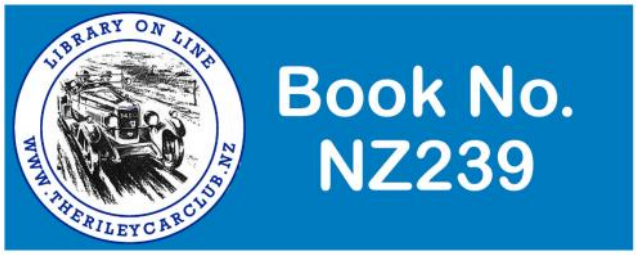
P. OLYSLAGER MOTOR MANUALS 30

RILEY

ONE - POINT - FIVE

SALOONS FROM 1957



Handbook for the

RILEY

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SALOONS

from 1957

PIET OLYSLAGER MSIA MSAE

Contents

SPECIAL NOTE

Although every care is taken to ensure accuracy and completeness in compiling this book, no liability can be accepted for damage, loss or injury caused by any errors or omissions in the information given.

Preface

THE PIET OLYSLAGER MOTOR MANUALS have been known to Continental motorists and garages for ten years and have proved their worth many times over. We consider that they are unique in their compact completeness and contain all the information needed to service, maintain and repair all makes of cars.

The manuals are presented in two forms in the English language, in these handy small books covering individual models and in cumulative loose-leaf form keeping abreast of all alterations and developments.

These two services set out to cover all that a motorist or garagemen needs to know to get the best out of motoring, and the series will eventually cover all popular makes of cars in the world.

The manuals were described, after considerable research by the International Commission on Automobile Documentation, as 'The best automobile documentation so far in the world'.

We are grateful to the manufacturers for their kind and enthusiastic co-operation in the production of this manual.

Fig. 1. Riley 1.5, four-door Saloon, 1957-1960

Fig. 2. Riley 1.5, four-door Saloon, 1960-1961

RILEY 1.5 | SALOONS from 1957

General

INTRODUCTION

The Riley One-Point-Five was introduced in November 1957, as a four-passenger saloon of compact dimensions.

The body is of all-steel unit construction, with four doors, and traditional Riley radiator shell.

The engine is the BMC 'B' series power unit, fitted with twin SU carburettors.

The drive line consists of a hydraulically-operated single dry-plate clutch, a four-speed gearbox with remote control and a hypoid rear axle.

Front suspension is independent with torsion bars and rear suspension is conventional in lay-out with semi-elliptic leaf springs.

During subsequent years various detail modifications were introduced. See also under *Modifications* on page 5.

IDENTIFICATION

Engine number: The engine number is stamped on a metal plate fitted to the right-hand side of the cylinder block. The engine number is prefixed 15R–U–H or 15RB–U–H (15=1500cc, R or RB=Riley, U=central gear change, H=high compression). Starting engine number: 15R-U-H101.

Fig. 3. Riley 1.5, four-door Saloon, 1961-1962

Car serial number: On the first 150 cars this number is located on a plate secured to the left-hand side of the engine bulkhead. Thereafter it was located on the right-hand 'A' post (front door post). It is prefixed by the model identification symbol.

Serial numbers for identification:

November 1957 (starting)	501
January 1958	945
January 1959	6220
January 1960	16280
January 1961	23940
January 1962 (R/HS2)	617

Model identification symbols:

Early type Riley 1·5 saloons had a symbol of three letters and two figures. Example: VAT 13. This symbol is also used as a prefix for the car serial number.

Explanation of symbol (early models):

First letter: make and type (Riley 1·5)

Second letter: body type (A=four-door saloon)

Third letter: body colour (A=black; B=light grey; C=dark red; D=dark blue; E=mid green; F=beige; G=brown; H=CKD finish; J=dark grey; K=light red; L=light blue; P=ivory; R=white; S=mid grey; T=light green; U=dark green)

First figure: Class of vehicle (1=rhd, Home market; 2=rhd, export; 3=lhd; 4=North America; 5=CKD-rhd; 6=CKD-lhd)

Second figure: indication of paint used for finish of car (1=synthetic; 2=synobel; 3=cellulose; 4=metallic; 5=primed; 6=cellulose for body, synthetic for wings)

Later models use the standardized BMC model identification symbol system, here R/HS2. The letter L is added to it if the car is fitted with left-hand drive.

Explanation of symbol (later models):

R = Riley
H = Engine group (1400–1999cc cubic capacity)
S = Four-door saloon
2 = Model series, used to record major changes
L = Left-hand drive (if applicable)

Body number: The body number is stamped on a plate on the left-hand side of the engine bulkhead, under the bonnet. On the first 150 cars this number is stamped on a plate which is secured to the centre of the bulkhead.

Gearbox number: This number is stamped on the top of the gearbox, adjacent to the extension joint.

Rear axle number: The rear axle number is stamped on the front of the axle housing, adjacent to the left-hand spring seat.

MODIFICATIONS

For modifications of a purely technical nature, see under *Repair data.*

1959 (April) From serial number 10701 larger tyres are fitted: 5·60—14 instead of 5·00—14.

1960 (May) Exterior chrome bonnet and boot hinges replaced by concealed hinges. Full-width parcel shelf below facia panel. Modified camshaft and combustion chambers. Lengthened engine oil dipstick (from serial number 18122).

1961 (October) 1962 models introduced with the following changes:
Front torsion bar settings lowered and new rear spring mountings to reduce overall height (by $\frac{7}{8}$ in at front, $\frac{1}{2}$ in at rear).
Jacking brackets re-located and strengthened; new type of jack.
Modified front side grilles, incorporating sidelamps and direction-indicator flashers.
New tail/stoplamp units.
New interior trim styling and interior and exterior colour schemes.
Modified front seats and increased headroom in rear compartment; front seats fixed to floor.
Safety-belt anchorages for front seats standard equipment.
Modified gearbox with involute-splined mainshaft, more durable second and third speed mainshaft bushes and stronger selector detents.

PRICES

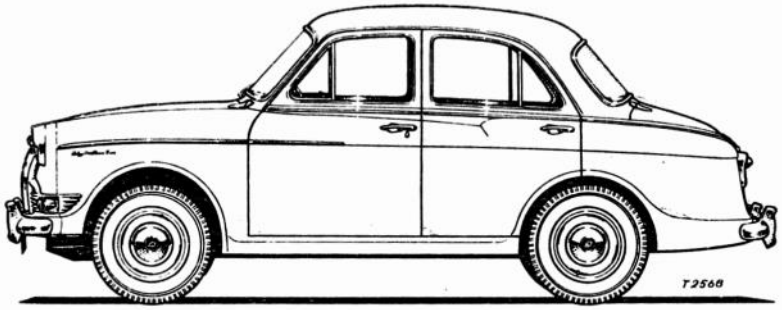


Fig. 4. Riley 1.5 Saloon, 1957-1960

UK, 1957 (November) £863,17.0 (£575 basic+£288.17.0 P.T.)
1958 (January) £863.17.0 (£575 basic+£288.17.0 P.T.)
1959 (January) £863.17.0 (£575 basic+£288.17.0 P.T.)
1960 (January) £815.14.2 (£575 basic+£240.14.2 P.T.)

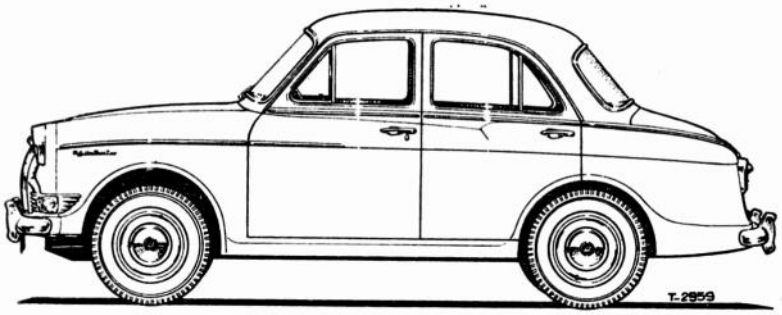


Fig. 5. Riley 1.5 Saloon, 1960-1961

UK, 1960 (June) £815.14.2 (£575 basic+£240.14.2 P.T.)
1961 (June) £815.14.2 (£575 basic+£240.14.2 P.T.)

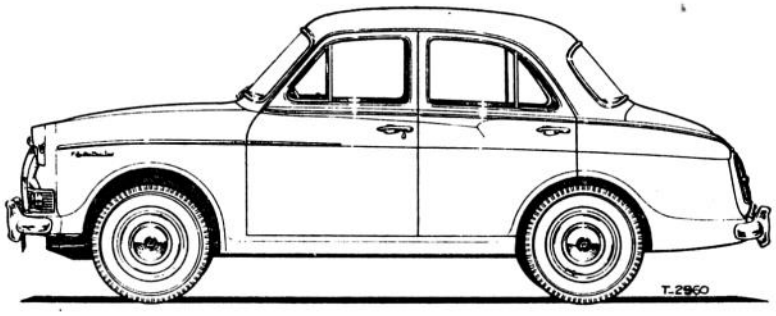


Fig. 6. Riley 1.5 Saloon, 1961-1962

UK, 1961 (October) £847.1.5 (£580 basic + £267.1.5 P.T. and Surcharge)
1962 (February) £847.1.5 (£580 basic + £267.1.5 P.T. and Surcharge)

UK, **Accessories (1961–1962):**

Cigarette lighter	£1.8.5
Exhaust deflector	£0.15.9
Exterior sun visor (Perspex)	£7.7.0
Reverse lamp, with switch	£3.0.0
Wheel trims (set of four)	£5.19.6
Wing mirrors, each, from	£1.2.6
Radiator blind	£4.0.0

NOTE: The above prices are without fitting charges.

INSTRUMENTS AND CONTROLS

Key to Fig. 7.

1 Glove box
2, 3 Temperature control, air intake control and blower switch. NOTE: On earlier models these controls were situated on either side of the central instrument panel (if heater fitted)
4 Loudspeaker (if fitted)
5 Choke control
6 Starter switch
7 Main beam warning light
8 Mileage recorder
9 Trip recorder
10 Speedometer
11 Fuel gauge
12 Oil pressure gauge
13 Water temperature gauge
14 Spare switch
15 Ignition warning light
16 Engine rev counter
17 Ignition switch
18 Panel light switch
19 Light switch
20 Windscreen-wiper switch
21 Windscreen washer control
22 Bonnet release
23 Gear pattern
24 Radio (if fitted)
25 Dip switch
26 Clutch pedal
27 Brake pedal
28 Gear lever
29 Accelerator pedal
30 Parking brake lever
31 Trip recorder resetting knob
32 Steering wheel
33 Horn button
34 Direction-indicator switch

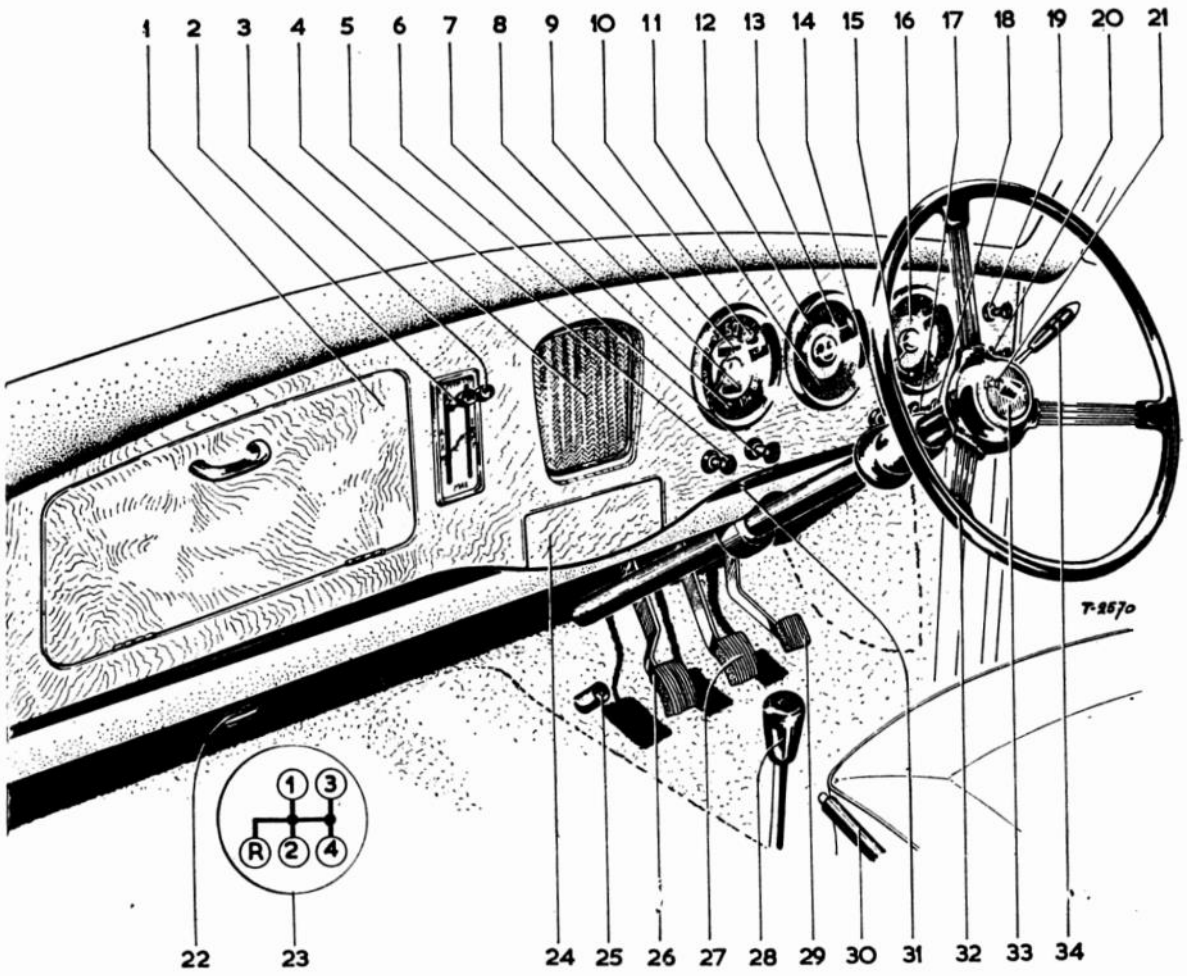


Fig. 7. Instruments and controls

ELECTRICAL EQUIPMENT

Lucas 12-volt battery 58 Ah (at 20-hour rate), positive (+) terminal connected to earth.

Headlights with foot-operated dimmer switch; separate sidelights (on 1962 models combined with front direction-indicator flashers); rearlights, stoplights, reflectors and direction-indicator flashers combined in single units; rear number-plate illumination; non-glare instrument illumination; warning lamps for head-lamp main beam, ignition/generator and direction-indicators. Twin-blade, self-parking windscreen-wipers. Twin windtone horns. Interior light with independent and automatic switches operated by the front doors.

A radio is optional equipment. Heating and ventilating equipment is standard equipment.

BODY

All-steel four-door saloon body of unit construction, incorporating body shell, floor, bulkhead, frame members and wing valances. Front and rear bumpers with over-riders. Polished walnut veneer facia and door cappings. On later models full-width parcel shelf below facia. One-piece curved windscreen. Curved rear window.

Winding windows to all doors; hinged ventilating panels to front doors. Wind-screen-washer. Upholstery with foam-rubber seat cushion overlays on spring cases;

leather upholstery in duo-tone colour scheme with leather cloth on non-wearing parts. Twelve cu ft luggage compartment with—on later models—torsion bar assisted lift to lid.

COLOURS

A variety of single tone and duo-tone body colours has been available.

Body and trim colours for 1962 models are as follows:

Single tone:

Body	*Upholstery*	*Carpet*
Dove Grey	Cardinal Red	Cardinal Red
Damask Red	Dove Grey	Dark Grey
Arianca Beige	Golden Beige	Arianca Beige
Arianca Beige	Powder Blue	Powder Blue
Old English White	Cardinal Red	Cardinal Red
Old English White	Powder Blue	Powder Blue
Island Green	Golden Beige	Arianca Beige
Island Green	Chinese Green	Chinese Green
Florentine Blue	Powder Blue	Powder Blue
Bermuda Blue	Powder Blue	Powder Blue
Black	Cardinal Red	Cardinal Red

Duo-tone:

Body	*Upholstery*	*Carpet*
Pale Ivory/Arianca Beige	Golden Beige	Arianca Beige
Bermuda Blue/ Florentine Blue	Powder Blue	Powder Blue
Old English White/ Island Green	Chinese Green	Chinese Green

Road wheels aluminium.

Dimensions and Weights

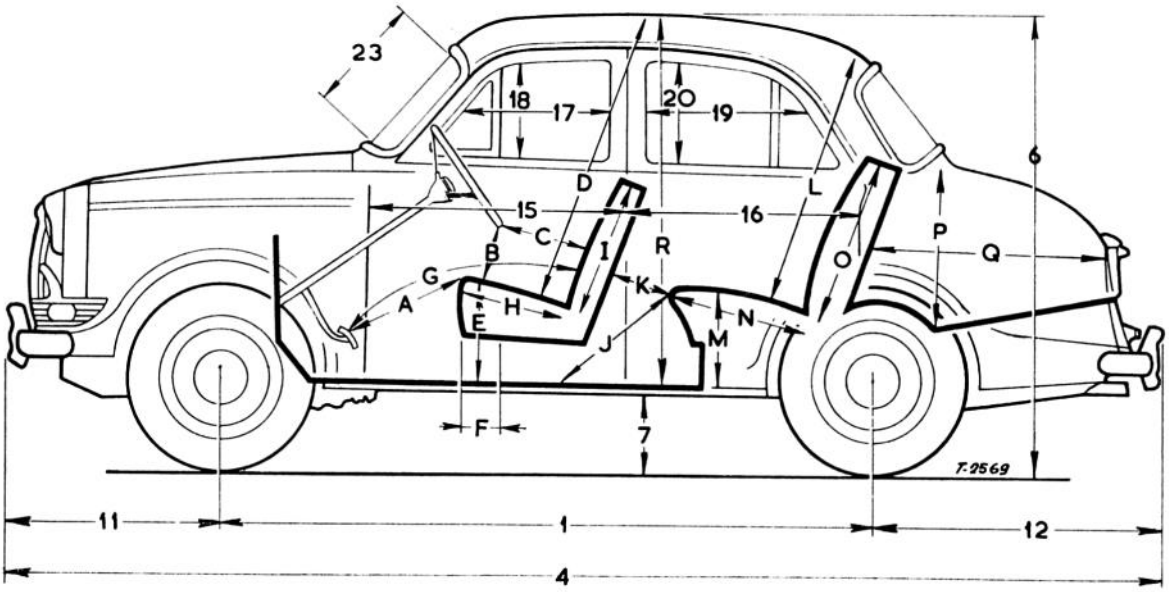


Fig. 8. Dimensions

EXTERIOR DIMENSIONS

		(*inches*)
1	Wheelbase	86
2	Track, front	50⅞
3	Track, rear	50 5/16
4	Total length	151¾
5	Total width	61
6	Total height	59¾
7	Ground clearance	6
8	Turning circle	34ft 3in
11	Overhang, front	27¾
12	Overhang, rear	38
15	Width of front door	34
16	Width of rear door	31
17	Width of front door window	19½
18	Height of front door window	12¾
19	Width of rear door window	22
20	Height of rear door window	13
23	Height of windscreen	15½
24	Width of windscreen	44
25	Height of rear window	12½
26	Width of rear window	43

NOTE: 1962 models are ⅞in lower at front, ½in at rear.

INTERIOR DIMENSIONS

		(*inches*)
A	Pedal to front of seat	14–19
B	Underside of steering wheel to seat	7
C	Steering wheel to front seat back-rest	11½–16½
D	Height over front seat	38
E	Height of front seat	12
F	Maximum adjustment of front seat	5
G	Pedal to back-rest of front seat	39½–44½
H	Depth of front seat	18½
I	Height of front seat back-rest	18¼
J	Leg-room, rear seat	21
K	Front seat back-rest to rear seat	5–10
L	Height over rear seat	39
M	Height of rear seat	15½
N	Depth of rear seat	17
O	Height of rear seat back-rest	21½
P	Height of luggage compartment	18
Q	Depth of luggage compartment	32½
R	Maximum interior height	46
W	Width of front seats, each	20
X	Width of rear seat	50
Z	Width of luggage compartment	38½

NOTE: Some interior dimensions of 1962 model are slightly different, due to modified seats and cushions.

WEIGHTS

	(*lb*)
1 Complete car, dry	1974
2 Complete car, ready for use	2060
3 Complete car, ready for use, with two passengers	2385
4 Complete car, ready for use, with four passengers	2710
5 Ratio of load on front and rear axle, ready for use	59/41

Technical Specifications

Figures in the following tables are based on measurements and weights according to the Imperial system, as used in Great Britain, i.e. the Imperial Gallon and the Long Ton. Figures in parentheses represent measurements and weights according to the American system, i.e. the US gallon and the Short Ton.

ENGINE

(1) Type:	water-cooled, four-stroke, pushrod-operated ohv engine in line
(2) Number of cylinders:	four
(3) Bore and stroke:	2·875×3·5in 73·025×88·9mm
(4) Piston displacement:	90·88cu in 1498cc
(5) Compression ratio:	8·3 : 1
(6) Total piston area:	25·9in

PERFORMANCE

(1) Maximum bhp:	68 at 5400rpm
(2) Brake mean effective pressure (bmep) at maximum torque rpm:	136lb/sq in
(3) Maximum torque:	83lb/ft at 3200rpm
(4) Compression pressure at cranking speed:	150lb/sq in
(5) Bhp per sq in piston area:	2·62
(6) Bhp per litre:	45·6
Bhp per cu in:	0·748
(7) Mean piston speed at 5400 rpm:	2586 ft/min

GEAR RATIOS

	Gearbox	*Overall*
First gear:	3·638 : 1	13·56 : 1
Second gear:	2·214 : 1	8·25 : 1
Third gear:	1·372 : 1	5·12 : 1
Top gear:	1·000 : 1	3·73 : 1
Reverse:	4·750 : 1	17·73 : 1

Rear axle ratio: 3·73 : 1 (11/41).
Tyre size: 5·60—14 (early models 5·00—14).

