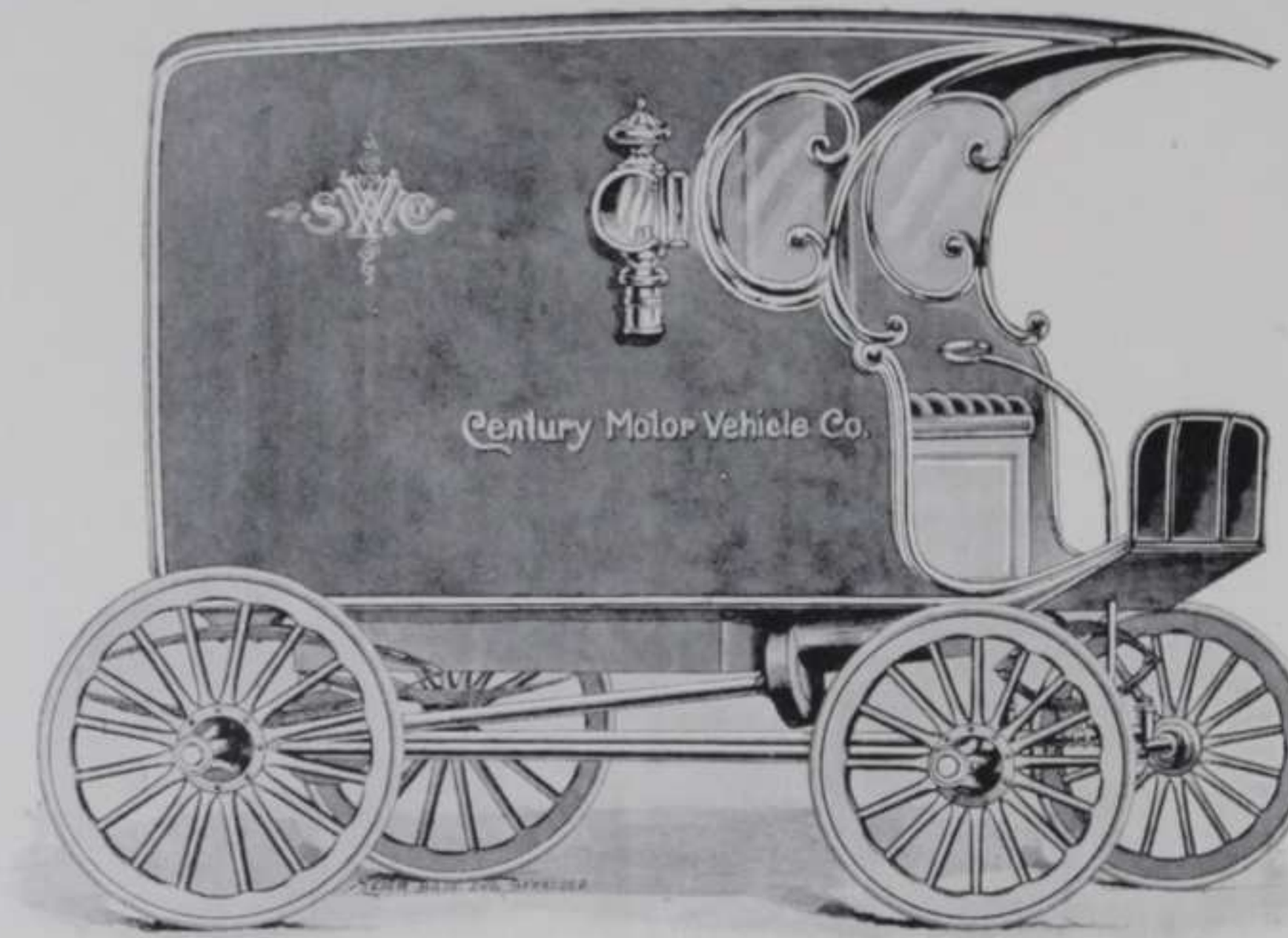

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GEAR—Century construction, tubular; track, 56 in.; wheel base, 84 in.

WHEELS—Century construction; 32 in. front, 36 in. rear; wood wheels with ball-bearings; steel channels, fitted with $1\frac{3}{4}$ in. solid rubber tires.

MOTOR—Century electric motor, 4 H. P., capable of 100 per cent. over-load.

TRANSMISSION—Century method, spur and bevel gears.

BATTERY—42 cells.

METER—Combination volt-ammeter.

BRAKE—Band brake, operated by foot lever.

STEERING—Century combination steering and motor controlling lever.

SPEED—4, 8 and 12 miles an hour.

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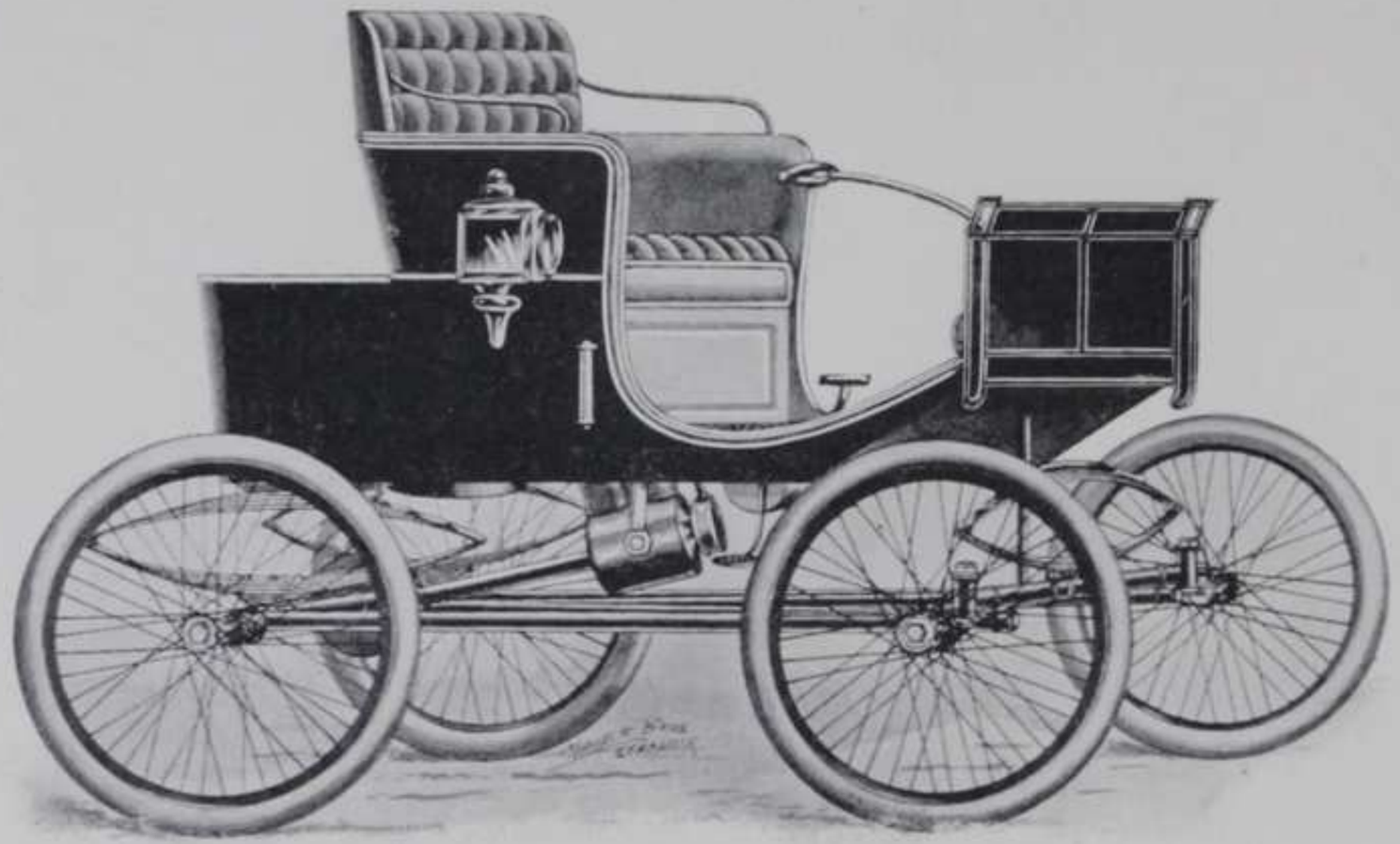

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SPECIFICATIONS.

GEAR—Century construction, tubular; track, 52 in.; wheel base, 63 in.

WHEELS—Century construction; steel wire spokes; wood rims; ball bearings; pneumatic tires, 32 in. x 2½ in front and rear.

MOTOR—Century two-cylinder motor, 4½ H.P.

TRANSMISSION—Century method, bevel gears.

GAUGES—Steam and air gauge; water gauge, and all necessary automatic fire and water controlling mechanism.

BOILER—Steel shell and heads; copper tubes; tested at 700 pounds cold water pressure; running pressure, 225 pounds.

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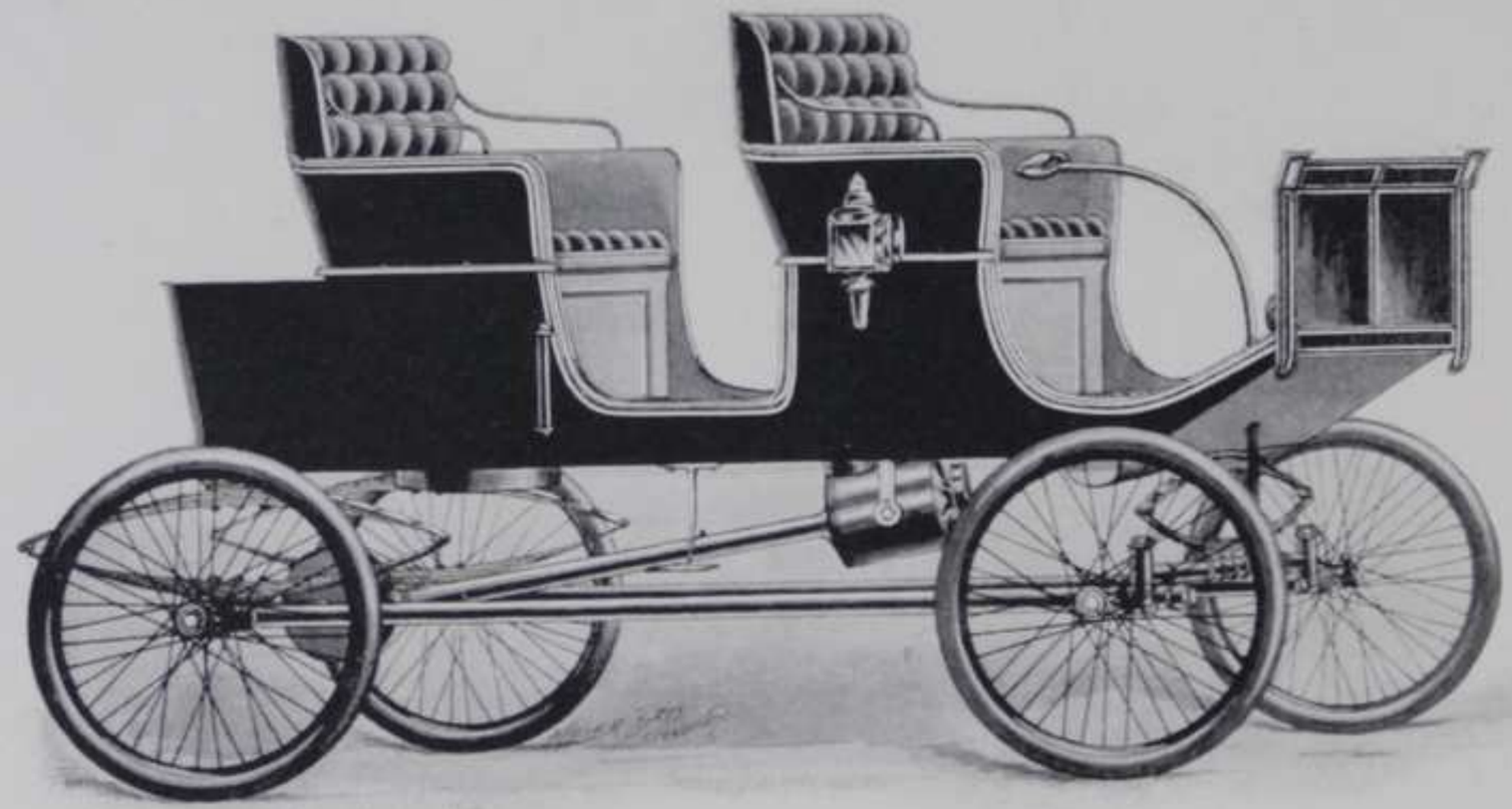
STEERING—Century combination steering and engine controlling lever.

SPEED—From 1 to 20 miles an hour.

TOOLS—All vehicles are fitted with bell, oil can and wrenches. We furnish as extras, on which we will be pleased to quote prices according to specifications, top, headlight, lamps, etc.



No. 2 CENTURY STEAM VEHICLE.

No. 2 Steam Vehicle.

SPECIFICATIONS.

GEAR —Century construction, tubular; track, 56 in.; wheel base, 84 in.

WHEELS —Century construction; steel wire spokes; wood rims; ball-bearings; pneumatic tires 32 in. x 3 in. front and rear.

MOTOR —Century two-cylinder motor, 4½ H. P.

TRANSMISSION —Century method, bevel gears.

GAUGES —Steam and air gauge, water gauge, and all necessary automatic fire and water controlling mechanism.

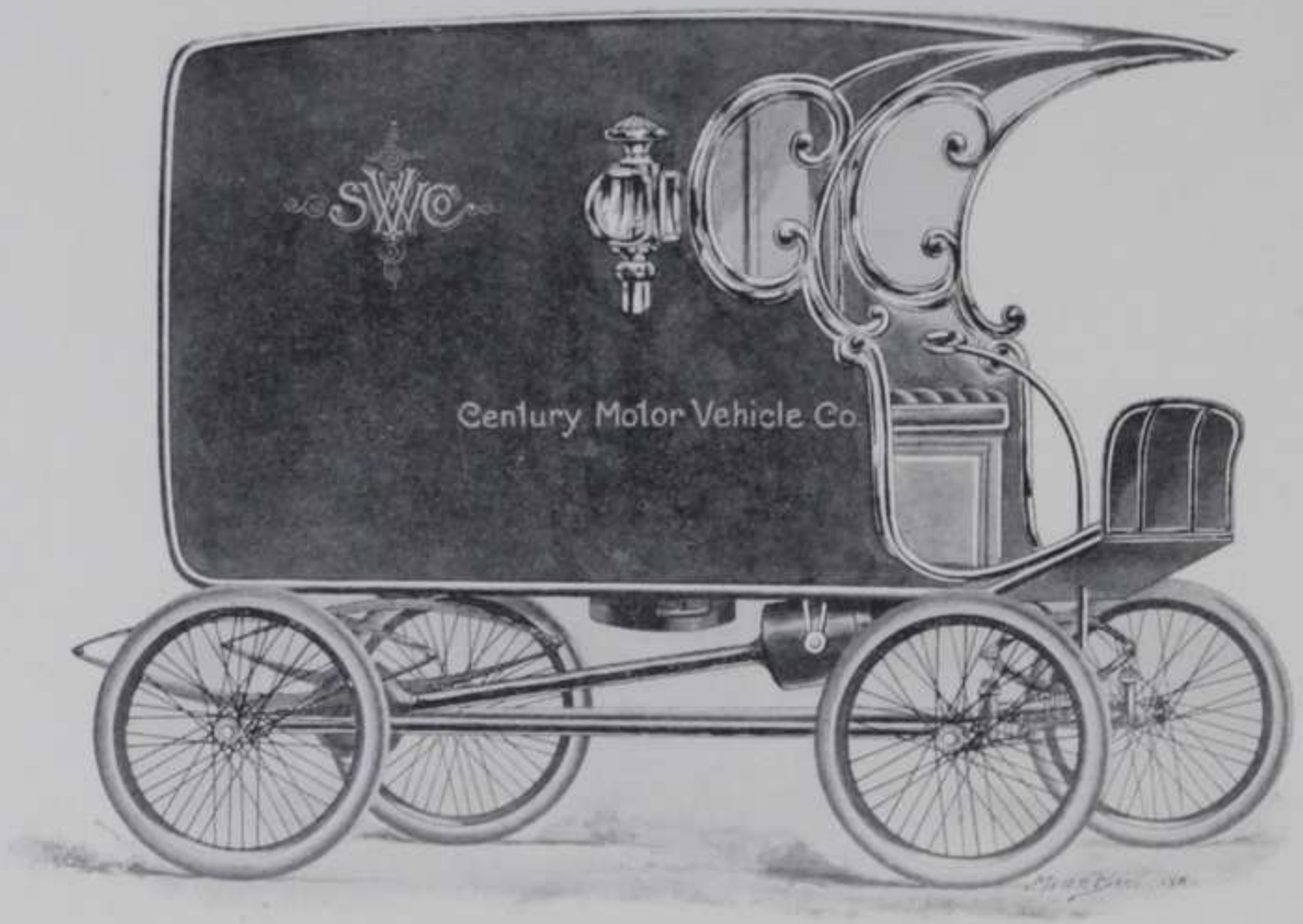
BOILER —Steel shell and heads; copper tubes; tested at 700 pounds cold water pressure; running pressure, 225 pounds.

BRAKE —Band brake, operated by foot lever.

STEERING —Century combination steering and engine controlling lever.

SPEED —From 1 to 12 miles an hour.

TOOLS —All vehicles are fitted with bell, oil can and wrenches. We furnish as extras, on which we will be pleased to quote prices according to specifications, top, headlight, lamps, etc.



No. 3 CENTURY STEAM VEHICLE.

No. 3 Steam Vehicle.

SPECIFICATIONS.

GEAR—Century construction, tubular; track, 56 in.; wheel base, 84 in.

WHEELS—Century construction; steel wire spokes; wood rims; ball-bearings; pneumatic tires, 32 in. x 3 in. front and rear.

MOTOR—Century two cylinder motor, 4½ H. P.

TRANSMISSION—Century method, bevel gears.

GAUGES—Steam and air gauge, water gauge, and all necessary automatic fire and water controlling mechanism.

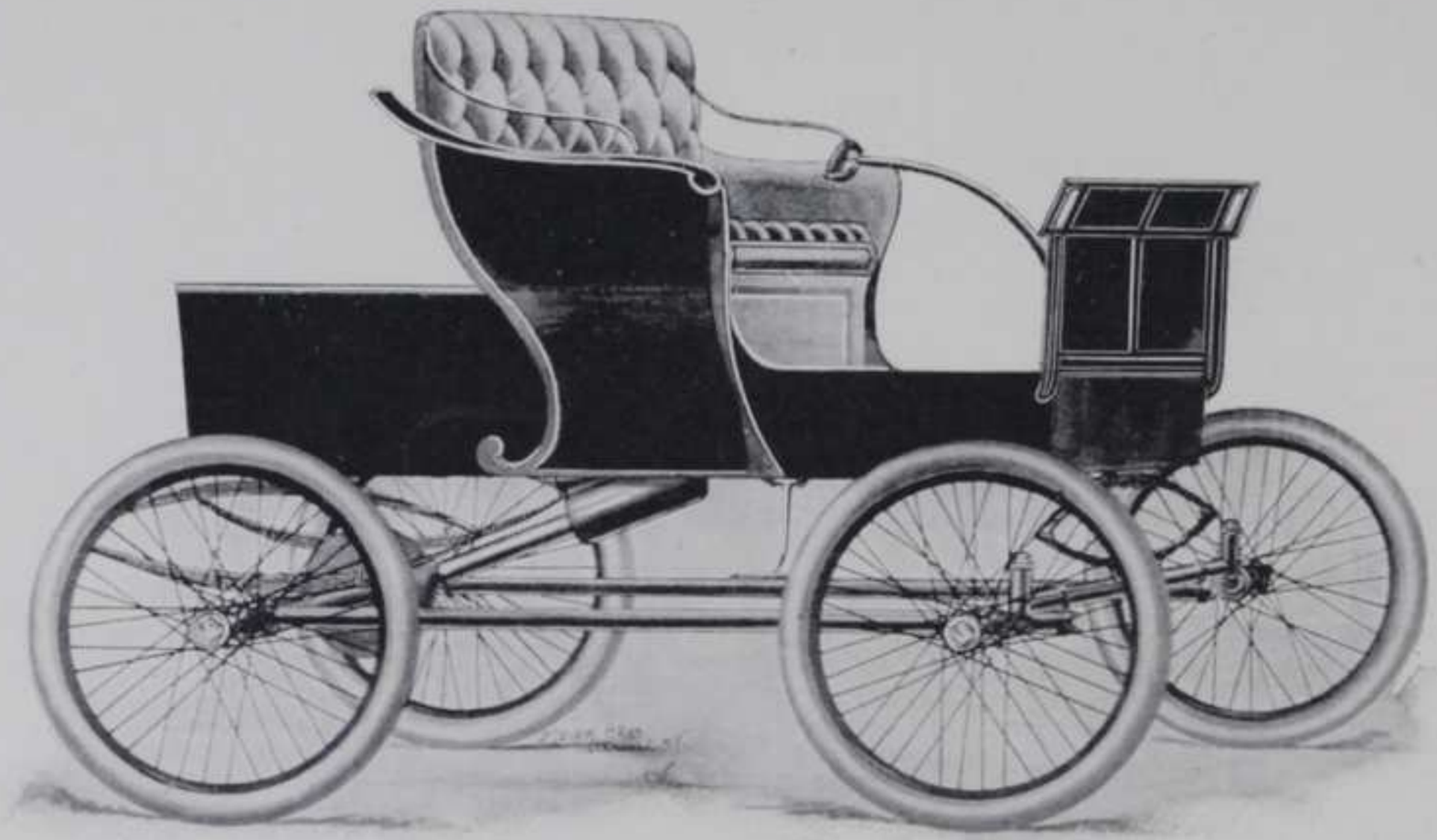
BOILER—Steel shell and heads; copper tubes; tested at 700 pounds cold water pressure; running pressure, 225 pounds.

BRAKE—Band brake, operated by foot lever.

STEERING—Century combination steering and engine controlling lever.

SPEED—From 1 to 12 miles an hour.

TOOLS—All vehicles are fitted with bell, oil can and wrenches. We furnish as extras, on which we will be pleased to quote prices according to specifications, top, headlight, lamps, etc.



No. 1 CENTURY GASOLINE VEHICLE.

No. 1 Gasoline Vehicle.

SPECIFICATIONS.

GEAR —Century construction, tubular; track, 56 in.; wheel base, 66 in.

WHEELS —Century construction; steel wire spokes; wood rims; ball-bearings; pneumatic tires, 32 in. x 2½ in. front, 32 in. x 3 in. rear.

MOTOR —Century gasoline motor, 6 H. P.

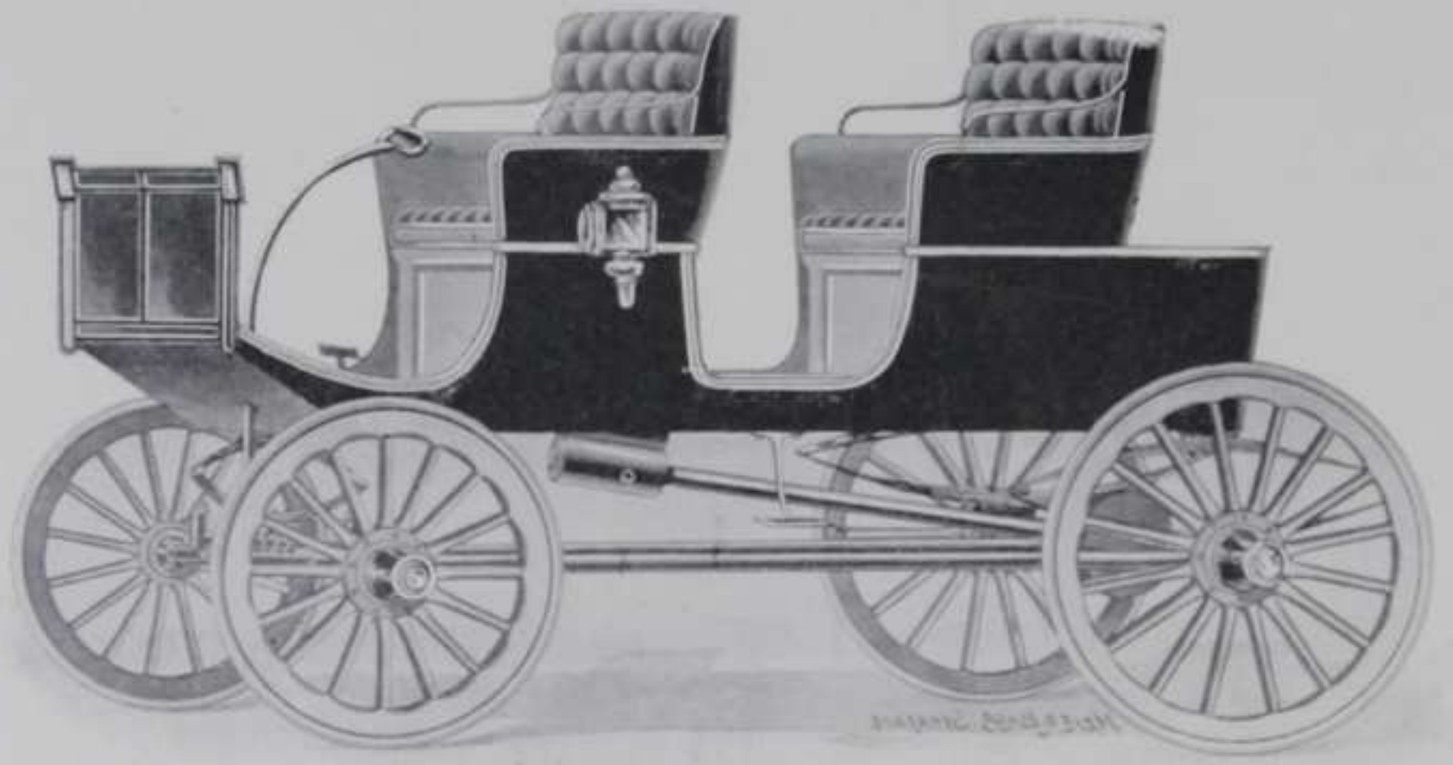
TRANSMISSION —Century method, spur and bevel gears; Century changeable speed gear.

BRAKE —Band brake, operated by foot lever.

STEERING —Century combination steering and motor controlling lever.

SPEED —From 3 to 15 miles an hour.

TOOLS —All vehicles are fitted with bell, oil can and wrenches. We furnish as extras, on which we will be pleased to quote prices according to specifications, top, headlight, lamps, etc.



No. 2 CENTURY GASOLINE VEHICLE.

No. 2 Gasoline Vehicle.

SPECIFICATIONS.

GEAR—Century construction, tubular; track, 56 in.; wheel base, 84 in.

WHEELS—Century construction; 32 in. front, 36 in. rear, wood wheels with ball-bearings; steel channels, fitted with 1½ in. solid rubber tires.

MOTOR—Century gasoline motor, 6 H. P.

TRANSMISSION—Century method, spur and bevel gears; Century changeable speed gear.

BRAKE—Band brake, operated by foot lever.

STEERING—Century combination steering and motor controlling lever.

SPEED—From 3 to 12 miles an hour.

TOOLS—All vehicles are fitted with bell, oil can and wrenches. We furnish as extras, on which we will be pleased to quote prices according to specifications, top, headlight, lamps, etc.

No. 3 CENTURY GASOLINE VEHICLE.

MAURICE LOEB,
Agent,
D. W. WEBSTER,
Consulting Engineer,
304-306 N. BROAD ST.,
PHILADA.

No. 3 Gasoline Vehicle.

SPECIFICATIONS.

GEAR—Century construction, tubular; track, 56 in.; wheel base, 84 in.

WHEELS—Century construction; steel wire spokes; wood rims; ball-bearings; pneumatic tires 32 in. x 3 in. front and rear.

MOTOR—Century gasoline motor, 6 H. P.

TRANSMISSION—Century method, spur and bevel gears; Century changeable speed gear.

BRAKE—Band brake, operated by foot lever.

STEERING—Century combination steering and motor controlling lever.

SPEED—From 3 to 12 miles an hour.

TOOLS—All vehicles are fitted with bell, oil can and wrenches. We furnish as extras, on which we will be pleased to quote prices according to specifications, top, headlight, lamps, etc.

FOR GENERAL INFORMATION we wish to call your attention to a few of the valuable improved features in the construction of the CENTURY VEHICLES.

MOTOR. We have a method of attaching the motor, whereby the entire weight of the same is supported by the springs of the body and avoids all vibration. It is attached to the body far enough toward the front end to equalize the weight in the body. This method of attaching motor is applied to our Electric, Steam and Gasoline propelled vehicles.

RUNNING GEAR. Our running gear is made from the best grade of seamless steel tube and is brazed into steel connections. It is so designed that the wheels, when running over uneven roads or obstructions, will conform to the inequalities of the road without twisting or bending any parts of the frame.

Our method of obtaining this result does so without sacrificing strength in any part, and the frame is the most durable of any in use.

POWER TRANSMISSION. We propel all our Automobiles by means of a gear shaft and steel gears, except on our light Special Steam machine, on which we use a chain and sprockets.

BEARINGS. All parts have ball bearings wherever practical, including the Front Wheels, Gear Shaft, and Rear Axle. Other bearings are of the most approved type. All bearings have means of properly lubricating.

CONTROL AND STEERING. Both operations are done by means of the one steering lever.

BRAKE. We furnish band brakes, operated by a foot lever, that will hold the carriage firmly on any grade, and will stop it suddenly if necessary.

COST OF RUNNING. This varies, and is from one-half cent to three cents per mile, depending on the class and weight of the vehicle.

EXTRAS. We will furnish as extras, a top on any of our pleasure vehicles, lamps, bell, special finish, etc., at the lowest price consistent with the requirements. Delay will be avoided if vehicles are ordered according to our regular specifications.

INSTRUCTIONS. We send with each vehicle shipped, a sheet of instructions for the operation and care of the same.

TERMS.

In consideration of the low net prices we will quote on application our invariable terms are: One-fourth cash when order is placed on our books, and the balance when vehicle is ready for shipment at Syracuse, N. Y. All orders will be filled in rotation as received.

SHIPPING DIRECTIONS.

Unless we receive definite shipping instructions we will ship by freight, using lines that to the best of our judgment will avoid delay in transit.

TIRES.

We fit to all our Vehicles the best of Tires, either solid rubber or pneumatic, and take advantage of any improvements in the same that prove themselves of worth.

WE INVITE CORRESPONDENCE.

THE CENTURY MOTOR VEHICLE CO.

PRINTED AT
THE MASON PRESS,
SYRACUSE, N. Y.

BLACK

MOTOR CARS

"RUN EVERYWHERE"

BY adding the truthful saying, "Seeing is Believing" to the old adage "The Proof of the Puddin' is in the Eatin'," we present all that is necessary in the way of an introduction to the interesting pages to follow.

BLACK MANUFACTURING COMPANY
CHICAGO, ILL.

R. J. PHILLIPS

Restaurant and Bakery

CHAS. BROWNING
MGR.

Lineville, Iowa, Sept. 12th 1908

Black Mfg. Co.,

Chicago, Ill.

Gentlemen:

Please find enclosed picture of my Model 12 Motor Buggy, my wife and myself in front of our home in Lineville, Ia.

I can not say anything that expresses my admiration for my car. I have had it on the worst roads in Missouri, and have never had any trouble at all. It is surely all you said it was and more. It is ready to go at any and all times, and when you start you know you are going to get there.

I had the pleasure of pulling a 15 horse power low wheel runabout up a steep hill a few days ago, but out of respect for the man would not tell the name of the machine.

I want to thank you again for your fair treatment to me in my business with you and recommend the Black to any and all in the market for an automobile.

Very truly yours,

Chas. W. Hawk
Lineville Ia.

Francis A. Resch,
Age 2 Years, Grandson of
Hiram Holcomb, Sycamore, Ill.,
Shares the Pleasures in the use of
a Black Motor Runabout Model 12
with his
Grandfather.

Edward Cooper & family of Newton Lower Falls. Mass. in their Black Motor Surrey Model 118.

Mr A. G. Morran
Manager Eastedge
Farmers Elevator Co.
Eastedge, N. Dak.
puts a
Black Motor
Runabout
Model 12
to Practical Use
in his
Daily Business

San Gabriel, Texas, Nov. 2, 1908.

Black Manufacturing Company,

Chicago, Ill.

Gentlemen:-

I bought a Black Motor Surrey Model 20 from your representative in charge of your exhibit at The Texas State Fair held at Dallas last week and I am well pleased with same.

I drove the car home myself, a distance of over 200 miles and it was the first car I ever undertook to drive and we did not make any unnecessary stops at all. Your machine received lots of praise in every town we stopped and some few said they were going to sell their machines and buy a Black.

I failed to get a book of instructions, so please mail me one at once, also the agency for your machines as I think I can sell several in the next few months. Send Catalogue, Price lists and everything necessary together with any information you can give me in regard to running the car and all will be appreciated.

Respectfully,

W. H. Camp.

Mr. F. M. Wood of Cedar Rapids, Iowa on a Country Run over Iowa Roads During Bad Weather in March 1908. Mr. Wood Purchased 150 Black Motor Cars at the Chicago Auto Show in December, 1907.

Frank E. Leonard
of Carlisle Springs, Pa.
and his Black Motor Buggy,
Model 112.

Mr. Davenport Case
drives a
Black Motor Buggy
Model 112
for
Dr. J. F. Briggs,
Shickshinny,
Pa.

The Black Motor
Runabout
Model 12
with
Chas. W. Haver,
Lineville, Ia.
at the
wheel

Mrs. J. W. Lamach of
Alexandria, Minn.
operates
The Black Motor Surrey
Model 20
in the absence of
her husband.

Mr. Valentine Arndt of
Coon Rapids, Iowa
with his family
in a
Black Motor Surrey
Model 20.

Double and Single Rigs — Stylish Turnouts A Specialty

CREAGER & O'RIELLY

...Livery...
Feed and Sale Stable

Fort Pierre, South Dakota. Sept. 4, 1908.

Black Manufacturing Co.,

Chicago, Ill.

Dear Sirs:-

In reply to your letter of the 2nd will say I will send you a photograph as soon as possible. Everything is O.K. I look for some business in the near future, for I will sure advertise the Little Black Motor. I gave it a 90 mile run yesterday over some very rough road. It did its work in first class shape. I think I will order a two seated very soon now. One car cannot do all my work. No more at present.

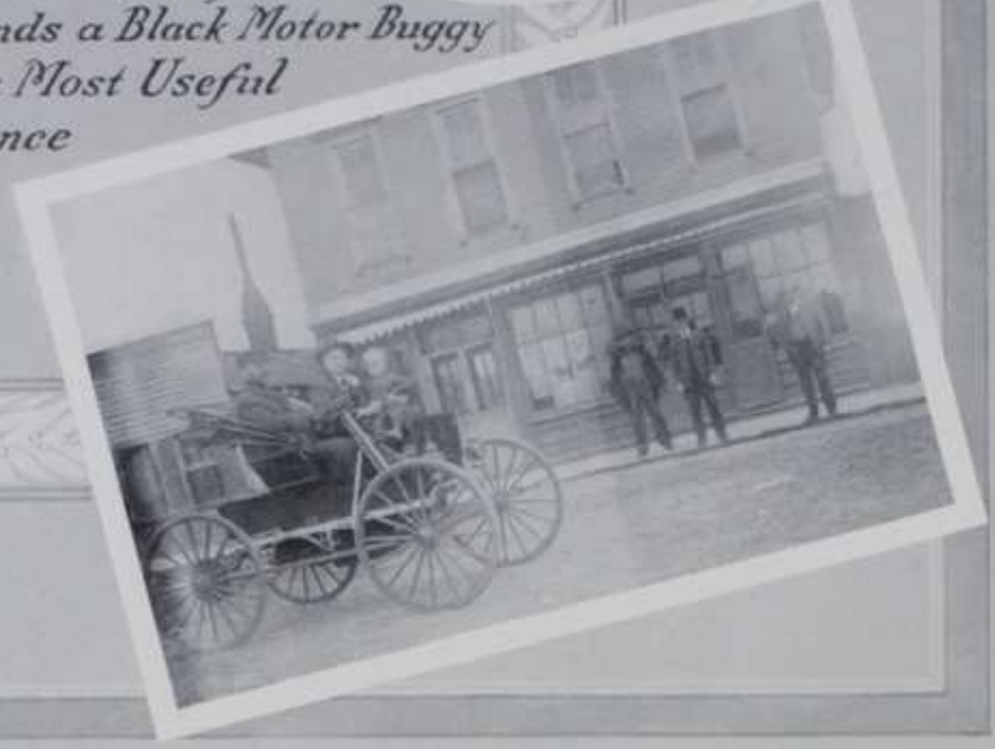
Yours truly,

Wm O'Rielly

The boys and girls enjoy themselves in Black Motor Cars.

The Black Motor Runabout Model 12 owned by Thos. Morgenson, Franksville, Wis.

Mr. J. M. Jenkens,
Solon, Iowa who had the Misfortune
to Loose One Limb Finds a Black Motor Buggy
Model 112 a Most Useful
Conveyance



Mr. B. G. Pull, Melbourne, Iowa, enjoys a "spin" in a Black Motor Runabout Model 12 and takes his son, brother and friends along.

OLDEST OSTEOPATHIC OFFICE IN THE COUNTY. OFFICE OPENED JULY 10, 1900

Dr. W. J. Cain, Osteopathic Physician,

Battlement Building

Benton Harbor, Mich. Aug. 31, 1908.

Black Mfg. Co.,

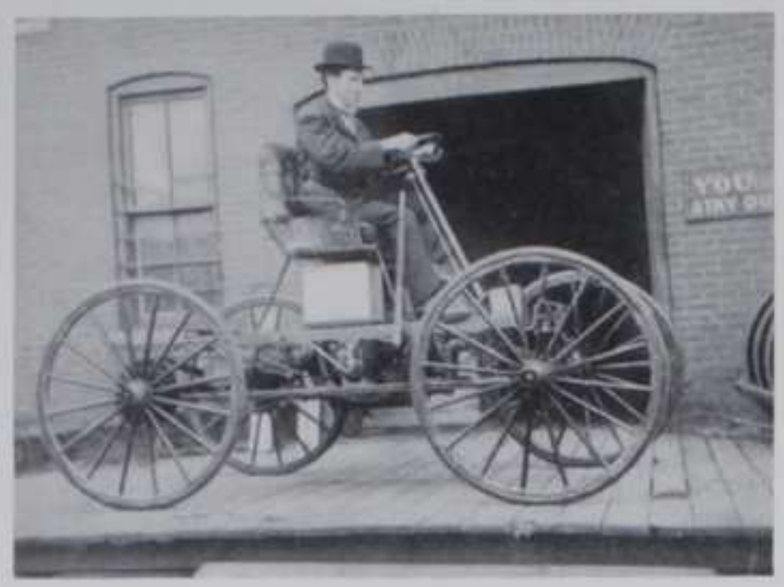
Chicago, Ill.

Dear Sirs:-

Yours of Aug. 27th '08 requesting me to have picture of machine taken received and will have same taken and forward at an early date. There are possibly 500 machines in our county, and I will go into sand or mud and up hill with any of them.

Respectfully,

Dr W. J. Cain



Snap Shots
of
Mr. L.E. Felger
of Lethbridge,
Alberta, Canada
and some of our
Factory Buildings
Taken just after
He Placed
an Order for
20 Black Motor
Cars
March 20th,
1908

A snap shot view of various models of Black Motor Cars on the way to the Goodrich Steamship Co's. docks, Chicago Sept. 5th 1908 These cars formed a part of the exhibit at the Wisconsin State Fair Sept. 7-11-1908.

John S. Burgher, Rossville, Staten Island, N.Y., in his Black Motor Buggy Model 112 along and near the coast of Atlantic Ocean.

Artesian District No. 1
CHAVES & ROOSEVELT COUNTIES
ARTHUR J. STEVENS, Supervisor

ROSWELL, NEW MEXICO, Sept. 14, 1908.

Black Manufacturing Co.,

Chicago, Ill..

Gentlemen:-

I am very much pleased with my Black Motor Runabout, Model 12, and desire to inform you that I have just made a run of about 200 miles, fording rivers, climbing some very steep hills and going through some quite heavy sand. We did not need to adjust a single thing on the whole trip and the auto took everything as nicely as one could ask for.

Please quote me at once your best price on your Black Motor Surrey, Model 20 with running boards and fenders, rubber tires, Timken roller bearing axles, two oil burning lamps, one Acetylene head light, horn and wide track gear. ·An auto of this description is about what is needed by a number of Well Drillers and Ranchmen. It would also be a good Contractor's Rig and there is going to be business for you here. My car has exceeded expectations, and we hear words of praise from almost every one.

Yours truly,

Arthur J. Stevens

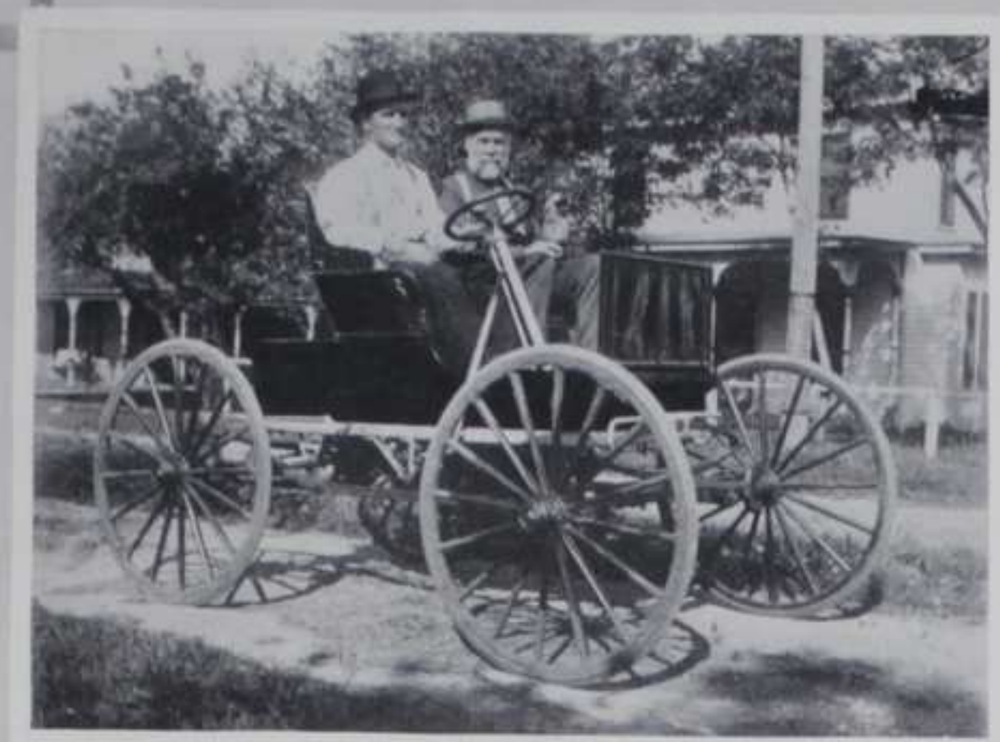
ARTESIAN WELL SUPERVISOR.
SEC'Y. WATER USER'S PROTECTIVE ASS'N.

J. R. Peirson and Wife
of Montrose, Pa.
in their
Black Motor Buggy
Model 112

The Black Motor
Runabout Model 12
owned by
P. W. Randleman,
Jefferson, Iowa,
decorated,
for street parade

Dr. Tom of Wellswood Manitoba, Canada finds his Black Model 112 very useful.

Mr. Spaeth of Raymond Minn. is greatly pleased with his Black Motor Surry Model 118.



The Black Motor Runabout Model 12 owned and operated by E.S. Pendergast, Sheeburn, Minn.

All hills look alike to "The Black".

A. F. Pasch

Manufacturer of

Full Cream Cheese.

R. F. D. No. 8

Green Bay, Wis., Sept. 5th, 1908.

Black Mfg. Co.,

Chicago, Ill.

Dear Sirs:-

I herewith enclose you photo of my car in front of my factory. I made a trip from Black Creek to Kunesh, a distance of 23 miles in 1 hr. 40 min. and had considerable sand and a number of hills to go up. I-am well pleased with my car.

Yours truly,

A. F. Pasch

A Black Motor Surrey. Model 20, with Removable Rear Seat. Can be used for Business or Pleasure

The exhibit of Black Motor Cars as it appeared at the Iowa State Fair held at Des Moines, Ia. Aug. 20-28. 1908.

About 25,000 people viewed this exhibit during the fair and more than $50,000.00 in orders resulted.

Wm. O'Rielly, a liveryman of Fort Pierre, So. Dakota finds Black Motor Cars entirely satisfactory for livery purposes.

The Black Motor Buggy Model 112 is Extremely Popular with the Old Folks. Fayette A. Becker of Owego, N.Y. Spends a Great Deal of His Time in the Enjoyment Afforded by "The Black"

A
MODEL 12 BLACK
MOTOR RUNABOUT OWNED BY J.I. LAMB. GENOA. NEBR.
MEETS THE APPROVAL OF THE OWNER AS WELL
AS HIS RELATIONS & FRIENDS

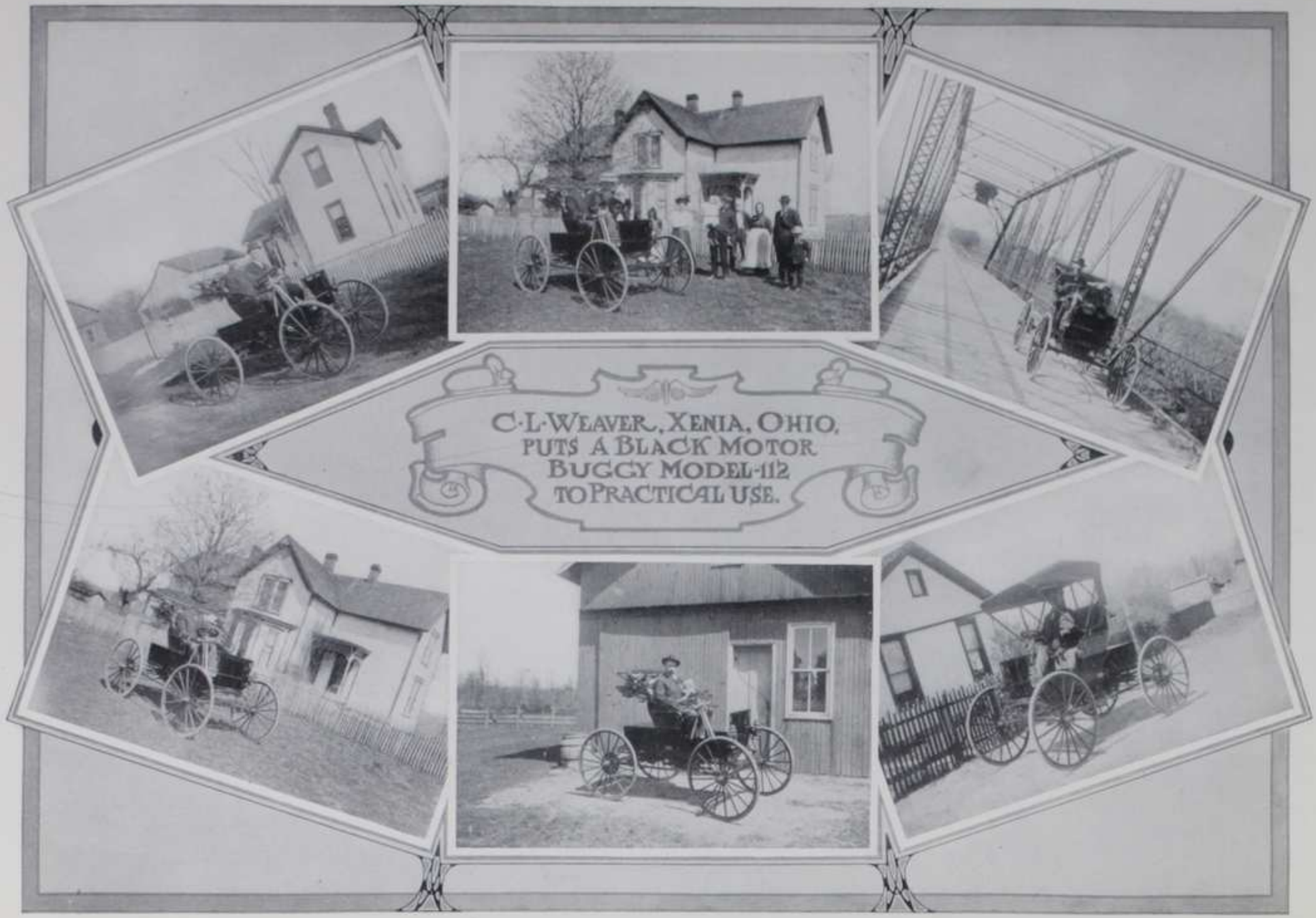
M. G. Knodle a Rural Mail Carrier of Melbourne, Ia. uses The Black Model 112 on his route.

J. H. Leimkuehler Cazenovia, Wis. who runs a Black Motor Runabout Model 12

J. F. Sheehan & Son of Alberta Lea, Minn. in his Black Motor Buggy Model 112

A. F. Pasch, Green Bay, Wisc. with his little daughter in a Black Model 12.

Floyd Chubb, Rapid City, Mich. trying out his new Black Model 12.


C·L·WEAVER, XENIA, OHIO,
PUTS A BLACK MOTOR
BUGGY MODEL-112
TO PRACTICAL USE.

A large and interesting exhibit of Black Motor Cars at The Minnesota State Fair held at Minneapolis, Minn. Aug. 31-Sept. 5 1908.

Many thousand visitors from North and South Dakota, Minnesota and Wisconsin investigated "The Black Cars" at the fair and a large volume of business resulted.

The Black Motor Surrey
Model 20 owned by
Mr. G. G. Gilbert
of Chico, California.
"Always room for one more."

Black Motor Cars
are becoming
quite popular
in Pacific Coast States

W. W. Hinds of Paris, Ill., who owns and drives a Black Motor Surrey Model 20, also a Black Motor Buggy Model 112 and finds both cars remarkable values.

Tillamook, Ore, Jan. 22nd, 1909.

Black Mfg. Co.,

Chicago, Ill.

Gentlemen:-

The Model 112 car, which I ordered for another party, arrived a few days ago and came in good condition. I set it up at the dock, started it and run it around town for a half hour, then turned it over to the man I sold it to. He is well pleased with it, and is getting along fine although he never had any experience with a car before.

When I sent the order for the car, I wrote you in regard to the agency for them in this country, and I have heard nothing in regard to it, and if I am going to handle them for you, I want to know it in time to do something.

No one out here would believe that your car would run when the rains set in and it got muddy, but I have been running my car for the last four months in the mud and it makes them "take notice" as every other car is laid up for the winter.

I have two more orders for cars which I will send in as soon as I have the authority to act as your agent.

Awaiting your reply, I remain,

Yours truly,

M. W. Storey

Mr. W. J. Perrin of Ferney, S.D. finds his Black Motor Runabout Model 12 very convenient and useful during the duck hunting season.

The exhibit of Black Motor Cars
at the Third Annual National Dairy Show
held at The Coliseum, Chicago, Dec. 2-10, 1908
was very interesting to the dairymen who attended

The Black in Reynolds Pass.
on the Continental Divide.
Rocky Mountains.
owned by J. Sherwood.
Lake, Idaho.

The Black
Motor Surrey Model 18
in the snow capped Rockies

A snap shot of
W.L. Archer
R.F.D. Carrier
on his route
out of McLean, Ill.
His Black Motor
Runabout Model 12
in daily use.

R.K. Stebbins in a
Black Motor Runabout Model 12
on a stony hill 3 miles west
of St Charles, Minn.

Dr. D.W. Scutt
of Watkins, N.Y. in his
Black Motor Buggy Model 112
making professional calls

The exhibit of
Black Motor Cars
at the Illinois State Fair
Sept. 25-Oct. 2 1908
held at Springfield, Ill.

The interest manifested
in Black Motor Cars
at this fair proved
their popularity in the
State of Illinois

The Black
Motor Buggy Model 112
owned by
Joseph Lorence
of Racine, Wis.

Walls and Partitions,
Foundation Blocks,
Concrete Floors,
Sills and Caps.

Telephone No. 49.

L. COFIELD

MANUFACTURER OF

IDEAL HOLLOW CEMENT BLOCKS

FOR ALL BUILDING PURPOSES

Chimney Flues, Caps,
Building Blocks,
Cellar Walls,
Cement Walks.

ANNANDALE, MINN. Dec. 3rd, 1908.

Black Mfg. Co.,

Chicago, Ill.

Gentlemen:-

The Model 20 Surrey I purchased of you is giving me good satisfaction so far. It can go as fast as I care to go and rides as easy as a buggy and is easily controlled. I am in hopes to be able to send you in an order for a carload of Surreys and Buggies for Spring shipment.

Respectfully yours,

L Cofield

C.J. Ericson, a R.F.D. Carrier of Winthrop, Minn. uses a Black Motor Runabout Model 12 to excellent advantage on his mail route

Wm. Peacock of Houston Heights, Texas and his Model 118 Black Motor Surrey

Mr. Isaac Davis of Dallas, Texas, seated in his Black Motor Buggy Model 112 in front of our exhibit at the Texas State Fair

A view of the exhibit of Black Motor Cars at the Texas State Fair Dallas, Texas. Oct. 17 Nov. 1 1908

Views of the large exhibit of Black Motor Cars at the State Fair of Texas held at Dallas Oct. 17 - Nov. 1, 1908.

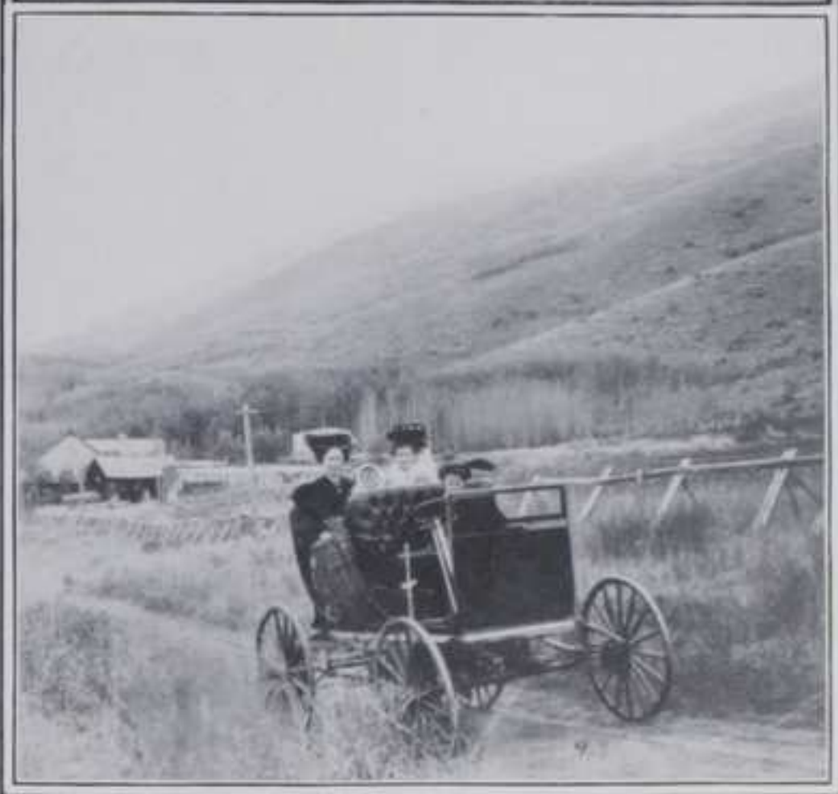
We Demonstrated to the people of Texas during the Texas State Fair that "The Black" is the car for hill climbing and use in sand and mud.

D.L.Wartzenluft of Kutztown, Pa.
starting for a "spin" in his
Black Motor Buggy Model 112

The Black Motor
Buggy Model 12
owned by
John C. Wakefield,
Dunlap. Ill.

The Black Motor Surrey Model 18
in the Rocky Mountains
owned by J. Sherwood,
Lake, Idaho.

The Black Motor Surrey Model 18
at Lake P.O.
Idaho



IF you want a car for practical use, one that will negotiate the worst of hills, mud or sand, in fact a car that will bring you there and back again, you will not make a mistake in placing an order for "The Black."

PLENTY OF POWER
EASY TO CONTROL
LOW COST AND UPKEEP
SAFER THAN A HORSE
CHEAPER THAN A HORSE

Do not delay, but let us have your order at once: now. Prompt shipment guaranteed

BLACK MANUFACTURING COMPANY
124-126-128 East Ohio Street Chicago, Illinois

1999
275
ISL

The Franklin Company
Engravers and Printers
Chicago

Scripps-Booth Motor Cars

Scripps-Booth Motor Cars

Six-Cylinder Models
Series "B"

Scripps-Booth Corporation
Detroit, Michigan

SCRIPPS - BOOTH SALES CO.
Garage and Service Station
135 N. FRANKLIN STREET
ALLENTOWN, PA.

The New Scripps-Booth Factory

SCRIPPS-BOOTH beauty reflects the inherent quality of the car. From the lustrous finish on the body to the bronze bushings in the mechanism, utmost skill, engineering progress and careful construction are evident.

The new models represent the greatest possible attainment of Scripps-Booth ideals—results of a determined and conscientious effort to build the finest motor car in its class, sponsored by unlimited resources, engineering skill and experience.

They are designed, machined and built in the new Scripps-Booth factory, providing ideal facilities for the continuance of Scripps-Booth standards.

The Scripps-Booth Corporation believes that the policy which will best protect the interests of Scripps-Booth owners is the policy which will best maintain the reputation of Scripps-Booth Cars.

The Scripps-Booth Corporation, with this ideal in mind, has used all of the vast resources at its command. These exclusive models are products of the ripened experience of the best automobile engineers.

Continual advancement and betterment irrespective of price, and constant maintenance of the highest standards and ideals are reflected throughout Scripps-Booth cars in their originality of design, mechanical excellence and sturdy construction.

The four models possess in greater measure than ever before, marked characteristics of quality, value, beauty and exclusiveness.

The prospective purchaser, therefore, is certain of securing the fullest equivalent of the money he proposes to invest, feeling sure that he will secure full service and satisfaction from his purchase.

Model B-39 Five Passenger Touring Car

THE aim in the designing of the Scripps-Booth Six-Cylinder Touring Car was to produce a moderate-weight, economical-to-operate automobile that would have the beauty, the convenience, the comfort and the durability of the car of greater weight and price.

These qualities of the fine automobile have been brought out, provided for and unified in this exceptional five-passenger model in a manner pleasing to the most exacting motorist. It is replete in those refinements that add so much to the comfort of driving, whether for business purposes or for recreation.

In the gracefully-curved, die-cast fenders, the nickeled radiator, the high multi-louvered hood and the tailored top you will find nothing radical, nothing contrary to your ideas of a perfect motor car. You will, however, feel the radiation of Scripps-Booth refinement which will convince you that this is a motor car in complete harmony with your ideals.

Details of Appointment—Page Twelve
Mechanical Specifications—Page Fifteen

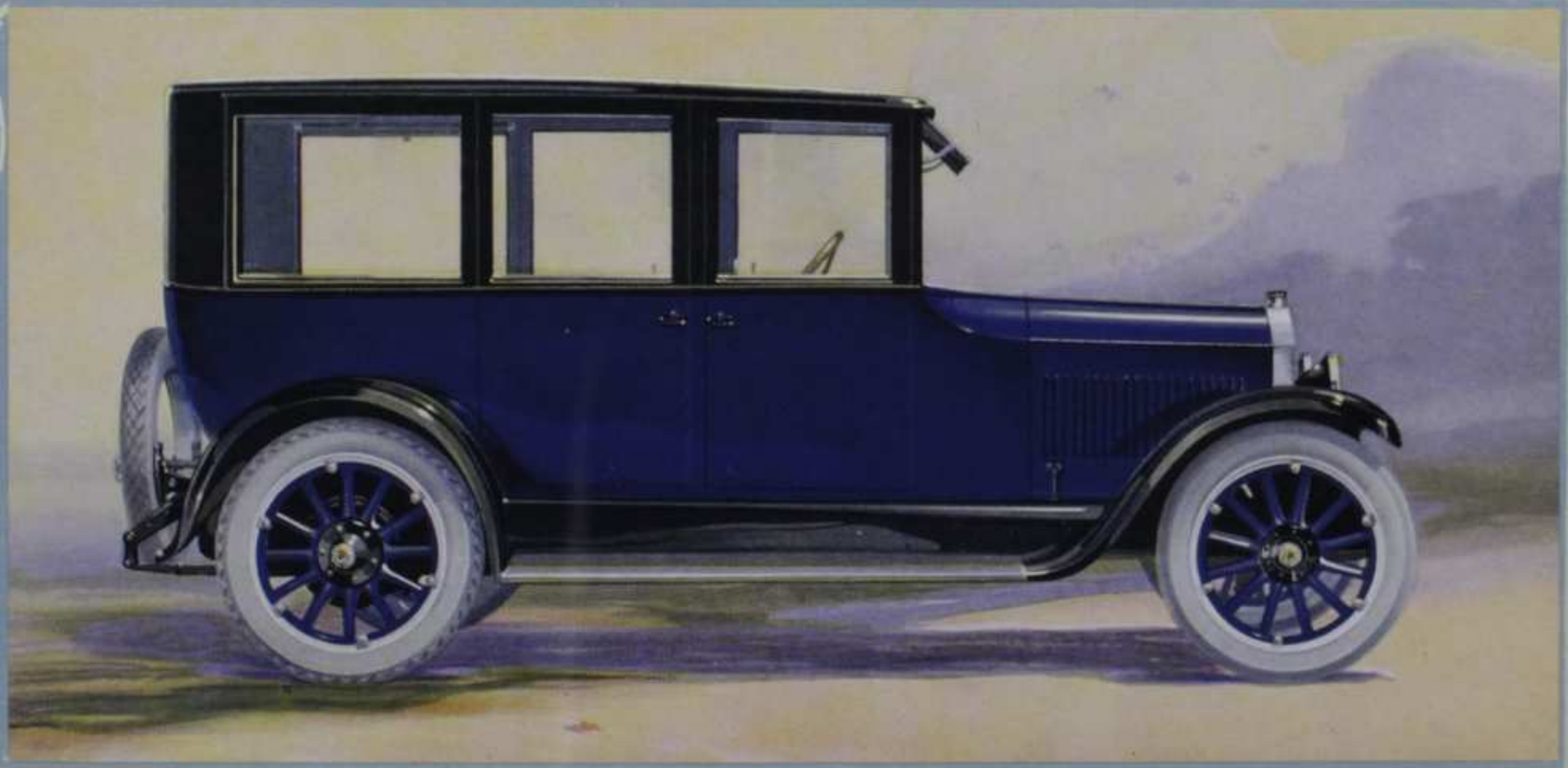
Model B-40 Three Passenger Roadster

IT can plainly be seen that each and every one of the necessary attributes to roadster perfection were borne strictly in mind in the designing of the Scripps-Booth Six-Cylinder Roadster. It is a motor car easy and economical to operate, distinctive in appearance, amply powered, convenient and of moderate weight.

Scientific design has given the graceful stream-line body a desirable lowness, adding much to the appearance and the riding qualities without a sacrifice of road clearance. It has given this model, with wide flexible springs, extra long spring suspension and correct distribution of weight, the motoring comfort of the larger car with the flexibility in traffic and low operative cost of the car of moderate weight and wheelbase.

In this well-upholstered and completely equipped automobile there is room for three passengers as well as an exceptional amount of luggage. You will find it both a likeable and serviceable companion in your daily work.

Details of Appointment—Page Twelve
Mechanical Specifications—Page Fifteen



Model B-41 Five Passenger Sedan

MOTORISTS who value quiet distinction, comfort and reliability, place their certain dependence upon the Scripps-Booth Six-Cylinder Sedan. In this model they find a family car, ideal for use in all weather and appropriate for all occasions. Its imposing appearance, elegant upholstery and complete appointment satisfy those desiring a motor car well apart from the commonplace.

The interior of this model radiates a friendly atmosphere. The lounge-like seats are tailored in woolen fabrics of the finest quality. The heavy all-wool carpet and the silk roller-curtains harmonize with the upholstery. The appointments are in appropriate taste.

This Sedan is of four-door type, providing entrance directly to the front and rear seats. All doors may be locked. The body of this model, as well as that of the Coupe, is Fisher built, steel-clad to insure sturdiness and to provide a perfect surface for the superior finish found on all Scripps-Booth models.

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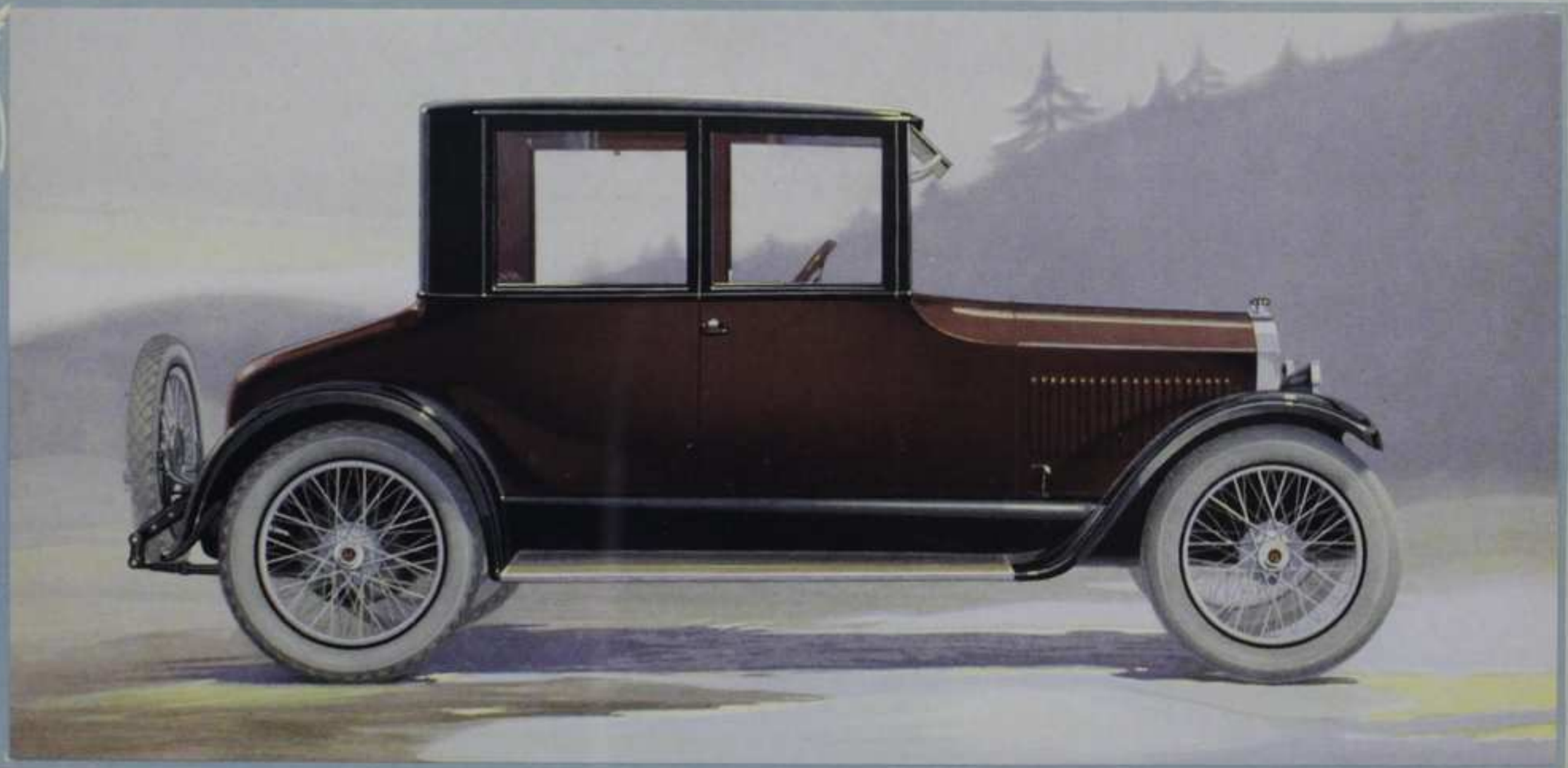
Mechanical Specifications—Page Fifteen



Model B-42 Four Passenger Coupe

THE Scripps-Booth Six-Cylinder Coupe will be found ideal for all-around use by those who insist that their motor cars be more than means of efficient transportation. The beautiful lines and characterful appointments of this model recommend it to those in search of a truly distinctive automobile for every occasion.

To the professional or business man who must travel in unfavorable weather, this model affords a desirable protection. He who must have dependable and economical service from his motor car will appreciate the steady flow of energy developed by the six-cylinder motor and also the manner in which the valve-in-head construction utilizes every ounce of energy without waste.

To the woman of fashion who prefers to drive her own car, the smart design and complete appointment appeal with especial emphasis. She will appreciate the many refinements that combine to make this model all she can desire as to comfort and style. No detail of construction or appointment has been considered small enough to be slighted.

Details of Appointment—Page Thirteen
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THE Scripps-Booth Touring Car and Roadster are attractive in design and finish. Their interiors are roomy, well-upholstered and equipped with the appointments that appeal to those who understand and appreciate the niceties of motoring comfort.

The seats are low, wide and deep. The upholstering is of curled hair over coiled springs, covered with real leather of an excellent quality. They are tipped to the correct angle to assure riding ease. The doors are wide, insuring convenience in entering and leaving. They are furnished with nickeled handles. The tools are conveniently "filed" in the door at the driver's right.

The tailored tops are of genuine Pantasote, full lined, and fitted with plate-glass rear windows. The curtains, rigidly mounted on steel frames, swing open with the doors. When not in use they are carried "ready-to-put-up" in a metal-lined compartment back of the front seat. They may be mounted in position in a few moments, and as they are never folded, their appearance is always neat, their fit is always perfect.

The instruments are mounted on the dash in a well-lighted cluster. A spot light socket and a handy glove compartment also adorn the instrument board. In addition to effectively illuminating at night the rear curb doorway, the tonneau light in the Touring Car may be pulled from its socket exposing eight feet of wire, permitting it to be used as an extension light.

The Roadster seat, accommodating three persons in comfort, is adjustable. This seat may be moved either backward or forward to provide a restful driving and riding position that will conform to the driver's height and size. In addition to the compartment under the rear deck, there is provided in the body proper of this model a large covered carrying space back of the seat, in which may be carried suit-cases or other articles of value.

IN addition to the fashionable low-hung appearance exemplified by all Scripps-Booth Motor Cars, the enclosed models have that desirable aspect of solidity essential to substantial closed car design. They are well provided with the refinements that add so much to the satisfaction and pleasure of closed car ownership.

The enclosed models are upholstered in a heavy all-wool coach cloth of exceptional quality. The thick velvet carpet, too, is of wool and like the silk roller curtains on the three rear windows harmonizes with the upholstering. Convenient pockets with elastic tops are attached to the doors.

The sashless plate-glass windows slide in special grooves, weather-proof and rattle-proof. The door windows are fitted with automatic regulators that they may be raised or lowered to any desired position instantly and with little effort. The rear quarter glasses drop into compartments provided in the body panels.

Both models are regularly equipped with Perfection heaters to provide warmth when desired. In the Coupe a substantial, well-upholstered seat, facing forward, with plenty of leg room, has been provided, making this a comfortable four-passenger model. When not needed, this seat may be folded under the cowl. A carpeted foot rest forms part of the regular equipment of the Sedan.

The rain vision sector of the windshield is of steel, highly enameled and adjustable. It thus serves three functions—rain visor, sun shade and rear view mirror. The lower edge is rounded to form a trough that rain falling on the visor may be carried to the sides of the car. Windshield cleaners are furnished as regular equipment.

The interior of the Sedan is softly illuminated by an artistic dome light; the Coupe, by silver mounted shoulder lights. These lights are operated by automatic door switches as well as push buttons. The silver-plated interior fittings are satin finished.

WHEN the original Scripps-Booth Six-Cylinder Motor Car was designed, the most advanced ideas in moderate-weight construction were united in the chassis. While the basic design of that chassis remains unaltered, Scripps-Booth engineers have introduced minor changes in keeping with their aim—to produce a chassis, sturdy, dependable and of moderate weight.

The supremacy of the six-cylinder motor is but due to sound scientific law. A motor having fewer than six cylinders cannot produce a constant power torque or driving force. Hence its action is not smooth enough for the exacting motorist of today.

A continuous power impulse is secured in a six-cylinder motor. Additional cylinders but increase the number of operating parts without greatly adding to the smooth operation of the motor. The valve-in-head motor has demonstrated its superiority in the qualities most desired in an automobile motor—power, economy and durability.

It is natural, therefore, that the Scripps-Booth Corporation has selected a six-cylinder valve-in-head motor as the ideal type of power plant. The Scripps-Booth motor is exceptionally compact, and accessible, developing over forty horse power.

The 115-inch wheelbase, the wide flexible springs and the extra long spring suspension insure the greatest possible riding comfort for a car of this weight, yet permit a short turning radius in congested traffic. The extra deep frame, steel felloed wheels, improved type of universal joints and large braking surface provide for sturdy construction and safety.

A motor cover allowing easy access to the valve mechanism, a handy light for illuminating the motor and the Alemite High Pressure System of lubrication which replaces the unhandy grease cup with a gun of six hundred pounds pressure, with its nipple attachment uniformly greasing all necessary parts of the chassis, are convenient utilities.

Mechanical Specifications

MOTOR—Six-Cylinder valve-in-head type, cylinders cast en bloc. Develops more than 40 horse-power. Removable head and lower crankcase. Pistons die-cast Lynite. Valve mechanism enclosed. Motor cover may be tilted back allowing easy access for adjustment and lubrication. Super-heater built into union intake and exhaust manifolds. Improved type of oil-tight oil pan.

CARBURETOR—Improved Marvel Type with hot air connection for heating air in cold weather.

LUBRICATION OF MOTOR—Force feed system through drilled crankshaft by gear-driven pump.

RADIATOR—New straight-front design, nickeled shell, detachable core with large radiating surface.

COOLING SYSTEM—Water circulated by pump. Fan, three-blade special design.

