

THE
BRISTOL TYPE 406 CAR

INSTRUCTION
MANUAL

Issue 3
October 1959

BRISTOL CARS
FILTON HOUSE, BRISTOL, ENGLAND



Overall Length..	..	..	. 16 ft. 6 inches	Overall Height (Unladen)	..	..	..	..	60 inches
Overall Width	68 inches	Ground Clearance (Unladen)	6½ inches
Weight 3010 lbs									

Fig.1 R.H. Front View of Car

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Wheelbase	114 inches	Rear Track	56 inches
Front Track.	53 inches	Turning Circle.. . . .	37 ft. 6 ins.
Toe-in	$\frac{1}{8}$ inch	Camber	$0^{\circ} \pm \frac{1}{2}^{\circ}$

Fig.2 L.H. Rear View of Car

Service and Spares

Service The Service Manager,
Bristol Cars Limited.
Filton.
Bristol, England.

Telephone: Bristol 693831
Ext. 45 and 112.

Telegrams-Aviation-
Bristol Car Service.

Spares The Spares Department
Bristol Cars Limited.
Filton.
Bristol, ENGLAND.

Telephone: Bristol 693831
Ext. 84 and 177

Telegrams-Aviation-
Bristol Car Spares.

Serial Numbers.

In correspondence or when ordering parts always:

Quote the chassis number ie.406/1/5200.

The chassis number plate is secured to the top face of the chassis side member on the left hand side in the vicinity of the petrol pump.

If an engine part quote the Engine number
ie. 110/5000

The engine number plate is situated on the exhaust rocker box cover.

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Recommended Lubricants

ENGINE.

Summer.

Mobiloil A.

Essolube 30

Energol SAE 30

Shell X-100 30

Castrol XL.

Winter.

Mobiloil Arctic

Essolube 20

Energol SAE 20W

Shell X-100 20/20W

Castrolite

GEARBOX & OVERDRIVE. (Common Filler).

Mobiloil A.

Essolube 30

Energol SAE 30

Shell X-100 30

Castrol XL.

Capacity..... 3½ pints

Mobilube GX 90

Esso Expee Compound 90

Energol EP.SAE 90

Shell Spirax 90 EP.

Castrol Hypoy

REAR AXLE.

Mobilube GX 140

Esso Expee Compound 140

Energol EP.SAE 140

Shell Spirax 140 EP.

Castrol Hipress

PROPELLOR SHAFT

Mobilube C.90

Esso Gear Oil 90

Energol SAE 90

Shell Dentex 90

Castrol ST.

ONE SHOT LUBRICATION.

Mobilgrease MP.

Esso High Temp. Grease

Energol N.3.

Shell Retinax A.

Castrolase WB.

Pre-packed.

Capacity2 pints

Mobiloil Artic.

Essolube 20

Energol SAE 20W

Shell X-100.20/20W

Castrolite.

FRONT HUBS, REAR SUSPENSION UNITS & REAR AXLE HUBS

WATER PUMP.

DISTRIBUTOR.

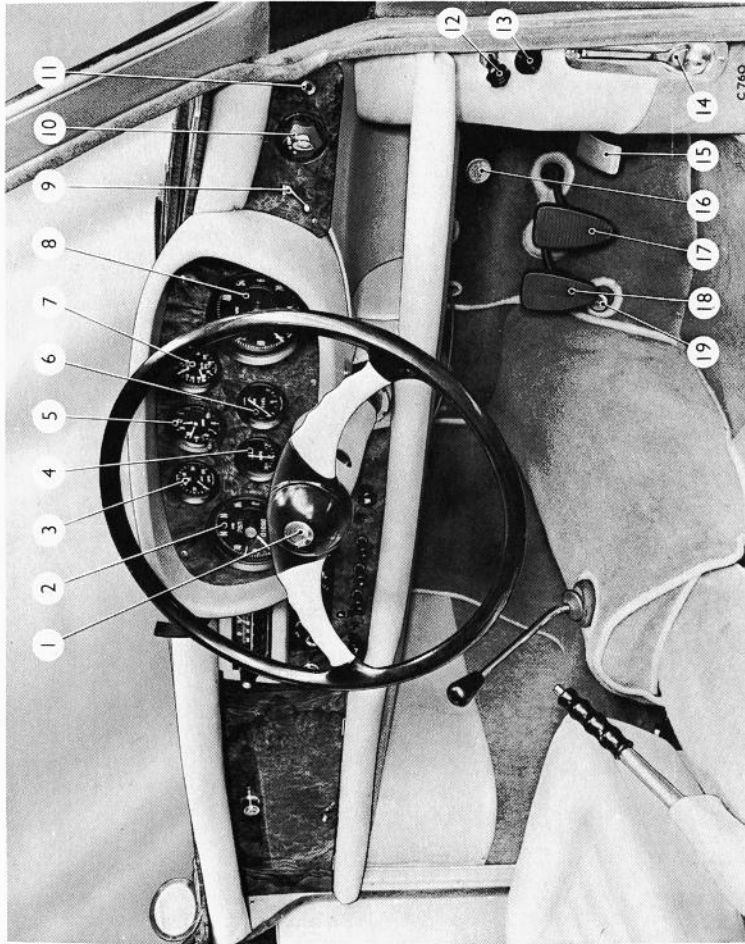


Fig.3 Instruments and Controls - R.H. View

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AFTER EVERY 6000 MILES (10000 KM)

Repeat the servicing called for after every 3000 miles and add:-
Clean and reset the contact breaker points.
Clean the inside of the distributor cover, segments and rotor;
check that the carbon brush is free.
Change the oil filter insert.
Check the valve clearances.
Clean the gauze filter and glass bowl of the petrol pump.
Clean the gauze filter inside the carburettor banjo connections.
Drain and refill gearbox/overdrive.

AFTER EVERY 10000 MILES (16000 KM)

Drain and refill rear axle.

AFTER EVERY 12000 MILES (20000 KM)

Repeat the servicing called for after every 6000 miles and add:-
Check the starter motor brushes and commutator.
Check the dynamo brushes and commutator.
Pack the front hubs with grease.
Fit new sparking plugs; check the gaps before fitting.
Check and, if necessary, pack the rear suspension units with grease.
Check the brake discs for condition.

INSTRUMENTS & CONTROLS - RH VIEW
KEY TO FIG. 3.

1. Horn Push.
2. Speedometer MPH - Smiths SN.6103/34.
Speedometer KPH - Smiths SN.6103/35.
incorporating Ignition and Headlamp warning lights.
3. Oil Pressure gauge - Smiths PG.1502/02.
4. Ammeter - Lucas 36242A.
5. Clock with hand setting knob - Smiths CE.3103/01.
6. Fuel gauge - Smiths FG.2530/33.
7. Oil and Water Temperature Gauge - Smiths GD.1502/02.
8. Revolution Counter - Smiths RN.2305/00
incorporating Fuel and Direction Indicator warning lights.
9. Overdrive Switch - Lucas 31500 D.
10. Lighting and Ignition Switch - Lucas 031258A.
11. Starter Button - Lucas 31282A.
12. Interior Light Control - Lucas 31302.
13. Speaker Control.
14. Bonnet Release.
15. Accelerator pedal.
16. 'One Shor' Lubrication operating pedal.
17. Brake Pedal.
18. Clutch Pedal.
19. Dipper Switch - Lucas 31284A.
20. Gear Change Lever.
21. Handbrake.

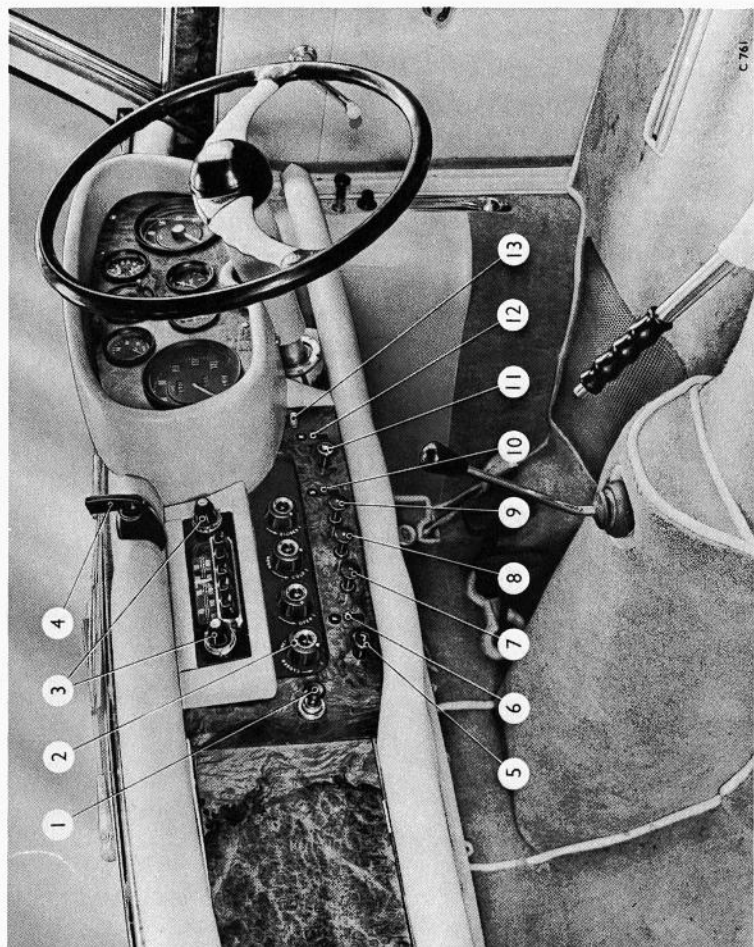


Fig. 4 Instruments and Controls - L.H. View

AFTER EVERY 500 MILES (800 KM)

Check the engine oil level.

AFTER FIRST 1500 MILES (2500 KM)

Free service agreement

or

Change the engine oil.
Change the oil filter insert.
Change the gearbox/overdrive oil.
Change the rear axle oil.
Check the valve clearances.
Check the fan belt tension.
Check the contact breaker gap.
Replenish the 'One-shot' system reservoir.
Check the electrolyte level in the battery.

AFTER EVERY 1500 MILES (2500 KM)

Change the engine oil.
Check the fan belt tension.
Replenish the 'One-Shot' reservoir.
Check the electrolyte level in the battery.
Grease the rear hub bearings.
Check oil level in rear axle and top up if necessary.

AFTER EVERY 3000 MILES (5000 KM)

Repeat the servicing called for after every 1500 miles and add:-
Lightly grease the contact breaker cam.
Lubricate the ignition automatic advance and retard mechanism.
Lubricate the contact breaker pivot post.
Lubricate the distributor shaft.
Check the oil level in the gearbox/overdrive.
Clean gap and test the sparking plugs.
Change the relative position of the road wheels.
Check the oil level in the rear axle.

MAINTENANCE SCHEDULE

AT FIRST 500 MILES (800 KM)

Free Service Agreement

or

Change the engine oil.
Change the oil filter insert.
Change the gearbox/overdrive oil.
Change the rear axle oil.
Check the valve clearances.
Check the fan belt tension.
Check the contact breaker gap.
Check the level in the brake fluid supply tank.
Grease the rear hub bearings.

WEEKLY

Check the water level in the radiator.
Check all tyre pressures.
Depress the 'one-shot' operating pedal once if the car has not completed 100 miles (160 KM).

AFTER EVERY 100 MILES (160 KM)

Depress the 'One-shot' operating pedal.

PERIODICALLY

Remove the road wheels and check the disc brake friction pads for wear. $\frac{1}{4}$ inch thickness is the minimum permissible.

Check the valve in the radiator cap for freedom.
Inspect all water system hoses for condition.
Check all water system joints for leakage.
Check and rectify oil leaks.
Check the battery for condition.
Check the level in the brake fluid supply tank.
Lubricate the handbrake cable through the nipple provided.
Lubricate the brake compensating lever through the nipple provided.
Lubricate the brake pedal levers through the nipple provided.
Lubricate the propeller shaft.

INSTRUMENTS & CONTROLS - LH VIEW KEY TO FIG. 4.

1. Cigar Lighter.
2. Heater Controls.
3. Radio Controls.
4. Direction Indicator Switch - Lucas 031046.
5. Panel Light Rheostat - Lucas 78312A.
6. Switch - Foglamp.
7. Ignition Manual Control.
8. Mixture Control.
9. Throttle Control.
10. Spotlamp Switch.
11. Wiper and Screenwasher Switch - Lucas 31847A.
12. Petrol Reserve Switch.
13. Speedometer Trip reset.

Standard Tool Kit and Stowage.

Tool Roll containing:-

3/16 x 1/4 Spanner.)	
5/16 x 3/8 Spanner.)	
7/16 x 1/2 Spanner.)	
Adjustable Spanner.)	
Pliers.)	
Screwdriver.	)	Under Bonnet in
Set of Feeler Gauges.	)	Bulkhead Compartment.
Bleeder Wrench.)	
Cylinder Head Plug Spanner.)	
Cylinder Head Box Spanner.)	
Tommy Bar.)	
Rubber Bleeder Tube (in tin)	)	Under Bonnet in
Sparking Plug Spanner.	)	Bulkhead Compartment.
'Minalite' Inspection Lamp.)	
Starting Handle.		Under Bonnet-Clipped to Bulkhead.
Bevelift Jack.		L.H. Wing Bay.
Wheel Brace.		Clipped in L.H. Wing Bay
Squared Key for Wing Bay.		Parcel Shelf.

Front Seat Adjustment

Both front seats are adjustable for leg reach and back rest.

To adjust for leg reach move outwards the knob on the lever at the front of the inner seat slide. This will release the seat from its location slot and the required position can then be selected.

The squab or backrest of the seat is fairly heavily spring loaded forwards. To select a position see Fig.54, release the small knobbed lever and press firmly backwards to the requirement. To release and bring forward support the backrest against the spring pressure.

The headrest can be used as illustrated.



Fig.54 Front Seat Adjustment

To close release the support stay and stow it in the rubber clip provided, lower the bonnet to within approximately 9 inches of its closed position and release it. Its own weight should lock it. Should it fail to lock on one side on occasions it can be pressed down until locked, but this is not recommended as a practice. Adjustment is provided on the taper locking pegs.

Luggage Boot

This is shown in Fig.53. The lid is self supporting and is externally locked with a key.

A light, in circuit with the side lamps, is provided on each side of the boot for loading and unloading at night.



Fig.53
Luggage
Boot

Engine

The Type 110 Engine of 'Bristol' manufacture is an overhead valve six cylinder unit of 2.2 litres capacity. Bore 68.69 m/m. Stroke 99.64 m/m. Capacity 2216 c.c. Compression Ratio 8.5 to 1. Nominal H.P. 17.55 (Treasury Rating). Cylinder Block fitted with 'Brivadium' dry liners. Aluminium alloy cylinder head with steel 'shrunk-in' inserts for valves and bronze inserts for sparking plugs. Polished hemispherical combustion chambers. Overhead valve inclined at 80° operated by vertical and cross-head rods. K.L.G. P. TENL.70 Sparking Plugs.

Camshaft mounted in four pressure lubricated bearings and driven by a duplex chain.

Three multiple jet down draught carburettors fitted with air cleaner.

Aluminium alloy pistons and forged steel connecting rods. Forged steel crankshaft, nitride hardened and statically and dynamically balanced. Fitted with lead indium shell type steel backed bearings. Torsional vibration damper incorporating fan drive fitted to front end of crankshaft.

Fan and positive pump water circulation cooling system with thermostatic control. Thermo syphon circulation from head to block.

High pressure lubrication by Hobourn Eaton type oil pump to all engine bearings via full flow oil filter.

Firing order.. .. 1.5.3.6.2.4.

Static Ignition Setting.. .. 5° before T.D.C.

Oil Pressure 60 to 70 p.s.i. at 70°C
(oil temp) and 3,000 r.p.m.

Running temp - oil.. .. 40°C to 100°C.

Running temp - water.. .. 75°C to 85°C (Max. permissible 95°C).

