Export Edition

INSTRUCTION BOOK

FOR THE

100 H.P. 2½ litre MODEL

(Series RMF)

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FRONT SUSPENSION

To achieve maximum benefit from Riley "Torsionic" Independent Front Suspension and to ensure the longest possible tyre life, frequent checks, as set out in this Instruction Book, should be made on the "Torsionic" Independent Suspension during the first 5,000 miles or 8000 km. of your car's life.

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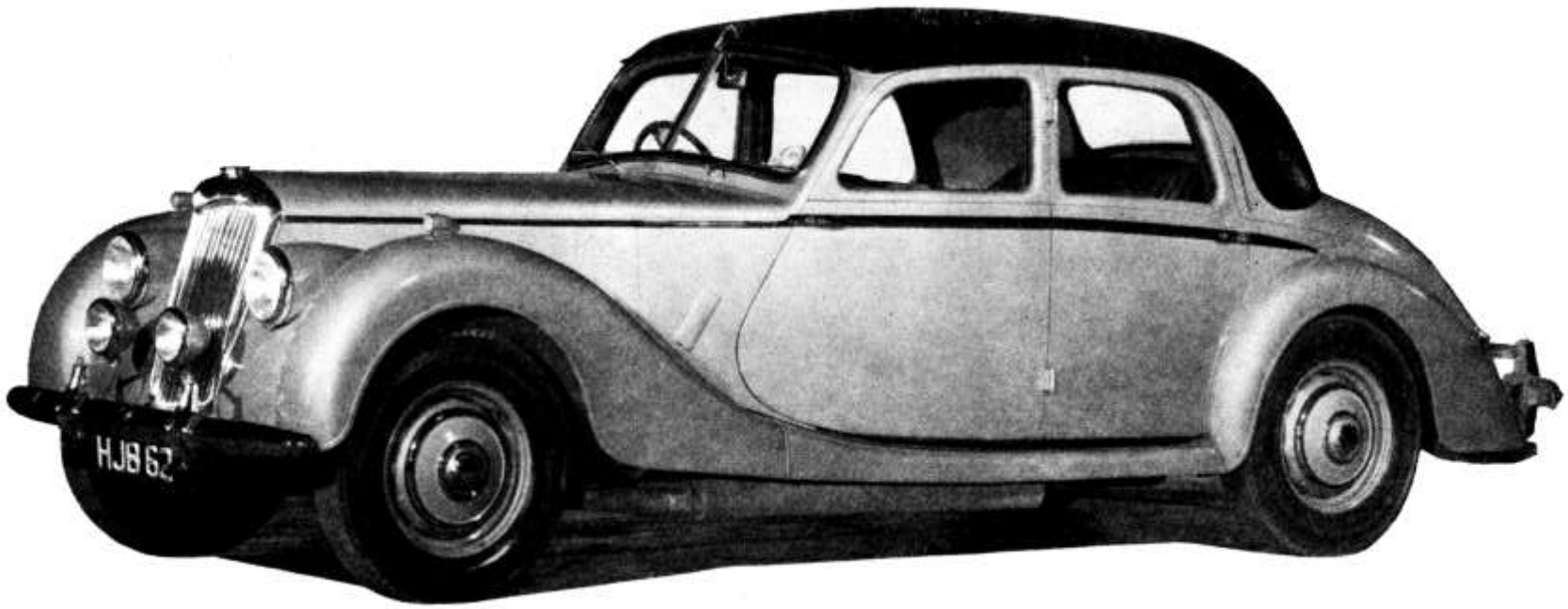


Riley 2½ litre Saloon

THE object in compiling this Instruction Book has been to provide a good working knowledge of the car and instruction for routine maintenance, but not to provide the owner with a complete guide for a major overhaul. Such an overhaul would require a set of special tools and equipment only to be found in garages and service depots, and without these the average private owner would be unable to continue.

For those who are in a position to undertake their own minor repairs, and who desire to do so, a comprehensive Workshop Manual is available at a nominal price on application to the Service Department, Nuffield Exports Limited, Cowley, Oxford, England.

If, after reading this book, you find yourself in difficulty, our Service Department is always at your disposal and will answer readily any questions on points which may be causing you trouble.