ELECTRICAL EQUIPMENT—Remy double-unit system, starting, lighting. Remy distributor, battery 6 volts, charged automatically and controlled by thermostat.

GASOLINE SYSTEM—15½ gallon gasoline tank at rear with end filler and quantity gauge. Gasoline supplied to motor by Stewart Vacuum System.

DRIVE SYSTEM—Shaft with Peters Universal Joint front and rear.

OILING SYSTEM—New style Alemite High Pressure Lubricating System with grease gun of 600 pounds pressure is furnished as part of regular equipment.

CLUTCH—Easy operating, leather-faced cone type, large diameter, with insert springs, insuring positive action and mild engagement.

TRANSMISSION—New Universal selective sliding gear type with short throw shifting lever of increased length. Three speeds forward and reverse. Improved type of brake lever with hand grip.

FRONT AXLE—Double heat-treated forged "I" Beam. Spindles fitted with cup and cone bearings, 10-inch road clearance.

REAR AXLE—Floating type, single bearing. Hyatt roller bearings in hubs and differential, New Departure ball bearings on pinion shaft.

BRAKES—Internal and External Special Asbestos lining, with braking surface exceeding 300 square inches.

SPRINGS—Front and rear both semi-elliptic, extra long, specially designed to insure flexibility and easy riding.

FRAME—Pressed channels of special heat-treated steel, depth seven inches, width two inches. Frame drilled for snubbers.

WHEELBASE—115 inches.

WHEELS AND TIRES—Kelsey Wood Artillery type, with steel felloes making stronger construction with lighter weight. Demountable rims, 32 x 4 tires, plain front, non-skid rear. Wire wheels optional at additional price.

WARRANTY

WE warrant each new motor vehicle manufactured by us to be free from defects in material and workmanship under normal use and service, our obligation under this warranty being limited to making good at our factory any part or parts thereof which shall within ninety (90) days after delivery of such vehicle to the original purchaser be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on our part, and we neither assume nor authorize any other person to assume for us any other liability in connection with the sale of our vehicles.

This warranty shall not apply to any vehicle which shall have been repaired or altered outside of our factory in any way so as, in our judgment, to affect its stability or reliability, nor which has been subject to misuse, negligence or accident. We make no warranty whatever in respect to tires, rims, ignition apparatus, horns or other signaling devices, starting devices, generators, batteries, speedometers, or other trade accessories, inasmuch as they are usually warranted separately by their respective manufacturers.

Scripps-Booth Corporation
Detroit. Mich

American Printing Co., Detroit

PRICES F. O. B. DETROIT

Five-Passenger Touring Car, Model B-39	$1295
Three-Passenger Roadster, Model B-40 .	$1275
Five-Passenger Sedan, Model B-41 . . .	$2100
Four-Passenger Coupe, Model B-42 . .	$1950

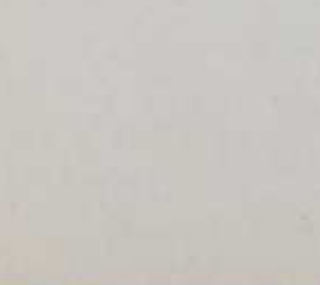
WIRE WHEELS EXTRA ON ALL MODELS

Prices effective May 20, 1921

1912
1150

Rauch & Lang
Electrics

Rauch & Lang
Electrics



Copyright 1912
The Rauch & Lang Carriage Co.
Cleveland, Ohio, U. S. A.
Issued January Fifth

Rauch & Lang Electrics

THE RAUCH & LANG CARRIAGE CO

CHARLES RAUCH, *President*

CHARLES L. F. WIEBER, *Vice Pres. & Gen. Mgr.*

CHARLES E. J. LANG, *Sec'y-Treas.*

CLEVELAND. OHIO
2180 West 25th St.

Reputation

THE Rauch & Lang Carriage Company for three score years has been working to solve vehicle problems—to make your purchase more satisfactory—to make you rejoice in the ownership of a vehicle. This means constant endeavor. In the Rauch & Lang Electrics you have the fulfillment of your ideals—because they are as near perfection as it is possible to build an electric pleasure conveyance.

Each of the electric pleasure cars shown here has as its greatest asset—Service.

The Rauch & Lang reputation has been built upon this service. For sixty years those who have purchased conveyances from this company have found the Rauch & Lang quality of service a most valuable part of each purchase.

Perfection of construction, coupled with reputation, should make it easy for you to decide that the Rauch & Lang is pre-eminently the car for your use.

STANHOPE
Wheel Base, 83½″

CHASSIS *No. 41—Shaft Drive.* Wheels and Tires, 32 x 3½″ Special Electric Pneumatic. 24 cells 9 M. V. or 24 cells 11 M. V. Hy-Cap - - - - - - - - - - - - $2100.00.

Chassis No. 43—Shaft Drive. Wheels and Tires, 32 x 4″ Special Electric Pneumatic. 24 cells 11 M. V. or 24 cells 13 M. V. Hy-Cap, $2250.00

Chassis No. 425—Shaft Drive. Wheels and Tires, 32 x 4″ Special Electric Pneumatic. 40 cells 9 P. V. or 40 cells 11 P. V. Hy-Cap, $2350.00

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

CHASSIS *No. 41— Shaft Drive.* Wheels and Tires, 32 x 3½" Special Electric Pneumatic. 24 cells 9 M. V. or 24 cells 11 M. V. Hy-Cap - - - - - - - - - - - - - $2400.00

Chassis No. 43—Shaft Drive. Wheels and Tires, 32 x 4" Special Electric Pneumatic. 24 cells 11 M. V. or 24 cells 13 M. V. Hy-Cap, $2550.00

Chassis No. 425—Shaft Drive. Wheels and Tires, 32 x 4" Special Electric Pneumatic. 40 cells 9 P. V. or 40 cells 11 P. V. Hy-Cap, $2650.00

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

COUPE

Body Design Copyrighted

Wheel Base, 83½"

DEMI-BROUGHAM
Body Design Copyrighted
Wheel Base, 83½″

CHASSIS *No. 43—Shaft Drive.* Wheels and Tires, 32 x 4″ Special Electric Pneumatic. 24 cells 11 M. V. or 24 cells 13 M. V. Hy-Cap - - - - - - - - - - - - - - $2700.00

Chassis No. 425—Shaft Drive. Wheels and Tires, 32 x 4″ Special Electric Pneumatic or 34 x 4″ Rauch & Lang Motz High Efficiency Cushion. 40 cells 9 P. V. or 40 cells 11 P. V. Hy-Cap - - - - - - - - - - - - - - $2800.00

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

CHASSIS *No. 44—Enclosed Chain. No. 45 —Shaft Drive.* Wheels and Tires, 34 x 4″ Special Electric Pneumatic or 36 x 4″ Rauch & Lang Motz High Efficiency Cushion. 24 cells 13 M. V. or 24 cells 15 M. V. Hy-Cap, $2450.00

Chassis No. 444—Enclosed Chain. No. 445—Shaft Drive. 40 cells 9 M. V. or 40 cells 11 M. V. Hy-Cap - - - - - - - - - - $2550.00

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

VICTORIA (Vis à Vis)

Body Design Copyrighted

Wheel Base, 91″

BROUGHAM
Body Design Copyrighted
Wheel Base, 91″

CHASSIS *No. 44—Enclosed Chain. No. 45—Shaft Drive.* Wheels and Tires, 34 x 4″ Special Electric Pneumatic or 36 x 4″ Rauch & Lang Motz High Efficiency Cushion. 24 cells 13 M. V. or 24 cells 15 M. V. Hy-Cap, $2800.00

Chassis No. 444—Enclosed Chain. No. 445—Shaft Drive. 40 cells 9 M. V. or 40 cells 11 M. V. Hy-Cap - - - - - - - - - - $2900.00

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

CHASSIS *No. 44—Enclosed Chain. No. 45—Shaft Drive.* Wheels and Tires, 34 x 4″ Special Electric Pneumatic or 36 x 4″ Rauch & Lang Motz High Efficiency Cushion. 24 cells 13 M. V. or 24 cells 15 M. V. Hy-Cap, $3000.00

Chassis No. 444—Enclosed Chain. No. 445—Shaft Drive. 40 cells 9 M. V. or 40 cells 11 M. V. Hy-Cap - - - - - - - - - - $3100.00

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

LANDAULETTE

Body Design Copyrighted

Wheel Base, 91″

COACH

Body Design Copyrighted

Wheel Base, 109″

CHASSIS *No. 454—Enclosed Chain. No. 455—Shaft Drive.* Wheels and Tires, 34 x 4″ Special Electric Pneumatic or 36 x 4″ Rauch & Lang Motz High Efficiency Cushion. 40 cells 9 M. V. or 40 cells 11 M. V. Hy-Cap, $3800.00

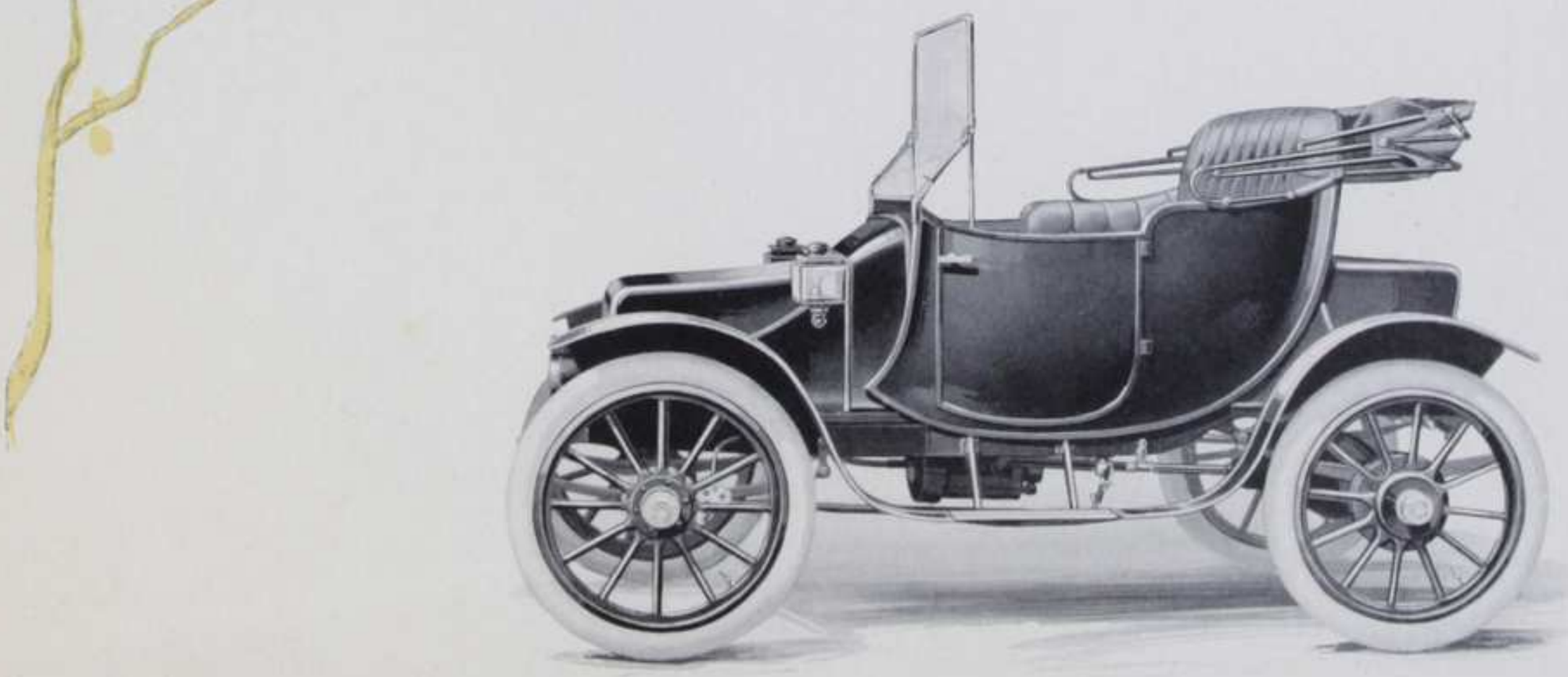
Two Side Lamps, Two Headlights.

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

CHASSIS *No. 444—Enclosed Chain. No. 445 —Shaft Drive.* Wheels and Tires, 34 x 4″ Special Electric Pneumatic or 34 x 4″ Rauch & Lang Motz High Efficiency Cushion. 40 cells 9 M. V. or 40 cells 11 M. V. Hy-Cap, $2600.00

Two Side Lamps, Two Headlights.

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.



ROADSTER

Body Design Copyrighted

Wheel Base, 91″

CLUB ROADSTER

Body Design Copyrighted

Wheel Base, 91″

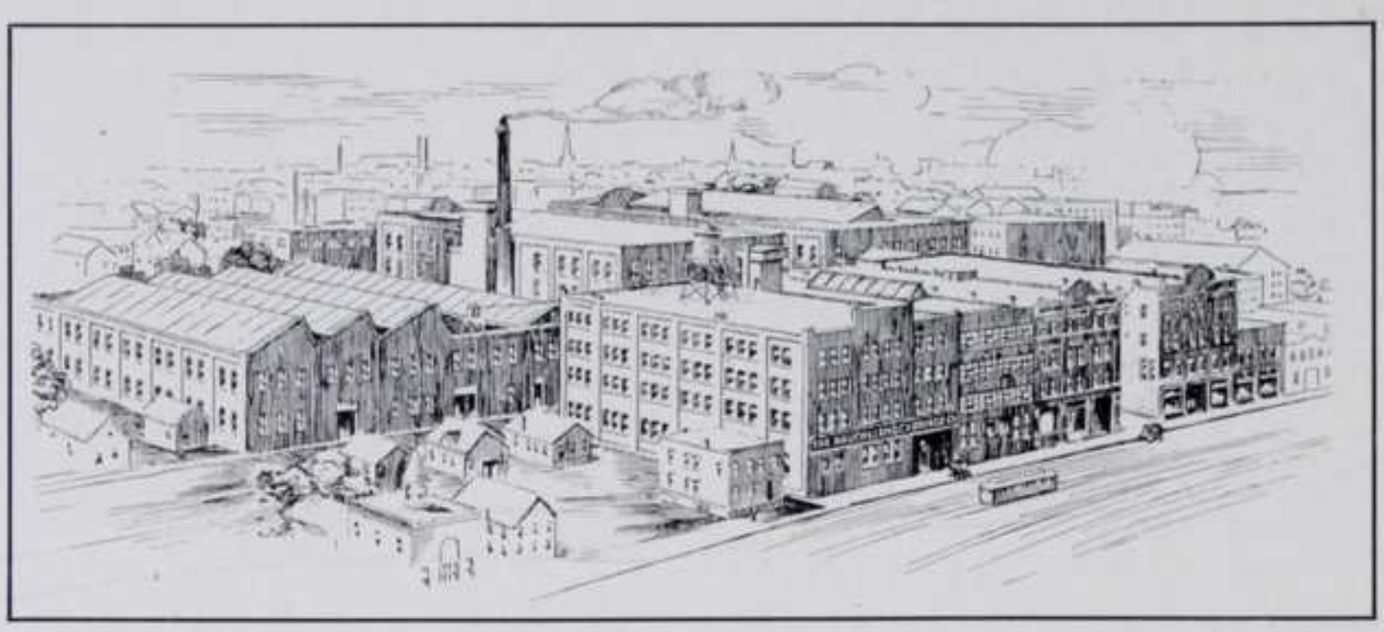
CHASSIS *No. 444—Enclosed Chain. No. 445—Shaft Drive.* Wheels and Tires, 34 x 4″ Special Electric Pneumatic or 34 x 4″ Rauch & Lang Motz High Efficiency Cushion. 40 cells 9 M. V. or 40 cells 11 M. V. Hy-Cap, $2800.00

Two Side Lamps, Two Headlights.

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

Descriptive

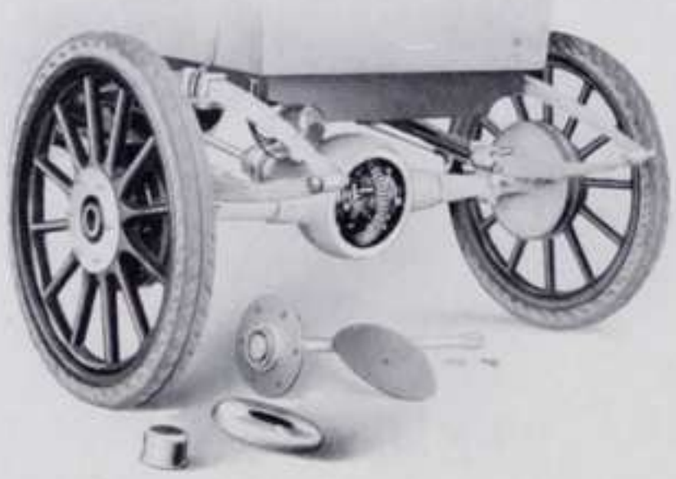
Rauch & Lang Electrics



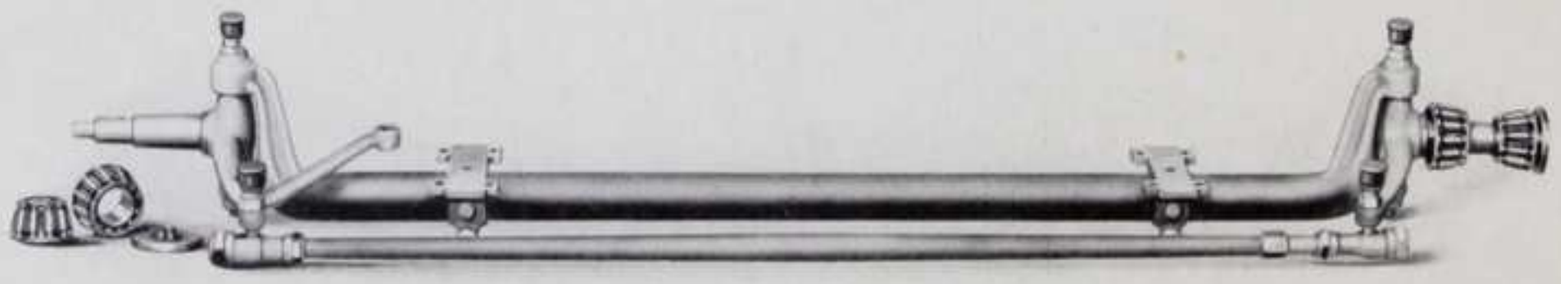
THE closing of the year 1911 and the beginning of 1912 marks another season of Rauch & Lang success. Since the very first it has been the policy of its founder and of his successors to make their product the best, and now on looking into the past, over a period of sixty years, a gratifying series of successful accomplishments and of public approval can be reviewed.

From the beginning it was realized that the use of the best material, together with the most skillful workmanship, does not necessarily create a product that will be considered of the highest quality, nor meet the increasing demands year after year of those who buy only the best, for there is that essential thing—service, without which no one can long hope to retain the confidence and the patronage of the public.

Service guarantees to the owner the uninterrupted use of his car. It is certain that the longer the vehicle has been in commission and the more it has become a necessity and the less a luxury, the more keenly the owner feels its temporary loss. After a period of time there may be a demand for repair parts and it must bring a feeling of security to the owner to know that the concern that manufactured the car and not only assembled, but makes all its parts, is standing behind its product and is ready to make prompt delivery of such parts at a reasonable cost.



Everyone can see that the growth of the automobile industry has been astonishing; in fact, there is nothing in the world's

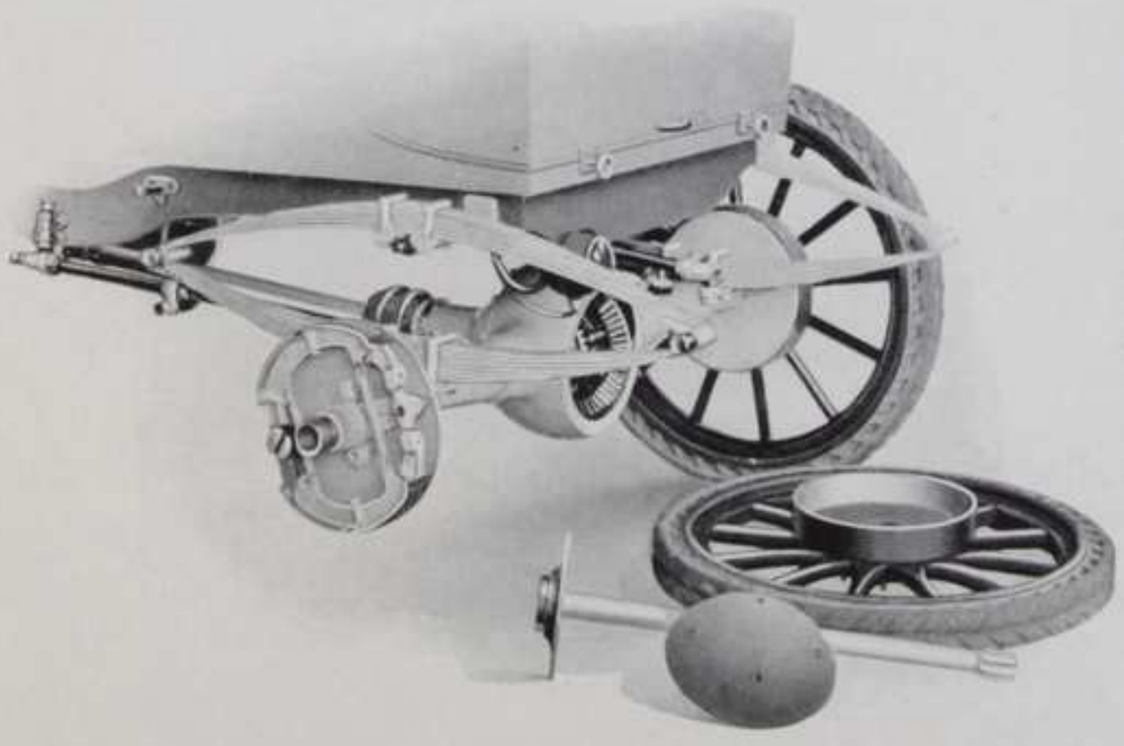


history to compare with it. This has necessitated a rapid change in methods of manufacture, of propulsion and in styles, to such an extent that the models of one year were sometimes radically different from those of the year before. In fact, with some builders it has resulted in the creation of freaks—freaks in appearance, in speed and in construction. This has brought about a rapid ageing and a correspondingly rapid fall in value when a car came into the market for resale, so that another point, that of design, is seen to be of great importance. The building of the product of this company along conservative lines, both as to style and construction, and the minor consideration given to high speed and extreme lightness where the only results can be short life, have contributed as much as good material, skilled workmanship and service to Rauch & Lang success. We need only point to the fact that our body design is not far different from that used in our earliest electrics, the same lines, the same general appearance, while some other makes have been changed so radically that there is no resemblance between their earlier and later types.

We do not aim particularly to bring out yearly models. We reserve the right to make improvements at any time and to apply them as soon as possible after their conception and test. The catalog appearing annually at about this time is merely a summary of the advances made in the preceding twelve months.

The newest models which are making their appearance late in 1911 differ in style from their immediate predecessors in being larger and lower. The increased size is in answer to the general demand for wider and deeper seats and more foot room. The small extension Coupe or the Demi-Brougham of these models has grown almost to the size of last year's large extension. In making the car lower the riding qualities and appearance have been improved.

The bodies are constructed along lines adopted a year ago. A hardwood framework supports the sheet aluminum panels and steel hoods, making the occurrence of checks utterly impossible.



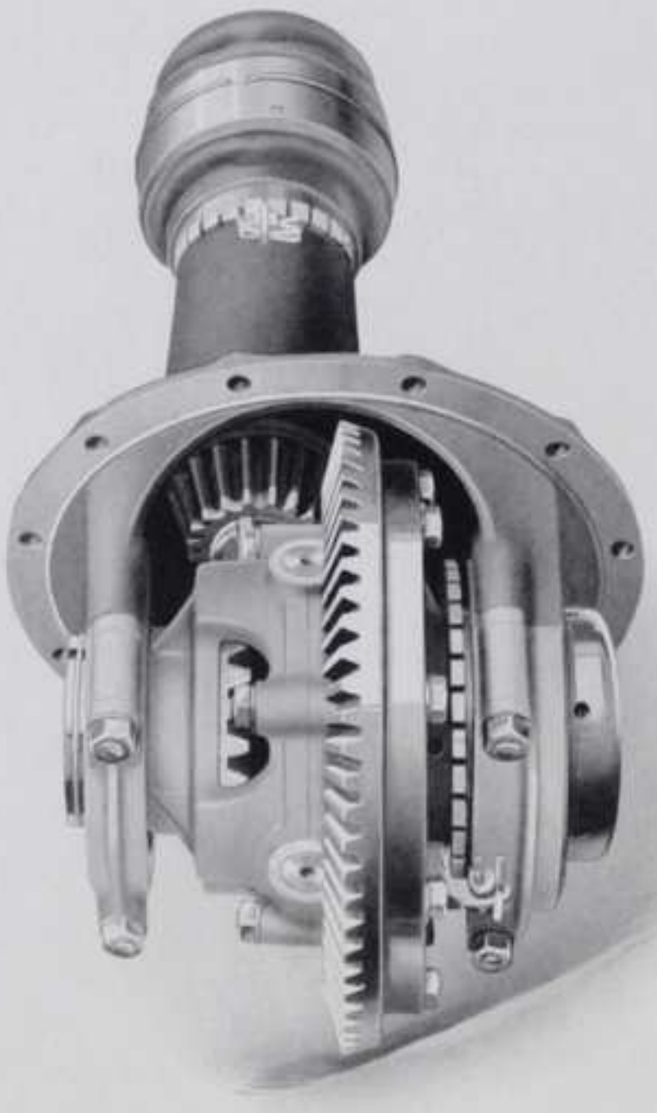
A much wider range in the selection of trimmings is open to the purchaser. Besides the shades of broadcloth and leather which have been considered standard for years, there is a wide assortment of Bedford cords and fancy cloths which have lately become very popular. With this variety of materials the painstaking work which is characteristic of Rauch & Lang product, produces results which are harmonious and elegant.

The accessories, such as toilet case, lamp switches and the like, have been given the final touch to bring them up to the level of excellence of the balance of the car and to make them all that can be desired.

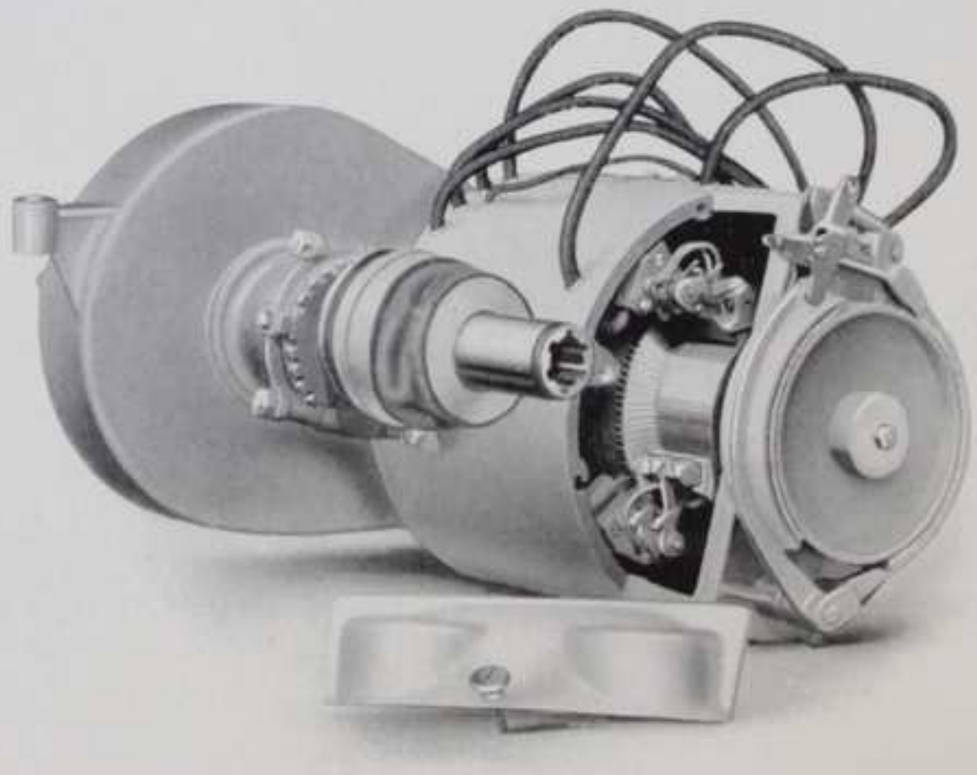
A very important feature is our new side lamp, of the same general appearance as heretofore. We have succeeded by the use of a special reflector and suitable bulb to produce a powerful searchlight effect without introducing the additional headlight with its objectionable appearance and its waste of current.

The car mechanically is much the same as a year ago, with the addition of such adjustable features as experience shows are advisable. An electric is so much quieter than a gasoline-driven machine that any slight rattle becomes noticeable and adjustment should be provided at all points where a moving joint is subjected to serious strains. While it is found that such construction adds somewhat to the weight and cost of the car, the owner gets full pay in satisfaction, low upkeep cost and continuity of service.

The steel frame is of the type that has been standard with Rauch & Lang for seven years. It has a four-inch drop and is of deep section, amply braced.



The spring suspension of the shaft-driven car has all the desirable elements of flexibility and easy riding besides securing parallel action and the elimination of torsional strains in the rear axle. To further secure flexibility the driving from the motor unit is through two universal joints, thus allowing the axle to practically float—being held in place by the action of the



springs. Special care has been taken to provide extra large, hardened spring bolts, fitted with grease cups integral with the bolt heads. They work in phosphor-bronze bushings, insuring long life and freedom from squeaks.

The rear axle has been designed with a view of securing a particularly rugged and at the same time accurate construction. Heat-treated alloy steel is used in the tubular portion and a strength is secured such that, without permanently yielding and without the use of a truss rod or similar device, the spring seats will support a weight twelve times the largest static load to which it will ever be subjected.

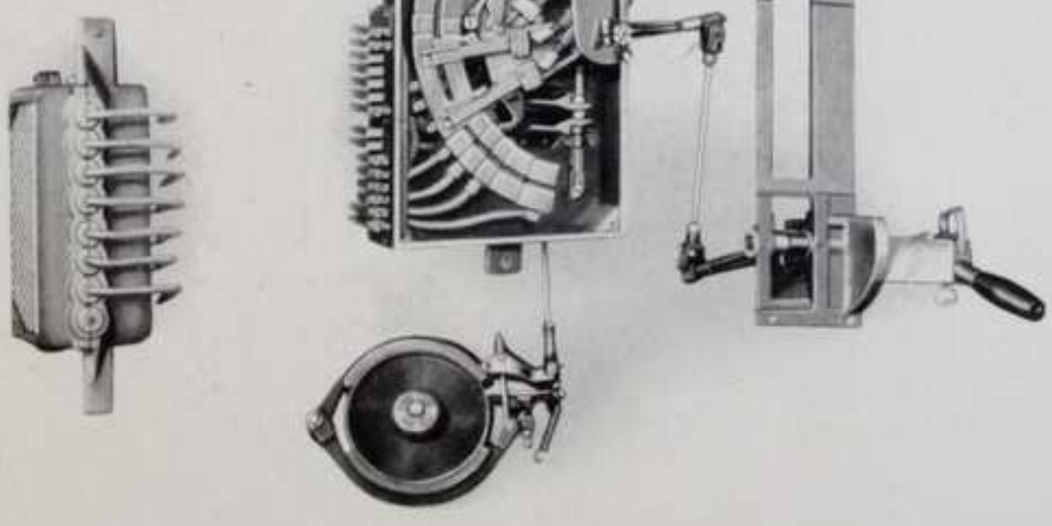
The differential, drive gear and pinion are mounted in a steel carrier that bolts against the front of the axle and is readily removable therefrom. These parts are all mounted on radial and thrust ball bearings, so arranged that all adjustments of mesh can be made by the turning of a nut behind gear and pinion respectively. An opening on the rear of the axle housing permits of access to the interior for inspection.

The drive wheels are each mounted on a large annular bearing seated on the outside of the axle tubing. Against the front of the hub is bolted the flange, which is part of the drive shaft. The drive shaft in turn fits into the differential gear and is driven thereby through six keys or splines. With this construction not only can the differential and gears be removed, but the drive shafts can be taken out of the axle without disturbing the wheels.

Owing to the lowering of the frame and body, the front axle has been given a corresponding drop. It is of the same general construction as heretofore, with ball thrusts in the spindle to make the steering easier.

The steering mechanism has been strengthened by the employment of tubing of special shape. The ball sockets are of new design and the balls themselves are much larger, giving more wear and rendering adjustments easier.

All our cars are built with the idea of being equipped, when called for, with solid



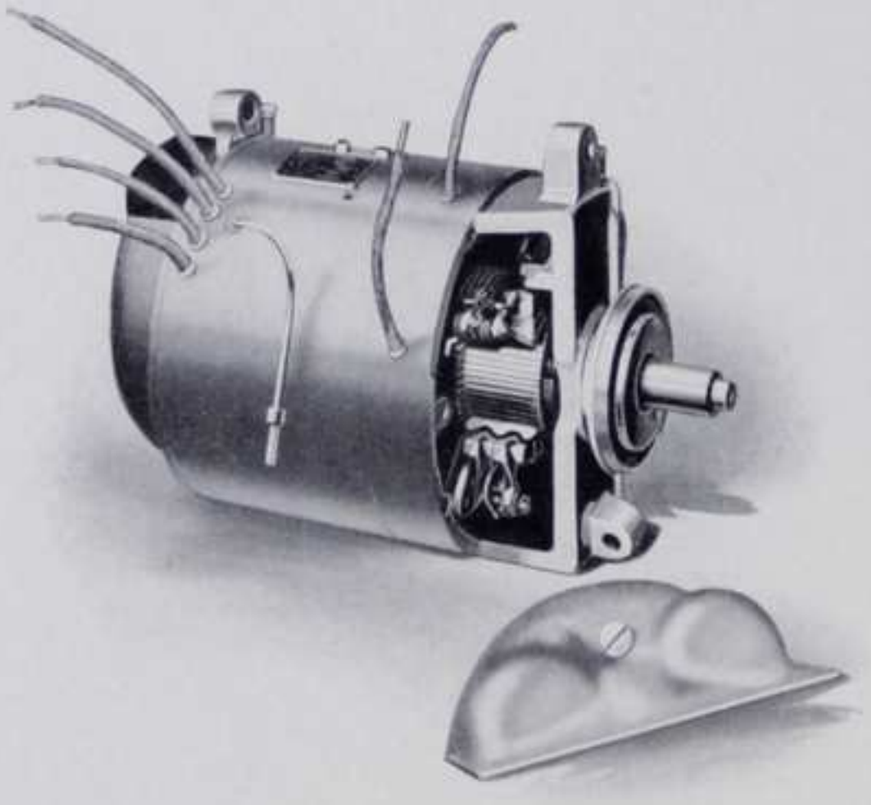
or cushion tires, and with this in view, design, material and treatment, are made to correspond. Alloy steels of various kinds, each suited to its purpose, are used throughout the car; axles, drive shafts, steering spindles and yokes, springs, gears and many other minor parts are thus carefully selected and tested and no pains are spared in their machining and treatment.

The motor is hung from a three-point suspension and includes as a unit the countershaft, which it drives through a silent chain. Ample provision has been made for oiling all bearings and chain, as well as for adjusting the latter. The motor is of the four-pole type with laminated pole pieces, large commutator surface and is very heavy in copper and iron, which produces a very powerful torque or pulling power at high efficiency. Nothing contributes as much as this to hill-climbing capacity.

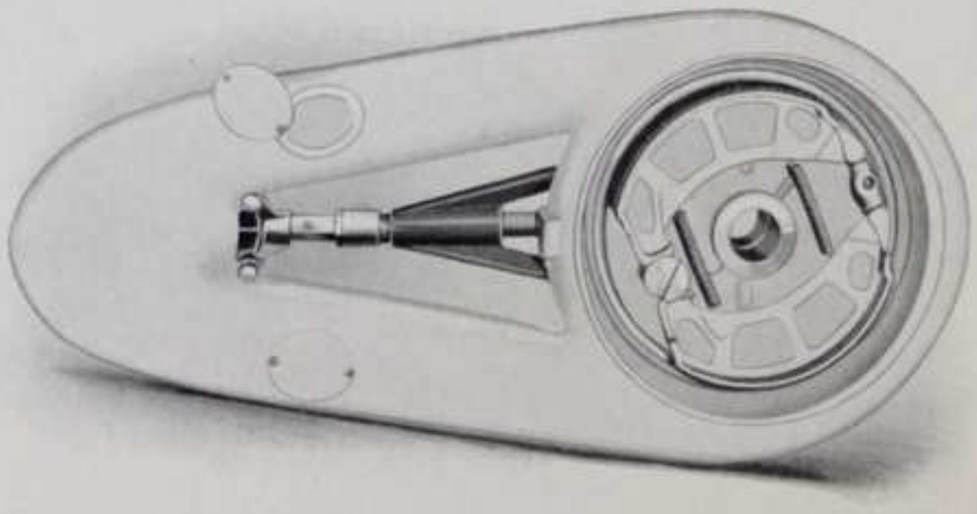
The batteries are placed under the hoods, front and rear, and are connected so as to be at all times in series. By means of the flat type controller used, a succession of speed steps is obtained, having continuous torque, so that from the first step to the highest speed there is no interruption to the pull of the motor. As a matter of safety, comfort and battery life, this is of greatest importance.

Just as it is necessary to have means of propelling the car, and as the motor, controller, batteries and auxiliary devices are intended for this purpose, it is important to have means by which the car can be stopped and held; in fact, life may be endangered by the lack of proper brakes.

Our braking system consists, first, of a pair of powerful expanding brakes, enclosed in the rear hubs and operated by a foot pedal. A roller type of expander cam makes them respond to the lightest touch and by a patented adjusting device they can be equalized and wear taken up so as to maintain them always at the point of maximum efficiency and sensitiveness.



To render the stopping of the car still more convenient, the control handle is equipped with a mechanical brake,

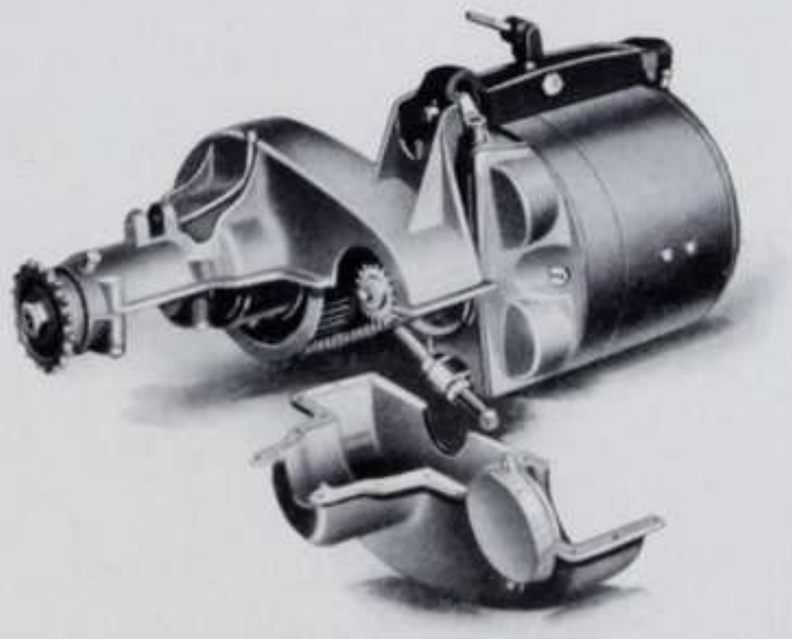


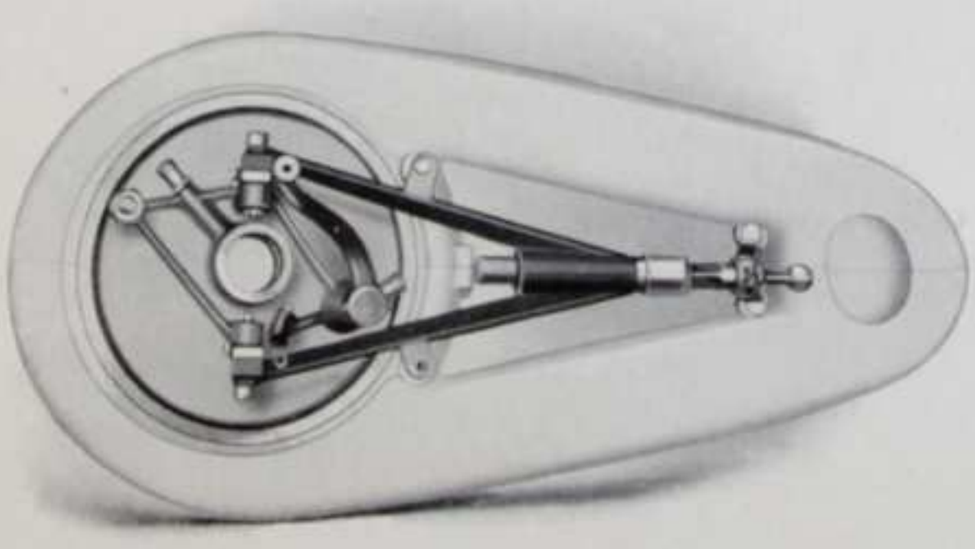
operating on the motor shaft, so that by a slight effort of the hand that controls the speed, this brake can be applied and the car brought to rest. This is perhaps the most natural and easiest executed movement when the driver gets into a place where a quick stop is required, since the same motion which shuts off the power applies the brake; there is no occasion to reach for a pedal or grasp a handle, which in an excited condition generally means a loss of time.

There is also an electric brake which is applied by the same movement of the control handle, but comes into action a little earlier. This automatically converts the motor into a generator and by its action produces torque which quickly reduces the speed of the car. Its construction is such that the action is strongest on the higher speeds where the maximum braking power is required and decreases with the speed. It is positive and dependable, requires no adjustment and wears out nothing. We have furnished both the electric and mechanical brake on our motors year after year and are convinced that they, together with a hub brake, constitute as perfect a braking system as can be produced.

A feature on which we pride ourselves as being, and for years having been, far in advance of all others, is our safety control handle. By the combination in this handle of a Yale lock with a switch for breaking the circuit, it has been arranged that with the key withdrawn from the lock, the circuit is open and the handle is locked and only to be moved into the braking position. With the key inserted and properly turned, the circuit can be closed and then, and only then, can the handle be moved forward to put the car into motion. The trigger operating the switch can be depressed at any point and power shut off instantaneously, but the circuit can again be closed only in the neutral position. Positive safety against thefts and absent-mindedness is thus secured.

Our chain-driven cars have been fitted with all the improvements and refinements which are found in the shaft models. The chassis are dropped in the same manner and the body sizes increased in proportion.





The demand for our enclosed side chain cars during the past year has been most gratifying, which indicates that in certain sections of the country there is a decided preference for these models.

To operate the car:—Insert key in face of handle and give quarter turn.—Pull handle to neutral position and raise trigger or circuit-closing device.—Place right hand on steering bar.—Push forward on the control handle until the desired speed is attained.—To stop the car, pull backward on controller handle until brakes are applied.—To reverse motion of vehicle, controller handle should be placed in neutral position, then depress foot lever located in floor and move the controller handle forward.—The vehicle can be stopped when going in either direction by pulling backward on controller handle until brakes are applied.

The remarkable increase of popularity of the electric car which began a few years ago, has been more pronounced during the past season. It has again and again been remarked that, "the electric car is coming into its own." It is beginning to occupy the position of importance, which due to its economy, safety, beauty and service, we have every reason to believe it will fill.

The electric needs practically no attention—is always ready for service—is absolutely safe; has as much speed as is necessary even where no speed traffic regulations are enforced, and owing to its ease of operation, can be readily driven by anyone without mechanical knowledge. Because of these facts the electric is recommended and is the ideal town car for everyone and every occasion. The advancement made in the last few years by the manufacturers of batteries has made possible a mileage of sufficient radius to care for all transportation needs other than touring.

With the passing of the speed mania and with the growth of the popular feeling that the automobile is not a toy, but one of the most important factors that enter into our everyday life, with the tendency of the buyer to consider more carefully the matter of value received, there can be no question of the ultimate success of the electric car.

We are manufacturing under United States patents dated as follows:

October	11, 1898	April	16, 1907	March	21, 1911
January	5, 1904	November	12, 1907	April	11, 1911
February	2, 1904	February	2, 1909	October	31, 1911
February	16, 1904	December	13, 1910		

Other patents pending.

Guarantee

WE guarantee all goods furnished by this Company for one year following the date of their shipment, based upon the date of invoice covering the goods; this guarantee being limited to the replacement in our factory of all parts giving out under normal service in consequence of defect of material or workmanship, without other responsibility on our part of any character. If the circumstances do not permit that the work shall be executed in our factory, then this guarantee is limited to the shipment, without charge, of the parts intended to replace those acknowledged to be defective.

This Company makes no guarantee whatever regarding tires or batteries.

We cannot accept any responsibility in connection with any of our motor cars when they have been altered or repaired outside of our factory.

Dealers are solely responsible to the purchaser of our goods for all undertakings and guarantees made by them beyond those expressed above.

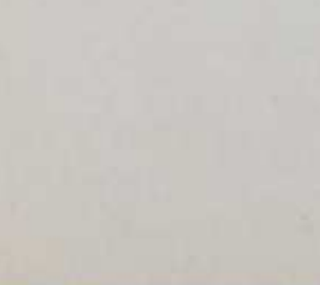
Cleveland Sales Room, Superior Avenue

THE CORDAY & GROSS COMPANY, CLEVELAND

1912
1150

Rauch & Lang
Electrics

Rauch & Lang
Electrics



Copyright 1912
The Rauch & Lang Carriage Co.
Cleveland, Ohio, U. S. A.
Issued January Fifth

Rauch & Lang Electrics

THE RAUCH & LANG CARRIAGE CO

CHARLES RAUCH, *President*

CHARLES L. F. WIEBER, *Vice Pres. & Gen. Mgr.*

CHARLES E. J. LANG, *Sec'y-Treas.*

CLEVELAND. OHIO
2180 West 25th St.

Reputation

THE Rauch & Lang Carriage Company for three score years has been working to solve vehicle problems—to make your purchase more satisfactory—to make you rejoice in the ownership of a vehicle. This means constant endeavor. In the Rauch & Lang Electrics you have the fulfillment of your ideals—because they are as near perfection as it is possible to build an electric pleasure conveyance.

Each of the electric pleasure cars shown here has as its greatest asset—Service.

The Rauch & Lang reputation has been built upon this service. For sixty years those who have purchased conveyances from this company have found the Rauch & Lang quality of service a most valuable part of each purchase.

Perfection of construction, coupled with reputation, should make it easy for you to decide that the Rauch & Lang is pre-eminently the car for your use.

STANHOPE
Wheel Base, 83½″

CHASSIS *No. 41—Shaft Drive.* Wheels and Tires, 32 x 3½″ Special Electric Pneumatic. 24 cells 9 M. V. or 24 cells 11 M. V. Hy-Cap - - - - - - - - - - - - $2100.00.

Chassis No. 43—Shaft Drive. Wheels and Tires, 32 x 4″ Special Electric Pneumatic. 24 cells 11 M. V. or 24 cells 13 M. V. Hy-Cap, $2250.00

Chassis No. 425—Shaft Drive. Wheels and Tires, 32 x 4″ Special Electric Pneumatic. 40 cells 9 P. V. or 40 cells 11 P. V. Hy-Cap, $2350.00

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

CHASSIS *No. 41— Shaft Drive.* Wheels and Tires, 32 x 3½" Special Electric Pneumatic. 24 cells 9 M. V. or 24 cells 11 M. V. Hy-Cap - - - - - - - - - - - - - $2400.00

Chassis No. 43—Shaft Drive. Wheels and Tires, 32 x 4" Special Electric Pneumatic. 24 cells 11 M. V. or 24 cells 13 M. V. Hy-Cap, $2550.00

Chassis No. 425—Shaft Drive. Wheels and Tires, 32 x 4" Special Electric Pneumatic. 40 cells 9 P. V. or 40 cells 11 P. V. Hy-Cap, $2650.00

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

COUPE

Body Design Copyrighted

Wheel Base, 83½"

DEMI-BROUGHAM
Body Design Copyrighted
Wheel Base, 83½″

CHASSIS *No. 43—Shaft Drive.* Wheels and Tires, 32 x 4″ Special Electric Pneumatic. 24 cells 11 M. V. or 24 cells 13 M. V. Hy-Cap - - - - - - - - - - - - - - $2700.00

Chassis No. 425—Shaft Drive. Wheels and Tires, 32 x 4″ Special Electric Pneumatic or 34 x 4″ Rauch & Lang Motz High Efficiency Cushion. 40 cells 9 P. V. or 40 cells 11 P. V. Hy-Cap - - - - - - - - - - - - - - $2800.00

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

CHASSIS *No. 44—Enclosed Chain. No. 45 —Shaft Drive.* Wheels and Tires, 34 x 4″ Special Electric Pneumatic or 36 x 4″ Rauch & Lang Motz High Efficiency Cushion. 24 cells 13 M. V. or 24 cells 15 M. V. Hy-Cap, $2450.00

Chassis No. 444—Enclosed Chain. No. 445—Shaft Drive. 40 cells 9 M. V. or 40 cells 11 M. V. Hy-Cap - - - - - - - - - - $2550.00

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

VICTORIA (Vis à Vis)

Body Design Copyrighted

Wheel Base, 91″

BROUGHAM
Body Design Copyrighted
Wheel Base, 91″

CHASSIS *No. 44—Enclosed Chain. No. 45—Shaft Drive.* Wheels and Tires, 34 x 4″ Special Electric Pneumatic or 36 x 4″ Rauch & Lang Motz High Efficiency Cushion. 24 cells 13 M. V. or 24 cells 15 M. V. Hy-Cap, $2800.00

Chassis No. 444—Enclosed Chain. No. 445—Shaft Drive. 40 cells 9 M. V. or 40 cells 11 M. V. Hy-Cap - - - - - - - - - - $2900.00

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

CHASSIS *No. 44—Enclosed Chain. No. 45—Shaft Drive.* Wheels and Tires, 34 x 4″ Special Electric Pneumatic or 36 x 4″ Rauch & Lang Motz High Efficiency Cushion. 24 cells 13 M. V. or 24 cells 15 M. V. Hy-Cap, $3000.00

Chassis No. 444—Enclosed Chain. No. 445—Shaft Drive. 40 cells 9 M. V. or 40 cells 11 M. V. Hy-Cap - - - - - - - - - - $3100.00

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

LANDAULETTE

Body Design Copyrighted

Wheel Base, 91″

COACH

Body Design Copyrighted

Wheel Base, 109″

CHASSIS *No. 454—Enclosed Chain. No. 455—Shaft Drive.* Wheels and Tires, 34 x 4″ Special Electric Pneumatic or 36 x 4″ Rauch & Lang Motz High Efficiency Cushion. 40 cells 9 M. V. or 40 cells 11 M. V. Hy-Cap, $3800.00

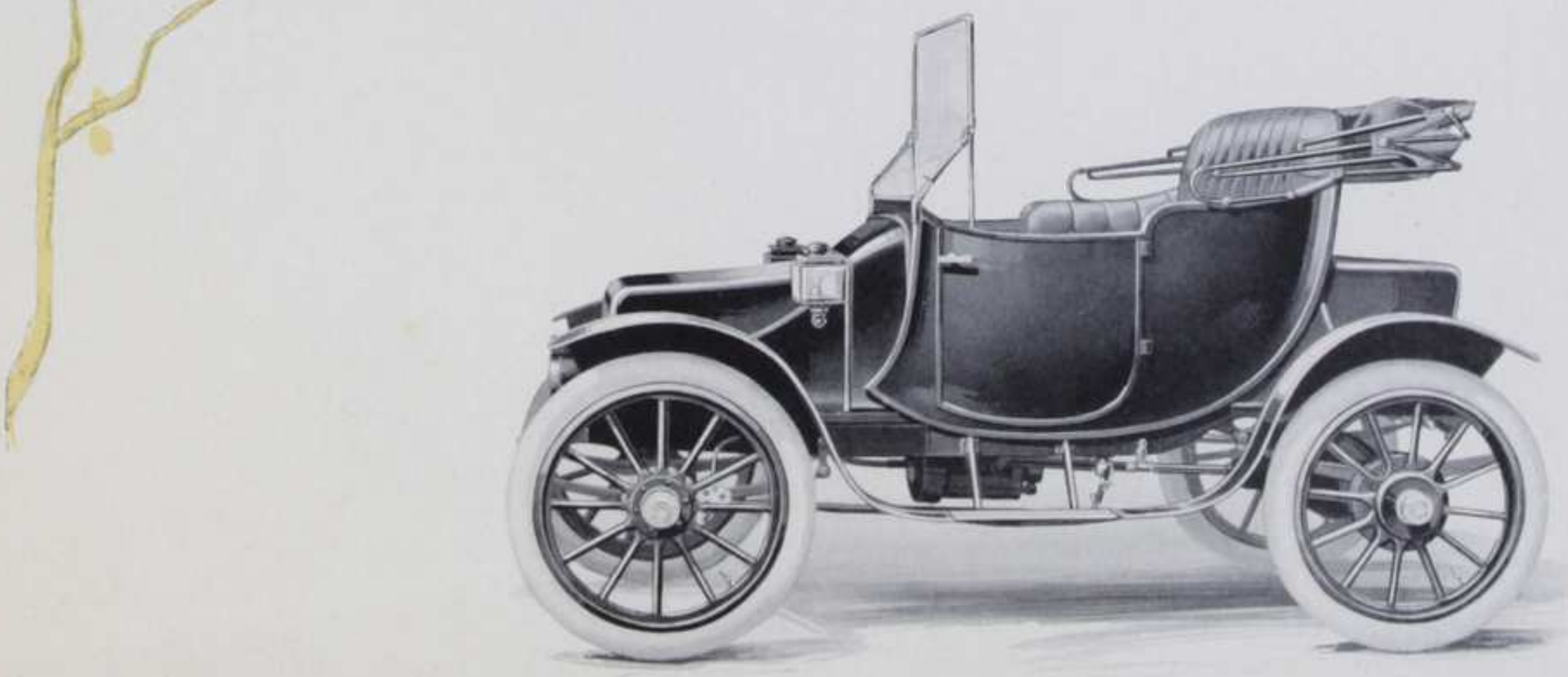
Two Side Lamps, Two Headlights.

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.

CHASSIS *No. 444—Enclosed Chain. No. 445 —Shaft Drive.* Wheels and Tires, 34 x 4″ Special Electric Pneumatic or 34 x 4″ Rauch & Lang Motz High Efficiency Cushion. 40 cells 9 M. V. or 40 cells 11 M. V. Hy-Cap, $2600.00

Two Side Lamps, Two Headlights.

Exide or Exide Hy-Cap Batteries Standard Equipment. "Ironclad" Exide Batteries furnished at additional cost.



ROADSTER

Body Design Copyrighted

Wheel Base, 91″

CLUB ROADSTER

Body Design Copyrighted

Wheel Base, 91″

CHASSIS *No. 444—Enclosed Chain. No. 445—Shaft Drive.* Wheels and Tires, 34 x 4″ Special Electric Pneumatic or 34 x 4″ Rauch & Lang Motz High Efficiency Cushion. 40 cells 9 M. V. or 40 cells 11 M. V. Hy-Cap, $2800.00

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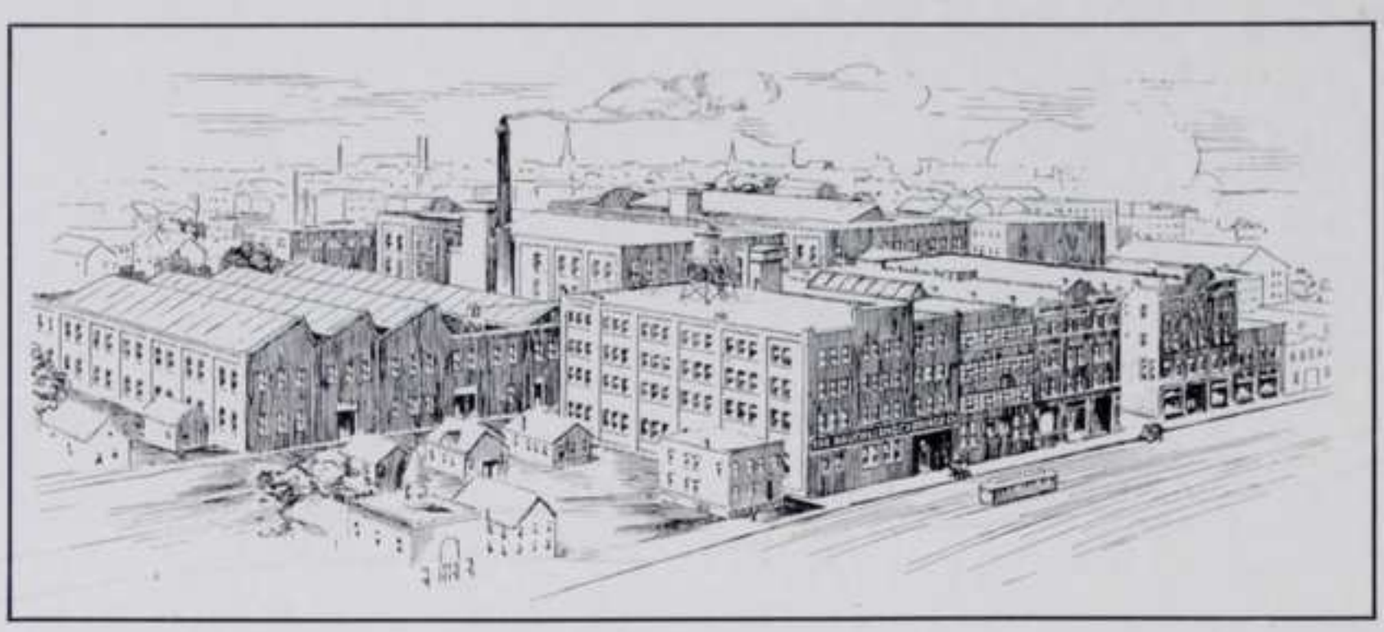
Descriptive

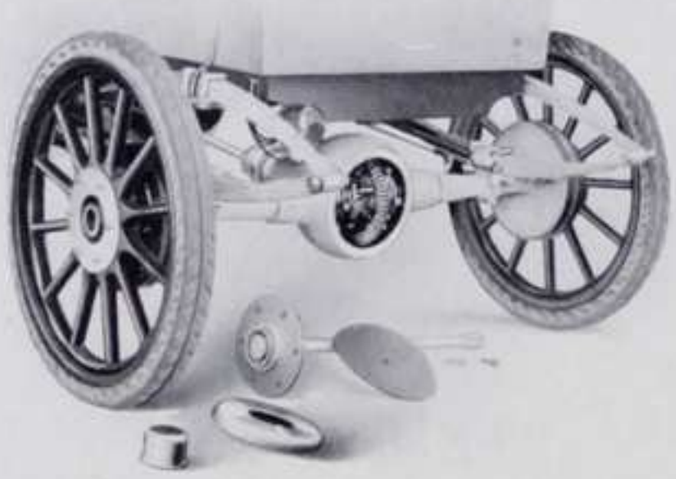
Rauch & Lang Electrics



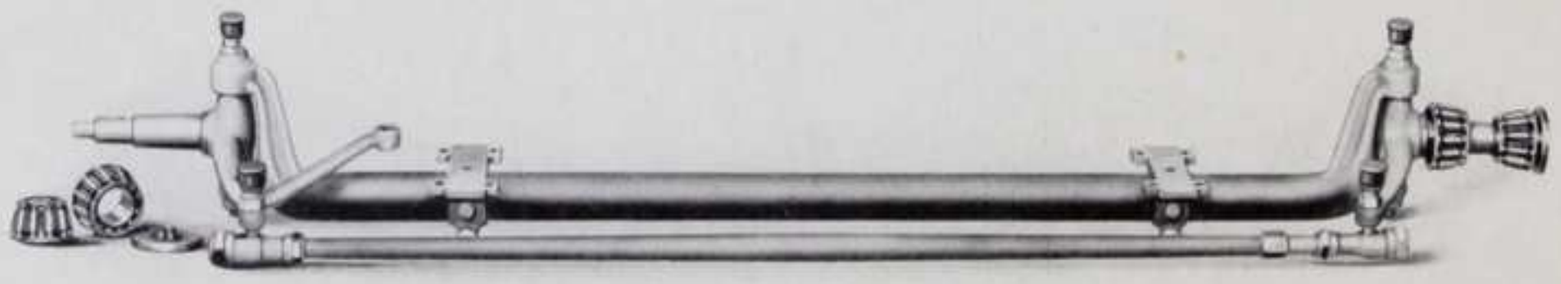
THE closing of the year 1911 and the beginning of 1912 marks another season of Rauch & Lang success. Since the very first it has been the policy of its founder and of his successors to make their product the best, and now on looking into the past, over a period of sixty years, a gratifying series of successful accomplishments and of public approval can be reviewed.

From the beginning it was realized that the use of the best material, together with the most skillful workmanship, does not necessarily create a product that will be considered of the highest quality, nor meet the increasing demands year after year of those who buy only the best, for there is that essential thing—service, without which no one can long hope to retain the confidence and the patronage of the public.

Service guarantees to the owner the uninterrupted use of his car. It is certain that the longer the vehicle has been in commission and the more it has become a necessity and the less a luxury, the more keenly the owner feels its temporary loss. After a period of time there may be a demand for repair parts and it must bring a feeling of security to the owner to know that the concern that manufactured the car and not only assembled, but makes all its parts, is standing behind its product and is ready to make prompt delivery of such parts at a reasonable cost.



Everyone can see that the growth of the automobile industry has been astonishing; in fact, there is nothing in the world's

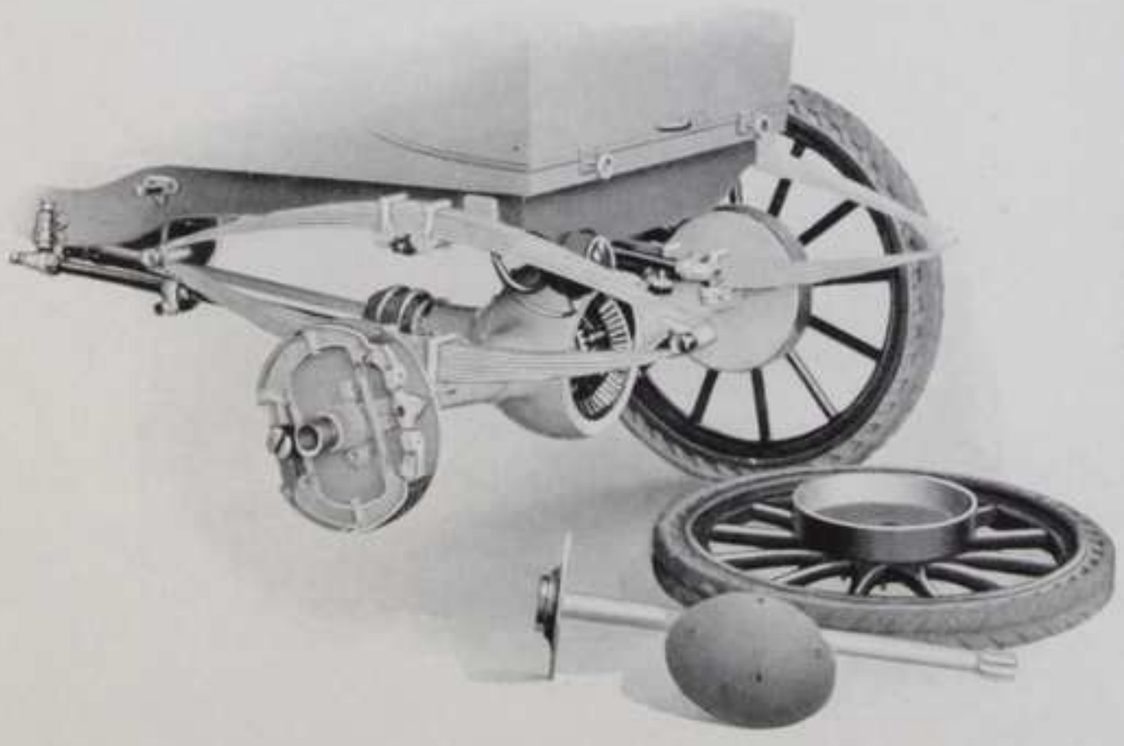


history to compare with it. This has necessitated a rapid change in methods of manufacture, of propulsion and in styles, to such an extent that the models of one year were sometimes radically different from those of the year before. In fact, with some builders it has resulted in the creation of freaks—freaks in appearance, in speed and in construction. This has brought about a rapid ageing and a correspondingly rapid fall in value when a car came into the market for resale, so that another point, that of design, is seen to be of great importance. The building of the product of this company along conservative lines, both as to style and construction, and the minor consideration given to high speed and extreme lightness where the only results can be short life, have contributed as much as good material, skilled workmanship and service to Rauch & Lang success. We need only point to the fact that our body design is not far different from that used in our earliest electrics, the same lines, the same general appearance, while some other makes have been changed so radically that there is no resemblance between their earlier and later types.

We do not aim particularly to bring out yearly models. We reserve the right to make improvements at any time and to apply them as soon as possible after their conception and test. The catalog appearing annually at about this time is merely a summary of the advances made in the preceding twelve months.

The newest models which are making their appearance late in 1911 differ in style from their immediate predecessors in being larger and lower. The increased size is in answer to the general demand for wider and deeper seats and more foot room. The small extension Coupe or the Demi-Brougham of these models has grown almost to the size of last year's large extension. In making the car lower the riding qualities and appearance have been improved.

The bodies are constructed along lines adopted a year ago. A hardwood framework supports the sheet aluminum panels and steel hoods, making the occurrence of checks utterly impossible.



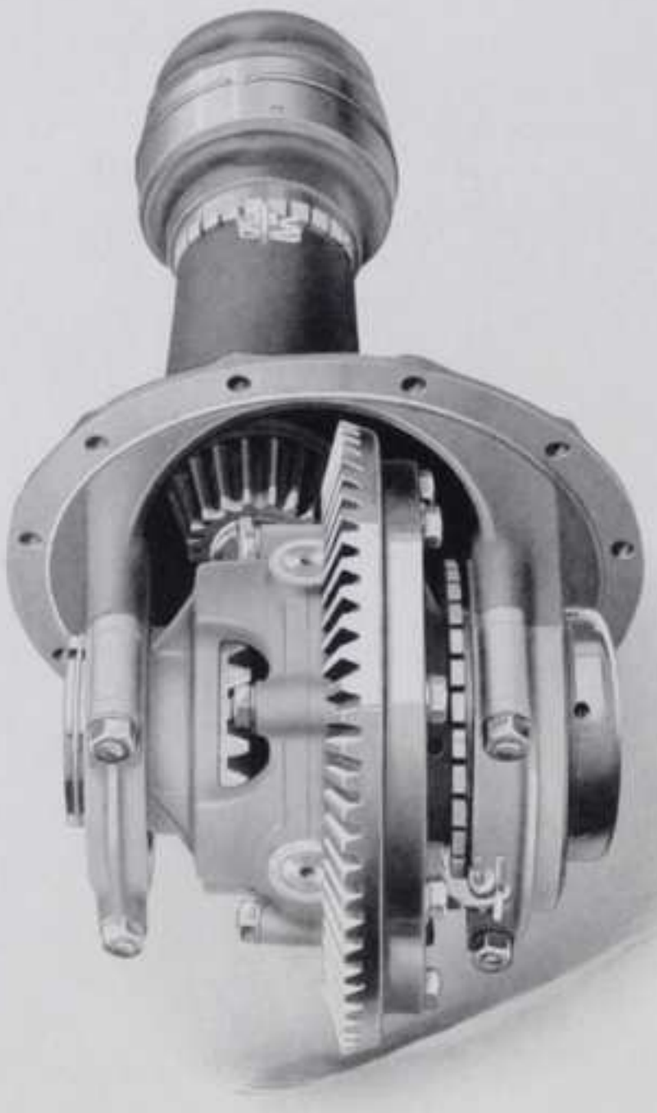
A much wider range in the selection of trimmings is open to the purchaser. Besides the shades of broadcloth and leather which have been considered standard for years, there is a wide assortment of Bedford cords and fancy cloths which have lately become very popular. With this variety of materials the painstaking work which is characteristic of Rauch & Lang product, produces results which are harmonious and elegant.

The accessories, such as toilet case, lamp switches and the like, have been given the final touch to bring them up to the level of excellence of the balance of the car and to make them all that can be desired.

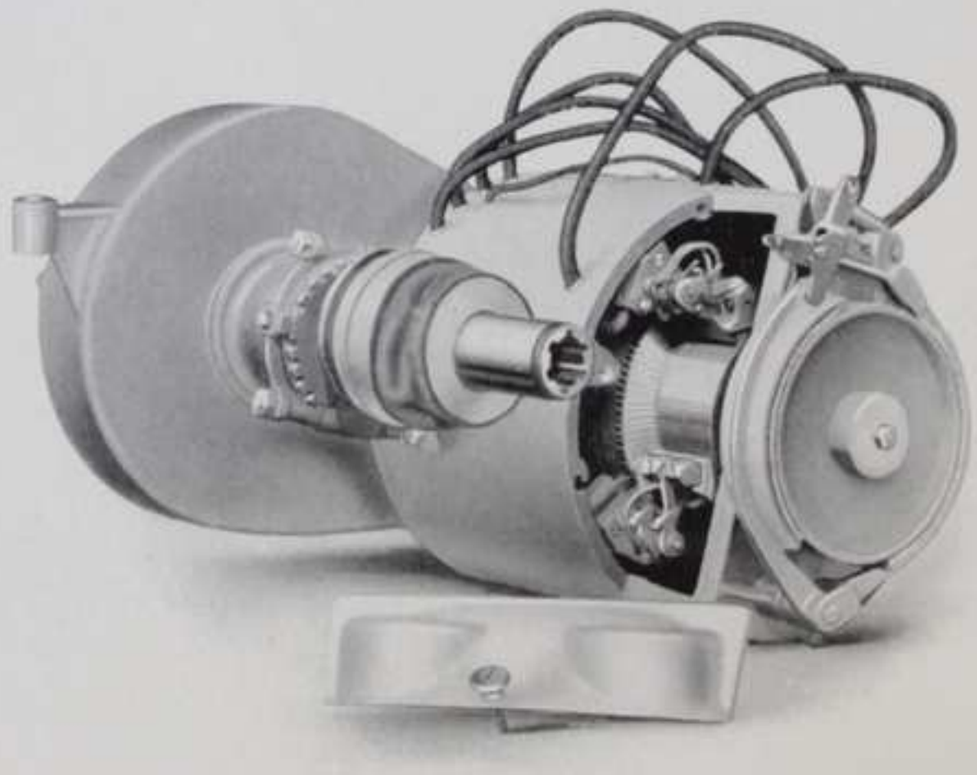
A very important feature is our new side lamp, of the same general appearance as heretofore. We have succeeded by the use of a special reflector and suitable bulb to produce a powerful searchlight effect without introducing the additional headlight with its objectionable appearance and its waste of current.

The car mechanically is much the same as a year ago, with the addition of such adjustable features as experience shows are advisable. An electric is so much quieter than a gasoline-driven machine that any slight rattle becomes noticeable and adjustment should be provided at all points where a moving joint is subjected to serious strains. While it is found that such construction adds somewhat to the weight and cost of the car, the owner gets full pay in satisfaction, low upkeep cost and continuity of service.

The steel frame is of the type that has been standard with Rauch & Lang for seven years. It has a four-inch drop and is of deep section, amply braced.



The spring suspension of the shaft-driven car has all the desirable elements of flexibility and easy riding besides securing parallel action and the elimination of torsional strains in the rear axle. To further secure flexibility the driving from the motor unit is through two universal joints, thus allowing the axle to practically float—being held in place by the action of the



springs. Special care has been taken to provide extra large, hardened spring bolts, fitted with grease cups integral with the bolt heads. They work in phosphor-bronze bushings, insuring long life and freedom from squeaks.

The rear axle has been designed with a view of securing a particularly rugged and at the same time accurate construction. Heat-treated alloy steel is used in the tubular portion and a strength is secured such that, without permanently yielding and without the use of a truss rod or similar device, the spring seats will support a weight twelve times the largest static load to which it will ever be subjected.

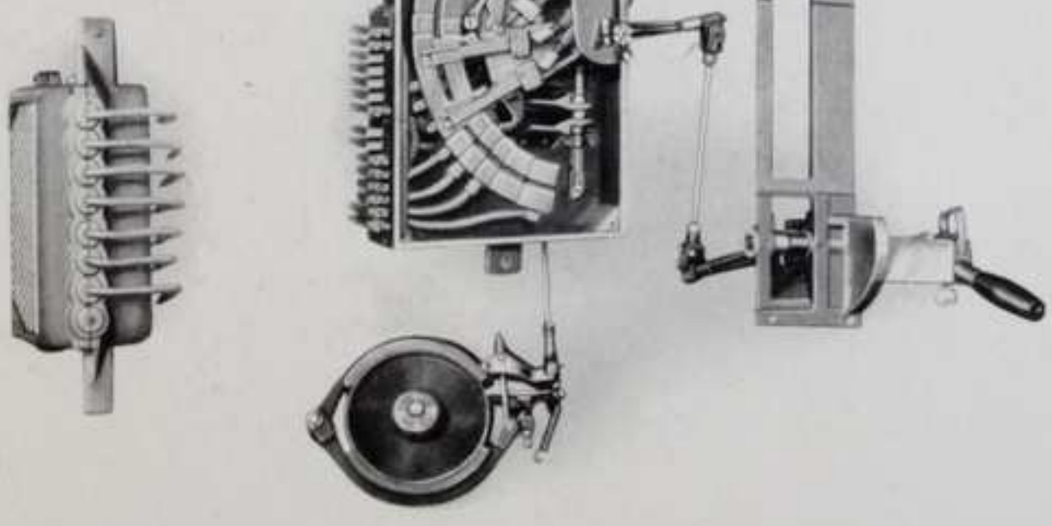
The differential, drive gear and pinion are mounted in a steel carrier that bolts against the front of the axle and is readily removable therefrom. These parts are all mounted on radial and thrust ball bearings, so arranged that all adjustments of mesh can be made by the turning of a nut behind gear and pinion respectively. An opening on the rear of the axle housing permits of access to the interior for inspection.