THEORETICAL ROAD SPEEDS

(Road speeds in mph, piston speed in ft/min)

	rpm	*1st gear*	*2nd gear*	*3rd gear*	*top gear*	*piston speed*
a.	1000	5·08	8·36	14·8	18·5	479
b.	3200	16·3	26·8	47·4	59·3	1533
c.	5400	27·5	54·2	80·0	100·0★	2586

b=rpm at maximum torque.
c=rpm at maximum power.

ROAD TEST

(1) **Maximum speed:** 87mph

(2) **Cruising speed:** 70–80 mph

(3) **Cruising range,** approximately: 250 miles

(4) **Speed in gears:**
Maximum speed in first gear: 29
second gear: 48
third gear: 75

(5) **Acceleration times** (through gears):
0–30mph: 5 sec
0–40mph: 8·5 sec
0–50mph: 12 sec
0–60mph: 19 sec
0–70mph: 26 sec

	in second gear	*in third gear*	*in top gear*
10–30mph:	5 sec	8·2 sec	—
20–40mph:	5·5 sec	8 sec	13 sec
30–50mph:	—	9 sec	13·1 sec
40–60mph:	—	11 sec	14·5 sec
50–70mph:	—	16 sec	18·5 sec

Standing quarter mile: 20·5 sec

(6) **Brake efficiency:**
Maximum from 30mph: 92% : 33ft stopping distance

(7) **Climbing power:** top gear: 1 in 12·7
third gear: 1 in 8·8
second gear: 1 in 5·5

(8) **Fuel consumption:** approximately 25–35mpg

(9) **Speedometer:** approximately 5% fast

★Theoretical value only.

Lubrication and Maintenance

RUNNING-IN SPEEDS

Do not exceed 45mph during the first 500 miles, and do not operate the engine at full throttle in any gear.

Do not overload the engine but change down to a lower gear in good time when necessary; avoid fierce acceleration.

GENERAL DATA

Engine:

Sump capacity: 7½ Imp pints (9 US pints), including 1¼ Imp pints (1½ US pints) for oil filter.

Oil viscosity: above 32°F (0°C): SAE 30 or 20W/30 or 10W/30.
32°F (0°C) to 10°F (—12°C): SAE 20W or 20W/30 or 10W/30.
below 10°F (—12°C): SAE 10W or 10W/30.

Oil dipstick: at right-hand side of engine.

Oil drain plug: at right-hand side of engine sump.

Oil filler cap: at front end of valve rocker cover.

Change oil when the engine is warm.

Engine oil filter: The oil filter is situated on the right-hand side of the engine crankcase and is of the full-flow type, with a felt-type element. Use element BMC Part No. 8G683 (AC AC32A, Fram CH814PL, Purolator MF. 21A/A (Micronic) or CE. 176A (felt), Tecalemit FG 2471).

Renew filter element at the same time as the engine oil is changed.

Wash filter casing in petrol and dry it thoroughly. Renew seating washer if necessary. Fill casing up with engine oil before reinstallation, during which the head of the fixing bolt should be held firmly against the bottom of the casing. Capacity: 1¼ Imp pints (1·4 US pints).

Air-cleaner: Oil bath type air-cleaner. When servicing the air-cleaner, wash the filter gauze in petrol or paraffin; drain and dry the gauze before refitting. Clean filter bowl and refill with fresh oil to level mark.

Cooling system: Capacity, including heater: 13 Imp pints (15·6 US pints). Pressurised cooling system; care should be taken when removing the radiator filler-cap. A thermostat is fitted under the water outlet of the cylinder head. The drain-cock for the cylinder block is located on the right-hand side of the block, at the rear. Remove the radiator filler-cap and move the ventilator control lever to the 'max' position, when draining the cooling system.

Frost precautions:

A minimum of 2½ Imp pints (3 US pints) of antifreeze should be used in winter. Use only antifreeze of the ethylene/glycol type, incorporating the correct type of corrosion inhibitor. The antifreeze should conform to Specifications B.S. 3151 or B.S. 3152.

NOTE: Since it is not possible to drain the cooling system completely when a heater is fitted, anti-freeze must be used to avoid frost damage in winter.

Water pump: In order to lubricate the water pump, temporarily remove the plug from the water pump housing. Lubricate sparingly with lithium-base grease. This supersedes previous instructions regarding SAE 140 or 140 EP gear oil.

Fuel tank: The fuel tank is situated at the rear of the vehicle. Capacity: 7 Imp gallons (8·4 US gallons).

Carburettors: Top-up the damper reservoirs (dashpots) periodically with SAE 20W oil to $\frac{1}{2}$in from the top of the piston rod.

Generator: Add two drops of light engine oil to the generator rear bearing through the hole in the rear end of the bearing plate.

Gearbox: To reach the combined oil filler and level plug, lift the floor covering on the left-hand side of the gearbox and remove the rubber plug from the floor.

NOTE: On early models the filler/level plug is reached from below the car. Clean area around plug before removing it and top-up if necessary to bottom of threads in filler-plug aperture, with engine oil SAE 30. The drain plug is at the bottom of the gearbox casing and the oil should be drained when it is warm. See also page $\frac{77}{88}$.
Oil capacity: early models 5 Imp pints (6·0 US pints)
later models 4$\frac{1}{2}$ Imp pints (5·4 US pints)

Rear axle/Differential: The combined oil filler and level plug is located on the rear side of the axle casing. Clean area around plug before removing it and top-up if necessary to bottom of filler plug aperture with gear oil SAE 90 EP; below 10°F (—12°C) SAE 80 EP. Do not overfill, so after topping-up allow time for any surplus oil to run out should too much have been injected. The oil drain plug is at the bottom of the axle housing and the oil should be drained when it is warm.
Oil capacity: 1$\frac{3}{4}$ Imp pints (2·1 US pints).

Steering gear: The steering gear is of the rack-and-pinion type and is provided with a lubricating nipple (accessible in the engine compartment under the dash panel).

When lubricating, give only up to 10 strokes with the oil-gun, filled with gear oil SAE 90 EP (below 10°F (—12°C) SAE 80 EP).

Front wheel bearings: Periodically remove hub grease-retaining caps and repack hubs with lithium-base multipurpose grease; partially fill grease-retaining caps. Do not overgrease.

Rear wheel bearings: The rear wheel bearings do not require maintenance.

Universal joints: Lubricate the nipples of the propeller shaft universal joints with a low-pressure grease-gun, filled with lithium-base multipurpose grease.

Grease nipples: Seven grease nipples are fitted (apart from the two on the propeller shaft and the one on the steering rack) and their location can be found on the lubrication chart on page 15. Use lithium-base multipurpose grease, or, alternatively, gear oil SAE 140 EP.

Speedometer drive: Every 12,000 miles the speedometer drive cable should be lubricated as follows. Disconnect drive cable from speedometer and pull inner cable from outer casing. Sparingly grease inner cable with a light grease and wipe surface grease from top 8in of cable. Do not overlubricate.

To reassemble, thread inner cable into casing with a twisting motion. When engagement of union at gearbox end is felt, cable can be pushed fully in so that square end stands out about $\frac{3}{8}$in from outer casing. Reconnect to speedometer.

Shock absorbers: The lever-type shock absorber units need periodical checking of fluid level. Thoroughly clean area round filler plug before removing it. Top-up

with Armstrong Super Thin Damper Fluid No. 624 (works recommendation). If this fluid is not available, a good-quality mineral oil conforming to specification SAE 20/20W may be used, but these alternatives are not suitable for operation under low temperatures. The rear shock absorber filler plugs are accessible after removing the rubber plugs at the base of each rear wheel arch, inside the car.

Before replacing the filler plugs, rock the car in order to expel any trapped air.

Brake and clutch fluid reservoirs: These fluid reservoirs are located in the engine compartment. Top-up if necessary to ½in below bottom of filler neck with Lockheed Genuine Brake Fluid for clutch master cylinder, Girling Fluid for brake master cylinder, or fluid conforming to specification SAE 70 R3. Topping-up is easier if a syringe is used; otherwise withdraw air inlet hose from heater unit.

TYRE PRESSURES

		lb/sq in	*kg/sq cm*
Tyre size 5·00—14:			
Normal,	front:	22	1·55
	rear:	22	1·55
Fully loaded,	front:	24	1·69
	rear:	26	1·83
Tyre size 5·60—14:			
All conditions,	front:	24	1·69
	rear:	24	1·69

ROUTINE MAINTENANCE

NOTE: For particulars see under *General data.*
Daily: Check engine oil level, radiator, fuel tank, tyres and lights.
Weekly: Check battery electrolyte level and tyre pressures.

RUNNING IN PERIOD

After the first 500 miles: drain oil from engine sump, gearbox and rear axle/differential; refill with fresh oil.

Free 500 miles service by dealer.

A. Every 1,000 miles:
*A*1 to *A*4 *inclusive.* Lubricate with grease-gun:
*A*1. King pins (4 nipples).
*A*2. Track-rod ball joints (2 nipples).
*A*3. Propeller shaft universal joints (2 nipples).
*A*4. Parking brake compensator (1 nipple).
*A*5. Gearbox: check oil level, top-up if necessary.
*A*6. Rear axle/Differential: check oil level, top-up if necessary.
*A*7. Brake and clutch fluid reservoirs: check fluid level, top-up with brake fluid if necessary.
*A*8. Carburettors: remove dashpot caps and add a few drops of SAE 20W engine oil.
*A*9. Air-cleaner (oil bath type): check oil level, to p-up if necessary.
Carburettor controls: lubricate with engine oil.
Brakes: inspect brake lines and pipes, check pedal adjustment.
Shock absorbers: check for leaks.
Wheels: check wheel nuts for tightness.

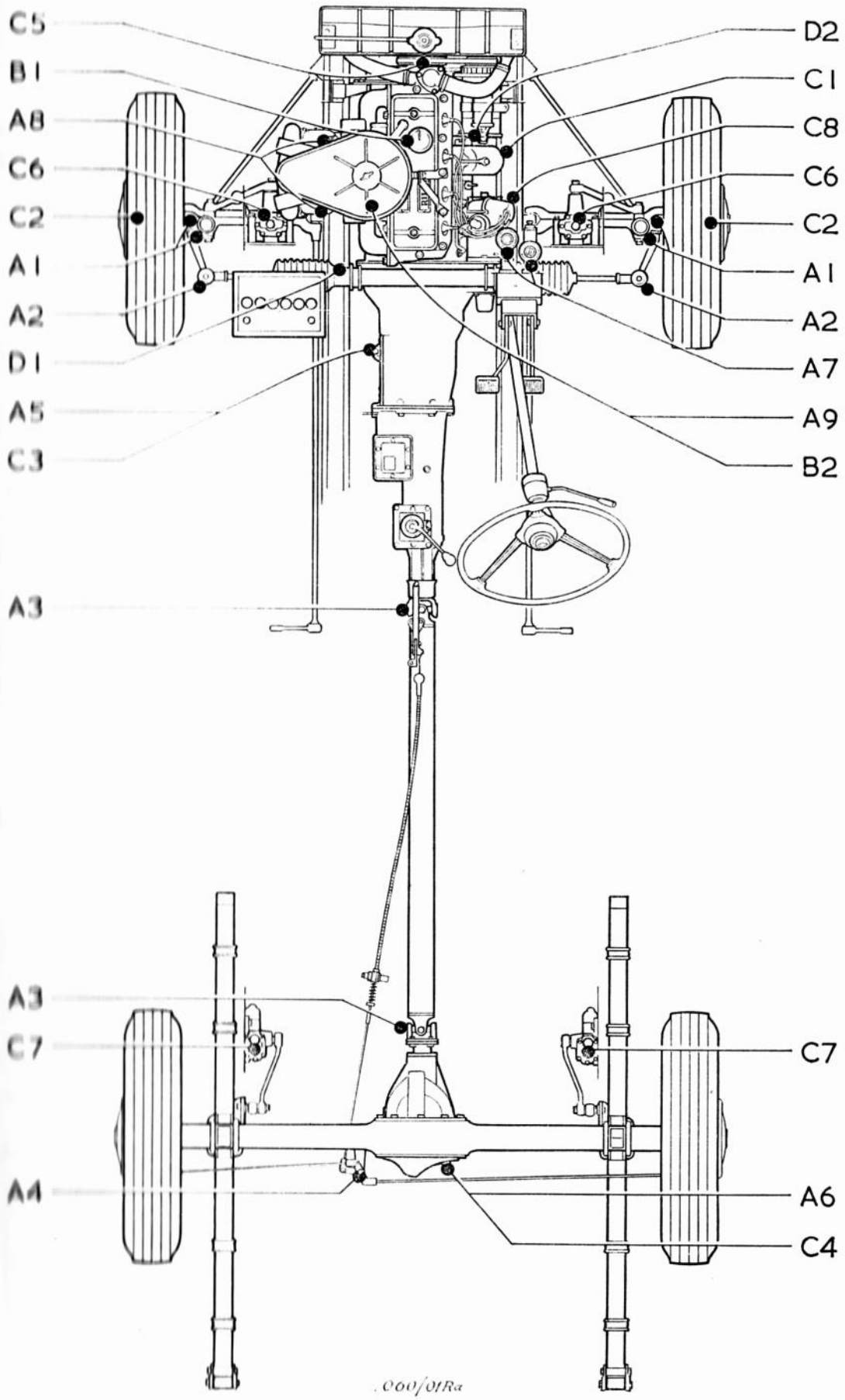


Fig. 9. Lubrication chart

B. Every 3,000 miles:

*B*1. Engine sump: drain and refill.
*B*2. Air-cleaner (oil bath type): clean and refill with fresh oil. Clean filter element.
Bodywork: lubricate door hinges and locks, bonnet lock and operating mechanism with engine oil.
Generator: check drive belt tension.
Spark plugs: clean and adjust.
Brakes: check, adjust if necessary.
Wheels: change round diagonally.

C. Every 6,000 miles:

*C*1. Engine oil filter: drain, clean housing and renew element.
*C*2. Front wheel bearings: partially fill grease-retaining caps with wheel-bearing grease.
*C*3. Gearbox: drain when hot and refill.
*C*4. Rear axle/Differential: drain when hot and refill.
*C*5. Water pump: (see under 'D').
*C*6. Front shock absorbers: check fluid level, top-up with shock absorber fluid, if necessary.
*C*7. Rear shock absorbers: check fluid level, top-up with shock absorber fluid, if necessary.
*C*8. Ignition distributor: remove rotor and apply a few drops of engine oil on screw thus exposed, one drop on breaker arm pivot and a few drops on automatic advance mechanism through gap round cam spindle. Lightly smear cam profile with grease or oil.
Valve clearance: check and adjust if necessary.
Fuel system: clean fuel pump filter.
Ignition distributor: check automatic advance mechanism; check contact breaker points gap, adjust if necessary.
Suspension: tighten rear spring seat bolts.
Front wheel alignment: check and adjust if necessary.
Bodywork: tighten door hinges and striker-plate securing screws.

D. Every 12,000 miles:

*D*1. Steering rack: lubricate with oil-gun (1 nipple, up to 10 strokes).
*D*2. Generator: lubricate rear bearing.
Engine sump: drain, flush out with flushing oil, and refill.
Water pump (*C*5), current recommendation: lubricate sparingly with grease (remove plug); see also page 12.
Carburettors: remove suction chambers and pistons, clean, reassemble and top-up; remove float chambers, empty sediment, and refit.
Speedometer cable: lubricate with light grease.
Cooling system: drain and flush out.
Spark plugs: renew.
Steering and suspension: check moving parts for wear.
Headlamps: check beam setting, reset if necessary.

E. Every 24,000 miles:

Engine sump and oil-pump strainer gauze: remove and clean, replace parts and refill sump with fresh oil.

Repair Data

Repairs are bet performed by the official dealers, who possess the necessary experience and special equipment.

These data have been compiled from the official workshop manuals and other manufactures' information, which were supplied through the kind co-operation of the Nuffield Organization and BMC Service Ltd.

ENGINE

Engine type: 15 R; later engines 15 RB.

The engine is built in unit with clutch and gearbox.

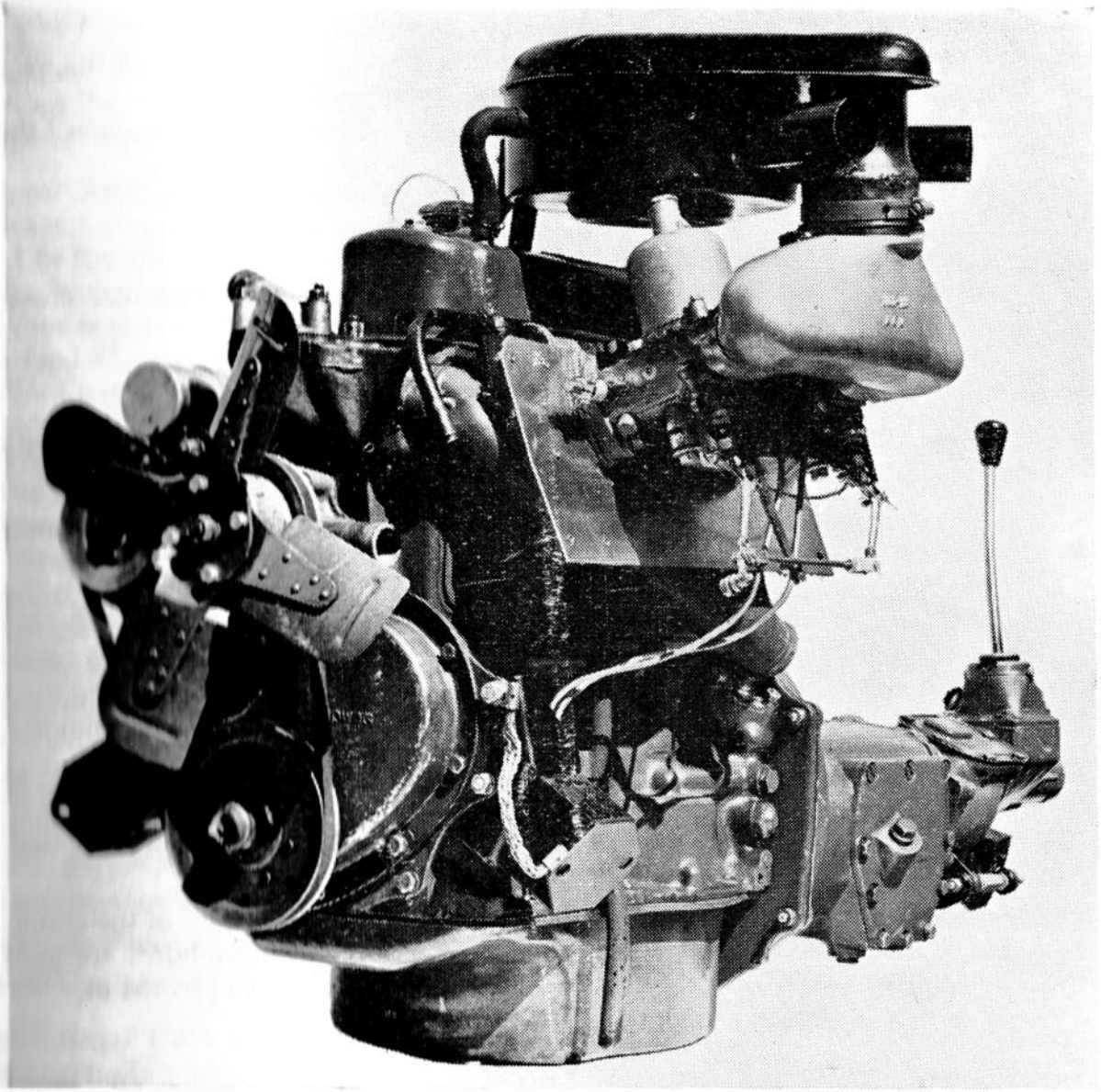


Fig. 10. Engine, general view

Engine removal:

(1) Remove the bonnet and disconnect the battery earth terminal.
Drain the engine and gearbox. Remove the air-cleaner, the carburettors and the radiator.

(2) Disconnect the oil-pressure pipe from the adaptor and remove the vacuum pipe from the support clip under the cylinder-head nut.
Disconnect the heater control cables and remove the heater hoses.

(3) Disconnect the wiring from the starter motor, generator, water temperature transmitter unit, distributor and coil.
Disconnect the screenwasher vacuum pipe from the manifold (when fitted). Disconnect the tachometer drive cable. Release the exhaust pipe from the manifold.

(4) Fold back the rubber cover around the gear lever, remove the circlip from the remote control housing and withdraw the gear lever.

(5) Remove the clutch actuating cylinder and tie it up, so that it is out of the way. Disconnect the speedometer drive cable from the gearbox.

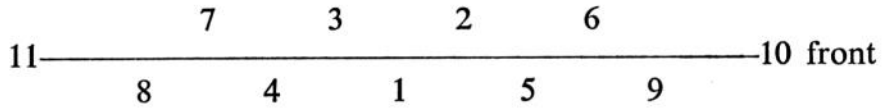
(6) Mark the rear universal joint flange and the pinion drive flange; disconnect the propeller shaft.
Disconnect the front engine mountings. Remove the earth wire.

(7) Hang the engine in a suitable tackle and take engine weight.
Remove the engine steady-bar.
Disconnect the engine rear mounting and remove the engine rear cross-member.
Carefully hoist the engine and remove it from the car.

Reinstallation is done in the reverse order of removal.

Engine compression: Compression pressure on warm engine at cranking speed with wide-open throttle should be approximately 150lb/sq in.