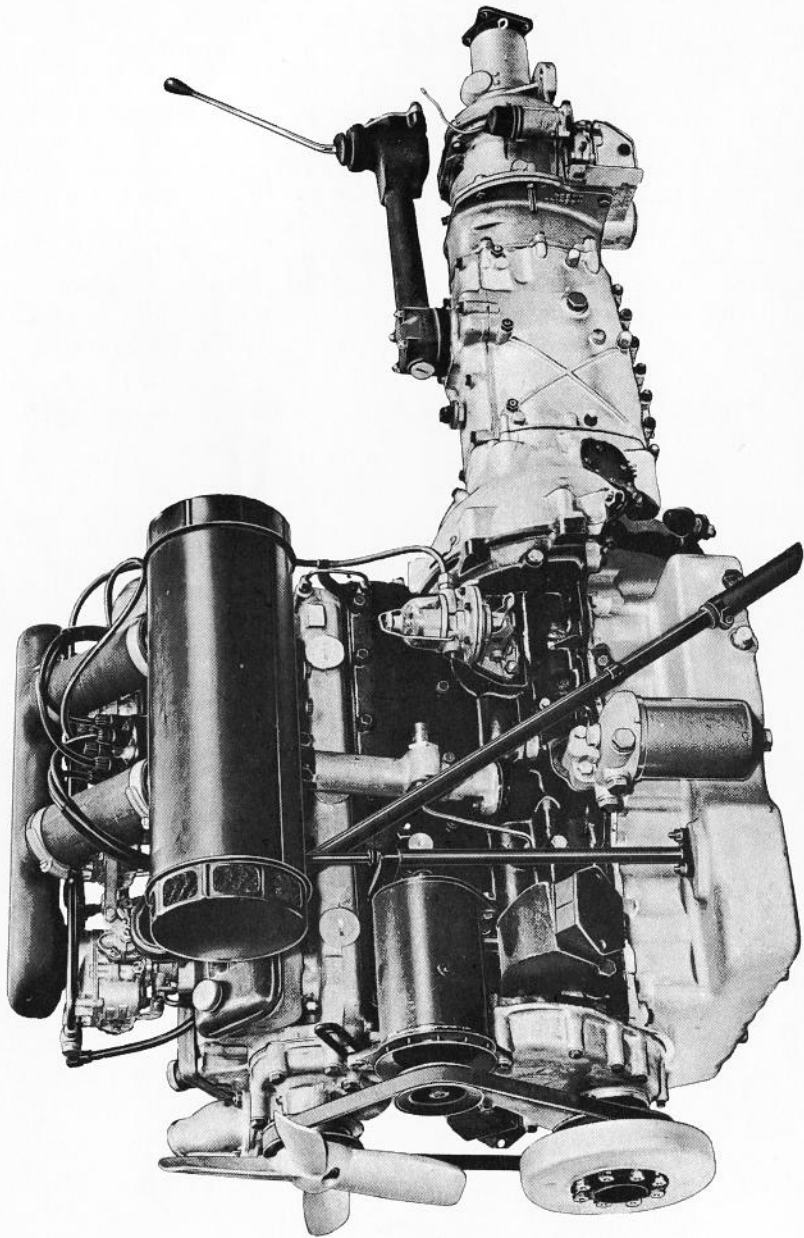


Fig. 5 Type 110 Engine with Gearbox & Overdrive - L.H. View

Tyre Pressures

Normal Cruising.

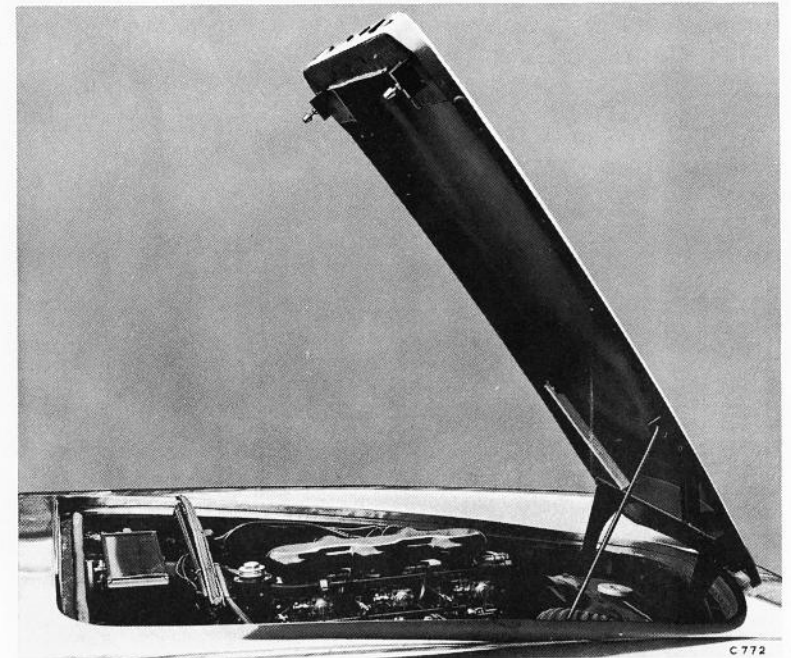
Front 22 PSI. Rear 27 PSI

Fully laden with passengers
and luggage.

Front 22 PSI. Rear 33 PSI

Bonnet

The bonnet is hinged at the front and has two self locking catches at the rear to hold it in the closed position. The catches can only be released from inside the car by pulling up the lever situated inside the right hand door, see Fig. 3,. This will release the bonnet sufficiently to allow it to be raised by hand. A support stay is housed along the right hand side of the bonnet aperture which can be released and pivoted to support the bonnet as shown in Fig.52.



C 772

Fig.52 Bonnet and Stay

Tyres

The correct maintenance of tyres is an extremely important factor in a car of high performance. Incorrect pressure, odd pressures and wheels out of balance greatly impair the safety of high-speed travel and seriously affect tyre life, steering accuracy and general road-worthiness. To obtain the most efficient road performance from the Type 406 car the recommended tyres and pressures should be used where circumstances permit.

Maintain the pressures regularly using a pressure gauge of known accuracy when the tyres are cold. Pressures can increase considerably in heat and with hard driving but this normally needs no adjustment.

It is recommended that at every 3,000 miles the wheels, complete with the tyres, are changed round and the spare wheel brought into use to promote even tyre wear. This is best achieved, for example, by exchanging the left front with the spare and fitting the left front to the right rear, that removed from the right rear now becomes the spare. Exchange the right front and the left rear.

Replace worn tyres in pairs whenever possible and arrange the wheels so that both front tyres are paired. Oddly worn tyres can affect steering accuracy, while one new and one well worn tyre on the rear tends to keep the differential in constant action.

Investigate immediately uneven wear on either front tyre since this may be caused by some misalignment or slackness in the front suspension, front hubs or steering.

Fitting New Tyres

When new tyres and/or tubes are to be fitted correctly align any manufacturers markings and see that the wheel complete wheel and tyre assembly is correctly balanced.

THE RECOMMENDED TYRES TO FIT ARE:

MICHELIN TYPE SDS 5.75/6.00 x 16

DUNLOP 'GOLD SEAL' 6.00 x 16.

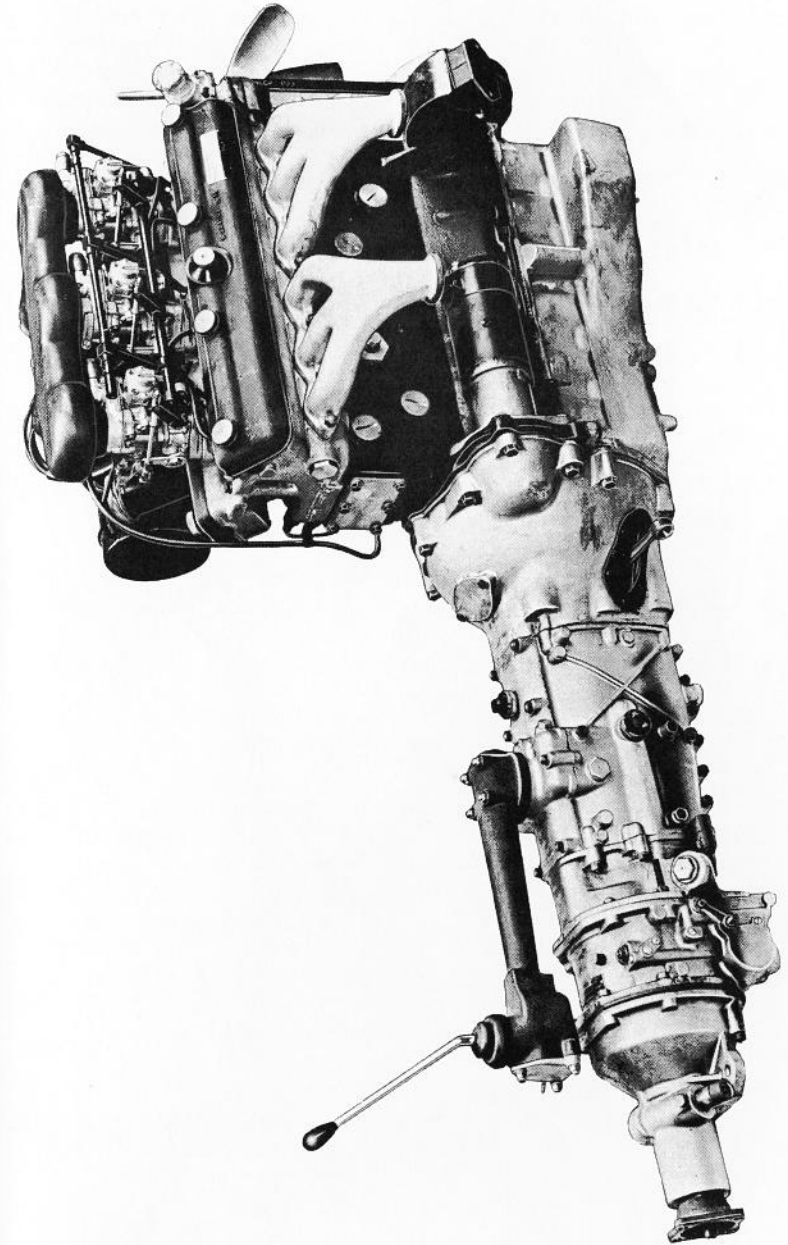


Fig. 6 Type 110 Engine with Gearbox & Overdrive - R.H. View

Valve Timing. Inlet opens 36° before TDC.
Inlet closes 76° after BDC.
Exhaust opens 76° before BDC.
Exhaust closes 36° after TDC.

Starting and Running from Cold

Switch on the ignition. The petrol gauge and the ignition warning light will register.

Make sure that the throttle control knob 'T' is pushed right home. Pull out the mixture control knob 'M' to its approximate half way position. It is only necessary to pull this control out to its full extent in extremely low temperatures. Do not touch the accelerator pedal.

Press the starter button and release when the engine runs. The revolution indicator will register about 1,500 r.p.m. with the mixture control in the above position and the car may then be driven off. Remember to release the handbrake. As soon as the engine will run smoothly, push in the mixture control knob or alternately the mixture control knob can be pushed in progressively to suit the conditions.

If the mixture control knob is forgotten and left in the intermediate position, it will increase the idling speed of the engine and under these conditions driving slowly in heavy traffic is more difficult.

Do not use maximum power until the oil temperature has reached 40°C .

Starting a Hot Engine

If the engine is hot (i.e. when the oil and water temperatures are not less than 50°C) do not use the mixture control knob. The procedure would be as follows:-

Switch on the ignition.

Take out the disc retainer from the centre of the wheel and fit to the road wheel about to be fitted. Locate this wheel on to the wheel studs and screw on and reasonably tighten the wheel nuts. Lower the car and finally tighten them. Screw on the hub disc and medallion and tighten as much as possible.

Fit the removed wheel into the spare wheel compartment with its clamp and stow the wheel brace. Remove and stow the jack.

Road Wheels

After the tyres and tubes are fitted the road wheels are dynamically balanced. Do not disturb these weights, they require no attention except for possible re-adjustment when a new tyre is fitted.



Fig.51 Wheel Hub Disc

Insert the fingers through the end of the slightly raised door, Fig.49, and lift the catch when the door can be raised to its full extent, Fig.50. Remove the wheel brace from its clips on the face of the clamp and using the wheelbrace unscrew and remove the spare wheel clamp allowing the spare wheel to be removed.

Removing and Fitting Road Wheel

To remove the road wheel from the car refer to Fig.51, and using the serrations for grip (this can often be started by turning the chromed disc) unscrew and remove the centre hub cap and medallion together with the chromed disc.

Loosen the five wheel nuts while the weight of the car prevents the wheel from turning then raise the car with the jack and completely remove the wheel nuts.

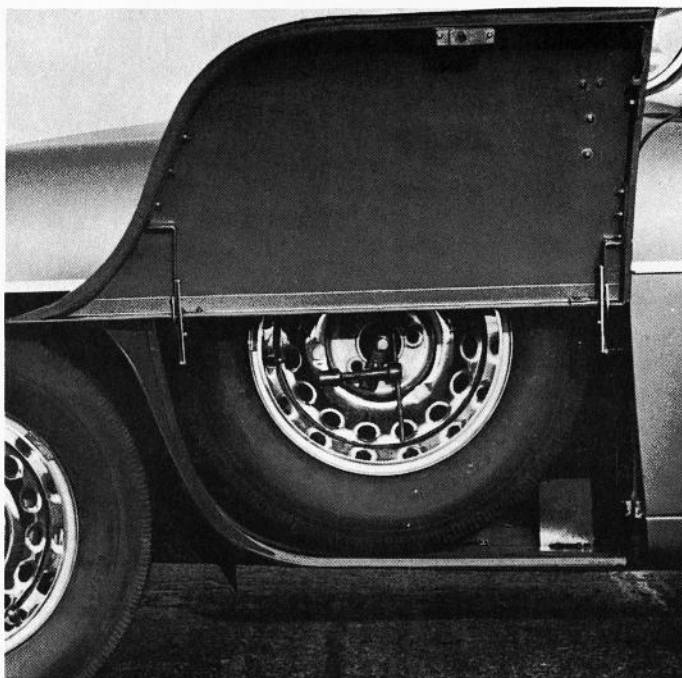


Fig.50 Spare Wheel Bay

Depress the accelerator pedal a little less than a quarter of its travel or alternately pull out the throttle control knob 'T' about $\frac{1}{4}$ inch. Press the starter button and release when the engine runs.

Release the accelerator (or push in the throttle control knob 'T') as soon as the engine runs normally.

Should the mixture control knob 'M' be used in error, the engine may not start. The remedy is to push in the mixture control knob, depress the accelerator to the floor and press the starter button; as soon as the engine fires, release the starter button and ease up on the accelerator to prevent the engine racing. When the engine is running evenly release the accelerator to the idling position.

Running In

A new or works reconditioned engine is, in effect, run in, but certain restrictions are recommended before full power is used.

For the first 1,000 miles do not exceed an approximate figure of 3,000 r.p.m.

Never permit the engine to labour, that is, use a lower gear with less throttle rather than the top gears or overdrive with more throttle. Avoid rapid acceleration.

Valve Clearance

The cylinder head being of aluminium and the cylinder block of cast iron, the valve clearance when cold is nil. For practical reasons the cold setting is given as .005 inch which should be finally adjusted to .012 inch at an engine temperature of 70° - 75°C on both the inlet and exhaust sides. To check, and if necessary, set the clearances, proceed as follows:-

Remove the inlet and exhaust rocker box covers.

With the car in neutral gear turn the engine with the starting handle until No.6 exhaust valve is fully open; No.1 exhaust valve (the one nearest the radiator will then be fully closed)

Using a feeler gauge, check the gap between No.1 inlet valve rocker and the face of the valve stem, as shown in Fig. 7. If necessary, slacken the locknut on the rocker adjustment screw and adjust to give .005 clearance; it should be possible just to move the feeler gauge at the correct setting.

Hold the adjusting screw, tighten the locknut and re-check the setting. Check, or set, the remainder of the valves in a similar manner. The open and closed positions are as follows:-

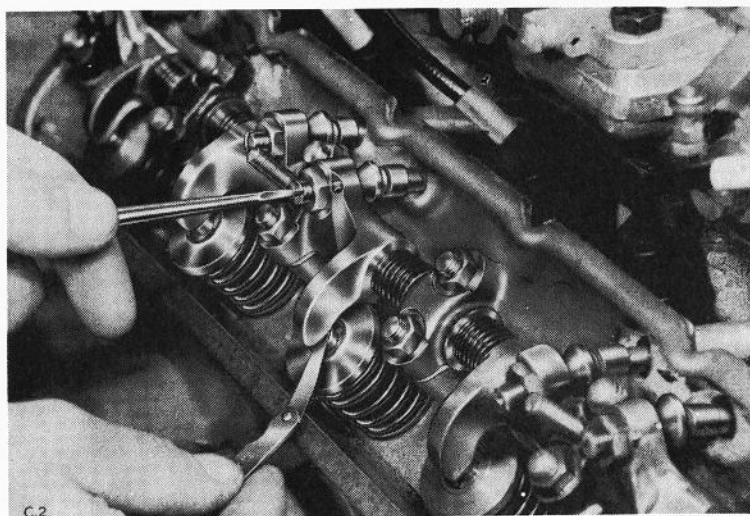


Fig. 7 Valve Clearance

Inlet		Exhaust	
Valve open	Valve closed	Valve open	Valve closed
No. 6	No. 1	No. 6	No. 1
No. 5	No. 2	No. 5	No. 2
No. 4	No. 3	No. 4	No. 3
No. 3	No. 4	No. 3	No. 4
No. 2	No. 5	No. 2	No. 5
No. 1	No. 6	No. 1	No. 6

Road Wheels and Tyres

Changing a Wheel

Jacking

Two jacking points are provided in a central position on each side of the car.