The First 1,000 Miles

or 1600 kilometres

During the early life of your car it is essential that the mechanism be run in carefully. We suggest three or four long runs when the car is new will be more beneficial than a series of very short runs, during which the engine will hardly have time to attain its normal working temperature.

Whilst it is not our policy to suggest to owners that they should maintain a set speed and never exceed this, until a certain number of miles have been covered we do suggest that the car be run as lightly and effortlessly as possible during its early life and that the actual running in should be of a progressive nature.

Careful study of the chapter on Lubrication, with particular reference to the change of oils at 500 miles or 800 km., will amply repay the time you spend on this operation.

If you think it necessary to use one of the many upper cylinder lubricants during the running-in period, be sure to use one of an approved brand.

Finally, nuts and bolts have a habit of settling down slightly after the car has travelled the first few hundred miles of its life, and such things as bumper bar attachments, body attachment bolts and similar points should be carefully checked and tightened where necessary.

General Data

Engine	4-cylinder, O.H.V.
Bore	80·5 mm. (3·169 in.)
Stroke	120 mm. (4·725 in.)
Capacity	2443 c.c. (149 cu. in.)
B.H.P.	100 at 4,400 r.p.m.
Sparking plugs	Champion NA8
Carburetters	Two S.U. horizontal H4 instruments, fitted with EE needles and 90 jets

Gear Ratios :

Top	4·1 to 1
Third	5·8 to 1
Second	8·84 to 1
First	14·95 to 1
Reverse	14·95 to 1
Rear axle ratio	4·1 to 1

Chart showing the relation between r.p.m. and road speed in m.p.h.

R.P.M.	ROAD SPEED							
	1st Gear		*2nd Gear*		*3rd Gear*		*Top Gear*	
	M.P.H.	K.P.H.	M.P.H.	K.P.H.	M.P.H.	K.P.H.	M.P.H.	K.P.H.
1,000	5·4	8·7	9·1	14·6	13·9	22·3	19·6	31·5
1,500	8·1	13·0	13·6	21·9	20·8	33·5	29·4	47·3
2,000	10·8	17·3	18·2	29·3	26·7	43·0	39·2	63·1
2,500	13·5	21·7	22·7	36·6	33·7	54·2	49·0	78·9
3,000	16·2	26·0	27·3	43·9	40·6	65·3	58·8	94·6
3,500	18·9	30·3	31·8	51·2	47·5	76·5	68·6	110·4
4,000	21·6	34·7	36·4	58·5	53·4	86·0	78·4	126·2
4,500	24·2	39·0	40·9	65·8	61·4	98·8	88·2	141·9
4,700	25·3	40·8	42·7	68·8	64·0	103·1	92·1	148·3

Tyres	6·00—16 Dunlop
Tyre pressures (driver and one passenger) ...	All round—24 lb. per sq. in. (1·7 kg./cm.²)
Tyre pressures (fully laden)	All round—26 lb. per sq. in. (1·84 kg./cm.²)

Dimensions

Height	5 ft. 1½ in. (1·54 m.)
Width	5 ft. 3½ in. (1·61 m.)
Length	15 ft. 6 in. (4·72 m.)
Ground clearance	7 in. (18 cm.)
Wheelbase	9 ft. 11 in. (3·02 m.)
Track	Front—4 ft. 4¼ in. (1·327 m.) Rear—4 ft. 4¼ in. (1·327 m.)
Turning circle	36 ft. 0 in. (11 m.)
Weight (unladen)	29¾ cwt. (1513 kg.)

Electrical System

Battery	12-volt, 63 amp./hour
Fuses	50 amperes and 35 amperes
Headlamp bulbs	42/36 watts. Lucas No. 354 (pre-focused)
Sidelamps	6 watts. Lucas No. 207
Tail-lamps	6 watts. Lucas No. 207
Stop-lamp	6 watts. Lucas No. 207
Reversing lamp	36 watts. Lucas No. 57
Roof-lamps	6 watts. Lucas No. 207
Fog-lamps	36 watts. Lucas No. 162
Ignition and panel lamps	2·2 watts. Lucas No. 987
Trafficator lamps	3 watts. Lucas No. 256 (festoon type)

Tappet Clearance

Inlet and exhaust	·011 in. (·28 mm.) (with engine hot)