Cylinder head: Cast-iron cylinder head. Unscrew and tighten the cylinder-head nuts in the sequence given below. Tightening torque: 40ft lb.



The cylinder-head nuts Nos. 7, 3, 2 and 6 also secure the rocker-shaft supports.

Cylinder-head gasket: The cylinder-head gasket is marked 'Top' and 'Front' to facilitate installation. From engine number 15 RB–U–H 6121, the thickness of the asbestos was reduced and the thickness of the copper and steel increased. The new gasket is interchangeable with the earlier type.

Cylinder block: Cast-iron cylinder block, integral with the upper half of the crankcase. No separate cylinder liners are used, but when the cylinder bores are unfit for the installation of 0·040in oversize pistons, dry liners can be pressed in.
Standard bore diameter: 2·875in.

Cylinder liners: The cylinder block must be bored out to the dimensions given under *Specifications*, to provide the necessary interference fit. When the liners are pressed into the block, the pressure must be released several times during the first inch. This will allow the liner to line-up properly. The cylinder liners must be installed with the chamfered end downwards. Press the liners in, until the upper edge is flush with the cylinder block mating face.

Specifications:

Part number of liner:	1H 641
Bore diameter in cylinder block:	3·0165–3·017in
Outer diameter of liner:	3·0185–3·01925in
Inner diameter of liner, pressed in and reamed:	2·8745–2·8760in

Inlet and exhaust manifold: Separate inlet and exhaust manifold, bolted together in the middle to form a hot-spot.

When the two manifolds have been separated, the bolts securing the inlet to the exhaust manifold must not be tightened until the manifold-to-cylinder-head bolts are fully tightened.

Engine sump: The removable engine sump is a steel pressing, having an uninterrupted mating face.

Crankcase ventilation: Positive crankcase ventilation by means of a connection between the valve-rocker cover and the air-cleaner. The air enters the engine via a pipe on the left-hand side of the cylinder block.

Pistons: Anodized aluminium alloy, split skirt, hollow crown pistons equipped with three compression rings and one oil control ring. The split in the piston skirt must be towards the camshaft side of the engine.

The crown of the piston is marked 'Front'.

From engine number 15R–U–H 580 modified pistons are installed to suit the new type of piston pin.

From engine number 15R–U–H 791, pistons having compression ring grooves of reduced diameter are installed.

Oversize pistons are identified by a number, enclosed in an ellipse.

The number on the piston denotes the actual bore size to which it must be fitted.

Always stamp the size of the piston on the cylinder block mating face adjacent to the cylinder bore, whenever pistons differing in size from those removed are installed.

The pistons can be removed upwards from the cylinder block.

Piston diameter is measured at bottom of skirt, at right angles to the piston pin.

Specifications:

Standard diameter:	2·8757–2·8760in
First oversize:	2·8857–2·8860in
Second oversize:	2·8957–2·8960in
Third oversize:	2·9057–2·9060in
Fourth oversize:	2·9157–2·9160in
Piston clearance at top of skirt:	0·0035–0·0042in
Piston clearance at bottom of skirt:	0·0017–0·0023in

Piston rings: Three compression rings and one oil control ring are fitted above the piston pin. The top ring is plain, the other two are tapered and must be installed with the side marked 'T' upwards. Starting with engine number 15R–U–H 791, the piston rings are of increased radial thickness. The new compression rings must not be used in pistons having the larger groove diameter. When installing the piston rings, make sure that the ring gaps are equally spaced around the piston circumference.

Specifications:

Height of compression rings:	0·0615–0·0625 in
Thickness of compression rings:	0·111–0·118 in (up to engine No. 15R–U–H 791)
	0·119–0·126 in (from engine No. 15R–U–H 791)
Fitted gap:	0·008–0·013 in
Clearance in groove:	0·0015–0·0035 in
Height of oil control ring:	0·1552–0·1562 in
Thickness of oil control ring:	0·111–0·118 in (up to engine No. 15R–U–H 791)
	0·119–0·126 in (from engine No. 15R–U–H 791)
Fitted gap:	0·008–0·013 in
Clearance in groove:	0·0018–0·0038 in

Piston pins (gudgeon pins): The hollow steel piston pins are clamped in the connecting-rod small end. The piston pins should be a hand push-fit through the piston; this can be checked by holding the piston with the assembled connecting rod in a horizontal position. The connecting rod should turn the piston pin by its own weight.

From engine number 15R–U–H 580, a modified piston pin, having a reduced internal diameter, is fitted.

The later piston pins are interchangeable with the originals as a set with later-type pistons.

NOTE: When, during dismantling or reassembly, the piston-pin clamp bolt is loosened or tightened, it is essential to clamp the piston pin in a vice by means of the special clamping plugs which are available for this purpose. In the absence of these clamping plugs, a steel rod may be clamped in a vice and the hollow piston pin slid over it.

On no account should the connecting rod be clamped in a vice, when the bolt is loosened or tightened, since such practice will always result in distorting the connecting rod.

Specifications:

Length of piston-pin:	2·27125–2·2809 in
Outer diameter:	0·6869–0·6871 in
Fit in piston:	0·0001–0·00035 in
Fit in connecting rod:	0·0001–0·0006 in

Connecting rods: The connecting rods are steel forgings of I-beam section, equipped with replaceable steel-backed bearing shells. Connecting rods, bearing caps and shells should never be filed or scraped.

The connecting rods are numbered 1 to 4 from front to rear; the big ends of the connecting rods are off-set; the wide side of numbers 1 and 3 connecting rods face the rear; those of numbers 2 and 4 connecting rods face the front.

When reinstalling the connecting rod and piston assemblies, take good note of the following:

The number stamped on the connecting rod and bearing cap must coincide with the cylinder bore in which the piston is to be installed; the bearing shell locating notches in cap and rod must be on the same side, and the oil squirt hole must be towards the thrust side of the engine, *i.e.* must be facing away from the camshaft. Tighten the piston-pin clamp bolt to 25 ft lb.

Specifications:

Length, centre to centre:	6·498–6·502 in
Axial clearance:	0·008–0·012 in
Radial clearance:	0·001–0·0025 in

Connecting-rod big-end bearings: Thin-wall, steel-backed, lead/bronze, lead/indium or lead/tin-plated bearing shells. The bearing caps and shells should on no account be filed or scraped.

Bearing shells are available in 0·010, 0·020, 0·030 and 0·040 in undersize. Tighten the big-end bearing-cap bolts to 35 ft lb.

Crankshaft: Forged-steel crankshaft with integral counter-weights running in three main bearings. End-float is controlled by thrust washers on both sides of the centre main bearing. The oil grooves in these thrust washers must face outwards.

Specifications:

Standard journal diameter:	2·0005–2·001 in
Minimum regrind diameter:	1·9605–1·961 in
Crank pin diameter:	1·8759–1·8764 in
Minimum regrind diameter:	1·8358–1·8364 in
Crankshaft end-float:	0·002–0·003 in

Main bearings: Replaceable thin-wall, steel-backed, white metal bearing shells. The bearing caps must never be filed or scraped. The main-bearing caps should be suitably marked in order to reinstall them in their original positions. The horizontal joint faces of the rear main-bearing cap must be lightly smeared with jointing compound to ensure a perfect oil-seal when the cap is bolted down. Tighten the main-bearing cap bolts to 70 ft lb.

Specifications:

Length of bearing caps:	1·375 in
Axial clearance:	0·0005–0·002 in

Flywheel: The flywheel is bolted on to the crankshaft rear flange. The starter ring gear is shrunk on. A new starter ring gear should be heated to 300–400°C (575–752°F) before it is placed on the flywheel.

To facilitate the reinstallation of the flywheel, the crankshaft rear flange is stamped with a timing mark, which should be in line with the timing mark on the flywheel.

Tighten the flywheel bolts to 35–40 ft lb.

Camshaft: The camshaft is situated on the left-hand side of the engine and runs in three bearings. Camshaft end-float is taken by a thrust plate behind the camshaft sprocket.

Specifications:

Diameter of front camshaft journal:	1·78875–1·78925 in
Diameter of centre camshaft journal:	1·72875–1·72925 in
Diameter of rear camshaft journal:	1·62275–1·62325 in
Camshaft end-float:	0·003–0·007 in

Camshaft bearings: The camshaft runs in three steel-backed white metal bearing bushes.

To renew the bearing bushes, the use of a special removing and replacing tool is strongly recommended.

From car serial number 18122 a modified camshaft was fitted. See also under 'Valve timing'.

Specifications:

Inner diameter of front bearing, pressed in and reamed:	1·790in
Inner diameter of centre bearing, pressed in and reamed:	1·730in
Inner diameter of rear bearing, pressed in and reamed:	1·624in
Radial clearance:	0·001–0·002in

Camshaft drive: The camshaft is driven by means of a duplex roller chain, which is kept at the right tension by means of a spring-loaded rubber tensioner. To free the tensioner from spring pressure, the bottom plug is removed and a $\frac{1}{8}$in Allen wrench inserted.

Turn the wrench in a clockwise direction, until the synthetic rubber slipper is free (between one half and one full turn).

The tensioner is released for operation by turning the plunger in a clockwise direction until the slipper moves against the chain.

Never turn the wrench in an anti-clockwise direction, or force the slipper head into the chain by external pressure.

When reinstalling the camshaft drive, make sure the sprockets are properly aligned. If necessary, align the sprockets by fitting the correct number of shims behind the crankshaft sprocket. The timing marks should be in line and towards each other.

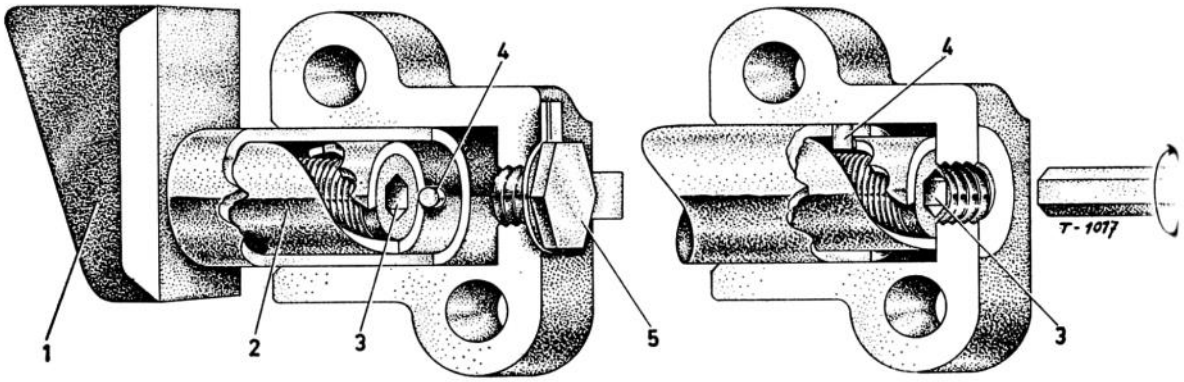


Fig. 11. Timing chain tensioner

1 Rubber pad
2 Sleeve with non-return ratchet
3 Sleeve retractor
4 Stop pin
5 Plug

Specifications:

Chain pitch:	$\frac{3}{8}$in
Number of links:	52
Number of teeth on crankshaft sprocket:	20
Number of teeth on camshaft sprocket:	40

Valve timing: Valve timing must be checked with a theoretical valve clearance of 0·021in.

		later engines*
Inlet valve opens:	5° B.T.D.C.	T.D.C.
Inlet valve closes:	45° A.B.D.C.	50° A.B.D.C.
Exhaust valve opens:	40° B.B.D.C.	35° B.B.D.C.
Exhaust valve closes:	10° A.T.D.C.	15° A.T.D.C.

*See also under 'Camshaft'.

Valve clearance: The valve clearance is adjusted when the engine is hot.

Valve clearance for timing:	0·021in
Running valve clearance:	0·015in

Valves: Overhead valves, operated by means of push-rods and rockers. The valve-keepers are of the split cotter type. When replacing the valves, make sure that the new packing rings are correctly located in the bottom of the cotter groove. Valve material, inlet: Silchrome 1, exhaust: XB.

Specifications:

Valve head diameter,	inlet:	1·500–1·505 in
	exhaust:	1·281–1·286 in
Valve stem diameter,	inlet:	0·3422–0·3427 in
	exhaust:	0·34175–0·34225 in
Valve lift:		5/16 in
Clearance in guide,	inlet:	0·0015–0·0025 in
	exhaust:	0·002–0·003 in

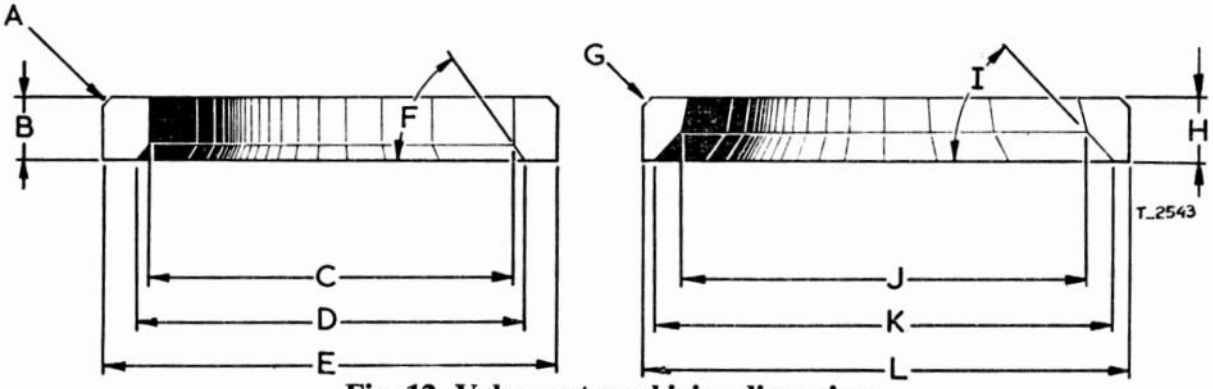


Fig. 12. Valve seat machining dimensions

A Maximum radius 0·015 in	Exhaust	G Maximum radius 0·015 in	Inlet
B 0·186–0·188 in		H 0·186–0·188 in	
C 1·0805–1·1005 in		I 45°	
D 1·221–1·241 in		J 1·240–1·260 in	
E 1·312–1·313 in		K 1·396–1·416 in	
F 45°		L 1·427–1·438 in	

Valve springs: Double valve springs; the valve-spring keepers are of the split cotter type. From engine number 15RB–U–H 872, modified valve spring shrouds, lower spring seats and valve spring cups were installed. To facilitate identification, the new spring cup has a circular groove in the top face and the valve spring cup is provided with a notch in the flange.

Specifications:

Free length inner spring, inlet and exhaust:	1 31/32 in
Free length outer spring, inlet and exhaust:	2 3/64 in
Fitted length, inner spring, inlet and exhaust:	1 7/16 in
Fitted length, outer spring, inlet and exhaust:	1 9/16 in
Number of active coils, inner spring:	6½
Number of active oils, outer spring:	4½
Spring pressure, inner spring, valve opened:	50 lb
Spring pressure, inner spring, valve closed:	30 lb plus or minus 2 lb
Spring pressure, outer spring, valve opened:	105 lb
Spring pressure, outer spring, valve closed:	60·5 lb plus or minus 2 lb

Valve seats: The valve seats are integral with the cylinder head. If it should be necessary during an engine overhaul to install valve seats, the cylinder head must be machined to the dimensions given in Fig. 12.

Valve guides: Cast-iron, removable valve guides.

If it is necessary to replace the valve guides, the old ones must be driven out toward the combustion chamber.

The new valve guides must be pressed in from the top, the inlet valve guides having the largest chamfer at the top; the exhaust valve guides with the counter-bored end to the bottom. The valve guides must protrude $\frac{5}{8}$in above the machined surface of the valve spring seats.

Specifications:

Length, inlet:	$1\frac{7}{8}$in (R type engine)
exhaust:	2 13/64in (R type engine)
inlet and exhaust:	$1\frac{7}{8}$in (RB type engine)
Outer diameter, inlet and exhaust:	0·5635–0·5640in
Inner diameter, inlet and exhaust:	0·34425–0·34475in

Valve tappets: Valve tappets of the 'barrel' type. New tappets should be fitted by selective assembly; they must just fall down their bores by their own weight when lubricated.

Specifications:

Length:	2·293–2·303in
Diameter:	0·81125–0·81175in

Valve rockers: The valve rockers are assembled on a hollow rocker shaft which rests in four supports on the cylinder head. The outer nuts of the rocker-shaft supports also serve to retain the cylinder head. It is essential to drain the cooling system and to unscrew the cylinder-head nuts in the sequence given on page 18 before the valve-rocker assembly is removed.

To facilitate the removal and reinstallation of the rocker-shaft bushes, the use of tool 18G 226 is recommended.

When new bushes are pressed in, the split must be just above the oil hole in the rocker, on the adjusting screw side. Use a 0·093in drill to drill the oil hole on the adjusting screw side and a 0·0785in drill for the oil hole on the valve spring side

Ream the new bush to 0·6255–0·626in.

Specifications:

Bore of rocker arms:	0·7485–0·7495in
Rocker ratio:	1·4 : 1
Clearance of rockers on shaft:	0·0005–0·002in
Outer diameter of rocker shaft:	0·624–0·625in
Length of pushrod:	8·8135–8·84375in

Engine lubrication: Full-pressure lubrication by means of an oil pump of the eccentric rotor type. The oil enters the pump through a gauze screen; the oil is delivered via a pressure relief valve on the rear left-hand side of the cylinder block and an external pipe on the right-hand side of the cylinder block, to a full-flow oil filter.

From the oil filter, the oil is delivered to a high-pressure oil gallery from which the main bearings receive their oil.

The connecting-rod bearings are lubricated in the usual way: the second and third connecting-rods bearing receive their oil from the centre main bearing; the first and fourth connecting rod from the front and rear main bearing respectively. From the front main bearing, oil is fed to the front camshaft bearing. A transverse drilling in the cylinder block feeds the oil from the front camshaft bearing to the timing-chain tensioner, to lubricate the timing chain and sprockets. From the centre camshaft bearing, oil is fed to a low-pressure oil gallery on the left-hand side of the engine. Oil from this gallery lubricates the oil-pump drive shaft.

The rear camshaft bearing is lubricated by oil from the rear main bearing. From the rear camshaft bearing, oil under reduced pressure is fed to the rear rocker-shaft support and the hollow valve rocker shaft. The valve rockers are provided with two oil holes, one squirt hole for the valve stem tip and the valve springs, and one for the push-rod ball-cup. The oil flowing down from the cylinder head lubricates the push-rods and tappets. The connecting-rod big-ends are drilled for additional cylinder wall lubrication; the piston pins are lubricated by splash.

Oil-pressure relief valve: At the rear left-hand side of the cylinder block a non-adjustable oil-pressure relief valve is installed.

Specifications:	*R-type engine*	*RB-type engine*
Free length of spring:	2·859in	3·0in
Fitted length of spring:	2·156in	2·156in
Fitted load:	13·5lb	16lb

Oil pump: An eccentric-rotor type oil pump is mounted in the left-hand side of the crankcase and is driven by a short vertical shaft from the camshaft.

On later engines a new oil pump and oil strainer are installed; the pump and the strainer are interchangeable with the former type as a complete unit.

Oil pressure: The normal oil pressure of a warm engine is 50lb/sq in for the R-type engine and 75lb/sq in for the RB-type.

Oil filter: A full-flow oil filter is mounted on the right-hand side of the cylinder block. The filter element should be replaced at recommended intervals. See page 16.
Filter elements: See page 12.
BMC part number: 8G683.
Capacity: 1¼ Imp pint (1·4 US pints).

Ignition system: Ignition by means of battery and coil.
Firing order: 1–3–4–2–.

Ignition timing: The contact breaker points should just start to open when the notch in the crankshaft pulley is almost in line with the centre tooth on the timing cover and No. 1 cylinder is almost at T.D.C. on its compression stroke. This will be 6° B.T.D.C. (the longest tooth indicates T.D.C., the centre tooth 5° B.T.D.C., the right-hand tooth 10° B.T.D.C.).

To time the distributor proceed as follows:

Install the distributor so that the rotor contact is in line with the number one spark plug cable terminal in the distributor cap and the vacuum control unit is parallel to the engine. The vernier adjustment should be in the middle of its range.

Secure the distributor to the cylinder block with bolt and lock washer through the clamp plate.

Slacken the clamp plate bolt; take up any lost motion in the drive by turning the rotor clockwise as far as it will go, and turn the distributor housing anti-clockwise until the contact breaker points are closed, and then turn the distributor clockwise until the breaker points just start to open. Tighten the clamp bolt.

The ignition is now timed to 6° B.T.D.C. A slight readjustment to the distributor may be necessary to suit the particular type of fuel in use and the setting should be corrected after checking the timing, as described above, or during a road test. If necessary, the correction can be made by means of the vernier control on the distributor housing.

Distributor: Lucas DM 2.

Contact breaker point gap:	0·014–0·016in
Breaker arm spring tension:	20–24oz
Distributor setting:	6° B.T.D.C.
Direction of rotation:	anti-clockwise when viewed from above
Condenser:	0·2 microfarad

Centrifugal advance (distributor degrees and distributor rpm):

Maximum advance:	14–16° at 2800rpm
	11–13° at 1550rpm
	3–6° at 450rpm

No advance below 250rpm

The distributor should be tested when decelerating on a synchrograph.

Vacuum advance:	7–9° at 20in Hg
	6–8° at 12in Hg
	3–6° at 8¼in Hg
	½–3 at 6½in Hg
	0–½ at 5in Hg

No advance below 3½in Hg.

Spark plugs: Champion N 5, 14mm (early models Champion NA 8).
Spark plug electrode gap: 0·024–0·026in

Ignition coil: Lucas HA 12.

Fuel system: The fuel tank is situated under the floor of the luggage compartment; the capacity is 7 Imp gallons (7·8 US gallons). The fuel is fed to the SU carburettors by means of an SU electric fuel pump.