Referring to Fig.48, lift the carpet at the side of the front seat, this will expose a circular dished plate with a cross handle release spring. Pull out the plate and insert the base of the jack through the aperture, then engage the lip on the jack body beneath the lifting bar on the chassis.

Spare Wheel

The spare wheel is housed in the nearside wing bay together with the wheel brace. To open insert the square key, supplied with the tools of the car, into the aperture on the lower edge of the wing valance and turn it to release the lock. The door will only open as far as the safety catch.

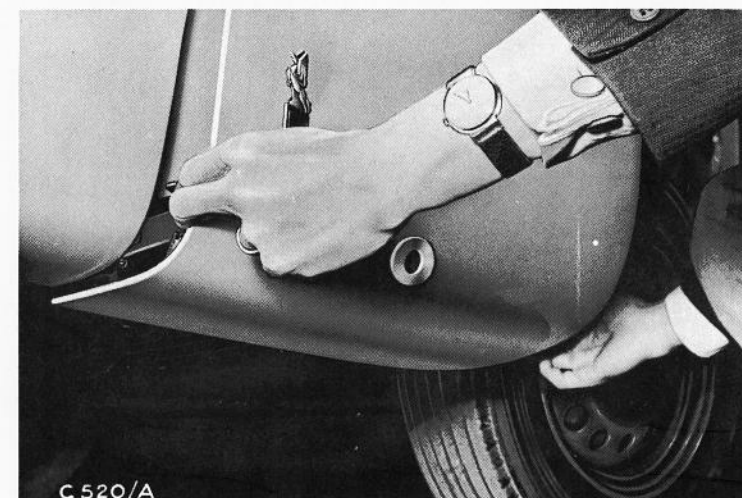


Fig.49 Opening the Wing Bay

temperatures selected by rotating the control 'H' clockwise.

If the air flow into the car is found to be insufficient turn control 'A' to BOOST bringing the blower motor into operation.

- (c) By rotating the control 'W' anti-clockwise air will be directed on to the windscreen at the temperature selected by control 'H'. With control 'W' fully opened the supply of air to the drivers feet will be considerably reduced.
- (d) The cold air flow on to the windscreen, by-passing the heater, can be considerably increased by turning control 'V' clockwise.

If additional air flow is desired open the rear quarter lights to suit requirements.

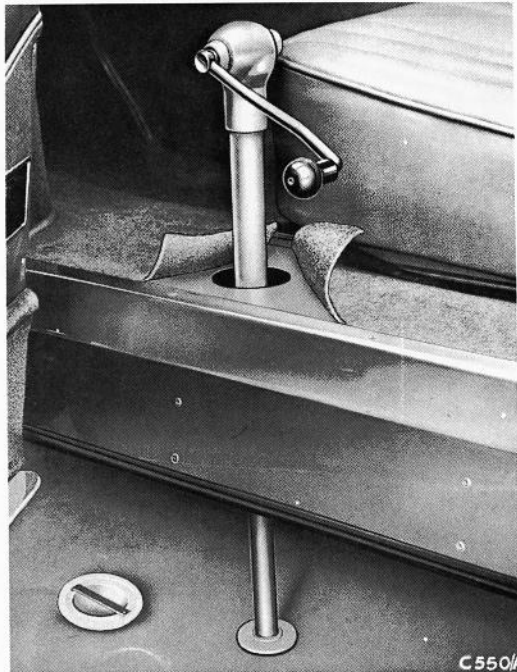


Fig.48
Car Jack
in position

Run the engine until an indicated temperature of 70° - 75°C is reached. At this temperature carefully check each valve clearance. It should be noted that the clearances are not now strictly uniform throughout and each should be carefully checked or reset to .012 inch.

Before replacing the rocker box covers, check the half round rubber seals at each end of the cylinder head and check the cover joints for satisfactory re-use.

Engine Lubrication

Engine oil

It is important, particularly in the interests of tappet wear, that the recommended lubricants are used.

The oil filler is located on the left-hand rear rocker box cover and the dipstick location is also on this side of the engine.

Checking the Level

Never check the oil level with the engine running; if the engine has been running, allow time for the oil to drain to the sump. When taking a dipstick reading see that the car is reasonably level, wipe the dipstick and make certain that it is fully inserted. Maintain the level at or near (but not over) the upper mark. Overfilling can result in high oil temperature and consumption.

Changing the Oil

It is recommended that this should be carried out at the periods quoted under "Maintenance" and preferably after an engine run, i.e. when the oil is hot. To drain the oil remove the "magnetic" drain plug on the left-hand side of the sump. Raising the right-hand side of the car will assist in complete drainage. After complete drainage thoroughly clean the plug and replace.

When refilling allow time for the oil to drain to the sump then check the level on the dipstick.

At a change of engine oil thoroughly clean the oil filter and change the oil filter element.

Oil Filter

The Vokes full flow type oil filter houses a replacement element known as the insert assembly. A seating is attached to the upper end of the insert assembly, which is held against the head by a spring thus providing a by-pass in the event of the insert becoming sludged. See Fig.8.

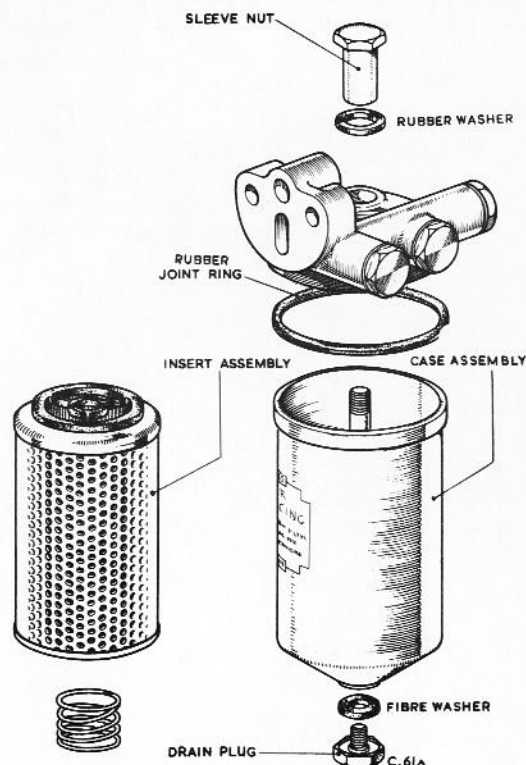


Fig.8 Vokes Oil Filter

To service, slacken the sleeve nut at the top of the filter head, hold the casing while the nut is unscrewed then remove the casing. Drain the oil and remove the insert assembly and spring.

NOTE: Speaker apertures, grilles and an aerial lead are incorporated into every car, irrespective of a radio set being installed or otherwise, in order to accommodate a set at any later date.

Heating/Ventilating and Demist System

This installation is controlled by four rotary controls on a panel mounted centrally on the dashboard, see Fig.47.

The system can be described briefly as two separate units.

- (1) The heater which supplies hot or cold air into the car below the dashboard and/or to the windscreen.
- (2) The cold air ventilator which allows cold air to by-pass the heater unit direct on to the windscreen.

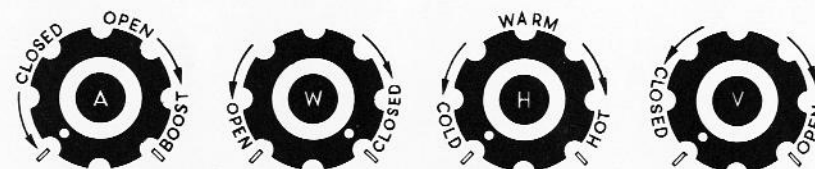


Fig.47 Heater Controls

On L/H drive cars the heater controls are as shown.

On R/H drive cars A control is moved to V position and V control is moved to A position.

The control positions for various conditions are as follows:

- (a) With the controls 'A' (for air) and 'V' (for ventilation) in the fully closed position the system is non-operative. The positions of the controls 'W' (for windscreen) and 'H' (for heat) are of no consequence at this stage.
- (b) By rotating the control 'A' clockwise the air flow into the car at the drivers feet will increase at various

Dipping Switch

Lucas FS.22 Part No.31284A.

The dipping switch is mounted on the toeboard to the left of the clutch pedal and is only operative when the headlamp is on MAIN BEAM i.e. when the RED headlamp warning light on the instrument panel is on.

When the switch is depressed the lower power filament of the headlamp bulb is brought into operation, the high power filament is cut out and the warning light on the instrument panel is extinguished. To bring the main beam of the headlamps back into operation, depress the switch a second time.

It should be noted that the Fog and Spot lamps are only operative when the headlamps are on main beam.

Radio

Radiomobile with Twin Speakers-Smiths RK.17861.
Aerial (less lead) - Smiths AR 32A.

The radio installation including twin speakers is classed as an optional extra. It comprises of a control unit and power amplifier, the control unit is mounted centrally on the dashboard and the power unit situated under the bonnet in the RH side of the bulkhead compartment. The front speaker is situated in the roof over the dashboard and the second speaker in the rear squab shelf.

The aerial is located externally on the roof, having two positions i.e. parking (closed) operative (extended).

The balancing of the two speakers is controlled by a rotary switch mounted below the parcel shelf on the drivers side, see Fig. 3. By rotating the switch fully clockwise the rear speakers becomes non-operative and similarly by rotating the switch fully anti-clockwise the front speaker becomes non-operative.

THE INSERT ASSEMBLY SHOULD BE
REPLACED AT LEAST EVERY 5,000 MILES.

Make sure that the casing is clean. Check the condition of the spring and the washer for the sleeve nut. Fit the spring to the casing and then the insert. Examine the rubber joint ring in the head of the filter and replace if necessary. Fill the casing, with its insert, with clean approved engine oil to ensure an immediate supply to the engine, fit the casing to the filter head and secure with the sleeve nut and its washer.

Oil Pressure

Pressure in the oil system is controlled by an external relief valve located on the cylinder block on the left-hand side of the engine.

The oil pressure should be 60 p.s.i. at 70°C and if the pressure is incorrect and cannot be traced to other causes, proceed as follows :-

Run the engine until the oil temperature is 70°C then open up the throttle to an indicated speed of 3,000 rpm.

Remove the relief valve cap, sealing washer and retaining pin, then screw OUT the adjusting screw to decrease the pressure or screw IN to increase the pressure. See Fig. 9.

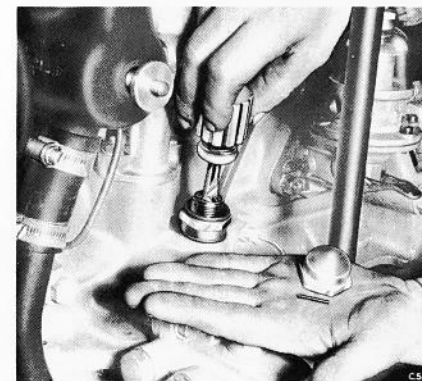


Fig. 9 Adjusting Oil Pressure Relief Valve

When the pressure is correct, refit the retaining pin, fit the cap and washer and tighten securely.

Oil Thermometer

The oil thermometer bulb is fitted to the left-hand side of the sump adjacent to the drain plug, its capillary tube linking the bulb to the oil pressure gauge on the instrument panel. The oil pressure gauge, capillary and bulb comprise a sealed assembly and no attempt should be made to disconnect one from the other.

Ignition System

The ignition system is of the normal battery and coil type with an ignition warning light (amber) on the instrument panel. An automatic advance and retard mechanism of the centrifugal governor type is incorporated into the distributor assembly below the contact breaker base plate. A manual control is also fitted, controlled by a push/pull knob "I" on the instrument panel.

Under normal circumstances this control should be left in its fully in position and it is only necessary to use it when a lower grade fuel has to be used. Pull out the knob as needed but remember to push it right in again when conditions permit.

Coil

The coil requires no routine attention other than checking the terminal connections for security and cleaning the spaces around the terminals at intervals.

Contact Breaker

It is vitally important always to keep the contact breaker points clean and parallel and gapped correctly.

THE CORRECT GAP IS .015 INCH and careful and accurate setting is recommended.

To clean the parts, remove the distributor cover by releasing the spring clips on either side. Lift off the rotor which is positioned by a slot. Release the nut and disconnect the L.T. lead at the terminal on the side of the distributor.

Flashing Indicator Warning Lamp

This lamp is situated within the revolution counter on the LH side. The bulb is fitted behind a GREEN glass and the light will continue to flash until the indicator switch is in the neutral position.

Replacing the Ignition, Head Lamp, Fuel and Indicator Warning Bulbs

Lucas Bulb No.987 2.2 watt.

Replacement of these bulbs should preferably be carried out by a 'Bristol' agent as they are replaced from the rear of the dashboard.

Inspection Lamp

The 'Minalite' type inspection lamp is stowed in the bulkhead compartment under the bonnet. When the lamp is connected to the inspection lamp/trickle charger socket the base becomes magnetic and the lamp will adhere to ferrous metal surfaces.

Take care to hold the lamp when it is disconnected to avoid damage by falling when the base loses its magnetism.

Inspection Lamp/Trickle Charger Socket

An electric supply/feed socket is mounted centrally on the forward face of the bulkhead beneath the bonnet. Since it is direct electrical contact with the battery, current may be drawn from the battery or supplied to it from a trickle charger.

The object of the trickle charger is to maintain the battery in a fully charged state when the car is not in use for lengthy periods, or when the drain on the battery is too great for the running times to permit a fully maintained charge (eg. short running periods in winter months using lamps, starter etc.). The normal proprietary trickle charger usually gives a charging rate of 1 to 2 amps.

lamp is as described for the rear interior lamps except that it is first necessary to remove the rear vision mirror followed by the radio speaker trimming panel.

Boot Lamp

Lucas 554. Part No.53343.

The lamps are mounted on either side of the boot compartment and are wired in circuit with the side lamps. A micro switch causes the lamp to light automatically when the boot door is opened.

Replacing a Boot Lamp Bulb

Lucas 209 6 watt.

Remove the two attachment screws release the metal cover plate and the glass cover which can easily fall unless care is taken. Remove and refit replacement bulb and re-assemble.

Ignition Warning Lamp

This lamp is situated within the speedometer on the RH side. The bulb is fitted behind an AMBER glass and comes into operation when the ignition is switched on.

Head Lamp Warning Lamp

This lamp is situated within the speedometer on the LH side. The bulb is fitted behind a RED glass and comes into operation when the headlamps are ON and are ON THE MAIN BEAM.

Fuel Warning Lamp

This lamp is situated within the revolution counter on the RH side. The bulb is fitted behind a BLUE glass and comes into operation when the petrol reserve switch is 'ON'. The reserve switch marked 'R', see Fig. 4, being mounted on the dashboard.

Loosen the terminal locknut shown at "A" in Fig.10 in order to release the contact breaker spring "C" then lift the fibre rocker off its pivot post, the spring being slotted to allow withdrawal. Remove the insulating washer from the pivot post. Release the screws "B" and lift off the fixed contact plate.

Inspect the contacts and if pitted badly or the contact surface is very thin, replace by a new set. The Part No. is Lucas 407050.

To dress the contacts use a fine carborundum stone but it is essential to keep the surfaces flat as shown in Fig.11 When satisfactory, wash off thoroughly with petrol to remove all traces of abrasive.