The drive wheels are each mounted on a large annular bearing seated on the outside of the axle tubing. Against the front of the hub is bolted the flange, which is part of the drive shaft. The drive shaft in turn fits into the differential gear and is driven thereby through six keys or splines. With this construction not only can the differential and gears be removed, but the drive shafts can be taken out of the axle without disturbing the wheels.

Owing to the lowering of the frame and body, the front axle has been given a corresponding drop. It is of the same general construction as heretofore, with ball thrusts in the spindle to make the steering easier.

The steering mechanism has been strengthened by the employment of tubing of special shape. The ball sockets are of new design and the balls themselves are much larger, giving more wear and rendering adjustments easier.

All our cars are built with the idea of being equipped, when called for, with solid



or cushion tires, and with this in view, design, material and treatment, are made to correspond. Alloy steels of various kinds, each suited to its purpose, are used throughout the car; axles, drive shafts, steering spindles and yokes, springs, gears and many other minor parts are thus carefully selected and tested and no pains are spared in their machining and treatment.

The motor is hung from a three-point suspension and includes as a unit the countershaft, which it drives through a silent chain. Ample provision has been made for oiling all bearings and chain, as well as for adjusting the latter. The motor is of the four-pole type with laminated pole pieces, large commutator surface and is very heavy in copper and iron, which produces a very powerful torque or pulling power at high efficiency. Nothing contributes as much as this to hill-climbing capacity.

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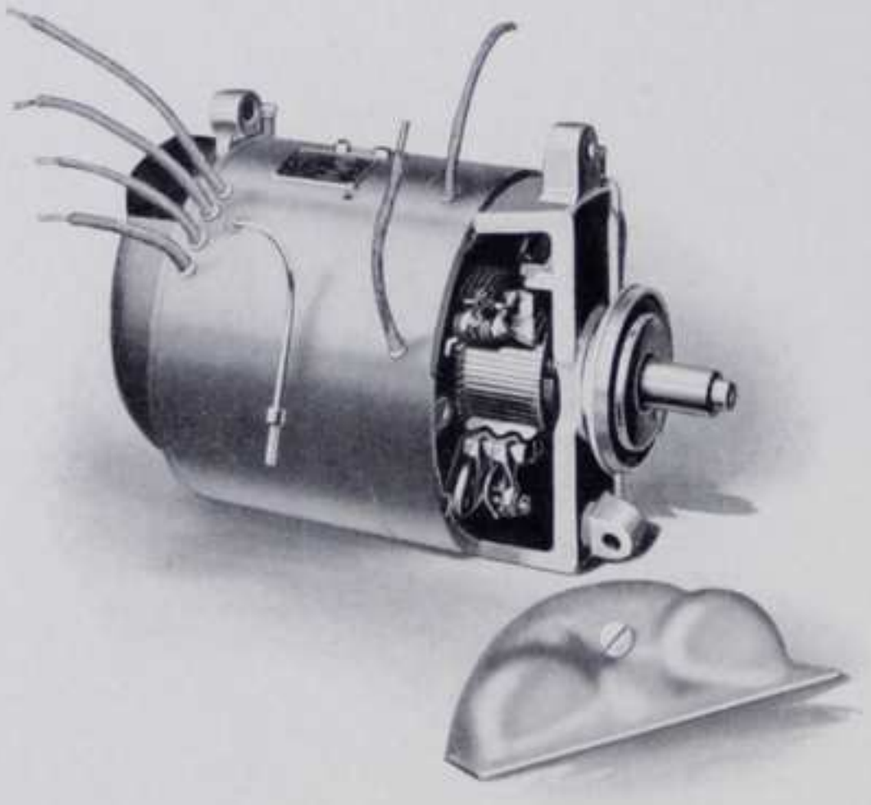

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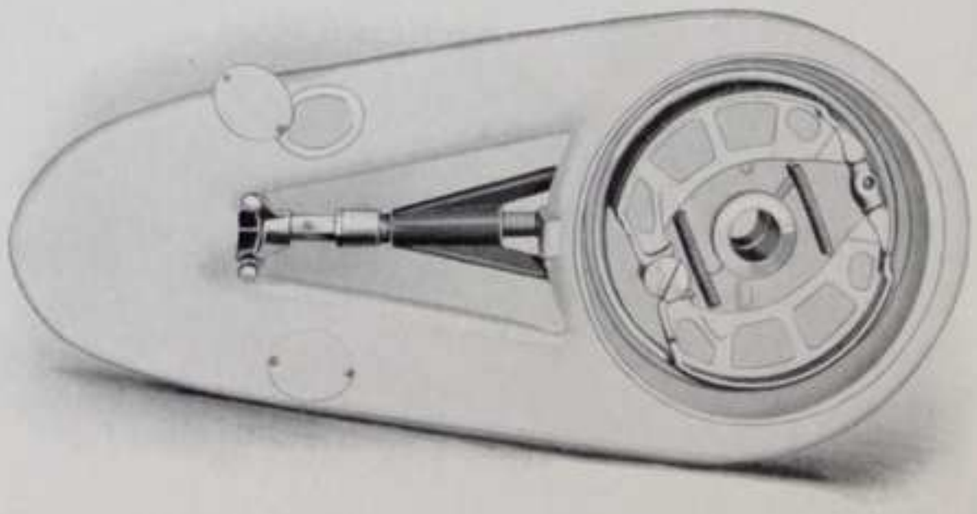

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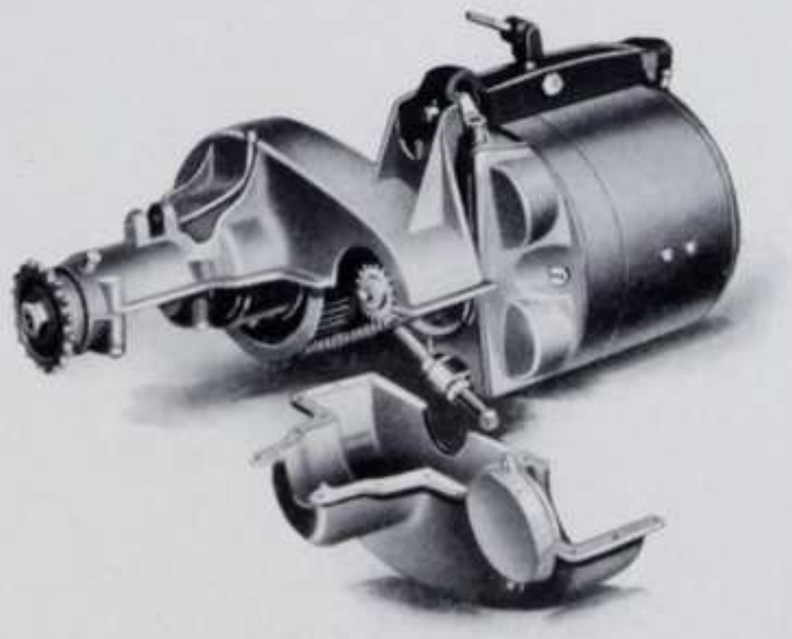
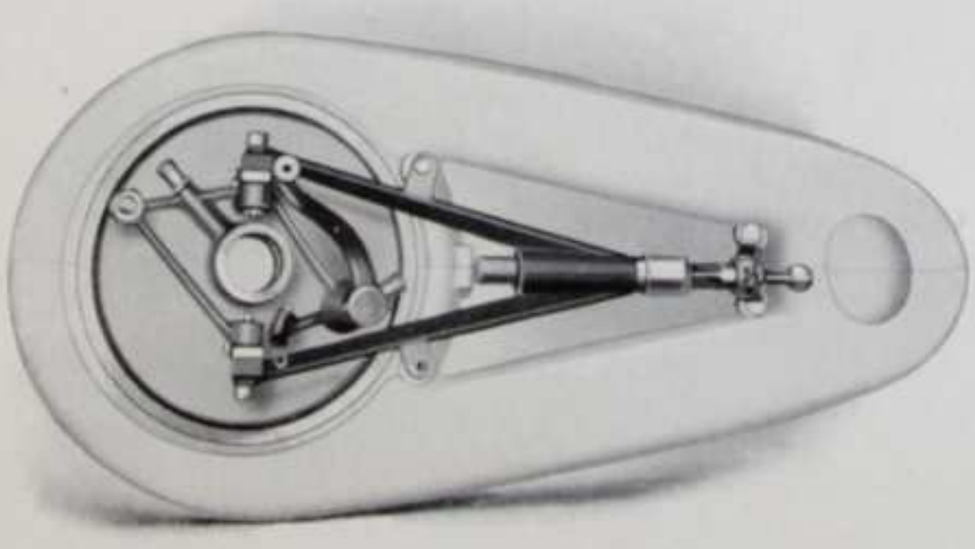
Our chain-driven cars have been fitted with all the improvements and refinements which are found in the shaft models. The chassis are dropped in the same manner and the body sizes increased in proportion.





The demand for our enclosed side chain cars during the past year has been most gratifying, which indicates that in certain sections of the country there is a decided preference for these models.

To operate the car:—Insert key in face of handle and give quarter turn.—Pull handle to neutral position and raise trigger or circuit-closing device.—Place right hand on steering bar.—Push forward on the control handle until the desired speed is attained.—To stop the car, pull backward on controller handle until brakes are applied.—To reverse motion of vehicle, controller handle should be placed in neutral position, then depress foot lever located in floor and move the controller handle forward.—The vehicle can be stopped when going in either direction by pulling backward on controller handle until brakes are applied.

The remarkable increase of popularity of the electric car which began a few years ago, has been more pronounced during the past season. It has again and again been remarked that, "the electric car is coming into its own." It is beginning to occupy the position of importance, which due to its economy, safety, beauty and service, we have every reason to believe it will fill.

The electric needs practically no attention—is always ready for service—is absolutely safe; has as much speed as is necessary even where no speed traffic regulations are enforced, and owing to its ease of operation, can be readily driven by anyone without mechanical knowledge. Because of these facts the electric is recommended and is the ideal town car for everyone and every occasion. The advancement made in the last few years by the manufacturers of batteries has made possible a mileage of sufficient radius to care for all transportation needs other than touring.

With the passing of the speed mania and with the growth of the popular feeling that the automobile is not a toy, but one of the most important factors that enter into our everyday life, with the tendency of the buyer to consider more carefully the matter of value received, there can be no question of the ultimate success of the electric car.

We are manufacturing under United States patents dated as follows:

October	11, 1898	April	16, 1907	March	21, 1911
January	5, 1904	November	12, 1907	April	11, 1911
February	2, 1904	February	2, 1909	October	31, 1911
February	16, 1904	December	13, 1910		

Other patents pending.

Guarantee

WE guarantee all goods furnished by this Company for one year following the date of their shipment, based upon the date of invoice covering the goods; this guarantee being limited to the replacement in our factory of all parts giving out under normal service in consequence of defect of material or workmanship, without other responsibility on our part of any character. If the circumstances do not permit that the work shall be executed in our factory, then this guarantee is limited to the shipment, without charge, of the parts intended to replace those acknowledged to be defective.

This Company makes no guarantee whatever regarding tires or batteries.

We cannot accept any responsibility in connection with any of our motor cars when they have been altered or repaired outside of our factory.

Dealers are solely responsible to the purchaser of our goods for all undertakings and guarantees made by them beyond those expressed above.

Cleveland Sales Room, Superior Avenue

THE CORDAY & GROSS COMPANY, CLEVELAND

Hupmobile

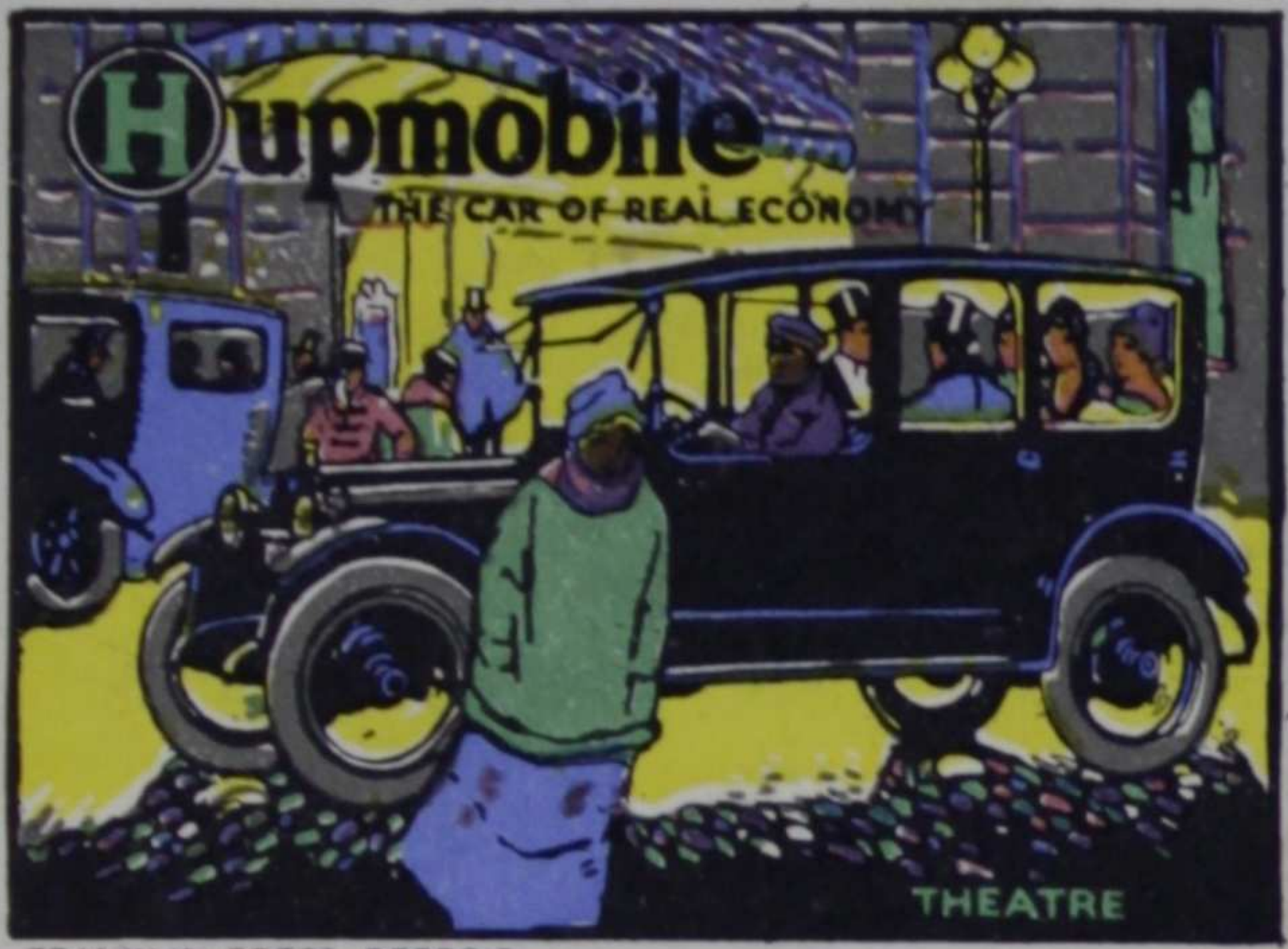
OUR purpose is to interest you in the Hupmobile.

We assume that you are already interested in automobiles — automobiles costing from $1000 to $1500. And having decided to spend about that amount for a car you are looking for the best value for your money.

We believe that the Hupmobile is the best car of its class in the world—that the Hup-

mobile can give you more for your money than any other car at anywhere near its price, regardless of size, number of cylinders or any other detail of construction.

We want you to believe what we believe, and so we ask you to make a comparison with other cars on certain definite points which, you will agree, the car you buy should have. In the car you buy



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you will want Sturdiness Power, Dependability, Economy of Operation, Simplicity of Construction, Comfort, Size and Good Looks.

Comfort, size and good looks are completely demonstrable only by seeing the car and riding in it. We can tell you that the smallest Hupmobile has a ten-foot wheel base, but words cannot make you feel the comfort of ten-inch upholstery and plenty

of room. Nor can pictures portray the superiority of finish in the Hupmobile; its real leather upholstery, its completeness of equipment. They can only give you some idea of the distinguished beauty of its low hung body, clear running boards, and smooth exterior.

Sturdiness, power, dependability, economy of operation, and simplicity of construction are motor and chas-

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sis qualities that promote your bodily safety, your freedom from annoyance, and insure the soundness of your motor car investment. These qualities can exist only where extraordinary care in the selection of materials and in manufacturing is exercised. Some twenty tests involving every part and assembly of every car insure these qualities in Hupmobiles.

The Series "N" Hupmobile has 20 per cent.

more power than its immediate predecessor. In quick pick-up and in performance on hills and in heavy going it is a veritable wonder.

Hupmobile repair costs average less than 14 cents per 1,000 miles, including breakages by accident. This is a proved record attested by 55,000 satisfied Hupmobile owners.

Simplicity of construction is an important point when adjustments

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and repairs are needed—and adjustments and repairs will be needed on whatever car you buy. The four-cylinder motor presents no difficulties to the average mechanic. Herein lies a saving of time and money.

Gasoline is a big item in the debit column of your automobile investment. The Series "N" Hupmobile averages from 14 to 16 miles to the gallon of gasoline. These figures are from cars in

service and not from "tests." They are extraordinary for a car of Hupmobile size. We gladly let them stand to be equalled or bettered by any car of comparable weight and price.

These are but bare outlines and statements of what the Hupmobile can do to meet the test of merit which we have imposed. You must find proof of our claims from Hupmobile owners and automobile owners in

general—for Hupmobile reputation is a thing we are proud of.

We ask and expect you to demand demonstration and proof of every advertised quality from the nearest Hupmobile dealer—ask him to equal in demonstration what other cars in the Hupmobile price class have done.

May we send you this dealer's name?

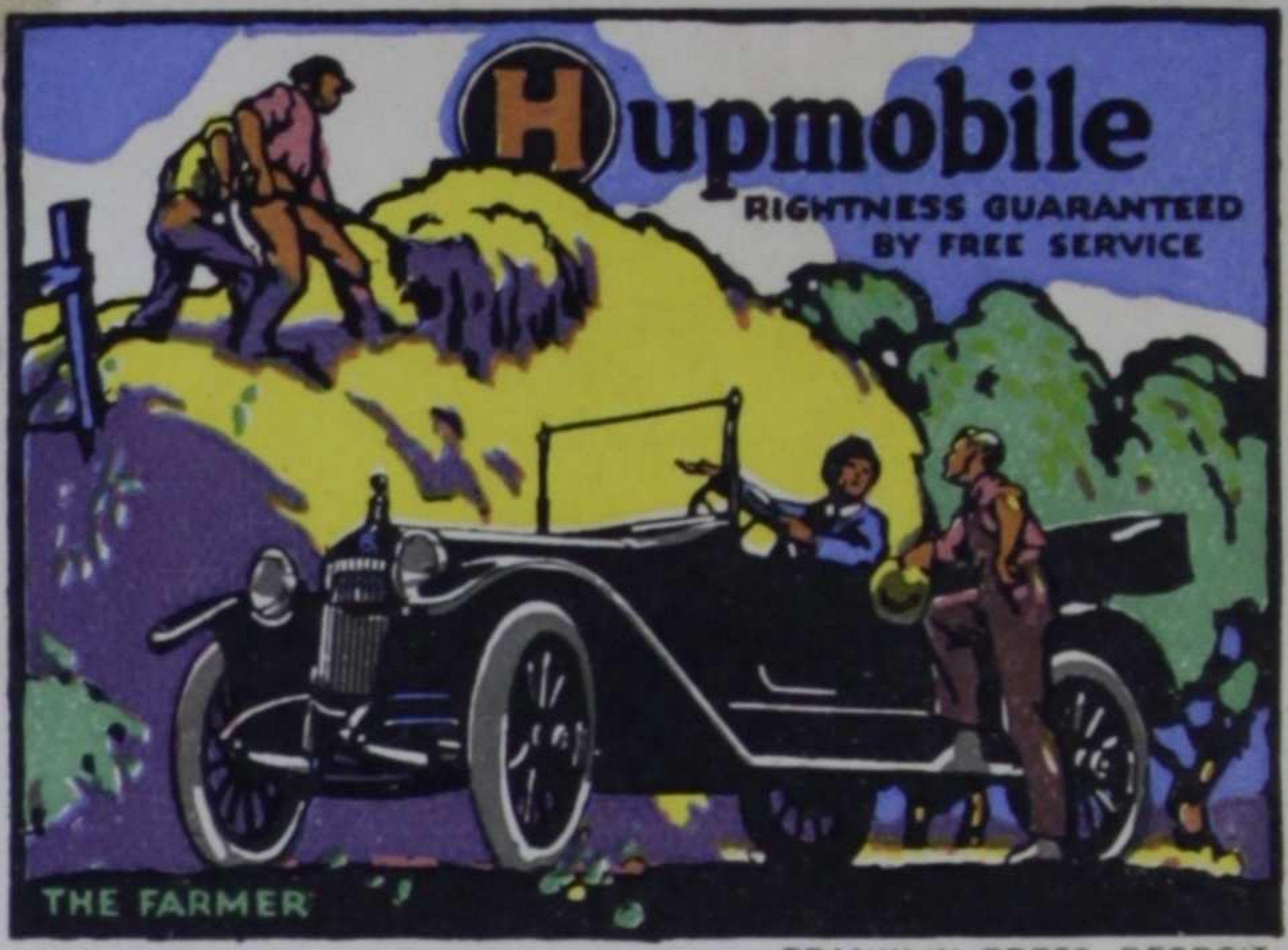
He will also gladly show you the seven

beautiful Hupmobile models which give the buyer the widest range of selection:

5-passenger Touring Car, $1085; (119-inch wheel base, 34x4-inch tires.) 2-passenger Roadster, $1085. 7-passenger Touring Car, $1225; (134-inch wheel base, 35x4½-inch tires). Sedan, $1365. Limousine, $2365; (134-inch wheel base, 35x4½-inch tires). Year-'Round Touring Car, $1185. Year-'Round Coupe, $1165.

Hupp Motor Car Corporation
Detroit, Michigan

Jackson, Mich. **Windsor, Ont.**



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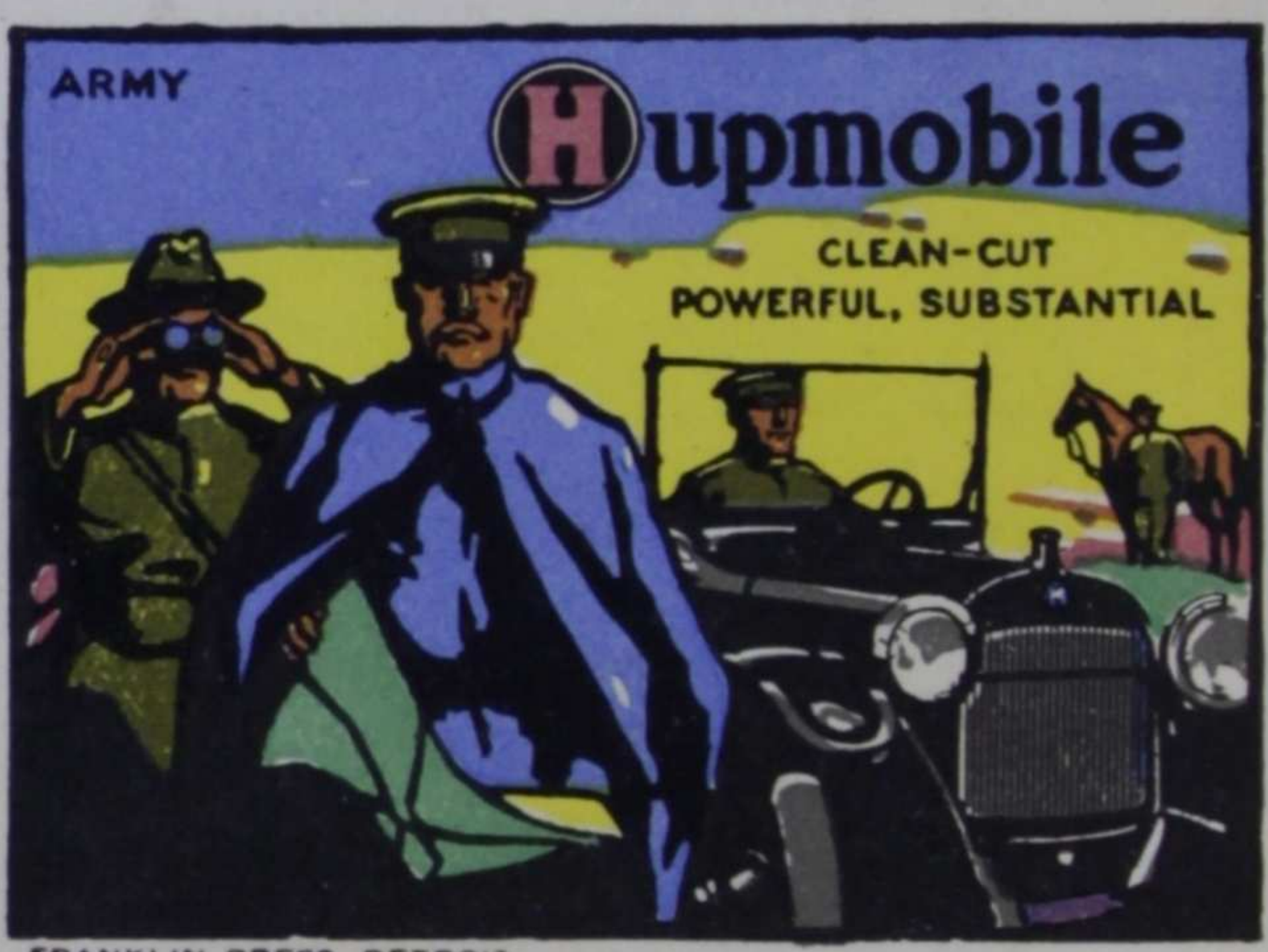

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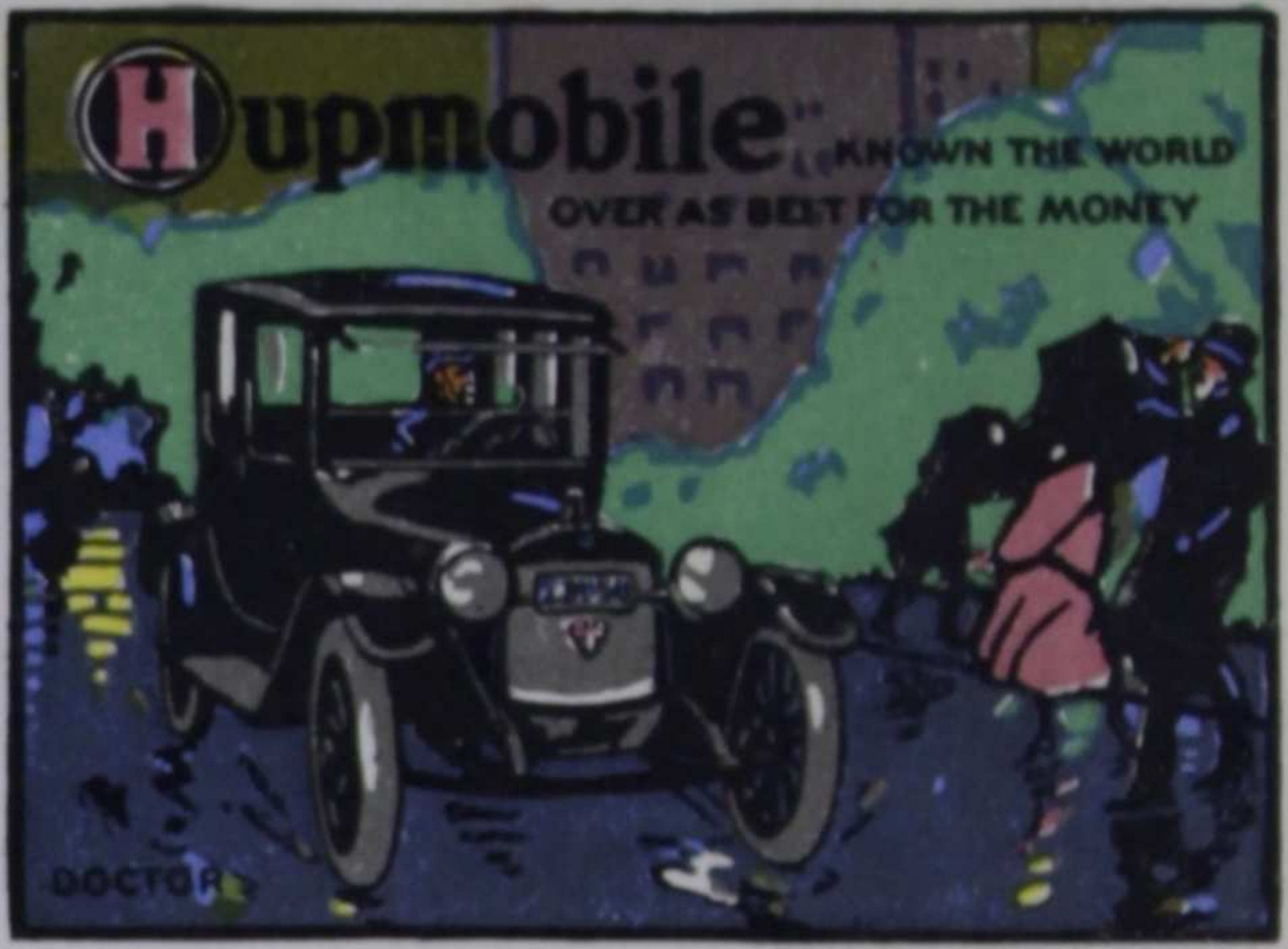

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HUPMOBILE GUARANTEED FREE SERVICE

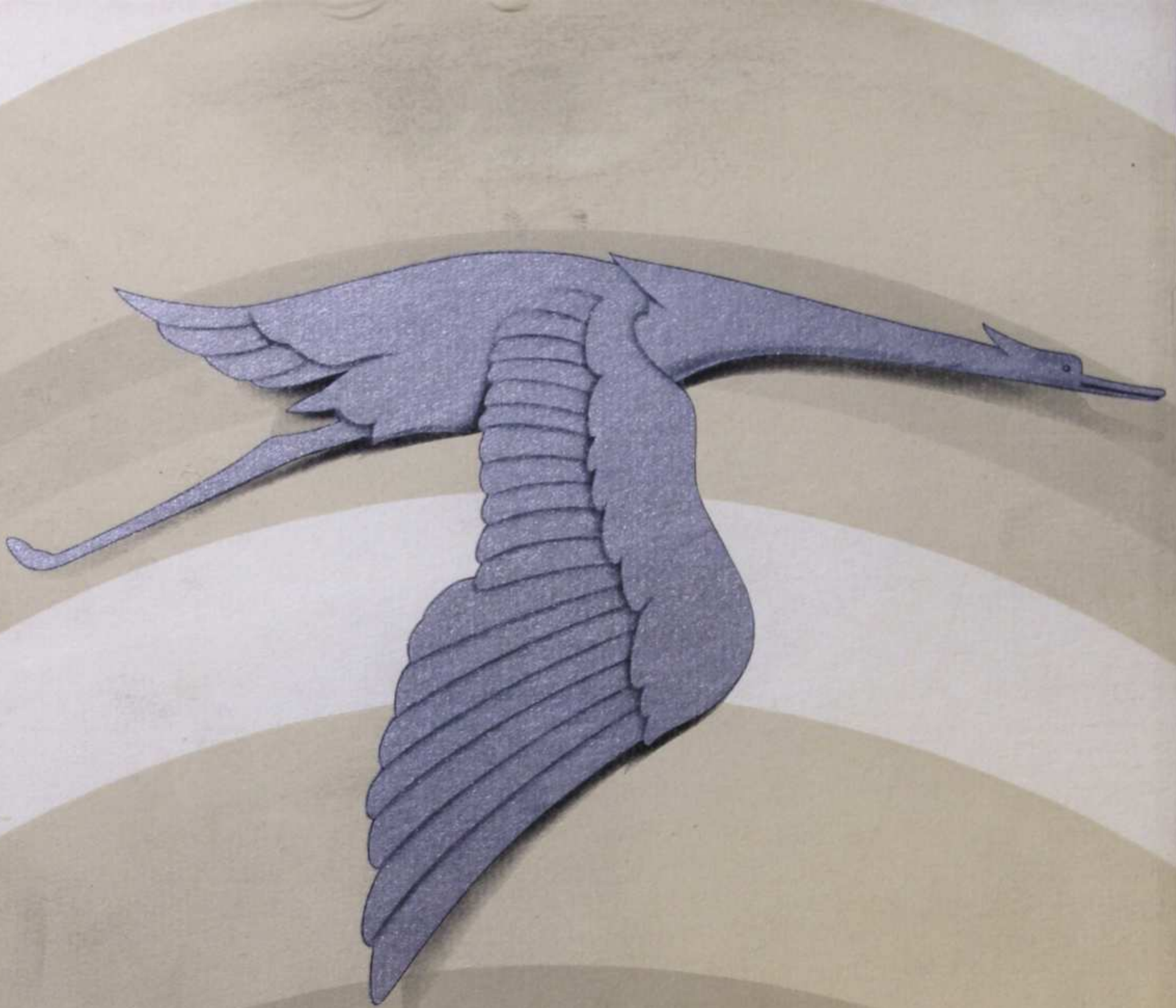
A BOOK of 100 coupons is given free of cost with every Hupmobile. Each coupon entitles the owner to a half-hour's free service labor on his car at any Hupmobile service station in the United States or Canada. These coupons insure expert adjustment, inspection and service for 10 months. Here is guaranteed service—so tangible, so definite and so practical that you cannot afford to purchase any car without first learning all of the details of the Hupmobile National Service plan.

BRIEF SPECIFICATIONS

Rear Axle: Floating spiral bevel type.
Brakes: Two sets, acting on rear drums.
Carburetor: Horizontal type—automatic. Heated intake manifold.
Clutch: Multiple disc; 17 saw steel discs.
Control: Left drive, center control. Enter from either side.
Cam Shaft Bearings: Bronze shell, babbitt lined.
Crank Shaft Bearings: Phosphor bronze shells lined with babbitt.
Ignition: Generator type—Atwater Kent ignition.
Lubrication: Combination force feed and splash system.
Motor: "L" head type; four cylinders cast en bloc—3¾-inch bore by 5½-inch stroke. Aluminum pistons.
Radiator Cooling: Self-circulating system. Motor never overheats.
Starter: Electric motor operated by pedal. Separate generator.
Valves: Tungsten steel forged in one piece. Will not warp or pit.
Regular Equipment: Electric starting and lighting system; Golde one-man top; Collin's quick-acting side curtains; speedometer; robe rail; foot rail; five demountable rims; non-skid tires on rear wheels; electric horn; exclusive type windshield; tools, etc.

The mark of superior motor car service

Hupmobile



HISPANO-SUIZA

(BIRKIGT-PATENTS)

Automobiles, Aviation and Marine Motors

Sole American Representative

CLARKE D. PEASE Inc.

NEW YORK — PARIS

PREPARED for those who will most appreciate the significance of HISPANO-SUIZA AUTOMOBILES, AVIATION AND MARINE MOTORS to the world of modern transportation, this book, suggesting something of their unrivalled performance and appearance,

is presented to

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with the compliments of

MR. CLARKE DEMOREST PEASE, President

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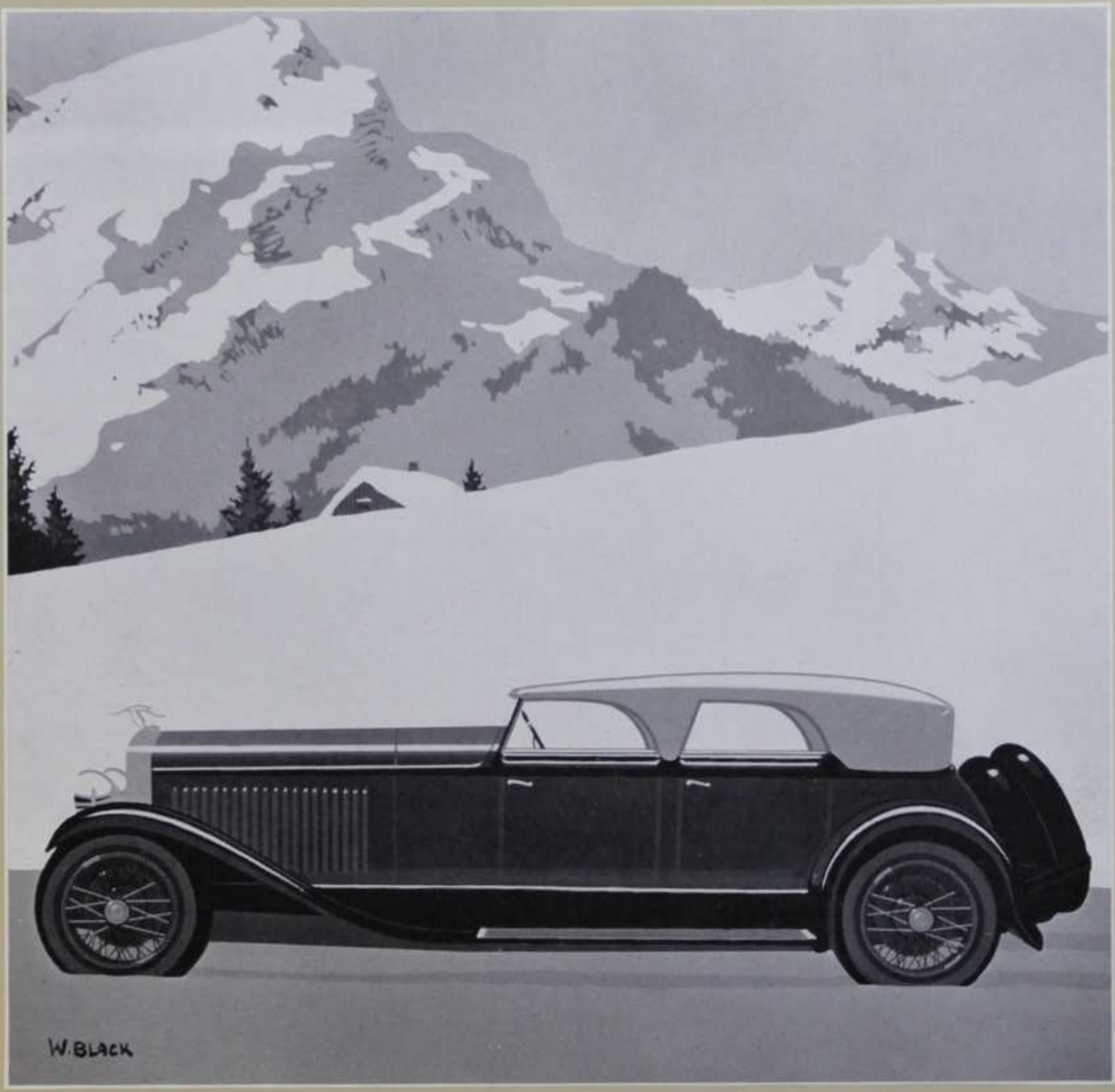

HISPANO-SUIZA TOURING CAR

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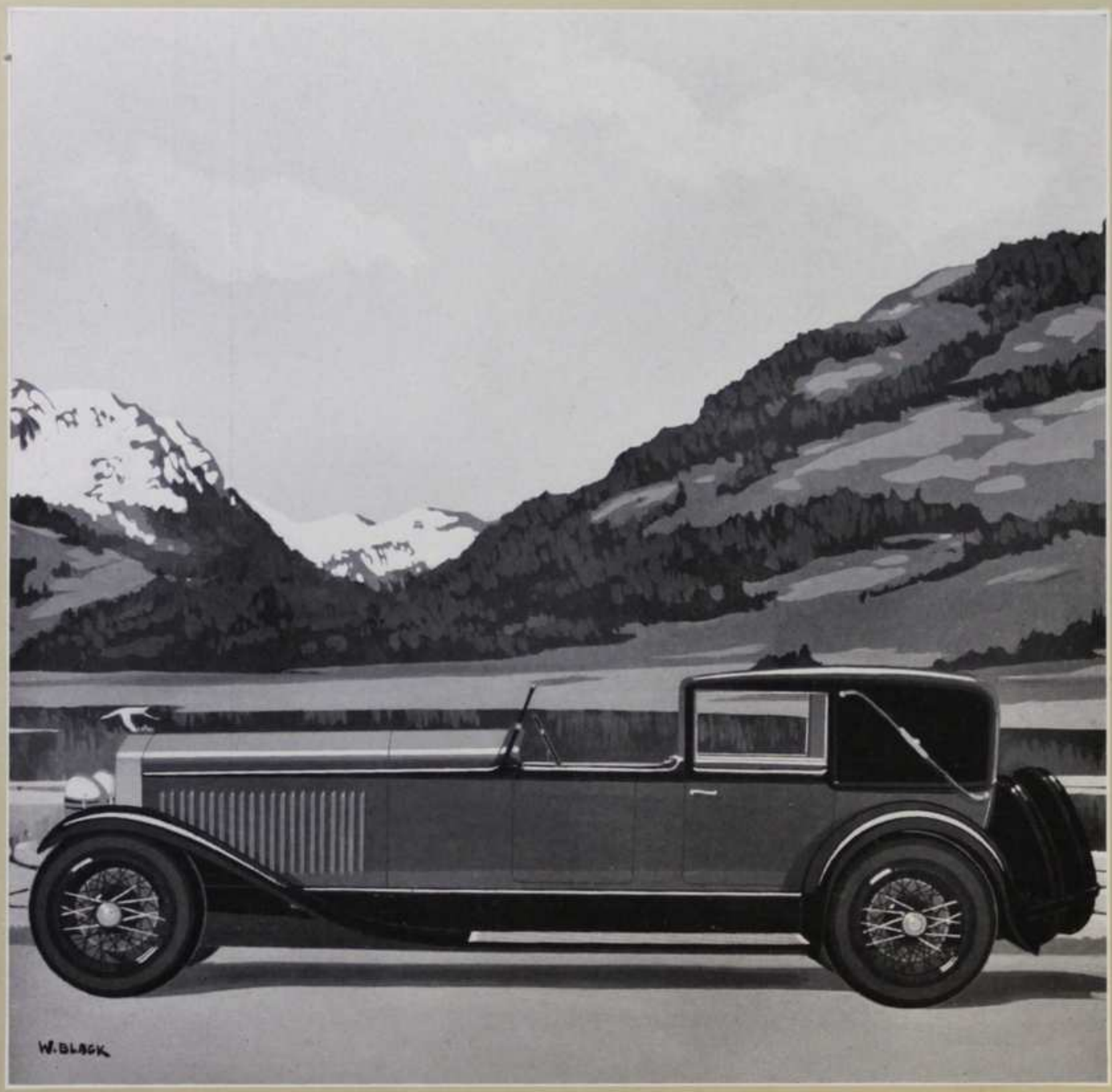
HISPANO-SUIZA AUTOMOBILE MOTORS

Composition de René Lelong

QUEEN OF THE ROAD

Captain Barnato at Brooklands with Hispano-Suiza Automobile Motor winning the world's speed records November 11th, 1924, Class "H" in the 200 miles, 300 miles, distances races 250, 300, 400, 500, kilometer distance races and the 2 hour and 3 hour runs.

CLARKE D. PEASE Inc. NEW YORK — PARIS



HISPANO-SUIZA COLLAPSIBLE CABRIOLET

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HISPANO-SUIZA INSIDE DRIVE CABRIOLET

CLARKE D. PEASE Inc. NEW YORK — PARIS

HISPANO-SUIZA MARINE MOTORS

Composition de René Lelong.

QUEEN OF THE WATER

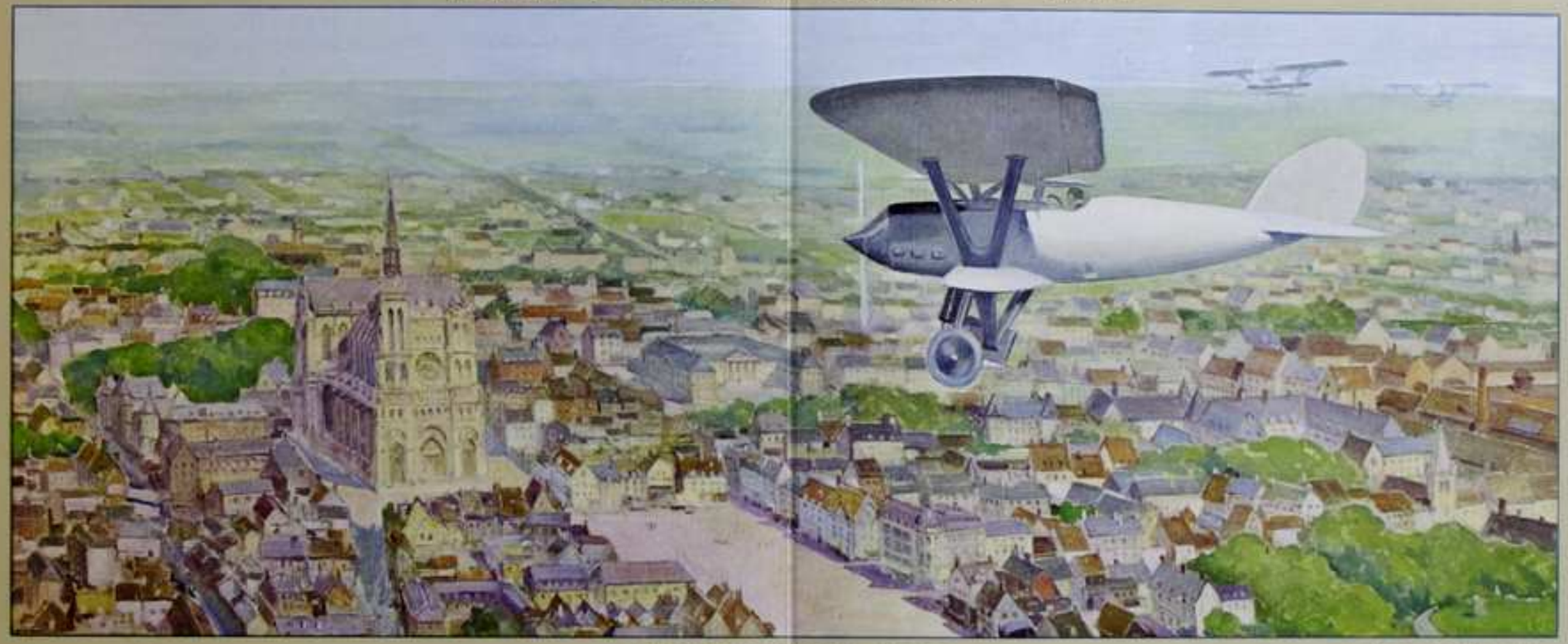
Dr. Etchegroin winning the championship (Internationales séries 12 litres 1926) with 180 HP Hispano-Suiza marine motor.

CLARKE D. PEASE Inc. NEW YORK — PARIS

HISPANO-SUIZA LIMOUSINE TOWN CAR

CLARKE D. PEASE Inc. NEW YORK — PARIS

HISPANO-SUIZA COLLAPSIBLE ROADSTER



HISPANO-SUIZA AVIATION MOTORS

Composition de René Lelong.

QUEEN OF THE AIR

Lieutenant Bonnet at Istres (France) with Hispano-Suiza aviation motor 50 W winning the world's speed record December 11th, 1924.

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DRAEGER
Paris (France)

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MUSEUM
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GIFT OF
Z. Taylor Vinson

$350.00

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DRAEGER
Paris (France)

FIAT 521

THE MODEL 521-C FIAT

The FIAT badge on the radiator of a car is like the armorial bearings of a noble house: it denotes a car of high and ancient lineage, an aristocrat amongst automobiles. It means that the car bearing it was built by a firm which, for thirty years has ever looked ahead, reaching out for greater perfection; a firm that in all its history has never stood still on the path of progress, has never betrayed a trust or failed to come up to expectations when the demand was for a better car, a masterpiece.

The new car described in these pages is therefore above all, a FIAT. That is, it is the fruit of a model organisation in which legions of research workers, experimenters, engineers and designers are ceaselessly engaged in sifting the accumulated experience gained in building innumerable cars, winning thousands of competitions and driving hundreds of thousands of miles on the most gruelling road tests. A firm that has opened up new horizons in modern industrial systems, both as regards metallurgy and mechanics, overlooking nothing that might be learned from other organisations abroad, neglecting nothing that would improve quality production on a vast scale at ever decreasing cost.

Through a wide-spread, active, commercial organisation, planned with foresight and acumen, the factory continually collects and studies the impressions, needs and desires of the private motorist.

FIAT, in hort, sis a name that expresses a whole programme, a name that has no need of any explanatory orlaudatory slogan.

A few words regarding the particular denomination of this var will, however, not be out of place. The denomination 521-C might naturally lead one to suppose that the new car was merely a more or less modified form of model 521, instead of an entirely different type of car. If this supposition is in part true, inasmuch as none of the excellent features of model 521 are lacking in the 521-C Saloon and the parts of boch cars are largely interchangable, it is none the less true that, on the other hand, the alteration of all those details of the chassis, transmission and bodywork affecting the properties of the car, was sufficient to confer on the new model the character and substance of a car fundamentally designed and builts as a five seater; indeed, as the five-seater «par excellence» full of markedly individual features, destined to rank high in the FIAT range of new models.

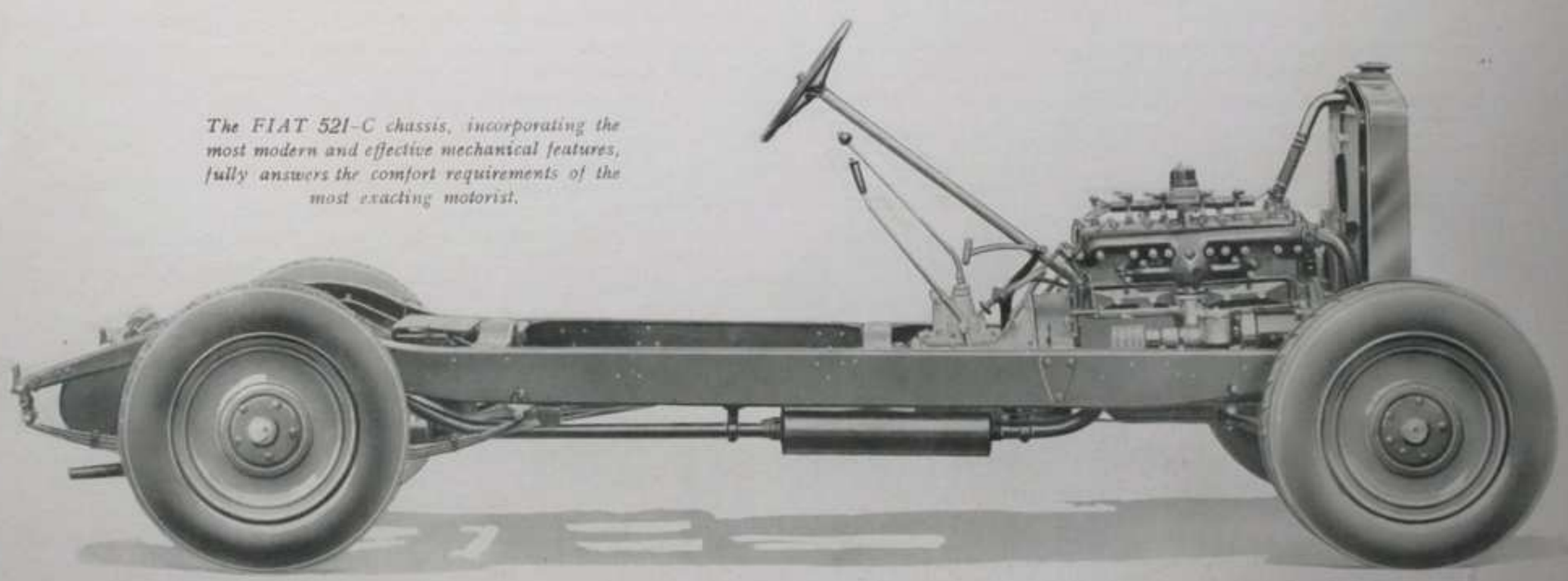
FIAT 521

The 521-C has no double, either in its particular characteristics, or in its performance, not only in FIAT's own production, but even in the production of any other country, as will be shown in the following pages of this very detailed catalogue.

It is offered to the large number of motorists who require a medium powered car with a brilliant performance and a high degree of luxury, but which does not overstep the limits of a relatively modest cylinder capacity and a still more modest purchase price. It is for those who, enthusiastic in their reception of the first model of the new productive cycle — model 520 — will undoubtedly receive with still greater favour this new car, finer, faster and more up-to-date.

Turin, 1929.

The FIAT 521-C chassis, incorporating the most modern and effective mechanical features, fully answers the comfort requirements of the most exacting motorist.

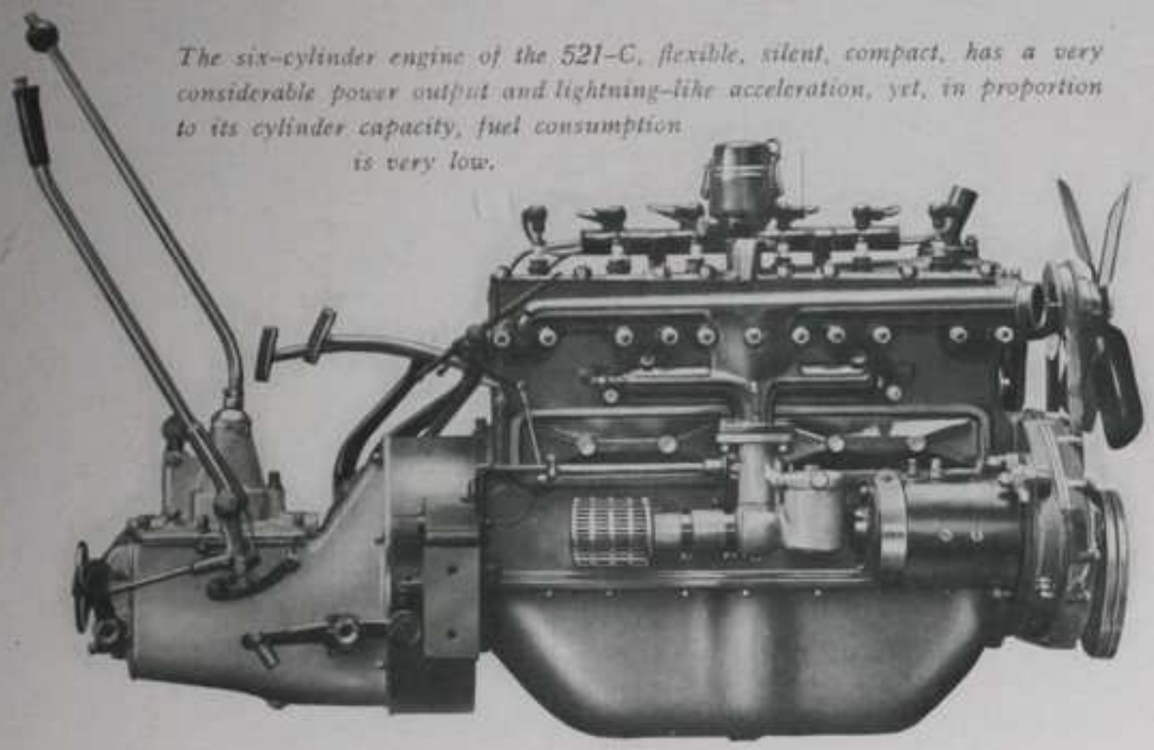


FIAT 521

THE MODERN CAR

Before stating that the car described in this pamphlet is essentially and absolutely modern, we feel it our duty to define what is meant exactly by a modern car; that is, what those factors are that the expert values and that the general public must learn to appreciate in expressing an opinion on a new model.

The six-cylinder engine of the 521-C, flexible, silent, compact, has a very considerable power output and lightning-like acceleration, yet, in proportion to its cylinder capacity, fuel consumption is very low.



1) **RELIABILITY.** — The first element of satisfaction in a car is essentially a moral one: the most important thing of all is a sense of absolute trust in one's own car.

The motorist must be, above all, perfectly *sure*. Sure of having no trouble with his car, and sure of possessing adequate means of affronting the dangers of the road; sure of freedom from annoying break-downs, sure of arriving to time at his destination; and finally, sure of not having unpleasant surprises in his garage bill for unusual adjustments.

2) **SPEED.** — Although it cannot be said that the desire for speed has ever gone out of the public's tastes, it is certain that for a time, under the influence of American practice, it seemed as if the best of the world's production were largely directed towards other ends.

Lately, however, the quest for speed has undeniably come back on a large scale in the automotive production of practically all nations. The return to the speed formula is not due so much to a doubtful increase of the sporting spirit in the general public, as to a greater confidence in motor vehicles and a greater driving skill on the part of the mass of motorists, and also, to a great extent, to a better and more rational system of road making and maintenance in all civilised countries.

FIAT 521 C

Under the heading of « Speed » must also be considered the inverse requisite, or rather the indispensable complement of speed, good brakes; of the utmost importance and admitting of no allowances.

3) **ACCELERATION.** — Anyone, nowadays, who drives a car, even if he be not of the stuff that makes a racing driver, likes to have a lively, responsive engine; that is, a six cylinder engine; and the fewer sporting proclivities he has, the greater his need for such an engine.

The out and out lover of pure speed, used to taking risks and driving fast even on crowded roads, needs only a powerful engine capable of giving a high actual speed, such as a four-cylinder engine can give. On the contrary, the tourist's chief requirement is for a flexible engine which will permit him to slow down in the most cautious manner when occasion demands, and get away again in the shortest possible time when the road is clear; the advantage of this over even a more powerful four-cylinder engine, is that a higher average speed over varied classes of roads can be maintained.

4) **RESERVE POWER.** — The modern car engine must possess the ingrained virtue of being able to adapt itself to an infinite variety of circumstances; it must therefore, not only be able to impart the fascination of speed, and the thrill of meteoric acceleration, but must also be able to pull well at low revolutions on the heaviest ground, with the biggest loads or up the steepest hill: it must continue to give of its best in spite of long periods of neglect, independently of decarbonising, valve grinding, and change of piston rings. It must, in brief, retain even under the most adverse conditions, a *reserve of power*, however small.

5) **APPEARANCE.** — It is certainly not possible today to neglect the finish and appearance of a car, whatever its class or price. Old fashioned shapes, bad or absent streamlining, an unnecessary freakishness of form or colour, or dull, shoddy paintwork etc. will effectually prevent sales.

The tastes of the public are particularly refined and unified: painting and finish must be approximately the same in the luxurious, costly car as in the low-priced popular vehicle.

6) **COMPLETENESS AND SIMPLICITY OF WORKING PARTS.** — This feature is now considered by the more fastidious part of the public, quite independently of the price of the car.

A car lacking some useful, although not indispensable organ, or built, through a mistaken conception of economy, in such a way as to increase the amount of labour and exertion necessary to its use or maintenance, or a car sold without those necessary

The 521-C is one of the most completely equipped cars on the market. The instruments comprise: a clock, a speedometer, an ammeter, a petrol gauge and an oil pressure gauge. The instrument board is flood lighted from the inside.

FIAT 521

accessories which the owner is obliged to purchase afterwards if he wants to enjoy to the full the pleasures of motoring, satisfies but a very small minority these days.

7) **EASE OF HANDLING.** — A powerful, flexible engine, with a brilliant pick-up is considered necessary to that ease of handling which is rightly to-day one of the most sought after features of a modern car.

The modern motorist ill adapts himself except on the very cheapest cars, to continually change gears at the slightest rise, or after a slow down in traffic. He looks upon the gearbox as a *reserve*, and not a thing to be used continually. When its use becomes imperative, then he wants it to be easily managed, almost by instinct, without need of special attention or particular movements to prevent missing his change or clashing the gears.

The acceleration control must also be sensitive at all speeds, whichever gear is engaged, throughout its entire range; the spark advance control must be adjustable with the utmost ease and be largely automatic, so that it will require little attention and prevent the engine knocking under any conditions.

What the modern motorist aims at getting is a car with the characteristics of a steam engine, controlled practically on the throttle alone, all the gradations of speed from dead slow to a mile a minute or more being obtained by merely pressing the accelerator pedal, and much quicker than could be done on the old style cars with complicated manoeuvrings of the clutch, gearbox, accelerator and spark advance, etc.

8) **SILENCE.** — One of the chief factors contributing to the stateliness and dignity of the modern high-class car, is silent running.

A noisy exhaust, such as was tolerated many years ago by the police regulations and public opinion, could cover a multitude of lesser sounds; squeaking spring shackles and door hinges, whining gears, noises in the gearbox, transmission and rear axle, body rattles etc.

Now, the rapid sequence of explosions being rendered almost inaudible by the improved silencers fitted, and by the distribution over a larger number of cylinders of the total cubic capacity of the engine, it is necessary to silence the minor noises effectually by removing their causes, rather than attempt to conceal them.

9) **SPRINGING.** — On a fairly good road a modern car should ride at least as smoothly as a first class railway carriage. The attainment of this result is by no means easy. So many factors, many of them in direct contrast, have to be considered, and only with long experience and a fully equipped experimental department can the problem be tackled with any prospect of success. One has only to notice how rarely a car is found with springs flexible enough to absorb the slightest shock, yet, at the same time stiff enough to prevent «side sway» on corners. Nearly all well sprung cars have a tendency to overturn on corners; if they have not this defect, then it is hard to drive them for long without excessive fatigue.

10) **COMFORT.** — It is comparatively easy to build a beautiful body, less easy to make it comfortable, and difficult to make it both as beautiful and as comfortable as the modern motorist has the right to expect.

A car is not only an object of admiration to those who see it, of pride to its owner, and of envy to those who have no car, but it is above all, a vehicle, and as such it must possess certain prerogatives that cannot be sacrificed for the sake of external appearance only.

The steering of the 521-C is always sweet and easy. Any play that may develop in the steering worm is easily and accurately taken up by this simple excentric bush device.

FIAT 521

Saloon bodies with too low a roof, too narrow doors, too wide pillars, too small windows, badly arranged seats badly upholstered, insufficient room and a hundred other details either neglected or carried out with but little regard for convenience, all these have become incompatible, despite numerous survivals, with the idea of the modern car. It is these little things, insignificant in themselves, which make or mar the motorist's enjoyment. The experienced body builder knows this, and while not sparing any effort to make the outside of the car a work of art, he redoubles his efforts — in comparison with those he himself put forth up to a little while back — to make the interior as perfect from every point of view as possible.

11) **PURCHASE PRICE.** — The importance of this element cannot be overestimated, as it is but too well known that on slender post-war budgets, low first cost exerts a most powerful attraction. The influence of the economic factor is so immediate and decisive as to frequently overshadow those other considerations which, besides price, must necessarily be duly weighed in deciding for one car rather than another. If therefore, it is desired to interest the bulk of average buyers in the modern car, the purchase price must be made particularly attractive.

12) **FUEL CONSUMPTION & RUNNING COSTS.** – Although an attractive purchase price has a great influence on the initial success of a new model; it is the running costs as exemplified principally by the consumption of fuel, which, at a later stage, confirms or destroys the public's good first impressions.

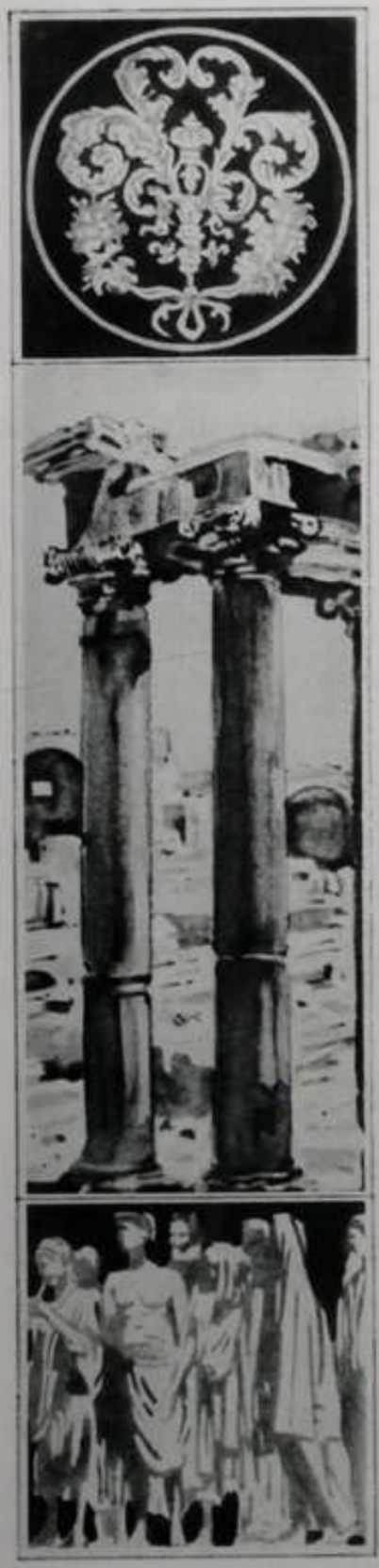
The reduction of running costs in an integral factor of the class of car, and not an independent, variable quantity. The consumption of fuel, on the other hand, is too often neglected or else sacrified to obtain brilliant performance, which a wise designer will seek to obtain by other finer and carefully tested technical means, than merely enlarging the carburetter jet.

13) **RE-SALE PRICE.** — The all important question of re-sale value of a car is largely dependent on the factors reviewed in the preceding paragraphs, plus a reputation for long life and the good will of the public. Given these conditions for any given make of car, that make will enjoy an equally large demand in the second-hand market.

This in reality, is nothing but another aspect of one, and perhaps the most important, of the running costs; the realisation of the rate per mile of capital redemption.

It is no exaggeration to state that the virtue of easy and ready re-sale, an outstanding feature peculiar to FIAT products, can, under certain conditions, actually halve the cost of motoring.

Having thus minutely defined a modern car, we will now proceed to describe and illustrate in the following pages, a moderate priced car which answers fully to the thirteen requisites of modernity.



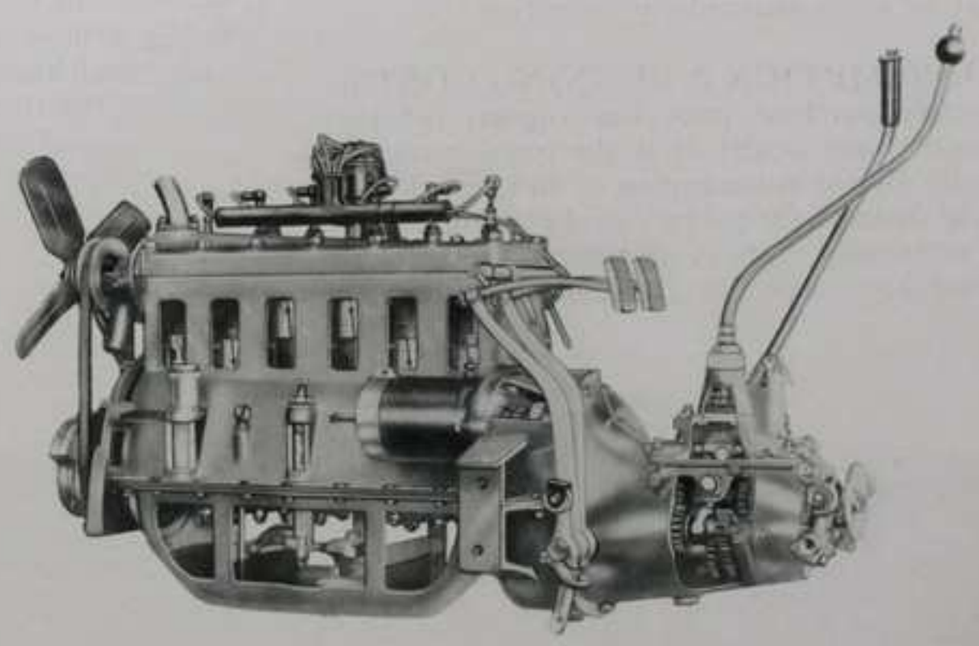
THE ENGINE & GEARBOX UNIT.

The engine of the 521-C has six cylinders 72×103 mm; with a total cubic capacity of 2516 cc. This enables the closed body model with five passengers up to do about 60 miles per hour and to climb gradients up to 1 in 14 on top gear.

It is sufficient to compare these figures with the small cubic capacity of the engine, the solid imposing lines of the body, to realise that the power unit is indeed an exceptional one.

In fact, only externally does the engine of the 521-C resemble the American type engine which is rapidly becoming standard all over the world. To the almost universal features of this type, which may be summed up as flexibility, silence, simplicity, and a certain cheapness of build, the engine of the 521-C adds certain essentially European characteristics; liveliness, responsiveness, high specific power per cc. of cylinder capacity, a high thermal efficiency and consequently a low fuel consumption.

To what extent this fusion of the best points in American and European practice—which has given back to the FIAT the honour of starting a new school and a new and decidedly original style of design—has been successful, is amply demonstrated by the following data: the engine of the 521-C reaches 3600 r. p. m. easily and with perfect safety, giving off over 50 HP; which output remains practically constant down to a speed below 2900 revolutions. Even at the lowest rotating speeds, the power developed decreases very slowly; at 1500



The six-cylinder L head engine, built with extreme accuracy of the finest materials, enables the car to give continuous all-the-year-round service without overhaul or repairs of any kind.

FIAT 521 C

The high turbulence form of combustion chamber has been adopted in order to attain the highest possible degree of thermal efficiency, in other words, the greatest power with the lowest fuel consumption.

r. p. m. it is about 30 HP, while at only 800 r. p. m. it is still 15 HP.

These figures explain how the 521-C saloon can cover a kilometer from a standing start in less than 50" (equal to a mile in under 80"), can accelerate in top gear from 10 to 40 kms. (5 to 25 miles) per hour in not more than 7". It may thus be concluded that for speed and maximum power the new 2;½ liter FIAT corresponds closely to a lively three liter engine of the classical Italian school, whilst for acceleration, pick-up and flexibility it is comparable to a modern 3 liter engine of the American school.

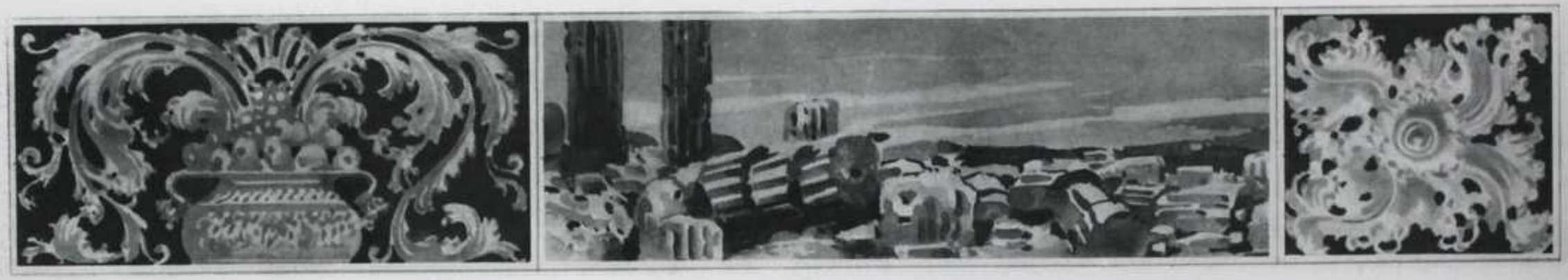
The pistons of the 521-C have split skirts to prevent seizing and to ensure silence. Each piston is provided with one oil scraper ring and one «Perfect Circle» ring, to prevent oil getting into the combustion chambers.

The rigid, seven-bearing crankshaft is perfectly free from «whip». Torsional vibration is eliminated by a special fly-wheel damper.

Of course, the fuel consumption is proportionate to the limited cylinder capacity, and to the sparing habits of the European market.

All this it has been possible to obtain from the vast, unparalleled resources of the FIAT in design, experiment and manufacture. The highest degree of perfection of which human skill is capable has been reached, precision has been pushed to infinitesimal limits and materials chosen in the most suitable manner for each separate part, but always a grade better and stronger than was provided for in the original designs, or found necessary in the subsequent severe tests and trials.

The rapid combustion cylinder head which enables modern L head engines to closely approach the performance



of the overhead valve type, but without its defects, has been radically improved in comparison with previous models. A new crankshaft balancing system makes the engine sweeter running than even one with eight or more cylinders. The crankshaft runs in seven long bearings which render it exceptionally rigid; all torsional vibrations are taken up by a special frictional flywheel damper. The cylinder block forms a single casting with the upper base chamber, stiffening the whole structure and ensuring perfect alignment. The material employed is a special nickel iron which has the advantage of resisting wear and consequently reduces the effect of gradual ovalisation of the cylinder bores.

Special care has been taken to secure equal compression and efficiency in all the cylinders, as well as a uniform preheating and feeding of the mixture through a new and original system of induction passages.

The single plate, dry clutch, with its low inertia and ease of control makes gear changing particularly easy. Strong, hardened wear resisting pins are used throughout the clutch actuating mechanism.

The pistons are of heat treated aluminium manganese alloy: they have high physical properties, great lightness and great hardness. To increase the quiet running of the engine and prevent «slap», the piston skirts are split obliquely.

In order to obtain perfect balance of the moving parts, the steel connecting rods are accurately machined all over. Abundant lubrication is provided, sufficient for the heaviest duties the engine could be called upon to perform. No special, expensive oils are required, neither

Besides the two usual filters in the main oil ducts, an oil purifier on the dash keeps the lubricant constantly clean, thus prolonging the life of the engine and making frequent changes of the oil in the sump unnecessary.

The camshaft is of the maximum rigidity and very silent working; the cam faces are extra wide and carefully hardened to resist wear.

FIAT 521

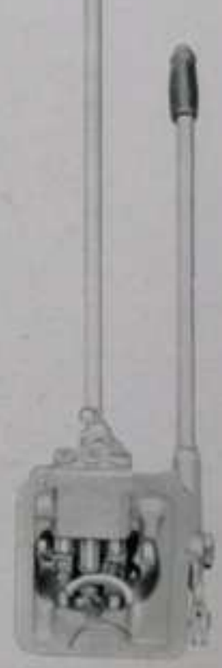
is it necessary to frequently change the lubricant, which passes continuously through a purifier in the circuit, besides passing through two ordinary gauze wire filters, one before and one after the high duty gear pump. There being no rockers or other organs between the cams and the tappets, the valve actuation is both positive and silent. The cam profiles have been the subject of much study and experiment in order to secure the maximum of silence.