Carburettors: Twin SU model H 4 semi-downdraught carburettors.

Specifications:

Diameter:	1½in
Needle:	standard AD, rich AR, weak HA
Jet:	0·090in
Piston spring:	red

SU carburettors are of the variable throat type; the fuel is metered by a tapered needle in the jet. The needle is secured to the sleeve, which determines the amount of throat opening; the position of the sleeve and needle are determined by the vacuum piston (the upper part of the sleeve) according to throttle valve opening.

In Fig. 13 a schematic view of the construction is shown. Normally, the piston, the sleeve and the needle are in the bottom position when the throttle is closed, but for the sake of clarity these parts are shown in a raised position. The piston is a free fit in the vacuum chamber with a very small clearance. A guide spindle is centrally located in the piston; this spindle is free to move up and down in the guide bore of the vacuum chamber, thus ensuring correct alignment of the piston and vacuum chamber at all times. When the engine is not running, the piston and needle assembly will fall to the bottom position by their own weight and rest on the bridge in the throat. (The SU H4 carburettors are equipped with a soft assist spring on top of the vacuum piston). With engine running, the sleeve forms a restriction to the air-stream; thus a partial vacuum is created. This pressure drop also creates a partial vacuum in the vacuum chamber above the piston, causing the piston, the sleeve and the needle to rise a certain amount. The raised needle determines the

amount of fuel emerging from the jet, thus the correct air/fuel mixture is automatically established. When starting a cold engine, the mixture may be enriched by pulling down the jet; the mouth of the jet will now be in line with a thinner portion of the needle, thus supplying a richer mixture. The jet is mounted in the jet retainer by means of two spring-loaded gland joints, thus ensuring a fuel-tight seal. In Fig. 14 an exploded view of the jet assembly is shown.

Fitting jet needles and centring the jets:

Two varieties of jet needles are in use, one with straight-cut shoulder, the other with rounded shoulder, as shown in Fig. 14. When fitting the needle, the portion of the needle that is marked with a dotted line must be flush with the vacuum piston sleeve. When assembling the carburettor, it is imperative to make sure that the jet and needle are correctly centred. This is done by screwing the adjusting nut all the way up; then lift the piston and needle assembly and listen for it to fall with an audible 'click'. If no click is heard, the needle is fouling the jet, which will have to be re-centred. This is done by loosening and retightening the jet retainer. Recheck whether the piston will now fall with an audible click; if necessary, repeat loosening and retightening the jet retainer until the jet is centred correctly.

Float setting:

When the float needle is seated, a 7/16in round bar should be an easy sliding fit between the arched fork of the float hinge arm and the edge of the float chamber cover.

If adjustment is necessary, carefully bend the hinge lever fork; *do not* bend the straight portion of the hinge lever.

Adjustment:

Make sure that the vacuum chambers and pistons on both carburettors are clean, the needles properly fitted and the jets correctly centred. Check the dampers for correct oil level and top-up if necessary, then proceed as follows:

(1) Remove air-cleaner and air duct, slacken the clamping screw on the throttle connector rod to enable the throttles to be set independently.

Ensure that the idle adjustment screws are holding the throttles partly open and that the jet adjustment nuts are not screwed all the way up.

(An average setting to start with is obtained by turning the idle adjustment screws down one full turn from the fully-closed position, and the jet adjusting nuts one and a half turns down from the topmost position.)

(2) Make sure the jet seats against the adjusting nut; if necessary, readjust or disconnect the choke cable.

On cars with connecting linkage between choke lever and throttle, unscrew the fast idle adjustment screw until it is well clear of the lifter.

(3) Warm up the engine and set the throttles to an idling speed of approximately 500rpm.

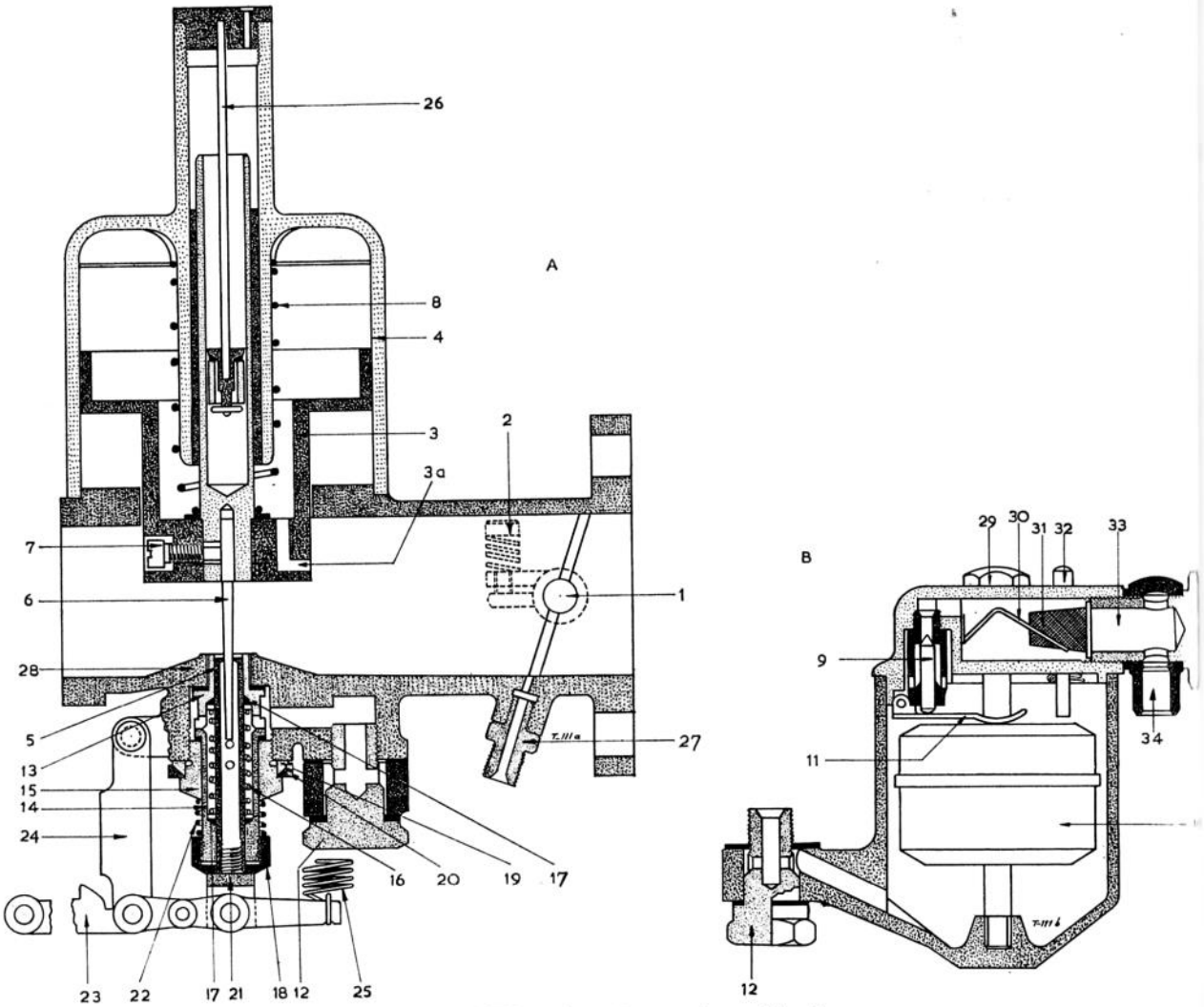
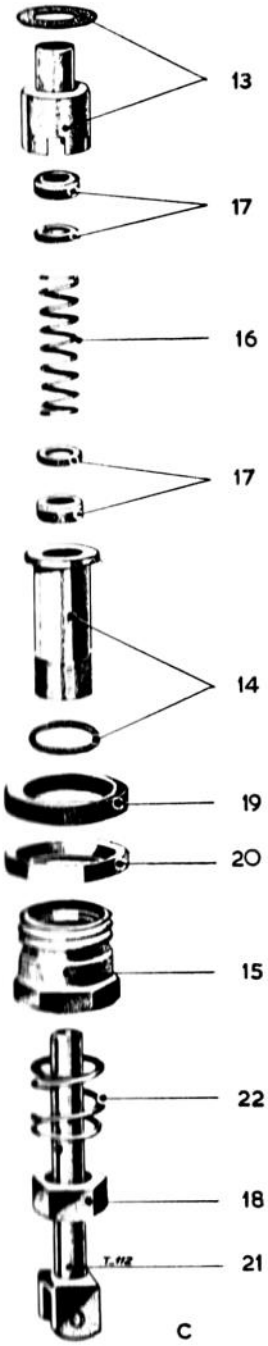


Fig. 13. SU carburettor, schematic view

1 Throttle valve
2 Idle speed adjustment
3 Vacuum piston and sleeve
3a Vacuum passage
4 Vacuum chamber
5 Jet
6 Jet needle
7 Needle clamping screw
8 Vacuum piston assist spring (not on all SU carburettors)
9 Float needle valve
10 Float
11 Float arm
12 Hollow float chamber attachment screw
13 Upper jet guide with joint washer
14 Lower jet guide with joint washer
15 Jet retainer
16 Spring
17 Gland packing joint washers and thrust washers
18 Adjusting nut
19 Jet retainer joint
20 Joint retainer with bevelled bore
21 Jet ((5) in schematic drawing)
22 Lockspring for 18
23 Jet lever
24 Jet lever link
25 Jet lever retracting spring
26 Damper-valve stem
27 Connection for vacuum pipe to ignition distributor
28 Bridge
29 Float chamber cover bolt
30 Fuel strainer retaining spring
31 Fuel strainer
32 Float actuating pin
33 Fuel-line connector
34 Fuel line



Key to Fig. 14:

13 Upper jet guide with joint washer
14 Lower jet guide with joint washer
15 Jet retainer
16 Spring
17 Gland packing joint washers and thrust washers
18 Adjusting nut
19 Jet retainer joint
20 Joint retainer with bevelled bore
21 Jet (5 in schematic drawing)
22 Lockspring for 18

Fig. 14. SU carburettor, jet assembly, exploded view

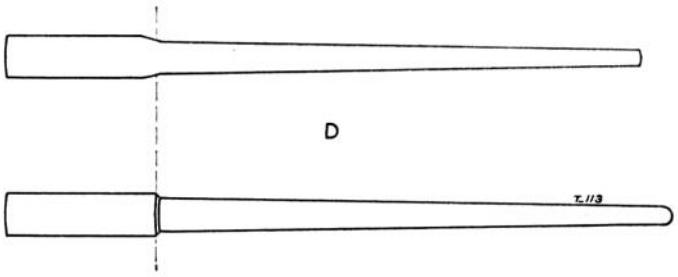


Fig. 15. SU carburettor, jet needles

NOTE: Do not lift the piston with a finger, since the finger forms too large an obstruction of the air intake; this will alter the mixture and lead to false conclusions.

(4) Listen to the hiss of air at each carburettor air intake (the use of a piece of tubing of about $\frac{3}{8}$in diameter, one end held to the ear and the other end in front of the air intake, will make it easier to compare the sound of both carburettors).

(5) Adjust both idle screws until the hiss is equal on both units and the idle speed is approximately 500rpm.

(6) Now turn off the ignition and, with a downward pressure on the rear throttle arm, tighten the throttle connector-rod clamping screw.

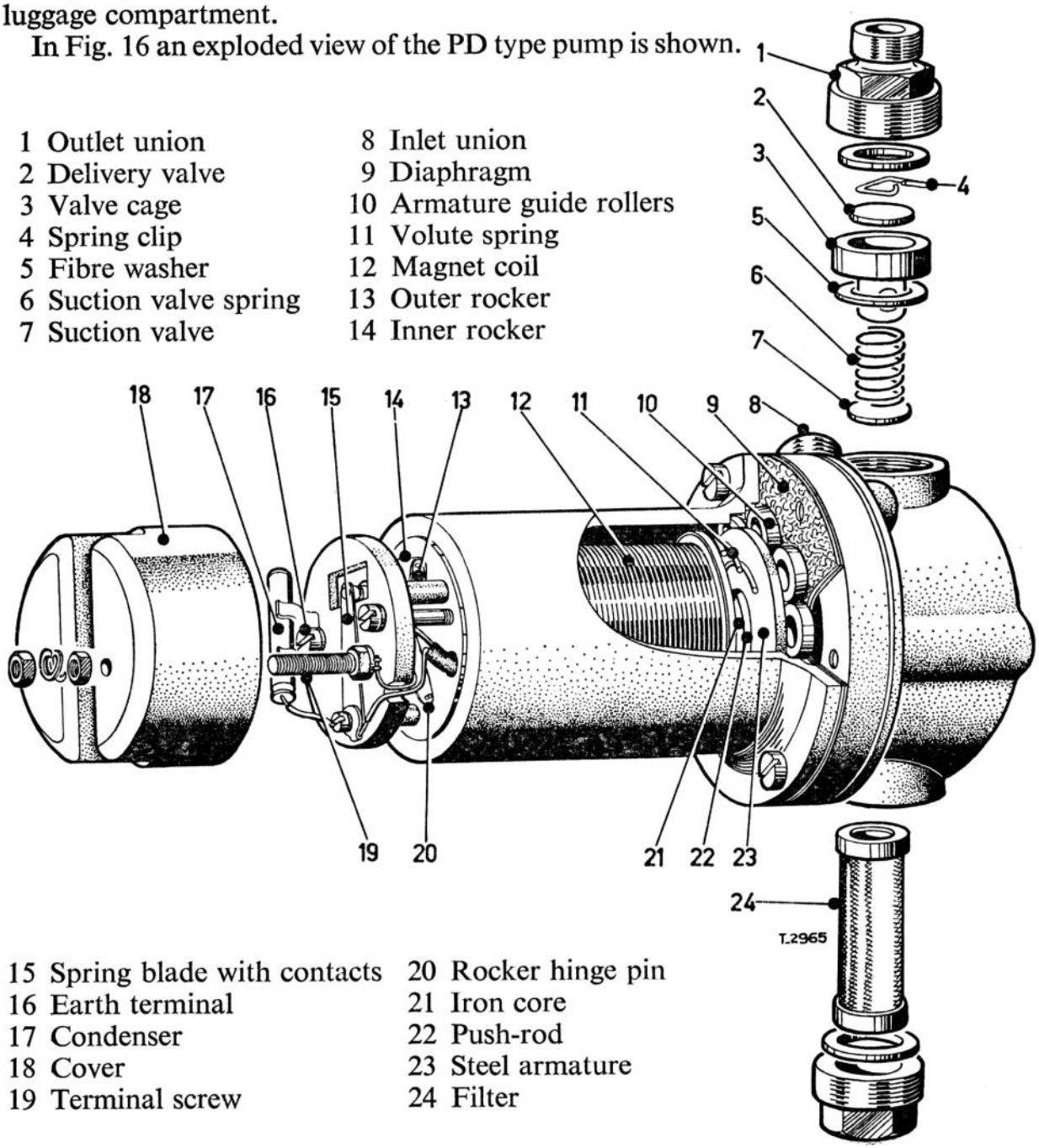
(7) Start the engine. While the engine is idling at approximately 500rpm, check the mixture of each carburettor in turn by lifting the piston approximately $\frac{1}{8}$in with a penknife blade or a thin screwdriver, inserted in the air intake or by means of the built-in piston lifting pin.

(8) If, when the piston is lifted, the engine speed increases, the mixture is too rich and the jet adjusting nut must be screwed up one-sixth of a turn. If the speed decreases, the mixture is too lean and the nut should be screwed down one-sixth of a turn.
(9) Continue adjusting each carburettor until, when the piston is lifted, no increase, or a very slight increase followed by a decrease in speed is noticed. The mixture is then correct and the engine should run regularly.
(10) Reconnect and adjust choke cable. Adjust fast idle adjustment screw on the connecting linkage between choke lever and throttle until the screw tip is just clear of the lifter; the clearance at this point should be about 1/64in.
(11) Refit the air duct and air-cleaner. Recheck idle speed and mixture.

Fuel pump: The electric SU fuel pump is located in the right-hand side of the luggage compartment.

In Fig. 16 an exploded view of the PD type pump is shown.

1 Outlet union
2 Delivery valve
3 Valve cage
4 Spring clip
5 Fibre washer
6 Suction valve spring
7 Suction valve
8 Inlet union
9 Diaphragm
10 Armature guide rollers
11 Volute spring
12 Magnet coil
13 Outer rocker
14 Inner rocker



15 Spring blade with contacts
16 Earth terminal
17 Condenser
18 Cover
19 Terminal screw
20 Rocker hinge pin
21 Iron core
22 Push-rod
23 Steel armature
24 Filter

Fig. 16. SU fuel pump

Specifications:

Output:	10 gallons 3·5 pints (Imperial) per hour
	12·5 US gallons per hour
Pump suction:	33 in fuel column
Pump pressure:	48 in fuel column

Air-cleaner: AC oil-bath air-cleaner. The air-cleaner should be cleaned and filled with fresh oil every 3000 miles. If the car is operated under severely dusty conditions, the air-cleaner must be cleaned more frequently. See also page 12.

Cooling system: Pressurised water cooling with pump and fan. A thermostat is fitted in the water outlet in the front of the cylinder head. When the thermostat is closed, the water circulates via a by-pass pipe. For capacities, see page 12.

The cooling system is provided with two drain taps, one on the right-hand side of the cylinder block, the other at the radiator base. As the cooling system is pressurised, the filler cap must be removed before the cooling system is drained. The pressure relief valve in the filler cap opens whenever the pressure in the cooling system exceed 4 lb/sq in. When a heater is fitted, antifreeze should be used for frost-precaution as the heater cannot be drained completely.

Water pump: Impeller type water pump.

Up to engine number 15R–U–H 715, the water-pump shaft was supported on two ball bearings. Starting with the engine number mentioned above, a new water pump was installed, having a unit type bearing and shaft assembly. The new water pump is interchangeable with the former type.

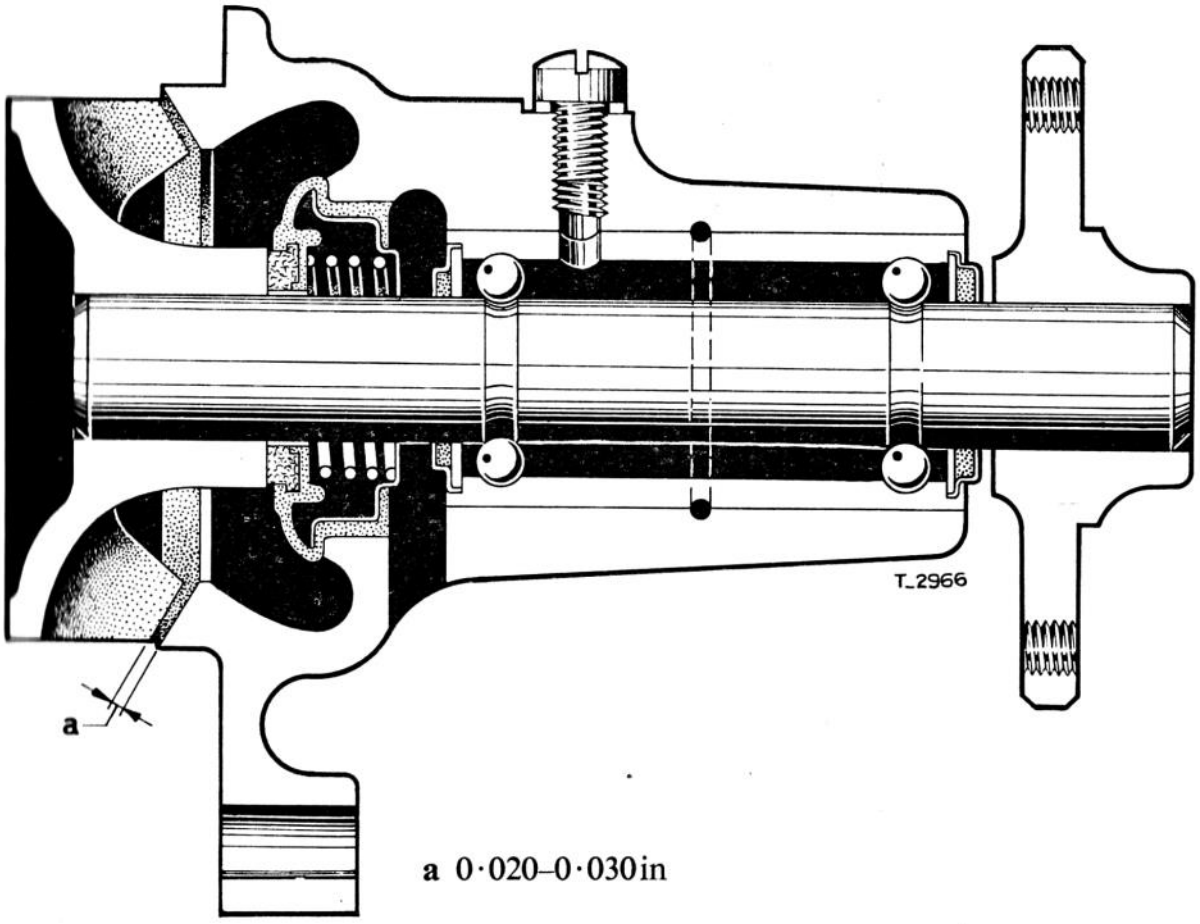


Fig. 17. Waterpump (later type)