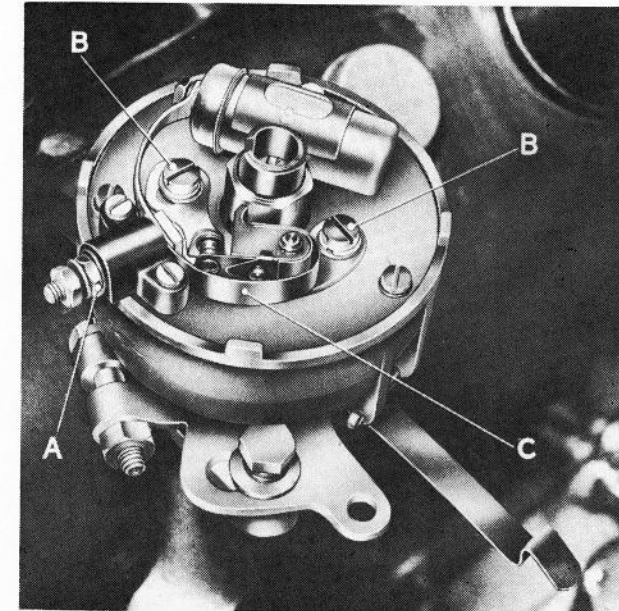
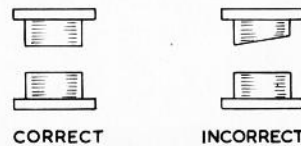


Fig.10 Contact Breaker details

To re-assemble, fit the fixed contact plate and fit but do not tighten the fixing screws. Fit the insulating washer to the pivot post. Smear the pivot post with oil and position the rocker and refit the slotted spring on to the L.T. terminal and tighten this connection.

With the car in neutral gear use the starting handle and turn the engine until the rocker is on the highest point of one of the distributor cam lobes. Using feeler gauges insert the correct thickness between the contact faces, Fig.13 and when correct, tighten the two screws "B", Fig.10. Re-check the setting by turning the engine to other cam lobes. The gap is critical and should be set as accurately as possible. Smear the cam slightly with grease. Connect and tighten the L.T. lead, replace the rotor and the distributor cap.

Fig.11 Contact Faces



To clean the rotor, scrape with a knife rather than use emery cloth. If burned badly, fit a new rotor.

To lubricate the distributor shaft, apply a few drops of thin machine oil around the exposed screwhead, Fig.12. Do not remove the screw.

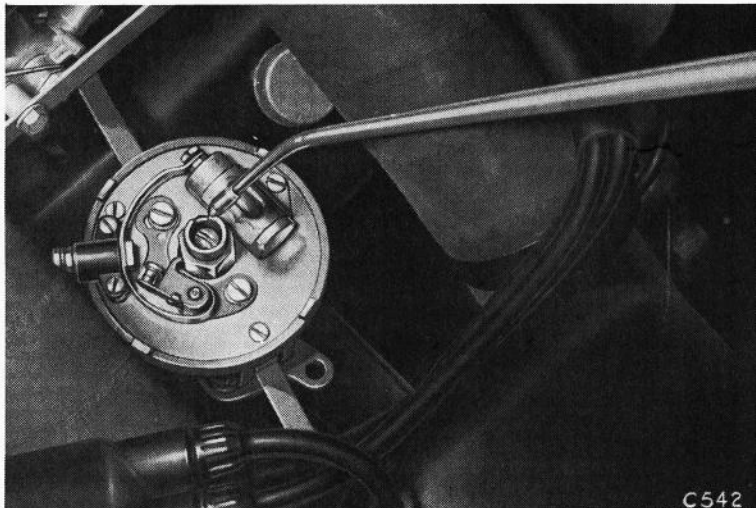


Fig.12 Lubricating Distributor Shaft

Replacement of Panel and Cigar Lighter Bulbs

Lucas Bulb No.987. 2.2 watt.

As these bulbs are replaced from the rear of the dashboard, any replacements should preferably be carried out by a 'Bristol' agent.

Interior Lighting

Three lamps are fitted for interior lighting. One on either side of the rear seat in the recess above the wheel arch which are controlled by individual switches adjacent to the lamp. The third lamp is mounted in the roof forward of the rear vision mirror. This lamp is controlled by an interior light control fitted below the parcel shelf on the drivers side, see Fig.3 , which is in conjunction with Micro switches installed in the hinge pillars.

The interior light control (courtesy switch) has three positions:-

- (1) With the switch turned fully clockwise the micro switches become inoperative and the lamp remains extinguished.
- (2) With the switch turned 1 click anti-clockwise the lamp will light when either door is opened and extinguished when closed.
- (3) By turning the switch a further 1 click anti-clockwise the lamp will remain illuminated irrespective of either door being in the open or closed position.

Replacing the Interior Lamp Bulb

11 m/m Festoon Bulb 9 watt.

To replace the bulb in the rear lamps release and remove one attachment screw together with the cover glass end attachment plate. Release the other attachment screw, then lift and remove the cover glass. Remove the bulb, fit replacement and re-assemble.

The method for replacing the bulb in the interior roof

Fig.46
Rear Lamp



designed to ensure correct fitment. To refit the cover glass reverse the procedure for removing.

Rear Number Plate Illumination Lamp

Lucas L.534. Part No. 53518

This lamp is mounted on a bracket situated in the bumper shell.

Replacement of Rear Number Plate Lamp Bulb

Lucas bulb No.222 4 watt.

Release the two attachment screws and remove the cover plate and glass cover which can easily fall unless care is taken. Remove and refit replacement bulb and re-assemble.

Panel Lamps

The instruments are illuminated by four lights plus an additional light for the cigar lighter. The lights are controlled in unison by the rheostat control knob, marked 'L' on the dashboard and are wired in circuit with the side lamps.

The lights are positioned as follows:- one behind the revolution counter, one behind the speedometer and two lamps together shared by the four control instruments and the clock.

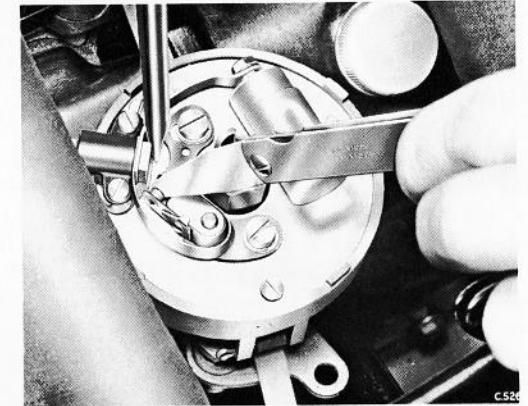
Checking the System

If trouble is experienced with the ignition system, make a systematic check as follows:-

Disconnect each H.T. wire in turn from its sparking plug adaptor and hold the end of the cable about $\frac{1}{4}$ inch from any bare metal part of the engine. With the ignition switch on turn the engine with the starting handle; if a spark occurs, the defect lies in the sparking plug or adaptor. If no spark occurs, proceed as follows:-

Remove the distributor cover and disconnect the centre lead (i.e. coil to distributor) from the cover. Ensure that the

Fig.13
Setting Contacts



engine is stationary with the contact breaker in the closed position. Hold the disconnect end of the centre lead about $\frac{1}{4}$ inch from a bare metal part of the engine and switch on the ignition. On opening the contact parts a spark should occur at the end of the lead. No electric shock will be felt at the contact breaker since it is in the L.T. circuit (12 volts).

If no spark occurs, ensure that the L.T. and H.T. connections to the coil are secure and clean, then repeat the check. If the check is ineffective, a defective coil is indicated. Proceed as follows:-

Disconnect the L.T. lead (marked SW) on the coil to eliminate the ignition switch circuit, then connect the SW

terminal direct to the negative terminal of the battery with a separate insulated wire. Repeat the check. If no spark occurs, a defective coil is confirmed. If a spark does occur, it indicates a defect between the coil and the ignition switch. Remember to disconnect the temporary wire at the battery or a discharged battery will result.

If, on checking for spark, a strong discharge is noted between the contact points as they open, it indicates a faulty condenser, but it is unlikely that a condenser will fail completely and suddenly.

Note:- A break in the H.T. winding of the coil may cause complete failure of the ignition or intermittent firing with overheating of the coil. Often if the coil ceases to function altogether at high speed, it will operate after being allowed to cool. In such a case the car should be driven slowly in order to get home.

Automatic Advance and Retard Mechanism

To check and lubricate this mechanism, remove the distributor cover and turn the rotor by hand (in the direction of its arrow) to its full extent against the spring resistance. When released, it should spring back to its original position. To lubricate the mechanism, inject a few drops of thin machine oil into the centre hole in the contact breaker base through which the cam protrudes.

Sparking Plugs

THE RECOMMENDED PLUG TO USE IS KLG P TEN L70

A special long reach universal joint spanner Part No. N.600011 should be used to fit and remove the 10 m/m sparking plugs. When removing and refitting plugs, always use this spanner with its tommy bar N.600130. A rubber insert on the top of the spanner grips the plug for extraction. Do not screw in the plug too tightly as finger pressure on the tommy bar is sufficient.

The plugs should be serviced at least every 3,000 miles and the gap re-set. THE CORRECT GAP IS .018 to .020 INCH. When this is no longer possible due to wear of the electrode, the plug should be replaced.

Replacing Reverse Lamp Bulb

Lucas bulb No.382 21 watt.

Remove the rim from the lamp by lifting the outer flange of the rubber moulding and remove the glass by lifting the inner flange of the moulding. Remove the bulb and fit the replacement. To refit the glass and rim reverse the procedure for removing, taking care to see that both glass and rim are fully located and secure.

Map Reading Lamp

Lampholder. Smiths Part No. 41/761/111/07

The map reading lamp is housed in the locking compartment on the left hand side of the dashboard and is controlled by a push switch mounted adjacent to the lamp wired in circuit with the side lamps.

Replacing the Map Reading Lamp

Smiths bulb. Part No. 40/621/100/11.

This bulb can only be replaced from the rear, gaining access through the aperture under the dashboard.

Combined Stop, Rear Lamp and Reflector

Lucas 551 Part No. 53377A.

This multi-purpose lamp incorporates a twin filament bulb. The stop light switch energised the brighter filament and lower powered filament serving the tail light circuit. The regulation type reflector is incorporated within the moulded glass, see Fig.46.

Replacing Stop and Rear Lamp Bulb

Lucas bulb No.380 21/6 watt.

Push and twist the cover glass anti-clockwise using the thumb and finger grip moulded on the glass. Withdraw the glass, remove the bulb and fit replacement. The bulb is

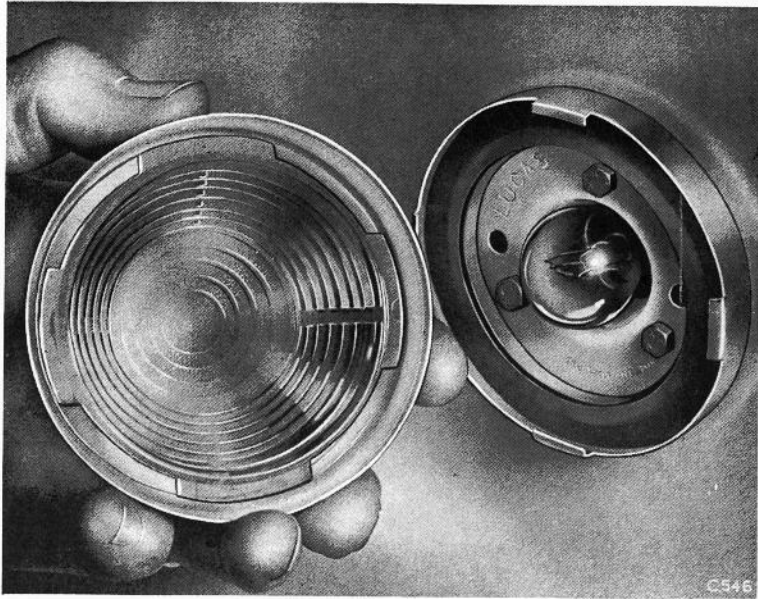


Fig.45 Front and Rear Lamp Bulb

Replacing Side (Roof) Lamp Bulb

Lucas Bulb No.989 6 watt.

Remove the securing screws attaching the bezel to the body skin. Remove the bezel, followed by the cover glass located in the rubber shroud. Remove the bulb and fit replacement. To refit the cover glass and bezel reverse the procedure for removing.

Reverse Lamps

Lucas 488. Part No. 522468.

These two lamps are housed on each side of the rear number plate. The lights come on when reverse gear is engaged and the ignition is turned on.

The K.L.G. plugs are of the detachable type and can be dismantled for cleaning purposes. Alternately, the plugs may be cleaned by the use of proper sand blasting equipment. Care, however, should be taken to see that all abrasive is cleaned from inside the plug. This is most readily done by dismantling the plug.

To take the plug to pieces, refer to Fig.14.

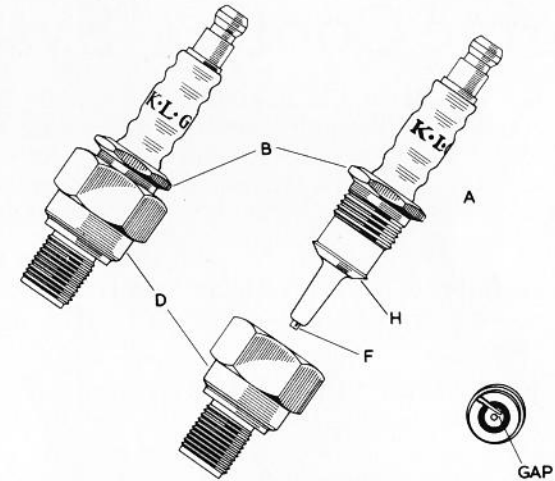


Fig.14 Sparking Plug Dismantling

The gland nut (B) should be unscrewed from the body (D) so that the insulated electrode assembly (A) may be withdrawn. This operation is best carried out by using two box spanners which fit the respective hexagons without slackness. Grip the box spanner for the gland nut in the vice while the other box spanner is used to unscrew the body.

If the insulation is oily, wash in petrol or paraffin, then with fairly coarse glass paper remove the carbon deposit and wash again. The firing point (F) should be cleaned with fine emery cloth.

The plug body (D) should be scraped clean internally with a knife or wire brush, paying particular attention to the earth electrode, and finally washed off in petrol.

The internal washer (H) should be lightly smeared with thin oil. Make sure that it is properly seated in the plug body before inserting the central electrode assembly. Screw in the gland nut and tighten sufficiently to give a gas-tight joint.

Finally adjust the gap to .018 to .020 inch carefully moving the earth electrode only to obtain this figure with a feeler gauge.

Engine Cooling System

Water drawn from the radiator by the centrifugal pump mounted on the part of the cylinder head is impelled around the inlet valve seats into the cylinder block jacket. The return flow passes around the exhaust valve seats to the pump and finally to the radiator via a thermostat valve incorporated into the pump.

The radiator is of the cellular matrix type, the system being sealed with a steam pressure relief valve incorporated in the filler cap.

The thermometer bulb of the water temperature gauge is located on the right-hand side of the cylinder block.

The thermostat valve in the water pump operates in the following manner. When the engine is cold, the valve seals the outlet to the radiator. Water is then circulated through the cylinder block and head, enters the valve housing and passes to the impellor to be re-circulated. A small bleed hole in the valve head prevent excessive water pressure. As the water temperature reaches 75°C, the valve is lifted from its seating permitting a flow via the outlet elbow of the pump to the radiator header tank. At normal running temperature the valve is fully open and full water circulation operates. This system promotes the rapid warming of the engine in cold weather.

Draining the System

Warning: Never remove the radiator cap while the engine is running since water may be ejected through the filler neck under pump pressure. After stopping a hot engine allow to cool and remove the filler cap slowly to release any steam pressure.

Replacing Bulbs in Fog and Spot Lamps

Fog Lamp Bulb Marchel 1282 JM7 48 watt.
Spot Lamp Bulb Marchel 1282 BM7 48 watt.

Release the attachment screw at the base of the rim and remove the light unit, then press and twist the bulb holder clockwise to detach the bulb holder. Remove the bulb and fit replacement. Re-assemble by reversing the foregoing procedure.

Adjusting the Fog and Spot Lamp Beams

The lamps are mounted on a spherical setting and can be manually adjusted in all directions. It may be necessary to remove the radiator under tray to gain access to the lamp securing nut.

Flashers

Front and Rear Lamps.
Lucas 538 Part No. 52272D.
Roof (Side) Lamps.
Lucas 598 Part No. 52326B.

The flasher type indicators are controlled by the indicator switch positioned centrally over the dashboard, the flasher unit being housed in the right hand wing bay. When the indicator switch is in operation a warning light in the instrument panel is energised and the lights will continue to flash until the lever on the switch automatically returns to its neutral position.

Replacing Front and Rear Lamp Bulb

Lucas Bulb No.382 21 watt.

Push in and twist the cover glass anti-clockwise using the thumb and finger grip on the glass. Withdraw the glass, Fig.45, remove the bulb and fit the replacement. To refit the glass, reverse the procedure for removing.

Fog and Spot Lamps

Fog Lamp Marchal Part No. 670/300.