The exhaust valves are of chrome-silicon steel with a high chromium content; the inlet valves are of nickel steel with a high nickel content. The valve gear is driven by a silent chain kept taut by the pinion of the dynamo, which latter is adjustable excentrically.

The electrical equipment has been specially designed throughout for this engine, with the object of supplying continuously and positively more than sufficient current for the various apparatus installed. Ignition is by battery and coil as is the case with all modern cars. This system ensures a much more powerful spark at starting and for slow running, rendering pick-up and acceleration more lively and maintaining the sparking plugs in such condition that they need no attention throughout their normal life.

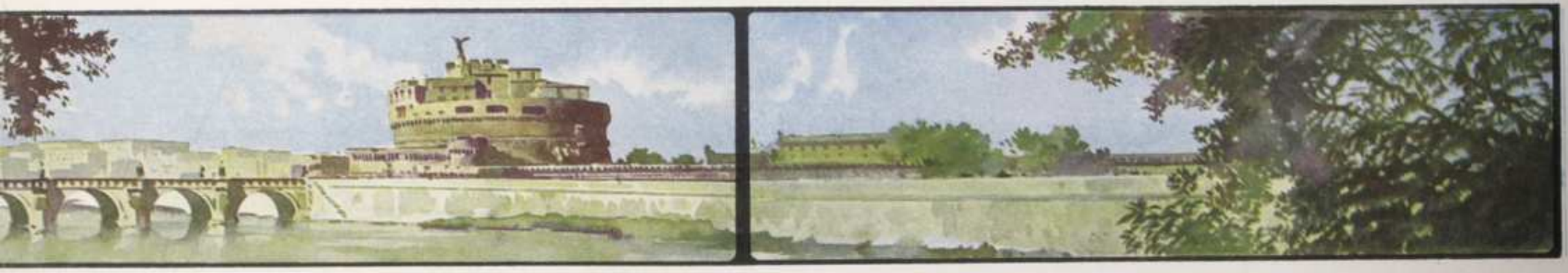
The clutch and gearbox are unit built with the engine. The clutch is composed of a single, polished steel disc with radial slots for expansion due to heat, and works dry. Lubrication and adjustment of the disc are unnecessary, and the clutch cannot slip. Besides these advantages, the dry single plate type of clutch presents a smaller inertia resistance to rotation and therefore facilitates gear changing, lasts longer and suffers no damage from overheating. The four speed gearbox is very easy to handle and is particularly silent. The

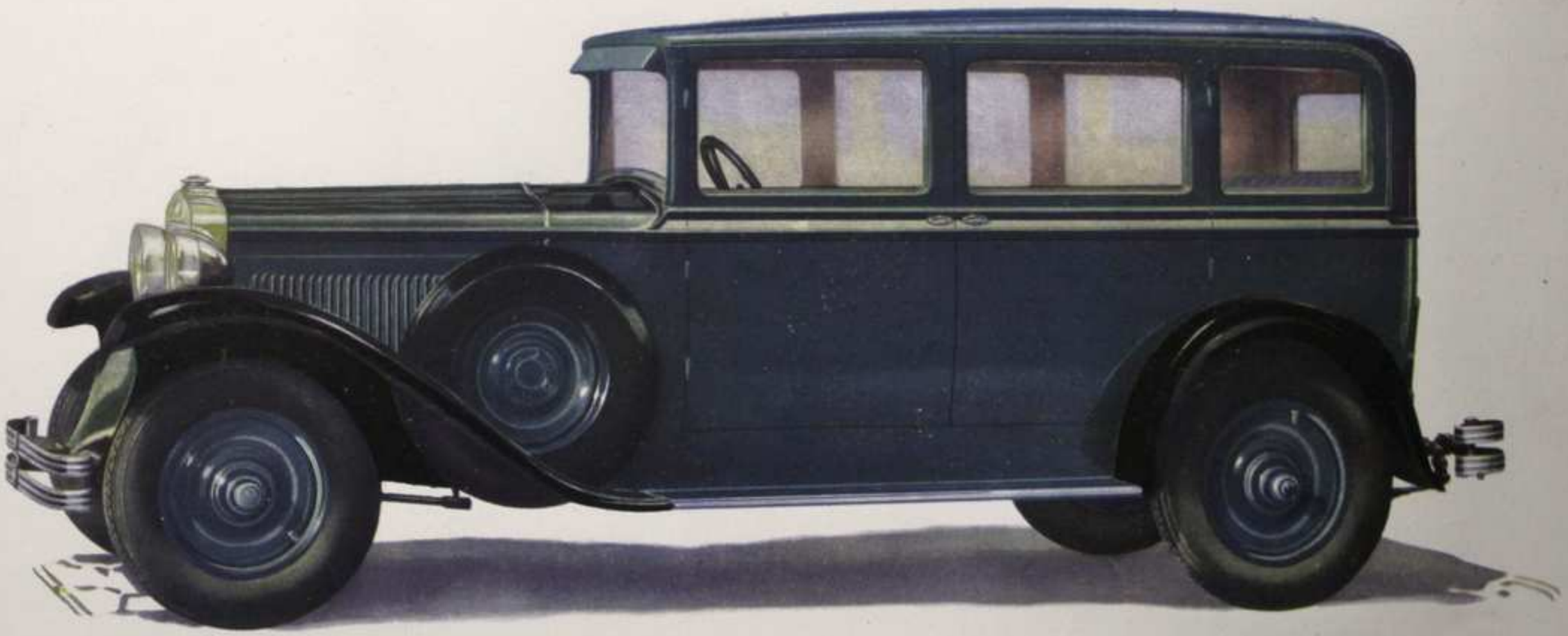
All the gear selecting mechanism being contained in the detachable gearbox cover, dismantling for inspection is easily and quickly accomplished.



FIAT 524

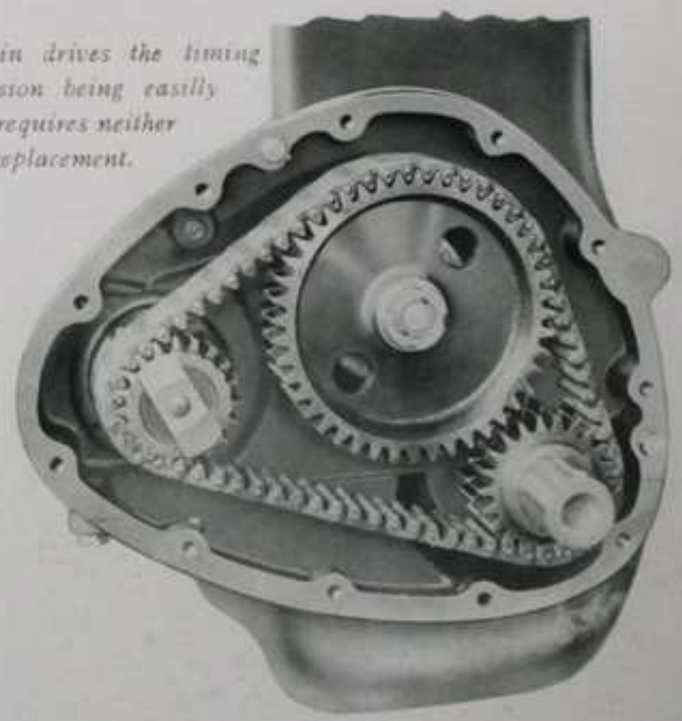
In the 521-C Saloon the maximum comfort is provided by the size, shape and upholstery of the seats, and by the width and position of the doors which permit of easy access.

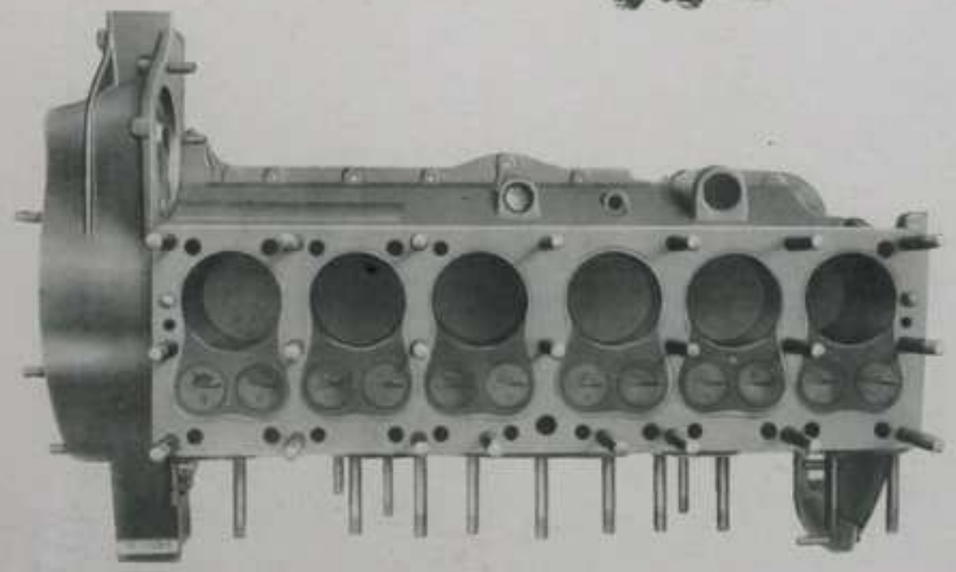




All gearbox shafts and pinions are of high tensile steel, accurately machined and guarantee the utmost strength, durability and silence.

A silent chain drives the timing gear. Its tension being easily adjustable, it requires neither attention nor replacement.

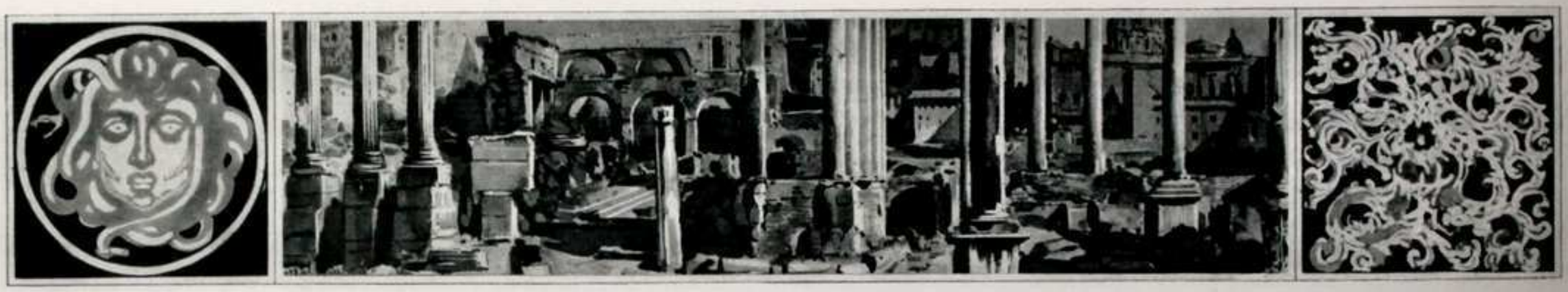




The six-cylinder engine of the 521-C, flexible, silent, compact, has a very considerable power output and lightning-like acceleration, yet, in proportion to its cylinder capacity, fuel consumption is very low.

The carburetter of the 521-C is simple and sparing of fuel. It is attached directly to the induction pipe and is fitted on the air intake with a special filter which excludes all dust and grit.

FIAT 521 C



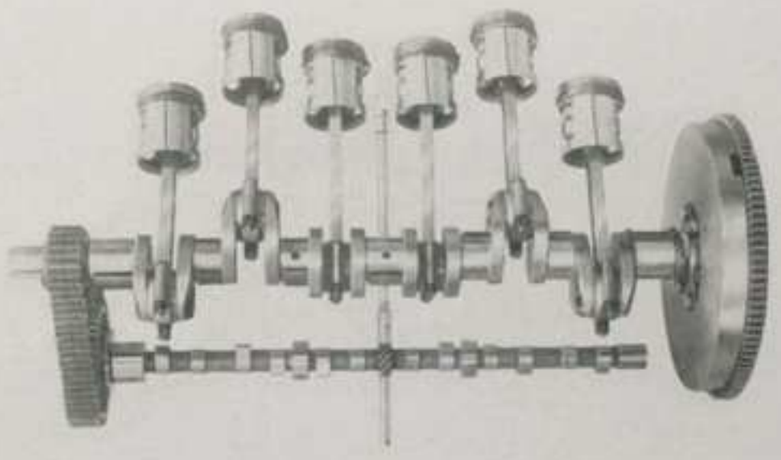
changes are actuated directly, without any intermediate mechanism, by a centrally situated hand lever. All the striker rods etc. are contained in the gearbox cover, which arrangement facilitates inspection and dismantling. The gears are of hardened and tempered chrome-nickel steel, very sturdy and practically wear proof. The constant mesh pinions have helical teeth, which make for quietness and unusually high efficiency. The gear shafts, of generous diameter, run on ball bearings and are free from vibration.

A special lock, with a different key for every car, enables the gear lever to be immobilised thus rendering the car practically thief proof.

The different gearbox ratios have been chosen so as to allow for generous overlapping, that is, a reduction of the necessity to change gears often, as either of two neighbouring gears can be used indifferently even when it is desired to attain the highest speed that road conditions will allow.

The road speeds for the various ratios corresponding to the maximum engine speed are as follows: direct drive (rear axle ratio 1 : 5,1) about 60 miles per hour – 3rd gear: 40 m. p. h. – 2nd gear: 29 m. p. h. – bottom gear: 17 m. p. h. – reverse: 21 m. p. h.

The maximum gradient that can be climbed in bottom gear is 1 in 3.



All the principal moving parts run in large pressure lubricated bearings. The reduction of the specific pressure per unit of area of the bearing surfaces promotes silence and prolongs the life of the engine.

FIAT 524

THE CHASSIS

The extremely powerful expanding brakes have self-energising aluminium shoes with fabric linings. The large diameter drums, by reducing the specific pressure between them and the shoes, prolong the life of the linings and provide efficient cooling even on the longest descents.

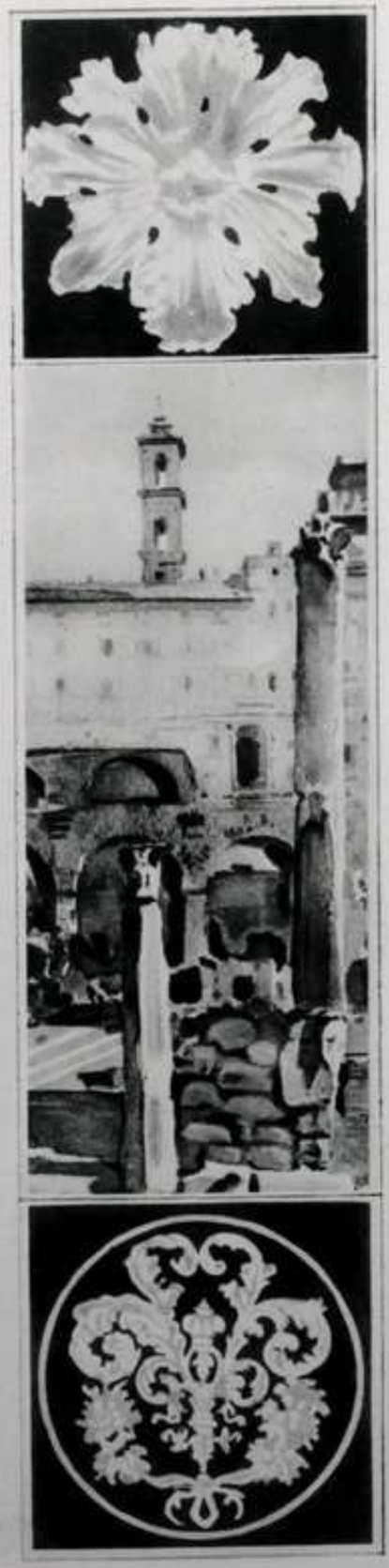
Not only the engine and gearbox unit, but every detail of the model 521-C chassis answers fully to every requirement of the truly modern car.

The frame, the side and cross members of which are all of pressed steel, is carefully proportioned in every part to the strains it has to bear. Profiting by a vast series of experiments, the maximum strength and rigidity have been secured with the least weight. The overall length of the chassis is 3,89 meters (12' 9"), the wheelbase 2,90 meters (9' 6") and the track 1,40 meters (4' 7"). The body space is 2,36 meters (7' 9") long.

The powerful, large capacity battery, although well protected, is easily accessible.

Some of the features of this type of car permit of the realisation of a very important point of design; the lowering of the centre of gravity of the loaded vehicle without reducing the ground

The front axle, a channel section steel forging, is sufficiently sturdy to resist both bending stresses and the torsional stresses set up by the use of the powerful front wheel brakes.

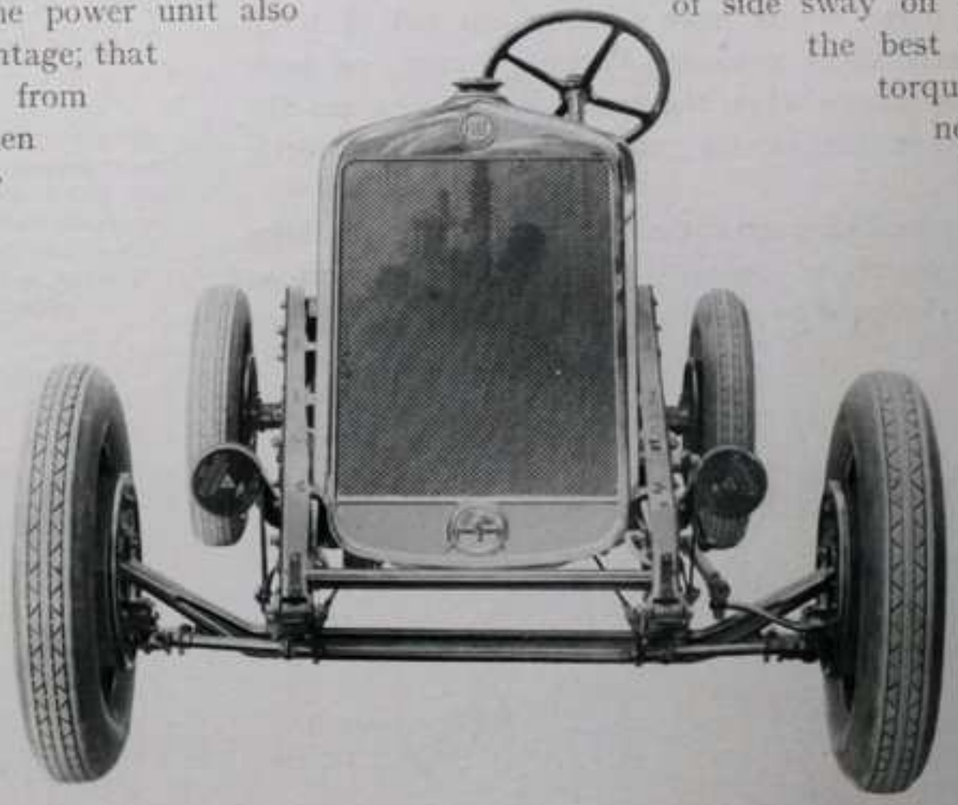


clearance to a dangerous limit; the ground clearance is, in fact, 19,5 cm. (7.5/8"). This lowering of the centre of gravity is brought about—apart from the design of the body, which will be described later on—through the shape of the springs and of the rear axle housing, as well as the position of the engine and gearbox unit. The spring shackles being brought very near to the top edge of the side members, and the springs having a very slight camber, the rear axle casing moves but slightly out of its normal position in line with the frame. The engine and gearbox unit is not only placed very low down in the frame, but is also slightly inclined towards the rear. In consequence there is a double lowering of the centre of gravity; first that of the power unit itself, and secondly that due to the lower level of the floor, rendered possible by the lower position of the cardan shaft.

The inclination of the power unit also entails an additional advantage; that of a straight line drive from gearbox to rear axle. When the car is loaded, the propellor shaft, fitted with a cardan joint at each end, is in a direct line with the engine crankshaft. The cardan joints are therefore only called upon for a slight movement when passing over inequalities of the road surface, instead of acting continually, as is generally the case, as a means of changing the linear direction of the drive. The drive is consequently more efficient and the cardan joints last longer, do not develop play and consume less lubricant, being subjected to but little wear. Further, the drive is rendered more silent.

The suspension has already been mentioned, and here we would draw attention to the fact that not only are the springs of small camber and considerable length (the front ones are 78 cm - 30"- and the rear ones 130 cm - 50.3/4" long), but they are made of a special maganese-silicon alloy steel of great flexibility and enormous strength, most carefully and rigidly tested. They have rolled eyes carrying long, hard bronze bushes inserted under pressure. They afford the maximum of riding comfort with the minimum of side sway on corners, and work under the best conditions for taking the torque and thrust, there being no torque tubes or rods.

The absence of any rigid torque member permits of a considerable reduction in the unsprung weight, and it is well known that light unsprung parts accumulate but little energy on rebounds and bumps and so contribute to a



Seen from the front, the chassis is of imposing appearance. The high, modern radiator has been designed to prevent overheating of the engine even on the longest ascents and under the most adverse running conditions.

FIAT 521

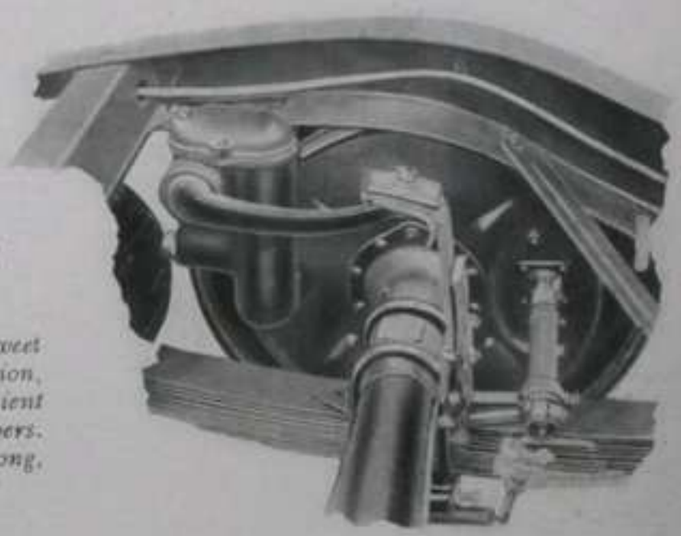
The pressed steel rear axle casing is of the floating type. Its stiffness and strength guarantee the durability and silence of its internal organs.

better springing efficiency. To this end the pressed steel rear axle housing has been made as light as possible, although the axle shafts and differential gears are as sturdy as it is possible to make them.

The final drive bevels have Gleason cut helical teeth and are perfectly silent working. Particular care has been taken to ensure silence when the transmission overruns the engine, i. e. when the car is running with the throttle closed.

Another special characteristic of this car is the braking —on all four wheels, of course.— The braking system has been specially designed to avoid all likelihood of the brakes jamming or the controls failing, the number and shape of the levers and rods being reduced and simplified as much as possible. The brake cables are of unusually generous proportions. The result is a set of brakes which, size and weight being equal, give double the effect of ordinary brakes. The shoe operating cams are of chrome-nickel steel, hardened in cyanide and have a special profile providing for the same progressive action under all conditions.

The steering is on the left hand side, as is now recognised as preferable for all countries where the right hand rule of the road prevails. It has been amply proved that having the steering on the off side is an important factor in driving safety and comfort. The steering



The rear springs, of sweet and progressive action, are fitted with efficient hydraulic shock absorbers. These are light, strong, silent and easily adjustable.

gear of the 521-C is of the worm and worm wheel type, conveniently geared down to permit of high speeds over rough roads without feeling too much the slight pulls of the steering wheel. At the same time the «irreversibility» of the steering gear is increased, that is, all road shocks are damped out before reaching the driver's arms. On the other hand, it presents none of the defects common to low geared steering gears, and which render them irksome, particularly on winding mountain roads.

This car responds readily to the wheel and is delightfully easy to steer. The caster effect is also extremely good; in this connection it is worth noting that the track, wheelbase and distribution of weight have been particularly studied in this chassis in order to arrive at the best camber and caster angles for the steering swivel pins, which have a great effect on the good steering qualities—or otherwise—of the car.

These correctly determined angles and the adjustable and rigid track rod, the ends of which have provision for taking up play, explain the total absence of wheel «wobble» at any speed over any road. Safety is built into the generously proportioned drag link, drop arm, and other steering connections, all of which are made of heat treated chrome-nickel steel. The steering lock is unusually good; the car can be turned without backing, in a 38 foot roadway.

The controls are arranged in the manner that experience has shown to be the safest and most convenient. The change speed and hand brake levers (this latter actuating the rear wheel brakes only) are in the centre. The accelerator pedal with foot rest is on the right. A small pedal actuates the self starter. The pedal for the four wheel brakes and that for the clutch have both a long leverage, giving smooth action, and, not being sepparated by the accelerator pedal can, if necessary be operated with one foot.

On the dash are mounted the throttle and air strangler controls.

The steering wheel carries the spark advance lever, the revolving knob controlling the head lamp dimmer and the electric horn button.

The chassis is fitted with hydraulic shock absorbers on all four wheels.

The differential is readily accessible for examination and adjustment. The final drive bevels have «Gleason» cut helical teeth ensuring silent running even after long use.

FIAT 521

THE BODIES

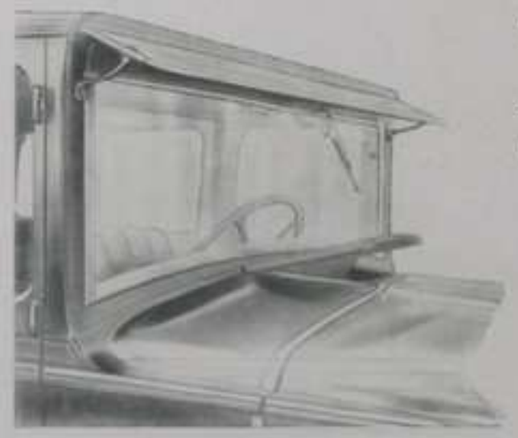
The radiator, of a new and pleasing shape, is high and modern and is continued down below the frame by a false radiator. It is entirely chromium plated instead of nickelled, thus assuring complete protection against rust and a magnificent, indefinitely durable brilliance.

In design the five-seater Saloon body of Model 521-C does not blindly follow current practice, but stands out from all other makes, for its appearance and the comfort it offers. It is an imposing car without being too high or too heavy. It is distinctive without being freakish, elegant but not gaudy. Simplicity and dignity characterise its lines. Internally it is light, airy, roomy and comfortable, all the latest ideas in fitments and trimming being freely made use of.

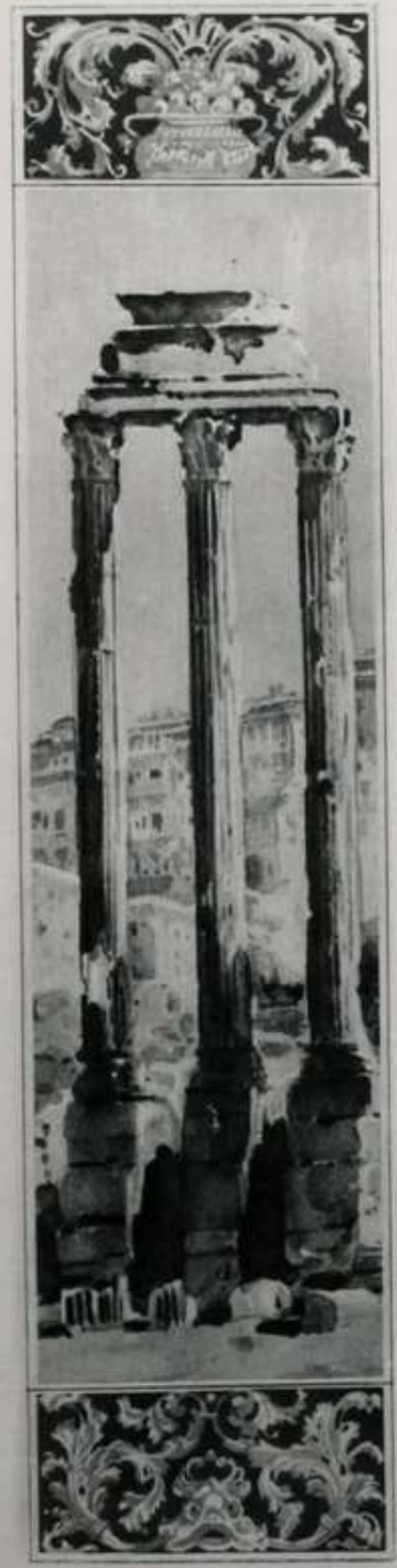
The radiator being very high and continued down below the dumb irons, gives the car an imposing appearance, whilst at the same time, by reducing the depth of the front valance, it takes off that impression of heaviness which a deep front valance always makes. The characteristic outline of the top part of the radiator, which is continued along the bonnet as far as the scuttle, imparts a slim rakish effect.

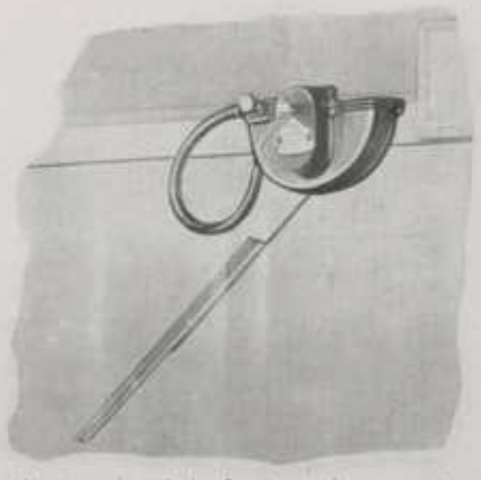
The wings, finished in black stove enamelling, are wide and deep. Although appearing to follow closely the curvature of the wheels, they leave ample space for oscillation. Complete protection is afforded against mud and dust and the wings never become dirty on the outside, so that, one can get into or out of the car even in bad weather without danger of soiled clothes.

The radiator and its shell, the lamps and all other exposed metal parts



Ventilation of the front seats, efficient even on the hottest day, is provided through a trap in the cowl, adjustable from the driver's seat.





The automatic windscreen wiper is positive is action and gives the driver clear visibility in rain or snow. It requires no adjustment or other attention.

are chromium instead of nickel plated. Chromium plating imparts a slightly blueish sheen, more attractive than that of nickel, to the parts so treated; moreover it offers a great resistance to heat and corrosive agents such as mud and water, even salt water. Its resistance to rust is 10 times greater than that of ordinary nickel plating.

Two spare wheels are carried, one on either side in wells in the front wings. The are placed very close to the car, which ensures a firm support. The raising of the bonnet for inspecting the engine is in no way interfered with by the spare wheels. The 521-C Saloon has no side valances; the sides of the body being continued down to the running boards, add to its rigidity, and the continuity of the colour improves the car's general appearance.

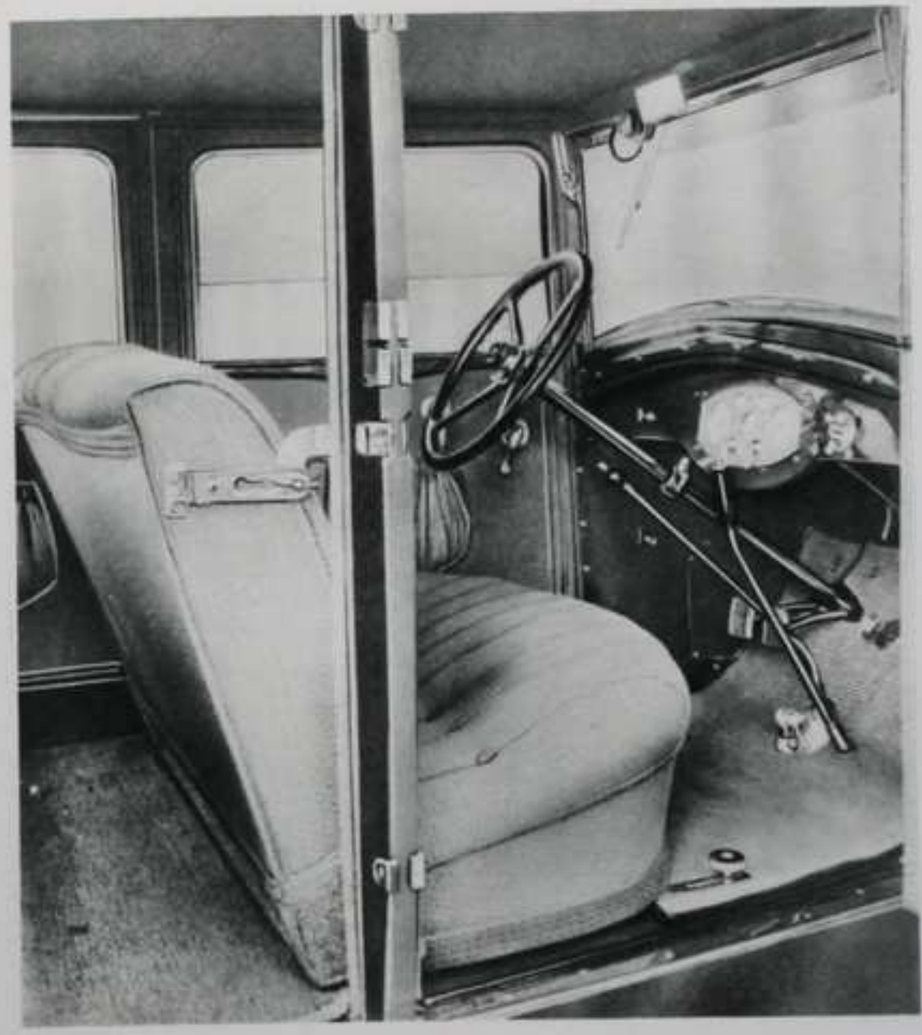
The running boards are covered with fluted rubber held in a stout metal frame fastened with invisible screws. Not only have they a handsome appearance but they avoid all danger of slipping when alighting from the car.

The long, ample windows allow of great visibility even from the back seats, without detracting from the stylish, dashing lines of the car. All the windows,

The horn button, the anti-dazzle control and the spark advance lever are mounted on the steering wheel.

The rear seat affords ample room for three adult passengers. The ceiling is high enough to allow of passengers keeping their hats on. The window winder handles are placed in the most convenient position and are very easy the work.

FIAT 521



The distance between the front seat and the steering wheel is fully adjustable, as is also the inclination of the back rest. A perfectly comfortable driving position is thus provided for all drivers, from the shortest to the tallest.

including the quarter lights, have drop glasses easily and comfortably controlled without exertion from the passengers' seats, the handles being grouped in such a manner as to be always within easy reach. Far from being a stuffy uncomfortable box in which a long journey on a warm day is unbearable, the 521-C Saloon is airy and roomy, quite as suitable for summer touring as an open car. The windows in the doors can be lowered completely, the quarter lights nearly so, which is an improvement on many, even bigger cars. Further, in the scuttle is a ventilator for the front seats, easily adjustable from the driver's seat. The windscreen, in one piece, can be opened wider than in most other cars and is fitted with quick acting clamps which hold it firmly and vibrationlessly in any position.

The doors are wide and open to 90°, thus ensuring easy entrance or exit for the most robustly built persons. The rear doors open against the direction of movement and this arrangement has been adopted, not only to relieve the centre pillar of strain, thus permitting it to be made narrower with advantage to visibility, but also to facilitate entry and exit. In this way, the driver is enabled to close the rear doors without getting out of the car.

The rear part of the body is stamped out of a single sheet. It has a large window which, besides letting more light into the car, also allows the driver a clear view when reversing.

The tank filler cap is in the most convenient position for filling. The luggage carrier is strong and practical, while the number plate bracket is neat and sensibly situated.

FIAT 521

A rear valance covers the petrol tank, and a neat sheet metal bracket is fitted for the number plate. The luggage grid at the rear is practical, strong and simple.

The interior of the 521-C five-seater Saloon is trimmed and finished in a refined and elegant manner. The upholstery is in a fine, soft cloth in the newest fashionable shades to match the external colour; The interior woodwork is veneered with fine briar wood. Roll-up blinds are fitted to all the windows. A silver plated lamp occupies the centre of the ceilng, and silver plated ashtrays are fitted beside the rear seats.

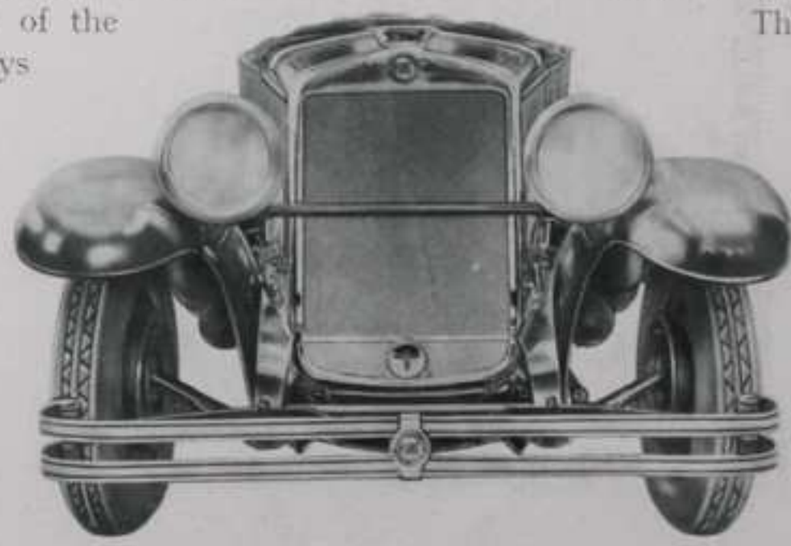
The front seat is adjustable as regards distance from the steering wheel and inclination of the back.

A neat and artistic instrument board furnishes all the indications the driver needs, without being crowded with dials not easily distinguishable while travelling.

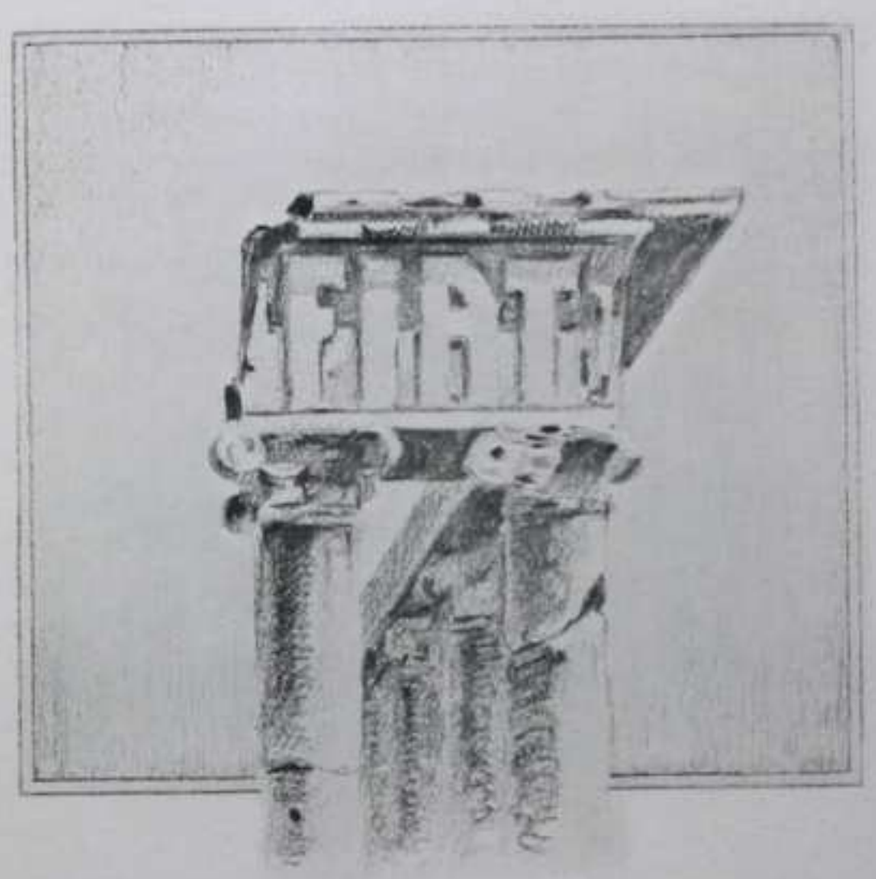
The full width rear seat accomodates three adult passengers in the utmost comfort. A full assortment of accessories is provided, including besides the instruments on the dash and the articles already mentioned, a driving mirror and an automatic windscreen wiper.

The instrument board carries a clock, speedometer, ammeter, petrol gauge and oil pressure gauge. A switch controls the ignition and the flood lighting of the instrument board; another switch operates the head and side lights.

The external finish of the body is brilliant and perfect. The paintwork is nitro-cellulose. The colours, of the most modern art shades, are blended and matched in such perfect harmony as to be a real credit to the craftsmen responsible for this masterpiece of the coachbuilder's art.



On request cars are supplied fitted with handsome front and rear bumpers, chromium plated like the radiator and the head lamps. Normally cars are delivered without bumpers, which do not form part of the standard equipment.



The descriptions and illustrations in this catalogue are to be taken as merely informative and not binding. FIAT therefore reserve the right, without prejudice to the fundamental features of the models herein described and illustrated, to effect at any time and without giving public notice, those alterations to parts, fittings or accessories that they may eventually think fit to make by way of improvement, or for any reason whatsoever of a manufacturing or commercial nature.

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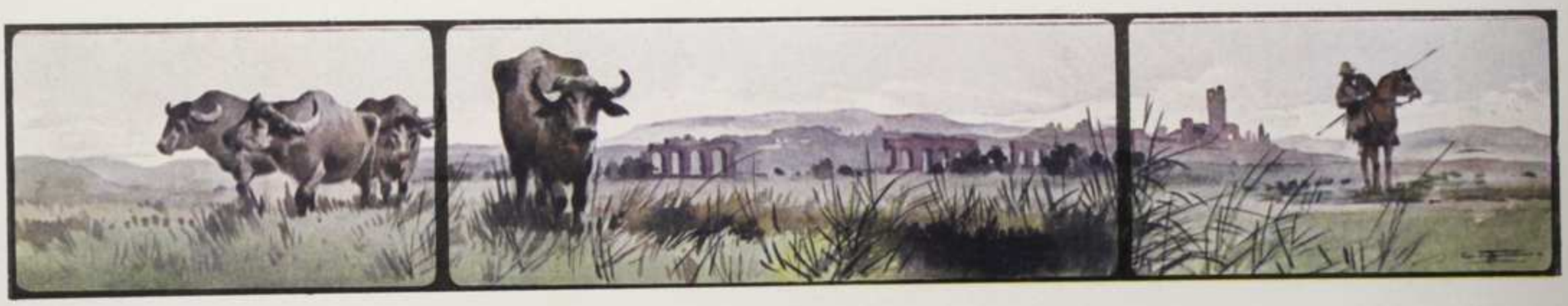
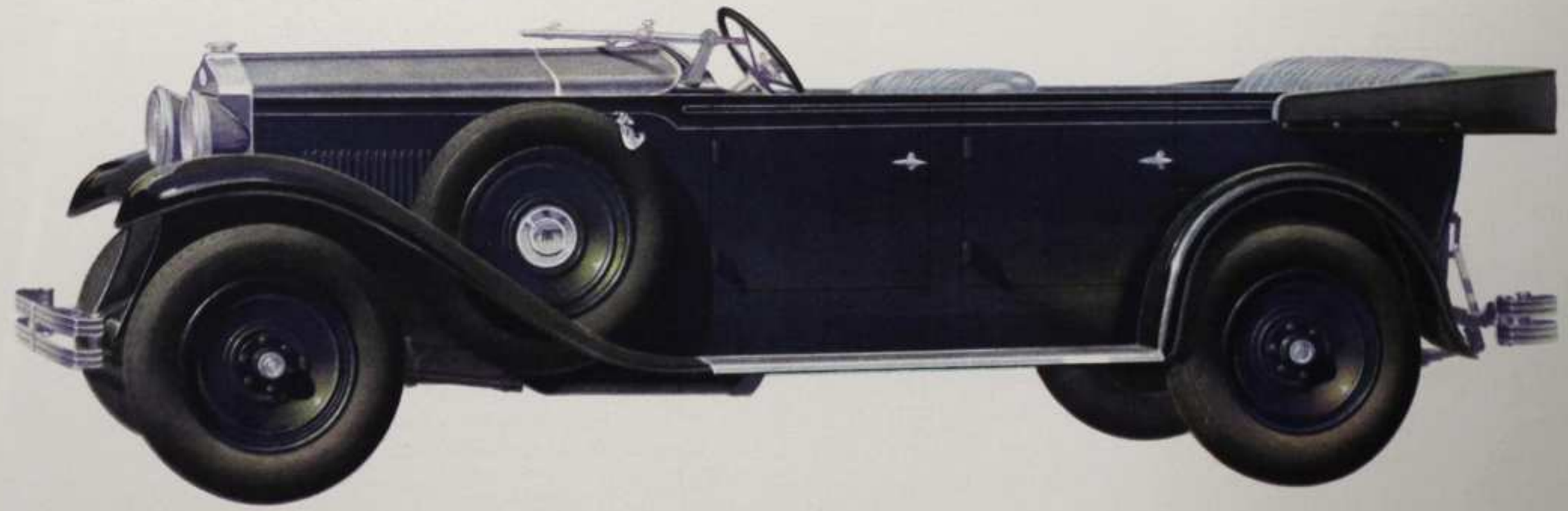


THE 5 SEATER TOURER



FIAT SPA

THE 521-C TOURER

This latest type of body which FIAT, in view of the great favour everywhere encountered by their model 521-C, have produced for lovers of fast touring and for sportsmen, has fine, tapering lines, is harmoniously proportioned and well finished.

Like the Saloon on the same chassis, it affords ample room for five passengers; the deep, restful seat cushions, well padded back rests and the interior trimming, all in washable leather, are of a plain colour harmonising with that of the brilliant external paintwork. The four doors are each provided with a capacious inside pocket.

The double-jointed, fully adjustable, folding windscreen has a single glass, and is fitted with a silent, positive automatic wiper. The double extension hood is of weatherproof fabric, of a tint matching that of the paintwork and upholstery.

Side curtains opening with the doors and fitted with large mica windows, are provided; when not in use they are stowed behind the rear seat back squab.

Wings and valances are black stove enamelled; all the other exposed metal parts are chromium plated.

Two spare wheels are furnished with the car; these are carried in wells in the front wings. The folding luggage grid at the rear is stove enamelled black, strong and practical.

The wheels are of the disc pattern, painted and lined.

The tools necessary for changing a wheel are carried in special spring clips in a handy position under the bonnet; the other tools are stowed under the front seat.

As in the case of the Saloon body, the Tourer is also fitted with adjustable ventilation flaps on the scuttle, and on request, can be supplied with bumpers front and rear. The bumpers do not, however, form part of the standard equipment of the car.