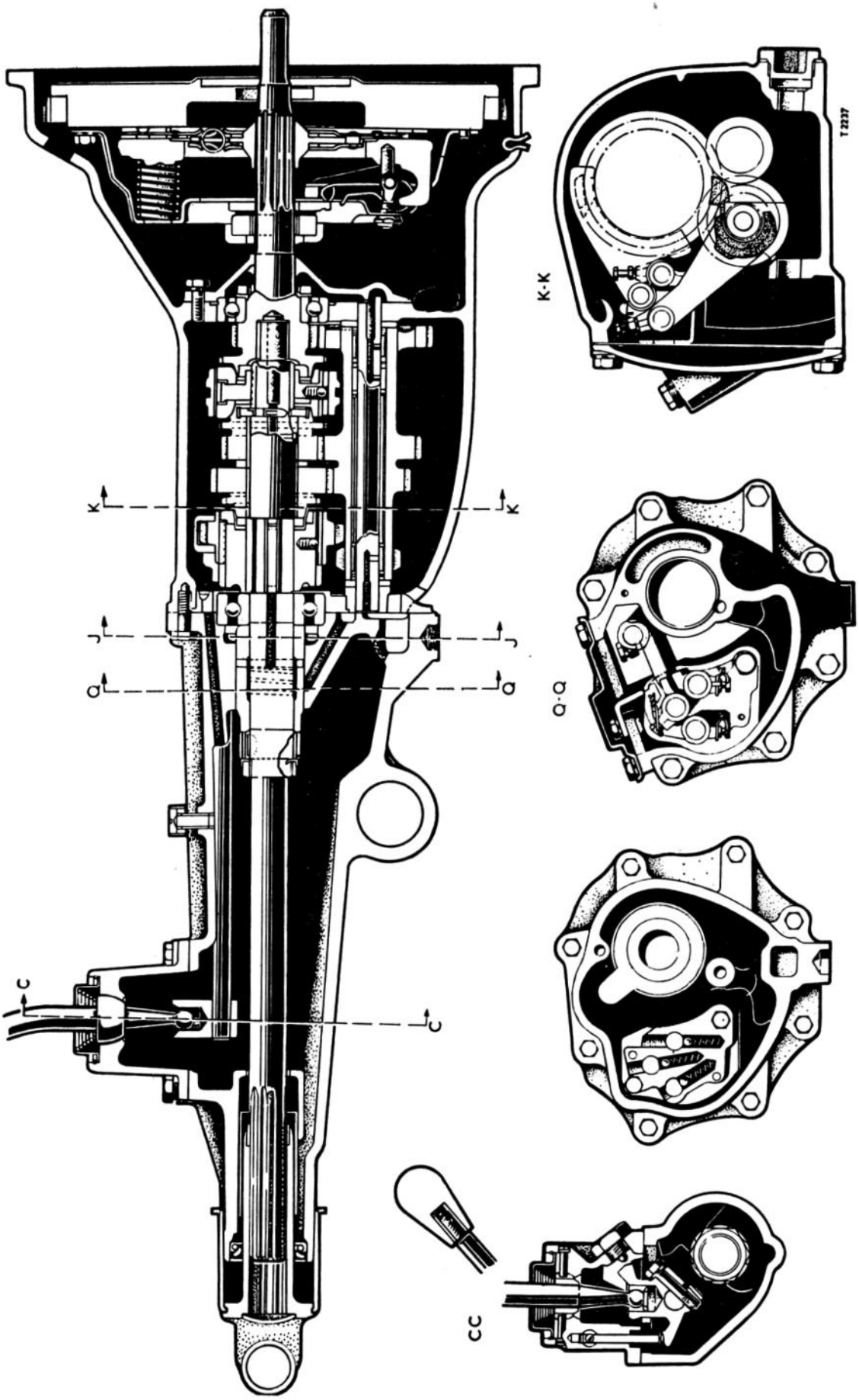


Fig. 18. Gearbox, sectional view

Thermostat: The thermostat is set to open from 70 to 75°C (158–167°F). This setting cannot be altered, but for winter conditions a thermostat with a higher setting can be obtained.

Frost precautions: The cooling system is unsuitable for the use of antifreeze mixtures with an alcohol base, owing to the high temperatures attained in the top radiator tank. Only antifreeze mixtures of the ethylene/glycol or glycerine type should be employed. Use only antifreeze of a reputable brand and mix it according to the manufacturer's instructions. See also under *Cooling system* on page 12.

TRANSMISSION

Clutch: Borg & Beck single dry-plate clutch, hydraulically-operated. The clutch release bearing is a carbon ring in a bearing cup; when worn, the complete bearing must be replaced.

Specifications:

Type:	A6–G
Diameter:	8in
Number of thrust springs:	6
Colour:	black and yellow
Number of damper springs:	6
Colour:	black and light green
Maximum permissible run-out of clutch plate:	0·015in
Release lever ratio:	4·6 : 1
Maximum permissible variation in spring pressure, when assembled:	10–15lb

Clutch master cylinder: The clutch master cylinder is mounted on the scuttle.

The fluid reservoir, which is built together with the master cylinder, should be topped-up with Lockheed Genuine Brake Fluid or fluid conforming to specification SAE 70 R3. The fluid level must be maintained at ½in below the bottom of the filler neck.

On later cars a new method of securing the push-rod in the cylinder is used. This cylinder can be identified by a circular groove. The new type of push-rod is not interchangeable with that used in earlier cars.

Gearbox: Four-speed gearbox with synchromesh on second, third and top gear. Top gear is a direct drive, third and second are constant mesh gears, and first and reverse gear are obtained by sliding spur gears.

Modifications:

From gearbox number 3525 a modified gearbox side cover is installed, having the filler plug in a more accessible position. If the new cover is installed on a gearbox prior to the number mentioned above, a hole must be cut in the gearbox tunnel to make the filler plug accessible.

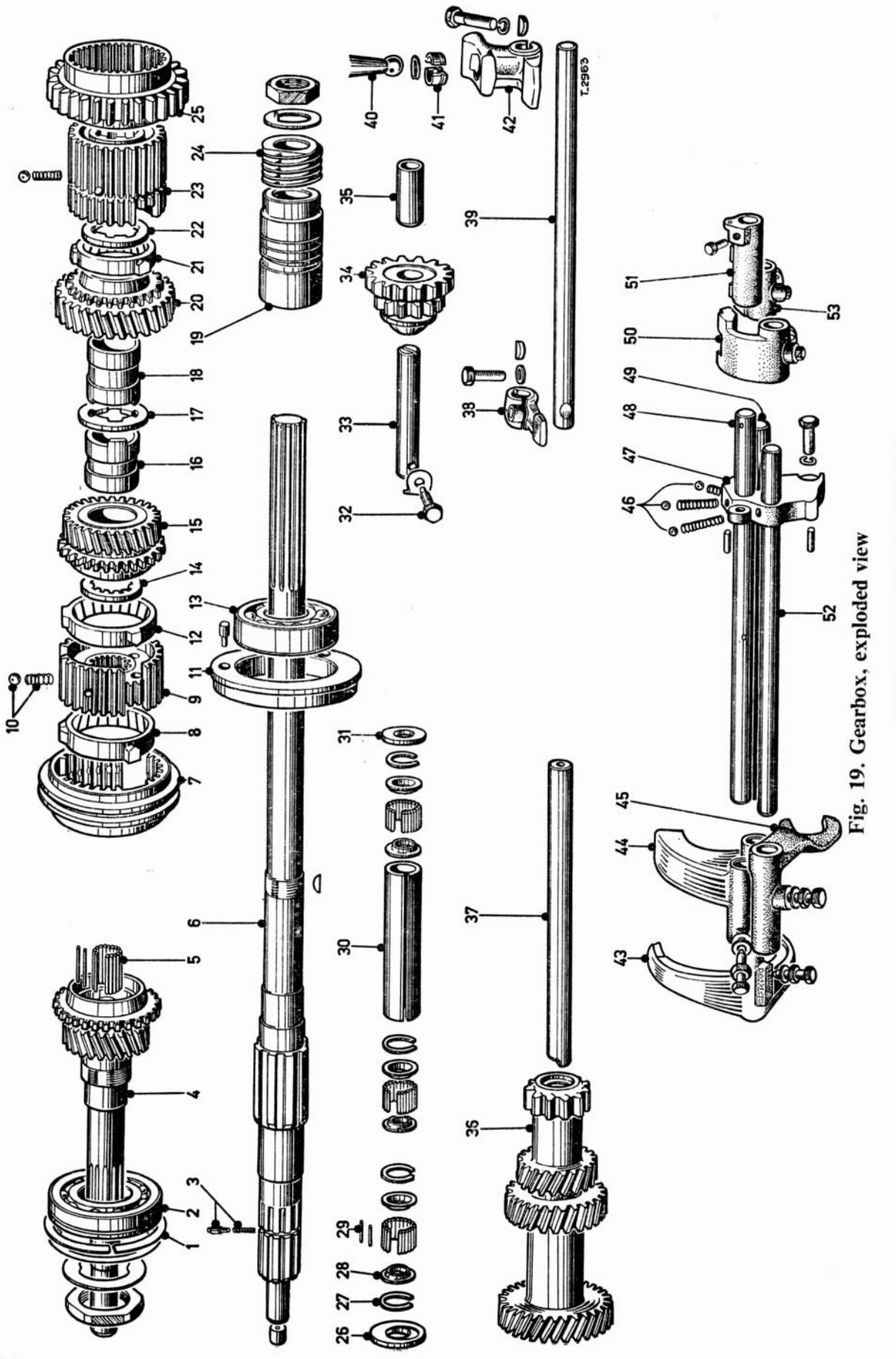


Fig. 19. Gearbox, exploded view

Cars equipped with the RB-type engine have a combined filler plug and dip-stick hole on top of the gearbox.

Removal and dismantling:

After removal from the car, the gearbox is dismantled as follows:

(1) Unscrew the speedometer drive, but do not withdraw the pinion from the bush, or the oil-seal will be damaged. Remove the gear lever and the gear-lever tower.

(2) Remove the extension housing top cover. Remove the interlock arm and plate from the extension housing.

Remove the gearbox side cover.

(3) Unscrew the bolts securing the extension housing to the gearbox, pull the extension housing rearward and turn it to free the shifter/selector finger from the shifter dogs. Remove the gearbox extension.

The dismantling and reassembly of the gearbox extension and the gear-lever tower is a straightforward operation, which requires no special description.

NOTE: Do not remove the sliding joint bush unless necessary, as removal will make it unfit for further use.

(4) Break the lock wire and unscrew the shifter-dog set bolts. Remove the shifter dogs.

Unscrew the three shifter-fork set screws.

(5) Unscrew the two cap screws securing the shifter-fork shaft guide block and withdraw the shifter-fork shafts, together with the guide block, from the gearbox. Take care not to lose the two dowels.

Key to Fig. 19:

1 Circlip
2 Main drive pinion bearing
3 Interlock plunger and spring
4 Main drive pinion
5 Mainshaft pilot bearing
6 Mainshaft
7 Third/top-gear synchronizer sleeve
8 Top-gear baulk ring
9 Third/top-gear synchronizer hub
10 Detent ball and spring
11 Mainshaft bearing housing
12 Third-gear baulk ring
13 Mainshaft rear bearing
14 Front thrust washer
15 Third-gear idler pinion
16 Third-gear idler pinion bush
17 Interlock ring
18 Second-gear idler pinion bush
19 Spacer bush with oil scroll
20 Second-gear idler pinion
21 Second-gear baulk ring
22 Rear thrust washer
23 Second-gear synchronizer hub
24 Speedometer worm wheel
25 First-gear sliding pinion
26 Front thrust washer
27 Circlip
28 Needle-bearing cage
29 Bearing needles
30 Spacer bush
31 Rear thrust washer
32 Set bolt
33 Reverse idler shaft
34 Reverse idler gear
35 Bearing bush
36 Countershaft gear cluster
37 Counter shaft
38 Selector/shifter finger
39 Remote-control shaft
40 Gear lever
41 Gear-lever bush
42 Selector/shifter socket
43 Third/top-gear shifter fork
44 First/second-gear shifter fork
45 Reverse-gear shifter fork
46 Detent balls and springs
47 Shifter-fork shaft guide block
48 First/second shifter-fork shaft
49 Third/top-gear shifter-fork shaft
50 Reverse-gear selector dog
51 First/second-gear selector dog
52 Reverse-gear shifter-fork shaft
53 Third/top-gear selector dog

(6) Wrap the guide block in a cloth to prevent the detent balls from jumping out and withdraw the shifter-fork shafts. Remove the shifter forks from the gearbox in the following order: reverse; top/third; second/first.
(7) Remove the clutch fork and the clutch-release bearing.

Remove the main-drive gear bearing cover complete with oil-seal, taking care not to lose the shims between the bearing cover and the bearing.
(8) Gently tap out the countershaft and lower the gear cluster to the bottom of the gearbox.

Unscrew the reverse idler-shaft set bolt, drive out the shaft and remove the reverse idler gear.
(9) Withdraw the mainshaft assembly towards the rear and the main drive gear towards the front. Take care not to lose the 18 needle rollers.

Remove the countershaft gear cluster and the two thrust washers.
(10) The needle bearings and spacer can be pushed from the countershaft gear cluster after removal of a circlip.

To reassemble the needle bearings proceed as follows:

Install a circlip in the innermost groove of the gear cluster.

Clamp the countershaft vertically in a vice (cut-away portion downwards) and assemble the inner roller bearing on the shaft against the vice jaws.

Slide the gear cluster with the large gear downwards over the shaft and the bearing.
(11) Remove the shaft from the vice and push the bearing against the circlip. Install a circlip, the end-roller assembly and a circlip.

Insert the spacer tube into the other end of the gear cluster.

Install the end-bearing and a circlip. Remove the countershaft.

The mainshaft is dismantled as follows:
(1) Remove the top-gear baulk ring, synchronizer hub, together with the synchronizer sleeve and third-gear baulk ring. When the shifter sleeve is separated from the synchronizer hub, care must be taken not to lose the balls and springs.
(2) Depress the small spring-loaded plunger in the front end of the mainshaft and turn the splined ring, so that one of its teeth covers the plunger.
(3) Slide the splined ring, together with the third-gear idler pinion and its bush, off the mainshaft; remove the plunger and the spring.

Slide the interlock ring and the second-gear idler pinion, together with its bearing bush and baulk ring, off the mainshaft.
(4) Remove the rear thrust washer and slide the second-gear synchronizer hub and the first-gear sliding pinion from the mainshaft.

Take care not to lose the synchronizer balls and springs, when the first-gear sliding pinion is separated from the hub.
(5) Bend back the lock washer and unscrew the nut securing the speedometer worm wheel. Remove the lock washer, speedometer worm wheel, spacer bush and Woodruff key.

If necessary, the mainshaft ballbearing can be pressed off. Carefully clean and inspect all parts, and replace those that are damaged or worn.

Reassembly of the mainshaft:
(1) Slide the rear thrust washer, with the ground side towards the front, on to the mainshaft.

Heat the second-gear idler pinion bush in warm oil and pass it over the mainshaft (notches towards the front), making sure the oil hole in the bush corresponds with the bore in the mainshaft.

(2) Install the second-gear idler pinion and its baulk ring on the bearing bush. The plain side of the gear must be towards the front.
(3) Slide the interlock ring and the third-gear idler pinion bush over the mainshaft. Locate the notches of both bushes in the interlock ring.
(4) Slide the third-gear idler pinion, flat face first, on to its bearing bush; install the spring-loaded plunger in the hole in the mainshaft. Depress the plunger and pass the front thrust washer, machined face towards the gear, over it. Turn the thrust washer until the plunger is released and locks it.
(5) Assemble the synchronizer balls and springs to the third/top-gear synchronizer hub and slide the synchronizer sleeve over it.
(6) Install the third/top-gear synchronizer hub assembly, together with the two baulk rings, on the mainshaft. The plain side of the hub must face the rear.
(7) Assemble the synchronizer balls and springs in the second-gear synchronizer hub and slide the first-gear sliding pinion over it.
(8) Install the second-gear synchronizer hub, the first-gear sliding pinion and the baulk ring on the mainshaft.
(9) Press the rear mainshaft bearing into its housing and press it on to the shaft. Slide the spacer bush over the mainshaft and fit the speedometer worm wheel. Tighten the nut and bend over the lock washer.

Reassembly of the gearbox:

(1) Insert dummy shaft 18G471 into the countershaft, assemble the needle bearings, spacer bush and thrust washers, and lower the complete gear cluster to the bottom of the gearbox.
(2) Reinstall the main drive gear, making sure that the bearing is correctly located. Stick the 18 bearing needles with grease in the pilot bearing bore.
Insert the mainshaft into the gearbox and enter the spigot in the needle rollers of the main drive gear.
Offer up the gasket, fitted between the gearbox and the extension housing, to position the dowel and the bearing housing. Push the mainshaft right home.
(3) Lift the countershaft gear cluster into mesh with the mainshaft gear and the main drive gear, insert the countershaft and line-up the cut-away portion in the front end of the shaft with the locating groove in the front cover.
(4) Install the reverse idler gear and shaft and secure the shaft with a lock bolt.
(5) Fit the main drive gear bearing cover, together with the shimpack found during dismantling. Install the clutch lever and fork.
(6) Place the shifter forks in the following order in the gearbox: first/second; third/top; and reverse.
(7) Bolt the shifter-shaft guide block to the rear face of the gearbox, refit the detent springs and balls, and push the shifter-fork shafts through the guide block into the respective shifter forks.
Tighten the set bolts.
(8) Place the shifter dogs on the rear ends of the shifter-fork shafts; tighten and wire the set bolts.
(9) If necessary, replace the extension housing oil-seal, preferably with tool 18G134 and adaptor 18G134N.
Bolt the extension housing to the gearbox, making sure that the shifter/selector finger engages the shifter dogs properly.
(10) Reinstall the interlock arm and plate, and fit the top cover. Bolt the gear-lever tower and the side cover to the extension housing. Screw in the speedometer drive and fill the gearbox with the correct grade of oil.

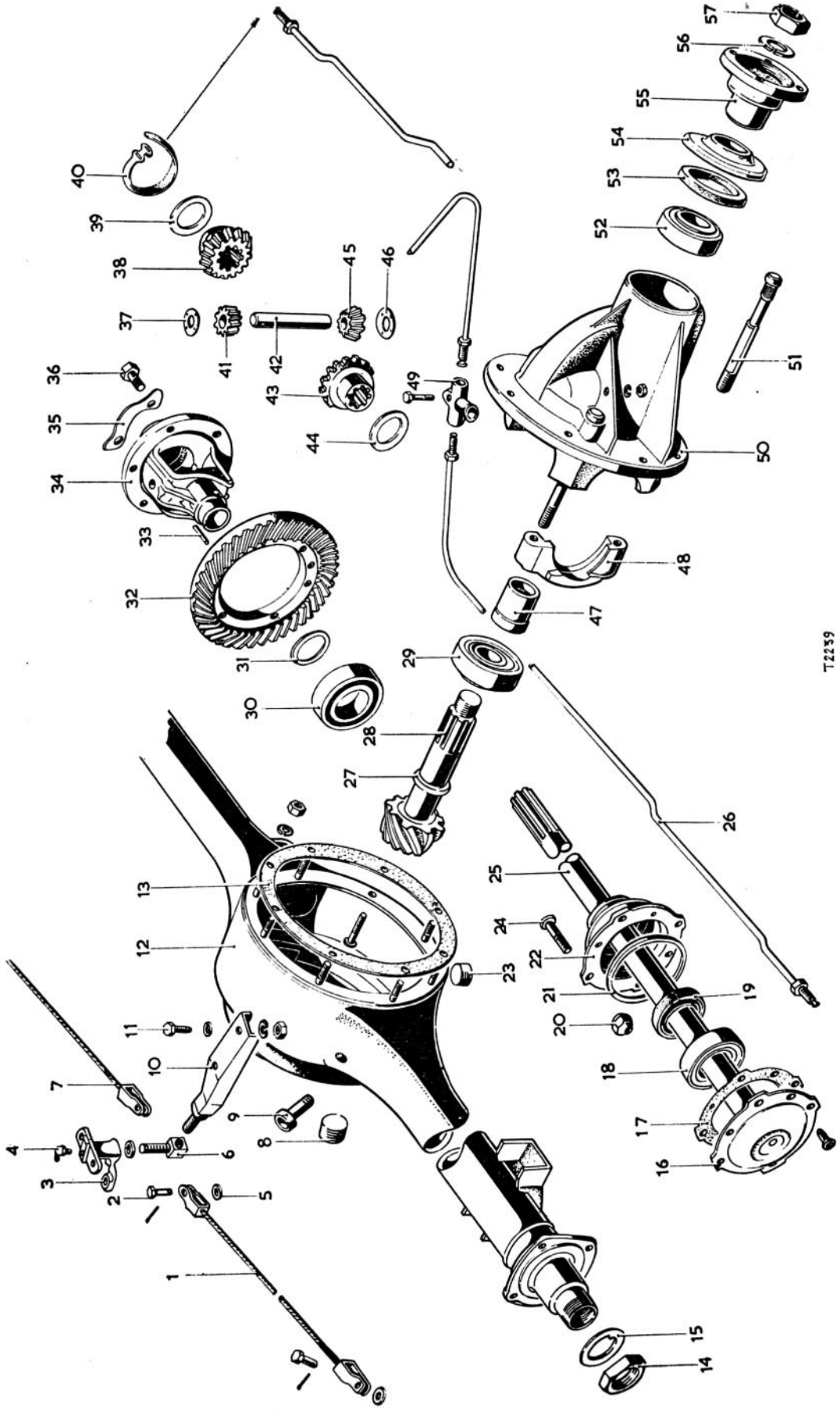


Fig. 20. Rear axle/differential, exploded view

Propeller shaft: Open propeller shaft with Hardy-Spicer universal joints. The front yoke of the front universal joint is a sliding fit over the gearbox mainshaft splines.

NOTE: Prior to removing the shaft, the flange of the rear universal joint and the pinion mating flange must be marked, in order that the shaft may be refitted in its original position.

Do not forget to top-up the gearbox after the propeller shaft has been reinstalled.

Length, centre to centre: $38\frac{7}{8}$in
Diameter: 2in

Rear axle/differential: Three-quarter floating rear axle with hypoid pinion and crownwheel. In Fig. 20 an exploded view of the rear axle is shown. Rear axle ratio: 11/41 (3·73:1).