Spot Lamp Marchal Part No.672/300.

These lamps are mounted in the air intake aperture and comprises a detachable light unit and backshell, see Fig.44. The lamps are controlled by a switch marked 'F' for fog and 'S' for spot on the dashboard. Both of these lamps are automatically extinguished when the headlamps are dipped except on some export models.



Fig.44 Fog and Spot Lamp Bulb

To drain the system, ease the radiator cap to allow air to enter and open the taps at the bottom right-hand side of the radiator and on the rear left-hand side of the cylinder block.

Filling the Radiator

THE WATER CAPACITY OF THE COOLING SYSTEM IS
16 PTS. (including heater).

The correct level of water is about $\frac{1}{2}$ inch below the bottom of the filler neck. It is important to check the level regularly and to maintain it at this level. In the event of overfilling, allow to drain slightly. It is possible that the water level will fall rapidly when the engine is first started due to the expulsion of air from the heater system. Therefore check and add, if necessary.

Radiator Cap

Incorporated in the radiator cap is a steam pressure release and overflow valve. It is advisable to check periodically that the spring loaded valve is free by pressing it open through the hole in the centre of the cap as shown in Fig.15.



Fig.15 Checking Radiator Pressure release and Overflow Valve

Flushing

Flush the cooling system at intervals dependent on local water conditions and the operating conditions of the car. It is also important to flush the system after the removal of water containing anti-freeze or if the car has been idle for a considerable period with the cooling system empty. Ordinary flushing can be done by pouring in water until clear water flows from the drain taps.

If more than this is required, any proprietary brand of flushing solution may be used providing that it is not harmful to aluminium. Always adhere to the maker's instructions when using this solution.

Frost Precautions

In temperatures below 0°C (32°F) it is recommended that a good brand of anti-freeze mixture is added to the cooling system. Check all joints and connections to avoid loss of the mixture and use to the manufacturer's instructions.

When anti-freeze is used and there is no leakage topping up with water does not diminish the efficiency of the anti-freeze since only the water content is lost through heating.

IF ANTI-FREEZE IS NOT AVAILABLE AND IT IS DECIDED TO DRAIN THE SYSTEM, MAKE SURE THAT THE CYLINDER BLOCK IS DRAINED AT THE CYLINDER BLOCK TAP.

Water Pump

The bearings of the water pump are pre-packed with grease by the manufacturers and therefore no attention is needed between overhaul periods.

Water Pump Thermostat

This can be lifted out from the water pump body by detaching the outlet casting.

If the bellows are punctured, this will be indicated by the entry of water and it should be discarded as unserviceable.

- (4) To raise the beam, screw the vertical trim adjusting screw (C) clockwise and vice versa.
- (5) To turn the beam horizontal, manipulate the horizontal adjusting screw (D) as necessary.

When adjustment is satisfactory refit the lamp rim.

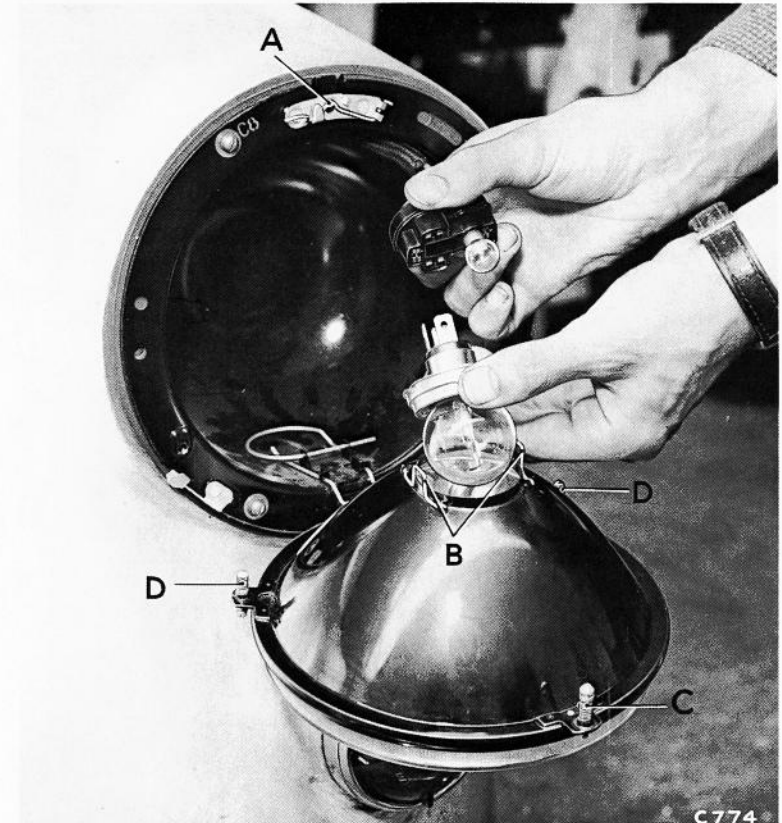


Fig.43 Headlamp Bulbs and Adjustment

Headlamp

Marchal Part No. 57973/200TG-12 VB.

Each lamp housing is built into the front wing the rim acting as a fairing between the wing contour and the light unit. The lamps are fitted with a twin filament bulb and separate sidelamp bulb.

Replacing the Bulbs

Headlamp bulb. Marchal Part No. 1263B. 45/40 watt.
Sidelamp bulb. Marchal Part No. RIVAL 89 6 watt

Remove the rim by pulling on the finger grip at the base of the rim when it will become entirely free. Lift the spring clip A, Fig.43. Lower the light unit which is hinged to the lamp shell. Care should be taken to avoid straining the leads.

Holding the light unit lift the two spring clips (B) and withdraw the bulb holder.

Pull the headlamp bulb direct out of its sockets but push and twist the sidelamp bulb to release. For refitting the procedure is reversed, but care should be taken when replacing the bulb holder to ensure that the BEAMDIP DIRECTION CLIP has not been disturbed. Instructions regarding this are printed on the back of the reflector.

Setting the Headlamp Beam

No adjustment is necessary under normal conditions of use, even after fitting a new bulb, but vertical and horizontal adjustment is provided.

To adjust the beam proceed as follows:-

- (1) Set the car on a level surface at an approximate distance of 20 to 30 feet from and facing a blank wall.
- (2) Remove the lamp rim.
- (3) Switch on the lamps and note the position of the light circles on the wall in relation to the height and spacing of the lamps on the car.

Ease the valve off its seat by pressing the outer bellows rim upwards, see Fig.16 and check that the valve returns to its seat on release of the pressure. If the movement is stiff and the assembly corroded, soak it in thin machine oil and carefully remove excessive corrosion to ease the valve action. Make sure that the valve seating and valve face are clean.

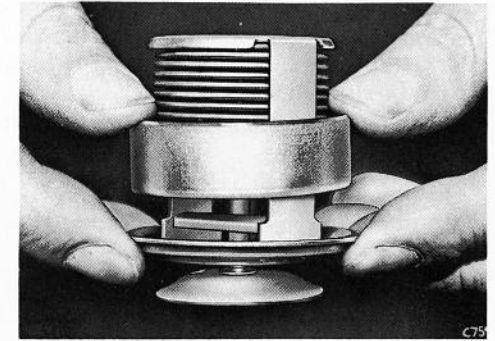


Fig.16. Checking Thermostat Valve Seat

To check the action of the bellows, immerse into boiling water and the valve should lift clear of its seating.

When refitting the thermostat, position it so that the side pieces do not obstruct the transfer passage.

Fan Belt

The belt is tensioned correctly if it can be deflected inwards, by hand, approximately 1 inch on its upward rim. If the belt is slack, release the three adjusting and mounting bolts of the dynamo and move the dynamo away from the cylinder block as shown in Fig.17 until the correct tension is obtained, then tighten the bolts and re-check.

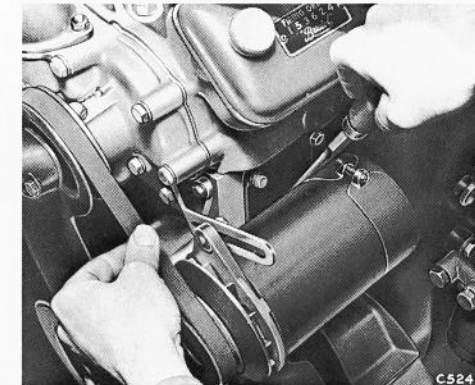


Fig.17.
Adjusting
Fan
Belt.

Fuel System

This consists of a petrol tank housed behind the rear seat squab, secured by two steel straps, a normal cam-driven petrol pump and three downdraught carburettors. A combined air cleaner and carburettor intake silencer is fitted.

THE PETROL CAPACITY IS 18 GALLONS including 2 gallons reserve. A blue warning light on the instrument panel indicates when the reserve is being used.

Carburettors

Front and Rear Carburettors.
Solex B32.PBI/7/1825.

Centre Carburettor
Solex B32.PBI/7/1824.

Choke	26	26
Main Jet	105	105
Corrector	170	170
Emulsion Tube	No.10	No.10
Pilot Jet	50	50
Air Bleed	1.0 m/m	1.0 m/m
Accelerator Pump Jet	60	90
GA Jet	2.0 m/m	2.0 m/m
GS Jet	95	95
Needle Valve	1.5 m/m	1.5 m/m
Needle Valve Washer	1.0 m/m	1.0 m/m

Carburettor Adjustments

Before leaving the Works the carburettors are tuned and adjusted correctly on premium grade fuel. Under normal conditions, therefore, it should be unnecessary to change the sizes of the jets. Should the performance of the car be affected by different barometric conditions, or should another grade of fuel be used, the owner is recommended to consult a qualified agent.

Slow-running

Make any adjustment to the slow-running with the water temperature over 70°C and with the mixture control "M" fully in. Before altering the setting of the volume control screws,

When 'parking' is selected the wiper blades automatically come to rest at the lower edge of the windscreen.

Horns

High Tone Lucas WT.618 Part No.69047

Low Tone Lucas WT.618 Part No.69046

Dual Windtone horns are fitted on each side between the radiator and the front grille. The push button in the centre of the steering wheel operates a solenoid relay switch situated under the bonnet on the inside of the right hand wheel fairing slightly to the rear of the radiator.

The horns should give a long period of service without attention under normal circumstances. If, however, the performance of one or both horns becomes unsatisfactory make sure that some outside source is not the cause of the trouble eg. a loose electrical connection, a loose attachment bolt or any loose metal parts in the vicinity of the horns which will often vibrate at a similar frequency when the horn is energised and so upset the note.

Ammeter

Lucas CZU 60 Part No. 36242A.

The ammeter is in circuit with all electrical accessories except the Starter Motor, Horn Relay, Cigar Lighter and interior lights. The instrument is positioned in the centre of the instrument panel.

Lighting and Ignition Switch

Lucas PRS 3 Part No. 031258A

The lighting switch surrounds the ignition switch and lock and is situated on the RH side of the dashboard. The three positions of the switch from left to right are as follows:-

- (1) All lamps OFF.
- (2) Sidelamps, Tail-lamps, Rear Number plate illumination lamp and Front Grille illumination ON.
- (3) As 2 including Headlamps ON.

All accessories protected by a fuse will be inoperative if that fuse is blown.

CAUTION. Never replace a blown fuse with one of a higher value as this will only lead to damage of accessories if a short circuit occurs.

The Voltage/Current Regulator controls the output of the dynamo according to the load on the battery and its state of charge. When the battery is in a low state of charge the dynamo output is high, this is shown on the ammeter.

No adjustment to the regulator or cut-out is normally required but should any attention be considered necessary it should be entrusted to a recognised Lucas agent.

Windscreen Wipers

Wiper Arm. Lucas Part No.744133.

Wiper Blade. Lucas Part No.737907.

The windscreen wiper motor and gearbox are mounted on the electrical control panel in the right hand wing bay. The cable rack transmits motion to the two wheelboxes inside the scuttle, which operate the wiper arms and blades. No adjustment or lubrication is normally necessary as all parts are packed with lubricant on assembly.

The windscreen wiper control knob, marked 'W' on the dashboard has three operating positions as follows:-

Fully anti-clockwise is the PARKING position.

1 Click clockwise will give MEDIUM speed.

2 Clicks clockwise will give FAST speed.

A thermostatic cut-out switch is built into the wiper motor to prevent over heating. However in order to avoid excessive load on the cut-out switch, the fast speed (1) should only be used in heavy rain. Never use it in snow or on a drying windscreen, i.e. when the load on the motor is likely to be in excess of normal.

check that the Bi-starter levers on the carburettors are all against their forward stops. If necessary, adjust the control unit until this is achieved.

An over-rich mixture is indicated by a tendency to "hunt" and a strong smelling exhaust, usually accompanied by the engine rocking in its flexible mountings. To weaken the mixture, turn the volume control screws IN (clockwise). See Fig.18.

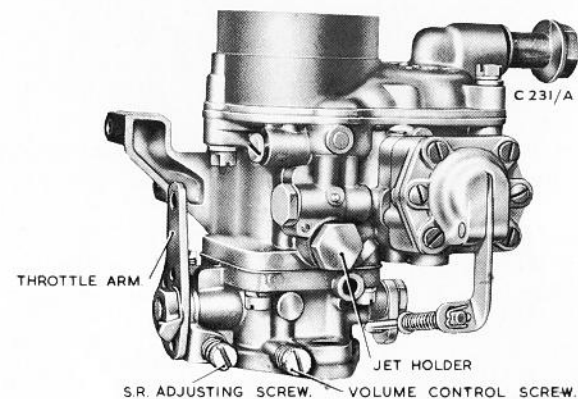


Fig.18 Carburettor Adjustment Locations

A weak mixture is indicated by a tendency to stall after erratic running. To enrich the mixture, turn the volume control screw OUT (anti-clockwise). When resetting the volume control screws, adjust each in turn, as necessary, by increments of not more than a quarter of a turn.

The correct slow-running speed of the engine is 450 to 500 r.p.m. Achieve this by turning each slow-running adjustment screw by equal increments, clockwise to increase speed and anti-clockwise to decrease.

In the event of the foregoing adjustments being "lost", start afresh with the sequence as follows:-

- (1) Set the throttles to the closed position.
- (2) Unscrew each slow-running adjustment screw until just clear of its abutment.

- (3) Adjust each screw in turn until a thin strip of paper can be "nipped" between each screw and its abutment.
- (4) Withdraw the paper strips and turn each screw IN (clockwise) ONE complete turn.
- (5) Turn each volume control screw fully home and then turn each back ONE complete turn.

Caution: Do not use force when turning these screws in or the seatings into which the tapered points fit will be damaged. If necessary, remove and lightly oil the threads of each screw.

- (6) Start up the engine and run until a temperature of not more than 70°C is reached.

First adjust the volume control screws as described previously and then the slow-running adjustment screws until the correct idling speed is shown on the revolution indicator

Running

If, after the slow-running adjustments have been carried out, the engine stalls on braking, turn the volume control screws on the front and rear carburettors only OUT (anti-clockwise $\frac{1}{4}$ turn.

Periodically examine the filters in petrol pipe banjo connections to the carburettors, Fig.19 and keep clean and in good condition.

It is most important that when the carburettor flange gaskets are replaced, they are of the correct type. If a gasket of softer or thicker material is used, the carburettor flange may become bowed owing to the gasket compressing more at the studs; this ultimately leads to air leakage at the joints and necessitates refacing the flange faces.

Petrol Pump

The petrol pump is a cam-driven A.C. type with a glass dome covered filter and hand priming lever.

Voltage and Current Regulator

Lucas RB 310 Part No. 37187A

Fuse Box

Lucas SF.6. Part No. 37132A

The voltage/current regulator and cut-out are housed on a common base covered by a metal cover and is located in the right hand wing bay, see Fig.40. The main terminals are mounted on the base adjacent to the cover. Two fuses are contained in the fuse block positioned immediately below the regulator. The positions of the fuses are clearly marked A1. A2 (Auxiliary fuse) and A3 A4 (Auxiliary ignition) and they protect certain accessories as follows:-

	Independent of the ignition switch	Controlled by the ignition switch
No Fuse	Head, side, tail, number plate lamp, headlamp warning light, panel lights, ammeter, map reading lamp, clock, front grille lamp.	Ignition and ignition warning light. starter push button.
Protected by the A1. A2. Fuse 35 amp.	Inspection lamp and trickle charger socket, horns, fog lamp, spotlamp, interior lights, cigar lighter, boot lamp.	-
Protected by the A3. A4.	-	Stop lamp, petrol gauge flasher indicators, flasher warning light, demister motor, reverse lamp, petrol reserve warning light, windscreen wiper motor.

the motor, and then turning the squared end of the shaft with a suitable spanner in a clockwise direction, viewed from the front of the engine.