Valve Timing

Inlet opens	12° before T.D.C.
Inlet closes	53° after B.D.C.
Exhaust opens	55° before B.D.C.
Exhaust closes	20° after T.D.C.
Ignition Timing	4° to 8° before T.D.C. with full advance on hand control
Firing order	1, 2, 4, 3
Contact breaker gap	·014 in. to ·016 in. (·36 mm. to ·41 mm.)
Sparking plug gap	·025 in. (·64 mm.)
Sparking plug	Champion N.A.8

Capacities

Fuel tank	12½ gallons (56 litres)
Cooling system	21 pints (12 litres)
Engine sump	14 pints (8 litres)
Gearbox	2⅝ pints (1·5 litres)
Rear axle **(Use Hypoid oil only)**	2½ pints (1·4 litres)

Wheel Nuts

The wheel studs and nuts have American National Fine threads.

Engine Temperature

The normal running temperature should be between 70° C. and 80° C. (158° F. to 176° F.).

Starting Handle

This is stowed in the left-hand side of the luggage boot.

Engine and Chassis Numbers

These are stamped on a plate on the bulkhead under the bonnet. Both should always be quoted in all correspondence, complete with prefixes and suffixes. The chassis number is also stamped on the frame on the left-hand side just below the bulkhead.

Anti-dazzle Driving Mirror

The angle of reflection is controlled by the metal tongue protruding below the casing of the mirror. Press the tongue forward to tilt the mirror surface and obtain a dazzle-free reflection. Normal rear vision is restored when the tongue is pulled to the rear.

Filler Caps

Petrol tank : When filling up with petrol remove both caps to avoid air lock and blow-back.

Radiator : A pressurised cooling system is employed, and care must be exercised when unscrewing the cap while the system is hot. To assist this the filler cap is retained by a bayonet catch with a graduated cam which permits release of internal pressure prior to removal. A lobe on the end of the cam guards against accidental release of the cap before the internal pressure is relieved. **Protect your hand against escaping steam.** Final removal of the cap is effected by pressing it downwards against the spring pressure to release it from the safety lobes.

TOOLS

All the tools are stored in the tool compartment under the bonnet except the starting handle, which is stored in the boot.

The following is a list of the standard tools supplied :

Special jack

Tyre pump

Grease gun

Tool roll with following tools :—

- 3 set spanners $\frac{3}{16}" \times \frac{1}{4}"$, $\frac{5}{16}" \times \frac{3}{8}"$, $\frac{7}{16}" \times \frac{1}{2}"$
- 3 box spanners $\frac{3}{16}" \times \frac{1}{4}"$, $\frac{5}{16}" \times \frac{3}{8}"$, $\frac{7}{16}" \times \frac{1}{2}"$
- Tommy bar
- Brake bleeding tube
- Adjustable spanner
- Hammer
- Screwdriver
- Two tyre levers
- Pair of pliers
- Tyre valve spanner
- Distributor screwdriver and gauge

500 Mile (800 km.) Service

Nuffield Exports Limited retain interest in their cars after they are sold, and want to know that you are obtaining the utmost satisfaction and pleasure from their products.

During the early life of the car, soon after it has completed 500 miles or 800 km., you are entitled to have it inspected free of charge by the Distributor or Dealer from whom the car was purchased or, if not convenient, by any other authorised Riley Distributor or Dealer by arrangement.

The following are details of the attention included in this service :—

(*a*) Drain sump, gearbox and back axle, and refill with recommended or approved lubricants.

(*b*) Oil and grease vehicle throughout with the recommended or approved lubricants.

Note.—New lubricants are chargeable to customers.

(*c*) Check and, if necessary, adjust :—

(1) Ignition timing and contact breaker points.
(2) Tappet clearances.
(3) Carburetter control gear, mixture setting and slow running.
(4) Dynamo and fan driving belt.
(5) Correct clearance and free movement for clutch pedal.
(6) Alignment of front wheels and setting of torsion bars.
(7) All steering controls.
(8) Tyre pressures.

(*d*) Adjust brakes and check level of fluid in supply tank.