Removal of a hub:

(1) Jack-up the car and remove the appropriate wheel. Remove the brake drum. Take precautions to prevent rear-axle oil from leaking on to the brake linings when the shaft is withdrawn.
(2) Unscrew the drive-shaft retaining screw and pull the drive shaft outwards.

Key to Fig. 20:

1 Parking brake cable
2 Fulcrum pin
3 Balance lever
4 Grease nipple
5 Washer
6 Fulcrum bolt
7 Parking brake cable
8 Filler plug
9 Breather
10 Balance lever support
11 Bolt, balance lever support to housing
12 Rear axle housing
13 Gasket
14 Hub nut
15 Lock washer
16 Stub axle flange
17 Gasket
18 Wheel bearing
19 Grease seal
20 Wheel nut
21 Oil-seal ring
22 Hub
23 Drain plug
24 Wheel stud
25 Stub axle
26 Brake line
27 Pinion thrust washer
28 Pinion
29 Pinion rear bearing
30 Differential bearing
31 Shim
32 Crownwheel
33 Differential pinion shaft lock pin
34 Differential housing
35 Lock plate
36 Crown wheel bolt
37 Washer
38 Differential side gear
39 Thrust washer
40 Retaining clip, brake line to axle
41 Differential pinion
42 Differential pinion shaft
43 Differential side gear
44 Thrust washer
45 Differential pinion
46 Thrust washer
47 Spacer bush
48 Differential bearing cap
49 Three-way connection
50 Differential carrier
51 Bearing-cap stud
52 Pinion front bearing
53 Oil-seal
54 Dust cover
55 Companion flange
56 Lock washer
57 Pinion nut

(3) Bend back the lip of the lock washer and unscrew the bearing retaining nut (the left-hand hub nut has left-hand thread). Remove the washer.
(4) Withdraw the hub with a suitable extractor. The bearing and grease seal will come away with the hub. If necessary, the bearing and grease seal can be pressed out; a new grease seal is fitted with its lip towards the bearing.

Reassembly and reinstallation are done in the reverse order of removal. The outer face of the bearing must protrude 0·001–0·004in beyond the outer face of the hub to ensure that the bearing is gripped between the abutment shoulder in the hub and the drive flange of the axle shaft.

Removal and dismantling of the differential:

(1) Drain the rear axle. Disconnect the propeller shaft (mark the flanges to facilitate reinstallation), and remove the drive shafts as previously described.
(2) Unscrew the nuts securing the differential carrier to the axle housing and remove the carrier.
(3) Ensure that the differential bearing caps are marked; unscrew the bearing-cap nuts and remove the differential housing.
(4) Tap out the differential pinion shaft lock pin from the crownwheel side and remove the differential shaft, the pinions, thrust washers and side gears.
(5) Remove the differential bearings with a suitable puller. Note that the bearings are marked on one side with the word 'thrust'.

Take care not to lose the shims fitted between each bearing and the differential housing.

(6) Knock back the tabs of the lock washers, unscrew the crownwheel bolts, and gently tap the crownwheel from the housing.
(7) Remove the pinion mating flange and gently tap the pinion rearward. The pinion rear bearing inner race will come away with the pinion.
(8) Remove the pinion shaft oil-seal and the pinion front bearing inner race. If necessary, the bearing outer races can be withdrawn with a suitable puller.
(9) Slide the spacer bush and the shims off the pinion shaft. Now the pinion rear bearing can be withdrawn.

Carefully clean and inspect all parts and replace those that are damaged or worn.

Reassembly and adjustment:

(1) Reinstall the pinion bearing outer races, place a shim of known thickness on the pinion head and press on the pinion rear bearing.
(2) Install the pinion in the carrier, fit the pinion front bearing and the companion flange, tighten the nut until 8–10in/lb bearing preload is obtained. The oil-seal, the spacer bush and pre-load shims are omitted at this stage.
(3) Zero the dial gauge on the machined step of gauge block 18G191B.

Remove the keep disc from the magnetic gauge block and position the magnet and the dial gauge on the pinion.

The dial gauge plunger must rest on the centre of the differential bearing bore. Make a note of the maximum depth reading.

Repeat this check in the opposite bearing bore and note the mean reading.

(4) The pinion head is in some cases marked with an unbracketed minus figure.
   (*a*) If the gauge reading is minus, the gauge reading must be added to the pinion head marking and the thickness of the shims be reduced by this amount.
   (*b*) If the gauge reading is plus, but numerically less than the pinion head marking, the shim thickness must be reduced by the difference.
   (*c*) If the gauge reading is plus and numerically greater than the pinion head marking, the shim thickness must be increased by the difference.

Example (a):

Gauge reading:	- 0.003in
Pinion head marking:	- 0.002in
Amount to be subtracted from the shim thickness:	- 0.005in

Example (b):

Pinion head marking:	- 0.004in
Gauge reading:	+ 0.003in
Amount to be subtracted from the shim thickness:	- 0.001in

Example (c):

Gauge reading:	+ 0.006in
Pinion head marking:	- 0.003in
Amount to be added to the shim thickness:	- 0.003in

When the gauge reading is plus and numerically equal to the pinion head marking, no correction is necessary.

(5) The actual mounting distance (pinion depth adjustment) of the pinion is marked on the pinion head in a rectangular bracket.

If the marking is a plus figure, the washer thickness must be reduced by an equal amount.

If the marking is a minus figure, the washer thickness must be increased by the same amount.

(6) Remove the pinion, install the correct number of shims under the pinion head and assemble the bearings, the new spacer bush, the pre-load shims, oil seal and mating flange.

(7) Tighten the pinion nut gradually to 140 ft lb. Check the pre-load frequently; this should not exceed 13 in lb, or the spacer bush will be deformed. When, however, this pre-load is exceeded, the pinion must be removed and a new spacer bush installed.

If necessary, correction to the pre-load is made by adding or removing shims between the spacer bush and the pinion front bearing.

(8) Install a differential bearing on the small surface plate of tool 18G 191B, the inner race over the recess and the side marked 'thrust' facing downwards.

(9) Place the magnetic gauge block on to the surface plate and zero the dial gauge on the step marked 'A'. Transfer the pointer to the plain surface of the bearing inner race and press the race firmly against the balls. Make a note of the dial reading.

A positive reading denotes the thickness of the shimpack to be subtracted from the shims at this side; a negative reading indicates the thickness of the shimpack to be added (variations from standard width of bearings, see also (10) and (11)).

Repeat this operation with the other bearing.

(10) Refer to Fig. 21.

Variations from the dimensions A and B are stamped on the differential carrier, near the bearing bores.

Variations from the dimensions C and D are stamped on the differential housing

The shimpack on the left-hand side is established as follows: A + D - C + 0·002in.

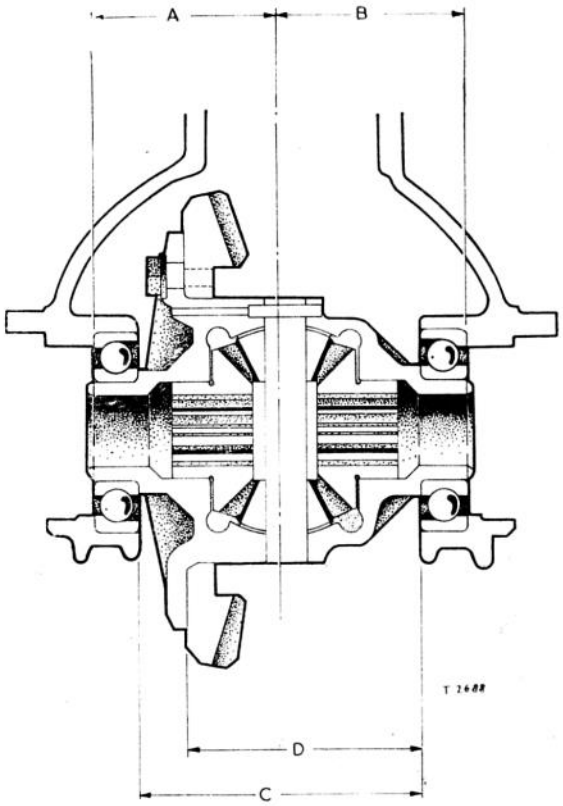


Fig. 21. Differential adjustment

A. Centre line of differential unit to bearing shoulder in carrier on left-hand side.

B. Centre line of differential unit to bearing shoulder in carrier on right-hand side.

C. Total width between bearing shoulders on differential housing.

D. Crownwheel mating face to bearing shoulder on right-hand differential housing

The shimpack on the right-hand side is calculated as follows: B—D+0·006in.

The letters in the formula are to be substituted by the dimensional variations stamped on the carrier and the housing.

(11) Compose shimpacks as described under (10) and add or subtract the correction for the bearing height as established under (9).

When the back of the crownwheel is marked with a framed number, this must be taken into account before assembling the shims and bearings to the differential housing.

If the framed number on the crownwheel is, *e.g.* —2, a shim of 0·002in must be transferred from the right-hand side to the left-hand side (crownwheel side). If the number is +2, a shimpack of 0·002in must be transferred from the left-hand side to the right-hand side.

Press the differential bearings (thrust face outwards) and the shims into the differential housing.

(12) Assemble the side gears, the differential pinions, thrust washers and the pinion shaft to the differential housing; burr over some metal to secure the lock pin in place.
(13) Bolt the crownwheel onto the differential housing (60 ft lb), but do not yet bend over the lock plates.

Place the assembly in 'V' blocks and check the crownwheel run-out by means of a dial gauge.

The maximum permissible run-out is 0·002in. When the crownwheel runs true, the lock plates can be knocked over.
(14) Install the differential housing, together with the differential bearings, in the carrier; install the bearing caps in their original positions and tighten the bearing-cap nuts to 65 ft lb.
(15) Check gear backlash with a dial gauge. The recommended backlash is etched on the crownwheel. Backlash should be within 0·004–0·007in. Backlash is adjusted by moving the crownwheel in or out of mesh by transferring shims from one side to the other. Do not alter the total number of shims. The transfer of a 0–002in shim from one side to the other results in a variation in backlash of about 0·002in.
(16) Further reassembly is done in the reverse order of removal.

CHASSIS

Chassis/body: The all-steel body and chassis are welded together to form a single unit. See Fig. 22 for dimensions.

Front suspension: Independent front suspension by means of torsion bars and double-acting hydraulic shock-absorbers of the lever type. In Fig. 23 an exploded view of the front suspension system is shown.

Torsion bar adjustment:
To correct any list on the car which may develop if the torsion bars have not settled evenly, an adjuster is provided at the rear end of each torsion bar.

The correct adjustment can be checked by measuring the riding height. For dimensions refer to Fig. 22 on page 44.

NOTE: On 1961–1962 models the riding height has been decreased.

If necessary, the riding height is adjusted as follows:
(1) Jack-up the front of the car and place stands beneath the forward end of the front door sills. Remove the wheels.
(2) Place a jack beneath the outer end of the lower suspension arm and raise it until the shock absorber arm is just clear of the rebound rubber.

Take precautions to ensure that the jack does not slip while the torsion bar load is taken.
(3) Disconnect the locating rod from the fork on the lower suspension arm and remove the front half of the lower suspension arm from the outer fulcrum pin.
(4) Carefully lower the jack until the load is taken off the torsion bar.
(5) Slacken the adjuster lock nut and turn the adjuster in the required direction. Turning the adjuster in a clockwise direction will lower the car, and turning in an anti-clockwise direction will raise it.

Tighten the lock nut after completing the adjustment.

If the adjusting arm is rotated by one spline of the torsion bar, the car will be raised or lowered approximately 1½in.

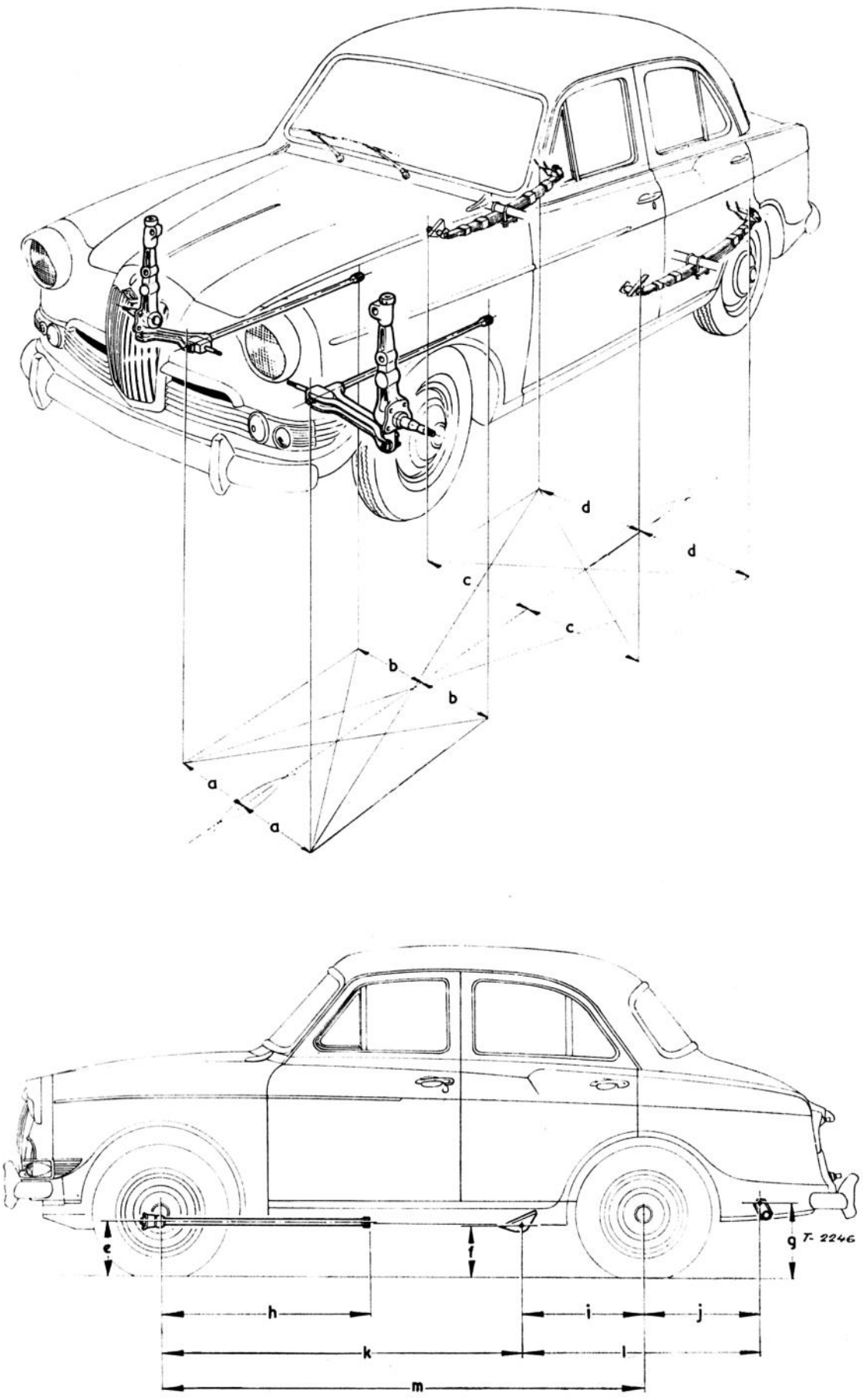


Fig. 22. Body floor dimensions

Reassembly is done in the reverse order of removal.

Removal of a torsion bar:

Proceed as described under (1) to (4) of *Torsion bar adjustment*, then continue as follows:

(1) Mark the position of the torsion bar relative to the lower arm and the rear bracket. Use paint or chalk and *never* scratch or centre-punch the bar.

(2) Remove the nut and bolt securing the adjuster arm to the cross-member and remove the adjuster arm.

(3) Pull the torsion bar rearwards to disengage its splines from the splines in the rear half of the lower suspension arm.

The front face of the torsion bar can be tapped with a copper or hide mallet. Working the suspension arm up and down may facilitate the removal of the torsion bar.

NOTE: Mark the bar to avoid interchanging it with the bar on the opposite side.

Always be very careful not to damage the torsion bars in any way, since a slight scratch or nick is likely to result in a broken torsion bar later on.

Reinstallation:

Always reinstall a torsion bar on the side from which it was removed, as a torsion bar becomes handed in service. Torsion bars are only interchangeable when new.

Each torsion bar is provided with 48 splines at each end, and for each consecutive spline position at the rear end a radial movement of the steering swivel of approximatley $1\frac{1}{2}$in is obtained.

(1) Support the front end of the car on stands and adjust the jack beneath the lower suspension arm, until the centre line through the outer fulcrum pin of the suspension arm is 7 1/16in below the centre line of the torsion bar.

NOTE: The car must be standing on a level floor and measurements must be taken from a horizontal flat plane. When a new torsion bar is to be installed, this difference in height must be increased to 7 7/16in to allow for a small permanent set, which takes place when the bar is loaded for the first time.

(2) Insert the rear end of the torsion bar through the cross-member and engage the front end in the suspension arm.

(3) Slide the adjuster arm over the serrations on the rear end of the bar, lining-up the bolt hole in the arm with the slot in the cross-member.

(4) Install the locating plate and insert the torsion bar retaining bolt from the cross-member side. Replace and tighten the nut.

(5) Raise the jack and reinstall the front half of the lower suspension arm over the outer fulcrum pin. Make sure that the rubber seals and thrust washers are correctly located.

Further reassembly is done in the reverse order of removal.

Recheck the riding height by measuring the difference in height of the inner and outer fulcrum points. This distance should be 15/16in on an unladen car and must be equal on right- and left-hand side.

Key to Fig. 22:

a	11 19/32in	**e**	9·1in	**h**	37 9/16in	**k**	$64\frac{1}{8}$in
b	12in	**f**	9 1/64in	**i**	$21\frac{7}{8}$in	**l**	$42\frac{5}{8}$in=0·060in
c	20in	**g**	13 21/32in	**j**	$20\frac{3}{4}$in	**m**	86in
d	20in						

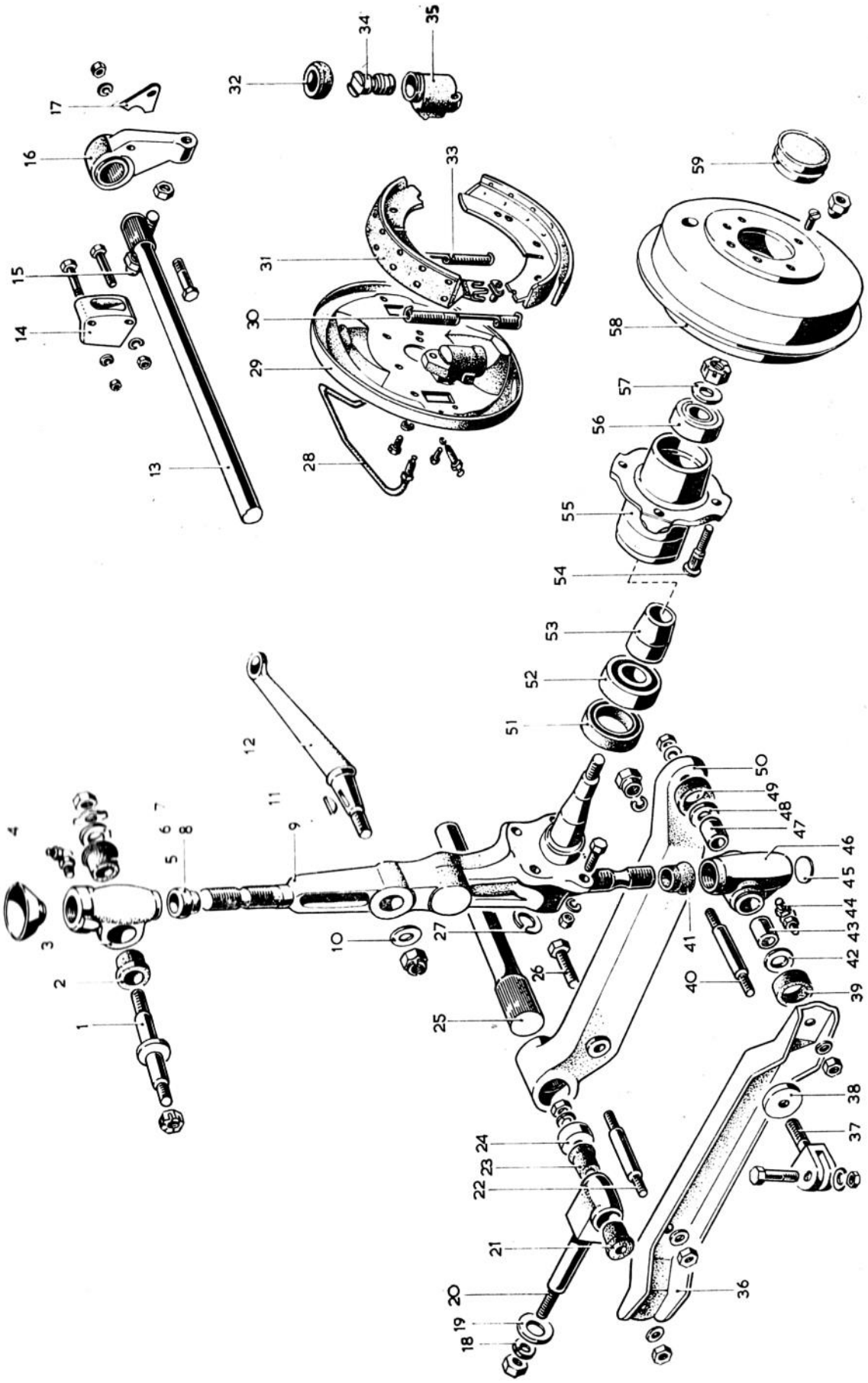


Fig. 23. Front suspension, exploded view

Front wheel alignment:

Camber: 3/4° positive
Caster: 3° positive.
King pin inclination: 9°.