The brush gear and commutator of the starter motor should be inspected and treated in the same way as the dynamo brushes explained previously.

Starter Solenoid

Lucas ST.950.

This is located in the engine bay on the right hand side below the 'One Shot' lubrication tank, see Fig.42.

The push button can be conveniently used for starting the engine (ensure that the gearbox is in neutral gear) when working on the engine bay.



Fig.42 Starter Solenoid

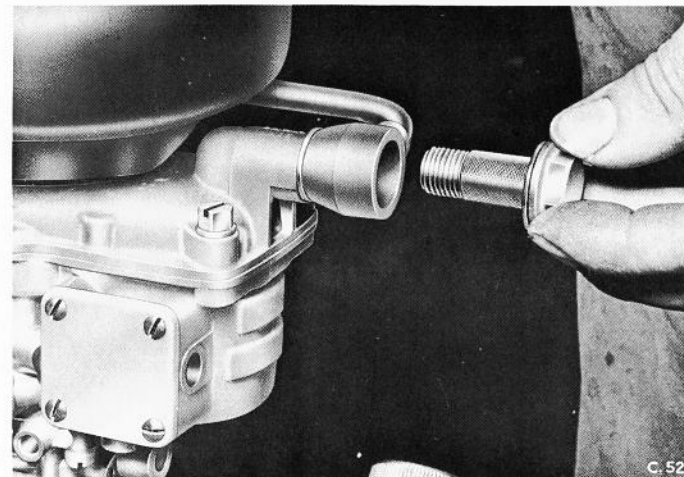


Fig.19 Removing Carburettor Fuel Pipe Filter

No attention is normally required beyond periodically cleaning out the glass cover, cleaning or replacing the filter and replacing the gasket seating of the glass bowl. These operations can be carried out without removing the pump by unscrewing the nut of the clamp retainer, see Fig.20.

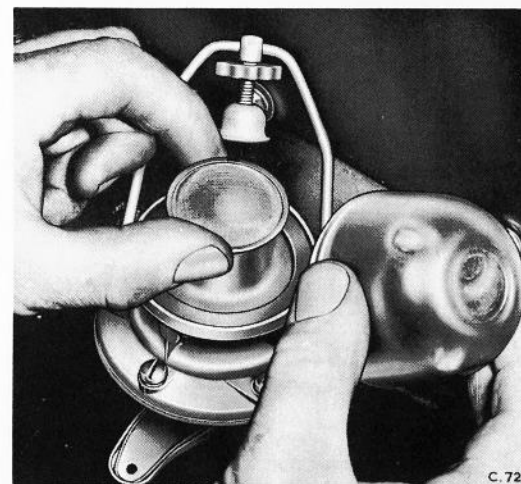


Fig.20 Removing Petrol Pump Filter

Should the pump be in poor condition, a new or maker's reconditioned unit is recommended.

Parts normally required for pump maintenance are:-

Bristol Part No.	A.C. Part No.	Description
N.370480	1524247	Filter Glass Cover
N.370490	1524250	Filter Gauge
N.370500	1524246	Gasket

Transmission

Clutch

The clutch will operate satisfactorily for very long periods without attention, but the 'free' travel of the clutch pedal decreases as normal wear takes place to the facings. Damage will result unless the correct travel is restored to the pedal. As wear takes place in the release bearing assembly the 'free' travel in the pedal will increase and may render silent gear changing difficult due to clutch 'drag'.

Clutch Adjustment

Adjustment is provided at the clutch operating lever Fig.21. The correct free travel is 1 inch measured between the pedal pad and the toeboard.

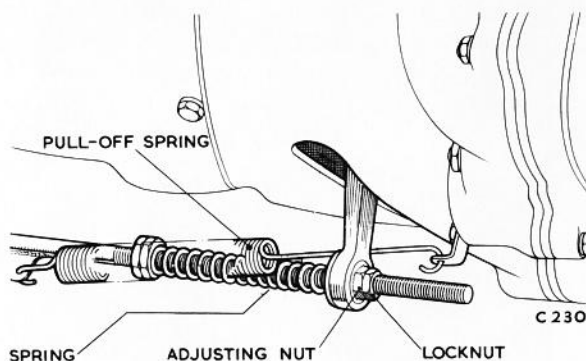


Fig.21 Clutch Adjustment

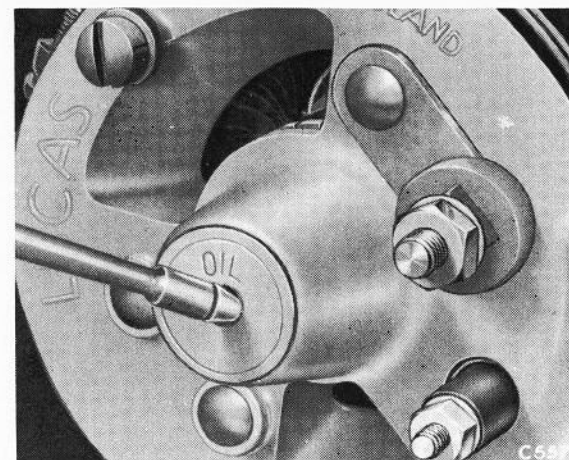


Fig.41
Lubricating
Dynamo

brush and the inside of its holder with a petrol moistened cloth. When refitting a brush make sure it is returned the same way round as it was before in order to retain the 'bedding' on the commutator. Fit new brushes if the present brushes have worn to less than $11/32$ in length as there will not be sufficient spring pressure to keep them against the commutator.

Commutator

This should show a clean polished surface. If it is blackened by carbon, clean by pressing a dry cloth against it while rotating the engine BY HAND. If it is very dirty moisten the cloth with petrol. Do not use emery cloth.

Starter Motor

Lucas M35G/1. Type WG3. Part No. 25026B.

The starter motor located on the right hand side of the engine is of normal design with a 'Bendix' type inertia pinion on a worm shaft to engage the starter ring on the flywheel.

In the event of the starter pinion becoming jammed in mesh with the starter ring it can usually be freed by first removing the protective cap, which is a push fit on the end of

the battery should be covered by adding distilled water to the cells through the filler plugs. Various appliances and methods are used for this procedure but it is important to guard against overfilling. Never use a naked light to examine the levels as the gas given out is inflammable.

No particular period can be given for topping up of the battery, warm weather and the conditions of use of the car must be taken into consideration. It is better to examine the levels frequently.

See that the battery is level and firmly clamped into position. The positive and negative taper connections are of different sizes and it is not normally possible to incorrectly attach them. To keep them dry should ensure them being clean but they can be smeared with vaseline or petroleum jelly.

Dynamo

Lucas Model C39. PV2.

The dynamo is driven by a triangulated belt drive at the front of the engine. For adjustment of the belt see Fig.17. To keep the dynamo windings within reasonable temperatures a cooling fan is fitted behind the driving pulley.

The rear bearing of the dynamo, Fig.41, should be lubricated at periods. This is not frequent and due to the inaccessibility it would be best carried out when the engine is decarbonised.

At a similar time the brushes and commutator of the dynamo could be examined. To do this loosen the clamp screw of the metal band around the rear end of the dynamo. Check that each brush is free to move in its holder by lifting the spring and pulling gently on the flexible connector. If they are inclined to stick withdraw the brush completely and wipe the

From beneath the car, either L.H. or R.H. according to the drive, slacken the locknut and turn the adjusting nut until the required 'free' travel is obtained. Tighten the locknut securely on completion of the adjustment.

Gearbox and Overdrive

'Bristol' manufacture gearbox, 4-speed with BorgWarner type synchromesh on 2nd, 3rd and 4th with freewheel on 1st gear. Laycock de Normanville overdrive operating in top gear only.

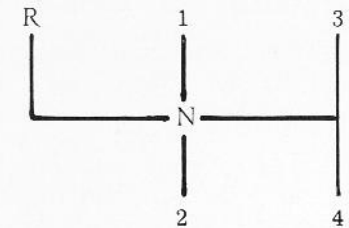
Gear Ratios (overall).

1st..	..	..	..	15.419
2nd.	..	..	..	7.793
3rd.	..	..	..	5.516
Top.	..	..	..	4.27
Overdrive	..	..		3.322
Reverse	..	..		12.336

Gear Controls

Forward gears, except 1st which incorporates a free-wheel, are provided with synchromesh mechanism, therefore when changing down from a higher gear, accelerate the engine at the same moment as de-clutching. The degree of acceleration may be judged by experience and/or glancing at the r.p.m. indicator and will, of course, vary with the speed of the car. Move the gear lever positively and smoothly. 'Snatching' a gear into engagement will result in rapid wear of the synchromesh mechanism since the relative speeds of the engaging gears will be adjusted solely by the mechanism and not by the speed of the car.

Fig.22 Gear Change Positions



Freewheel 1st Gear Unit

AS THE FIRST GEAR IS A FREEWHEEL UNIT IT CANNOT BE USED TO RETARD THE SPEED OF THE CAR OR AS A BRAKE WHEN THE CAR IS STATIONARY.

The freewheel will carry all normal loads but it is possible, particularly with the higher power of the latest engines, to impose very severe stresses which can result in gear fracture.

When in 1st gear it is always best to avoid sharp engagement of the clutch with hard engine acceleration. Normal engagement is quite in order, but harsh engagement will result in the rollers of the freewheel 'hammering' the shell of the gear.

Overdrive

The overdrive is operative only when the top (4th) gear is engaged and is brought into operation by the switch on the dashboard. Changing down from top gear automatically disengages the overdrive.

Checking Gearbox/Overdrive Oil Level

Lift the carpeting in front of the right hand front seat to expose the panel in the side of the front tunnel. Release the screws and remove the panel. Remove the combined level and filler plug from the overdrive unit, see Fig.23. With the car level, if the oil is below the hole add sufficient oil until level with the plug orifice allowing time for the oil to find its level throughout the gearbox and overdrive unit.

Draining and Refilling Gearbox/Overdrive

To drain the units remove the drain plugs from the gearbox and overdrive, see Fig.24, but refilling is done through the overdrive only.

After refilling, drive the car a short distance then again top up with oil. This is necessary as some of the oil will be taken into the hydraulic system.

Electrical System

This is a Lucas 12 volt system. Current is supplied by a ventilated two brush dynamo in conjunction with a voltage and current regulator with automatic cut-out and a 12 volt 51 ampere battery.

Battery

The battery is housed in the offside wing bay, see Fig.40. To open see Spare Wheel.

Always keep the top of the battery clean and dry. 'Topping up' the battery is a routine matter and means that the plates in

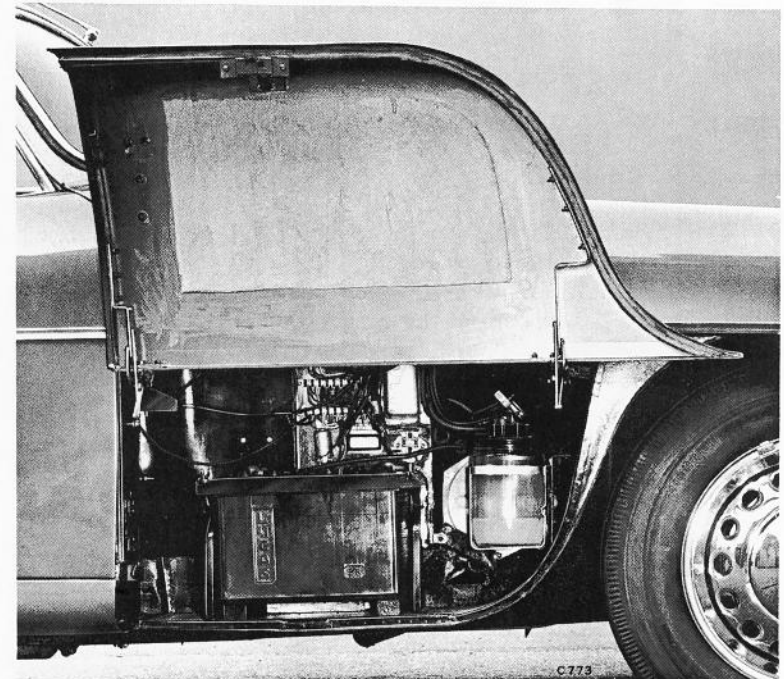


Fig.40 Offside Wing Bay and Stowage

lid. To increase the length of time for which the wipers should operate after the water has stopped, turn the screw in a clockwise direction.

If the delay time should become erratic, or the wipers continue to wipe without stop, this will almost certainly be due to dirt in the pneumatic hydrostatic valve. This can be cleared as follows.

Obtain access to the Glass Jar in the R.H. wing valance see Fig. 40. Turn the whole jar or the lid of the jar, whichever occurs conveniently, a half turn anti-clockwise allowing the bleed screw to face outwards. With the engine running remove the bleed screw, operate the washer and allow water to flush out the dirt. The bleed screw should then be replaced and set to give a delay after the water stops of approximately 6 seconds. Return the jar or lid to its correct position.

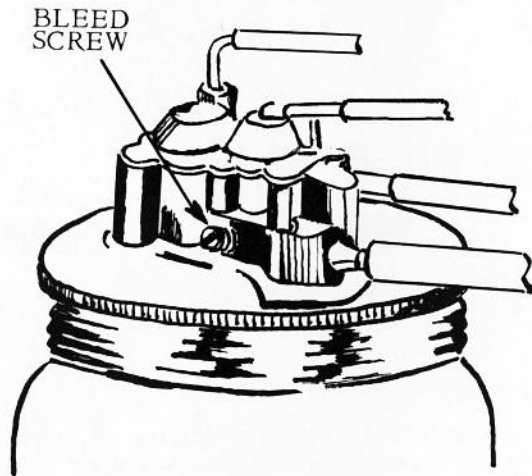


Fig.39A. Position of Bleed Screw on Water Jar

Cleanliness is essential in dealing with the overdrive unit. The smallest amount of dirt or 'fluff' from a wiping cloth finding its way into a valve will give considerable inconvenience and trouble. Therefore make sure that the oil is clean and carefully clean all around the level/filler plug BEFORE REMOVING IT.

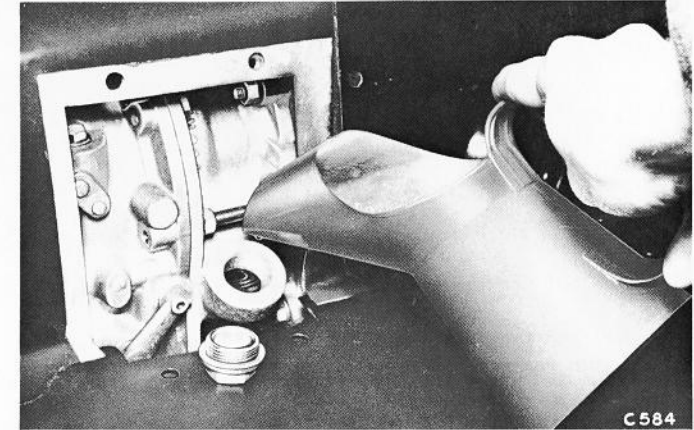


Fig.23 Topping Up Gearbox and Overdrive

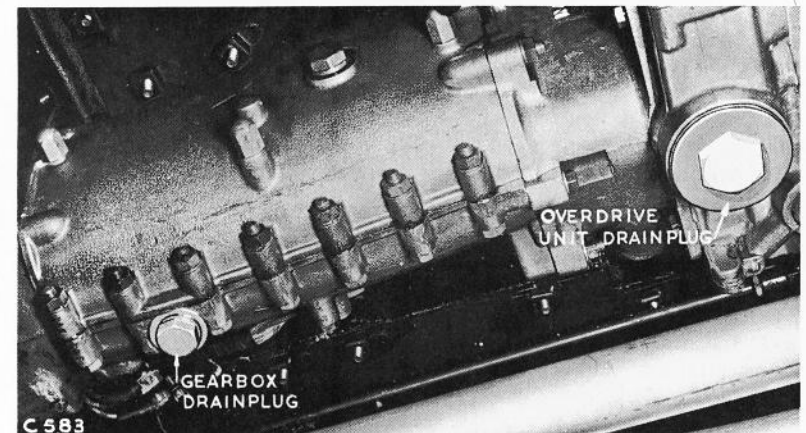


Fig.24 Gearbox and Overdrive Drain Plugs

Propellor Shaft

Lubrication nipples are provided in the front and rear universal joints and also for the sliding portion of the shaft. See Fig.25.