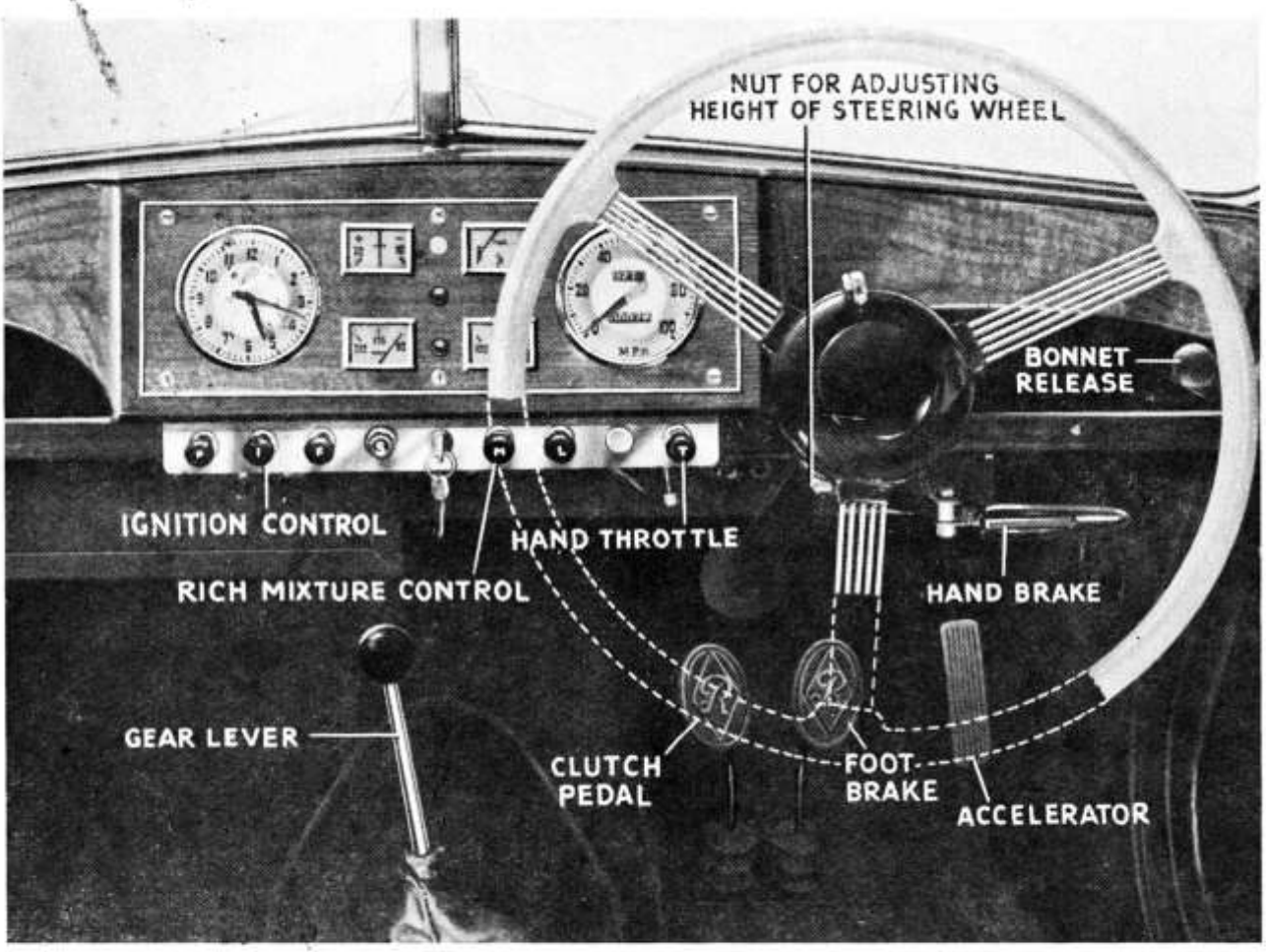
(*e*) Look over and tighten all nuts, particularly cylinder head, wheels, spring clips, body bolts, universal joints and steering gear.

(*f*) Top up battery and check working of all electrical equipment.

(*g*) Remove external oil filter element and fit new element.

This service is free, only material used being chargeable to the customer.

Controls



The engine and driving controls.

The following is a description of the various controls, gauges, and switches which are provided. Their description is sub-divided into two parts: the Engine and Driving Controls, and the Instruments and Switches.

ENGINE AND DRIVING CONTROLS

The steering wheel is of the sprung type and is fitted with a telescopic adjustment. To adjust the position of the wheel, slacken the hand grip nut on the bottom of the steering wheel hub. When the correct setting has been obtained, the nut must be re-tightened.