FIAT

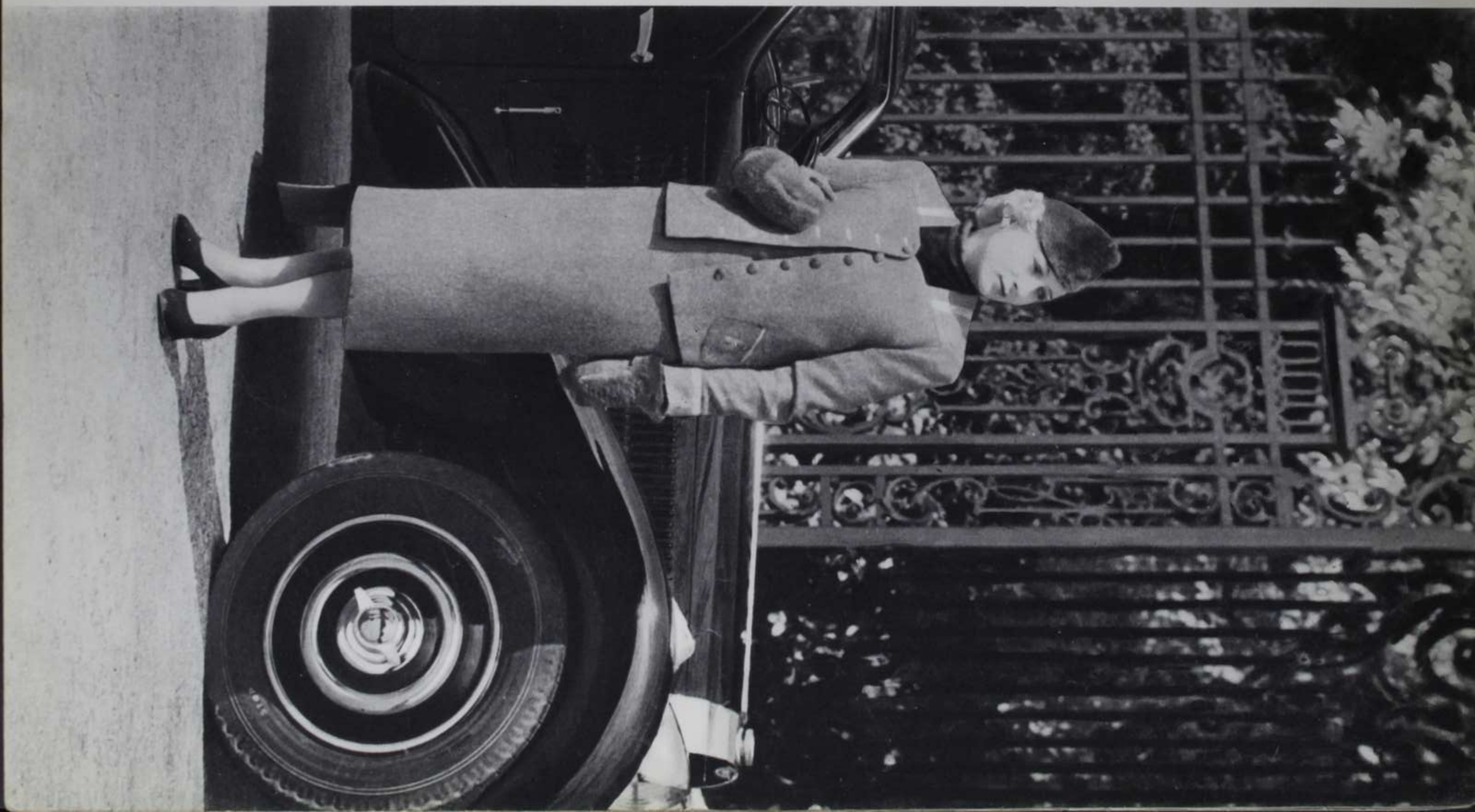
BUGATTI

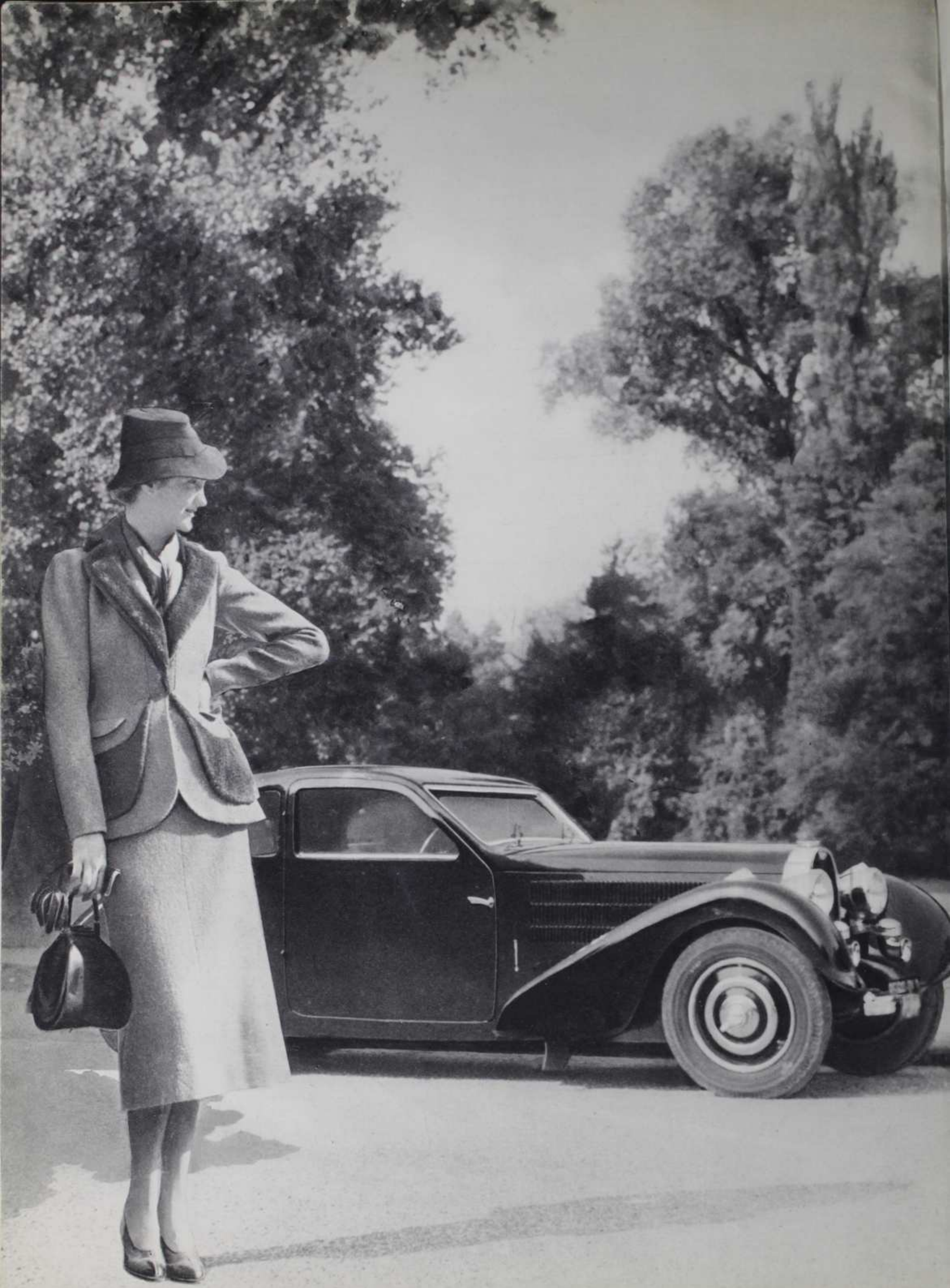
Le pursang de l'automobile

AUTOMOBILES BUGATTI

USINE A MOLSHEIM (BAS-RHIN) - MAGASIN D'EXPOSITION : 46, AVENUE MONTAIGNE, PARIS

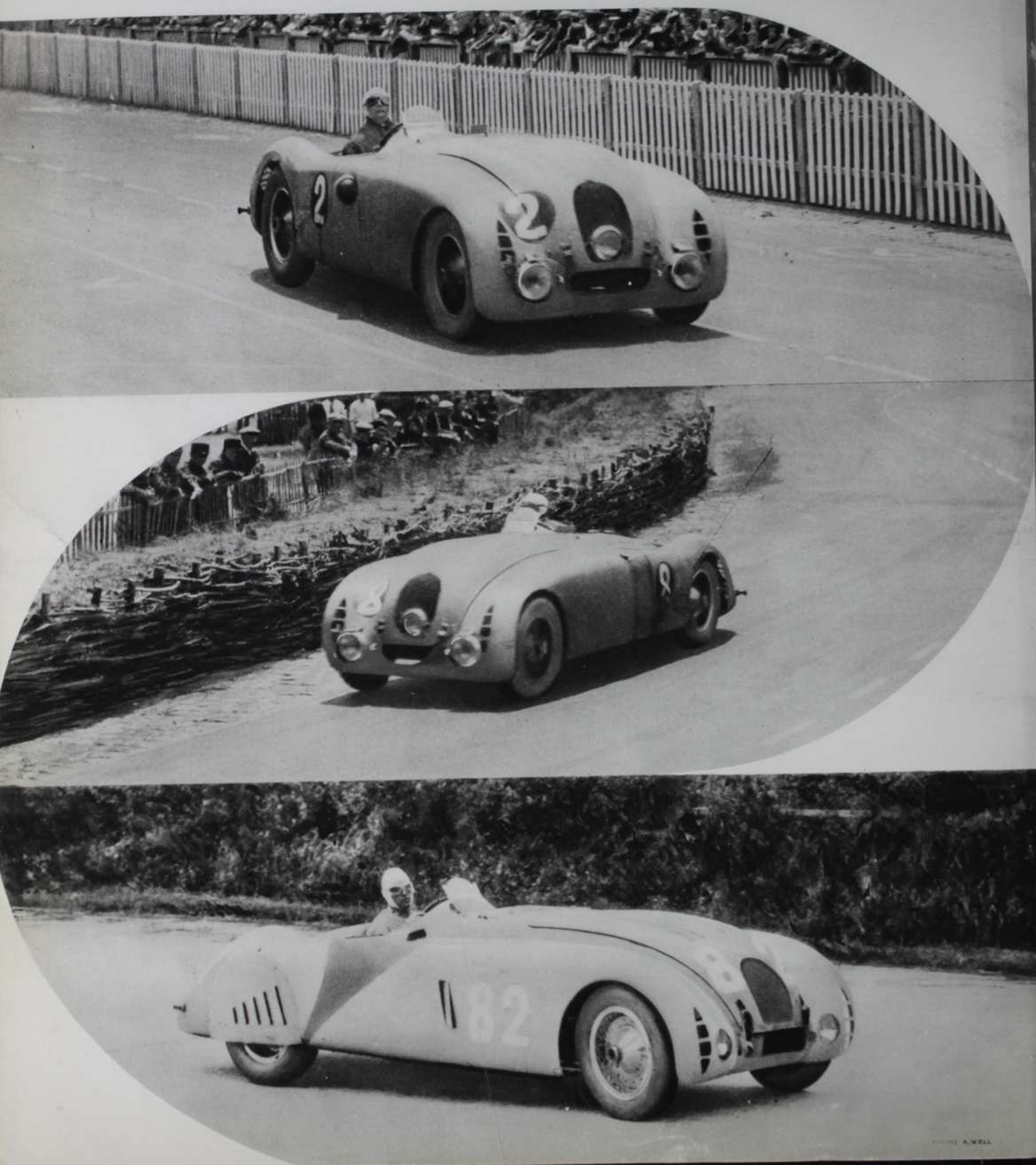
ELEGANCE





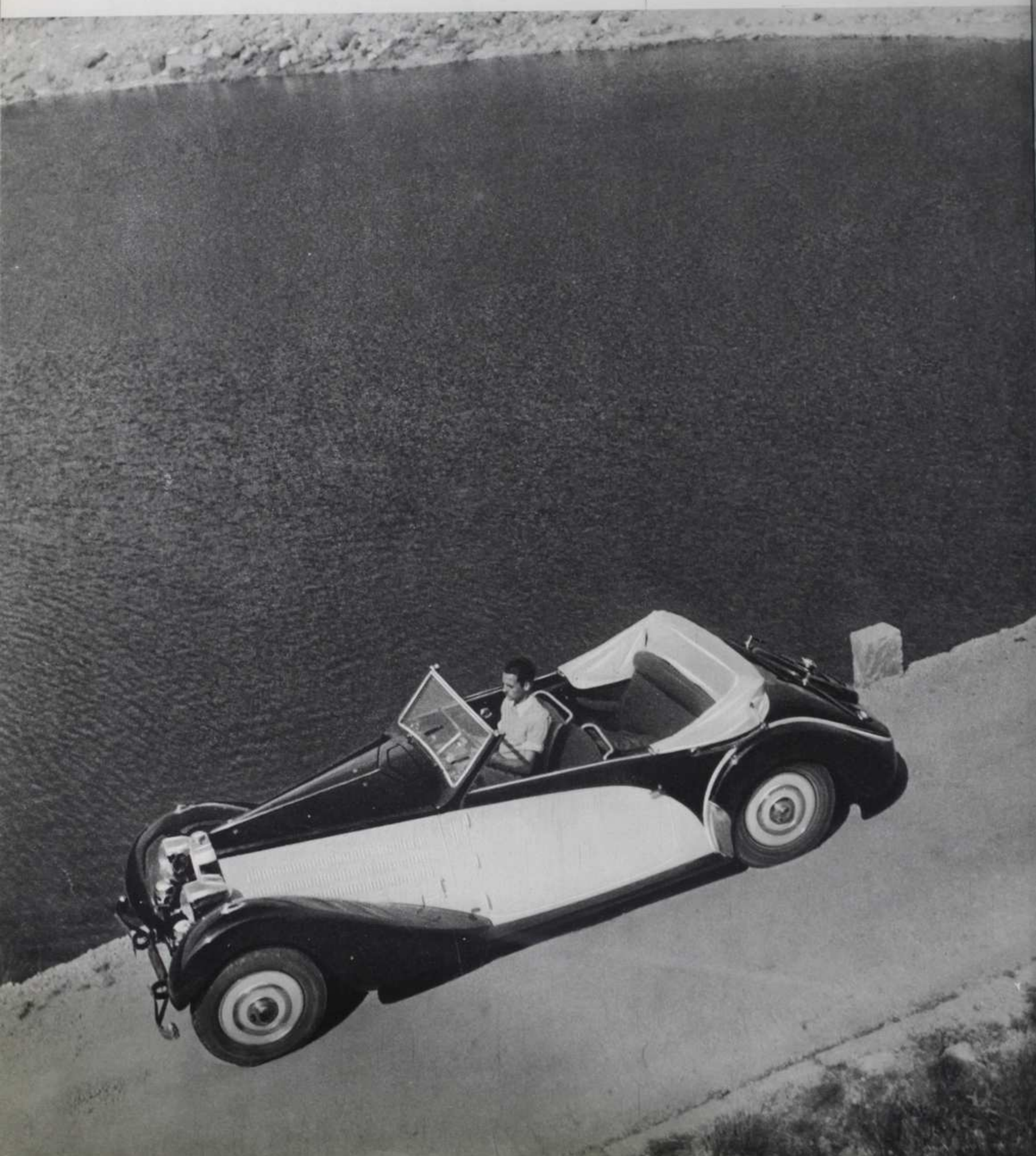
CONFORT

VITESSE

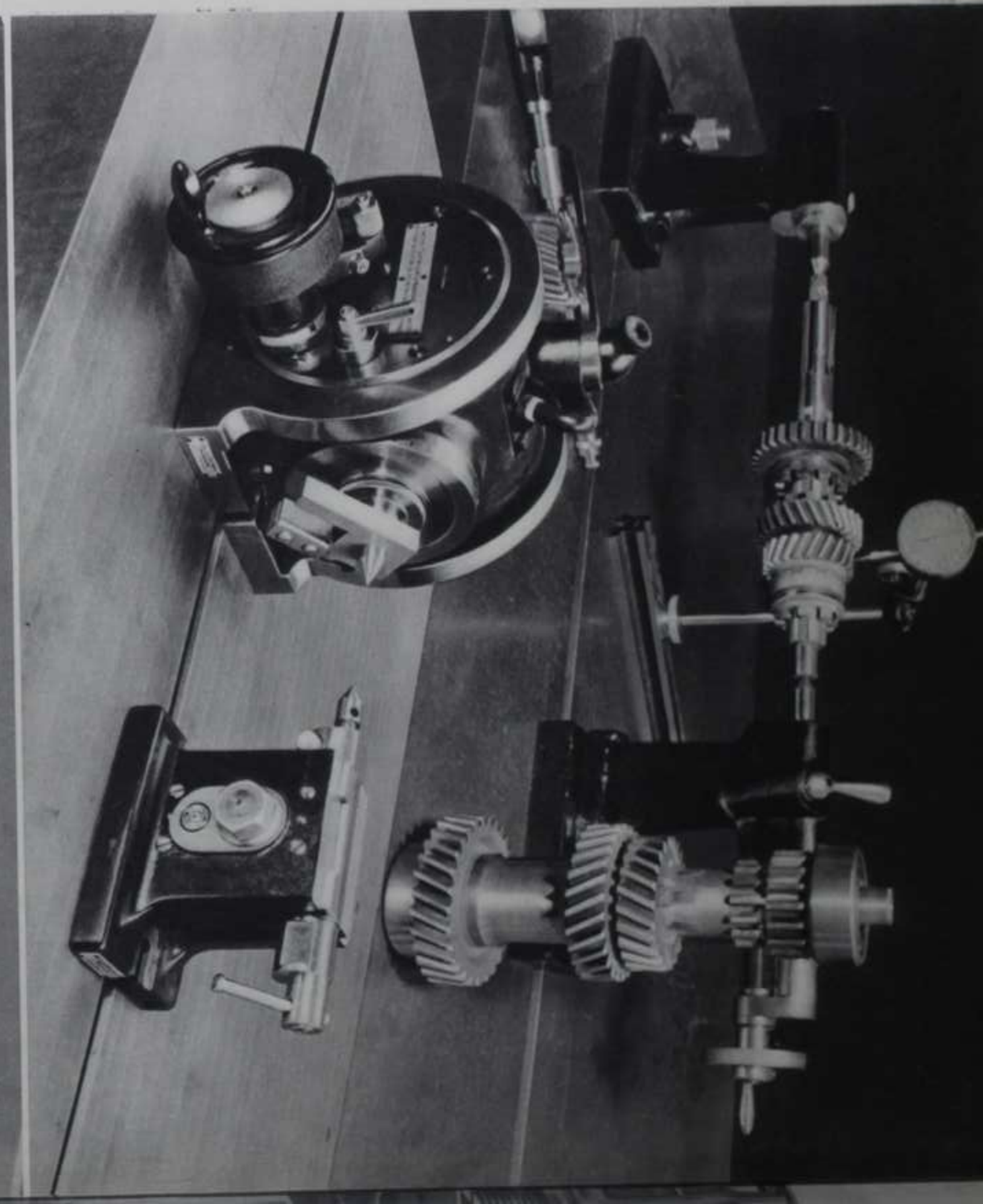


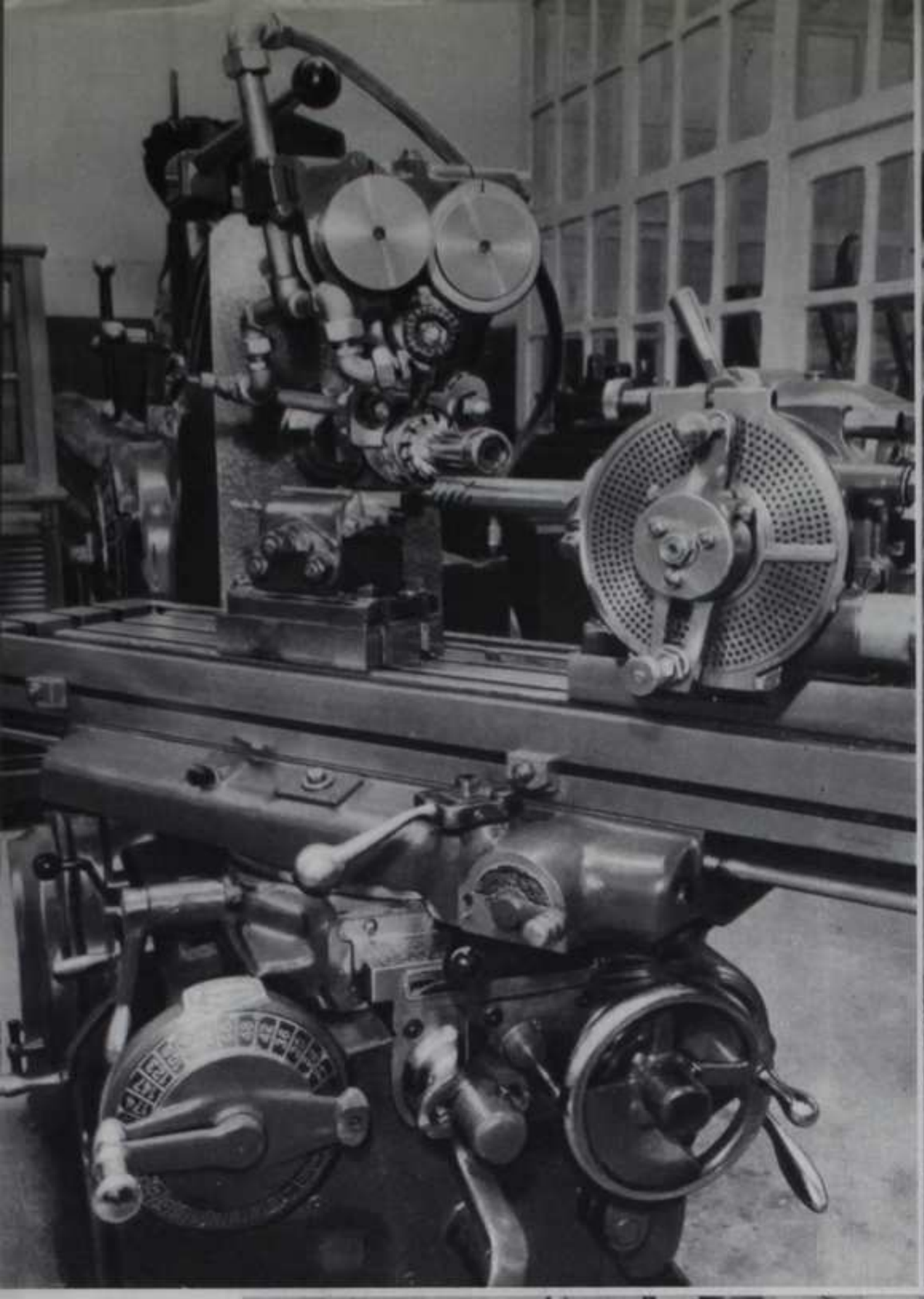
PUISSANCE

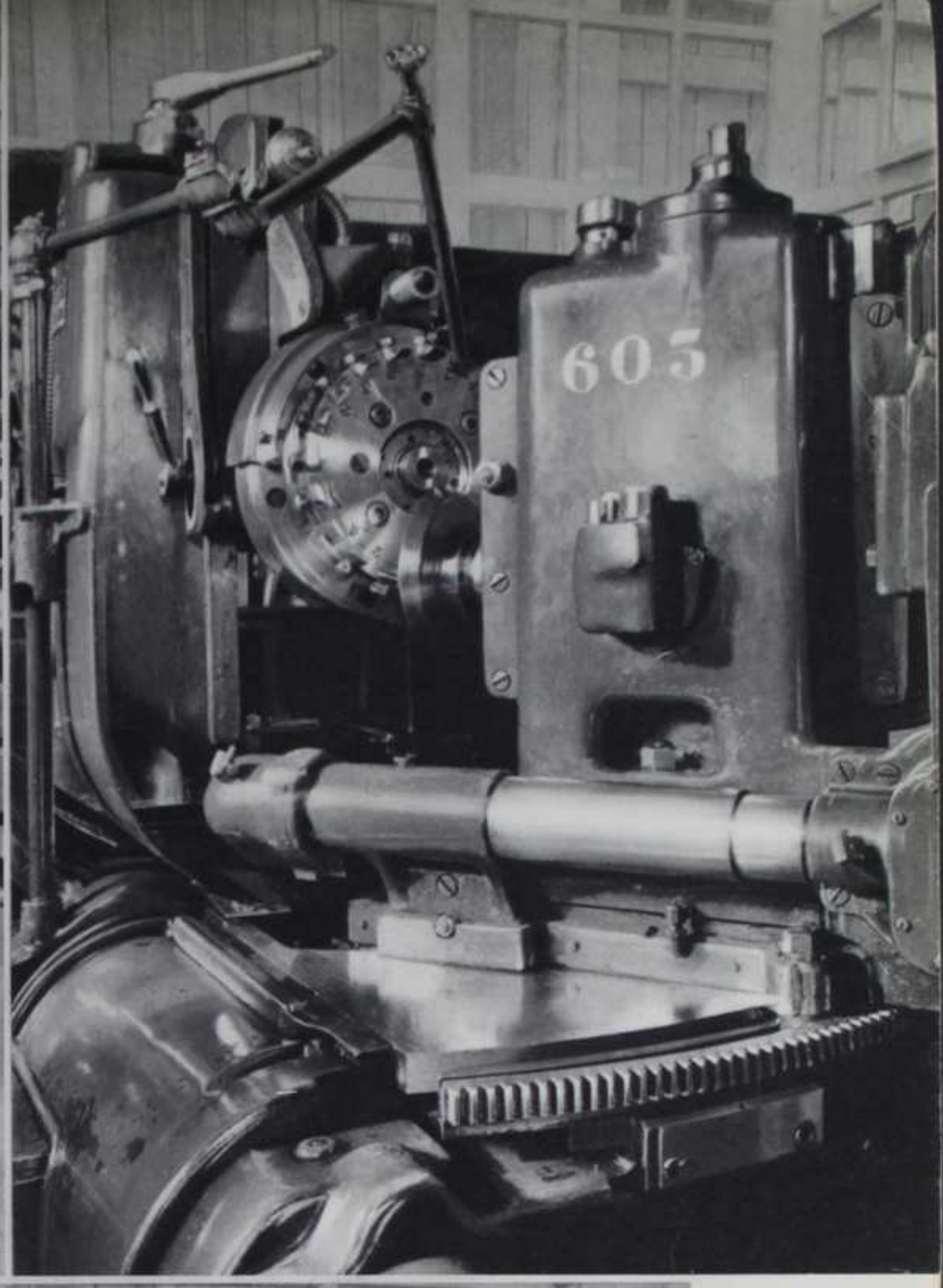
SÉCURITÉ



PRÉCISION



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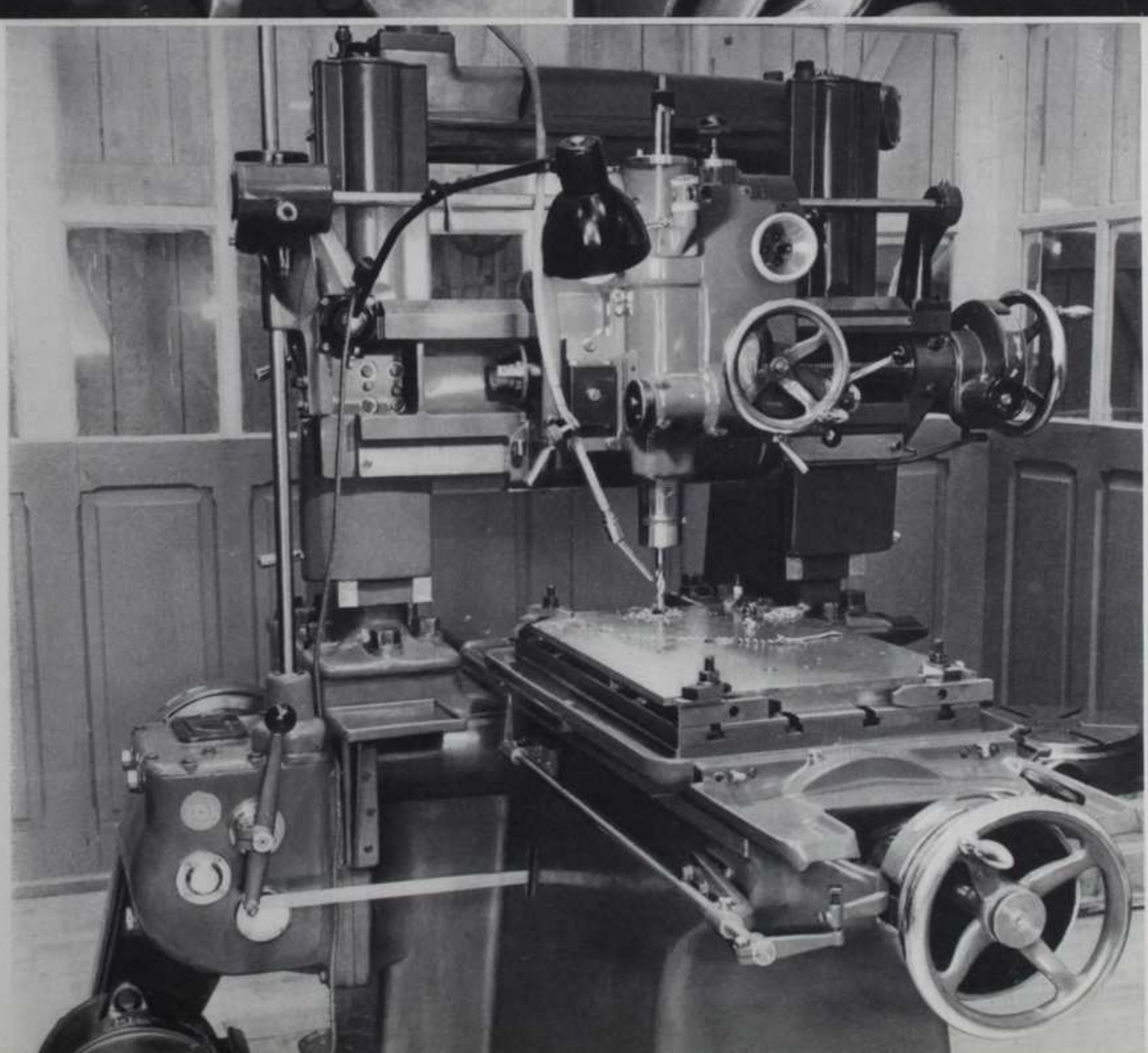
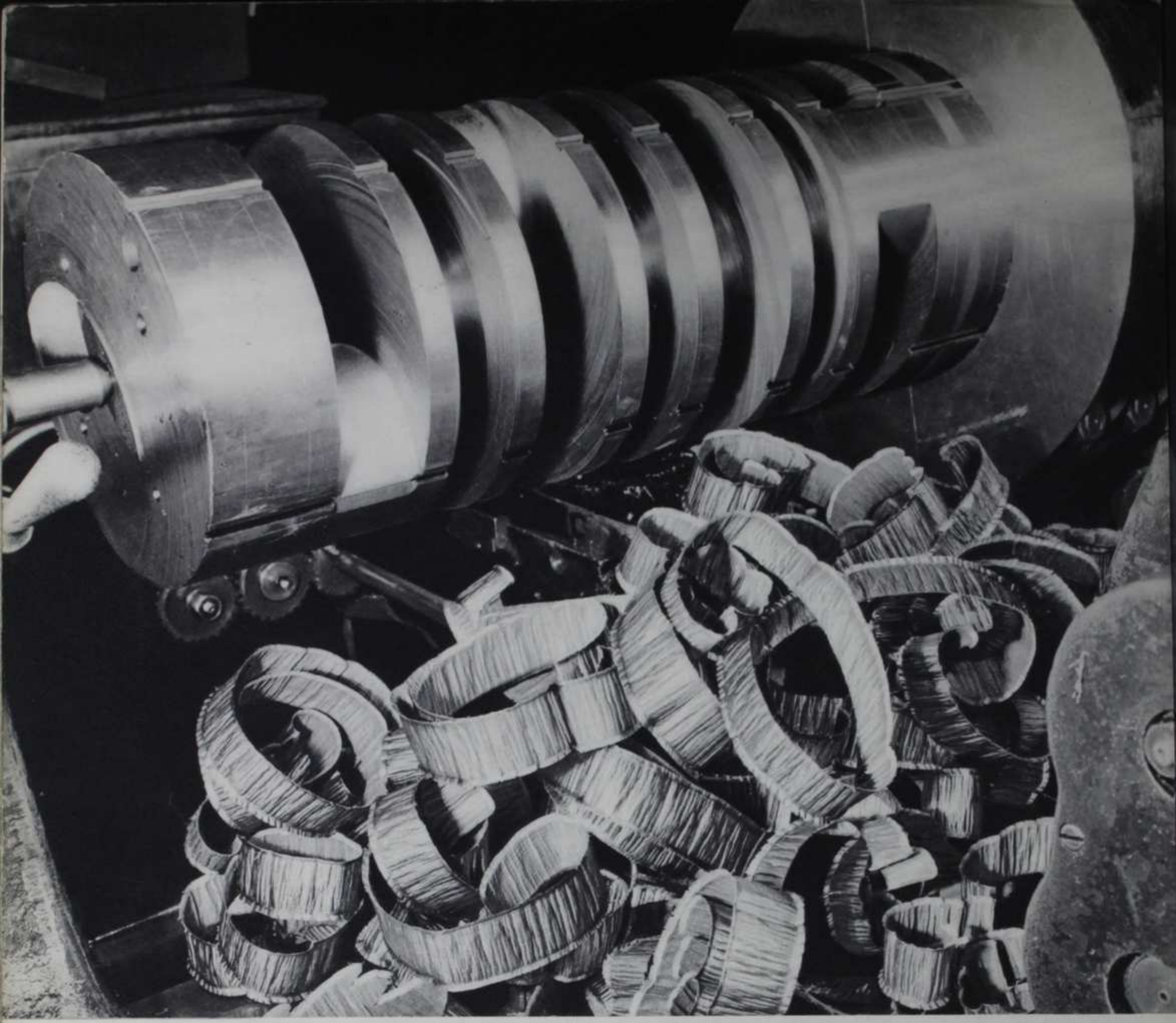
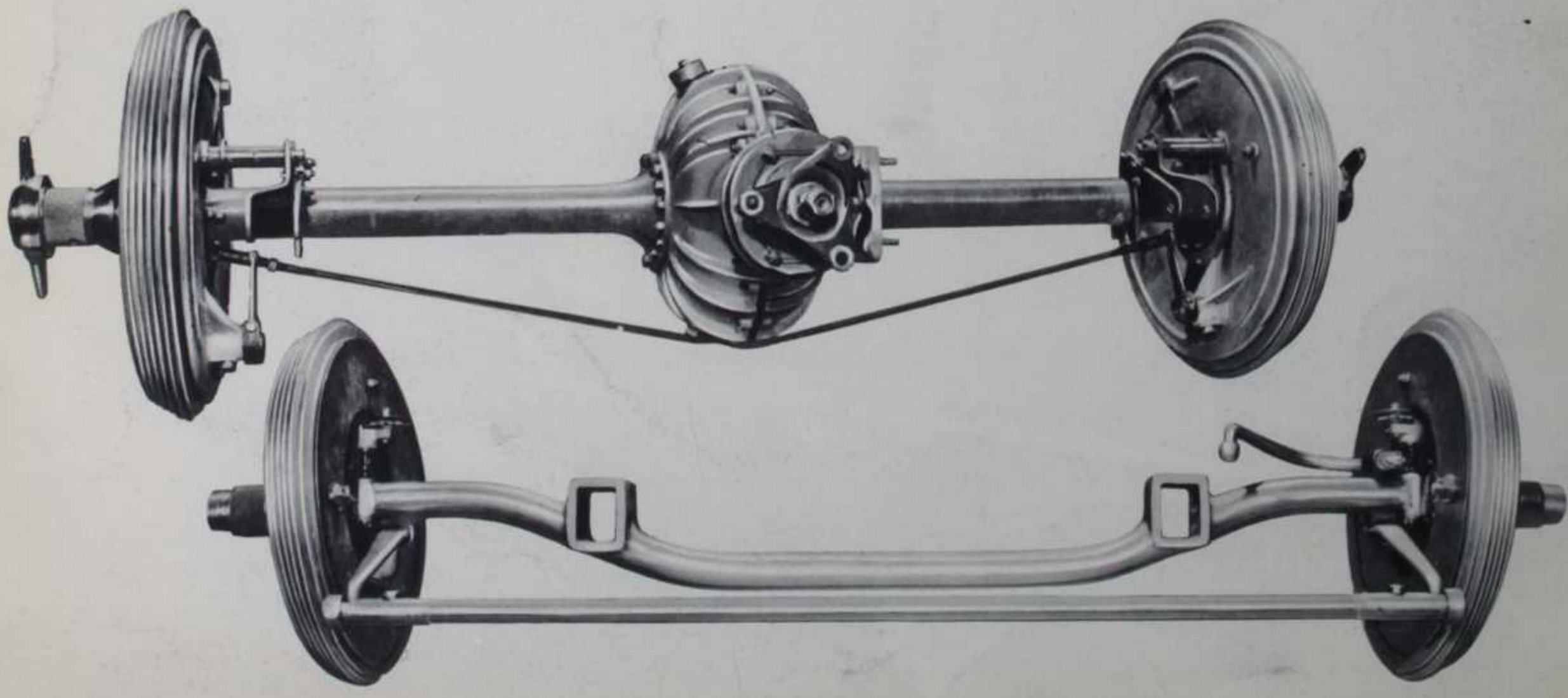
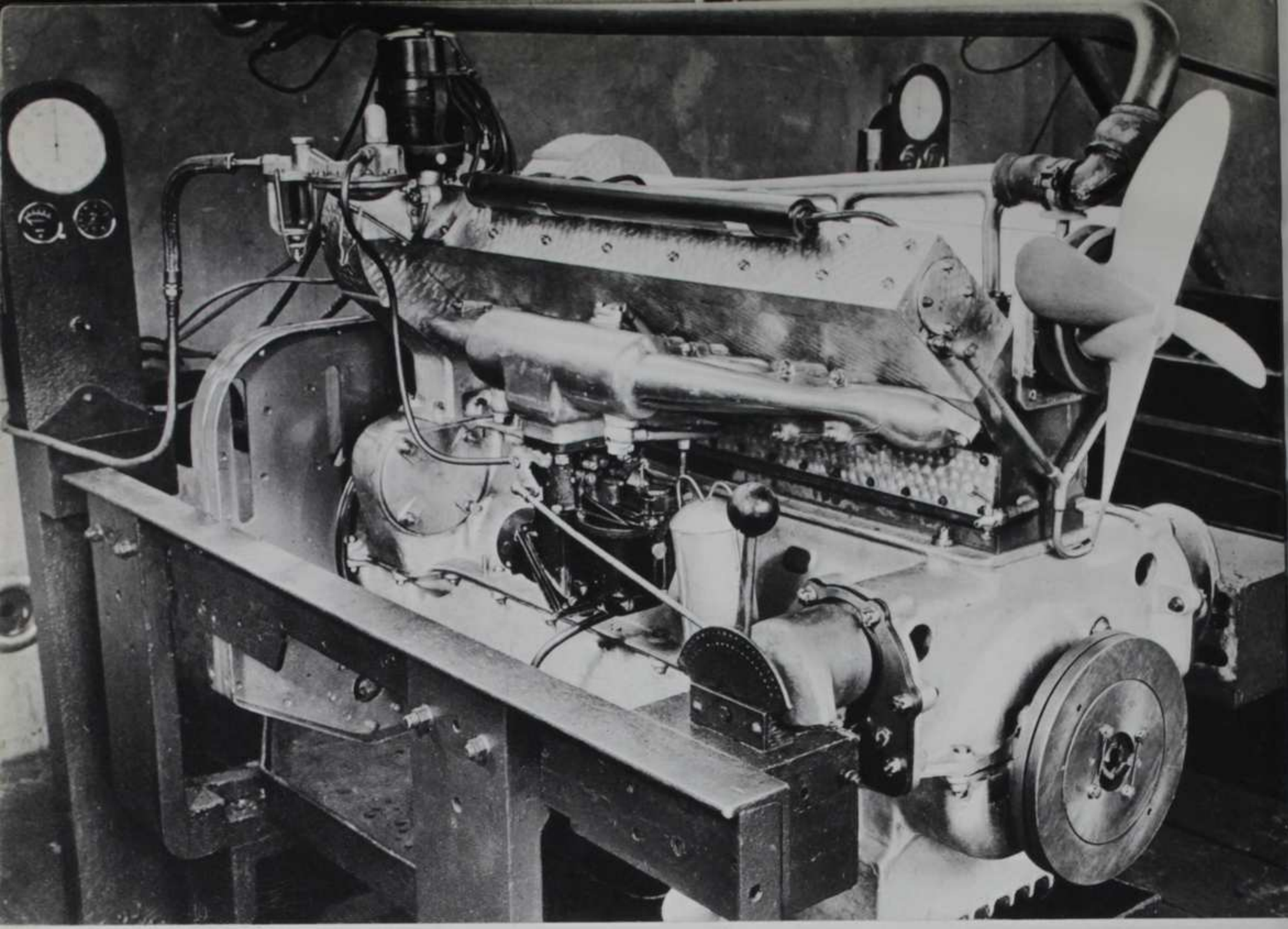
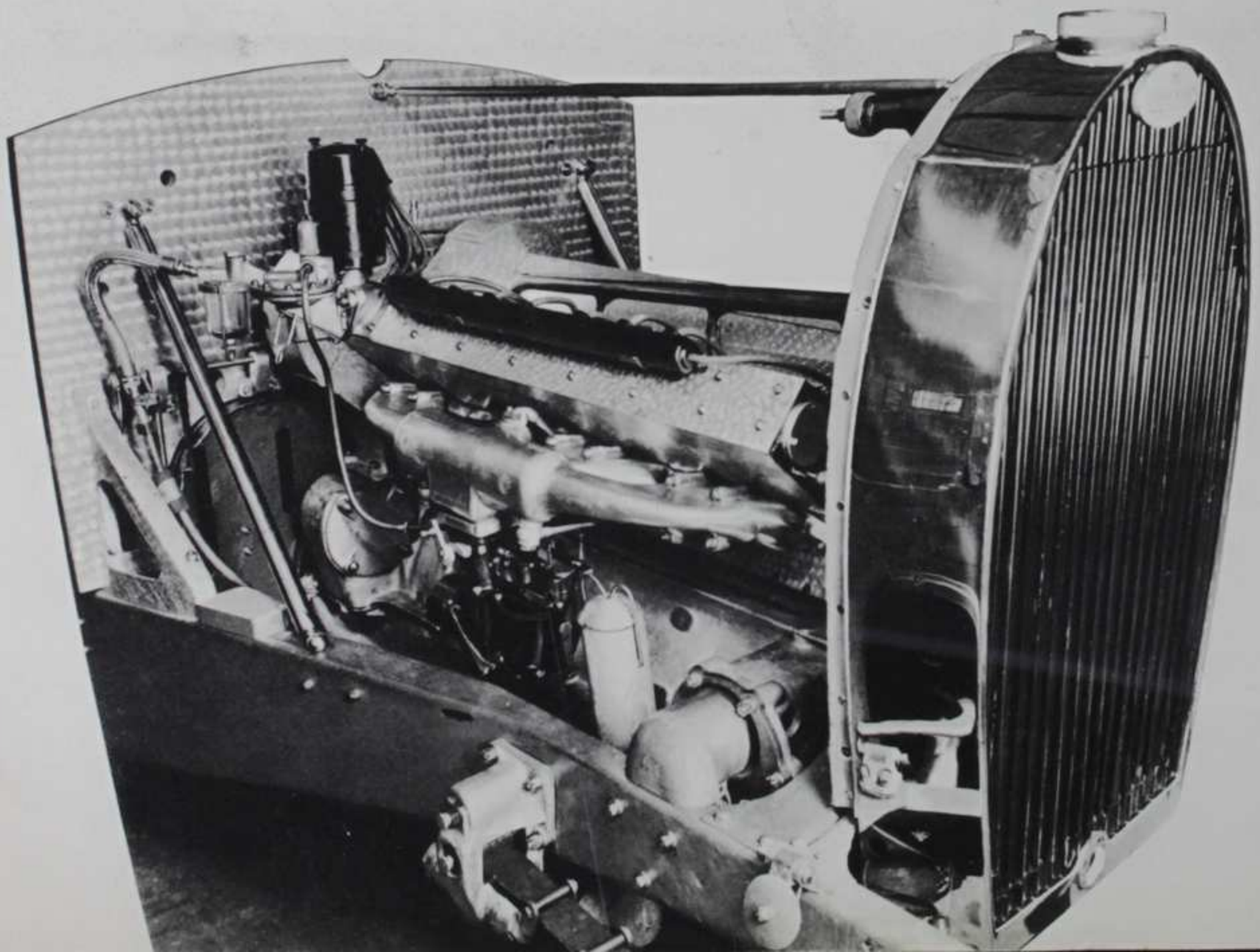










Cabriolet décapotable

STELVIO

57

Châssis " Type 57" avec carrosserie Cabriolet
décapotable "STELVIO" - 4 places - 2 portes

Conduite intérieure

GALIBIER

Châssis " Type 57" avec carrosserie Conduite Intérieure "GALIBIER" - 4 places - 4 portes

Coach

VENTOUX

Châssis "Type 57" avec carrosserie Coach "VENTOUX" - 4 places - 2 portes

57

Coupé

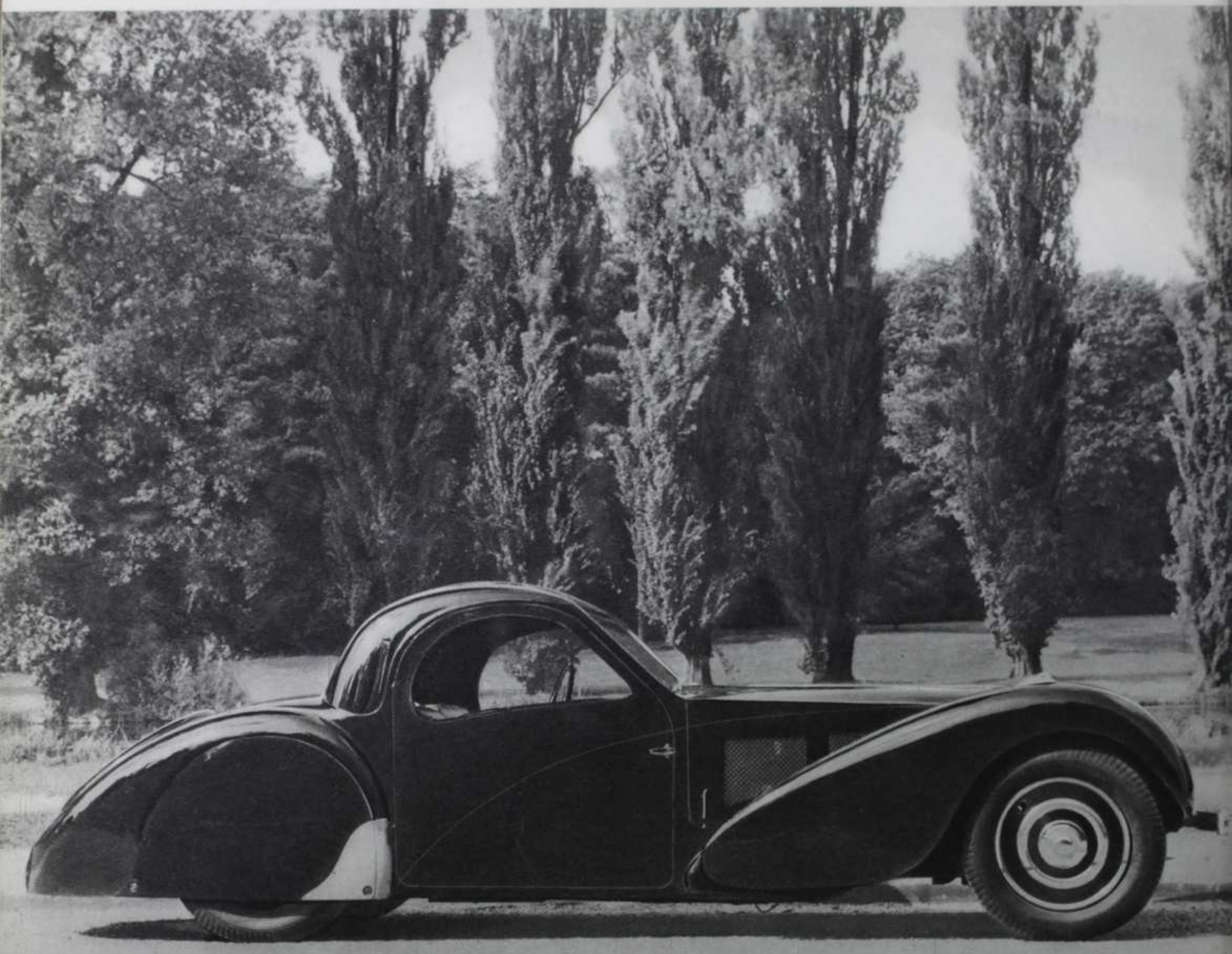
ATALANTE

Châssis "Type 57" avec carrosserie Coupé "ATALANTE"
2/3 places - 2 portes

57

Coupé

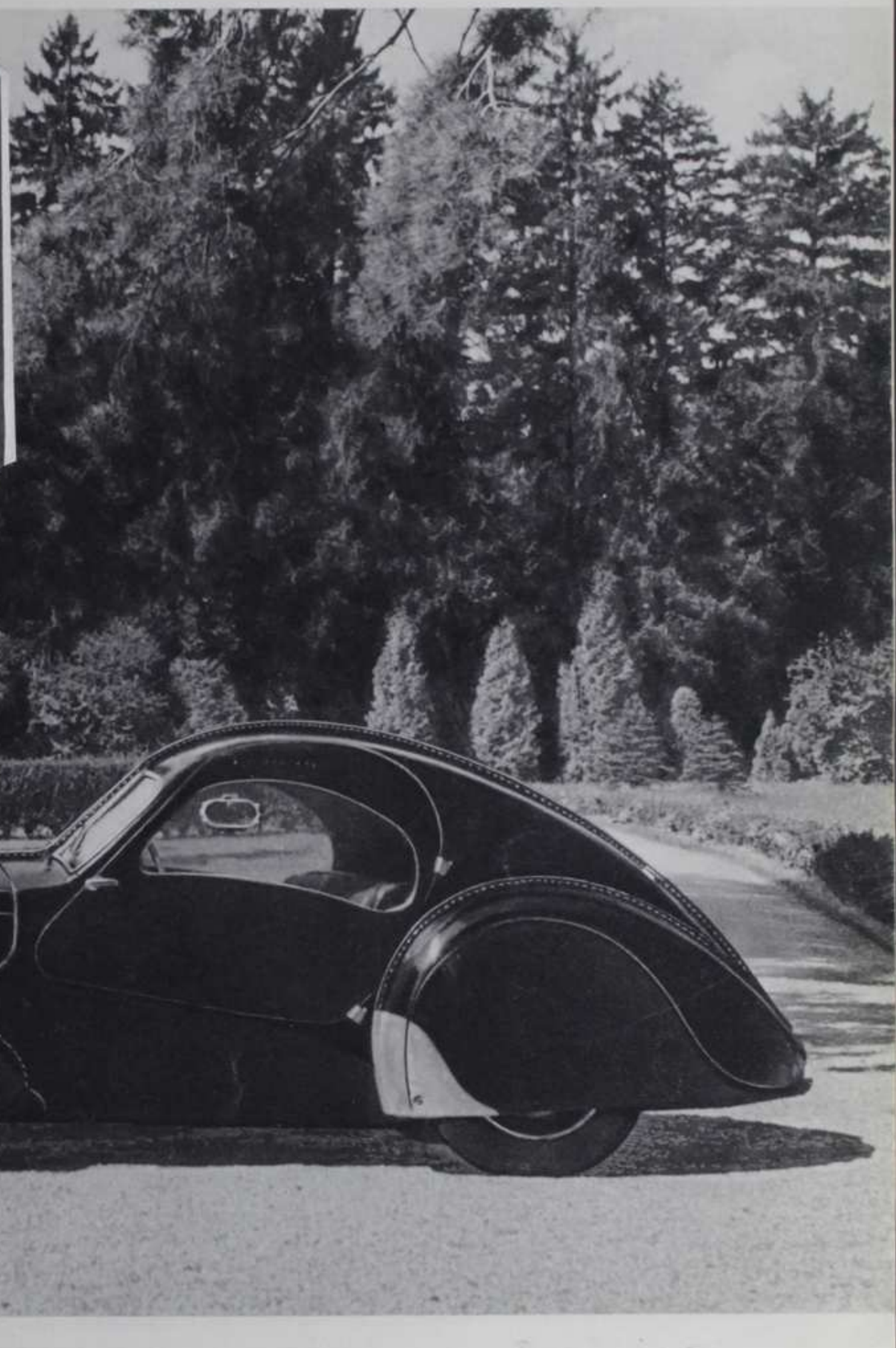
ATALANTE



Châssis "Type 57 S" avec carrosserie Coupé "ATALANTE"
2/3 places - 2 portes

57S

ATLANTIC



Châssis " Type 57 S " avec carrosserie "ATLANTIC"
2 places - 2 portes

57 S

PERFORMANCES

TYPE SPORT 57 - S.

3 litres 257 - Sans compresseur, 19 CV

1936 - 1936

GRAND PRIX de l'A. C. F.	1er
GRAND PRIX de la MARNE	1er
GRAND PRIX du COMMINGES	1er

14 Records internationaux (catég. 3 à 5 litres)

RECORD de l'HEURE	Moyenne	217 Km. 941
RECORD des 6 HEURES	—	204 Km. 230
RECORD des 24 HEURES	—	199 Km. 445
RECORD des 200 MILLES	—	205 Km. 560
RECORD des 500 KM.	—	201 Km. 980
RECORD des 3 HEURES	—	202 Km. 760
RECORD des 500 MILLES	—	204 Km. 390
RECORD des 1000 KM.	—	203 Km. 440
RECORD des 1000 MILLES	—	199 Km. 244
RECORD des 2000 KM.	—	196 Km. 684
RECORD des 12 HEURES	—	198 Km. 358
RECORD des 3000 KM.	—	199 Km. 147
RECORD des 2000 MILLES	—	199 Km. 329
RECORD des 4000 KM.	—	200 Km. 484

1937 - 1937

GRAND PRIX de PAU	1er
GRAND PRIX de BONE	1er
24 HEURES DU MANS	1er

Record battu : moyenne 136 Km. 977
Record du monde sur route

GRAND PRIX de la MARNE	1er

TYPE COURSE 3 l. 300 et 4 l. 700

1936 - 1936

GRAND PRIX de DEAUVILLE	1er
GRAND PRIX d'AMÉRIQUE	2e

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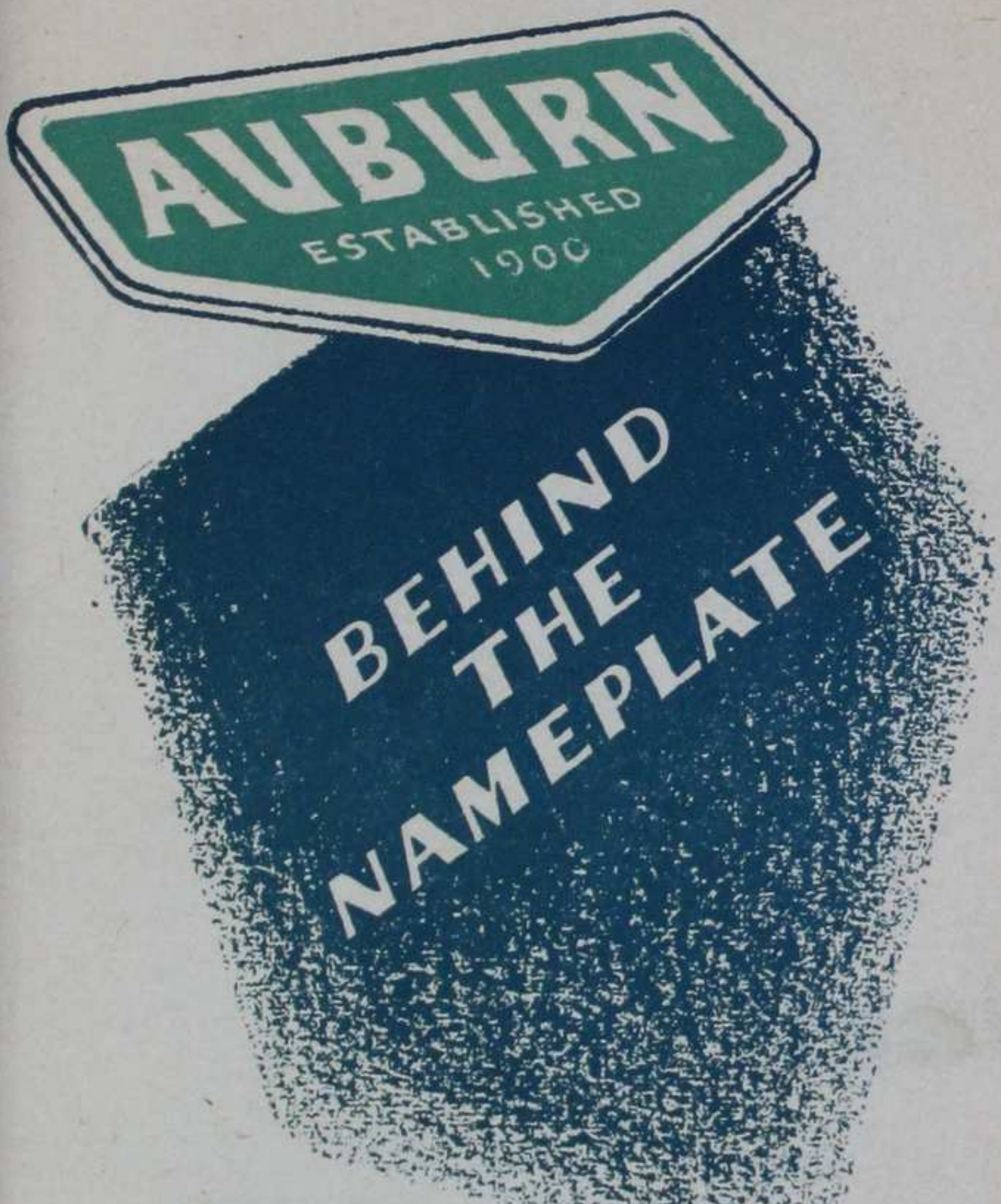
BUGATTI

A-21



Auburn Automobile Company
Auburn, Indiana, U. S. A.

AUBURN

Motor Cars

AUBURN AUTOMOBILE COMPANY

AUBURN, INDIANA

BEHIND THE NAME PLATE

Foreword

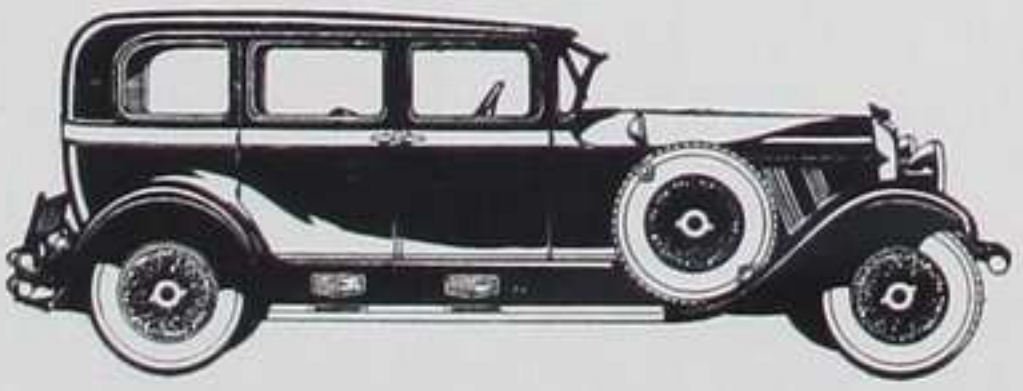
THE beauty of design and finish may be the first thing to attract you to the AUBURN motor car, but, after all, "Beauty is as Beauty does," and it is the inbuilt quality and stamina of the AUBURN that is responsible for its many thousands of owners and boosters.

When you purchase a new home, you don't stand on the walk in front and inspect it, then buy it because it has a color that is pleasing to you—emphatically not. You carefully inspect every room noting all conveniences and if it meets your requirements better than any other you purchase it. It is the same with Auburn cars. We feel that Auburn cars are the last word in style and beauty, but before you buy we want you to drive a number of the models noting the convenience of starting, ease of riding, large, wide doors, the convenience of the Brewster type windshield for night driving, and all the other refinements and mechanical improvements which make Auburn the greatest value on the market today.

In designing the new series 6-80, 8-90 and 120 models, we felt our first obligation was to previous Auburn owners because they have made possible Auburn's rapid growth and wonderful success. To continue to enjoy their patronage and protect their investment the new series embody no changes that obsolete previous models, but are, due to additional niceties and mechanical refinements, the last word in motor cars.

With this in view we have built what we believe to be the best line of motor cars on the market.

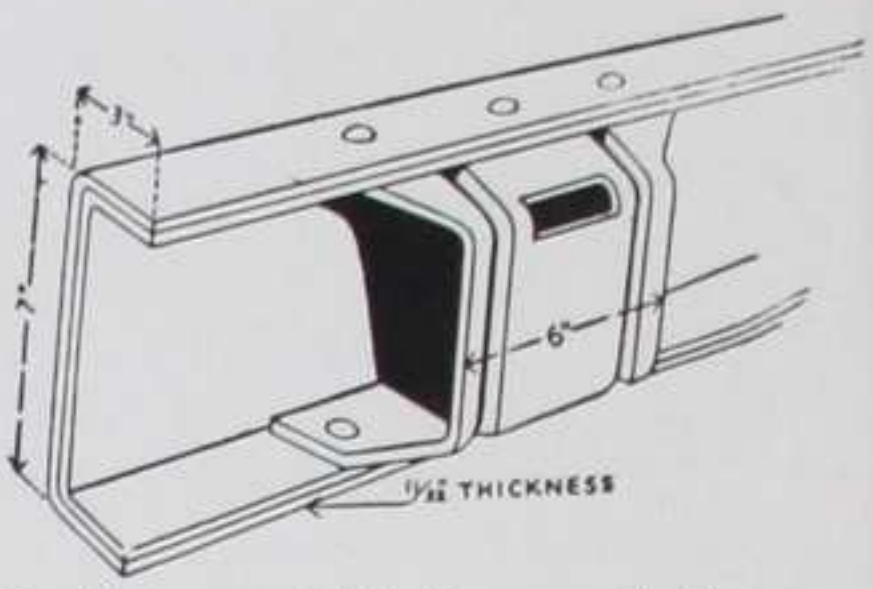
This booklet contains just plain facts which illustrate the superior construction of Auburn cars and is prepared to substantiate our belief that AUBURN offers the greatest value in motor cars.



Frame

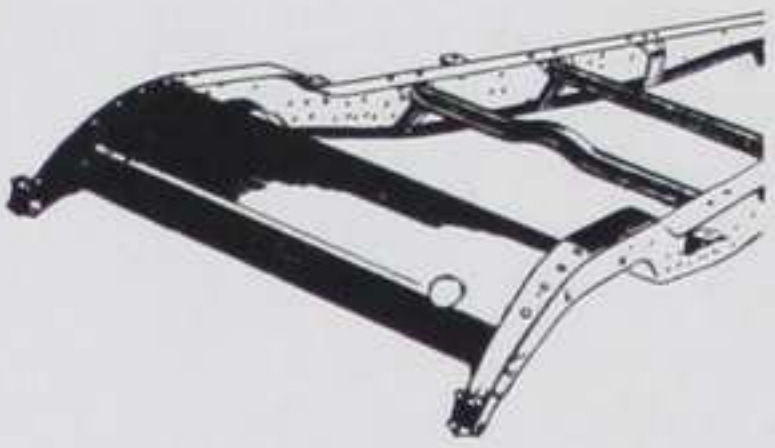
The foundation of any motor car is the chassis frame and on this one particular unit much depends in the satisfactory service you will receive from your motor car.

For that reason we have made the frames under all new Auburn cars, in our honest belief, the strongest frames ever put under any automobile at any price. They are shimmy-proof and give the car unusual stability at any speed on any road, because they are made of heavier steel, deeper, wider and reinforced by more cross-members.

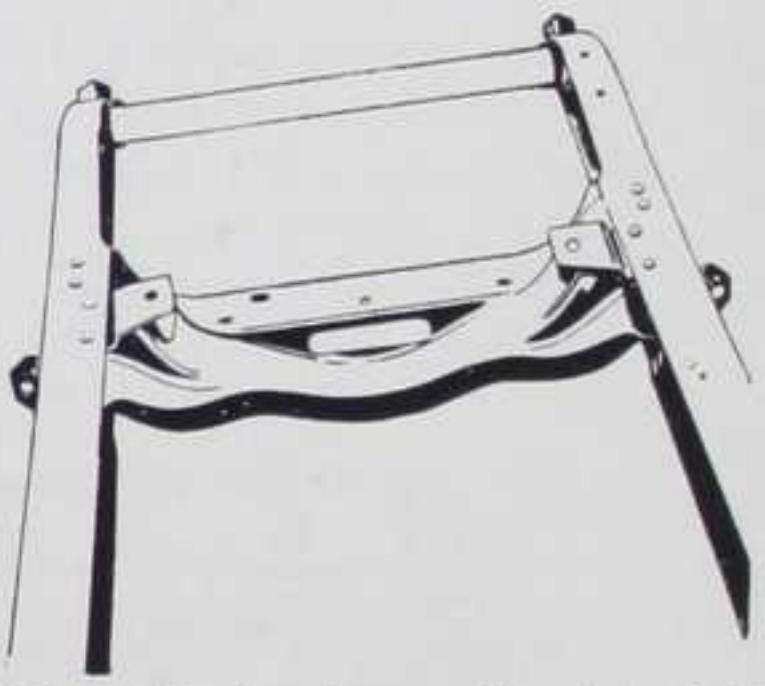


Double armor-plate frame and shimmy-proof motor supports.

The frame of the 120 model is made of pressed steel $\frac{3}{16}$ of an inch thick with side rails seven inches deep and three-inch flanges. The front ends of the side-members are joined by a 2-inch tubular cross member; a U-shaped member joins the center point of the side rails, and an inverted pan cross-bar out of 5/32-inch stock boiler plate nearly 16 inches wide is inserted at the rear of the frame which completely covers the top of the 18-gallon gas tank. One channel cross-bar is used and the rear motor mountings act as an additional safety factor and absolutely eliminate shimmy. A 5/32-inch reinforcement channel is placed inside of the side rails running from the front end of the spring horn to just behind the rear motor support.

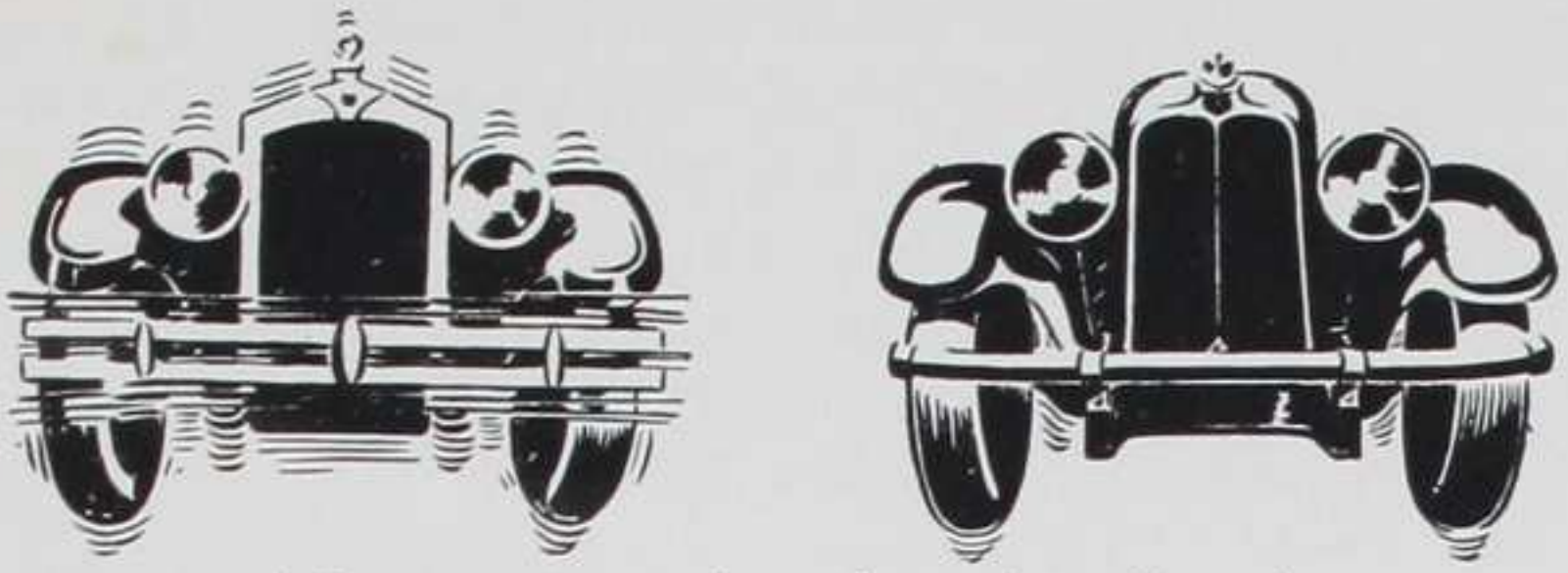


Rear boiler-plate cross member, extra-wide gussets and frame one-inch deeper for entire length.



Note the sturdy angular step channel cross member which forms an unusually strong front motor support.

In addition to the above described tubular and channel cross-members the 120 has a combination angular and step channel member joining the front of the side rails just back of the 2-inch tubular cross member. The front motor supports are strongly gusseted to this member



Auburn remains steady on the road at all speeds. No wobbling or weaving.

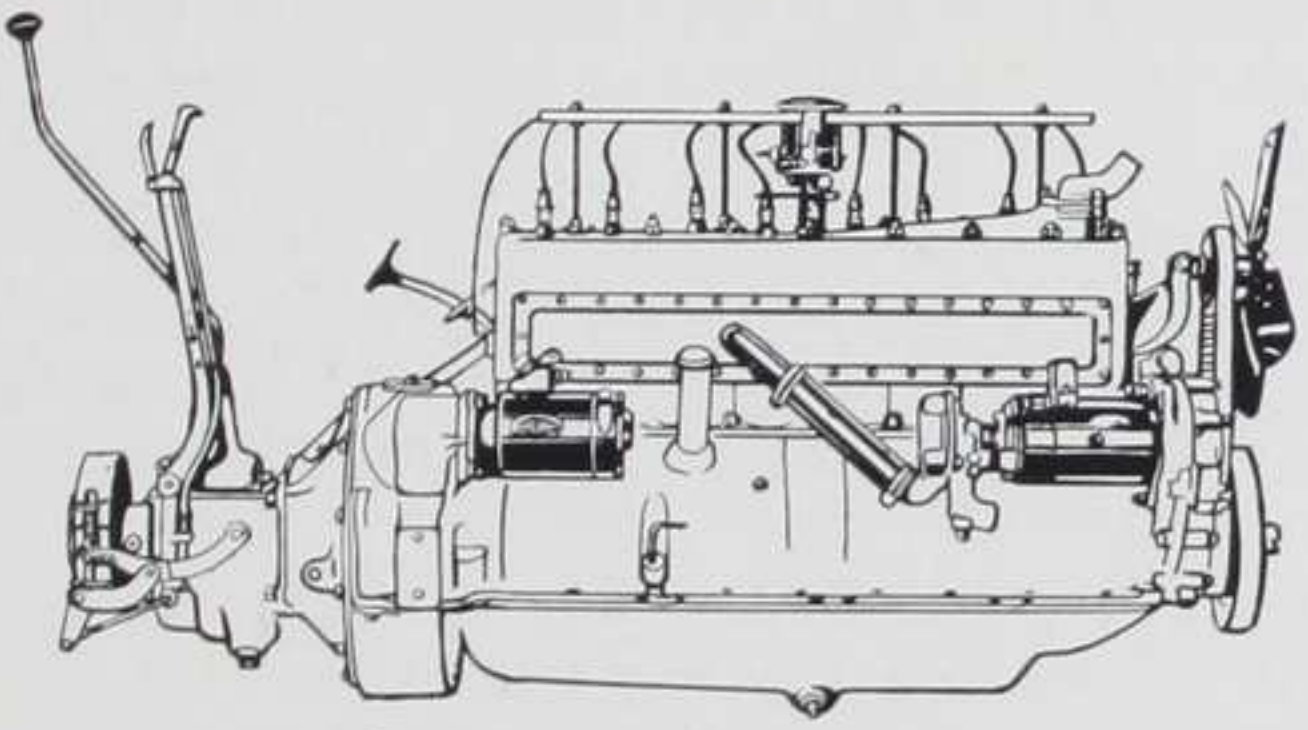
as well as to the side members of the frame, which makes an unusually strong motor mounting. The radiator is also mounted on this box-like member which absolutely eliminates radiator shimmy.

The frame of the 8-90 is equally as strong as the frame of the 120 and has all the features of the 120 frame with the exception of being a few inches shorter in length.

The frame of the 6-80 has all the general dimensions of the 120 and 8-90 model excepting the reinforced channel. This gives the 6-80 the strongest frame used on any passenger car listing for less than $1,000.

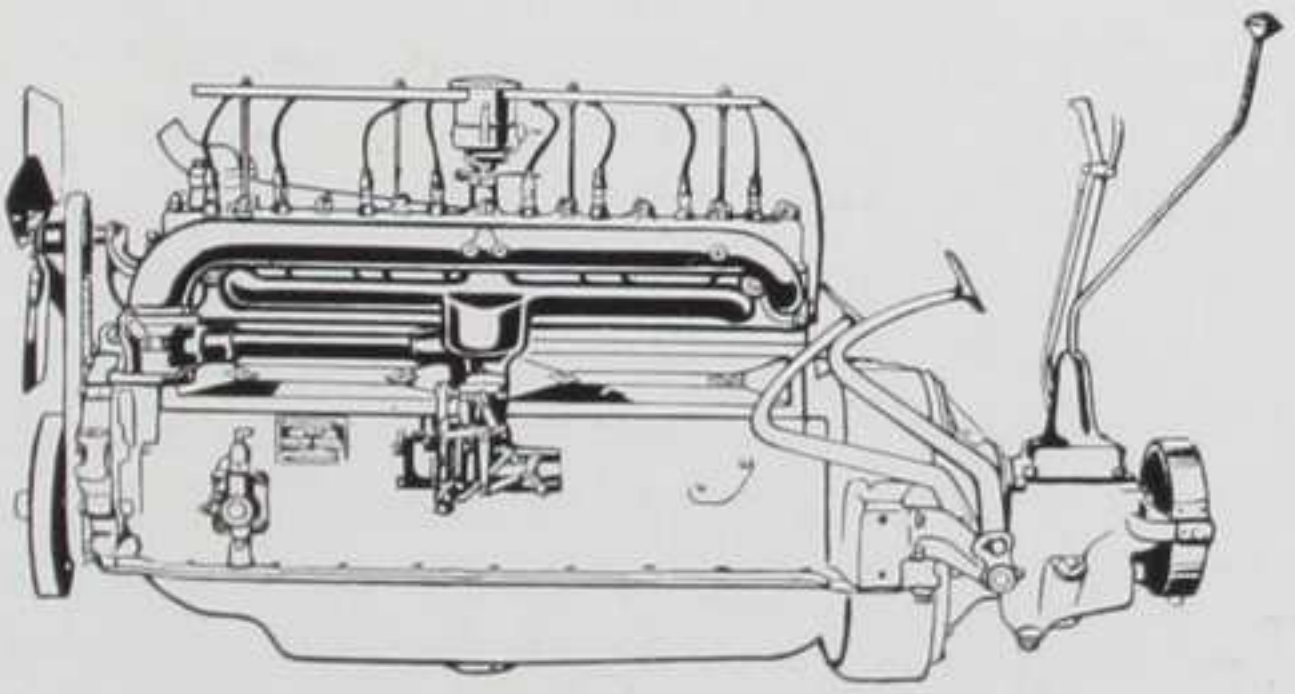
Motors

Our new series 120 is one of the most powerful American production cars, delivering 125 horsepower.



Right Side of Model 120 Motor.

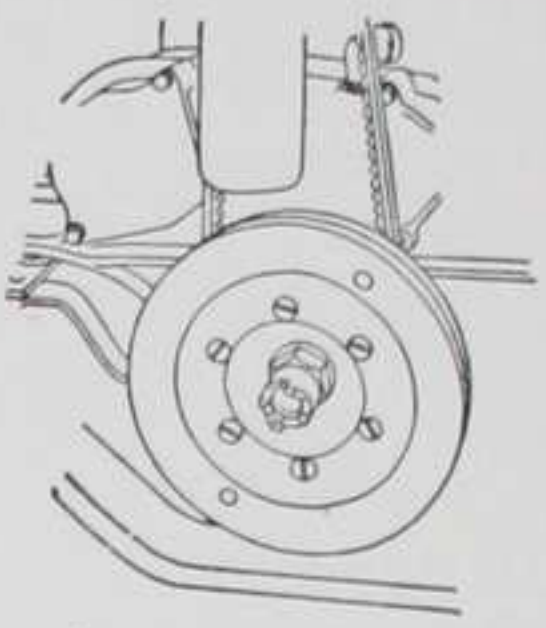
A Lycoming straight-eight motor with a bore of 3 1/4 inches and a stroke of 4 1/2 inches is used. The piston



Left Side of Model 120 Motor.

displacement of this model is 298.64 cubic inches and develops a maximum of 125 horsepower. Compression ratio of 5.25 to 1 is standard with 6.56 to 1 as optional.

This model is very powerful and has obtained its super power through improved manifolding, carburetion and combustion chamber design. The design enables Auburn to pack a greater charge of gas into the cylinders through dual manifolding, dual carburetion and improved head and port design.



Vibration is minimized by the use of a Lanchester balancer.

With the dual carburetion and manifolding on both the 120 and 8-90 models each cylinder is insured of the proper charge of gas.

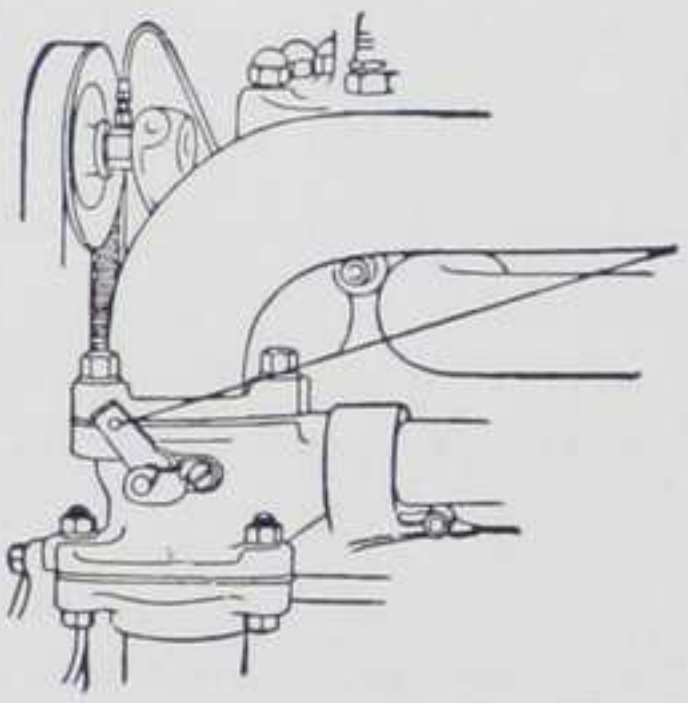
In operation it is practically on the same principle as though two carburetors and two manifolds were used, the carburetor, while having only one bowl, has two vent tubes and there is an intake manifold to each four cylinders. There is a separate idle adjustment for each set of four cylinders, but the one high speed adjustment takes care of the entire eight cylinders.

The dual carburetor is very simple in operation and no more difficult to adjust than the ordinary single carburetor; and it insures full charge for each cylinder, giving far greater smoothness of performance, power and speed.

While dual carburetion is used on the straight eights, it is possible in the six-cylinder model to secure maximum efficiency with the use of a single carburetor; therefore, it is not equipped with dual manifold nor carburetor.

Vibration in the 120 and 8-90 models is minimized by the use of a Lanchester vibration dampener.

In the model 120, we have been able to secure 125 horsepower without raising compression to the point that special high-priced fuels are necessary, which is an item of considerable importance to the purchaser as, of course, it means considerable saving in the operation of a motor car. At the same time we have so distributed the motor heat as to reduce both water and oil temperatures 20 degrees, which is a certain guarantee



This lever on manifold exhaust operates from dash and opens and closes valve that permits warming fuel as weather conditions require, insuring greatest efficiency.

of even longer life because of better lubrication.

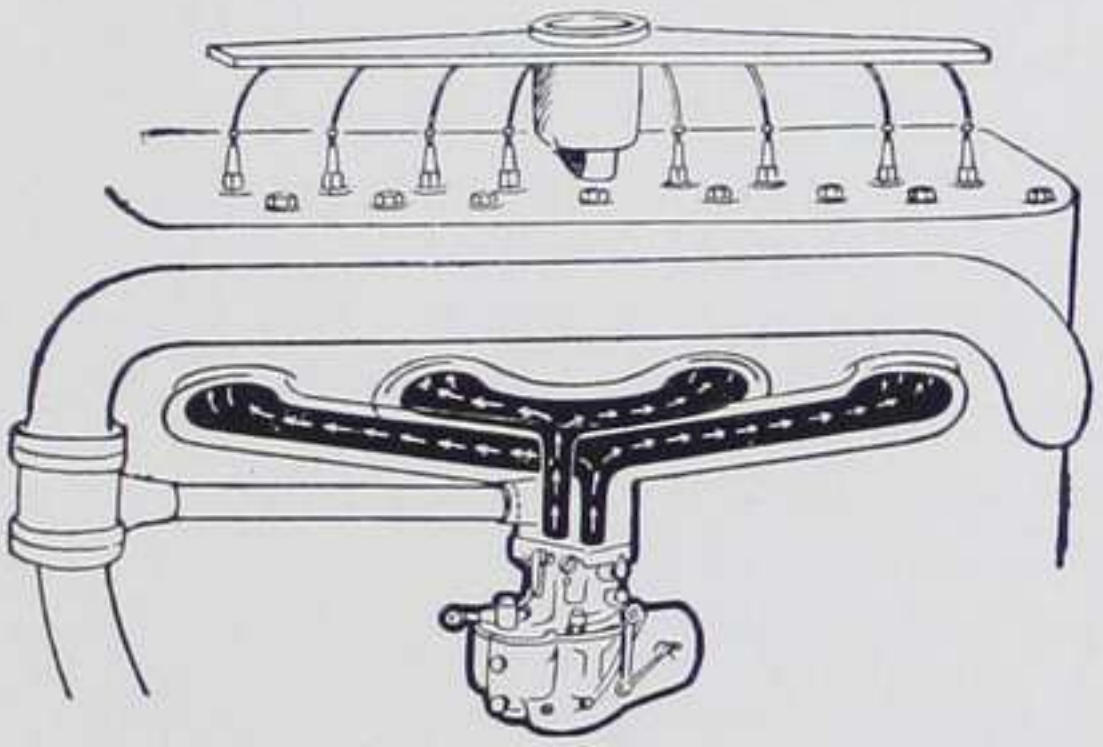
Our high speed, flexibility and smooth running in all models are obtained by the use of Bohnalite steel strut pistons and connecting rods which are perfectly balanced; also, by the latest engineering improvements in gas distribution.

The Bohnalite steel strut pistons are much lighter than the ordinary cast-iron pistons which means less pressure on the bearings; therefore, longer wear and freedom from bearing troubles in the motor.

Thermostatic heat control is standard on all motors which insures their operation at even temperature regardless of weather conditions. The model 120 engine is equipped with manifold heat control which enables you to operate the car at maximum efficiency under any weather condition, by controlling the amount of heat at the carburetor, and insuring proper vaporization of all fuel before entering cylinders.

All three models are equipped with Lycoming motors, which, in our judgment, are unequalled in horsepower output by any stock motors ever built of comparable size. Lycoming is also the world's largest producers of eight-in-line motors, which offers Auburn the added advantages of quantity production.

We feel safe in saying there are no better motors on the market for power, flexibility, smoothness, quietness and durability, and we only ask you to drive one of the new Auburn cars to prove it.



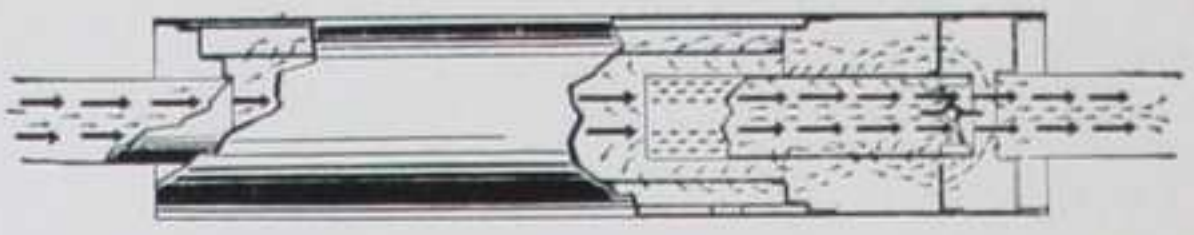
Showing dual carburetion principle and method of concealing wiring.

The appearance of all Auburn models under the hood is unusually clean, and all wiring, with the exception of very short wires to the spark plugs, is concealed. Wires above the spark plugs are carried in specially designed conduits, which greatly add to the neat appearance of the motor. Wiring cable used is the finest available being of the corona-proof type which gives complete assurance of freedom from ignition leaks that result in

loss of power and are very common when inferior types of cable are used.

Special Muffler Design

In this day and age of high speed, it is essential that all parts be designed with this point in view. The muffler on the 120 model is of the very latest scientific con-



Special muffler with by-pass for increased power at high speeds.

struction with special exhaust by-pass controlled from the front compartment. When this by-pass is open the exhaust gases have direct passage through the muffler and back pressure is reduced from about 5½ to 1½ pounds. This is especially useful in the increased power it gives at higher speed and even with the by-pass open there is no objectionable exhaust noise.

Steering Gear, Clutch, Transmission, Etc.

Cars must now be very easily handled for the convenience of the women drivers and the Auburn 120 steers with astonishing ease. The cam and lever steering gear is used with an 18 to 1 ratio, and as the cam is mounted between two $\frac{5}{16}$-inch ball bearings, one at each end, the cam is given a very free movement and unusually easy steering control is gained. These features are particularly appreciated when parking the car in small space or in turning sharp corners.

Phantom view of steering gear.

The transmission, clutch, universal joints and axles have all been improved in design and quality to take care of the increased torque and have been especially selected for their freedom from troubles and quietness in operation.

Quality has simply been poured into every part of the 120, 8-90 and 6-80 models to meet all requirements, and then we added more than was required for factors of safety and endurance.

Every detail in the construction of the Auburn is given special attention for long wear and freedom from annoyances. For example, to operate the stop-light when the brake pedal is depressed, we have connected a

rod from the switch to the brake pedal in place of merely using an ordinary wire.

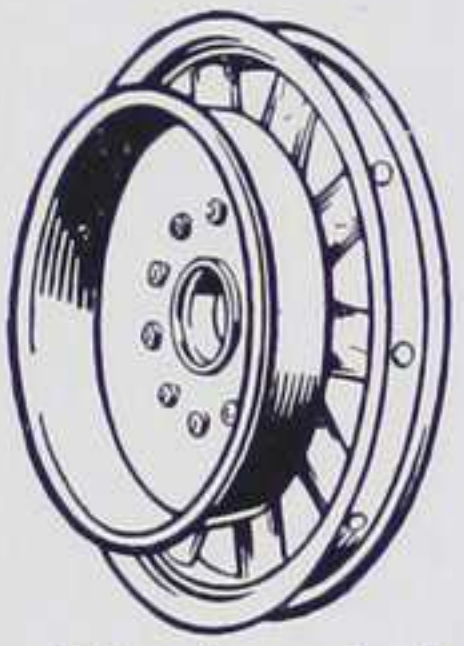
A very small feature but one which illustrates the length to which Auburn has gone in the sturdiness of the chassis, is the tail lamp bracket with which all models are equipped. This bracket is of heavy steel tubing and unusually sturdy.

Tail lamp bracket unusually sturdy.

Brakes

While acceleration is one of the primary requisites of a motor car, braking power is equally important and in this day of increased speed as well as the large volume of traffic on the roads, brakes are of supreme importance.

With this in mind, Lockheed hydraulic internal expanding four-wheel brakes are used on all Auburn models. All brake drums are carefully machined and there is a wide flange on the brake drum which keeps it perfectly round and true, insuring equal braking pressure even after long and hard usage. Our experimental cars have traveled as far as 20,000 miles without an adjustment of any kind.



Extra large brake drum, ground to a true curve with reinforcing ring that keeps its shape permanently true.

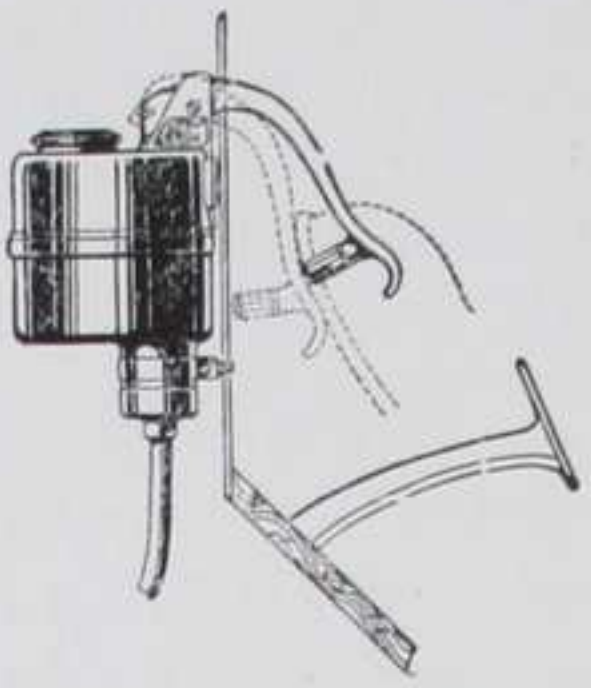
One of the very important features of the latest type of hydraulic internal expanding brakes, as used on Auburn, is the fact that the pressure cylinder is directly connected with a supply tank filled with braking fluid so that braking lines and pressure cylinder are at all times sure to be full of fluid and give instant, easy and positive operation, the supply tank taking care of all expansion and contraction of the liquid or any small loss that might occur.

Pedal pressure is extremely light, although positive braking action results, and both clutch and brake pedals are covered with rubber pads to avoid any possible damage to driver's shoes.

Chassis Lubrication

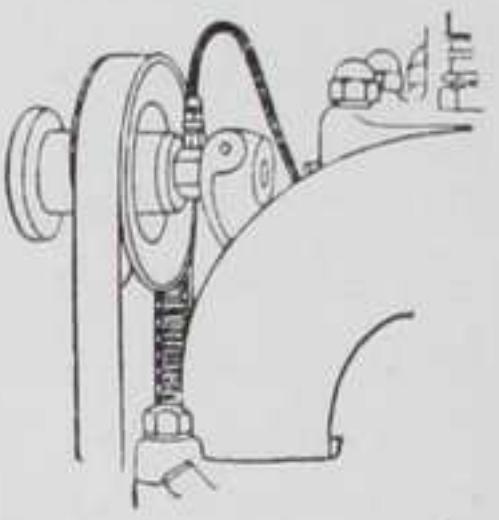
The most wonderful chassis ever built would be useless after a few hundred miles of operation without proper lubrication, and, as we believe we have the finest chassis, we naturally would use the most reliable and

efficient oiling system and one which operates with the least bother to Auburn owners. The Bijur system of lubrication was selected because it meets every requirement. This system enables you to oil 21 points on the Auburn chassis simply by giving a pedal a light push with your foot. Among the 21 points oiled are the fan bearing, water pump bearing, clutch throw-out bearing, spring shackles and the king pins. Think of it—a Saturday afternoon's greasing job done in ten seconds by a push of a pedal. Metering pins on all points oiled automatically see that each bearing gets just the right amount of oil.



Bijur chassis lubricating tank and operating pedal under dash.

The Auburn 6-80 model is the only car listing for less than $1,000.00 that has the Bijur system installed as original equipment.



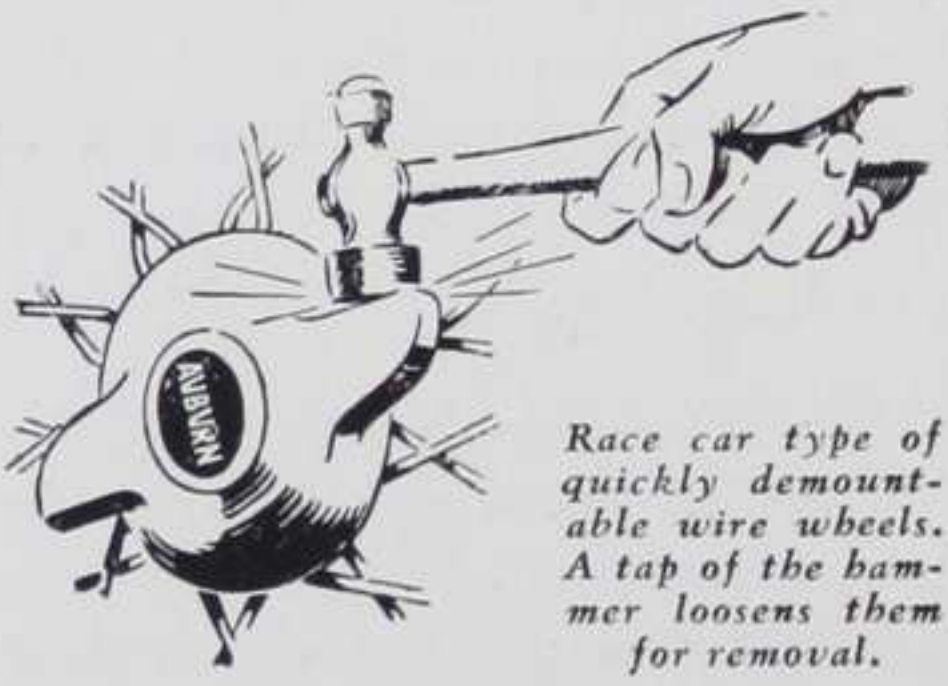
Metering pin on fan bearing, one of the 21 points lubricated.

Wheels

Wood wheels of an entirely new ten-spoke design are used with exceptionally large spokes, making a very sturdy looking wheel and adding to the beauty of the car.

New 10-spoke wood wheel.

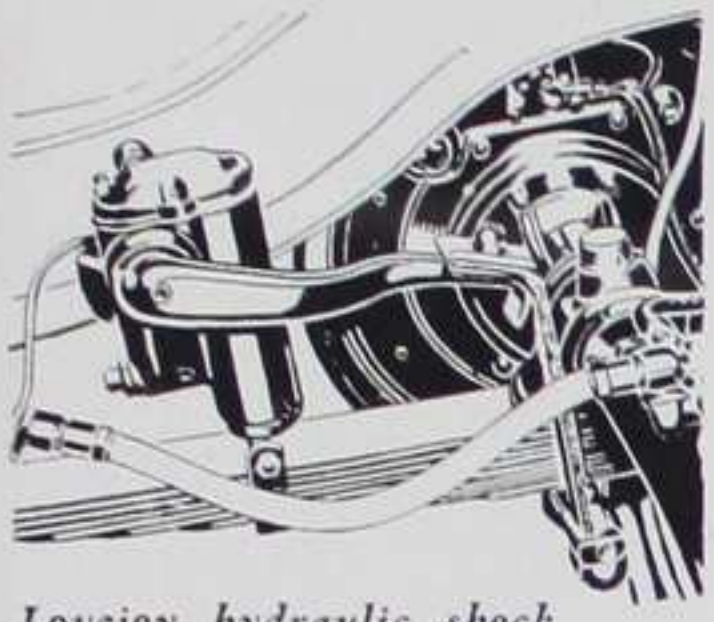
Wire wheels are of the Dayton design with quick demountable hub caps, making it possible to change a wheel in a very short period of time by merely removing the hub cap. These wheels have been tested under the severest of conditions and we know they will stand up and give unusually satisfactory service.



Race car type of quickly demountable wire wheels. A tap of the hammer loosens them for removal.

Springs and Shock Absorbers

The springs on the 120 model are of the semi-elliptic type with eleven leaves made of the strong silico-manganese steel composition. The overall length of the rear springs is 56¾ inches, each leaf being 2¼ inches wide. Springs on the 8-90 and 6-80 are equally as strong and as sturdily constructed.



Lovejoy hydraulic shock absorbers.

Four hydraulic shock absorbers are standard on all chassis models and these coupled with the long, thin spring leaves keep the car steady at all speeds and under any road conditions.

Running Boards

Instead of using the ordinary wooden type of running boards with their many faults, such as splitting, easy warping, and easy breaking in collision, Auburn uses all-steel running boards which form a regular side bumper for all models. The running boards are rubber covered to prevent slipping and carry out the general line of Auburn beauty.

Steel running boards.

The running boards on the 120 models are equipped with scuff plates and kick plates are placed in the flashing just underneath the doors. These add a dash of distinction to these models and are very serviceable.

Radiator

The radiator on the new 120, 8-90 and 6-80 models is designed to give a higher and narrower appearance, making the Auburn unusually distinctive, and it is interesting to note how other manufacturers have copied this front end design. A narrow, chrome-plated strip through the center of the radiator adds an appearance of height. The radiator shell is chrome-plated, and a neatly designed radiator cap, beautiful in its simplicity, adorns the top of the shell. The cap is removable by just a quarter turn.

New radiator cap.

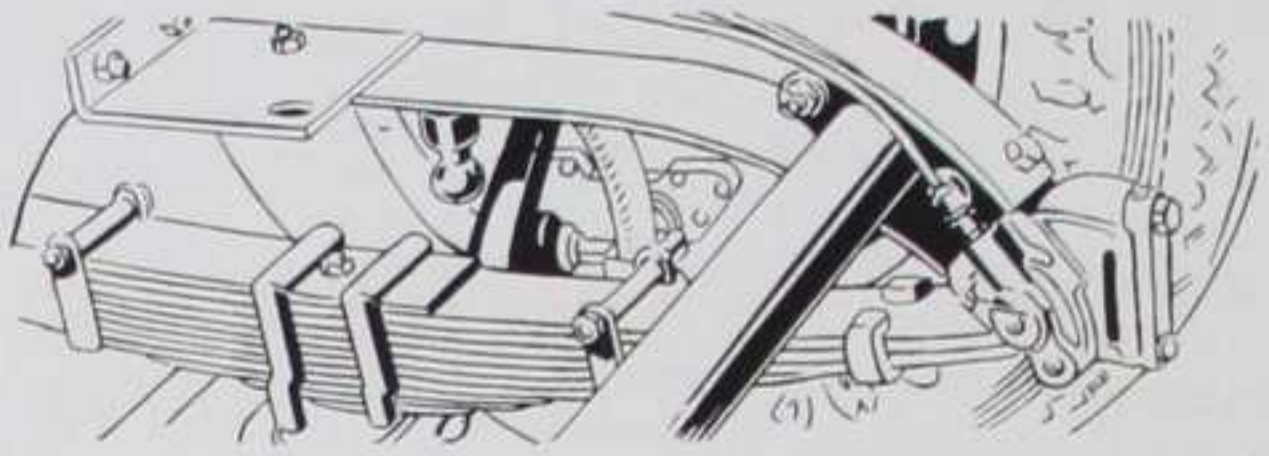
Large radiator, insuring ample cooling capacity.

The water is driven through the five-gallon capacity

cooling system by a centrifugal action pump and ther mostatic heat control is used.

Bumpers

Bumpers are of the large, round bar design in front, and the bar type bumperettes are used on the rear. On the 120 models the bumpers are chrome-plated, while on



Front spring and bumper mounting integral with frame.

the 8-90 and 6-80 models, black enameled bumpers are standard—chrome-plated being furnished at slight additional charge.

Bumper brackets are cast as an integral part with the ends of the frame on all models bringing the bumper action closer to the frame and making it more able to withstand shocks by throwing them directly into the heavy chassis frame.

Headlamps

The headlamps on the Auburn models are the largest used on any stock car in America, measuring 13 inches in diameter; and in addition to being the most beautiful lamp used by any manufacturer, give perfect illumination for night driving. Monogram lenses, which give an equal distribution of the light rays, of 11½-inch diameter are used. Headlights on the 120 model are dimmed by resistance and on the other models by double filament bulbs. The storage battery is located along the right-hand chassis side rail directly under the front seat.

Extra large headlamps.

Sturdy tire lock.