Toe-in: The front wheels must be parallel to each other, with the car in an unladen condition.

Caster and camber are accurately set during production and no adjustment should be necessary. Toe-in may be adjusted by varying the length of the track rods.

Rear suspension: Rear suspension by means of conventional semi-elliptic leaf springs and double-acting hydraulic shock-absorbers of the lever type.

The front spring eye and the rear spring shackles are fitted with rubber bushes.

When reinstalling the rear springs, do not tighten the front spring eye-bolt and the shackle nuts until the normal load is applied to the springs, so that the flexible rubber bushes are deflected to an equal extent in both directions during service. Failure to take this precaution will inevitably lead to early deterioration of the spring bushes.

Key to Fig. 23:

1 Upper fulcrum shaft
2 Rubber bush
3 Upper trunnion
4 Plug and stop-plate assembly
5 Rubber bush
6 Washer
7 Lock washer
8 Seal
9 Steering swivel
10 Washer
11 Woodruff key
12 Steering arm
13 Torsion bar
14 Rear bracket
15 Adjuster
16 Adjuster arm
17 Lock plate
18 Lock washer
19 Washer
20 Inner fulcrum pin
21 Rubber bush
22 Inner fulcrum shaft
23 Rubber bush
24 Spigot ring
25 Torsion bar
26 Tie-bolt
27 Lock washer
28 Balance pipe
29 Brake backing plate
30 Retracting spring
31 Brake shoe
32 Dust boot
33 Retracting spring
34 Piston
35 Brake cylinder body
36 Lower suspension arm, front half
37 Fork for locating rod
38 Washer
39 Rubber bush
40 Outer fulcrum shaft
41 Seal
42 Washer
43 Bush
44 Grease nipple
45 Welch plug
46 Lower trunnion
47 Bush
48 Washer
49 Rubber bush
50 Lower suspension arm, rear half
51 Grease seal
52 Inner wheel bearing
53 Spacer bush
54 Wheel stud
55 Hub
56 Outer wheel bearing
57 Washer
58 Brake drum
59 Grease cap

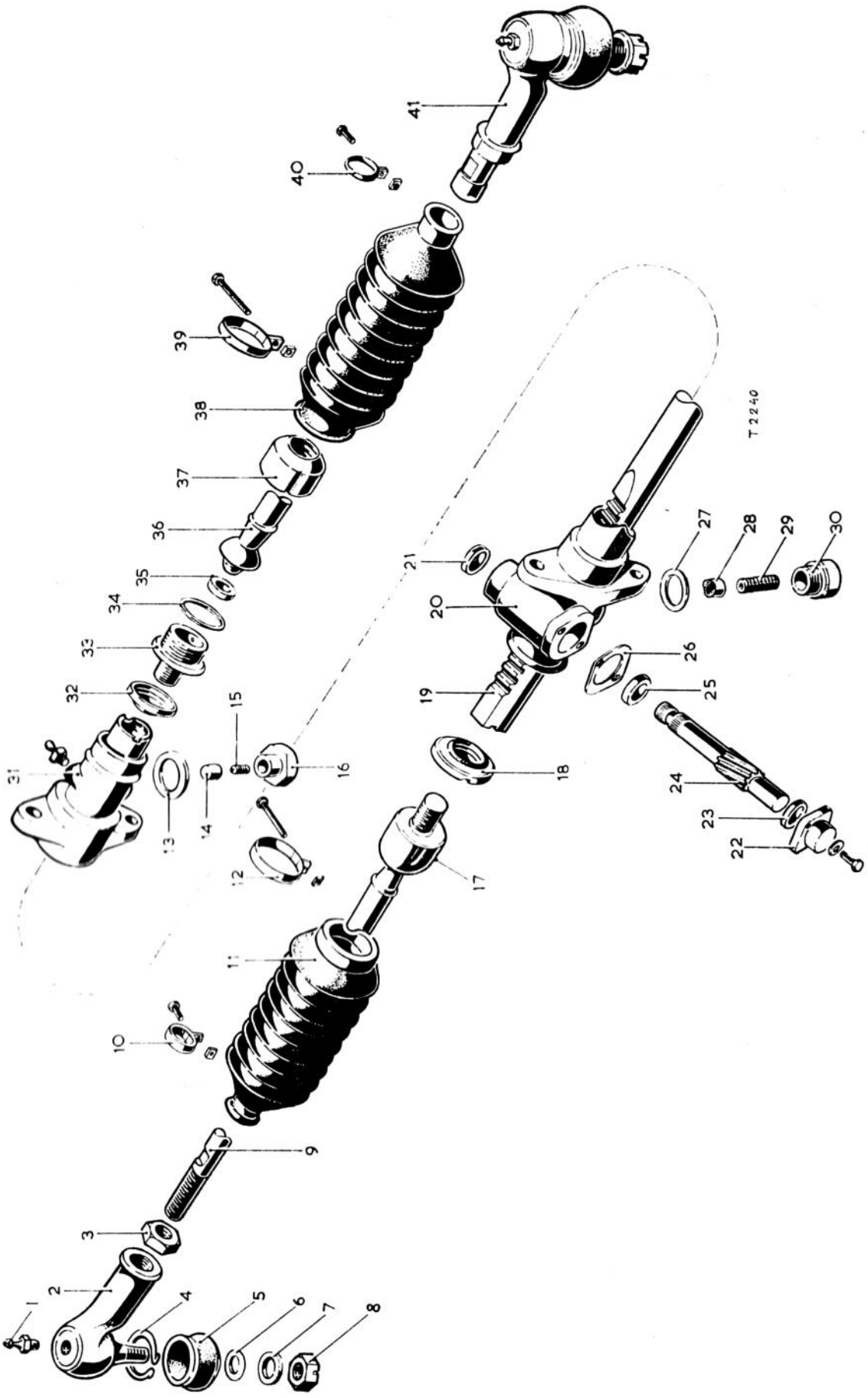


Fig. 24. Steering gear, exploded view

Wheel bearings and hubs: The front wheel hubs run on two non-adjustable ball-bearings, pre-load being determined by a collapsible spacer.

The rear wheel hubs run on a single non-adjustable ballbearing, which is fitted to the outer end of the rear-axle housing.

Shock-absorbers: Hydraulic shock-absorbers of the lever type. The dampers are set during production and no attempt should be made to dismantle without the use of special tools.

Shock-absorbers which do not function properly must be replaced. Armstrong Super Thin Shock-absorber Fluid should be used for topping-up. If this fluid is not available, any mineral oil of a reputable brand, conforming to SAE 20/20W, can be used. This alternative, however, is not suitable for low-temperature operation.

Steering gear: The steering gear is of the rack-and-pinion type; in Fig. 24 an exploded view is shown.

Removal:

(1) Disconnect the battery. Disconnect the wiring from the horn and direction-indicator switch.

(2) Remove the clamp nut and bolt from the serrated lower end of the steering column. Remove the steering column clamp from under the facia. Disengage the steering column from the pinion shaft splines and remove the column from the car.

(3) Unscrew the track-rod ball-joint nuts until they are flush with the end of the thread.

Sharply tap the steering-arm eye and drive the taper pin from its seating, while supporting the arm from above. Unscrew the castellated nut and remove the track rods. Note the position of the rubber washers.

Key to Fig. 24:

1 Grease nipple
2 Track-rod ball-joint
3 Lock nut
4 Circlip
5 Dust boot
6 Ring
7 Washer
8 Castellated nut
9 Track rod
10 Dust-boot clip
11 Dust boot
12 Dust-boot clip
13 Washer
14 Secondary damper pad
15 Spring
16 Secondary damper housing
17 Ball-joint assembly
18 Lock washer
19 Steering rack
20 Steering rack housing
21 Pinion seal
22 Pinion-shaft lower bearing
23 Lower thrust washer
24 Pinion
25 Upper thrust washer
26 Gasket
27 Washer
28 Rack-damper pad
29 Spring
30 Rack-damper housing
31 Steering-rack housing
32 Lock washer
33 Ball housing, male
34 Shim
35 Ball seat
36 Track rod
37 Ball housing, female
38 Dust boot
39 Dust-boot clip
40 Dust-boot clip
41 Track-rod ball-joint assembly

(4) Disconnect the propeller shaft, support the gearbox rear end with a jack and remove the rear engine cross-member. Lower the engine a *few inches.*
(5) Unscrew the four bolts securing the steering rack housing to the brackets on the body and remove the rack housing from the car.

Reinstallation is done in the reverse order of removal.

NOTE: Do not tighten the bolts securing the rack housing to the body until the steering column is reinstalled and the steering column clamp secured.

Dismantling of the steering rack housing:

(1) Measure and make a note of the distance from the inner ball joint to the outer ball-joint lock nut on both sides.
(2) Slacken the ball-joint lock nuts and unscrew the ball-joint assemblies.

Release one of the dust-boot clips and drain the steering gear. Remove the dust boots.

(3) Unscrew the hexagonal cap which is adjacent to the oil nipple and remove it, together with the spring and pressure pad.

Unscrew the damper cap on the pinion side and remove it, together with the pressure pad, spring and shims.

(4) Remove the two bolts securing the pinion-shaft lower bearing and remove the bearing and the shims.

Remove the pinion and the lower thrust washer. The upper thrust washer can be removed after removal of the rack.

(5) Secure the rack housing in a vice with soft jaws, bend back the lock washers and unscrew the inner ball-joint caps, preferably with tool 18G313.
(6) Withdraw the rack from the housing.

Screw the ball-seat housing from the ball-joint caps, preferably with tools 18G313 and 18G312.

Remove the shims and ball seats and suitably mark the shims, so that they are not interchanged.

Carefully clean and inspect all parts, and replace those that are damaged or worn.

Reassembly:

(1) Install a new lockwasher on one side of the rack, refit and tighten the ball-seat housing, refit the shims and ball seat, insert the track-rod ball-end, and screw up the ball housing until it is a tight sliding fit.

Adjustment is carried out by varying the thickness of shims fitted beneath the ball-seat housing. Shims of 0·005, 0·008 and 0·010in are available.

(2) Insert the rack in the housing and install the other ball joint in the same way. The centre tooth of the rack must be in the middle of the housing.
(3) Install the thicker pinion thrust washer, with its chamfered edge towards the rack, in the rack housing.

Place the thinner thrust washer on the plain end of the pinion (chamfered edge towards the pinion) and replace the pinion. Check that the centre tooth of the rack is in line with the mark on the splined end of the pinion shaft.

(4) Refit the shims and the pinion lower bearing. Check the axial clearance of the pinion shaft; this clearance should be within 0·002 and 0·005in. If necessary, vary the shim thickness to obtain the correct clearance.

Shims are available in thicknesses of 0·003, 0·005 and 0·010in.

(5) Install the dust boots and dust-boot clips.

Screw the ball-joint lock nuts and ball-joint assemblies into approximately their original positions. (Refer to the note made during dismantling.)

(6) Install the rack-damper thrust pad and the damper cap, omitting the shims and spring. Screw down the cap until it is just possible to rotate the pinion by drawing the rack through its housing.

Measure the gap between the damper cap and the damper-cap seat in the housing. Add to this figure 0·002–0·005in to obtain the thickness of the shim-pack, which must be placed beneath the damper cap. Shims of 0·003 and 0·010in are available.

(7) Remove the damper cap, insert the thrust spring and install the required number of shims. Reinstall the damper.

(8) Install the damper on the oil nipple side and fit a new pinion shaft oil-seal. Fill the steering-gear housing with hypoid oil.

(9) Installation is done in the reverse order of removal. Do not tighten the mounting-bracket clamp bolts until the steering column is secured to the column support bracket; this to obtain correct alignment of the pinion and the steering column.

Brakes: Girling hydraulically-operated footbrake on all four wheels. Mechanically-operated parking brake on the rear wheels only. The front brakes are of the two leading shoe type with a separate cylinder for each brake shoe; the rear brakes have a single-acting cylinder for both shoes. Each rear wheel brake cylinder incorporates a mechanical expander, operated by the parking brake lever.

Specifications:

Diameter of drum:	front	9in
	rear	8in
Length of brake lining:	front	8·66in
	rear	7·66in
Width of brake lining:	front	2·25in
	rear	2·5in
Total brake lining area:		124sq in
Lining material:		AM 2

Brake adjustment:

Each front brake incorporates two squareheaded adjusters, fitted in the brake backing plate; the rear brakes are equipped with one adjuster in the backing plate of each brake.

Front brakes:

(1) Jack-up the car, spin the wheel and apply the footbrake hard to centralise the brake shoes.

(2) Turn one adjuster in a clockwise direction, until the brake shoe is in contact with the brake drum; then turn back the adjuster two 'clicks'.

(3) Repeat these operations on the second adjuster and adjust the brake shoes of the opposite wheel in the same way.

Rear brakes:

(1) Place a block in front of one of the front wheels and jack-up the rear of the car. Spin the wheel and apply the footbrake hard to centralise the shoes.

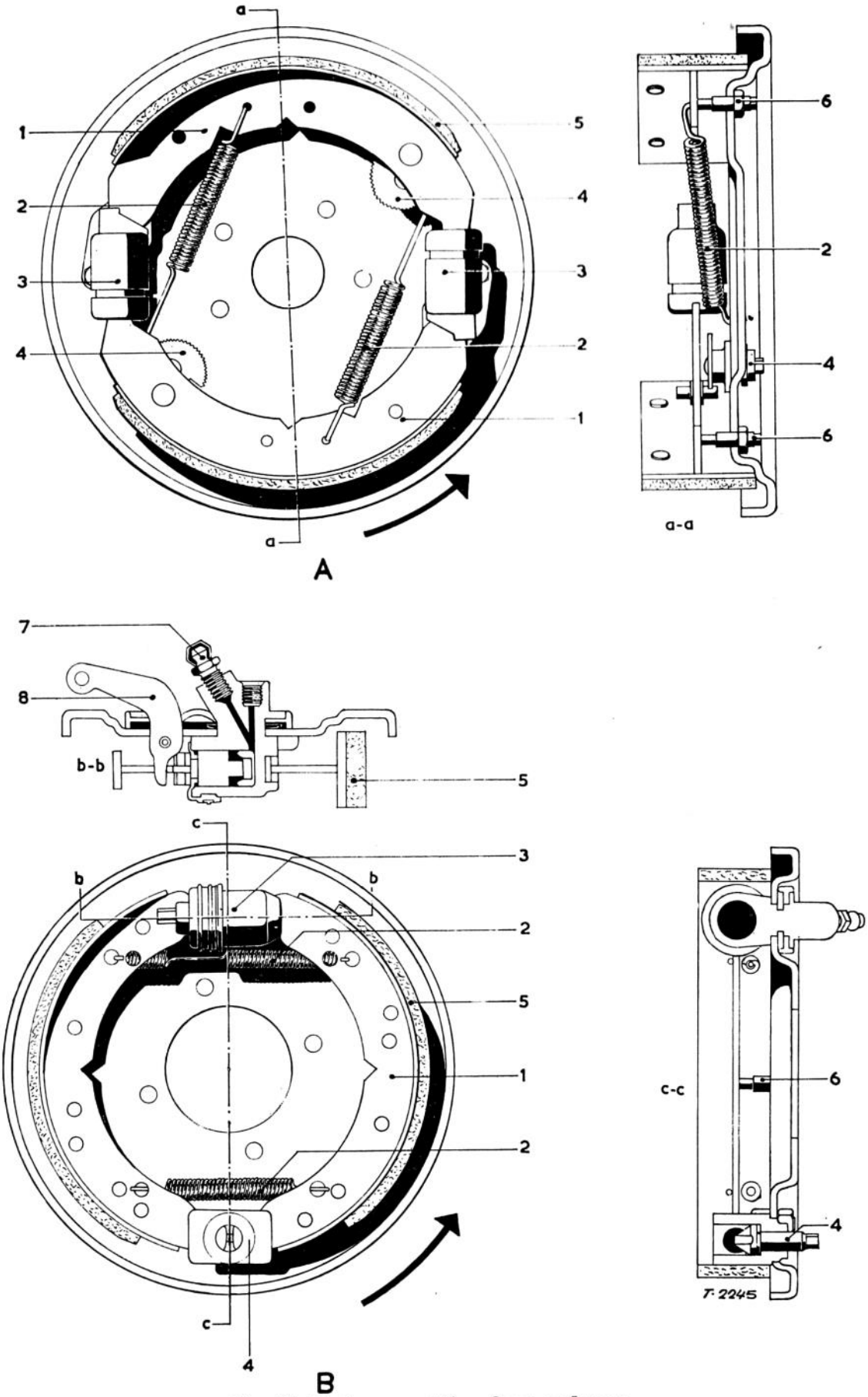


Fig. 25. Brake assemblies, front and rear

Key to Fig. 25:

A *Front brake assembly:*
1 Brake shoe
2 Retracting spring
3 Wheel brake cylinder
4 Snail-cam adjuster
5 Brake lining
6 Steady post

B *Rear brake assembly:*
1 Brake shoe
2 Retracting spring
3 Wheelbrake cylinder
4 Adjuster wedge
5 Brake lining
6 Steady post
7 Bleeder screw
8 Parking brake lever

Key to Fig. 26:
1 Washer
2 Push-rod
3 Delivery port
4 Plunger
5 Cup
6 Spring thimble
7 Spring
8 Valve spacer
9 Spring washer
10 Valve stem
11 Valve seal

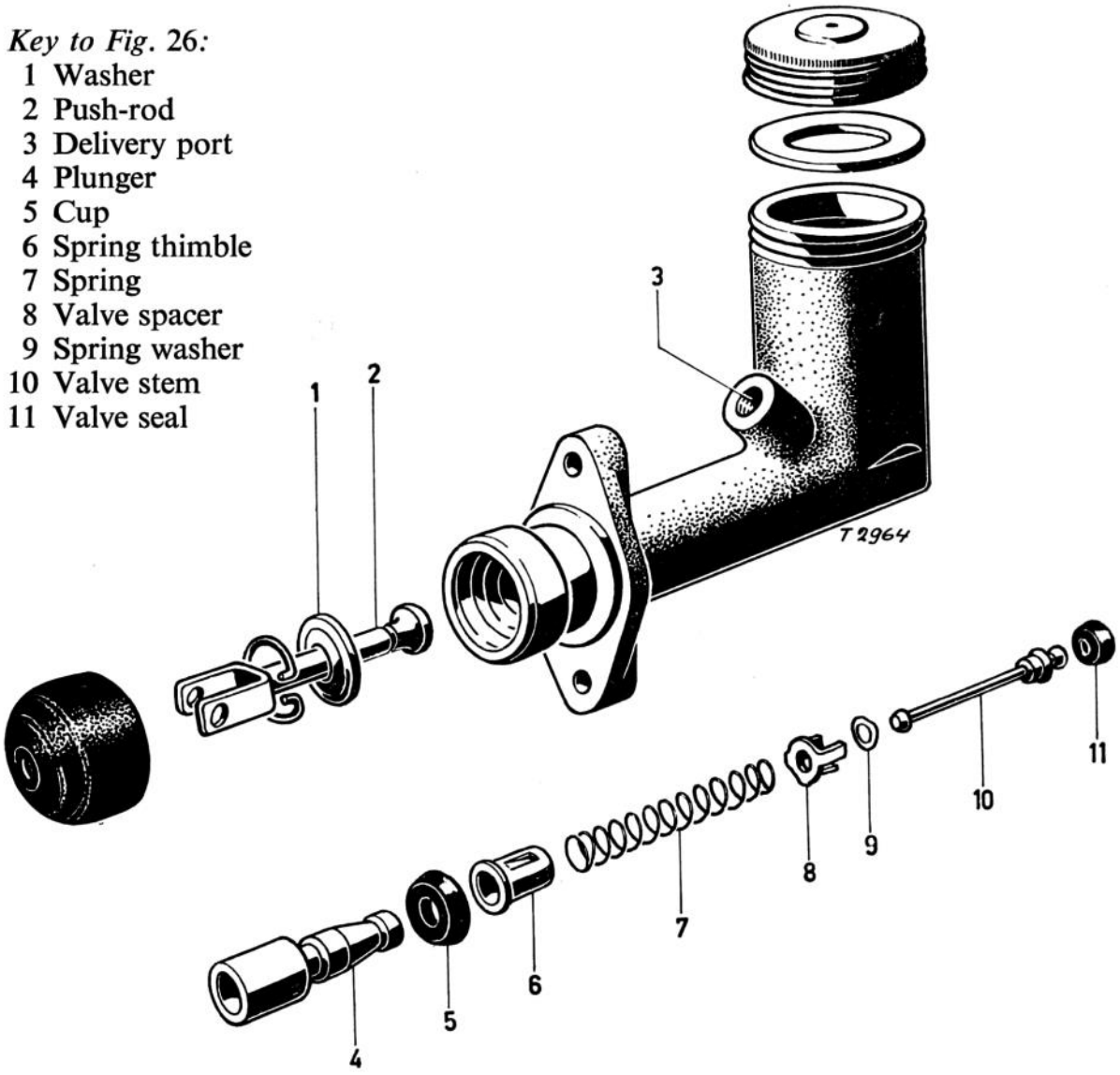


Fig. 26. Brake master cylinder

(2) Turn the adjuster in a clockwise direction until the brake shoes are in contact with the brake drum, then turn back the adjuster just enough to free the drum (two 'clicks').
(3) Repeat these operations on the brake shoes of the opposite wheel.

Brake master cylinder: The brake master cylinder is built together with the brake fluid reservoir. For brake fluids and topping-up of the fluid reservoir see page 14.