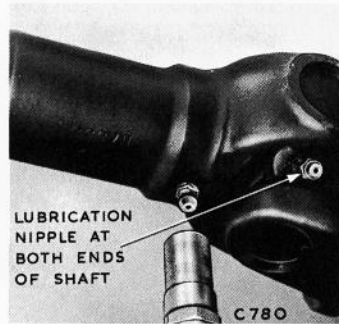


Fig.25 Propellor Shaft Lubrication

Front and Rear Suspension and Front Hubs

Front Suspension

The front wheels are independently sprung by a single transverse leaf spring. The spring eye acts as the lower link of the stub axle swivel pins, the upper connection of the swivel pins being attached to "wishbone" radius arms. Telescopic shock absorbers are attached to front cross member brackets at their upper ends and to the spring eye bottom bracket at the lower end. Each shock absorber is pivoted in rubber bushes.

An anti-roll bar, Fig.26, is fitted, all locations being rubber bushed.

The outer ends of the spring and the swivel pin upper and lower joints are lubricated by the "one-shot" system and are enclosed in gaiters.

It is recommended that Trico Washer Solvent XAW-30 is used in the water supply as it:

- (1) Protects the jar from cracking in cold weather.
- (2) Saves the trouble of emptying the jar.
- (3) It can be used in summer and winter.
- (4) It helps to clean the Windscreen.

Do not use Anti-Freeze in the Jar.

The jets can be cleaned, Fig.39, as follows:-

- (1) Unscrew the small knurled button 1 turn but do not remove.
- (2) Operate the washer and allow water to flow freely through the loose jet.
- (3) Retighten knurled button taking care not to damage the plastic washer.
- (4) Repeat the above procedure on the other jet - do not open both jets at the same time.

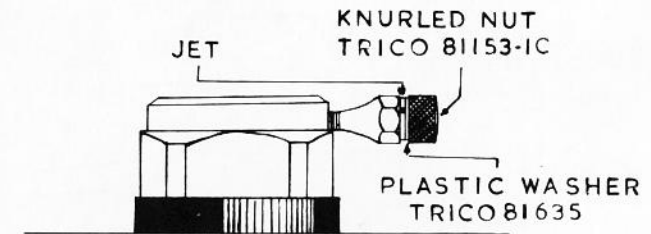


Fig.39 Windscreen Washer Jet

Bleed Screw

The wiper motor should commence to operate approximately 1 second after the water starts and return the wipers to the parked position at a predetermined time after the water stops; this is normally set before leaving the Works to give a 6 second delay. If for any reason this requires resetting this can be achieved by means of the small bleed screw Fig. 39A on the side of the pneumatic hydrostatic valve on the top of the jar

No attention need normally be given to this installation, except the maintenance of the oil supply in the reservoir attached to the bulkhead of the car. Fig.42

The operation pedal, accessible in the driving position Fig. 3, should be depressed once every 100 miles under normal road conditions. The quantity of oil fed to each location is controlled by the air chambers on the header and extra foot pressure on the operating pedal serves no useful purpose. Depress the pedal only until positive resistance is felt and then release it.

Trico Windscreen Washer and Electric Coupler

The purpose of this system is to maintain clear vision particularly to allow the wipers to do their work when the windscreen is otherwise dry.

The system is actuated by induction depression and therefore can only be operated for any length of time when the engine is running.

It is operated by the windscreen wiper switch marked 'W' on the dashboard and should be used as follows:-

Assuming that the screen vision has been temporarily blurred by a passing vehicle or vehicles Press ONLY on the windscreen wiper knob. This will bring the spray into action and the wipers will give a fast wipe. The spray and the wipers will automatically stop in a short time sequence. If insufficient press again.

Turning the knob will only bring the wipers into operation, see Windscreen wipers.

The water supply is contained in a glass jar in the offside wing bay, see Fig.40, and a swing cover on the lid of the jar allows filling to take place in situ.

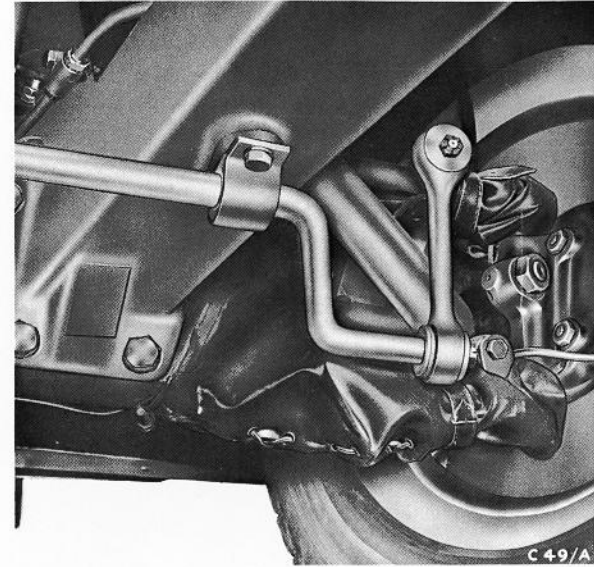


Fig.26 Anti-Roll Bar

Front Hubs

Each front wheel hub is mounted on two taper roller bearings and has an oil seal at its inner end. No attention other than periodical packing with grease is necessary. Packing with grease is best carried out by completely removing the hub and packing between the bearings. Loading the hexagon hub cap with grease and screwing it on is not recommended as grease may be forced past the rear oil seal.

Rear Suspension

Torsion bars are fitted to the rear suspension. They are marked left hand and right hand (L and R) respectively on the rear face and they are not interchangeable. The front serration of the torsion bars are located on adjustable sockets while the rear serrations locate in the suspension unit main arm. See Fig.27.

The suspension units are packed with grease and norm-

ally do not require attention while the suspension arm assemblies are lubricated by the oil in the rear axle casing.

Telescopic shock absorbers are fitted between the axle casing and the chassis frame.

Rear Axle

The rear axle assembly and differential is of Salisbury manufacture (4.27 to 1 ratio) semi-floating type with shim adjustment for all bearings and meshing of the hypoid drive gear and pinion matched assembly. The axle shafts are splined at the inner ends which engage splines in the differential side gears, while the outer ends have tapers and keys to fit

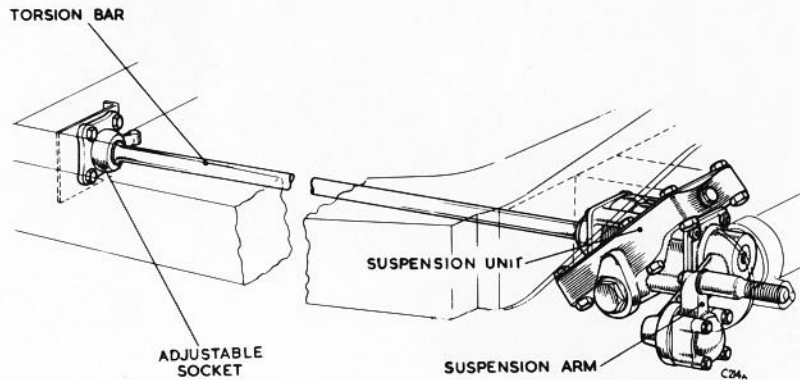


Fig.27 Rear Suspension System

the rear wheel hubs. The hubs are supported by taper roller bearings pressed on to the axle shafts and located in the ends of the axle tubes. Outward thrust on either wheel is taken by the adjacent hub bearing, whilst inner thrust is transmitted through the axle shafts and slotted axle shaft spacer to the opposite bearing. Thus, each hub bearing takes thrust in one direction only.

Rear axle alignment is provided for in the design of the suspension arm units and axle location is by Watts linkage. Rubber bushes are provided throughout this linkage so lubrication is not necessary.

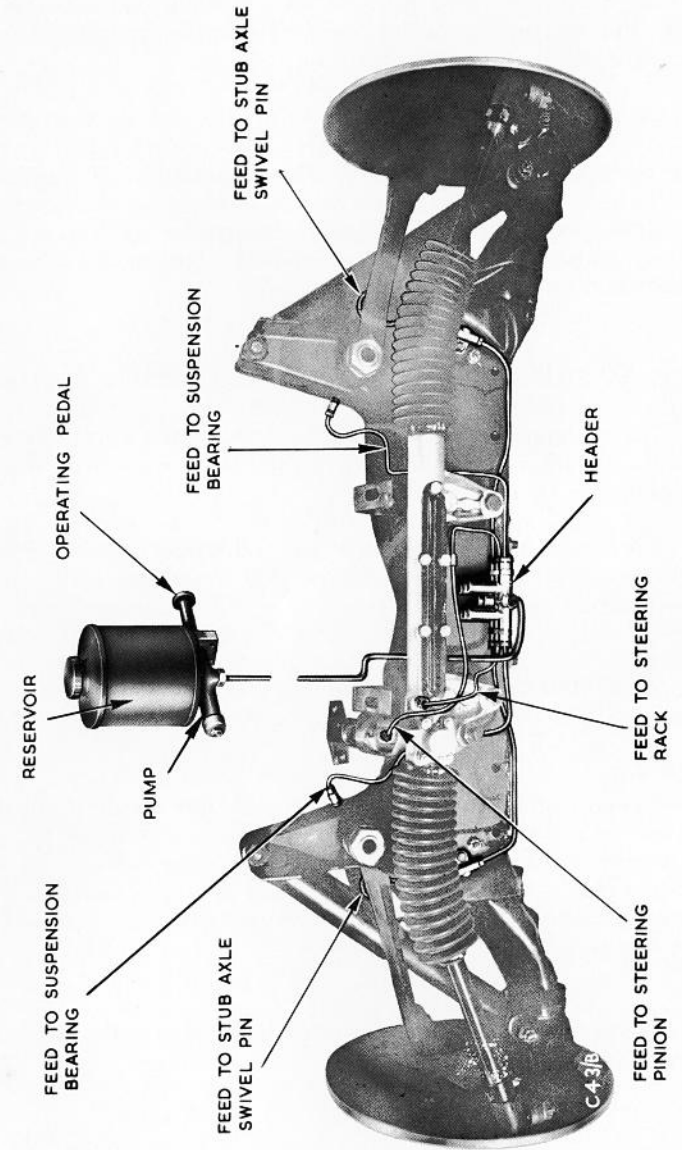


Fig.38 Diagram of 'One-Shot' Lubrication

Indications that lubrication is required are:-

- (a) 'knocks' or pulses in the brake pedal when the brakes are put on or off.
- (b) The tendency of the brakes to lag and 'jerk-on' when applied, or stick on and suddenly 'jerk-off' when the foot is removed from the pedal i.e. a general lack of quality and progression.

To lubricate, remove the cover, this has three short hexagon screws and three long. Remove the three short bolts then progressively unscrew the three longer bolts to relieve the spring tension in the piston chamber. The section of hose between the pipes will allow them to be separated. Withdraw the piston assembly and lubricate the piston with an approved vacuum cylinder oil such as Edgar Vaughan 'Cosmolubic' 100. The cylinder bore and the wick beneath the leather cup should be well saturated with vacuum oil.

When replacing the cover tighten progressively but do not finally over-tighten the bolts as this will distort the joint faces.

Servo Air Filter

This is fitted in order to ensure clean air being drawn into the servo chamber. It should be periodically inspected and cleaned.

Vacuum Tank

This unit normally needs no attention. It has the dual purpose of providing a reserve to ensure further application of the brakes should the engine stall and also becomes a part of the windscreen wash installation.

'One-Shot' Lubrication System (Enots)

The system is illustrated in Fig.38 and it feeds the whole of the front suspension, steering box and steering tie tubes.

Draining and Refilling

The first drain of oil should be at 500 miles and then the axle should be drained and refilled every 10,000 miles or at least every six months. Preferably drain after the car has been run and the oil is warm. The drain plug is located on the underside of the casing in the centre and level/filler plug on the rear cover.

Check the oil level and top-up if required every 1,500 miles or at least monthly.

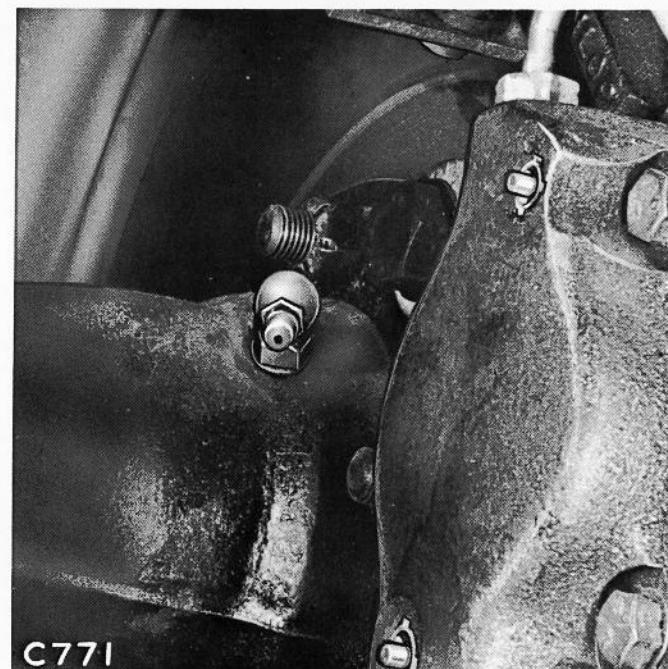


Fig.28 Grease Nipple - Rear Axle Casing

Hub Bearing Greasing

Greasing should be carried out at 500 miles and thereafter at every 1,500 miles or at least monthly. A grease nipple is provided at either end of the axle as shown in Fig.28.

Steering

Steering Wheel

The steering wheel has two fixed positions as shown in Fig.29. To alter from one position to the other disconnect the battery, prise out the horn push assembly and disconnect the cable from the horn push. Unscrew the hexagon securing bolt from inside the steering wheel. Unscrew the hexagon domed nut from the holes in the side of the steering wheel fairing and take out the spring washer and bolt. Remove or add the long spacing sleeve and align the bolt hole of the steering wheel with the new position groove on the steering column. Insert the bolt, fit the spring washer and dome nut and tighten. Fit the hexagon securing bolt inside the steering wheel and tighten. Re-connect the cable and press in the horn push.

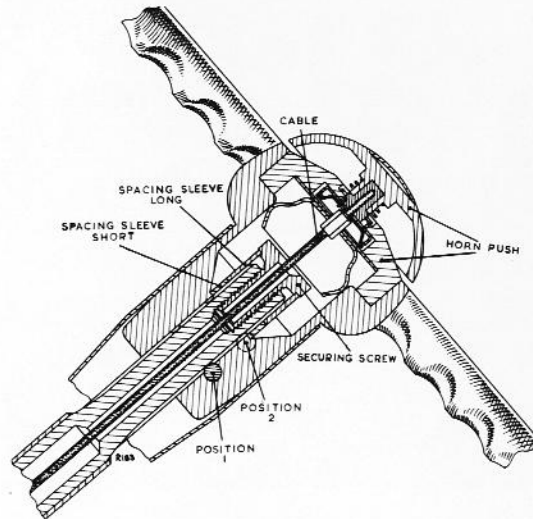


Fig.29 Steering Wheel Adjustment

Steering Column Attachment Bracket

This shimmed spherical bush assembly does not normally need attention.

The correct handbrake travel, from the fully off to the fully on position, is 4 to 5 teeth on the ratchet. On no account attempt to correct excessive travel by adjusting the cables as these are set correctly by the manufacturers.

The handbrake pads are completely separate to the foot-brake pads, see Fig.37, and they can be set to correct the handbrake travel as follows:-

Jack up the rear of the car in order to spin the wheel, or wheels, and set the handbrake lever in the car in the fully off position.

Insert a screwdriver through any hole in the road wheel opposite to the handbrake adjusting screw and tighten sufficiently to prevent the wheel from spinning, then slacken back 1/3 turn. This should allow the wheel to rotate by hand.

Repeat this procedure on the other rear wheel, lower the car on to its wheels and check the handbrake travel.

Master Cylinder

The master cylinder is mechanically linked to the foot brake pedal and, at a ratio proportionate to the load applied, provides the hydraulic pressure necessary to operate the brakes.

This unit does not normally need attention but a check should periodically be taken to ensure that when the brake pedal is in the OFF position there is no pre-loading of the master cylinder piston. The push rod protruding through the rubber cap of the master cylinder should have a free fore and aft movement of approximately .015 to .020 inch. If necessary adjust the push rod fork end and its locknut.

Servo Unit

Attention may be necessary, at varying intervals, to the vacuum cylinder of this unit where the leather cup has a tendency to dry out due to the heat of the engine.

cables to the rear wheels only. At periods lubricate the brake cable through the grease nipple on the rear conduit. Fig.36.