Tire Lock

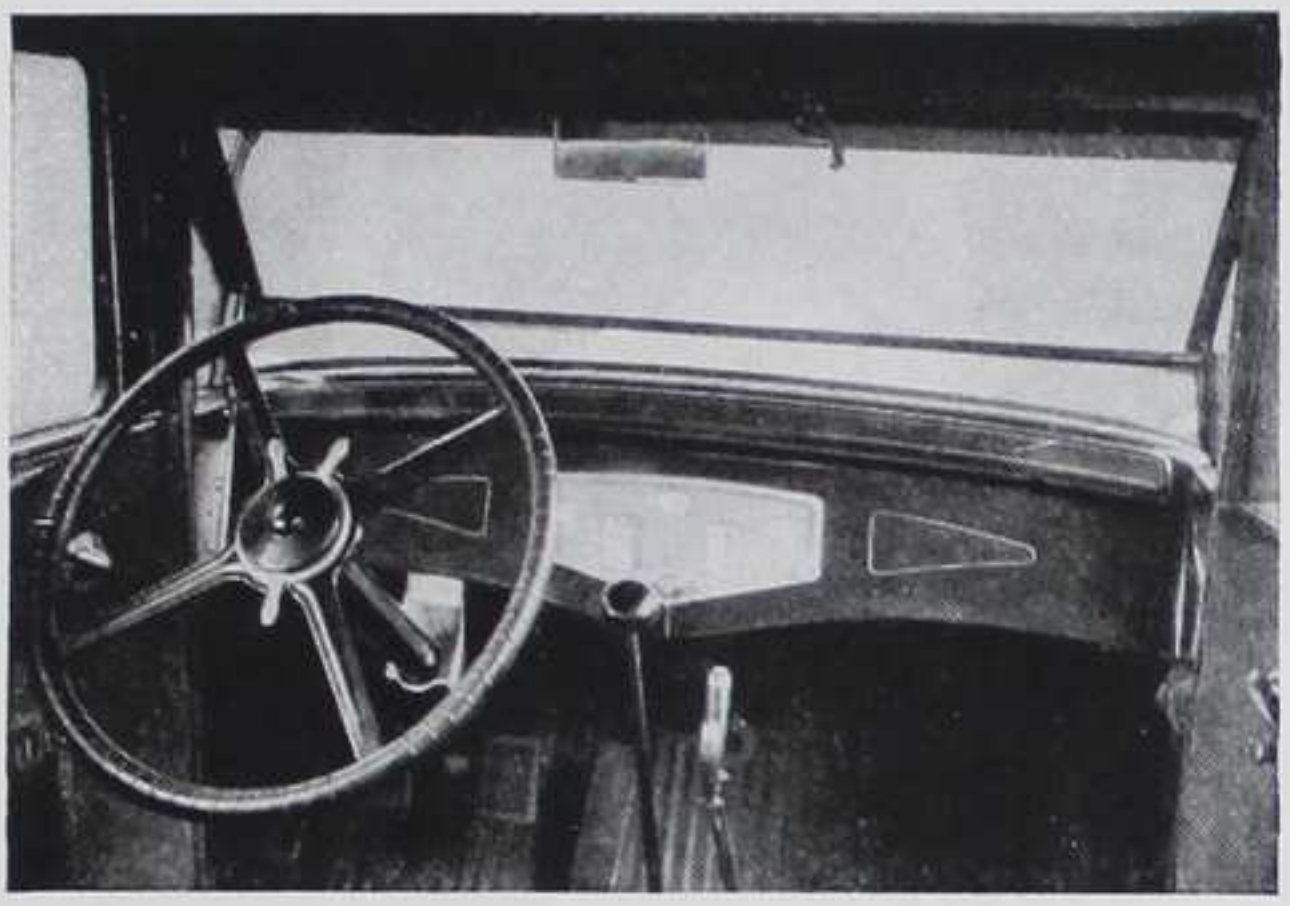
For the tires mounted on the side, a special

type of tire lock is used that is not only very pleasing in design, but extremely serviceable as well, and very easily operated.

Steering Wheel

The steering wheel on the Auburn models is of hard rubber composition, large in diameter but with a small rim, better fitting the hands of the woman driver and, also, easier to handle for the man as well.

Auburn pioneered the placing of the light switch on

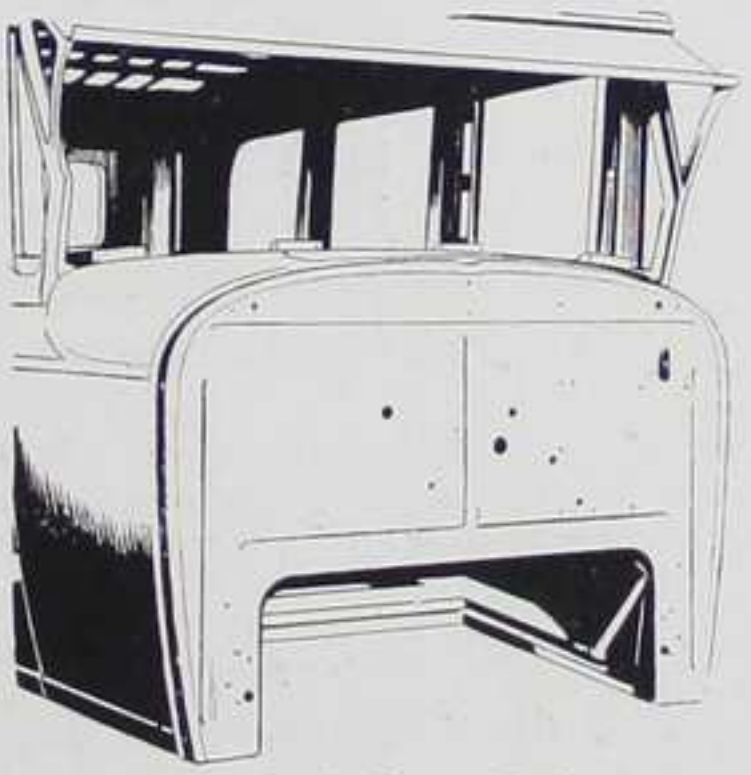


Steering wheel and controls. Note rubber covered pedals and rubber mat.

the steering column and continues the spark, throttle and lighting switch controls on the top of the steering column where they can be reached without removing the hands from the wheel. These control levers, however, are of a special design in hammered silver finish to match the other interior hardware.

Body Construction

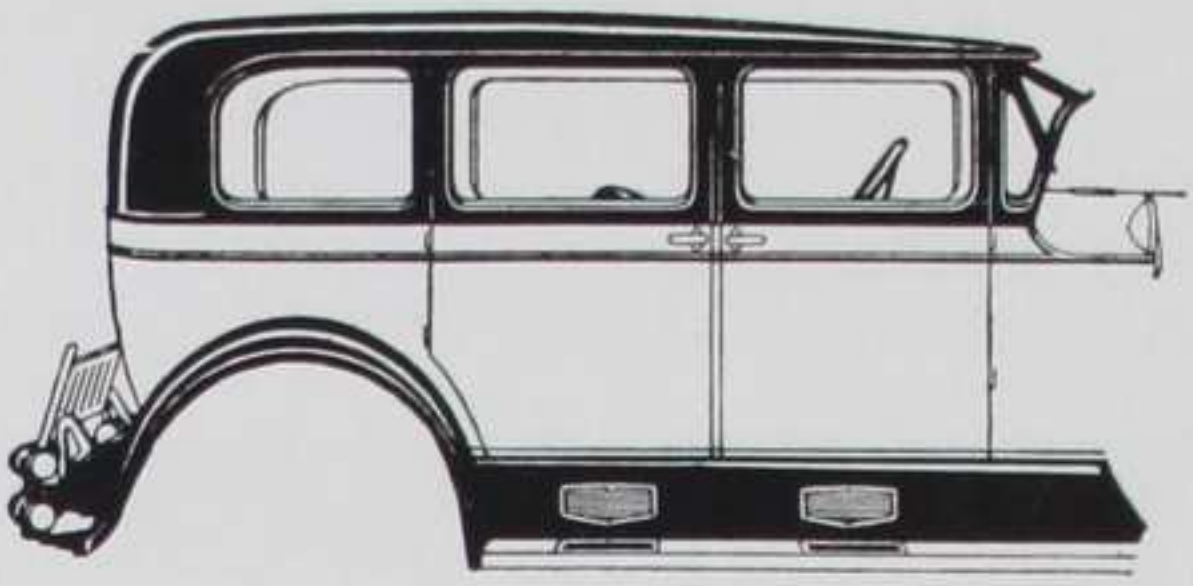
In the construction of the Auburn bodies every care has been exercised to make them as sturdy as possible and to eliminate all squeaks, rattles, and other petty annoyances.



Metal dash on body.

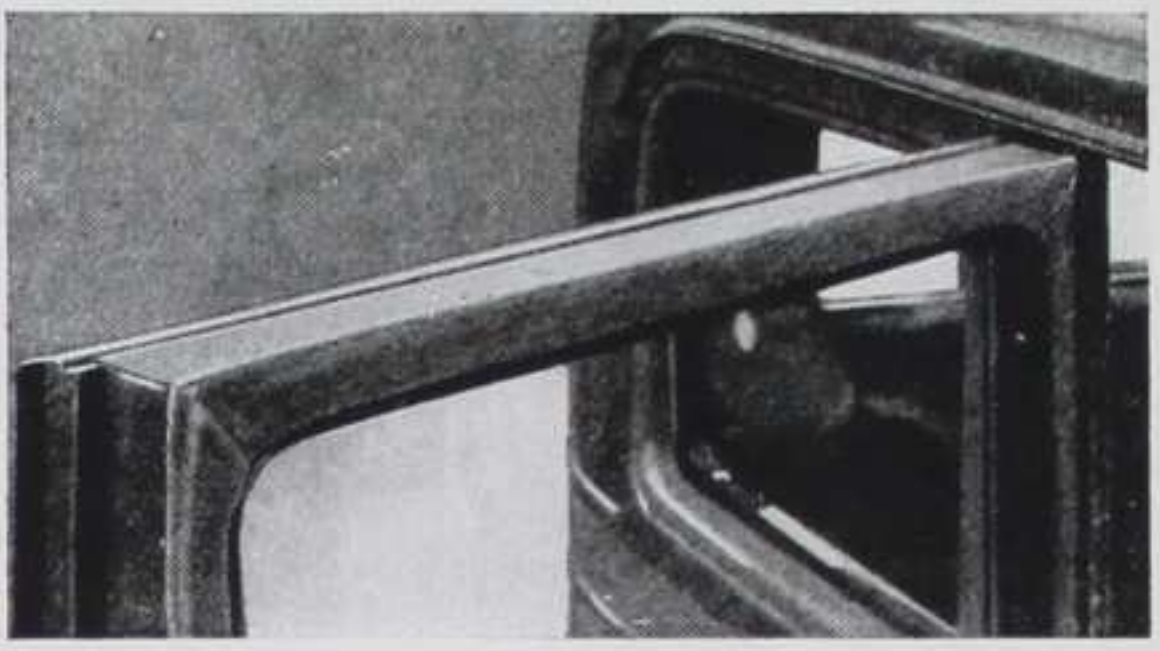
The wood frame-work of the body has been made much heavier and doubly reinforced, especially in the front end, and exceptionally heavy material has been used with all joints thoroughly screwed and glued or fastened with wooden dowels, whichever practice was the better for that particular joint.

The body frames are thoroughly braced at all points of strain with angle irons and these angle irons are so designed that they fit snugly into the corners and anti-squeak is used between the irons and the frame-work to prevent all possibility of squeaks.



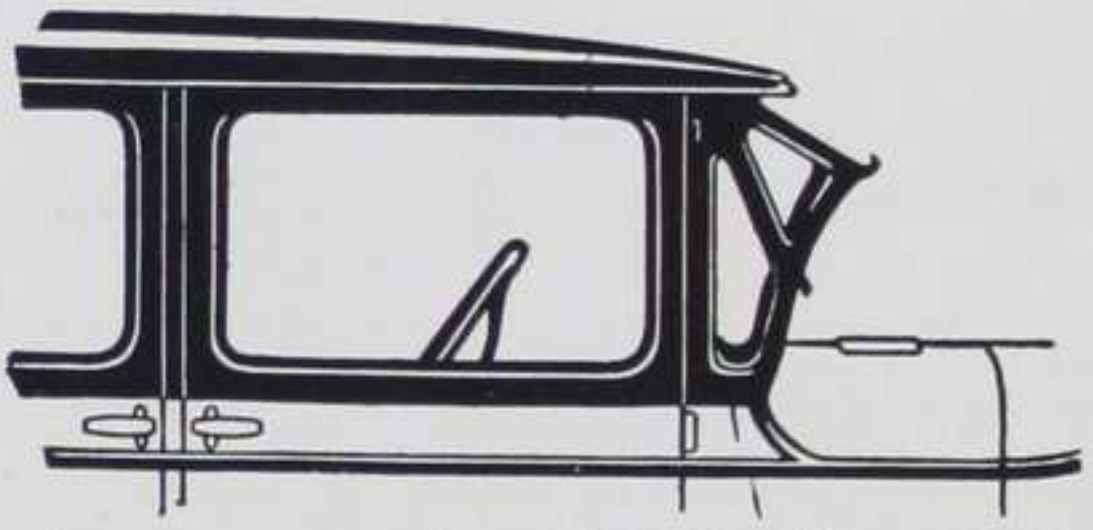
Metal side quarters, Brewster type windshield, lower and stronger construction.

The front of the cowl is of metal and the instrument panel is of metal and so placed in the body as to form a rigid brace between the sides. The metal panels are die-formed, making them unusually smooth and an absolute fit on the body frame-work.



Top of door grooved to make thoroughly water-tight.

Auburn continues to use the metal roof quarter, which design it pioneered over five years ago and that



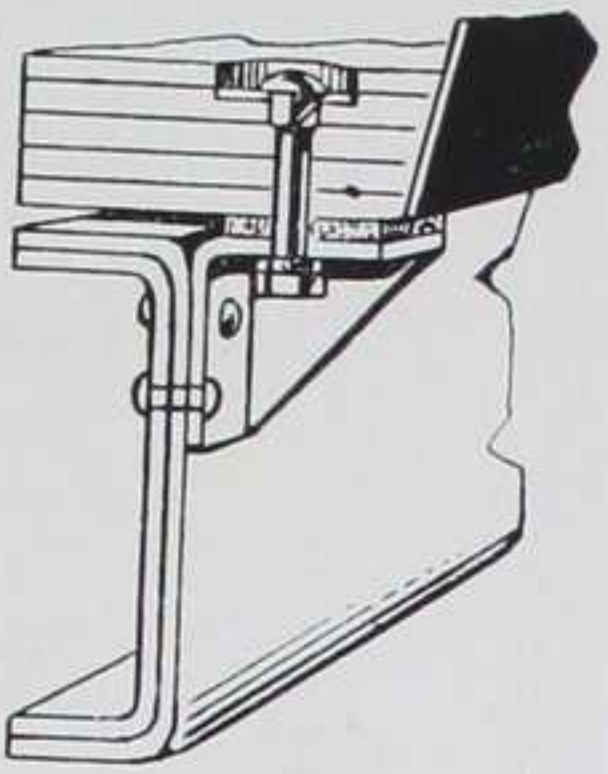
Brewster type of windshield, felt padded metal glass channels, heavy door posts, hammered silver hardware.

has since been copied by many higher-priced motor cars.

The door frames, as well as the sides of the doors, are metal covered and doors run the full length of the body, fitting flush with the bottom sill and not resting on top

of the sill, eliminating any possibilities of rattle and rumble from this source.

To make all doors absolutely water-tight and insure no water getting in at the top of the door, all doors have a groove along the top that will catch all water that might leak in from the outside edge at the top of the door.



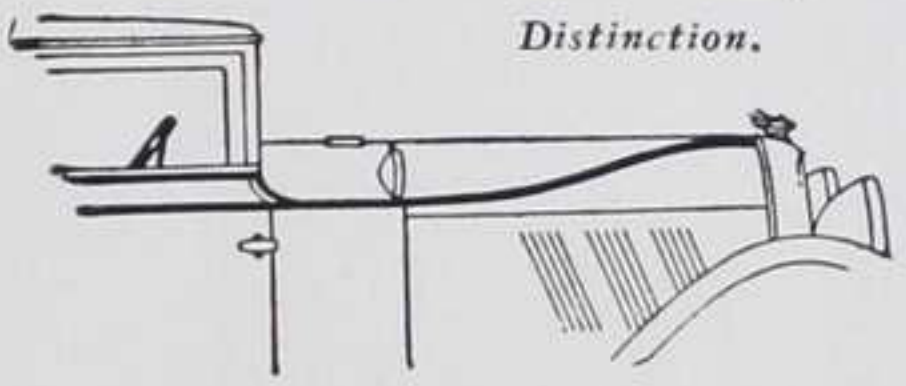
Double strength frame and body mounting on anti-squeak pads.

Brewster windshield is, also, used on the sedans and sport sedans, and has been improved in construction, making it thoroughly water-tight. The sloping upper glass of the Brewster windshield prevents all glare from lights in the rear in night driving, which is a feature of importance these days of heavy traffic.

To avoid squeaks and rattles, all bodies are mounted on rubber pads as shown in the illustration and anti-squeak is also liberally used in the mounting of fenders and flashings to prevent metal touching metal and causing squeaks.

Body Design and Seating

Design of the bodies of the Auburn models has been refined to make them a little more pleasing to the eye, and at the same time no radical changes have been made that would obsolete previous motor cars built during the last five years. This is a feature of great importance as it insures you that the car will not be obsolete when you decide to trade it in for a new one.

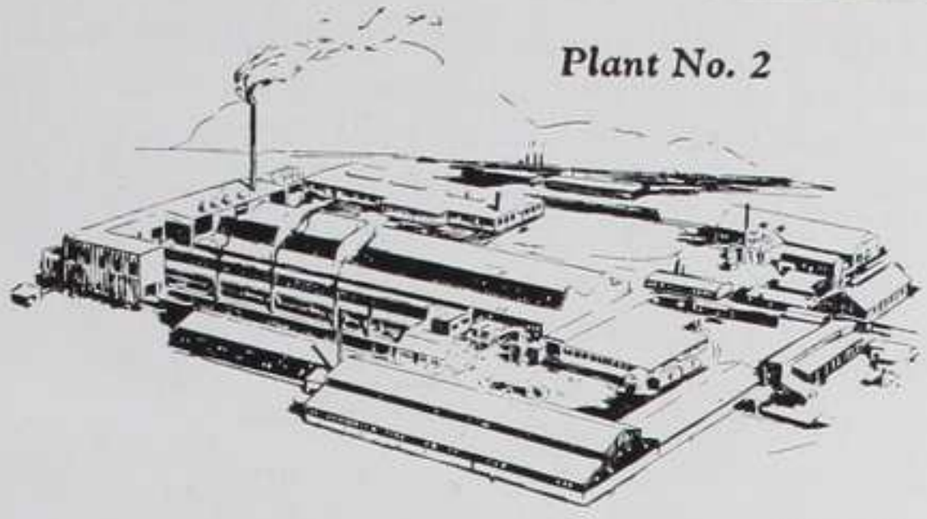


Distinction.

Auburn continues to be the most individual and distinctive car in the industry by using the curved bead up over the hood, which is one of the most envied designs on any motor car and has openly been copied in recent months by several makes of cars, some of them of custom design and the highest priced on the market.

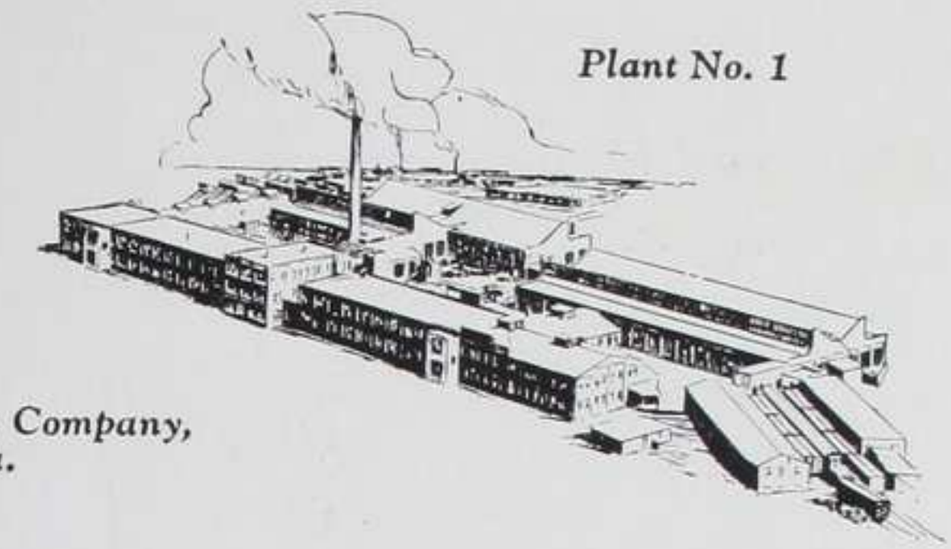
Cars of other design.

Auburn seating position.

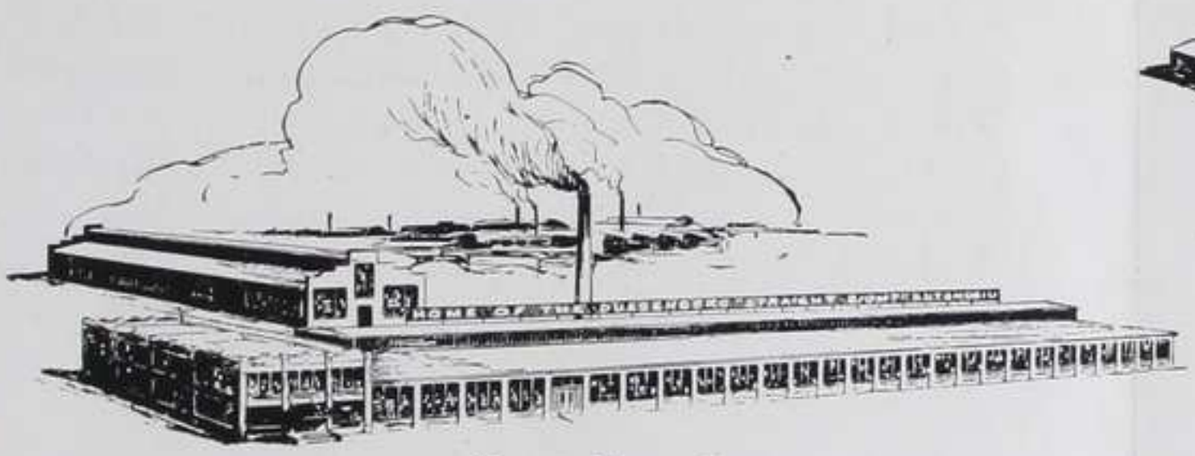


Plant No. 2

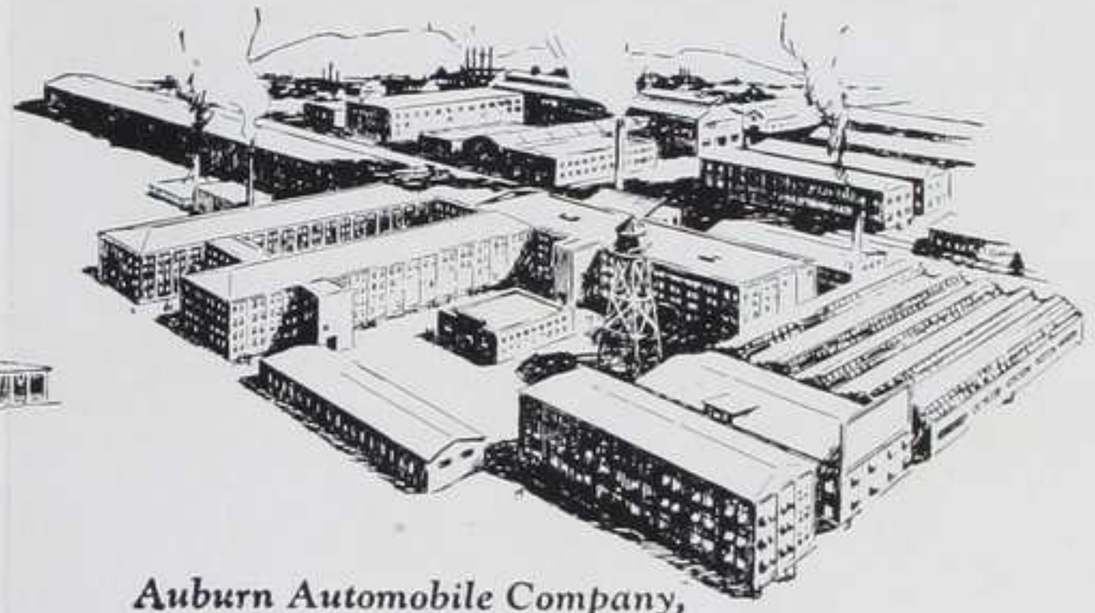
Lycoming Manufacturing Company,
Williamsport, Pa.



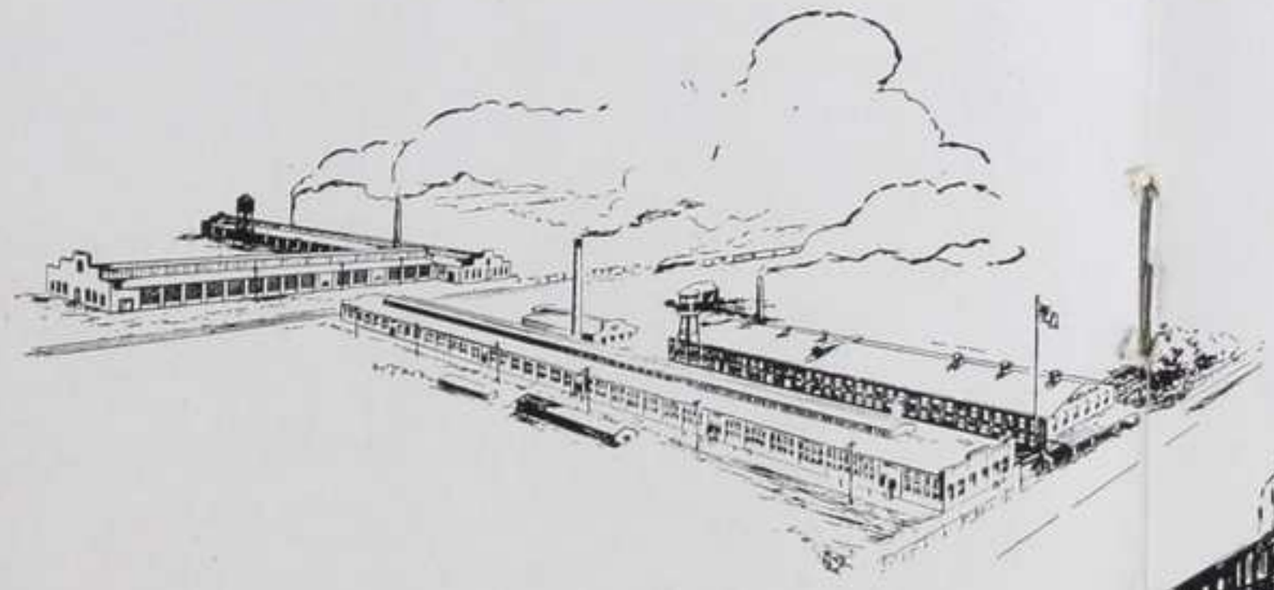
Plant No. 1



Duesenberg, Inc.,
Indianapolis, Ind.



Auburn Automobile Company,
Auburn, Indiana



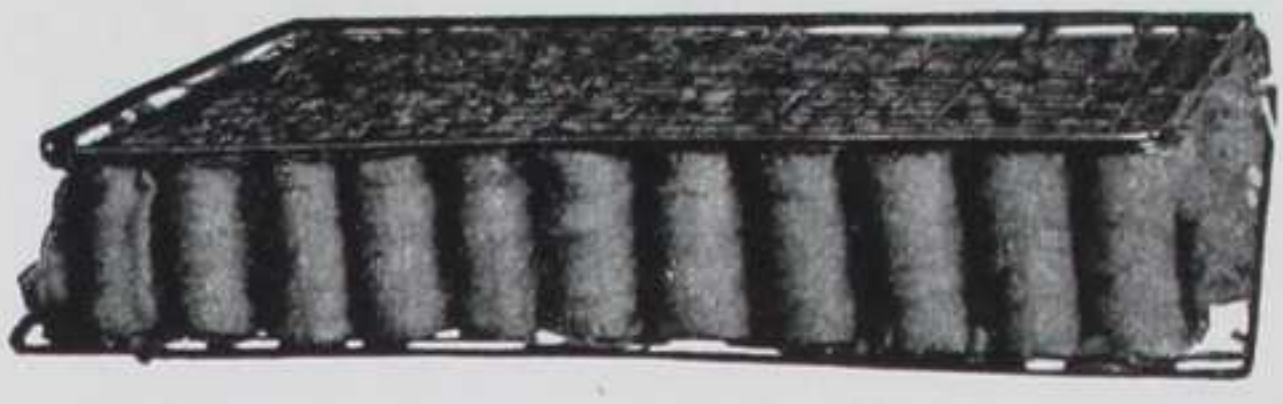
Auburn Automobile Company, Connersville Plant

Limousine Body Company, Kalamazoo, Mich.

The seating arrangement in every body model is such as to give perfect comfort for the specified number of occupants of the cars and enable them to ride all day without fatigue.

Cushions and Upholstery

Cushions are soft and deep and the luxura type cushion springs are used in the 120 models and the seat cush-



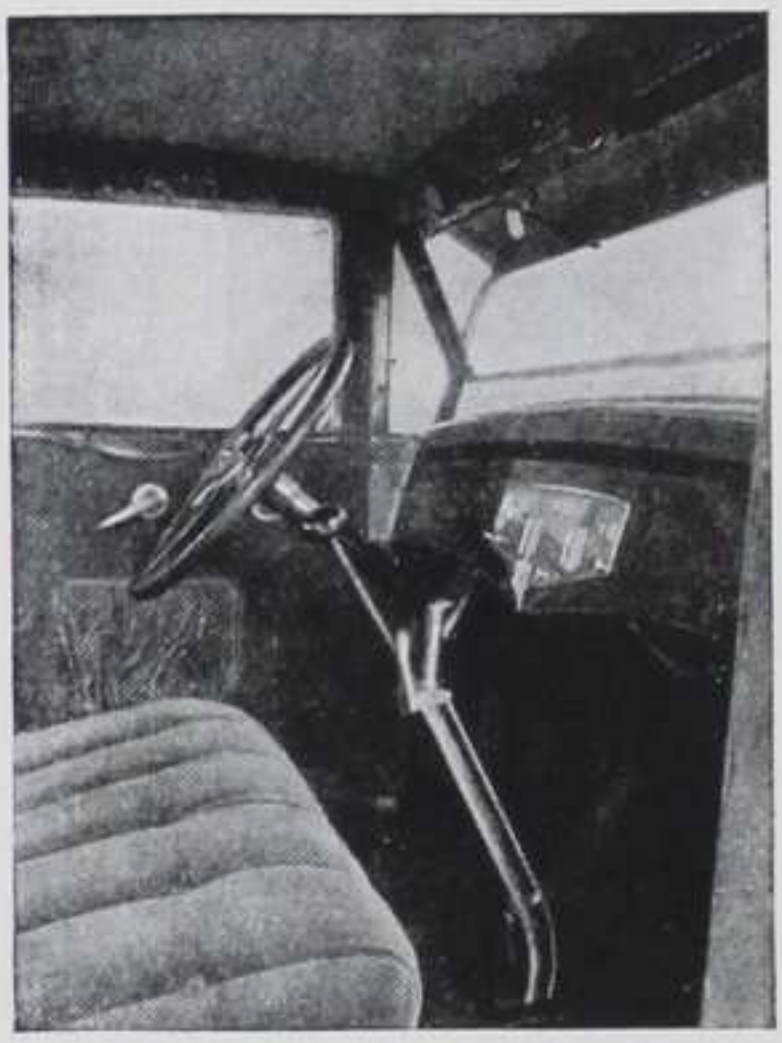
Cushion spring. Heavy frame and every coil in individual sack.

ions are exceptionally wide, forming a support under the legs that makes them unusually comfortable. The luxura type cushion springs have each individual spring enclosed in a cloth sack preventing any possible squeaks or rattles from the springs, and, also, making them operate entirely independent in action and giving more resilience on rough or rutty roads.

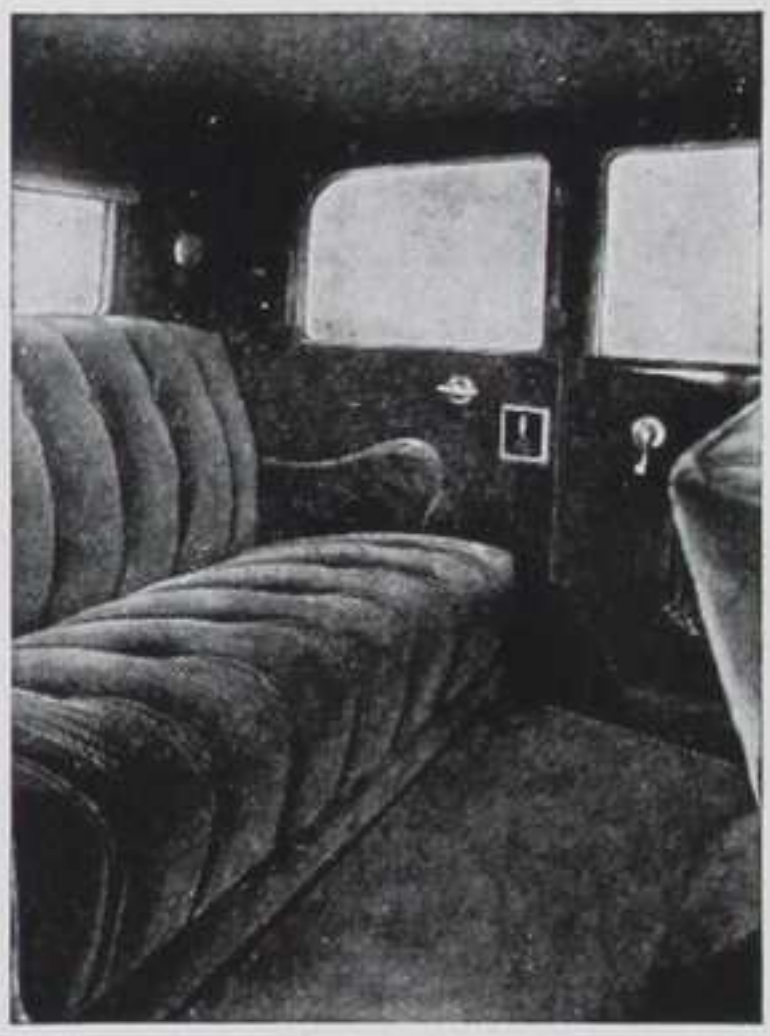
Cushions in all models are thoroughly padded with cotton pads which means much in the long life and comfort of the cushion.

Controls and Interior Fittings

A special effort has been made to see that all controls, including steering wheel, gear shift lever and emergency brake lever are ideally located for convenient access of the driver and a new accelerator of the large treadle type has been provided which is rubber covered so as not to



Front compartment of sedan



Rear compartment of sedan.

ruin a lady's shoes in driving, and giving perfect comfort regardless of the length of the drive, not tiring the leg or ankle. Interior fittings are of the finest and of a special hammered silver finish design, greatly adding to the beauty of the interior of the car.

Doors are operated with remote control handles that are much more convenient to reach when seated in the car. These handles also lock the doors securely by merely pulling them up when leaving the car. Sedans and sport sedans are equipped with dome lights, and the 120 models with reading lights in the rear quarters.

Large cowl lamps on all models.

Special care has been given to the upholstery of all models, leaving no rough or unfinished edges, and the appearance is most pleasing when looking within the car. The 120 models are also equipped with electric cigar lighter placed on the steering column bracket so that it is readily accessible to the occupants of the front compartment and may be passed to the occupants of the rear compartment. Smoking sets are standard equipment in the 120 model sedans. The 8-90 and 120 model sedans have arm rests for the comfort of the passengers in the rear compartment.

Door panel.

Pockets in all doors are provided for gloves and small parcels in shopping, and the garnish rails on all closed models are of one-piece metal, curved to fit, eliminating any possibility of squeaks or rattles from these sources.

The glass in the 8-90 and 120 closed models operate in metal channels, and the glass in the 6-80 operate in an improved felt channel, making all door glass and quarter glass in the closed models unusually easy of operation and close fitting.

Instrument Panel and Controls

The instrument panel is of unique design and all instruments are grouped in one panel, including speedometer, gasoline gaurge, oil gauge, motor heat indicator and ammeter. Controls are also placed in the border of the instrument panel, adding a decorative treatment to its design, and include starter button, instrument

board lamp switch, electro lock, choke, and windshield wiper control.

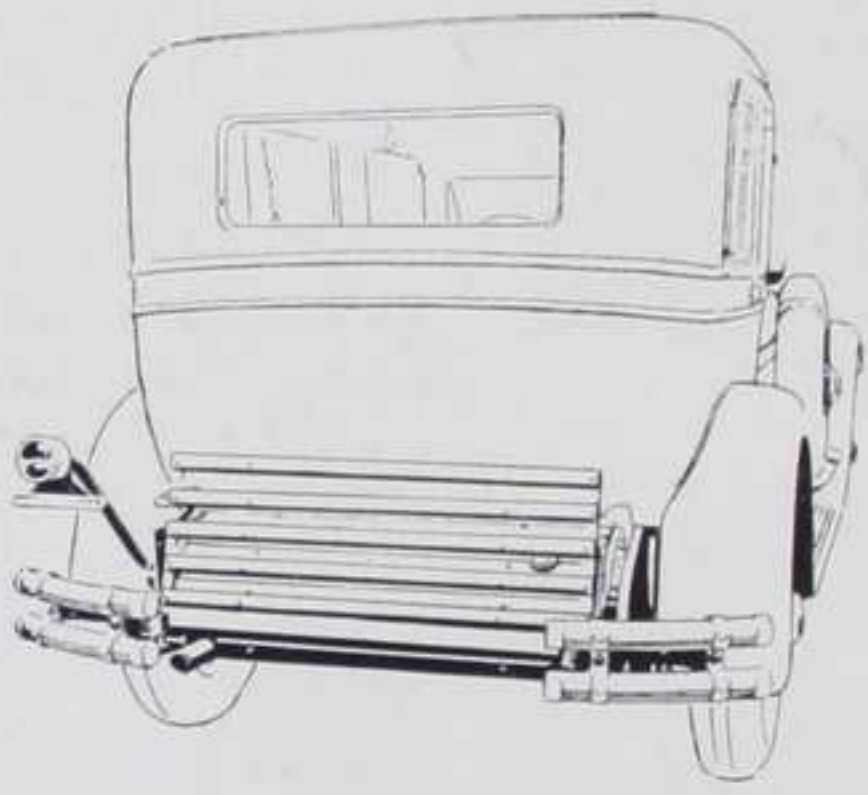
The electro lock is one of the most thief-proof locks yet devised and is approved by all insurance underwriters.

The instrument panel is lighted at night by two concealed lights, giving perfect illumination but no glare within the car.

New instrument panel indirectly lighted; coincidental lock and all controls conveniently located.

The location of the starter button on the instrument panel eliminates any necessity of groping around in the dark with the foot, trying to locate the starter button and ruining the shoes, and it is also a great convenience when a car is stopped on a hill, as it enables the driver to have both feet on the clutch and brake pedals, permitting easier starting of the car.

The gear shift lever as well as the emergency brake lever is unusually long and right at the driver's fingertips. The emergency brake lever has large type spoon latch on the 8-90 and 120 models, not only making it easier of operation but, also, improving its appearance.



Wood finish slats on trunk rack and covering for gasoline tank.

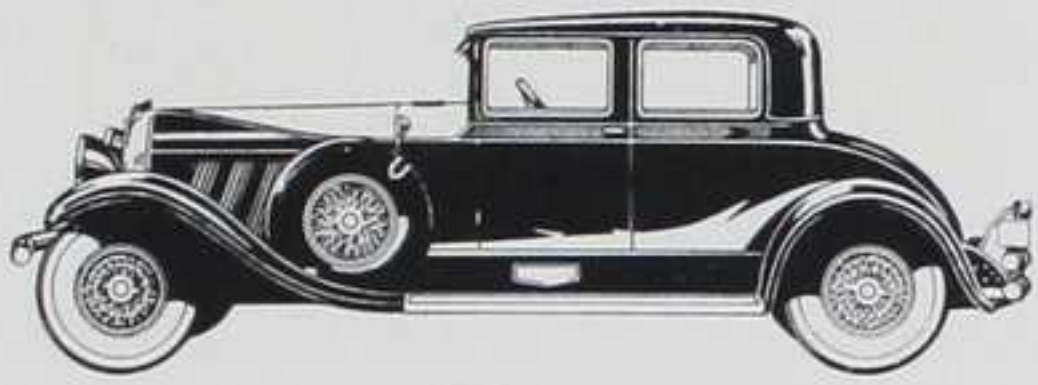
Front compartments of all cars are equipped with a heavily padded rubber mat, making it much easier to keep the front compartment clean and this is, also, much more durable than carpet in this compartment where it is subjected to the greatest wear.

The 120 models are equipped with wood finish metal slats over the gasoline tank, greatly improving the appearance of the rear end of the car, and trunk racks on the sedan are of wood finished metal slats harmonizing with the covering on the gasoline tank. This practice is customary only on cars far higher in price than the Auburn models.

Body Types

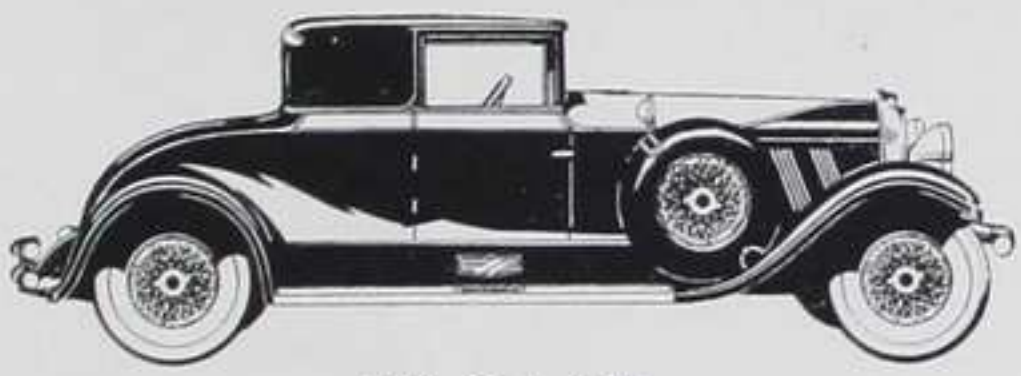
The body types on the new Auburn models include victoria, cabriolet, sport sedan, and sedan on the 6-80; victoria, cabriolet, sport sedan, sedan, speedster, and phæton sedan on the 8-90 and 120.

The Victoria Model is a two-door, four-passenger closed car and is ideal for the professional man. The



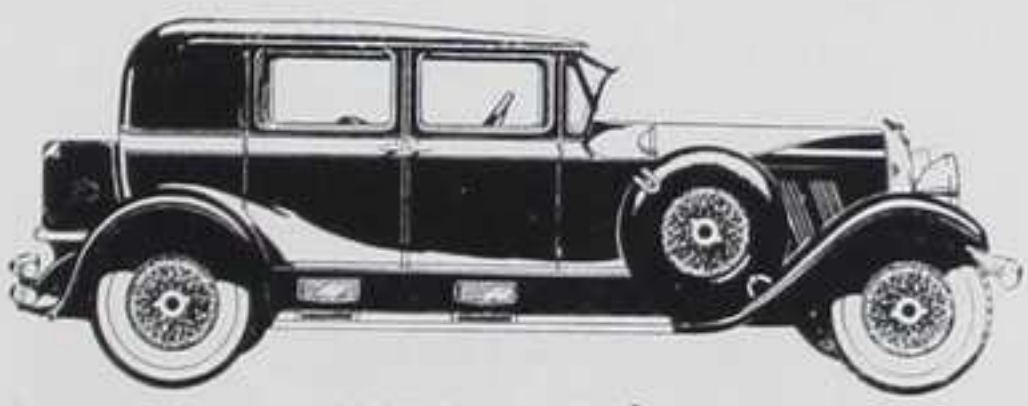
120 Victoria

driver's seat is slightly ahead of the passenger seat and a folding auxiliary seat offers comfortable riding for the fourth passenger. Ample space for small parcels is provided.



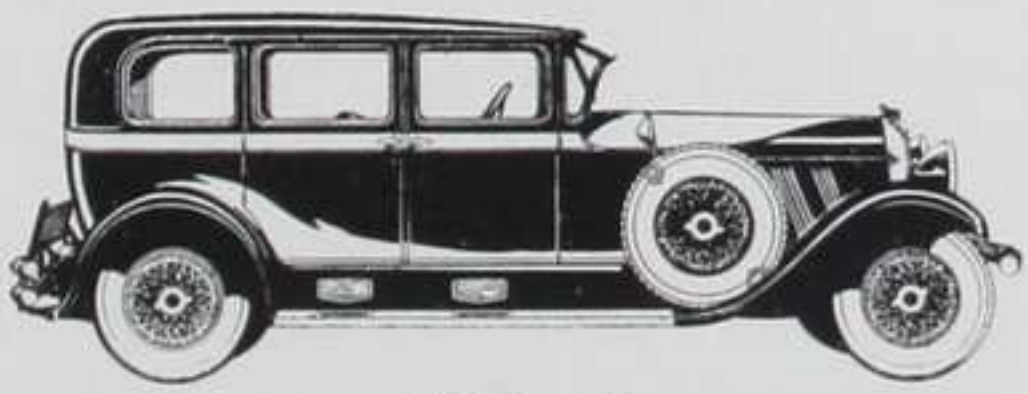
120 Cabriolet

The cabriolet, also, is of the collapsible top design with a rumble seat and can be converted from an open to a closed car in a very short time.



120 Sport Sedan

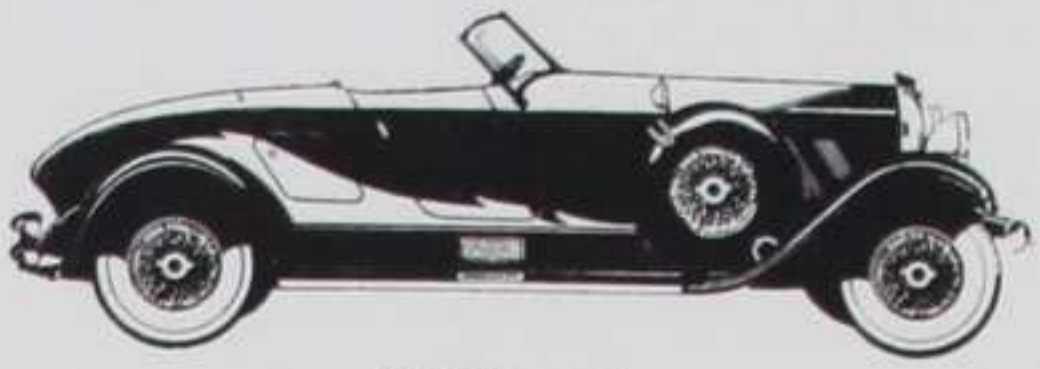
The sport sedan is a four-door, five-passenger, close-coupled closed body with a trunk on the rear and the sedans are the conventional five-passenger, four-door sedans.



120 Sedan

The speedster is an entirely new boat-shaped, two-passenger design, modeled from the famous Duesenberg

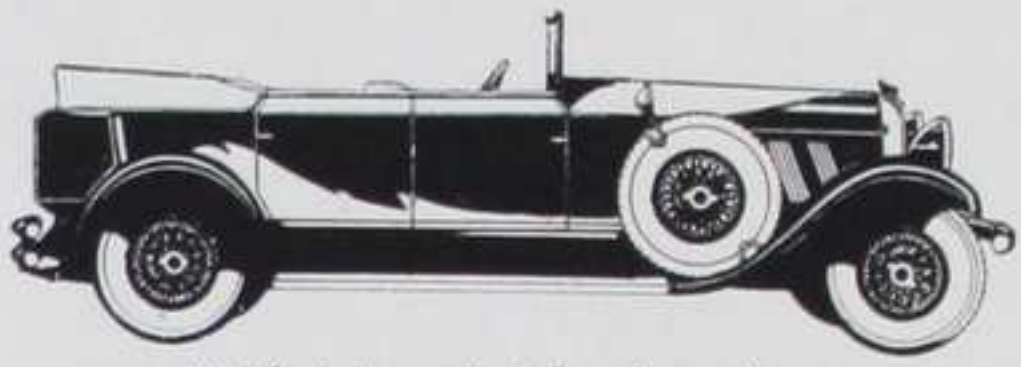
race car and is finding great vogue among those desiring a truly sport-type motor car.



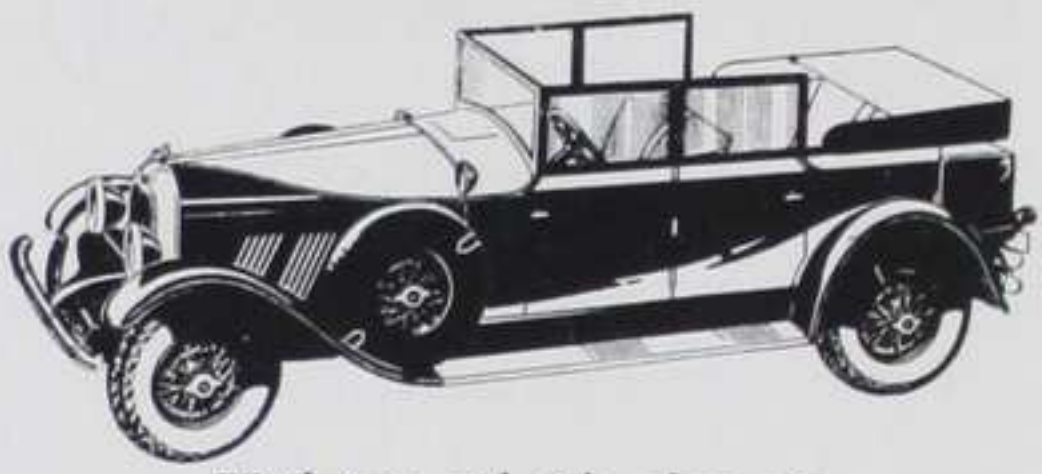
120 Speedster

Phaeton Sedan

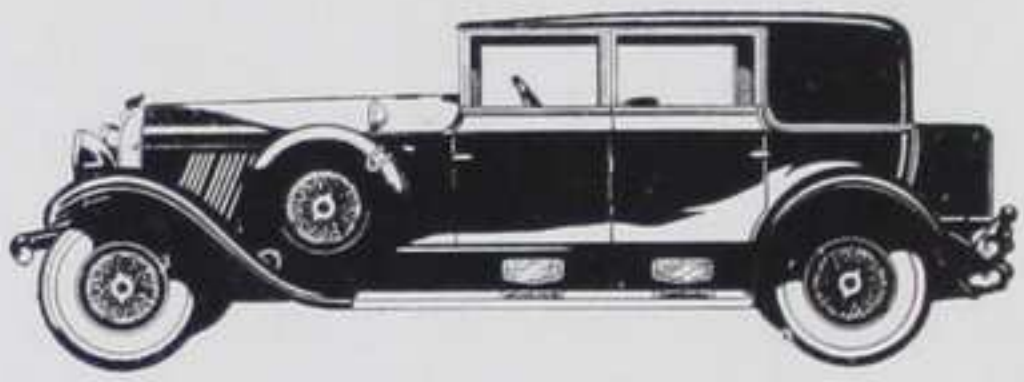
The phæton sedan is a distinctly new body design, heretofore obtainable only on special order from custom



With top and side glass down.



With top and side glass up.



Comfortably enclosed.

coach builders and is a full five-passenger model with a special collapsible top that can be readily put down, converting this into a touring car, or when the top is up, making it a real five-passenger sedan.

All the door frames on this model are of nickel finish and the windshield pillars are unusually narrow. The center pillars are, also, exceptionally narrow and can be removed when the top is down and the glass are down, making it really an open car.

One of the features of design of this model is the hinging of both front and rear doors on a common hinge, which enables the exceptional narrowness of the center pillar.

Phæton sedans are regularly equipped with a trunk on the rear and have all the appearance of a custom-built car, costing two or three times the price asked by Auburn, and their popularity is unusually great among those desiring a car of true individuality and distinctiveness.

SPECIFI

Model 120

FRAME—7 inches deep channel with 3 inches wide flanges—$\frac{3}{16}$-inch stock. Double reinforcement from front of frame to back of rear motor support. Six cross members, including wide $\frac{5}{32}$-inch boiler plate at rear of frame. All cross members strongly gussetted at points of strain.

BRAKES—Service—Four-wheel. Lockheed hydraulic internal expanding type. 14-inch brake drums. Operate with extremely light pedal pressure and require very little attention. Will run indefinitely without adjustment. Parking brake on propeller shaft.

MOTOR—Eight cylinder, cast enbloc. 3¼ inches x 4½ inches. S. A. E. horsepower, 33.80. Actual brake horsepower, 125. Five-bearing crankshaft—Bohnalite pistons. Lanchester balancer eliminating all traces of vibration. Large water passages, insuring perfect cooling.

WHEELS—Wood wheels, 18-inch diameter, with ten large spokes standard with 6.50-inch tires.

CLUTCH—Double plate type, moulded facings, special mounting and lubrication of release bearing. Non-adjustable.

UNIVERSAL JOINTS—Hardened ground ball construction, require very little attention and lubrication approximately once every five thousand miles. No back lash.

WHEELBASE—130 inches.

Model 8-90

FRAME—7 inches deep channel with 3 inches wide flanges—$\frac{5}{32}$-inch stock. Double reinforcement from front of frame to back of rear motor support. Six cross members, including wide $\frac{5}{32}$-inch boiler plate at rear of frame. All cross members strongly gussetted at points of strain.

BRAKES—Service — Four-wheel. Lockheed hydraulic internal expanding type. 12-inch brake drums. Operate with extemely light pedal pressure and require very little attention. Will run indefinitely without adjustment. Parking brake on propeller shaft.

CATIONS

MOTOR—Eight cylinder, cast enbloc. 2⅞ inches x 4¾ inches. S. A. E. horsepower, 26.45. Actual brake horsepower, 93. Five-bearing crankshaft—Bohnalite pistons. Lanchester balancer eliminating all vibration. Large water passages, insuring perfect cooling.

WHEELS—Wood wheels, 18-inch diameter with ten large spokes standard with 6.00-inch tires.

CLUTCH—Single plate type, moulded facings, special mounting and lubrication of release bearing. Non-adjustable.

UNIVERSAL JOINTS—Hardened ground ball construction, require very little attention and lubrication approximately once every five thousand miles. No back lash.

WHEELBASE—125 inches.

Model 6-80

FRAME—7 inches deep channel with 3 inches wide flanges— $\frac{5}{32}$-inch stock. Six cross members, including wide 16-inch boiler plate at rear of frame. All cross members strongly gussetted at points of strain.

BRAKES—Service—Four-wheel. Lockheed hydraulic internal expanding type. 12-inch brake drums. Operate with extremely light pedal pressure and require very little attention. Will run indefinitely without adjustment. Parking brake on propeller shaft.

MOTOR—Six cylinder, cast enbloc. 2⅞ inches x 4¾ inches. S. A. E. horsepower, 19.84. Four-bearing crankshaft—Bohnalite pistons. Large water passages, insuring perfect cooling.

WHEELS—Wood wheels, 18-inch diameter with ten large spokes standard with 5.50-inch tires.

CLUTCH—Single plate type, moulded facings, special mounting and lubrication of release bearing. Non-adjustable.

UNIVERSAL JOINTS—Hardened ground ball construction, require very little attention and lubrication approximately once every five thousand miles. No back lash.

WHEELBASE—120 inches.

INSIDE HISTORY OF AUBURN

The Company

FOUNDED in 1874, the Eckhart Carriage Company was for many years one of the best known vehicle manufacturers in the central west. Its owners, sensing the day when the carriage business would come to grief, shortly after the first motor cars were made in America, turned their thoughts, energies and experiments in the direction of the new "horseless" carriage.

After much hard labor, many disappointments, and ridicule from their friends and business associates, the principals of the carriage company felt in 1900, that the time was ripe for launching into their new venture of manufacturing motor cars for sale. Thus, in 1900, the Auburn Automobile Company was established, with Charles Eckhart as President, and Morris Eckhart as Vice-President and General Manager.

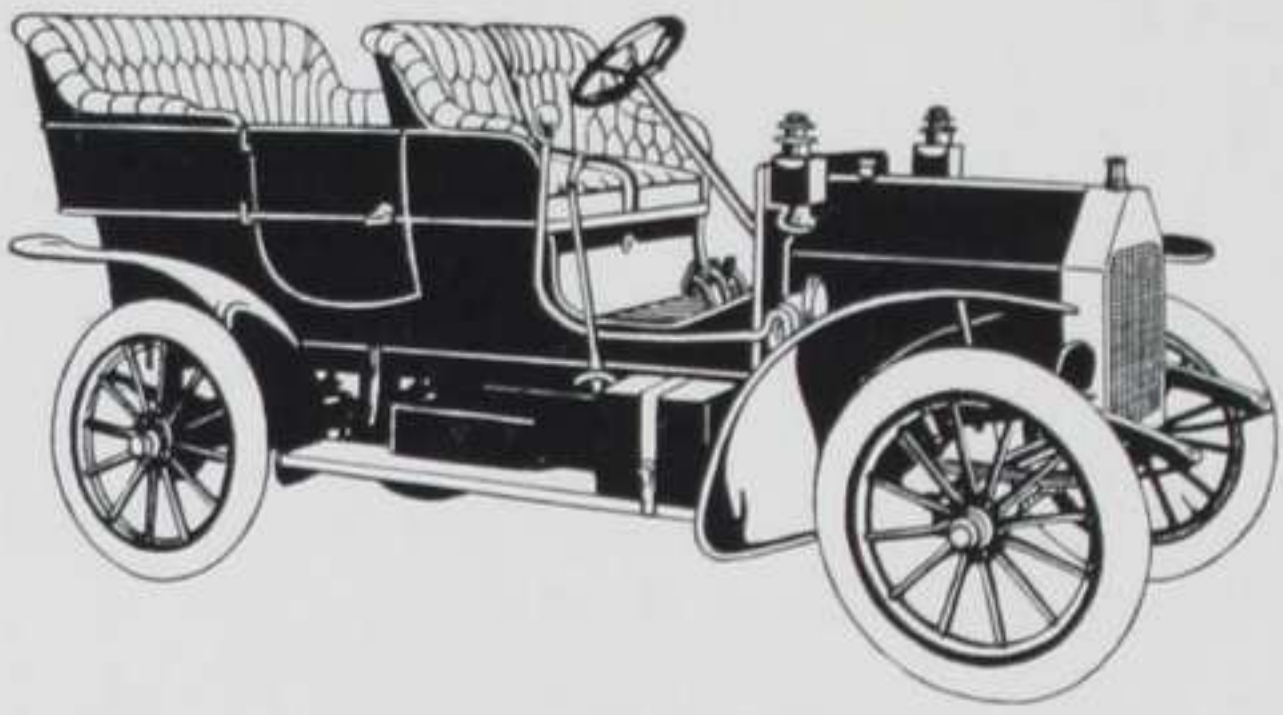
The capital of the organization in embarking upon this wild venture was $2,500, and efforts were confined to building of a successful one-cylinder car. While a number of cars were manufactured and delivered locally and to buggy dealers the first year or two, Auburn made its first appearance in a national way at the Chicago Automobile Show in 1903.

First Auburn Car—1900.

This model was a single cylinder, 78-inch wheelbase "heavy" runabout with a detachable tonneau which made it a five-passenger. Of course, no windshield or top were furnished and the lamps were merely oil lamps with a large lantern type light for the front, given the proud name of a "search-light."

For several years models were confined to the single cylinder, but in 1905, the two cylinder was announced. Many of the buggy dealers who had handled Eckhart buggies for years, fell in line with progress and took over the franchise for the sale of Auburn motor cars.

With the demand for Auburn cars constantly growing in local territory and a large portion of the production being absorbed there for many years, little thought was given by the founders of the company to national distribution. The original capital of $2,500, through reinvestment of earnings, had grown many, many times over.



First two-cylinder Auburn.

New models were brought out after the two cylinder, first the four and then the six. Windshields, tops and headlights were added as optional equipment at an extra charge in 1907, and later became standard with the passing of the years and conversion of the motor car from a luxury to be enjoyed by the few to a necessity of the masses.

Of course, the efforts of the company during the war were confined to service for the government. After the close of the war a desire for national prominence and distribution was born in the hearts of the founders and with this national idea in view, it was felt that a reorganization was desirable and the interesting of unlimited capital.

In June, 1919, Morris Eckhart, who at that time had control of the company, sold his interest to a group of Chicago capitalists and the sales and advertising program of the Auburn Automobile Company was greatly enlarged.

While considerable progress was made under that management, in August, 1924, E. L. Cord, a man of wide experience in every phase of the automobile industry, came to Auburn as Vice-President and General Manager, later purchasing control of the company from the group of Chicago owners.

One of Mr. Cord's first activities with the Auburn Automobile Company, was the introduction of the new line of straight eight motor cars which widely increased the popularity of Auburn automobiles, and created a tremendous growth in sales.

Since 1924, the growth of the Auburn Automobile Company has been one of the outstanding, if not the most outstanding success in the entire automotive industry. It has grown from a total production of 2,600 cars in 1924 and a company with assets of barely $1,000,000, to production of 15,000 motor cars in 1928, and control of assets of over $20,000,000, and a financial position which is one of the soundest in the industry. Production has now risen to a volume of 5,000 cars per month in the spring of 1929 and indications are that total production for the year will far exceed that of 1928.

While in 1924, the sole production facilities of the Auburn Automobile Company were limited to the plant at Auburn, Ind., since that time in addition to three new buildings, adding thousands of square feet of floor space, and complete rearrangement of production lines with a capacity of nearly 150 cars a day at the Auburn plant, the Auburn Automobile Company now owns and is operating a plant at Connersville, Indiana, with a capacity of 250 cars per day, also, the Central Manufacturing Co. at Connersville and owns the controlling interest in the Lycoming Mfg. Co., at Williamsport, Pa., Limousine Body Co., at Kalamazoo, Mich., and Duesenberg, Inc., of Indianapolis, Indiana.

Thus, has Auburn in the past four years achieved a position as one of the most successful of the independent motor car manufacturers and a distribution not only nation wide but world wide as well, having distributors in every principal country of the entire world.

The success of Auburn is of vital interest to every purchaser of an Auburn car and your assurance of the stability of the company back of the product.

AUBURN AUTOMOBILE COMPANY

BALANCE SHEET

ASSETS

CURRENT ASSETS:			
Cash in Banks, on Hand and Certificates of Deposit			$1,118,966.66
Call Loans			2,800,000.00
Notes and Accounts Receivable—			
Notes Receivable:			
Trade-Notes and Time Drafts	$137,004.01		
Employees	30,680.60		
		$ 167,684.61	
Accounts Receivable:			
Drafts on Customers	526,013.39		
Open Accounts			
Trade	818,633.26		
Employees	22,515.01		
Controlled Companies	150,992.69		
Sundry	3,785.51		
		1,521,939.86	
		1,689,624.47	
Less: Reserve for Doubtful Items		42,914.45	
			1,646,710.02
Accrued Interest Receivable			7,784.85
Inventories at cost or market, (whichever is lower)			
Finished Cars		234,441.42	
Materials and Work in Process		1,644,775.82	
			1,879,217.24
TOTAL CURRENT ASSETS			7,452,678.77
DEFERRED CHARGES:			
Prepaid Insurance		22,095.41	
Prepaid Show Expense		7,553.00	
			29,648.41
INVESTMENT IN CAPITAL STOCK OF CONTROLLED COMPANIES			2,673,631.32

FIXED ASSETS:

	Book Value	Depreciation	Net	
Land	$ 69,893.00		69,893.00	
Land Improvements	39,135.01	11,121.51	28,013.50	
Buildings	1,248,419.40	261,667.00	986,752.40	
Equipment	690,745.37	125,668.84	565,076.53	
Dwellings	6,584.33	2,651.36	3,932.97	
Construction Work in Process	194,045.13		194,045.13	
	2,248,822.24	401,108.71		1,847,713.53
			TOTAL	$12,003,672.03

We have examined the accounts and records of the Auburn Automobile Company for the year ending November 30, 1928, and certify that the above Balance Sheet, including surplus analysis, in our opinion correctly indicates the financial position and net worth of the Company as of November

AUBURN

AUBURN AUTOMOBILE COMPANY

NOVEMBER 30, 1928

LIABILITIES

CURRENT LIABILITIES:			
Accounts Payable—Trade			$ 508,514.40
Sundry Creditors			64,084.43
Dealers' Deposits			51,069.39
Accruals—			
Wages, Salaries and Commissions	$ 264,600.49		
State and Local Taxes	63,009.05		
Interest on 6% Gold Notes	9,500.00		
Federal Income Taxes, Estimated	158,000.00		
		495,109.54	
TOTAL CURRENT LIABILITIES			$1,118,777.76
THREE YEAR 6% GOLD NOTES, DUE OCTOBER 1, 1929			950,000.00
Total Current Liabilities and Funded Debt			2,068,777.76
DEFERRED INCOME AND RESERVE FOR CONTINGENCIES			115,450.00
NET WORTH			
Representing Capital Stock and Surplus			
Capital Stock, No Par Value:			
Authorized 500,000 shares			
Unissued 358,550 shares			
Outstanding 141,450 shares			6,123,911.92
Surplus			
Balance December 1, 1927		2,543,929.87	
Add: Profit for year ending November 30, 1928	$1,291,458.81		
Less: Provision for Federal Income Tax	158,000.00		
		1,133,458.81	
		3,677,388.68	
Deduct:			
Prior Year's Tax Adjustments	17,925.29		
Dividends— Cash	528,412.00		
Stock at value assigned by the Board of Directors $1.00 per share	10,568.24		
		556,905.53	
			3,120,483.15
Capital Surplus			
Representing the excess of appraisal value over cost of the Connersville Plant Balance December 1, 1927		595,972.58	
Less: Amortization		20,923.38	
			575,049.20
			9,819,444.27
Contingent Liability on Dealers Accounts Approximately		299,000.00	
			TOTAL $12,003,672.03

January 30, 1929.

30, 1928, and the earnings for the year ending that date. The inventories were taken and valued by the Company at cost or market, whichever was lower.

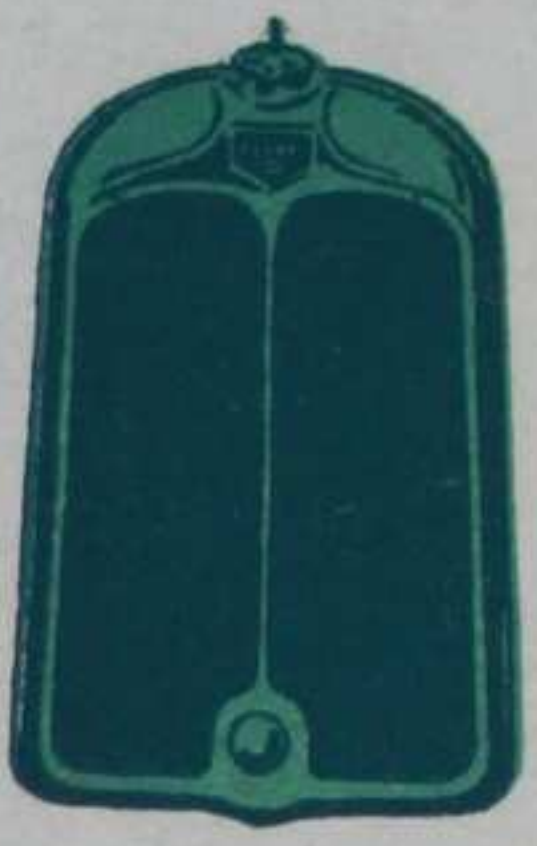
Yours faithfully,
(Signed) ARTHUR YOUNG & CO.

A U B U R N

In this booklet we have endeavored to tell you briefly about the quality construction of the new Auburn models. The only way, however, you can determine for yourself just how these models fit your needs is by riding in and driving them, and we would sincerely suggest that if you have not already done so, you arrange with your local Auburn dealer for a demonstration. He will be very glad to show you any one of the various models and give you an opportunity of driving them without the slightest obligation.

Auburn Automobile Company
Auburn, Indiana

L. P. HARDY CO., SOUTH BEND, IND.
PRINTED IN U. S. A.



[PRINTED IN U.S.A.]

DUPONT

MOTOR
CARS

THIS catalog illustrates a number of the models built by Du Pont. Constantly changed color schemes and upholstery materials insure individuality in all cases.

LIST OF REGULAR MODELS

SEDAN, Five or Seven Passenger
BERLINE, Five or Seven Passenger
TOWN CAR, Five or Seven Passenger
CLUB SEDAN, Five Passenger
COUPE, Two or Four Passenger
CONVERTIBLE SEDAN, Five Passenger
CONVERTIBLE VICTORIA, Four Passenger
PHAETON, Five or Seven Passenger
ROADSTER, Two Passenger—with Rumble Seat
SPEEDSTER, Two or Four Passenger
CONVERTIBLE COUPE, Two Passenger — with Rumble Seat

We are ready at all times to create special coachwork of any description, giving careful attention to your requirements.

PRICES ON APPLICATION

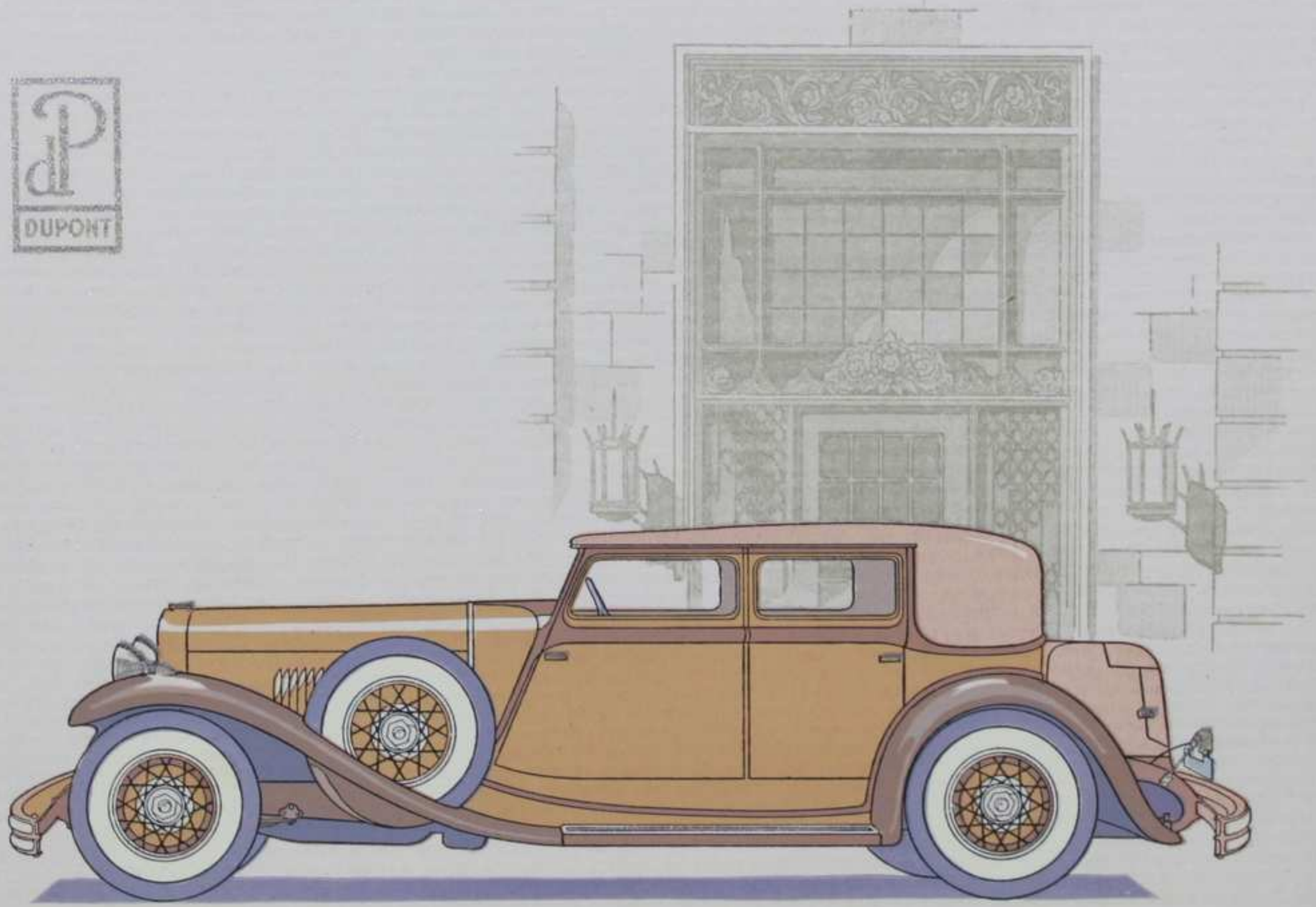
DUPONT MOTORS, INC.