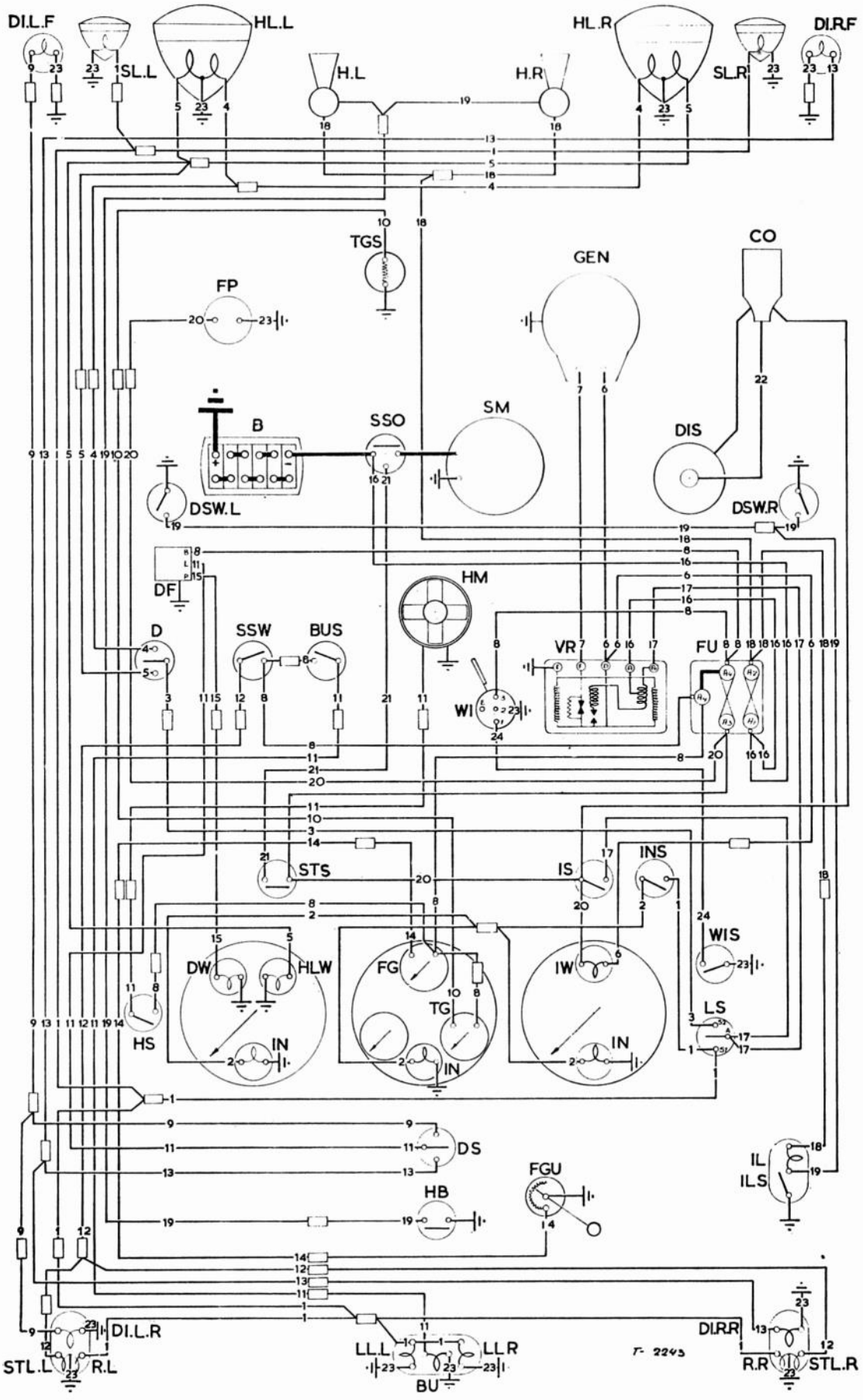


Fig. 27. Wiring diagram

Wheels and tyres: Pressed-steel disc wheels with four bolt-holes.
Rim dimension: 3·00 × 14

Tyres: tubeless
Tyre size: 5·00—14 (early models)
5·60 —14 (later models)
Tyre pressures: see page 14

ELECTRICAL EQUIPMENT

Electrical system: 12-volt, positive earthing.

Wiring diagram: See page 54.

Key to Fig. 27:

B	Battery
BU	Reversing lamp
BUS	Reversing lamp switch
CO	Coil
D	Dimmer switch
DF	Direction-indicator flasher
DILF	Direction-indicator, left front
DILR	Direction-indicator, left rear
DIRF	Direction-indicator, right front
DIRR	Direction-indicator, right rear
DIS	Distributor
DS	Direction-indicator switch
DSWL	Door switch, left
DSWR	Door switch, right
DW	Direction-indicator warning light
FG	Fuel gauge
FGU	Fuel tank gauge unit
FP	Fuel pump
GEN	Generator
HL	Horn, left
HR	Horn, right
HB	Horn button
HLL	Headlamp, left
HLR	Headlamp, right
HLW	Mainbeam warning light
HM	Heater motor
HS	Heater switch
IL	Interior light
ILS	Interior light switch
IN	Instrument light
INS	Instrument light switch
IS	Ignition switch
IW	Ignition/generator warning light
LLL	Number plate lamp, left
LLR	Number plate lamp, right
LS	Light switch
RL	Rear lamp, left
RR	Rear lamp, right
SLL	Side lamp, left
SLR	Side lamp, right
SM	Starter motor
SSO	Starter solenoid
SSW	Stoplamp switch
STLL	Stoplamp, left
STLR	Stoplamp, right
STS	Starter switch
TG	Water temperature gauge
TGS	Water temperature gauge sender unit
VR	Voltage regulator
WI	Windscreen-wiper
WIS	Windscreen-wiper motor

Key to wire colours (Fig. 27):

1 Red	7 Yellow/green	13 Green/white	19 Brown/black
2 Red/white	8 Green	14 Green/black	20 White
3 Blue	9 Green/red	15 Light green	21 White/red
4 Blue/red	10 Green/blue	16 Brown	22 White/black
5 Blue/white	11 Green/brown	17 Brown/blue	23 Black
6 Yellow	12 Green/purple	18 Brown/green	24 Black/green

Battery: 12-volt, 58 Ah at 20-hour rate, positive terminal connected to earth.
Type Lucas GTW 9A/2 (early models)
Lucas BT 9 A (later models)
Lucas GFZ 9 A (early export models)
Lucas BTZ 9 A (later export models)

Cell electrolyte capacity:	½ pint
Normal recharge current:	5 Amp
Sg of electrolyte:	1·270–1·285 at normal temperature 70°F (21°C), fully charged
Sg of electrolyte:	1·110–1·130 at normal temperature 70°F (21°C), discharged

Add four points of specific gravity for every 10°F (5½°C) above 70°F.
Subtract four points of specific gravity for every 10°F (5½°C) below 70°F.

Starter motor:	Lucas M35 G 1
Number of brushes:	four
Brush spring tension:	30–40 oz

Do not undercut the commutator insulation.

In the event of the starter pinion becoming jammed in the starter ring gear, the starter pinion may be freed by placing a wrench on the square end of the armature shaft.

Generator: Lucas C 39 PV/2V or C40/1, two poles, shunt-wound.

Cut-in speed:	1050–1200 rpm
Maximum output:	13·5–19 A
Field resistance:	6·0–6·3 Ohm
Maximum undercutting depth of the commutator insulation:	1/32 in
Minimum permissible length of brushes:	11/32 in
Brush spring tension:	20–25 oz

Control box: Lucas RB 106/2.

Cut-in voltage:	12·7 V—13·3 V
Drop-off voltage:	8·5–11·0 V
Reverse current:	5·0 A (max.)
Regulator voltage at 20°C (68°F):	16·0–16·7 V
(early models with C 39 PU/2 generator):	15·4–16·4 V

For every 10°C (18°F) above or below 20°C add, respectively subtract, 0·1 V.

Fuses: A fuse block, containing two 35 A fuses and two spares, is mounted on the scuttle.

Lamp bulbs:

	(*Watts*)
Headlamps, home market:	42–36 (dip left)
Headlamps, Europe, except France:	45–40 (dip vertical)
Headlamps, export left-hand drive and USA:	42–36 (dip right)
Sidelamps:	6
Stop/tail-lamps:	21/6
Direction-indicator flashers:	21
Number-plate illumination:	6
Interior lamp:	6
Reverse lamp:	21
Instrument illumination and warning lights:	2·2

ENGINE FAULT FINDING CHART

Engine will not start

A. Starter does not crank engine	
Battery run down	*Recharge; replace if defective*
Battery posts and terminals loose or corroded	*Clean and tighten. If badly corroded, soak with water to facilitate removal and avoid damage to the battery posts*
Faulty starter switch or solenoid, if fitted; broken battery cable or loose connection	*Check wires and cables; check solenoid and switch, replace if defective*
Starter motor defective	*Repair or replace*
Starter drive stuck (starter will run, but does not crank engine)	*Clean and if necessary repair or replace*
Starter drive pinion jammed with starter ring gear	*Free by rotating squared end of starter spindle with a spanner*
B. Starter cranks engine slowly	
Battery partly run down	*Recharge; replace if defective*
Loose or corroded connections	*Clean and tighten*
Faulty starter switch or solenoid; partly broken cable or loose connection	*Check wires and cables; check solenoid and switch, replace if necessary*
Starter motor defective	*Repair or replace*
C. Starter cranks engine, but engine will not start	
Trouble in ignition system:	
No spark at plugs:	
Moisture on spark plugs, ignition distributor, coil and wires (this trouble often occurs after parking overnight in foggy or rainy weather)	*Clean and dry. Avoid recurrence by coating wires, distributor rotor, cap, coil and spark plug insulators with moisture-proof lacquer*
Spark plugs flooded, due to excessive use of choke	*Start engine on full throttle. If this does not help, clean plugs. With plugs removed, turn over the crankshaft a few times to blow the accumulated fuel from the cylinders*

Spark plugs oiled up	*Clean; if necessary replace*
Spark plug insulator cracked	*Replace*
Spark plug gap too wide or too close	*Reset gap*
No spark at distributor:	
Loose, broken or shorted low-tension lead between coil and/or inside distributor	*Check and tighten; also check internal leads in distributor. These leads sometimes break inside their insulation, and the break is not always visible. Pull carefully on one end; a broken lead will stretch*
Cracked rotor or distributor cap	*Replace*
Contact breaker points dirty, worn or maladjusted	*Clean and adjust; if necessary replace*
Carbon brush in distributor cap not making contact	*Free; if necessary replace*
Faulty condenser	*Replace*
No spark at coil:	
High tension lead loose or broken	*Replace*
Broken or loose low-tension leads or faulty ignition switch	*Check wiring, repair or replace; check switch, replace if defective*

D. Starter cranks engine, but engine will not start	
Trouble in fuel system:	
No petrol in carburettor:	
Empty fuel tank	*Fill -up. If necessary, check and repair or replace fuel gauge*
Obstructed or damaged fuel pipe	*Clean; if necessary repair or replace*
Air leak in petrol line	*Check and repair or replace. Pay special attention to flexible fuel line (if fitted). If flexible fuel line is porous, a temporary 'get-you-home' repair can often be made securely wrapping the line with friction tape or rubbing with hard soap*
Fuel filter clogged	*Clean and refit with new gasket. Always carry a spare gasket and a glass filter bowl, if so equipped*

Fuel pump defective	*Repair or replace. If electric pump does not function, lightly tap pump housing until ticking resumes*
Petrol in carburettor:	
Jets clogged	*Clean; blow out with air (never use wire to clean jets)*
Float needle stuck	*Clean or replace*
Carburettor flooded	*Clean float needle valve; if necessary replace. If this trouble persists, check fuel pump pressure*
Choke control faulty	*Repair or replace*
Air leak at inlet manifold or carburettor base	*Check nuts and bolts for tightness; if necessary replace gaskets*
Water or dirt in carburettor	*Clean. If this trouble persists, check rubber hose in fuel tank filler neck for damage or looseness, causing water to enter tank*

NOTE: *If ignition system and carburettor are in order, yet the engine will not start, check timing*

Engine starts but does not run properly

E. Engine misfires	
Ignition trouble	
Spark plug or coil leads loose or damaged	*Tighten; replace if necessary*
Incorrect spark plug gap	*Regap*
Cracked spark plug insulator	*Replace faulty spark plug*
Spark plug oiled up	*Clean, if necessary replace with spark plug of correct type. If trouble persists, check for mechanical trouble*
Cracked distributor cap	*Replace*
Loose connection in primary circuit	*Check and repair. Also check, and if necessary replace, ignition switch. In rare cases the ammeter has been found to be the cause of this trouble, due to faulty internal connection*
Distributor otherwise faulty	*See* **C**
Trouble in fuel system	*See* **D**

Mechanical trouble	
Incorrect valve clearance	*Adjust*
Valve sticking	*Try to free by pouring a gum solvent of good quality into carburettor air intake; if not successful, dismantle and repair*
Valve spring broken	*Replace. Usually the valve concerned will have to be ground*
Worn piston, piston rings and cylinder or burnt valve; cylinder-head gasket blown	*Test compression; if too low, dismantle for repairs*
F. Engine starts and stops	
Trouble in ignition or fuel system:	*See* **C** *and* **D**
Obstructed exhaust system	*Check and repair or replace*
G. Engine runs on wide throttle only	
Idle jet clogged or mixture improperly adjusted	*Clean idle jet and/or idle air bleed; adjust*
Valve sticking or burnt; valve spring broken; other mechanical trouble	*Check and repair. Pay special attention to heat riser, if so equipped, since a burnt heat riser tube will cause exhaust gas to enter intake manifold. This will sometimes cause backfiring in carburettor*
H. Lack of power	*Check and correct* (*See* **C**)
Ignition too far retarded or other ignition trouble	
Obstructed exhaust system	*Dented exhaust pipe and/or muffler* *Dislocated baffle plate or muffler* *Replace*
Trouble in fuel system	*Check and correct* (*See* **D**)
Loss of compression	*Test compression; if found to be too low, check valve clearance. If valve clearance is properly adjusted and compression is still low, check for other mechanical trouble, such as burnt valves and/or worn pistons, rings and cylinders*
Dragging brakes	*Check and correct. Essentially this is not an engine trouble*

I. Engine runs roughly	
Ignition timing incorrect	*Check and correct. Pay attention to possibly stuck advance mechanism, because the fixed advance may be correctly adjusted, yet the timing while running will be incorrect if the automatic advance is stuck*
Lean or rich mixture	*Check carburettor and fuel system, see* **D**
Improperly adjusted valve clearance	*Check and correct*
J. Engine knocks	
Ignition too far advanced	*Check and correct. Attend to possibly stuck advance mechanism, see* **I**
Excessive carbon deposit	*Decarbonize*
Loose bearings or pistons or other mechanical cause	*Check and repair*
K. Engine overheats	
Cooling system:	
Lack of water	*Top-up and check for leaks*
Fan belt loose or broken	*Check and adjust or replace*
Radiator clogged by insects	*Clean*
Cooling system clogged internally	*Clean with a cooling system cleaner of a reputable make and flush out according to maker's instructions. Inspect radiator hoses and replace if in bad condition*
Thermostat stuck or faulty	*Check and replace if necessary*
Ignition improperly timed	*Check and correct. Attend to possibly stuck advance mechanism*
Lean or rich mixture	*Check fuel system; see* **D**
Excessive carbon deposit	*Decarbonize*
Obstructed exhaust system	*Check and repair or replace*
Cylinder-head gasket of the incorrect type	*Replace*

THE OLYSLAGER MOTOR MANUALS

This manual is one of a new series which will eventually cover all popular cars. The following have already been published:

AUSTIN A30 and A35 Saloons, Countryman, Pick-Ups and Vans from 1951

AUSTIN A40 Mark I and II Saloons, Countryman and Estate Car from 1958

AUSTIN A70 Hampshire, Hereford, Countryman and Pick-Up from 1949

AUSTIN SEVEN 850 Saloon, Countryman, Van and Pick-Up from 1959

AUSTIN-HEALEY SPRITE Mark I and II from 1958

CITROEN 2CV, A, AZ, AZL, AZLM, AU, AZU, AZUL, AP, AZP, BJ, Bijou, Sahara 4 x 4, from 1949

FIAT 500, 500D and Giardiniera, Saloons, Convertibles and Estate Cars from 1957

FIAT 600, 600D and Multipla, Saloons, Convertibles and Coaches from 1957

FIAT 1100 and 1200 Saloons, Convertibles and Estate Cars from 1957

FORD ANGLIA/PREFECT/POPULAR/ESCOURT/SQUIRE 100E models from 1953, Thames Van 300E models from 1954

FORD ANGLIA 105E/PREFECT 107E from 1959

FORD CONSUL/ZEPHYR SIX/ZEPHYR ZODIAC Mark I 1951-1956

FORD CONSUL/ZEPHYR/ZODIAC Mark II from 1956

FORD TAUNUS 17M P2 and P3, Saloons, Estate Cars and Vans from 1957

HILLMAN MINX Series I, II, III, IIIA, IIIB, from 1956, Hillman Husky Series I, II, from 1958, and Easidrive

MERCEDES-BENZ 180a, 180b, 190, 190b, from 1957

MERCEDES-BENZ 219, 220S, 220E, from 1956

MORRIS MINI-MINOR 850 Saloon, Mini-Traveller, Mini-Van and Mini-Pick-Up from 1959

MORRIS MINOR 1000 Saloon, Convertible and Estate Car, Morris Series III, Quarter-ton Van and Pick-Up, from 1956

OPEL Olympia, Rekord, Car-a-Van and Delivery Van from 1953, and Opel 1200 from 1959

PEUGEOT 203, 203L, 203U from 1956, Peugeot 403 from 1955

RENAULT DAUPHINE R1090, Dauphine-Gordini R1091, Floride/Caravelle R1092 and Ferlec Automatic Clutch from 1956

RILEY 1.5 Saloon from 1957

SIMCA ARONDE Saloons, Coupés, Estate Cars and Vans from 1954, and Simcamatic

SINGER GAZELLE Series I, IIA, III, IIIA, IIIB from 1956

TRIUMPH HERALD and HERALD 'S' from 1959

TRIUMPH TR2, TR3, TR3A Sports Roadster, Hardtop Coupé from 1953

VAUXHALL VELOX/CRESTA Series PA Saloons and Estate Cars from 1957

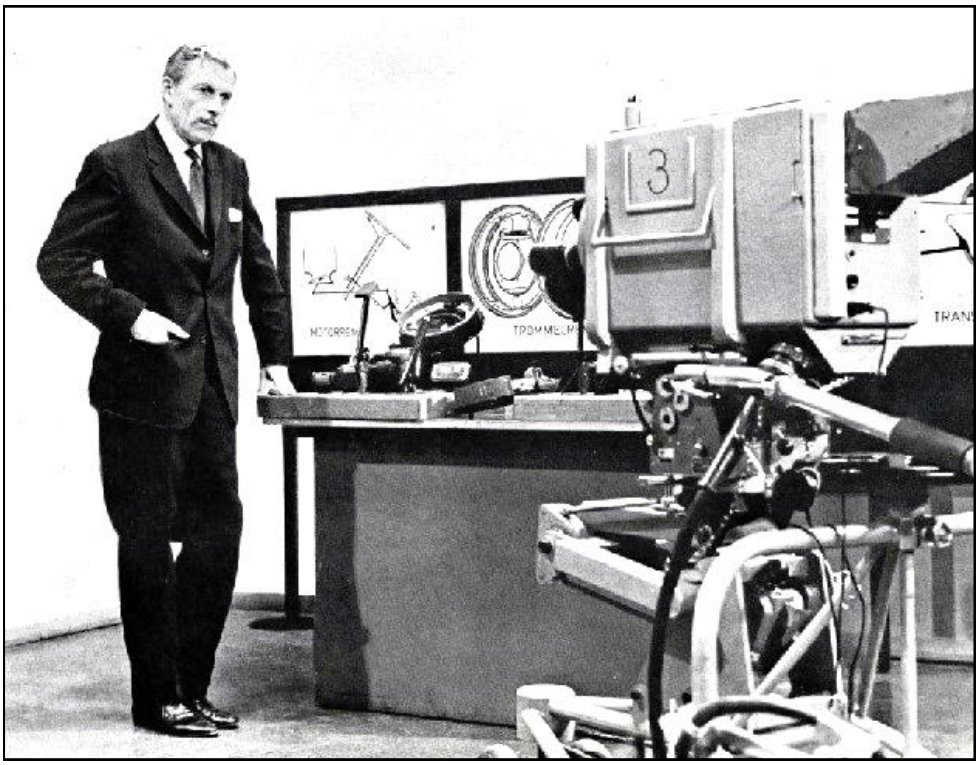
VAUXHALL VICTOR F Models Series 1 and 2, Saloons and Estate Cars, from 1957

VOLKSWAGEN cars from 1954, Karmann-Ghia and Utility vehicles from 1955

WOLSELEY 1500 Saloon from 1957

Forthcoming Titles:

AUSTIN A55 Mark II and A60	**AUSTIN A40, A50 and A55 Mark I**
MORRIS OXFORD Series V and VI	**MORRIS OXFORD Series III and IV**
WOLSELEY 15/60 and 16/60	**LANDROVER Series II and IIa**
M.G. MAGNETTE Mark III and IV	**STANDARD VANGUARD 4 and 6**
RILEY 4/68 and 4/72	**M.G. M.G.A. 1500 and 1600**



Piet Olyslager was a Dutch businessman who was well-known in the Automotive sector for his designs, collections and construction. He was an avid collector of information, brochures and magazines, which are now housed at the Olyslager Archives and at the European Centre for Mobility Documentation (ECMD).

Given his close relationships with Bugatti and Talbot, plus his contacts in the Auto Industry both locally & internationally, he realised the urgent need for reliable technical information on vehicles by manufacturers, garage owners, consumers and oil companies.

After the Second World War, Olyslager started to provide garages with technical information on vehicles left by the Allied Forces, writing advice on paper as well as detailed diagrams. In 1948, he decided to adapt a universal format and started the Olyslager Organisation.

Olyslager.com

P. OLYSLAGER MOTOR MANUALS 30

RILEY

ONE - POINT - FIVE

SALOONS FROM 1957