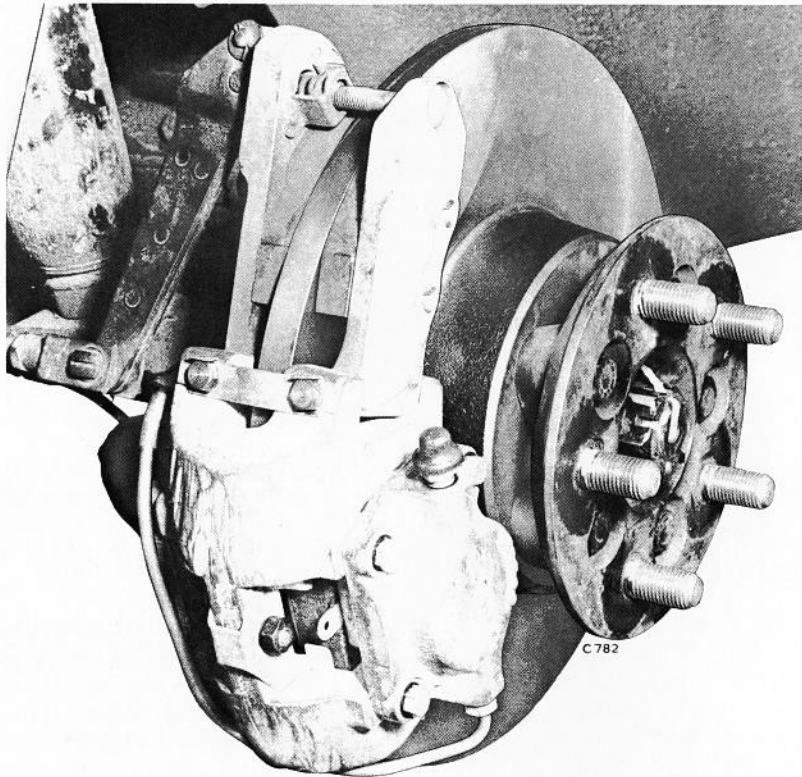


Fig.37 Rear Disc Brake with Handbrake

Steering Box

This rack and pinion assembly is located on the front cross member. A flexible coupling connects the pinion to the steering column and a ball jointed tie rod assembly connects the ends of the steering rack to each steering arm. A tuftol spring loaded damper fits directly on to the rack adjacent to the pinion position. Lubrication of the steering box and tie tubes is a part of the 'one-shot' system. Bellows type rubber sleeves protect the sliding ends of the rack and the ball joints at the steering rod end are protected by a tight fitting rubber shroud.

The pinion is made adjustable for mesh with the teeth of the rack by an eccentric phosphor bronze bush. This bush has two flats fitting an external adjustable plate Fig.30, firmly clamped by the pinion retainer. The set screw at the forward end controls the pinion end thrust.

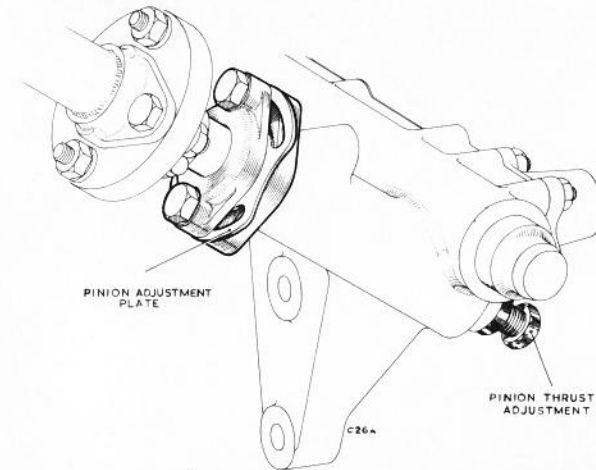


Fig.30 Pinion Adjustment Plate

Brake System

The brake system consists of four 'Dunlop' caliper type disc brakes hydraulically controlled by means of a foot operated master cylinder and a vacuum servo unit. Fig.31.

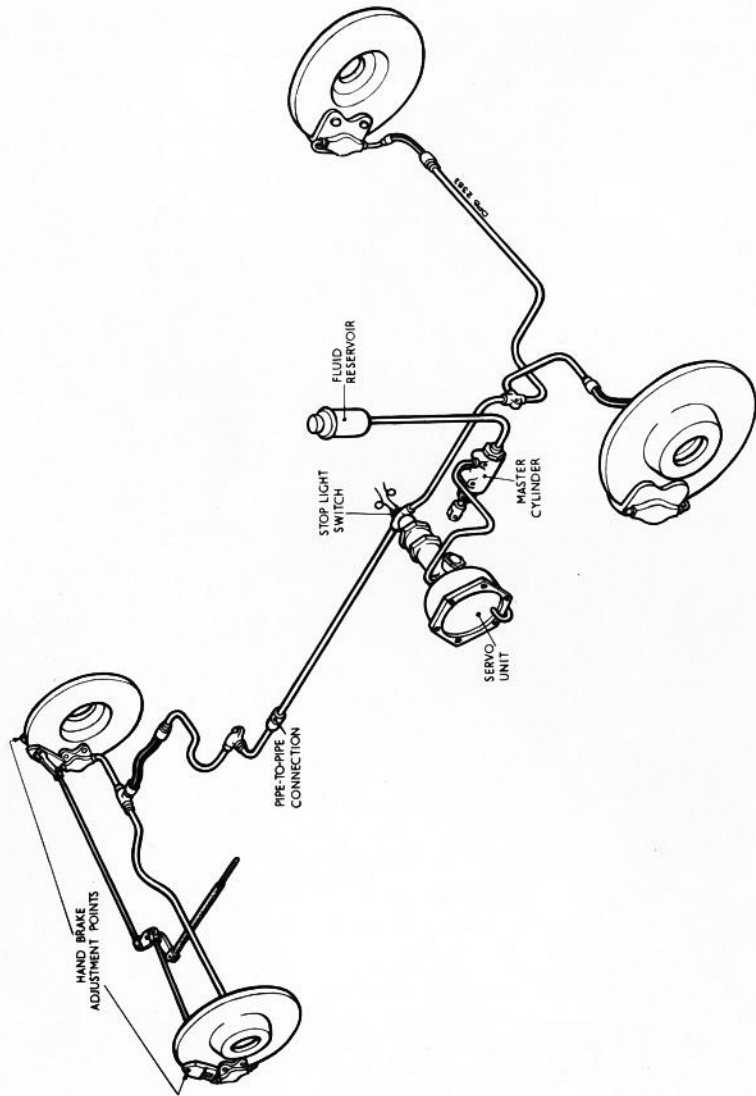


Fig.31 Disc Brake Installation

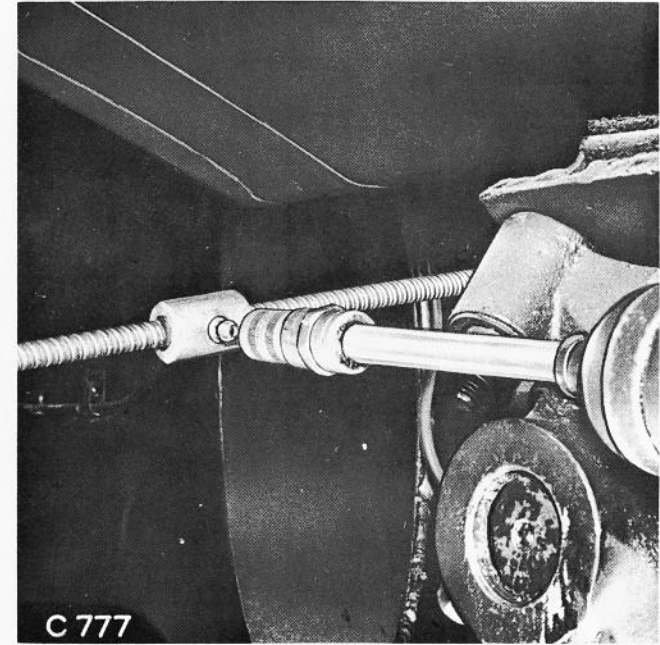


Fig.36 Lubricating Handbrake Cable

Similarly, bleeding is equally essential following any servicing operation involving the disconnecting of any part of the system.

Brake Adjustment

Brake adjustment is automatic during the wearing life of the friction pads. With the road wheels removed the pads should be checked for wear at frequent intervals by visual observation and measurement. When wear has reduced the pads to the minimum permissible thickness of $\frac{1}{4}$ (0.250) inch the pad assemblies (complete with securing plates) must be renewed. If checking is neglected the need to renew the pads will be indicated by a loss of brake efficiency.

Handbrake Adjustment

The handbrake is a normal ratchet controlled lever situated between the front seats and operating via a rod and

Apply normal working load on the brake for a period of two to three minutes and examine the entire system for leaks.

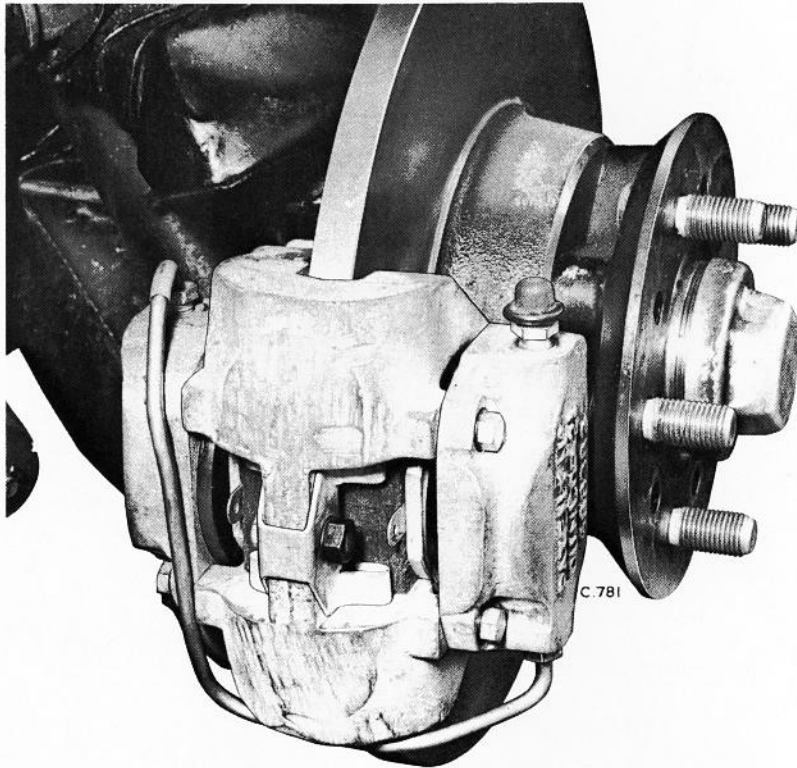


Fig.35 Front Disc Brake

The complete system is designed to need the minimum of attention and providing the hydraulic fluid in the reservoir on the bulkhead, see Fig.32, is maintained no defects should normally occur. Fluid loss must be supplemented by periodically topping up the reservoir with the recommended fluid. (LOCKHEED HEAVY DUTY BRAKE FLUID, SAE.70 R1).

When a recommended alternative fluid is used it should completely fill the system as it is not advisable to top up the reservoir only and so cause a mixture of fluids.

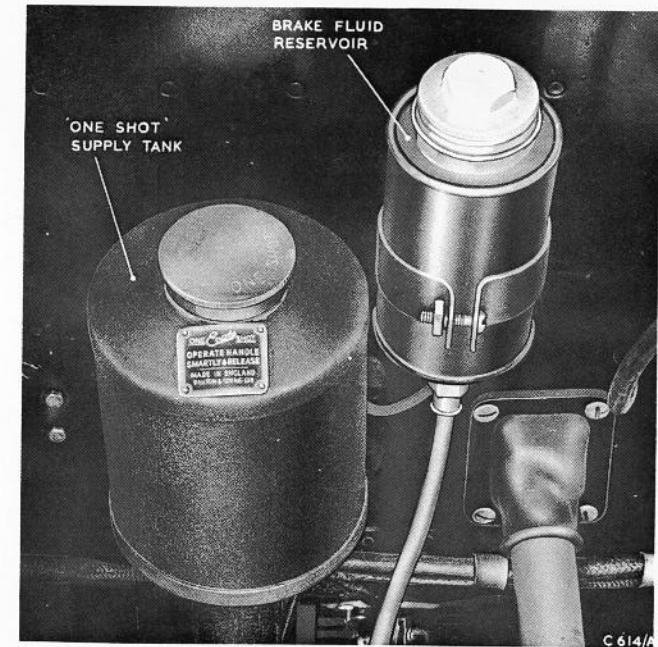


Fig.32 Brake Fluid Supply Tank

Lubrication nipples are provided for the brake and clutch pedal levers Fig.33 and for the brake compensating lever situated on the rear axle casing. Fig.34.

Bleeding the Brake System

The inclusion of air in the system is indicated by sluggish response of the brakes and spongy action of the brake pedal.

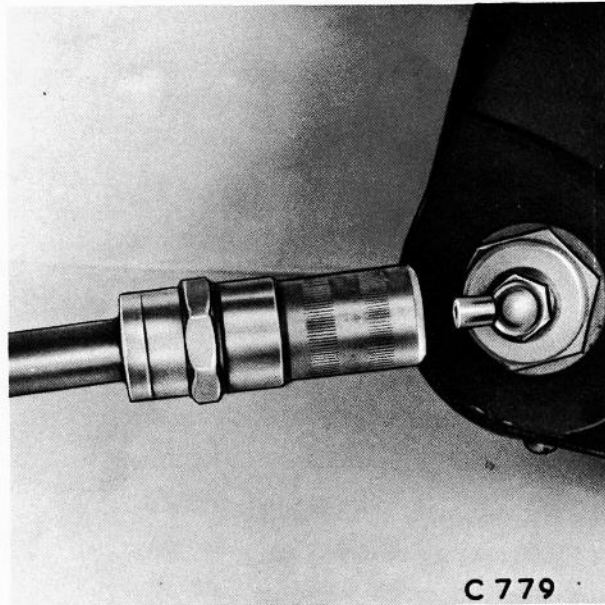


Fig.33 Lubricating Clutch and Brake Pedal Levers

This inclusion may be due to a loose connection or by allowing the fluid in the reservoir to fall to a low level. These defects must be immediately remedied and the complete system bled as follows:

Check all connections and bleed screws to see that no leaking is occurring and tighten where necessary.

Fill the reservoir with the correct fluid and keep topped up throughout the bleeding operation.

Jack up the car and remove the nearside rear road wheel. Remove the rubber protective cap from the bleed screw and attach the bleeder tube from the tool kit. Immerse the other end of the tube in a small quantity of brake fluid

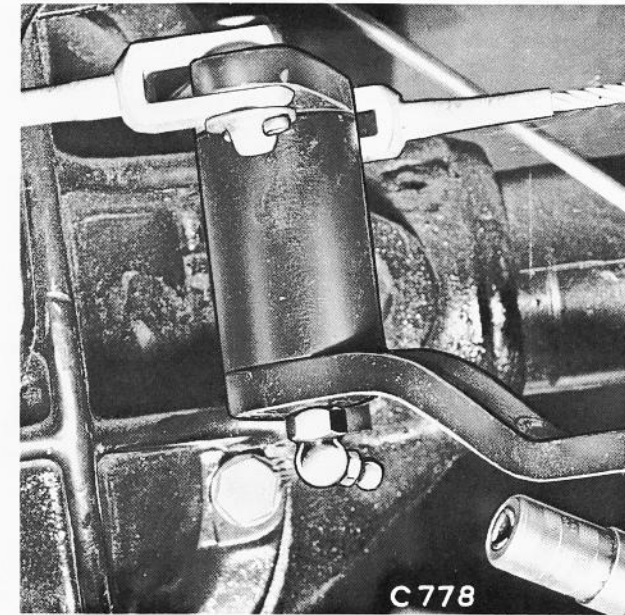


Fig.34 Lubricating Brake Compensating Lever

contained in a clean glass jar. Slacken the bleeder screw, with the spanner supplied in the tool kit, and operate the brake pedal slowly backwards and forwards through its full stroke until fluid pumped into the jar is reasonably free from air bubbles. Keep the pedal depressed and tighten up the bleed screw. Release the pedal.

Repeat for each brake in turn.

Repeat the complete bleeding sequence until the fluid pumped into the jar is completely free of air bubbles.

With all bleeder screws tightened and with the protective caps fitted, top up the reservoir.