WILMINGTON, DELAWARE

DUPONT

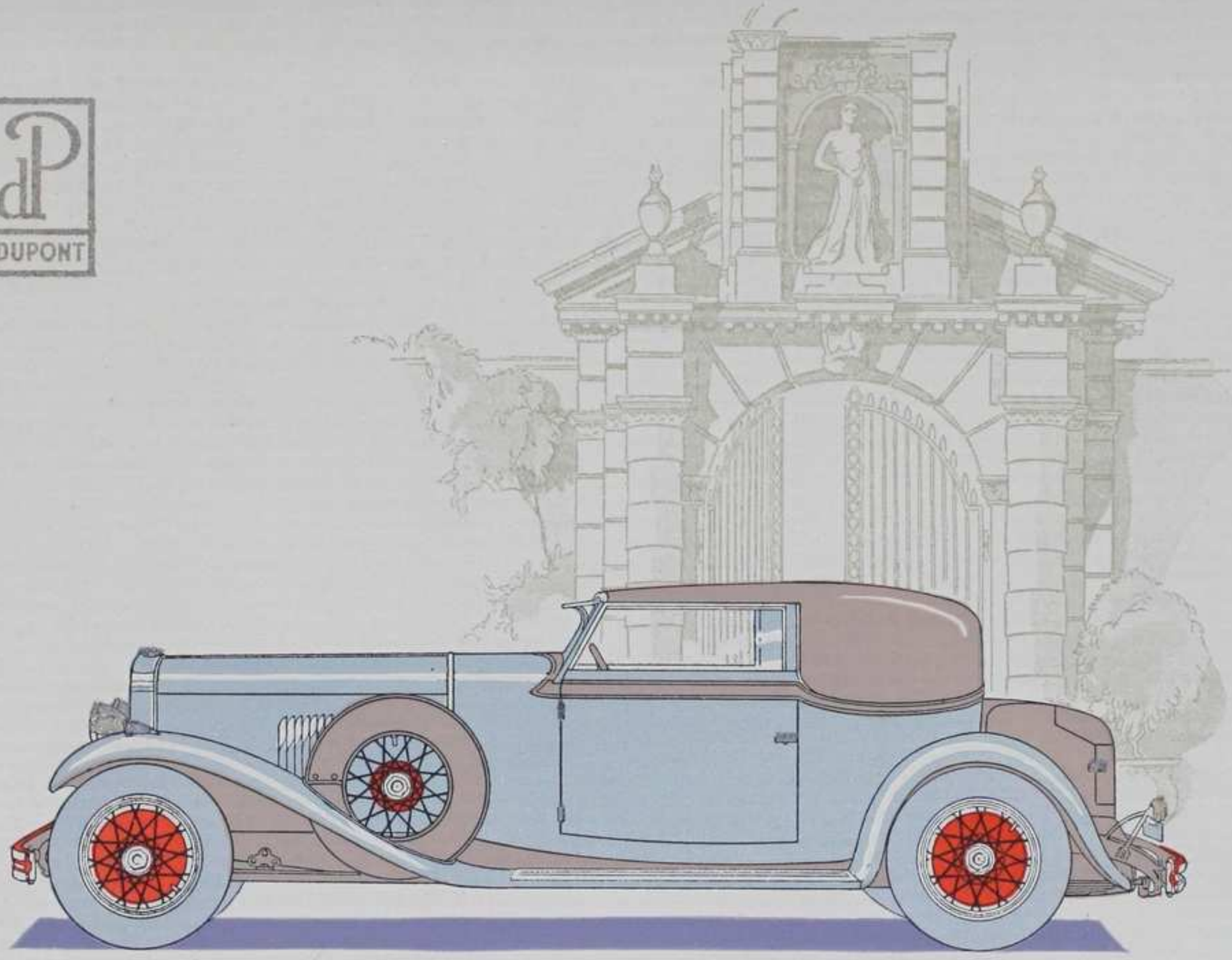
DUPONT MOTORS, INC. SEDAN WILMINGTON, DEL.

DUPONT



DUPONT MOTORS. INC. CLUB SEDAN WILMINGTON DEL.

DUPONT



DUPONT MOTORS, Inc.

CONVERTIBLE VICTORIA

WILMINGTON, DEL.

DUPONT

DUPONT MOTORS. INC.

TOWN CAR

WILMINGTON DEL

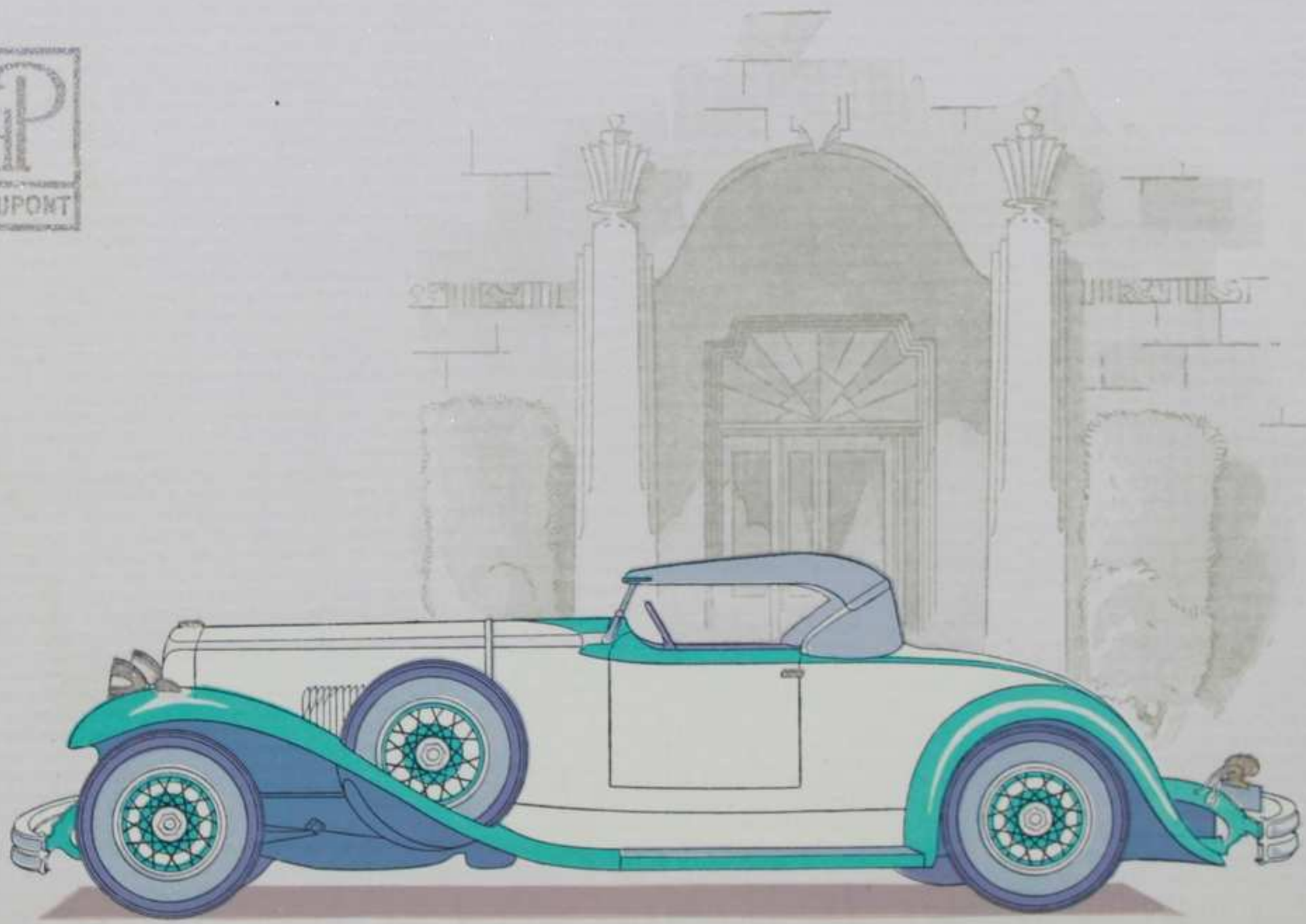
DUPONT

DUPONT MOTORS INC.

CONVERTIBLE SEDAN

WILMINGTON, DEL.

DUPONT

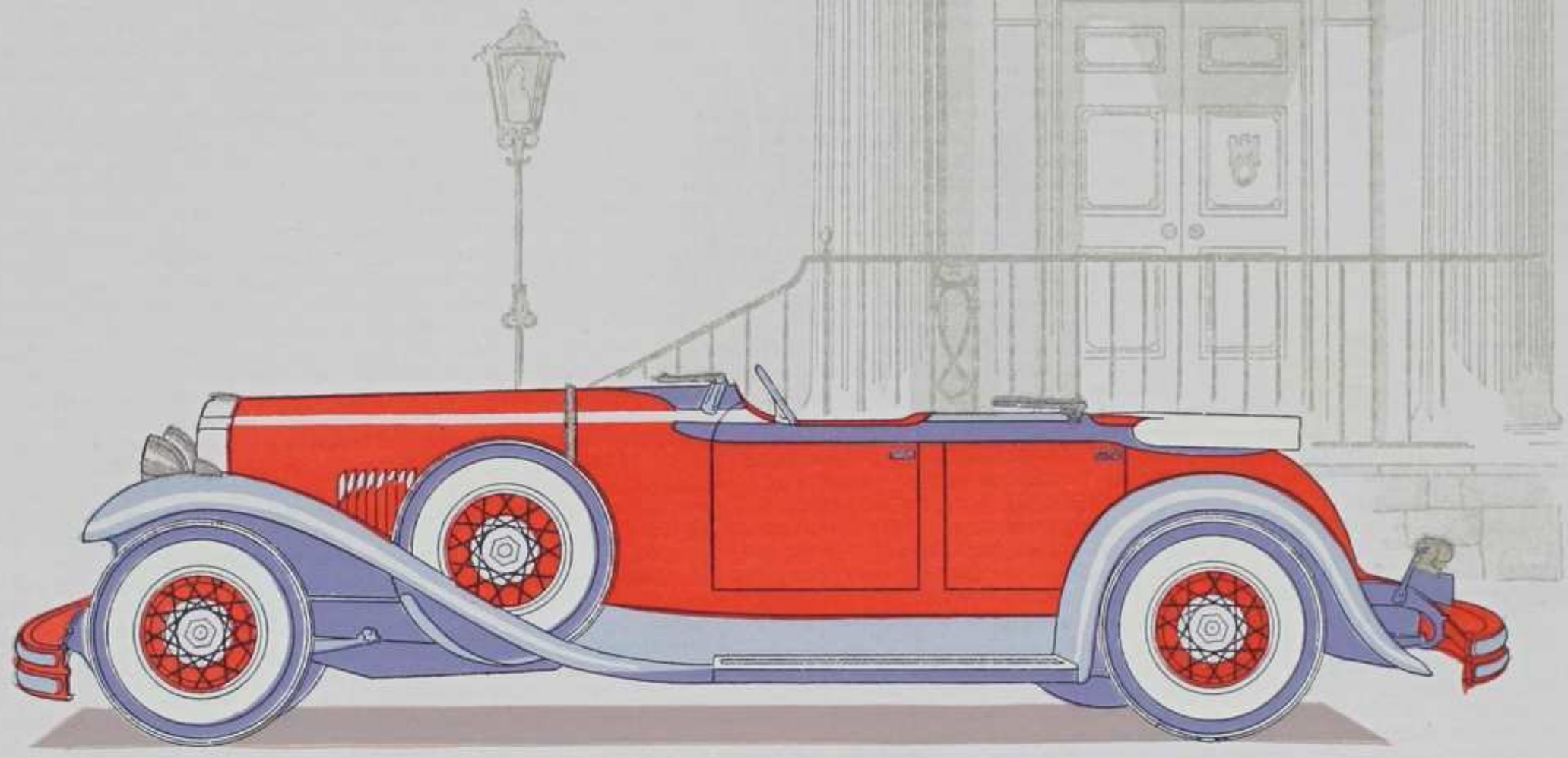


DUPONT MOTORS. INC

ROADSTER

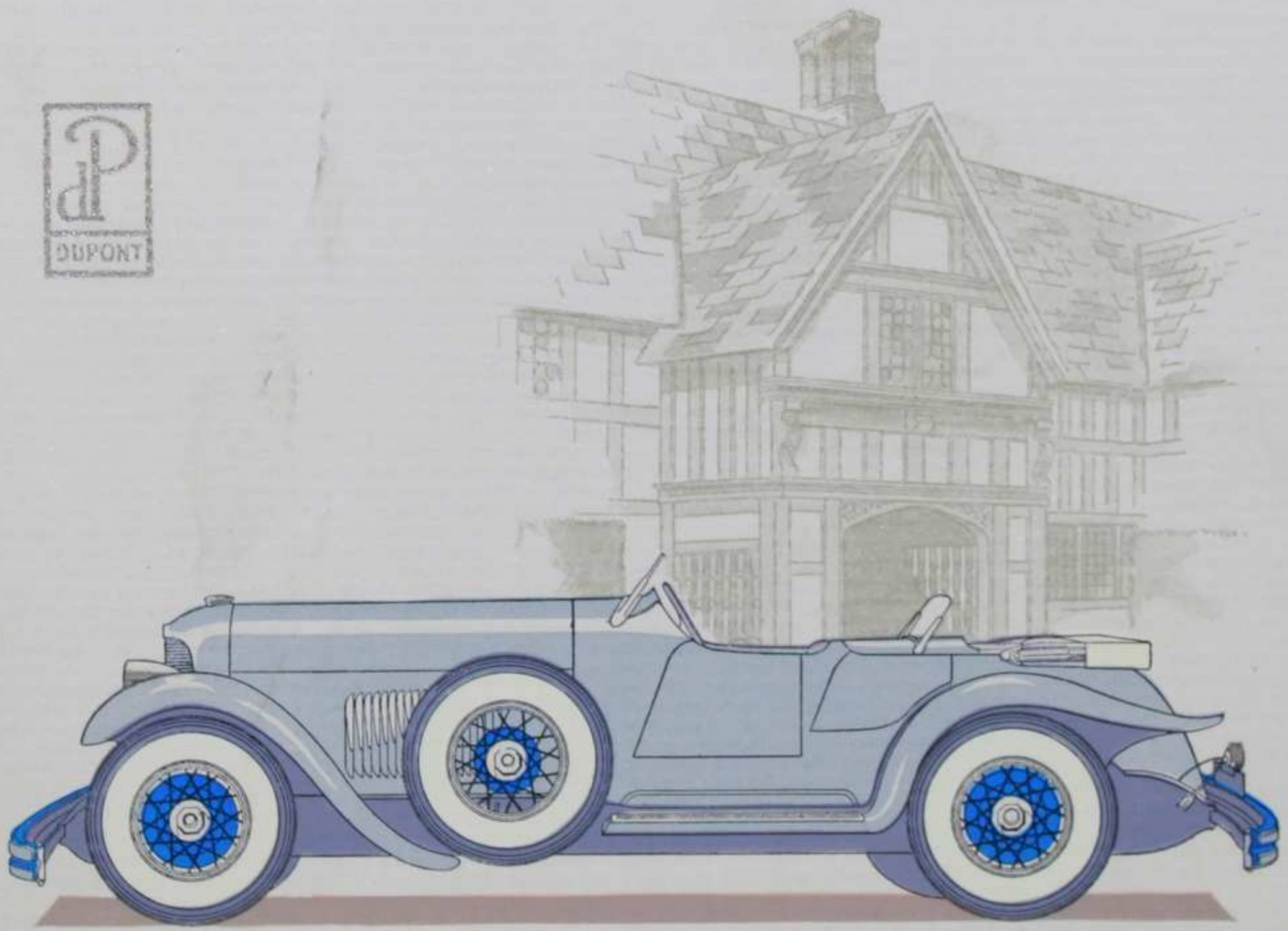
WILMINGTON. DEL.

DUPONT



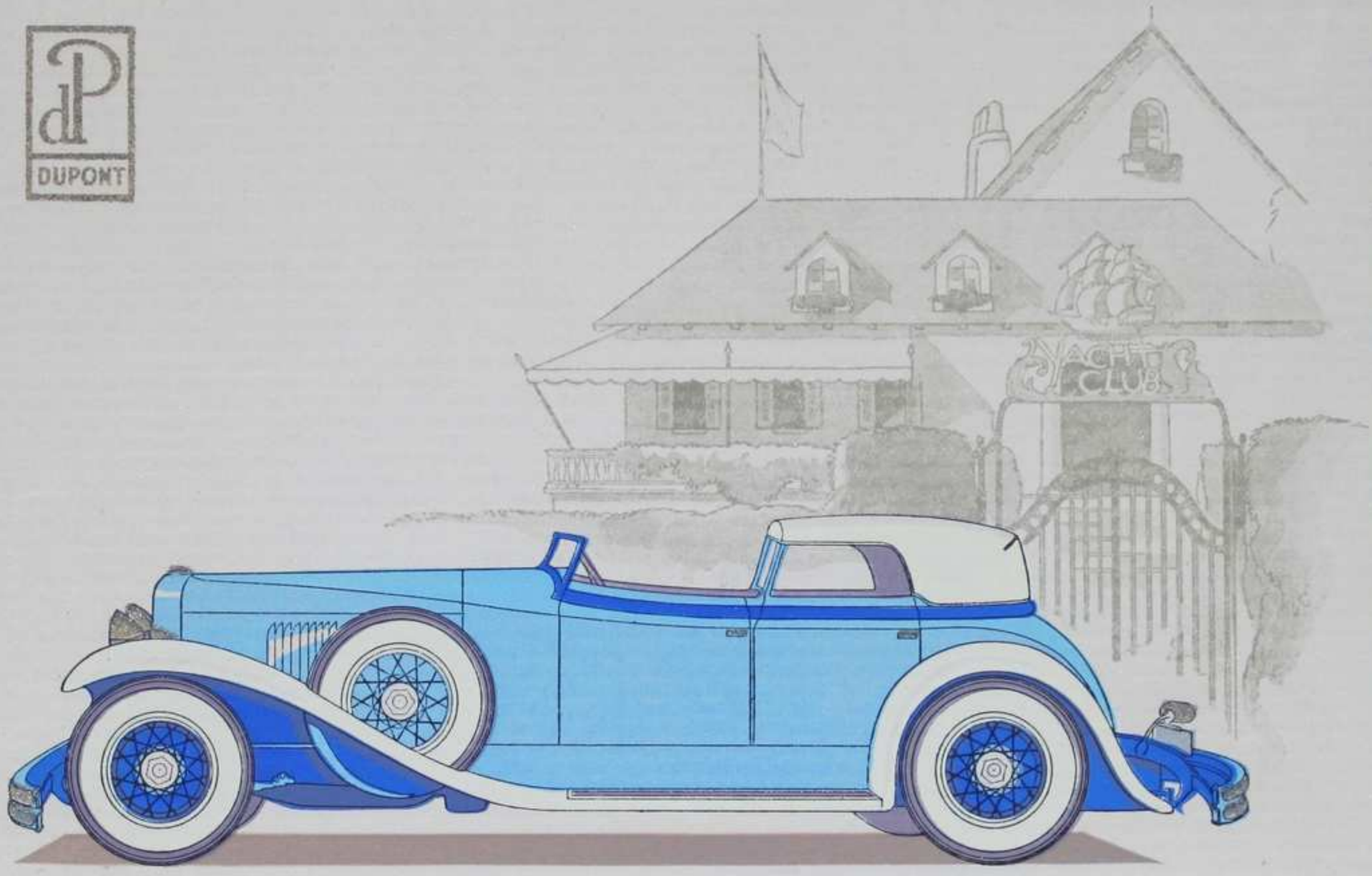
DUPONT MOTORS, INC. PHAETON WILMINGTON DEL.

DUPONT



DUPONT MOTORS, Inc. SPEEDSTER WILMINGTON, DEL.

DUPONT



DUPONT MOTORS, Inc.

TRANSFORMABLE

WILMINGTON, DEL.

Specifications—Model G

Engine

TYPE—L Head eight cylinders in line, cast en bloc; detachable head.

PISTON DISPLACEMENT—322 cubic inches; bore 3⅜″; stroke 4½″; S. A. E. rating, 36.45 H. P.

VALVES—Special heat-resisting alloy.

PISTONS—Light weight aluminum alloy.

CONNECTING RODS—Drop-forged steel, heat-treated.

CRANKSHAFT—Drop-forged, heat-treated steel crankshaft, supported by five large bearings.

CAMSHAFT—Seven bearings.

CAMSHAFT DRIVE—By link-belt chain. Automatic idler adjustment.

MOTOR OILING SYSTEM—Force feed pressure by gear pump.

MOTOR COOLING SYSTEM—Centrifugal pump; large cellular type radiator.

CARBURETION—Dual carburetion with hot air control.

ELECTRIC SYSTEM—Six volt system; 130 ampere hour battery; separate unit starter and generator.

IGNITION SYSTEM—Dual coils and distributor.

Chassis

WIRING—Fuses provided for all circuits; with four spare fuses in clips; fuse boxes conveniently located under hood.

CLUTCH—Multiple disc, dry plate type.

TRANSMISSION—Four speeds forward, one reverse; unit with power plant.

STEERING GEAR—Irreversible type, 18″ steering wheel, with steering post fastened to adjustable bracket.

FRONT AXLE—Special design; large I-beam section of carefully heat-treated alloy steel. Tapered roller bearings.

REAR AXLE—Semi-floating type of special heat-treated alloy steel; tapered roller bearings.

WHEELS—Six wire wheels standard.

TIRES—32″ x 6.50″. Special balloon cord.

BRAKES—4-wheel hydraulic brakes operated by foot pedal; 16″ brake drums. Emergency hand brake operating on propeller shaft directly in rear of transmission.

SPRINGS—Made of special alloy steel. Front springs 2″ wide, 40″ long; rear springs 2½″ wide, 60″ long.

FRAME—Pressed steel channel 8″ deep; 6 rigid cross members.

GASOLINE SUPPLY—Fuel pump system. 22-gallon tank with 2-gallon reserve supply, located at rear of frame

WHEELBASES—125″ to 150″ according to Body requirements.

TREAD—58½ inches.

Body and Equipment

CONSTRUCTION—Hardwood frame, hand hammered aluminum panels, special cast aluminum dash and tool compartment. Finest grade upholstering materials and hardware, hand buffed leathers, safety glass throughout.

DESIGN—Executed to customer's requirements when desired.

FINISH—Duco, color as specified; all bright exterior parts chromium plated.

EQUIPMENT—Two-way hydraulic shock absorbers, extra tires and tubes; heavy type front and rear bumpers; full tool equipment; electric vibrator horn; automatic windshield wiper; cigar lighter; full set of instruments, including 8-day clock, mounted on instrument board; rear view mirror.

Prices on Application

du Pont Motors, Inc. Wilmington, Delaware

The Vapomobile Steam Cars

[ALL PREVIOUS LISTS CANCELLED.]

TELEGRAMS:
"VAPOROUS," NOTTINGHAM.

TELEPHONE No. 1177.

The Motor Construction Co.

MANUFACTURERS OF

THE "VAPOMOBILE"
STEAM CARS.

Canal Street
NOTTINGHAM.

JANUARY, 1903.

The Chiswick Press
W. B. Cooke, Darling Place, Notting Hill

Introduction.

IN presenting to the Public our Catalogue for 1903 we beg to point out that a slight re-adjustment in our prices has been found necessary.

To compete in price with the American Cars we have adopted the course of quoting two prices for each of our Cars—with the exception of the 12-H.P. and higher powered Cars—the lower priced Cars of any type are fitted with American Engines in each case, while the higher priced Cars are fitted with our own English Engines of the highest workmanship and quality of materials, at the same time we should point out that, with the exception of these Engines, all our Cars are, as before, of British manufacture (see also paragraph on Boilers).

We have lessened the bulk of our Catalogue by publishing all the illustrations separately, and those desiring to have the illustration of any particular Car, or part, will oblige by mentioning their requirements by number.

Adopting the plan of our last Catalogue, which found favour with the public, we proceed to describe the different part of our Cars categorically.

Engines.

OUR Engines are of the double high pressure type with link motion, and are so designed that the frame of the Engine—which is of aluminium—forms an oiltight crankcase enclosing the cranks and connecting rods. All our double acting Engines are fitted with piston valves and circular crosshead slides. [See plate 6.]

Where American Engines are fitted we have adopted the "Mason" Engine, which has acquired such a high reputation in America. [See plate 7.]

Boilers.

Hitherto all our Boilers, whether of English or American manufacture, have been of the firetube type, and for simplicity this type is hard to beat. But the demand which has arisen for an increased range of action has led us to turn our attention to the water-tube, or semi-flash boiler.

With this type of boiler it is possible to use the feed water over and over again in a way which is not practicable in the fire-tube boiler, as the trace of oil which (after filtration) is always present in the water, which is returned by the condenser sooner or later, causes trouble in the fire-tube boiler, which is absent in the water-tube type. To put the matter briefly we should recommend the public to specify fire-tube boilers where a running distance of 20 to 25 miles with one tank of water is sufficient, but where it is required to run 50 to 100 miles with one filling of the water tank, we recommend the semi-flash boiler, used in conjunction with our patent condenser, which latter returns a very large percentage of the exhaust steam as water. In all our Cars we fit either our own English built boiler or a boiler of American construction, as our clients may prefer, without any difference in price. [See plate 10.]

"V A P O M O B I L E"

No. 1.

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Patent Feed Water Level Regulator.

WE have acquired the sole rights for Europe of the above valuable patents. The invention consists briefly of a patent steam trap, low water alarm, and in the special use of a back pressure valve. By adopting this apparatus the use of a "Water glass" becomes quite unnecessary, and the constant "taking on and off" of the pump is done away with. The apparatus maintains the level of the water in the boiler at a practically uniform height, it is quite automatic in action and both simple and certain in construction. Part of the apparatus consists of an "alarm," which, should the engine pump fail from any cause, gives immediate and unmistakable warning to the driver. We fit this apparatus to our own Cars for 10 guineas extra, or to any other make of Steam Car for 12 guineas. [See plate 12.]

Carriage Bodies.

We have endeavoured throughout to fit our cars with bodies of one quality only—the very best,—and Messrs. Starey's, Ltd., of Nottingham, who have built most of our bodies, have, it is generally admitted, been very successful in carrying out our designs in the very best possible manner.

Burners.

THE Burners which we make for our Cars are constructed to burn either Paraffin or Petrol. If the former is used the burners are of a heavier make, and the vaporizing coils are larger, and in consequence the burners are more costly. At the same time it must be understood that the burners which are made specially for Paraffin will burn Petrol equally well. Our Paraffin fired Cars are usually fitted with our patented arrangement for starting the burner with a specially designed blow lamp supplied with Petrol or Benzoline from a special tank, which is connected with the main air pressure tank.

Wheels.

For the lighter Cars we recommend wheels with steel spokes of specially strong construction, but where artillery wheels are preferred, we are always prepared to fit the latter at an extra cost of £2 per wheel.

Underframes.

Our underframes, which are constructed throughout in our own works, are of English Solid Drawn Steel Tubes of very heavy gauge and large diameter. Very special care is given to brazing the joints of these frames; altogether the frames are of unequalled strength, and specially suitable for use in rough country districts.

"V A P O M O B I L E"

No. 2.

Brakes.

ALL our Cars are fitted with double acting brakes, and the larger Cars with two extra brakes, but any of the Cars can have extra brakes added at prices given below.

Tyres.

On the three lighter types of our cars we fit Goodrich Single Tube Tyres, which we have found to give great satisfaction. If any other make of tyre is required it can be fitted at an extra cost, for which see below.

Chains and Differential Gears.

All our Cars are fitted with chains of extra strength. The differential gears are of the enclosed dust-proof type.

Condensers.

BY our patent Condenser, which differs essentially from any other type on the market, we obtain nearly double the cooling surface for a given weight of metal. We avoid entirely all back-pressure on the engine, while we secure a certain amount of forced draught, which assists the burner. The condenser is placed underneath the carriage except in the case of a covered vehicle, when it may be placed with advantage on the top.

Where the construction of the boiler admits of the water of condensation being used over again, a very great economy of water results from the use of this condenser.

Feed Water Heaters.

Large Feed Water Heaters are fitted to all our Cars.
The following **extras** can be fitted to any of our Cars:—

	GUINEAS.
Automatic Steam Driven Air Pumps, fitted complete for	8
,, ,, ,, **Auxiliary Water Pump,** ,, ...	8
(Either of the above can be supplied (without fitting)	6
Mud-guards, (the set)	3½
,, if of patent leather	8
Extra Brakes, per pair	4
"Klinger" Water Gauge	2½

No. 1. Light Two-Seater.

IN this Car we have combined the lightest possible construction with adequate strength.

The Car is not designed to carry heavy weights on rough roads.

It is of the very best finish throughout, and upholstered in real leather.

PRICE.

	GUINEAS.
If fitted with American Engine (see page 3)	150
Or, if fitted with our own Engine of English design and construction throughout ...	170

This Car carries water for 20 to 25 miles, and oil or spirit for 30 to 36 miles.

See Plate 1.

No. 2. Two-Seater, with Solid Panel Back.

THIS Car is designed to carry two passengers, but, if required, a seat for a third passenger may be added behind, the frame being amply strong enough for this.

Water for from 20 to 30 miles is carried, and oil or spirit for 40 miles. The Car is fitted with a 16in. boiler.

PRICE.

	GUINEAS.
With American Engine (see page 3)	180
Or, if fitted with our own Engines of English design and construction throughout ...	205
Back Seat, to carry one passenger, extra	8
*If fitted with water-tube boiler, condenser and apparatus for returning condensed water to the tank	235

*See paragraph on Boilers, page 4.

See Plate 2.

"VAPOMOBILE"

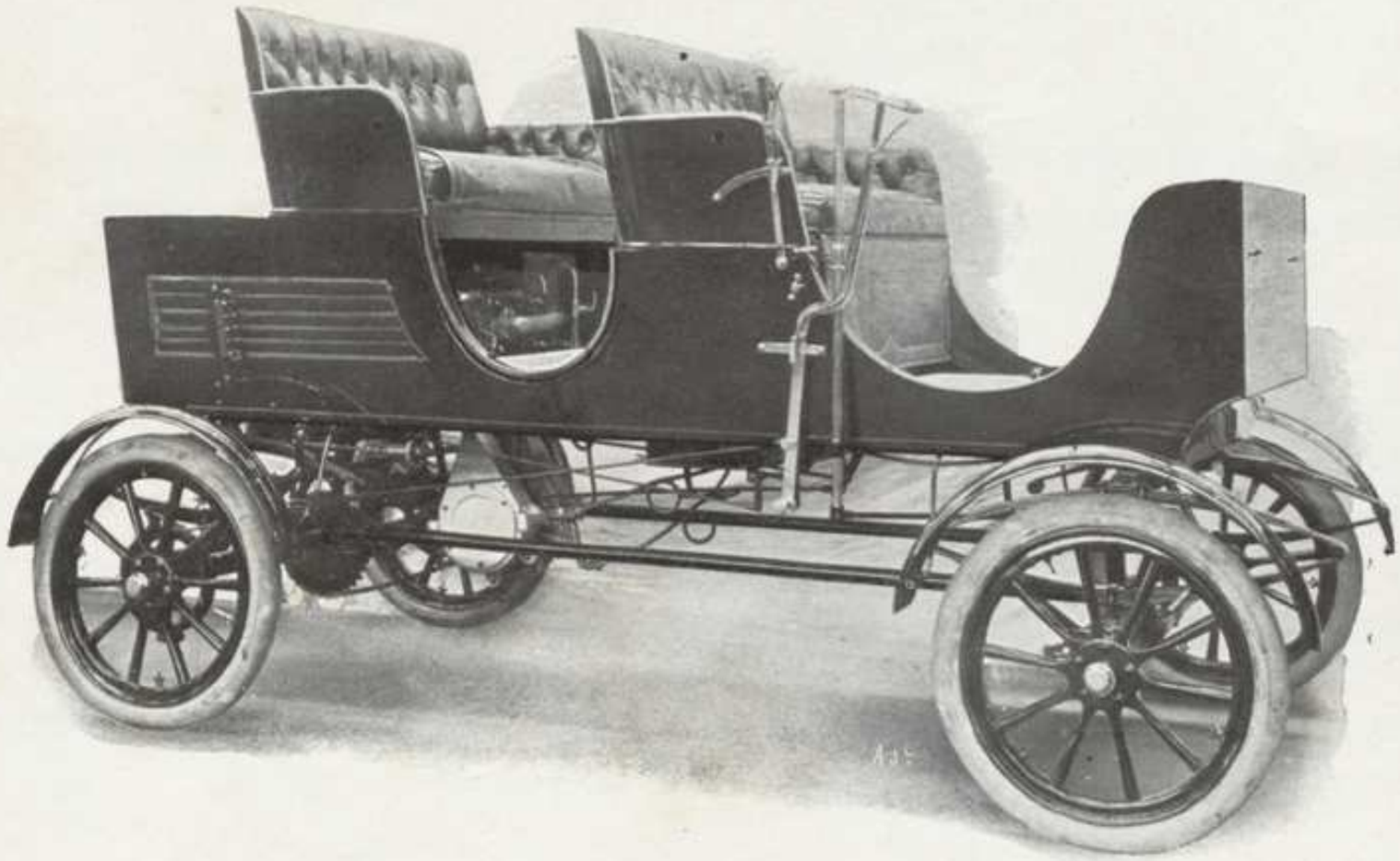


Plate 4.

No. 3. Four-Seater.

A FOUR-SEATED Car, built on the "Dos-a-dos" principle, the body being of our own special design. This is a very strongly built Car, with plenty of seating accommodation, and unusually large luggage space. It can be had with or without canopy, fitted with 19in. boiler, carries water for 20 to 25 miles.*

PRICE.

	GUINEAS.
With large American Engine, 3⅛in. by 4in.	250
Or, if fitted with our own Engine, No. 2 size, 2¾in. by 4½in.	270
Canopy (extra)	12½
Basket, painted to match Car (extra)	£2/7/6
*If this Car is fitted with water-tube boiler, condenser and apparatus for returning condensed water to tank	310

*See paragraph on Boilers, page 4.

See plate No. 3.

No. 4. Double Phæton.

THIS is our most popular type of Four-seater. This car is now only made in one type, namely, that lately known as the "B Type." It is fitted with 8 H.P. Engines, 19in. boiler, artillery wheels, and Grappler Tyres, water for 25 to* 30 miles, and spirit or oil for 50 miles.

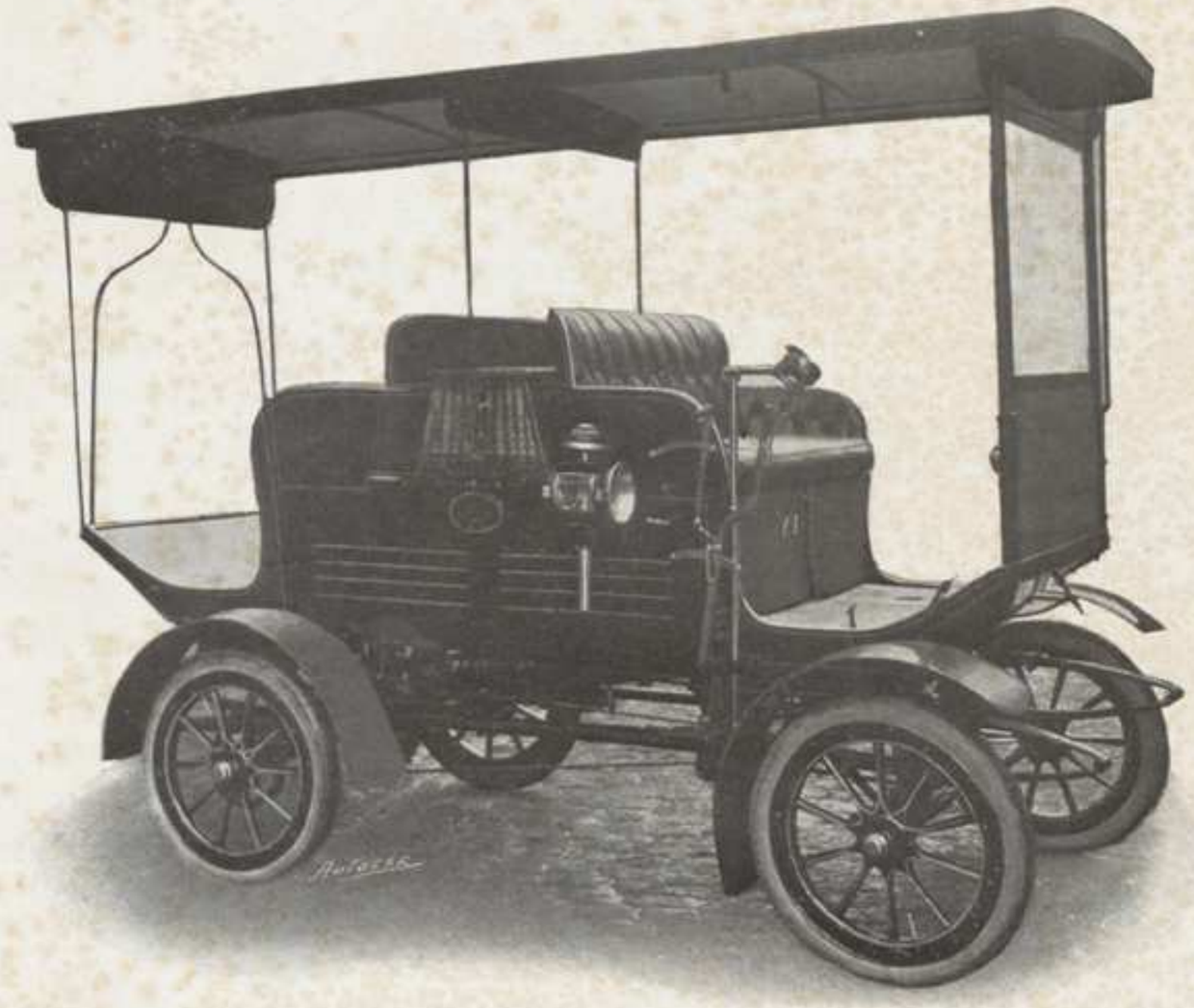
PRICE.

	GUINEAS.
If fitted with large American Engine	295
If fitted with our own No. 2 Engine	320
*If this Car is fitted with water-tube boiler, condenser and apparatus for returning condensed water to tank	350
If fitted with 20in. boiler in place of 19in. (extra)	10

*See paragraph on Boilers, page 4.

See plate 4.

"V A P O M O B I L E"



No. 3.

No. 5. Special Four-Seater.

THE body of this Car is almost entirely of Aluminium, upholstered in real leather. It is fitted with artillery wheels, with 32in. by 3½in. pneumatic tyres. Chains and Chain-wheel are of extra strength.

The Car is built on a steel frame of Channel section. Engines 12 H.P., boiler 14 H.P.

Fifty gallons of water and 15 gallons of fuel are carried.

A 12 H.P. condenser is included in the price of the Car. This is carried under the frame.

PRICE.

	GUINEAS.
Of Car complete, without brougham top	430
Brougham top, extra, according to finish	20 to 40
Price of "Châssis" alone	350

This Car may be fitted with water-tube boiler and apparatus for returning condensed water to tank for (extra) 10 guineas.

See paragraph on Boilers, page 4.

See plate 5.

List of Accessories and Parts.

	£	s.	d.
6 H.P. Engines, our own make, with aluminium crank-cases, &c.	38	0	0
8 H.P. ditto ditto (see plate 6)	45	0	0
12 H.P. ditto ditto	75	0	0
5½ H.P. American Engines, 2½in. by 3½in.	17	0	0
10 H.P. ditto 3⅛in. by 4in. (see plate 7)	32	0	0
If fitted with Brampton chain wheels, extra	0	15	0
12 H.P. Engine (English), suitable for Delivery Vans	52	10	0

Paraffin or Petrol Burners, complete (see plate 8) :—

14-inch Burners	4	0	0
16 „ „	5	5	0
19 „ „	6	10	0
20 „ „	7	10	0
24 „ „	9	9	0

Patent Condensers.

[See plate 11.]

According to size ... ... 10 to 18 Guineas.

Patent Water Level Regulator.

If fitted to one of our own Cars ... ... 10 Guineas.
If to any other make of Steam Car ... ... 12 „

List of Accessories and Parts—*continued.*

	£	s.	d.
Underframes, pinned and brazed, but un-painted (see plate 9)	10	10	0
Differential Gears, including chain wheel, from	8	10	0
Wheels, built up from extra strong butted end, steel spokes, with hubs complete	2	10	0
Artillery Wheels, in place of steel-spoke wheels, extra	2	0	0

Boilers.

See plate 10.

(Steel Shells and Copper Fire-Tubes.)

	£	s.	d.
14 inch **Boilers**	18	10	0
16 „ „	21	5	0
19 „ „	33	0	0
20 „ „	37	0	0
24 „ „	60	0	0
Copper Shell Boilers, up to 16in. at, extra per boiler	6	0	0
Half-inch Copper Boiler Tubes cut to length	per dozen	0	7	6
Water-tube Boilers of the above sizes at (extra per Boiler)	15	0	0

Tyres.

Any make of Tyres which our clients may desire can be substituted for the stock tyres at an extra cost, depending on the tyre.

Repairs.

REPAIRS to Steam Cars are a special feature of our business. We are at all times prepared to send an expert to any part of the kingdom to effect any Repairs, or to report and advise on the state of any Car.

We charge for his services at the rate of from 10/6 to 15/- per day. Railway fare and allowance for accommodation and food extra.

Advantages of Steam Cars over Petrol-driven Cars.

Freedom from noise. Absence of unpleasant vibration.

No "whirring" of machinery when car is standing. No starting handles to turn.

Great flexibility of speed. Splendid hill-climbing powers.

Less cost in tyres. Less difficulty to localize the trouble if anything should go wrong.

And (by the use of heavy oils) less risk of fire, and greater suitability for use in those parts of the world where petrol is impossible to obtain or dangerous to use owing to the heat of the climate.

Finally, if crude oil is used in the burner, less cost of running.

FIAT

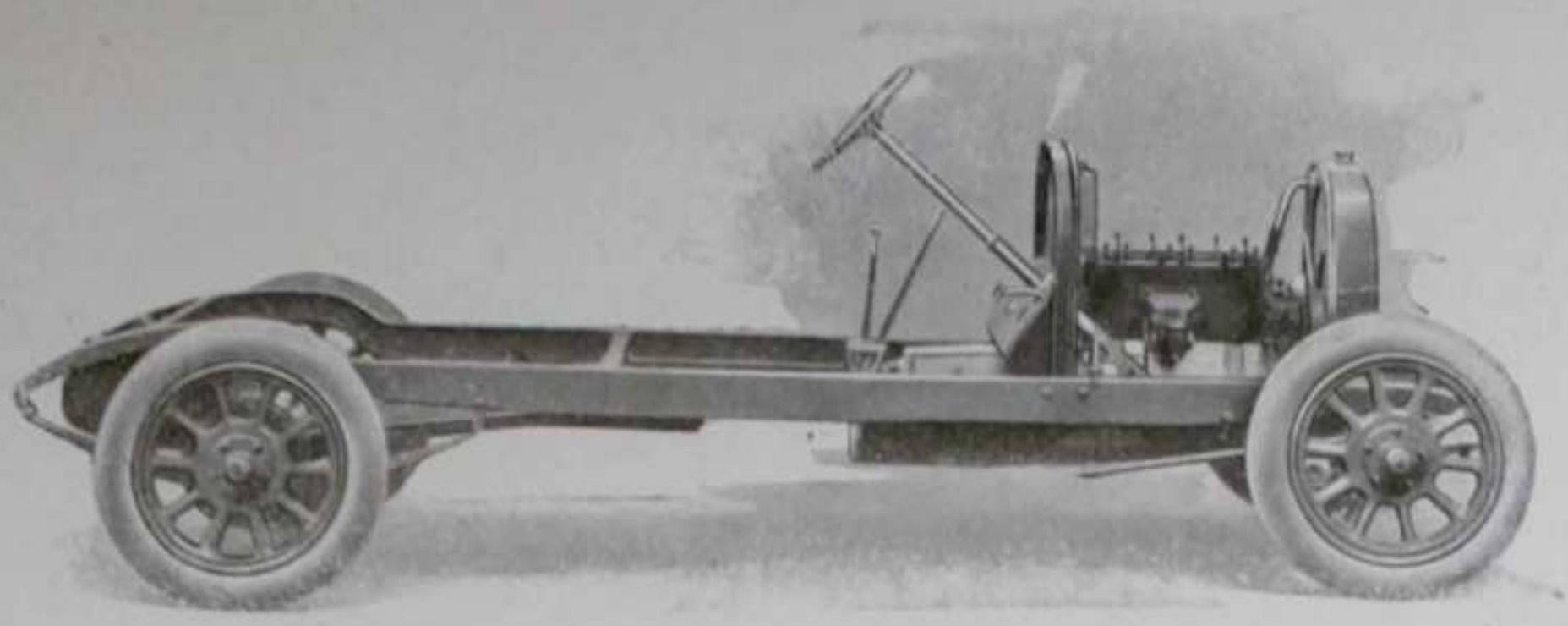
MODEL 510

FIAT CAR

MODEL 510

"Nihil Melius"

The highest examples of mechanical skill, careful construction, power, speed, silence and elegance, are found in the model 510 standard and sport six cylinder car, the last word in modern large car production.



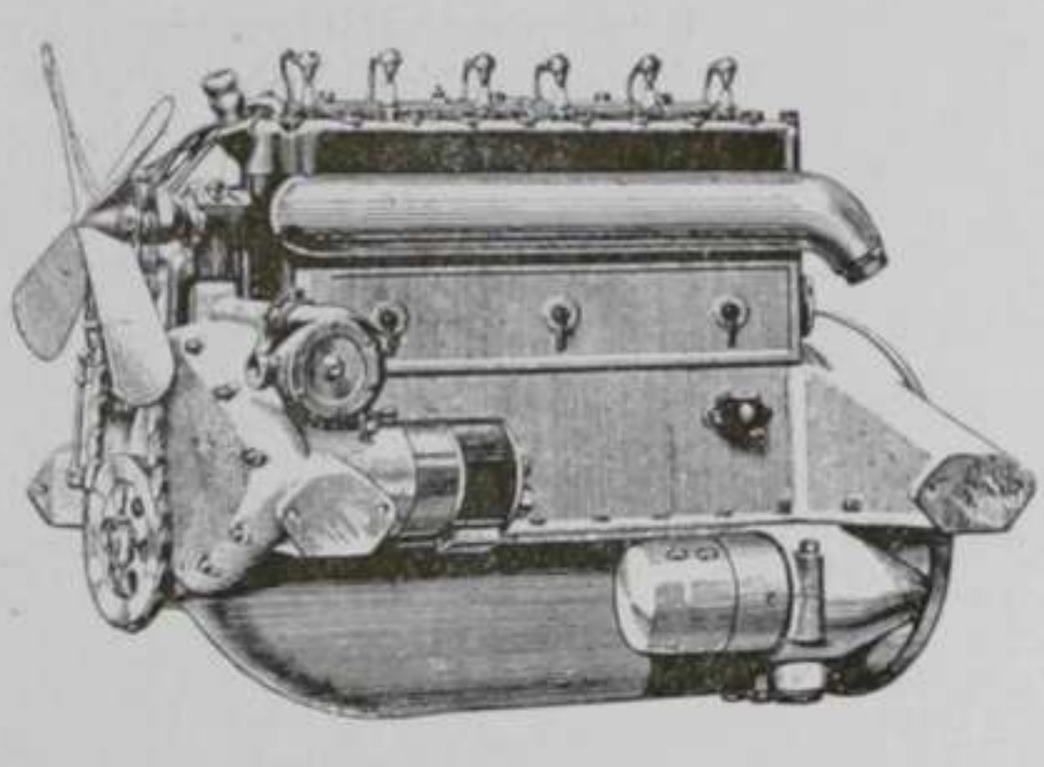
CHARACTERISTICS

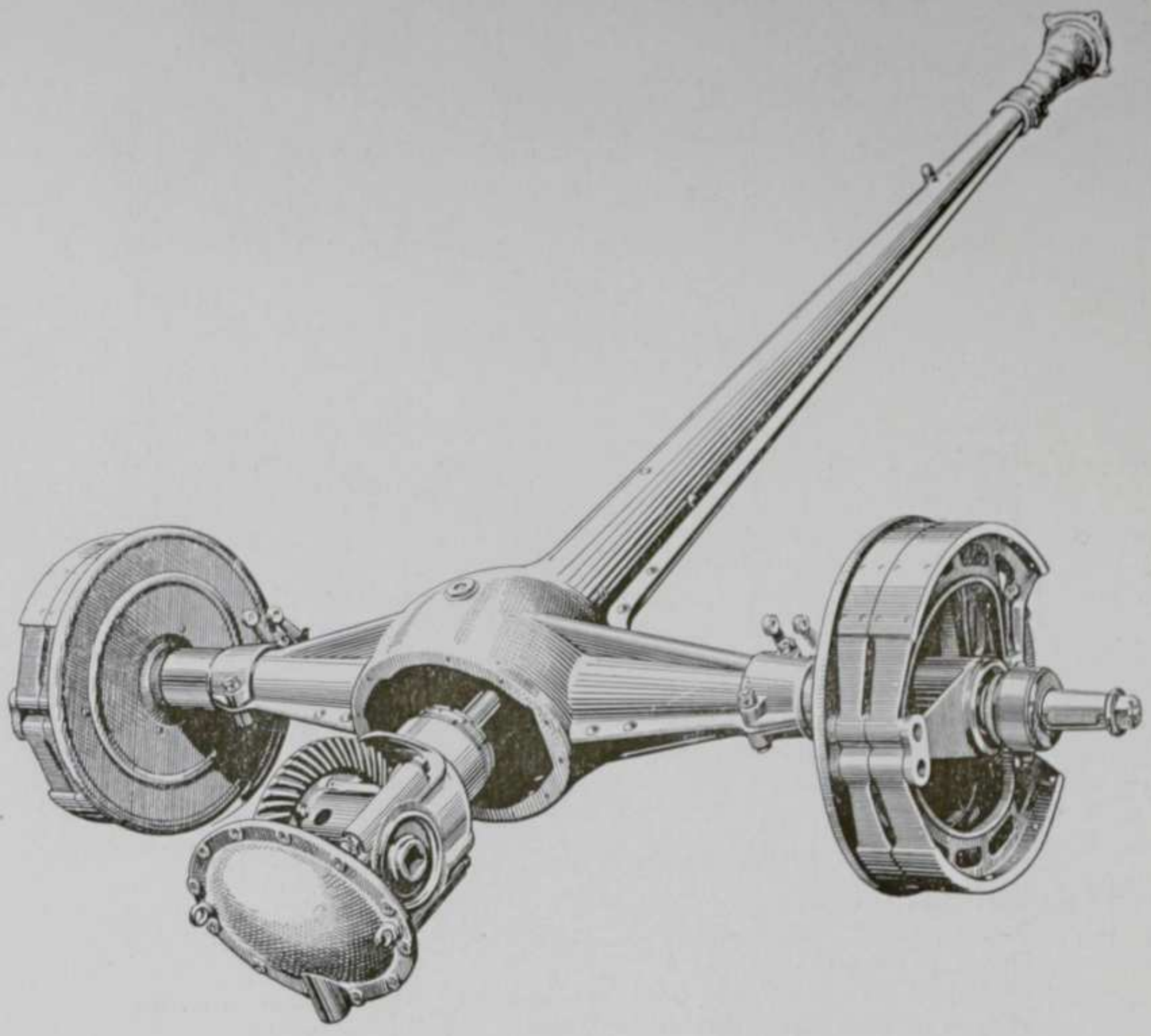
Cylinders	n.	6	Stroke	mm.	130
Bore	mm.	75	Power	HP	20-30

Wheelbase	11' 2"
Wheel track	4' 7"
Body space	9' 2¼"
Length of the châssis	15'
Width at front	2' 3"
Width at rear	3' 5"
Minimum clearance, about	10"
Weight of the châssis only with tyres and spare wheel about ..	cwt. 22
Weight of the châssis complete with open touring body, including petrol, oil, water, about	cwt. 32½
Weight of the châssis with closed body, about	cwt. 34

DIFFERENCES FOR THE SPORTING TYPE

Wheelbase	10' 2"
Body space	8' 2"
Length of the châssis	13' 11"
Weight of the châssis only, with tyres and spare wheel about	cwt. 20
Weight of the châssis complete with body, including petrol, oil and water	cwt. 31½





REAR AXLE. — The axle casing is of pressed steel in two pieces welded together and rivetted. It bears at the back an aluminium cover which forms the cage for the differential, enabling this to be removed and examined together with the transmission shaft without it being necessary to dismont the body and without disturbing the adjustment of the conical driving pinion.

SPECIFICATION

Carburettor, patented FIAT type. - *Ignition* by high tension magneto. - *Clutch* multiple disc type, with pedal control.

Gear box: selective type, with four speeds forward and one reverse. The change speed lever is placed inside the body.

Transmission by cardan shaft, with one universal joint only, and by spiral bevel gears.

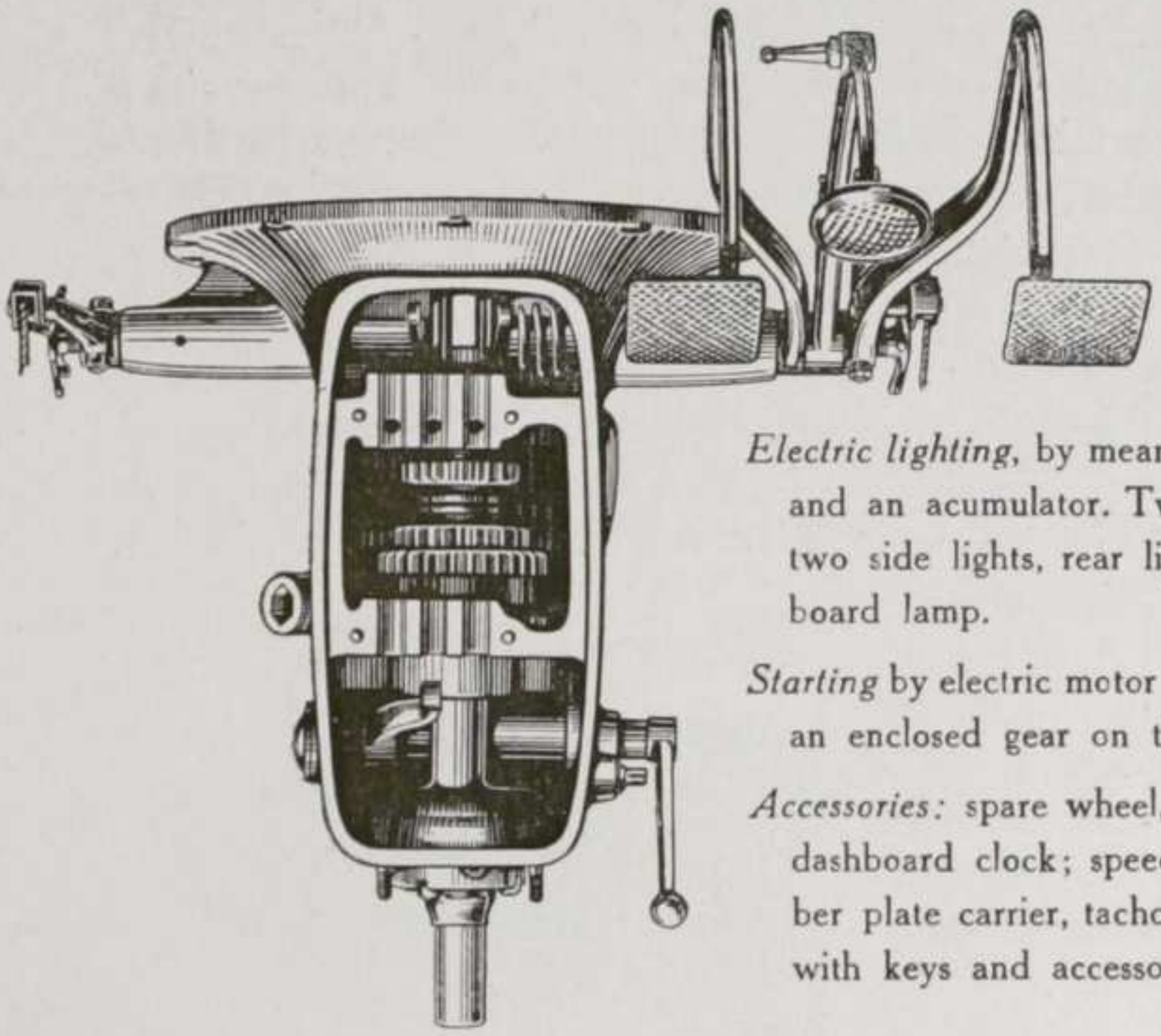
Steering: Right hand type, by worm and wheel. Throttle and ignition levers mounted on the steering wheel.

Brakes: Both sets operating on rear wheel drums. One pair by pedal, the other pair by lever inside the body.

Wheels: steel spoke type, detachable from the hub and fitted with 895 × 135 mm. tyres.

Lubrication under pressure by gear pump.

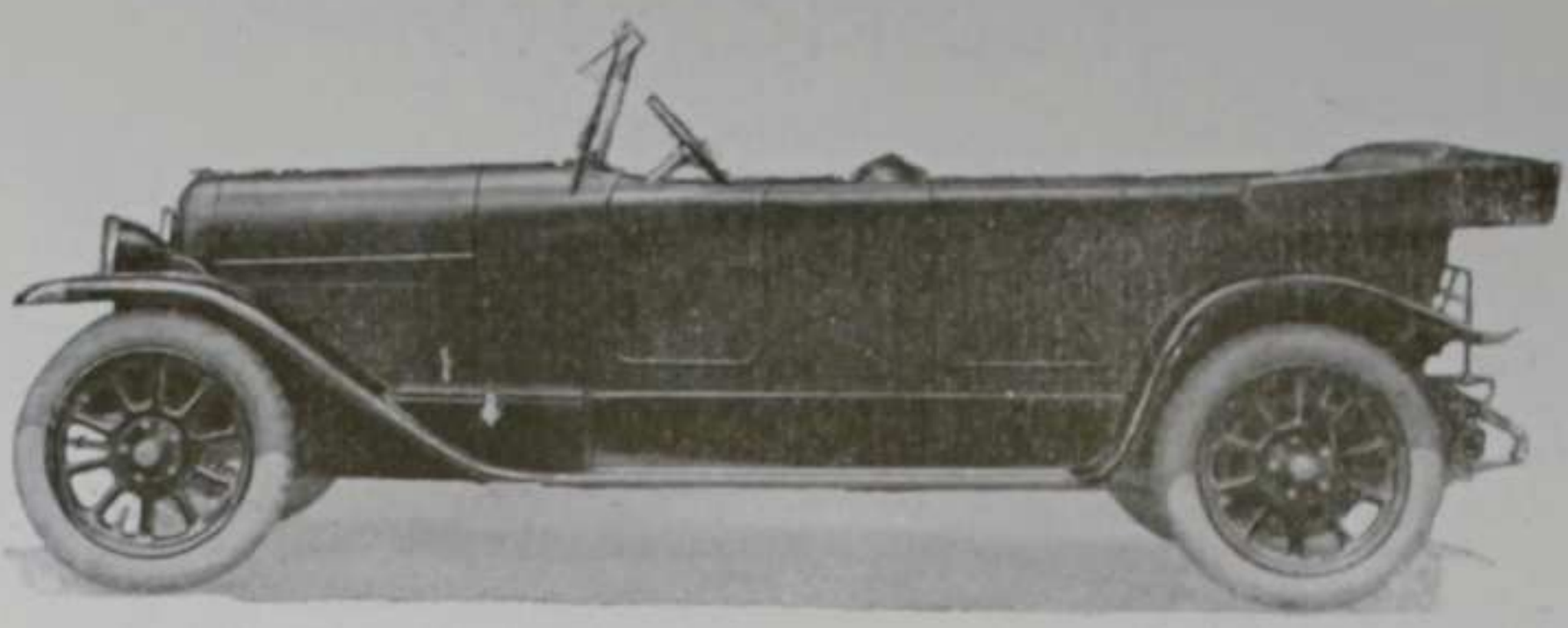
Cooling by water, with centrifugal pump. - *Petrol tank* under pressure, with level indicator. It is not necessary to pump by hand to obtain the initial pressure.



Electric lighting, by means of a dinamo and an acumulator. Two headlights, two side lights, rear light and dashboard lamp.

Starting by electric motor engaging with an enclosed gear on the flywheel.

Accessories: spare wheel, electric horn, dashboard clock; speedometer, number plate carrier, tachometer, tool kit with keys and accessories.



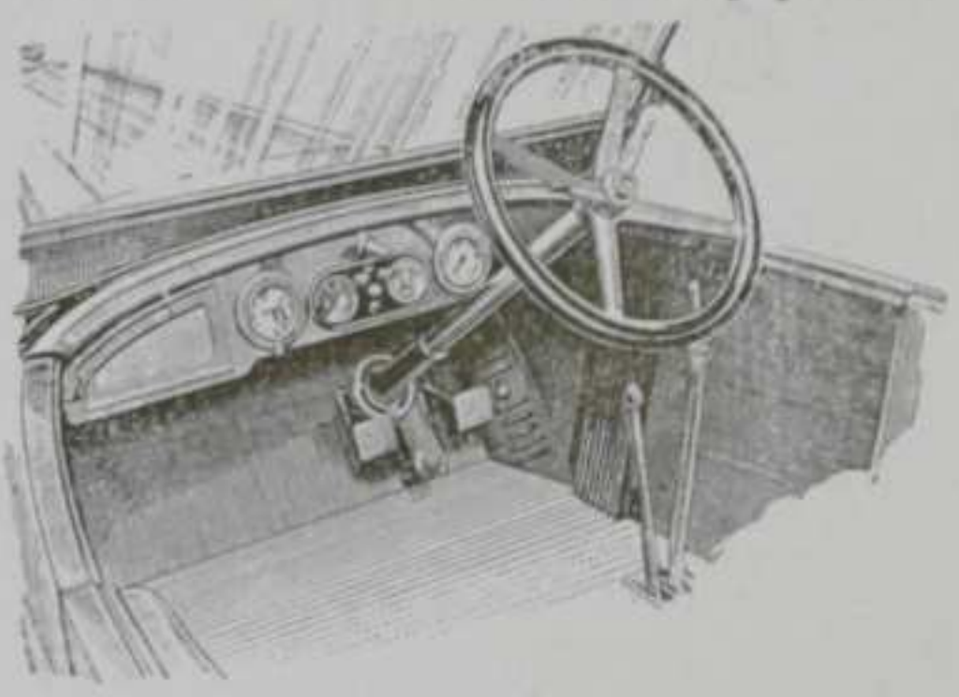
TORPEDO DE LUXE

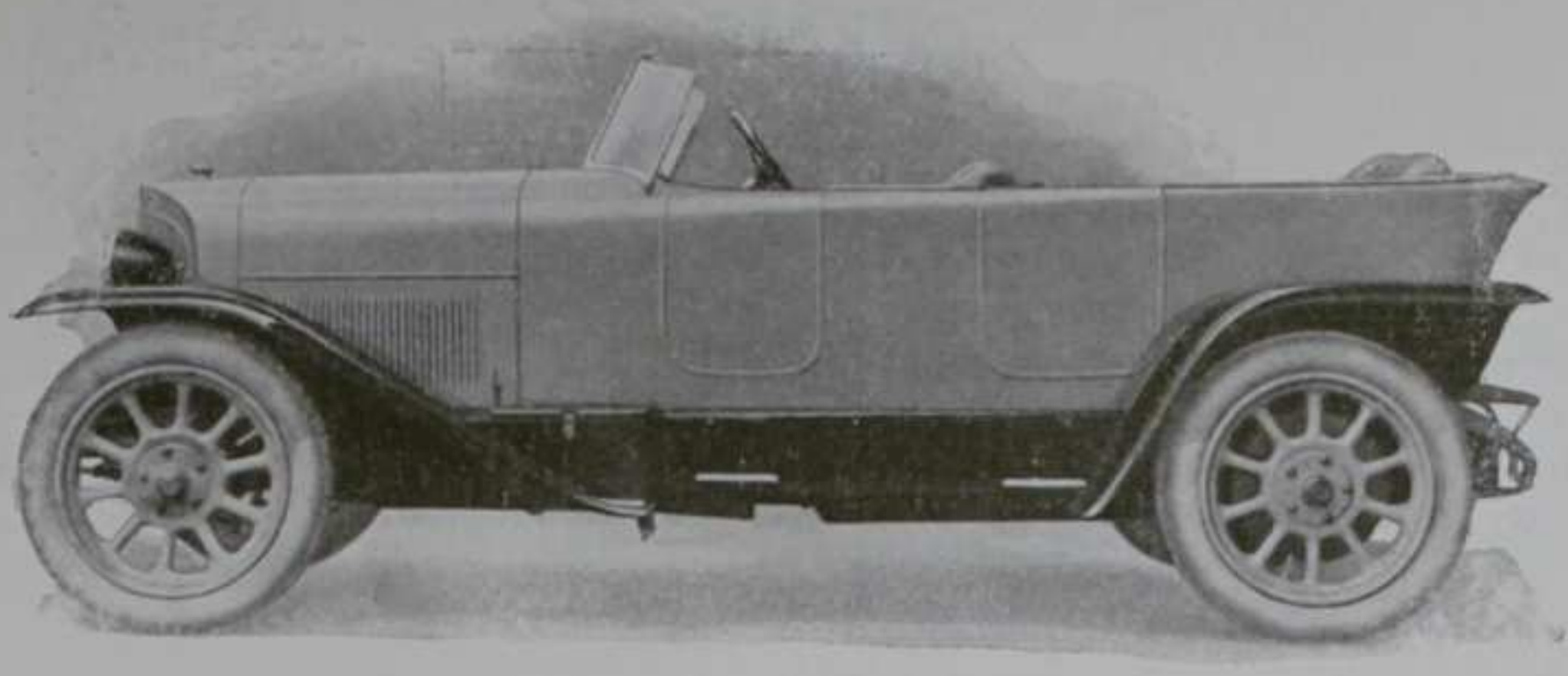
Straight line body - Stream line bonnet and scuttle - Six seats i. e. two persons on the main seat at rear, which is provided with central arm rest, two on the front seat including driver, and two in the disappearing extra seats facing forward - Double inclined and adjustable windscreen - " Neverleek " double extension hood with glass rear light and provided with side curtains - Hood envelope of imitation leather - Three doors, two on the nearside, one on the offside.

Painted to choice in six colours: blue, red, brown, pearl grey, deep grey, green - Apron under radiator, wings, wheel, etc., in black - Metal parts nickel plated.

Antique leather upholstery to match colour of body - Moquette carpet on floor - Mahogany cabinet work - Companion cabinet behind front seats - Locker under scuttle - Leather map pocket.

Luggage carrier at rear with metal panel protector - Spare wheel carrier for wheels - Two tool boxes - Box under front seat - Petrol tank protector - Boot scrapers - Foot rest.





TORPEDO "SPORT" LUXE

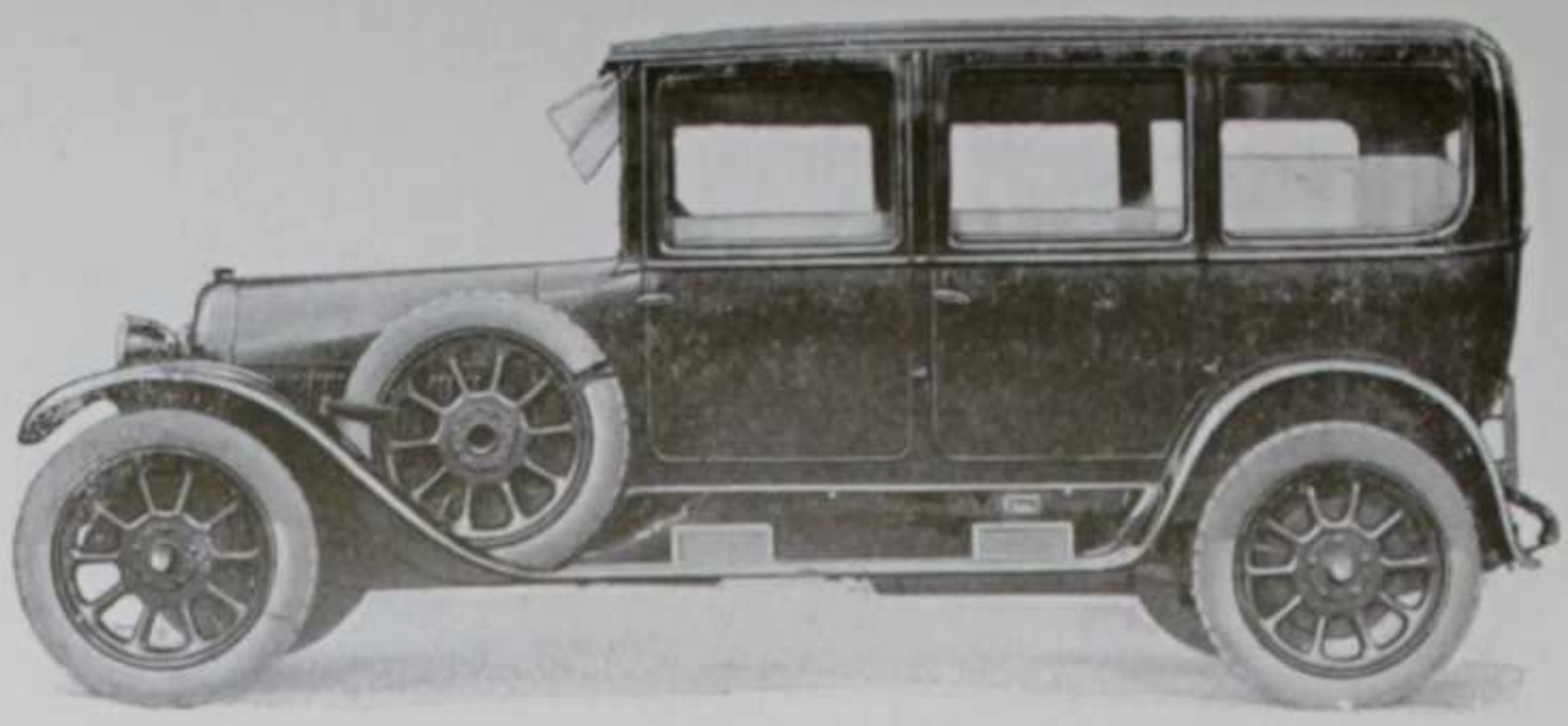
Straight line body - Special stream line bonnet and scuttle - Four seats - Special inclined-shaped windscreen - " Alpagas " double extension hood with rear lights - Side curtains carried up to windscreen and provided with lights - The hood when down in concealed in rear of body - Three doors with concealed hinges - Steps for the doors.

Painted in light colours - Wings, wheels, etc., in black or to harmonize with colour of the body - Metal parts nickel plated.

Upholstery in antique leather to match colour of body - Carpets on floor for front and rear seats - Robe-rail on back of front seats - Cabinet work - Locker under scuttle - Map pockets.

Luggage carrier at rear with metal panel protector - Spare wheel carrier for one wheel - Box under front seats - Two tool boxes - Petrol tank protector.

Extra special luxe finish.



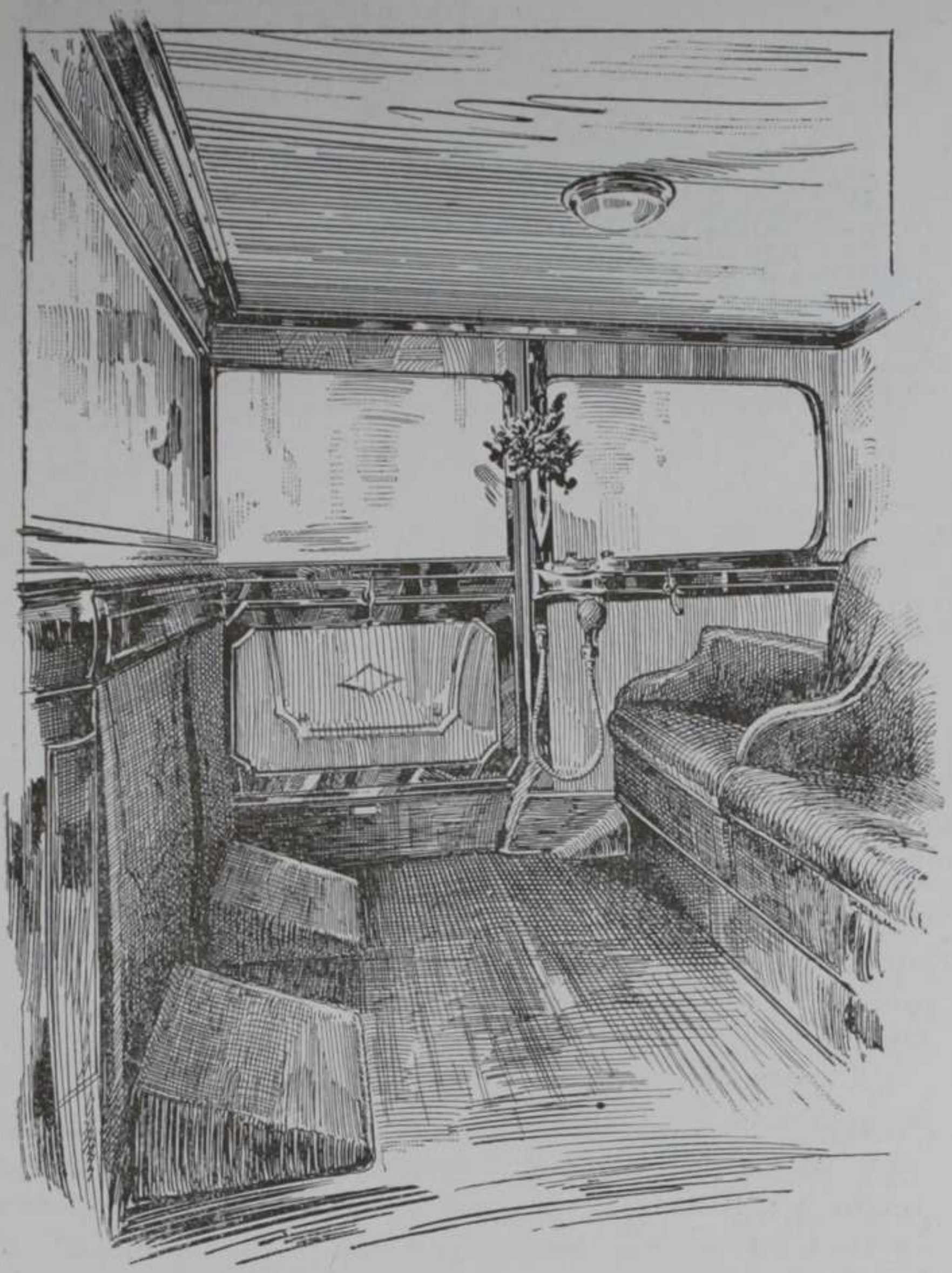
INTERIOR DRIVE SALOON

Body: Straight line Limousine in two compartments giving privacy, to seat 6 persons, (two on main seat, two on driver's seat, and two on arm chair seats facing forward) - Rear seats with removable elbow rests - Stream line scuttle dash and bonnet - Double adjustable wind screen and third hinged crystal on top - Three frameless windows on each side and a rear light - Double window behind driver's seat the right side being sliding - Doors with special regulator - Rear light - Four doors, with safety locks and concealed hinges.

Painting: to choice - Metal parts nikel plated.

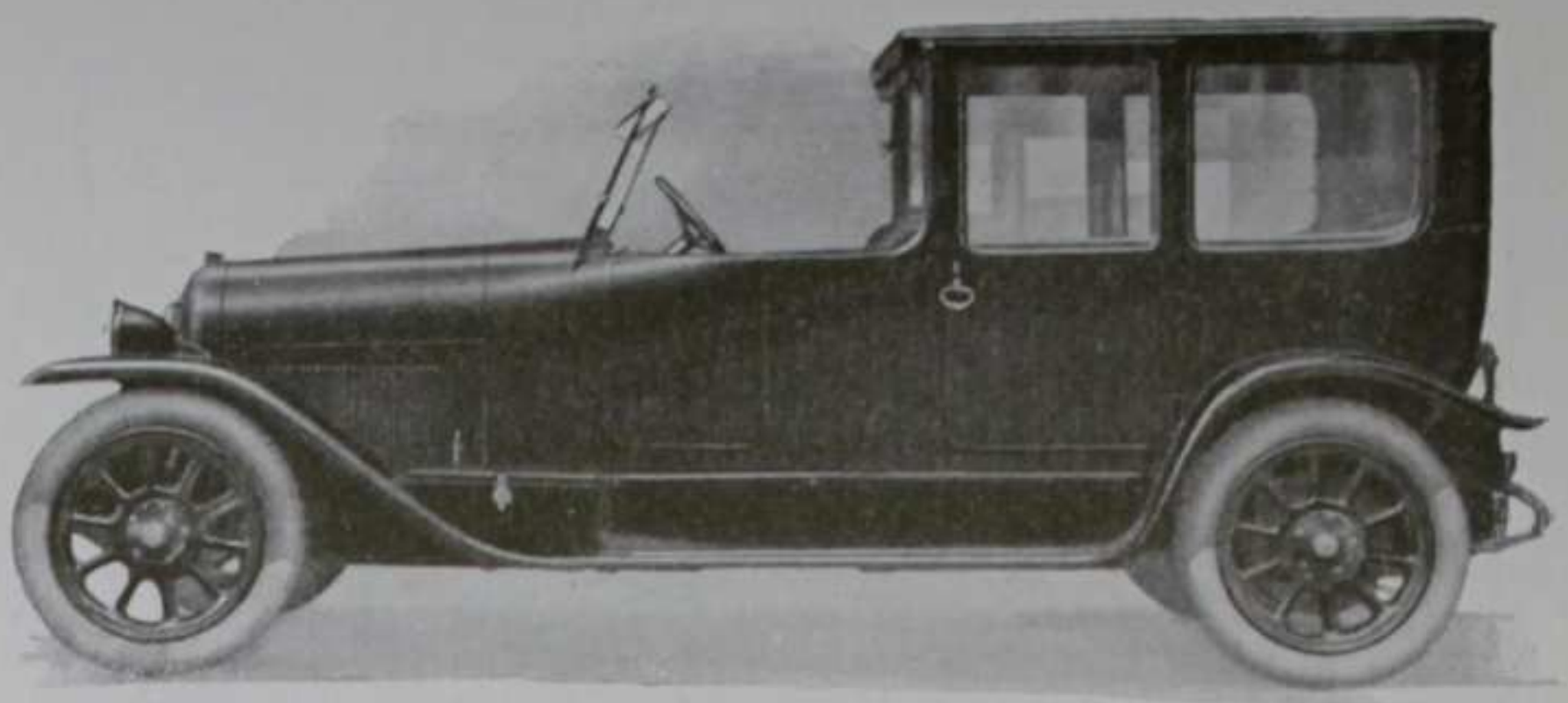
Upholstery: leather on front seats - Interior upholstery in cloth, well sprung, very soft, comfortable and of the finest quality - Carpet inside on floor - Silk blinds to the rear windows - Woodwork on the inside of the doors - Mouldings - Polished wood cabinet - Locker under scuttle; pocket in leather for maps.

Equipment: Folding luggage carrier and panel protector - Spare wheels let into front wings - Space under front seat for accessories; protector for petrol tank - Mud scrapers, pile carpet foot rests, electric light in roof; order transmitter from



rear to front seats; flower vase, companion de luxe, light on running boards.

Painting and general finish is carried out in the best style, the whole forming a well appointed and dignified carriage.



COUPÉ TORPEDO

Straight line body without fixed front roof extension, but with roll up extension - Stream line bonnet and scuttle - Six seats i. e. two persons on the main seat at rear which is provided with central arm rest, two on the front seat including driver, and two on the disappearing extra seats facing forward - Double inclined and adjustable windscreen with attachments for the extension - Three doors - Two windows in each side with patent lifters - Single window behind the front seats - Rear light.

Painted to choice in four colours: blue, deep grey, green, brown - Wings, wheels, etc., in black - Metal parts nickel plated.

Front seat upholstered in black or antique leather - Interior upholstered in fine cloth - Carpet on floor of rear seats - Silk blinds to windows - Mahogany woodwork - Inlaid mahogany cabinet behind front seats - Locker under scuttle - Leather map pocket.

Luggage carrier at rear with metal panel protector - Spare wheel carrier for wheels - Tool boxes on running boards Box under front seat - Petrol tank protector - Boot scrapers Foot stools - Interior roof light - Speaking tube - Flower holder and ash tray - Companion.

The whole with extra special luxe finish.

Extract From "General Selling Terms".

Art. 8. - FIAT reserves to itself the right to effect any modifications in construction without any obligation to notify the purchaser and is under no obligation to apply to those productions already constructed or in course of construction, and destined to a purchaser, such modifications as might have already been considered and approved.

35-

THIS CATALOGUE

CANCELS ALL PREVIOUS ONES

PRINTED IN ITALY

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Ajani & Canale - Torino

THE CROSSLAND STEAM CAR

"The Pulse of the Universe"

CROSSLAND PFAFF ENGINEERING LABORATORIES

CHICAGO. ILLINOIS

INTRODUCTORY.

Put yourself in my place. Here I was, a man who had grown up with the Automobile business; lined up with one of the largest motor concerns in America, whose product I pioneered, doing very well. But I was not satisfied. I had the desire to expand, to grow. I wanted to grow and increase the size of my activities, from local application to Universal. I wanted the fighting feeling of quality and quantity growth combined—I wanted the feeling of having accomplished a purpose for the benefit of mankind and therefore devoted my spare time to the study of Steam and its application to the Automobile realizing there was a long felt want for this new power, whose superiority was manifest in every conceivable test with the Internal Combustion Engine. Steam was indeed not new to me, I had sidetracked it for this power—the Internal Combustion Engine. After realizing the many faults of the gasoline motor, I returned to the problem of Steam for the Automobile.

How many times did I picture to myself an ideal Steam Car! This is what I wanted: a new power, a new Automobile a big Luxurious Motor Car of distinctive design possessing a new grace of line, when viewed from any angle. A car supreme for smooth running in which every expectation would be realized, scientifically engineered throughout, combining reserve power and speed with unusual lightness, eliminating complication, making simplicity of operation a predominant factor.

An organization built on a progressive, vital, new motor-value idea; solid, modern business men associates; a healthy democratic method of capitalization; full freedom to work out my own ideas in my own way with such an organization.

My desire has been: Something so big, whose magnitude was unlimited, where I could hurtle every ounce of my energy, every atom of my brain power, every second of my time into it and make the world know it is big: Now I have my chance with the CROSSLAND STEAM CAR, which is the creation of my brain.

I have at last accomplished this desire, both as to power and design.

H. Crossland Robb

CROSSLAND STEAM CAR.

LET us tell you a story that will, we believe, be the most interesting you have ever read. After you have finished, let us have your verdict.

Steam is without question, the ideal source of power for self-propelled vehicles. It is the most direct, the most flexible, the most potent of all power impulses; it is also the simplest and most easily controlled.

The CROSSLAND STEAM CAR utilizes to the fullest extent all these well known advantages of steam; at the same time greatly simplifies their application to motor vehicle requirements.

The power plant of the CROSSLAND STEAM CAR has only 29 moving parts, of which 16 are in the engine. Can you conceive the simplicity of it? Complication entirely removed. There is no clutch, no gear set, no complicated driving mechanism. Another thing of very vital importance is the fact that you have at all times stored up energy to be used in the emergency. In the event of crossing a railroad track it is utterly impossible to kill your engine as this stored up energy is ready to be used at all times. You can turn off your fuel and will have sufficient head of steam to run your car from 3 to 5 miles, and all the power is absolutely delivered to the rear wheels.

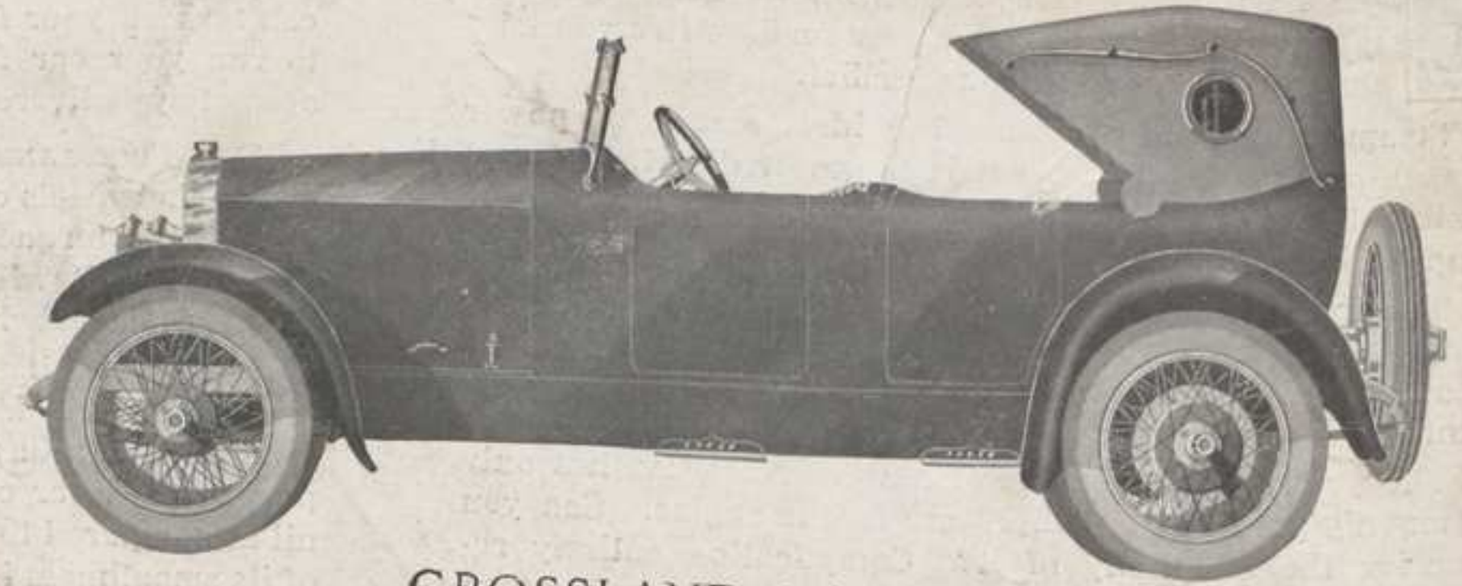
The CROSSLAND STEAM CAR will climb any hill upon which the wheels can find traction; and because of the evenness of the torque and the availability of all the power at low speeds, it will plow through sand or find traction in slippery places where other cars would be utterly helpless.

One of the biggest factors for the assurance of its immediate success is its economy. We use exclusively Kerosene for fuel; Gasoline is not necessary even for starting purposes. Wear of parts and wear on tires are practically nil as compared to internal combustion types due to the fact of its smoothness in operation and running thereby avoiding all vibration that is always constant in a throbbing gasoline motor. It means three to four times the life of the car, which is one of the most vital questions today in the merchandising of automobiles.

THE FAWN

(FIVE PASSENGER)

Perfection in design, and appointment is particularly noted in this model, which is distinctive to the smallest detail—Superior riding qualities in the Crossland are arrived at through absolute perfect balance and perfect distribution of weight. An added distinction is the new Streamline which is exclusive in the Crossland.



CROSSLAND STEAM CAR

Designed by Harry Crossland Pfaff.

QUESTIONS AND ANSWERS.

Q.—Is our fuel-lighter any better for the handling of Kerosene than the one that is used in competitive steam cars, or is it as good?

A.—One of the advantages in ours is that we do not have an electric current to ignite our fuel; we do not use a match, torch, nor spark. There is no renewal of spark plugs. We ignite our fuel chemically, which is absolutely positive. We atomize our fuel; then we ignite it instantly. After the fuel is ignited we produce steam enough to move the car in about half a minute. The reason we can do this in so short a time is, that we have adequate heating surface with water on one side of the tubes and products of combustion on the other side, combined with a perfect circulation in the boiler.

Q.—Is there any other type of boiler used in automobiles using a water circulation?

A.—No, not in a true sense. Some have circulation in the liquid itself, due to the difference in specific gravity, but this is retarded owing to counter-current in the mass of liquid. Others of the flash or semi-flash type have water coming in at one end and steam going out of the other.

Q.—What is the method of circulation in the flash type of boiler.

A.—Water comes in at one end of the tube and passes out at the other as steam. In the fire-tube boiler the circulation is simply in the liquid itself; down in some parts of the liquid and up in others according as some parts are hotter than others.

Q.—What about the semi-flash boiler?

A.—The semi-flash boiler has the same method of circulation as the flash type except that a water level is maintained in the tube.

Q.—What is the type of our boiler?

A.—Our boiler is a water tube boiler in every sense of the word. The water flows in a circuit through the tube, passing upward where the tubes are hottest and flowing downward in the colder tubes to fill the space left vacant by the rising water.

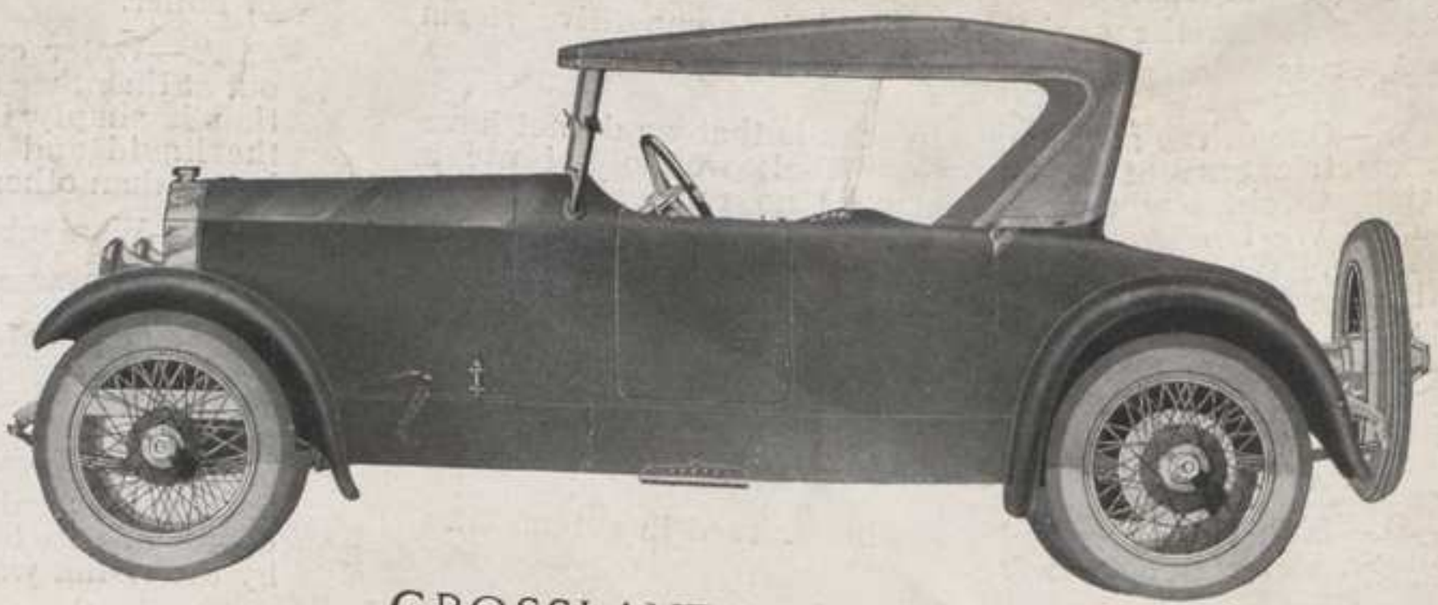
Q.—Is there any particular advantage in this type of boiler over the fire-tube?

A.—Yes, the flow of water is unobstructed by counter-current; that is, it is constantly in one direction and meets no opposing currents going in the opposite direction.

THE STAG.

(FOUR PASSENGER)

This model boasts of comfort, luxury, beauty and excellent appointment, which is the character of the Crossland product. Refinement in coach work; simplicity; built upon sound principles which have remained unchanged since the beginning of time—STEAM.



CROSSLAND STEAM CAR

Designed by Harry Crossland Pfaff.

Q.—Is that an advantage in generating steam?

A.—Yes. The greater ease with which the circulation takes place, the easier the steam is freed from the surface of the water and the more heat units can be extracted for a given area of tubes. In our boiler we have a large water surface, from which the steam easily escapes to the steam space. This is a great advantage over the flash or semi-flash type which has a very restricted area. We have a large steam space over our water surface which affords us a certain amount of reserved power and also gives us dry steam. The flash and semi-flash boiler have practically no reserve power and due to their small water surface, have a tendency to give wet steam.

Q.—Are we going to super-heat our Steam?

A.—Yes, with a new type of super-heater.

Q.—What about the condensing system? What mileage will you get from a 25 gallon tank of water?

A.—We will get at least 800 miles on the minimum. The reason we do this is because we will have a condensing outfit which is proportionate to the amount of steam we will use. We will aid our condensation by a compensating device, which gives us more effective condensation under full load. Another very vital thing is that we have sixteen times the area for condensation of any steam car in existence today.

Our generator is the only one so constructed that is absolutely self-cleaning in every respect. All the passages which connect the various parts of the generator are inclined in a direction to direct sediment deposits therein, towards the blow-off pipe, located at the lower point of the water circulation passages. With this arrangement, all sediment in every part of the steam or water passages or chambers of the generator will be automatically assembled at one point in the generator, where the same may be readily and quickly removed. Our generator is the first ever constructed that is absolutely flexible and is not affected by the weaving of the vehicle.

Statements we have made herein are all taken under the worst conditions and are not made under normal operation of the car. Therefore, the power plant is fully adequate for any and all circumstances or condition under which it may be placed to operate. Under normal conditions this insures us more than satisfactory results. The CROSSLAND STEAM CAR will show a very much lower cost per mile than can be obtained from any internal combustion motor vehicle

(Continued on Page Eleven)

SPECIFICATIONS.

Body—
Perfect Stream Line.

Color—
Body, hood and wheels, Marshall Field Green; black mud guards.

Upholstery—
Genuine grain leather, black, hand buffed. Curled hair stuffed, inclined cushions, 10½ inches deep.

Top—
One man type, with instant curtains. Plate glass window in rear curtain. Curtains open with doors.

Windshield—
Slanting, our own design; single glass with rain vision shield; ventilating type.

Lights—
Large headlights with dimmers below reflected to road. Dash and tail-light. Auxiliary light with long cord. Delco generator and Utility storage battery.

Horn—
Two tone electric. Under hood. Button above quadrant on steering post.

Steering gear—
Worm and Gear type. Warner design.

Wheel base—
131 inches with standard 56 inch tread.

Wheels—
32 x 4½, Houk Wire Wheels, Vanadium Steel Spoke construction. Artillery wood type optional.

Tires—
Mason Cord, rib tread front, anti-skid rear, 33 x 5 oversized.

Springs—
Semi-elliptical front and rear with reversible Shackel which carries entire load on the Springs and not on the shackel, insuring wonderful riding qualities, our own special design and construction.

Frame—
Channel section pressed steel 7 inches deep with six extra heavy supporting cross-members.

Front Axle—
Standard Timken Heavy Duty. Over-sized for weight of car.

SPECIFICATIONS.

Rear Axle—
Standard Timken Extra Heavy Duty. Our own design differential and housing.

Brakes—
Two. Expanding and contracting, 14 inch drum.

Engine—
Two cylinder, 5 x 4 double acting. Uni-flow type; bolted in Unit with rear axle and geared direct with differential ring gear.

Boiler—
Standard Crossland design, Water tube, sectional. Positive water circulating type, with Superheater combined.

Burner—
Standard Crossland design. One, three and five battery construction assuring the greatest economy, atomizing type operating on 2 to 4 pounds pressure.

Fuel Tank—
At rear of car; 22 gallon capacity. Kerosene fuel.

Water Tanks—
Suspended under car on frame. 25 gallon capacity in cold water tank. 11 gallon capacity in hot water tank, perfectly insulated preventing any possibility of freezing. Self cleaning. Our own design.

Pumps—
Long stroke, steam driven. With auxiliary pumps for extreme emergencies. Our own design.

Condenser—
Our own special design suspended under the car. Having an area for condensation equal to 16 times the largest radiator construction. Sufficient for 800 miles running on one filling of water tank.

Air Tank—
Suspended along channel of frame.

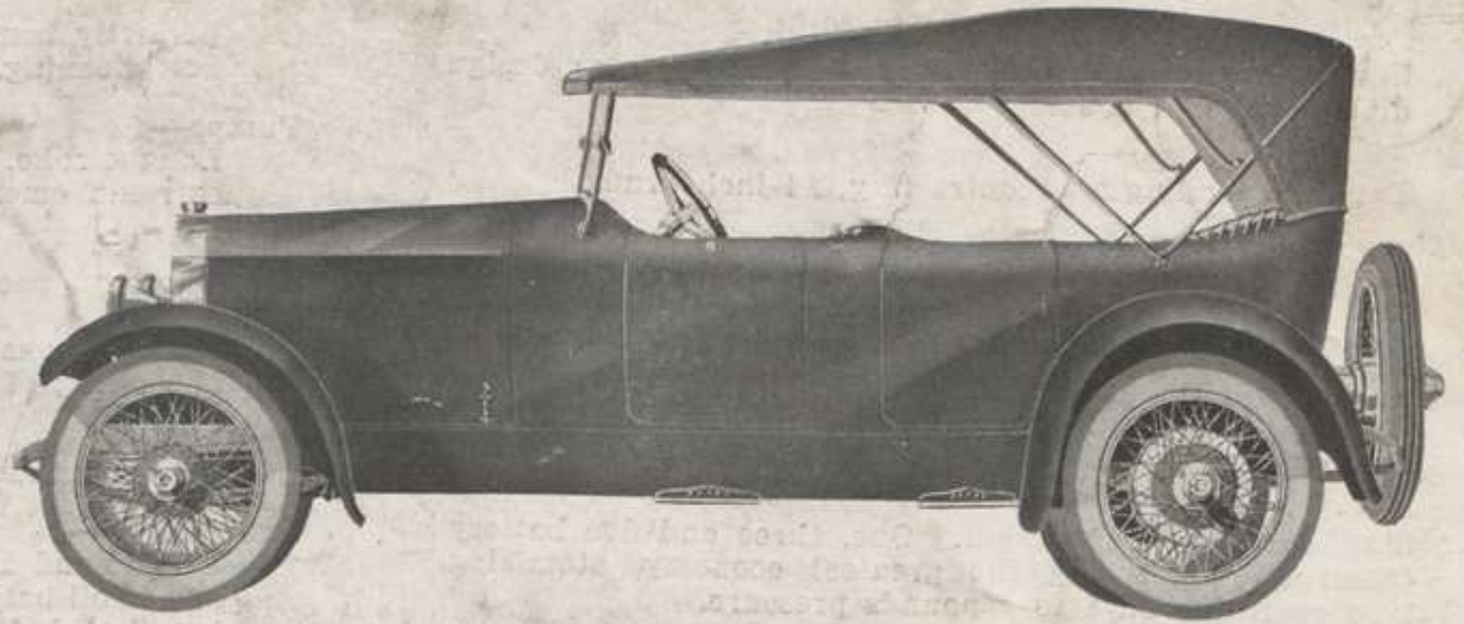
Lubrication—
Engine and differential assembly enclosed in one unit and run in oil bath. Cylinders lubricated from pump supplied by oil tank from under seat.

Instrument Board—
Steam gauge; fuel gauge; water gauge; oil sight feed; Ammeter; Stewart Warner Speedometer; and 8 day Standard clock.

THE DRAGON.

(FIVE AND SEVEN PASSENGER)

This model carries the same perfection of grace that predominates in the Crossland Product, combined with sturdiness, flexibility and instantaneous exhilaration. Careful attention has been given to color schemes in upholstery and paint, which offers perfect harmony.



CROSSLAND STEAM CAR

Designed by Harry Crossland Pfaff.

of equal size now in use. Taking into consideration the weight of our car, the balance and the power impulse of our engine, we should get eighteen miles on the minimum to a gallon of Kerosene, which in itself is a big item of economy. We are more economical in the consumption of fuel than any steam car on the market. We are lighter in weight, more modern in design, and our argument being, we have developed this car with a scientific knowledge of the elements we are using, which has not been true of any steam development to date.

We have 121 square feet of heating surface which is practically double the amount of any competitive Steam Car to one gallon less of water, which insures us twice the steaming capacity and instantaneous generating of steam.

Steam, known by every engineer in the universe to be the greatest power we have, and something that is really tangible, something permanent, with every obstacle of the internal combustion engine eliminated, superior power, less complication, absolute simplicity in its every detail, wonderful economy, entire loss of vibration. The effect of its operation is identical with the smoothness of an electric vehicle, only steam has about thirty times more stored up power or energy than the electric battery has. The internal combustion engine develops its maximum power at a certain number of revolutions. After it has reached this peak, it lops off in power. This is not true of Steam as the more you run and the harder you pull the more power you develop. The present day steam cars cannot operate faster than 30 to 35 miles an hour all day long and maintain steam. In our boiler we can operate at 70 miles an hour and maintain our steam indefinitely.

One of the big faults of the present day steam car is their inability to pump sufficient water on grades to maintain steam. We pump on the level more water than competitive steam cars and have auxiliary pumps for steep grades and hills that operate at ten times engine speed to maintain a water level in this extreme emergency. We do not drive our pumps or electric generator off of our rear axle as do competitve steam cars, but drive off of our drive shaft, which is the proper place. Our water tank is so constructed

THE GREYHOUND.

(TWO AND THREE PASSENGER)

The owner of this model can be justly proud. It boasts of perfect symmetry in design, it is in a class by itself. The soft deep cushions offer luxurious comfort, combined with speed—Unsurpassed.

(Closed models will offer entirely new and distinct lines, which are exclusive features found only in the Crossland.)

CROSSLAND STEAM CAR

Designed by Harry Crossland Pfaff.

that its action is identical with a cream separator, eliminating the complication. In other words, we can remove all sediment and deposits therein so that it cannot again get to the boiler in the event that it should pass through into the condenser.

There are numerous features in the car itself which should be seen in order to be appreciated. We have endeavored in the building of this power plant to eliminate the complications that have existed in the steam car to date by making it absolutely fool-proof and automatic in every respect, and not depending on one automatic action, but on several in the event that one should fail. Our boiler is so constructed that it is in numerous sections and is removable in about twenty minutes, put it in the back seat and you can be on your way, and you can do this with half of the boiler and still have sufficient steaming capacity to carry you wherever you want to go. This is not true of competitive cars, which means that if you get a collapsed tube you lay up the entire car to have it fixed as it is not removable.

It is utterly impossible to burn out your boiler in the CROSSLAND STEAM CAR, as when your water reduces its water level below normal your fires go out automatically and it is impossible to light them again until you have replenished with water.

We have decided to build the CROSSLAND STEAM CAR within a range of price from $1,000.00 to $2,650.00. In this price-class this will put us absolutely alone in the Steam field. Think what that means! We do not use a radiator —but put a dummy on the car merely to keep from deviating from the usual in automobile design, as some peculiar front end would, in our opinion, be a sales resistance, and our design will keep away from this error.

In the design of the CROSSLAND STEAM CAR Mr. H. Crossland Pfaff has produced an absolutely new and destinctive creation which has been pronounced sensational in the Automobile Industry.

POINTED PARAGRAPHS OF FACTS.

Big business has been the great factor in the world's progress. It is an easy matter to trace the development of it. Large scale production began with the invention of the *Steam Engine*. Before that period, business was local. Your shoes were made by the neighborhood shoemaker; your furniture was made by a local cabinet maker. But *Steam* enabled these articles and all others to be manufactured in quantities. Business began to spread. *Steam* applied to the Locomotive was the next step. That afforded the means of distribution which made *Steam* the cause of big business reaching over the entire world.

Stop a moment and think! What would our Railroads do without *Steam?* The superiority of its power is manifest in our largest institutions; without it they would be entirely useless. What about our Ocean Liners? Think of is magnitude. The world and its millions depend entirely upon it. It is—

"The Pulse of the Universe"

The Universe Lighted and Moved by Steam.

Myriads of people to be whirled daily to and from their work and play—by Subway, Elevated and Surface Lines. Cross Country travel by the *Hundred Thousands.*

Offices, Shops and Homes by the *Millions*, Leagues of Streets, a Skyful of Electric Signs—*to be lighted.*

ALL BY STEAM

THE POWER THAT MOVES THE WORLD.

"From nothing per mile to the limit of your nerve."

No human dare open the throttle for five minutes to its limit.

The CROSSLAND STEAM CAR. The most Powerful, the most Economical, the Fastest and the Slowest car in the world.

The cost of mechanical upkeep will be, not to exceed 1/10 that of a high grade Gasoline Car.

HISPANO SUIZA

Il a été tiré de cet Album
500 exemplaires
numérotés de 1 à 500

Exemplaire

N° 319

offert par la Sté Française Hispano Suiza à

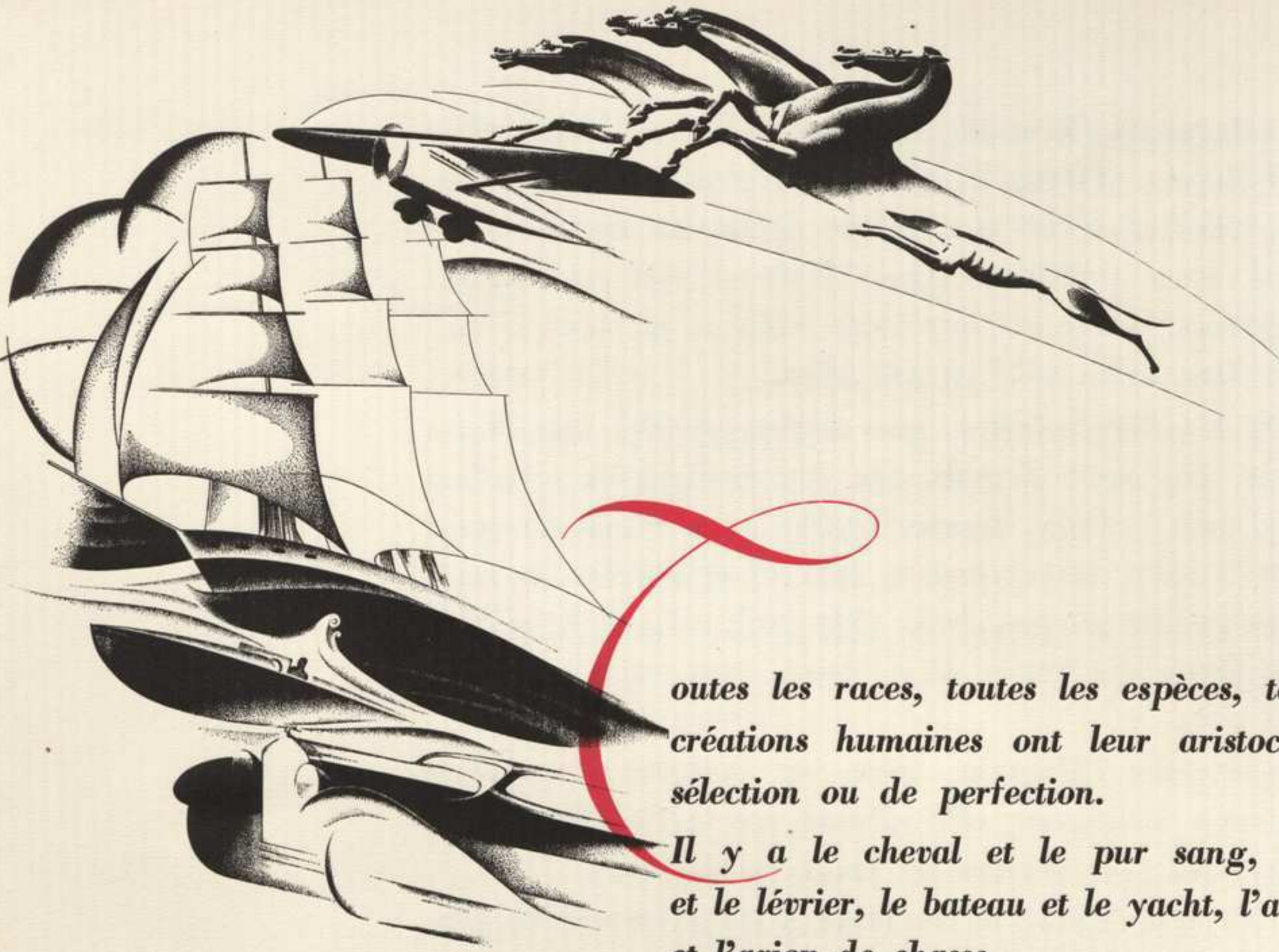
M

HISPANO SUIZA

il y a

l'Hispano Suiza et puis,

...il y a des automobiles



outes les races, toutes les espèces, toutes les créations humaines ont leur aristocratie de sélection ou de perfection.

Il y a le cheval et le pur sang, le chien et le lévrier, le bateau et le yacht, l'aéroplane et l'avion de chasse.

Il y a de même l'automobile et l'Hispano Suiza.

Car la mécanique elle aussi peut être de Race. L'automobile peut s'affirmer robuste, pratique, confortable, économique, qualités qui font d'elle une esclave docile, un bon outil de travail, le moyen pratique de se déplacer pour se distraire ou gagner sa vie.

Il est indispensable qu'il en soit ainsi.

Mais l'automobile n'offre pas seulement des avantages pratiques, elle peut devenir une source de joies sportives et de plaisirs raffinés, passer de l'utile au luxe, du rang d'esclave à celui de compagne, être la satisfaction de ceux qui ne se contentent pas de la série mais exigent la qualité rare, la classe, les lettres de noblesse, pour tout ce qui les entoure.

A ceux-là seuls l'Hispano Suiza est destinée. Compagne de l'homme intelligent, elle affirme son goût, défend son prestige, rend plus intenses ses émotions sportives.

Seule l'Hispano Suiza fait connaître à ses passagers les joies pures de la vitesse dans le confort, la sécurité, le silence.

Tenir le volant d'une Hispano Suiza c'est exalter sa conscience de vivre en beauté, c'est sentir sa volonté amplifiée par une machine de race, nerveuse, souple, rapide, faire corps avec un chef-d'œuvre mécanique qui surpasse la mécanique et procure la légitime fierté que donne la possession d'une œuvre d'art.

L'Hispano Suiza, c'est, à une époque de progrès scientifique durement imposé au monde, la machine hautement représentative du génie humain, parce que créée avec l'amour de la perfection et la coûteuse recherche de l'art.

Au Gotha de l'automobile, l'Hispano Suiza est Reine.

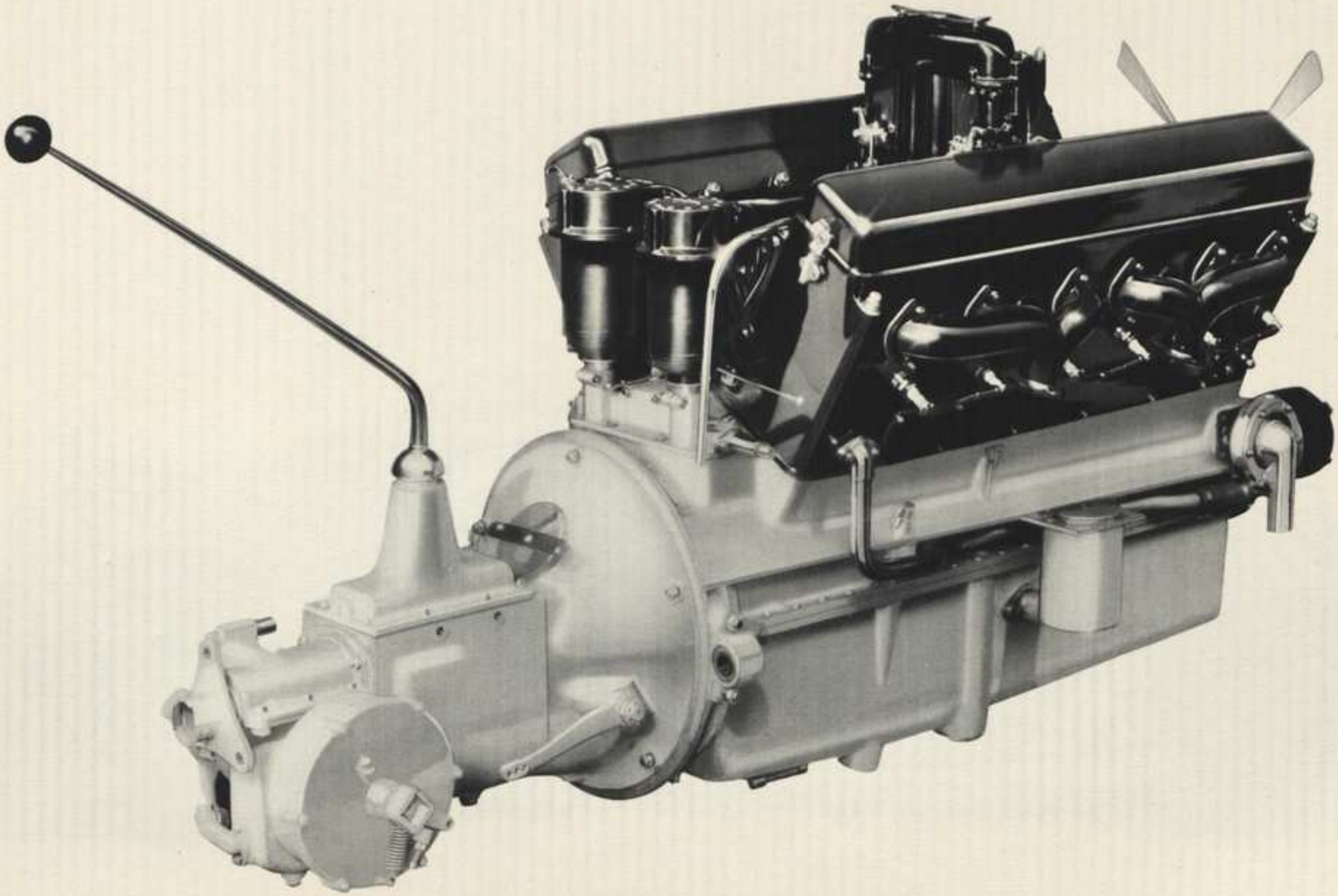
TOUS LES CHASSIS HISPANO SUIZA
sont garantis pendant 3 ans.

CARACTÉRISTIQUES DES CHASSIS 54 CV, 12 CYL.

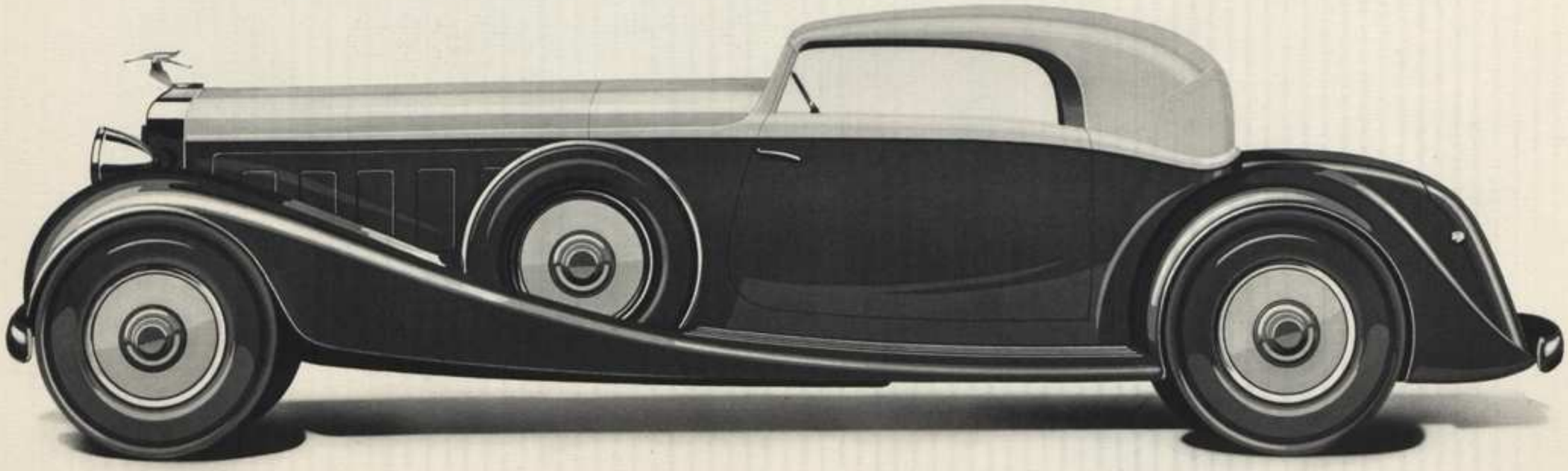
	CHASSIS LONG	CHASSIS NORMAL	CHASSIS LÉGER	CHASSIS COURT
Longueur totale du châssis ..	5 m. 149	4 m. 949	4 m. 860	4 m. 560
Voie	1 m. 500	1 m. 500	1 m. 450	1 m. 450
Empattement..	4 m. 009	3 m. 810	3 m. 710	3 m. 420
Emplacement de carrosserie..	3 m. 086	2 m. 890	2 m. 705	2 m. 405
Entrée de carrosserie.	2 m. 290	2 m. 190	1 m. 985	1 m. 685
Poids du châssis	1.580 kgs	1.570 kgs	1.410 kgs	1.400 kgs

LE MOTEUR 54 CV, 12 CYL.

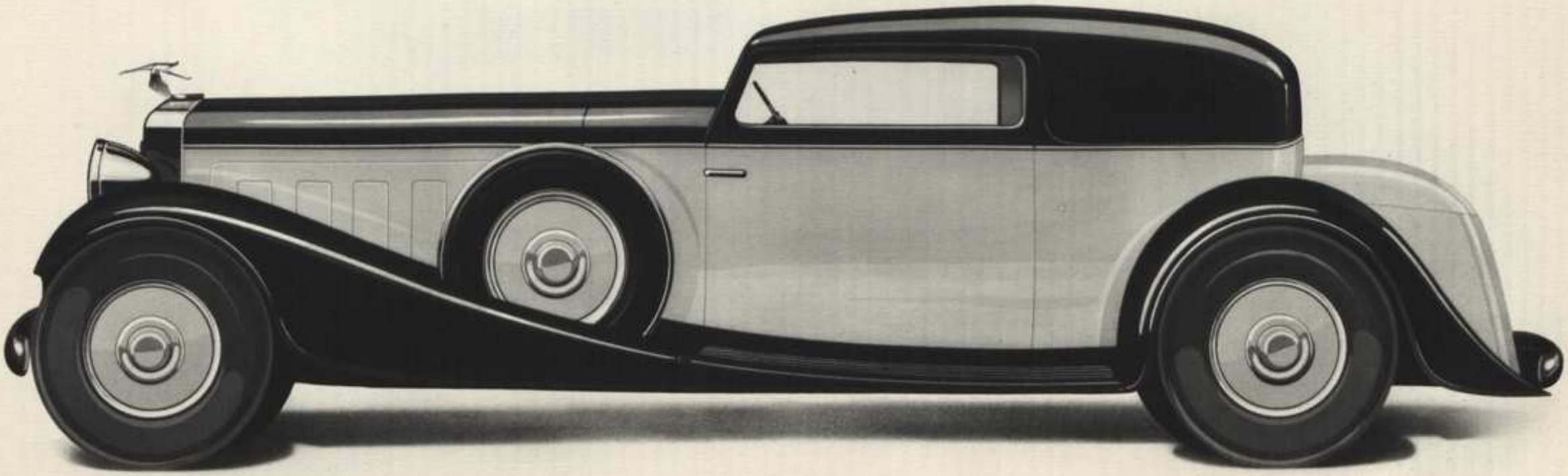
100×100 m/m



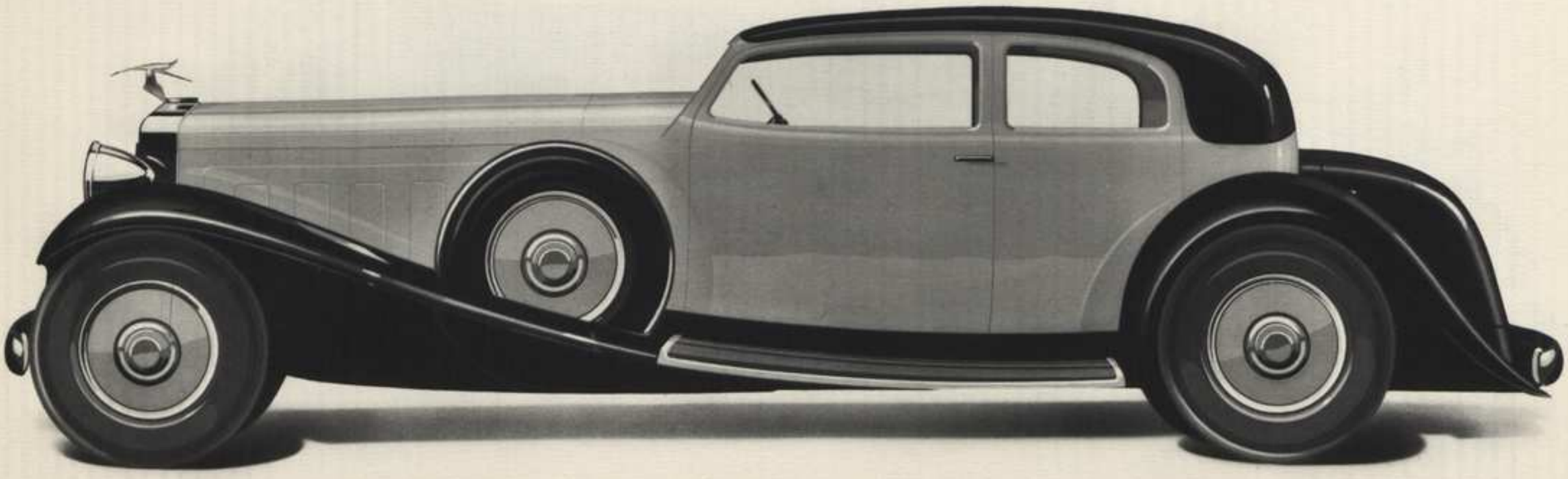
CABRIOLET 3 PLACES
Sur châssis 54 HP court.
CARROSSERIE MILLION GUIET



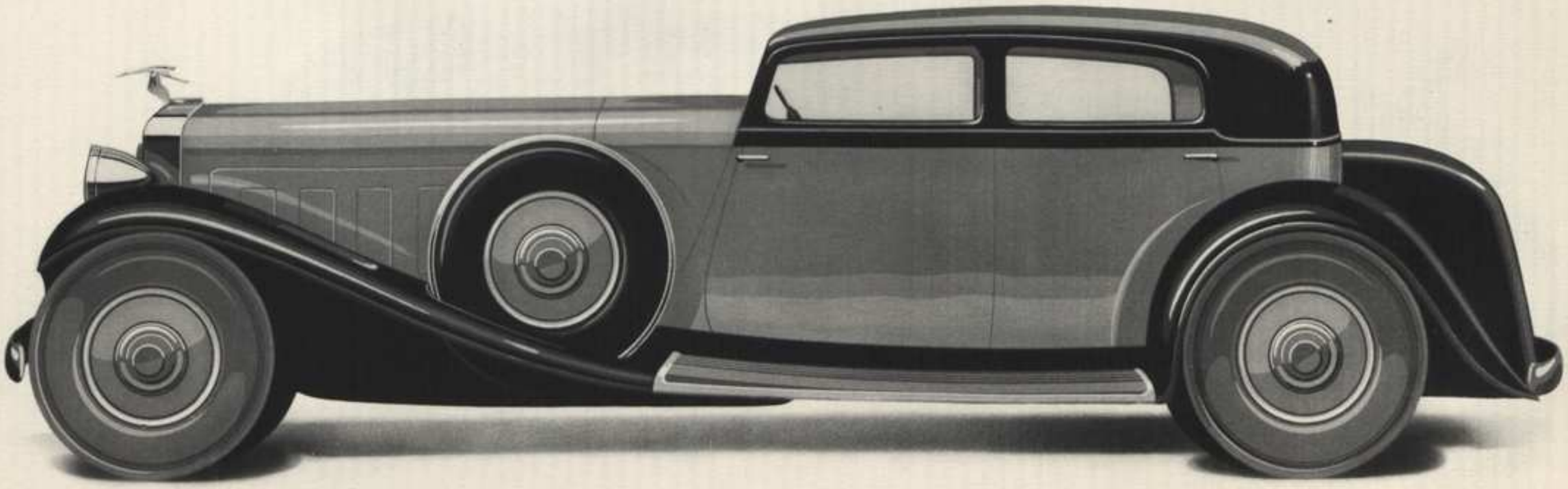
FAUX-CABRIOLET 5 PLACES
Sur châssis 54 HP léger.
CARROSSERIE KELLNER



CONDUITE INTÉRIEURE 5 PLACES
Sur châssis 54 HP léger.
CARROSSERIE VANVOOREN



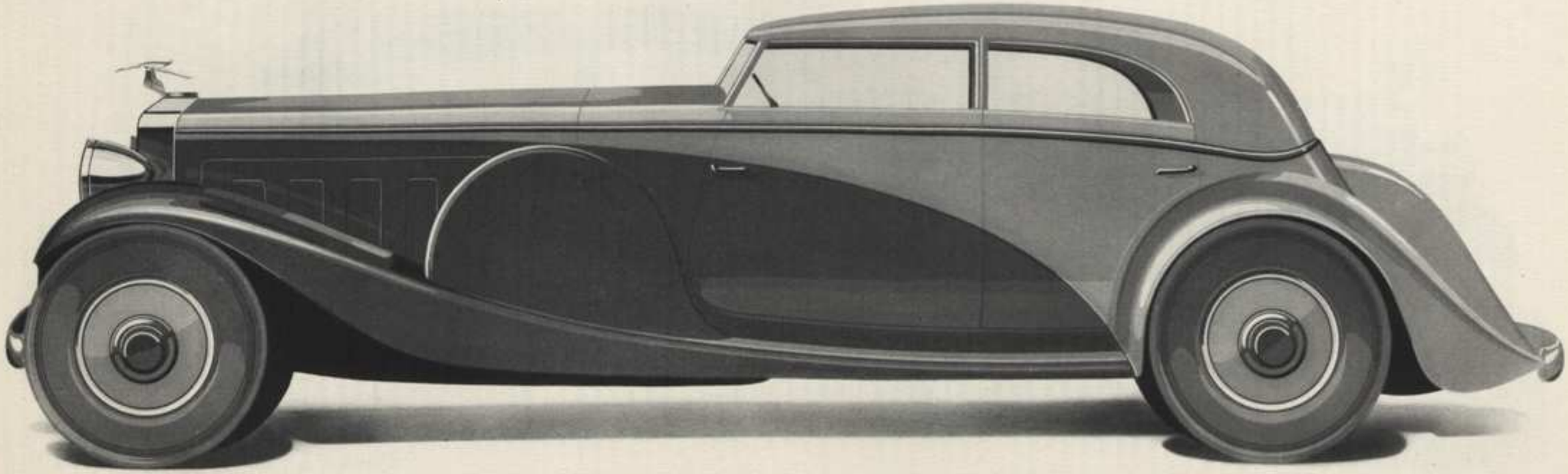
CONDUITE INTÉRIEURE 5 PLACES
Sur châssis 54 HP léger.
CARROSSERIE BINDER



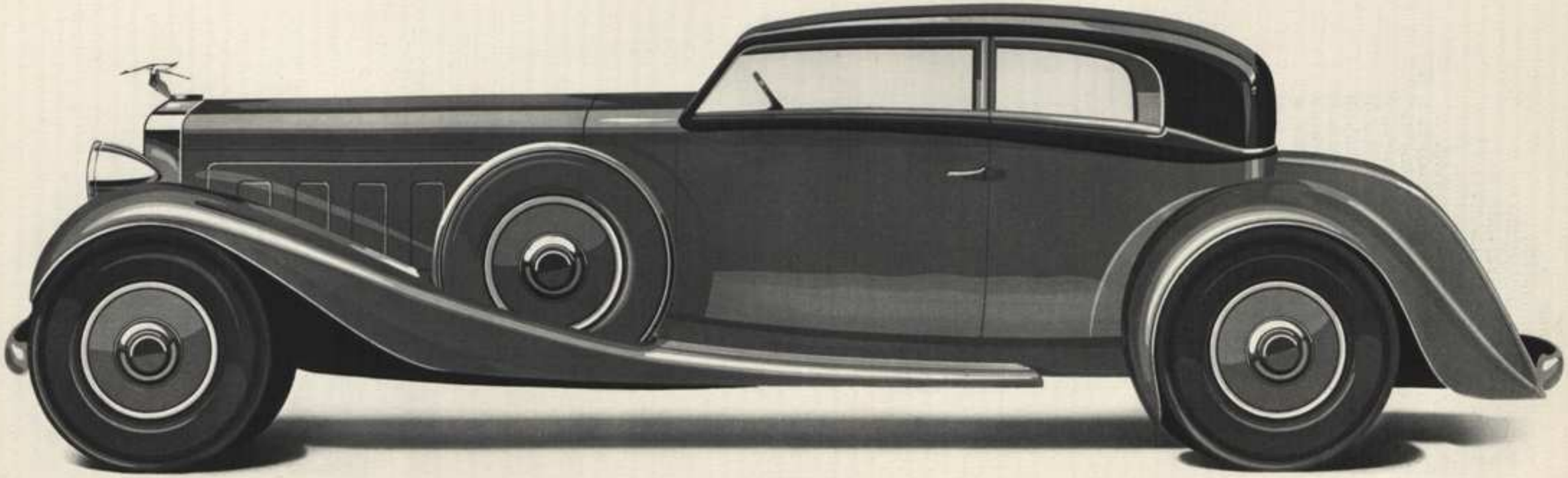
CARROSSERIE AÉRODYNAMIQUE 5 PLACES

Sur châssis 54 HP léger.

CARROSSERIE FRANAY



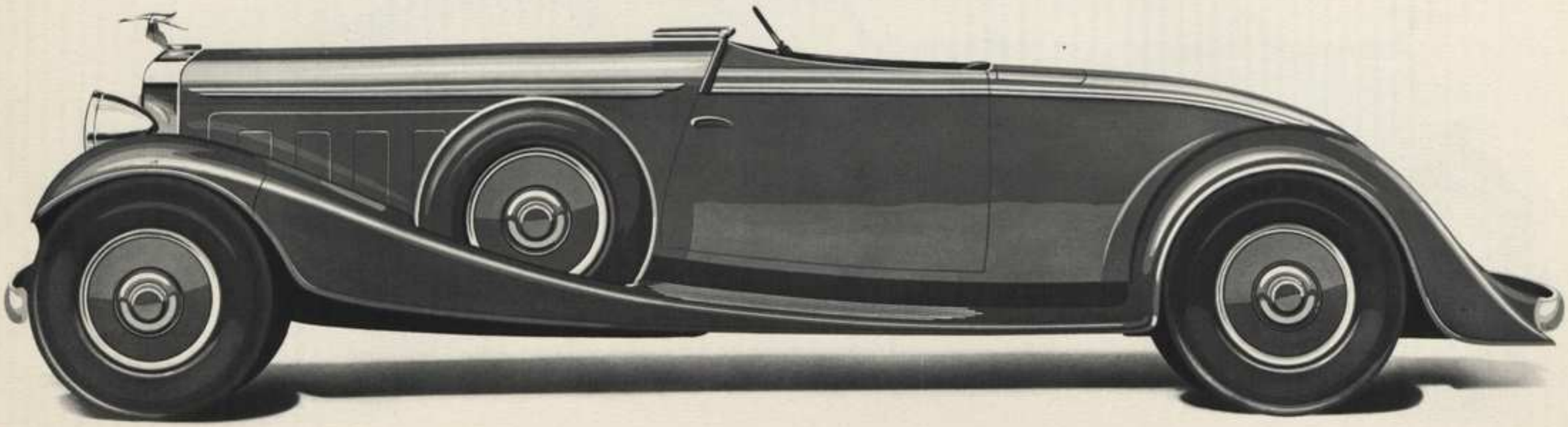
CONDUITE INTÉRIEURE TRANSFORMABLE 5 PLACES
Sur châssis 54 HP léger.
CARROSSERIE SAOUTCHIK



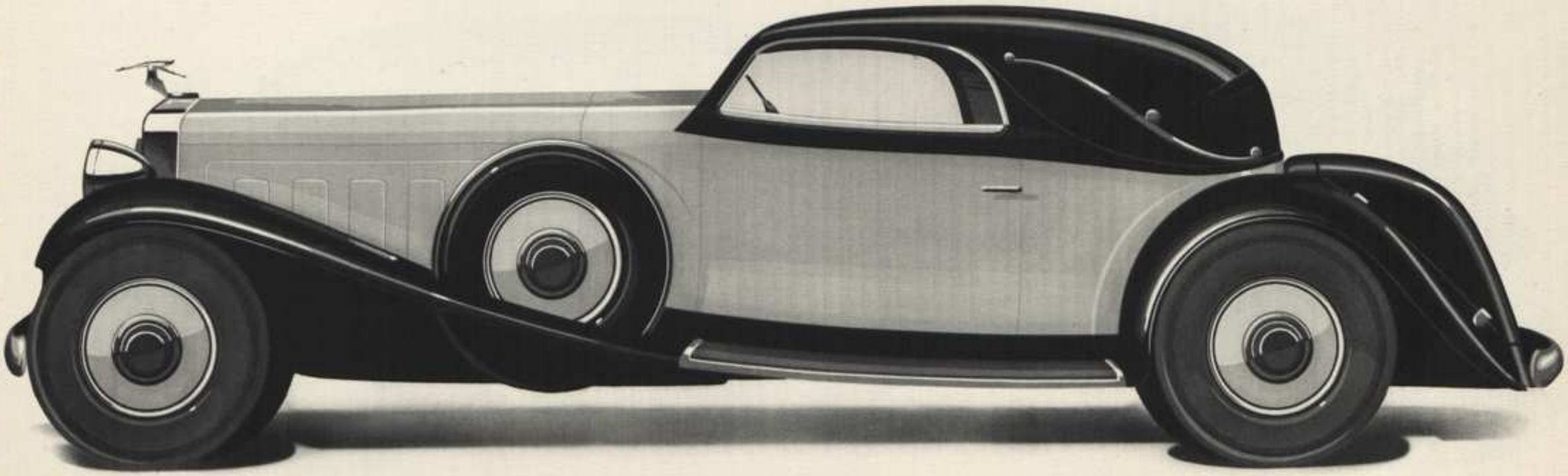
ROADSTER A CAPOTE DISSIMULÉE 3 PLACES AVANT

Sur châssis 54 HP normal.

CARROSSERIE FERNANDEZ



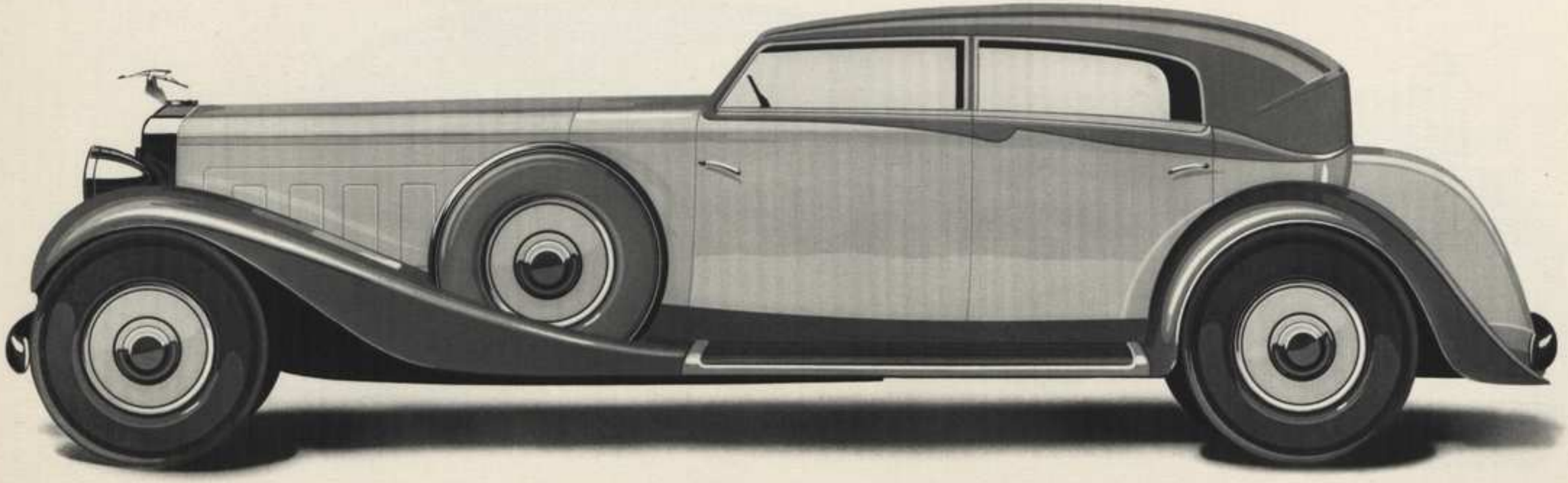
CABRIOLET 5 PLACES
Sur châssis 54 HP normal.
CARROSSERIE VANVOOREN



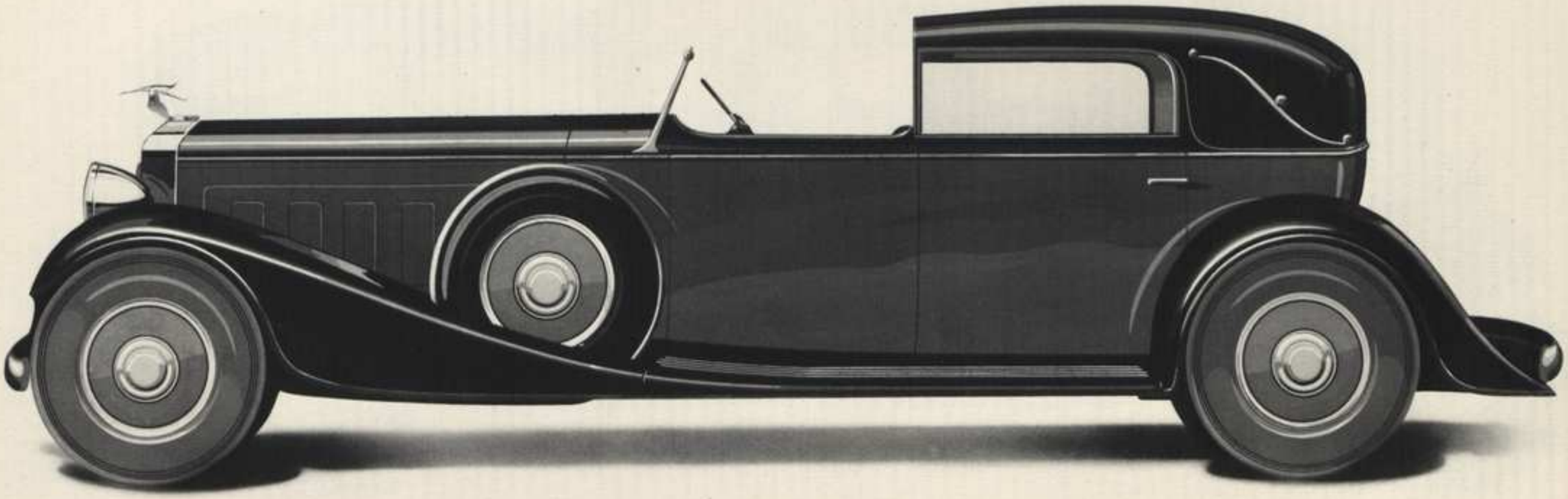
CONDUITE INTÉRIEURE TRANSFORMABLE 5 PLACES

Sur châssis 54 HP normal.

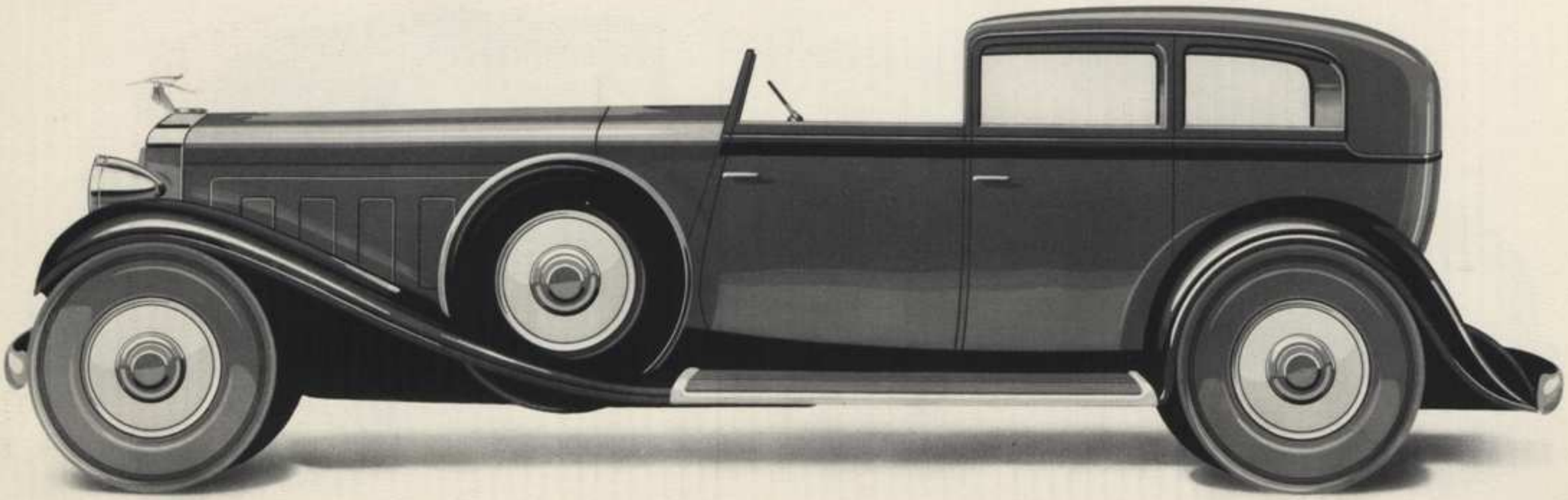
CARROSSERIE SAOUTCHIK



CABRIOLET 4 PLACES INTÉRIEURES
Sur châssis 54 HP normal.
CARROSSERIE KELLNER



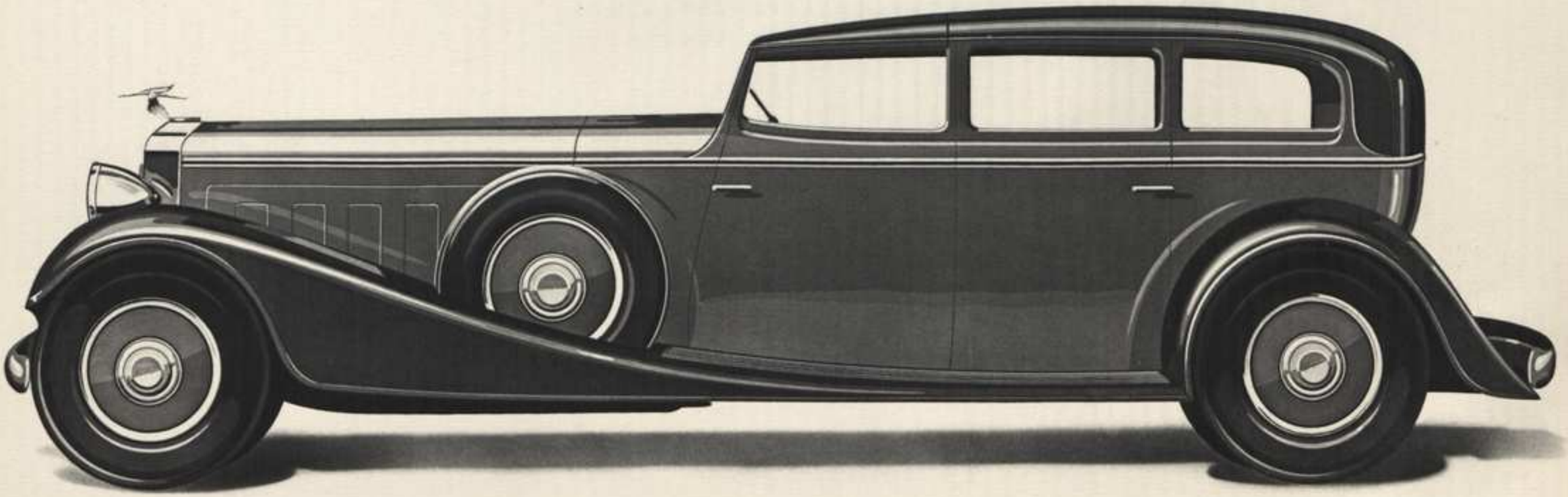
COUPÉ LIMOUSINE 7 PLACES
Sur châssis 54 HP normal.
CARROSSERIE BINDER



COUPÉ LIMOUSINE 7 PLACES - AVANT EXTENSIBLE

Sur châssis 54 HP long.

CARROSSERIE LETOURNEUR & MARCHAND



SOCIÉTÉ FRANÇAISE HISPANO SUIZA

USINES ET BUREAUX :

Rue du Capitaine-Guynemer, à BOIS-COLOMBES

R. C. Seine 211.048 B

MAGASIN D'EXPOSITION

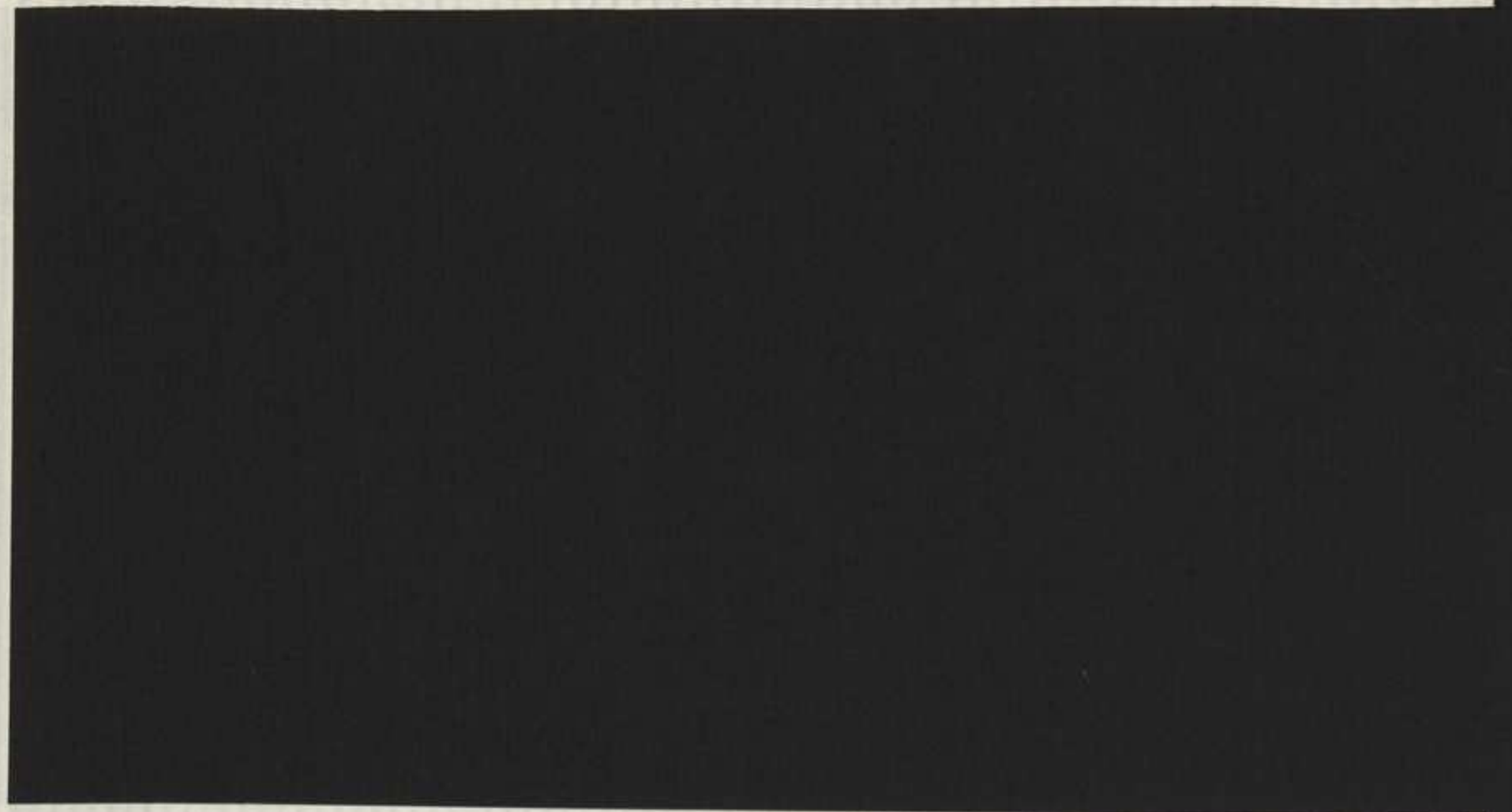
150, Avenue des Champs-Élysées, PARIS

Téléphone : ÉLYSÉES 55-02, BALZAC 47-59

R. C. Seine 255.140 B

DRAEGER, IMP.

ESSENTIAL



ESSENTIAL

DRAEGER FRÈRES
IMPRIMEURS S.

RELIURE
"PLASTIC"
BREVETÉE
S. G. D. G.