The gear lever is situated in a central position, being so arranged that the minimum movement by the driver is necessary when changing gear. Reference to the illustration on page 33 will show the gear positions.

Clutch, foot brake and accelerator pedals are fitted in that order, from left to right.

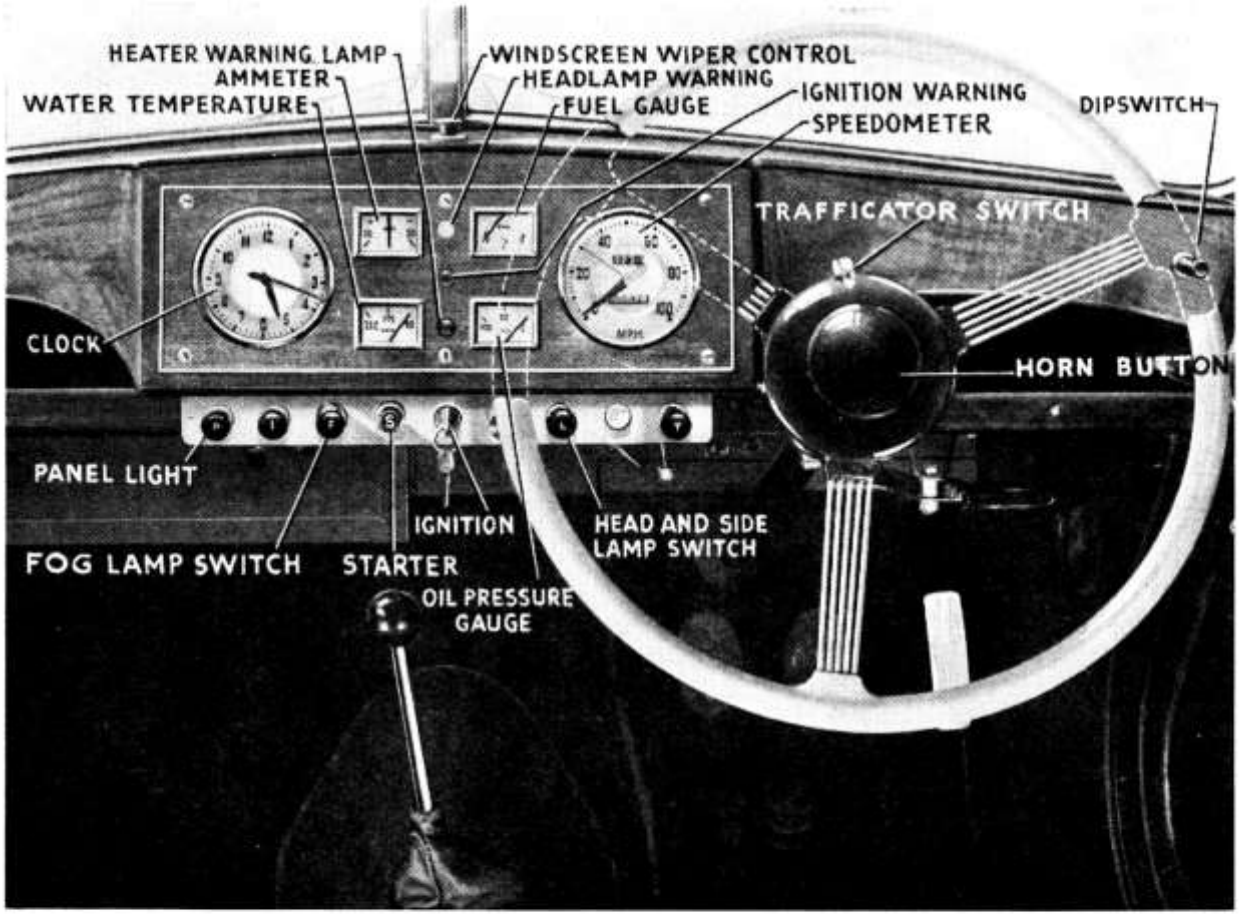
The hand brake will be seen just below the glove tray and to the right of the steering wheel, the ratchet release being incorporated in the pistol-grip handle.

The rich mixture control is on the right-hand side of the ignition switch and marked " C." Its sole function is to provide a rich mixture for starting and it should be closed as quickly as the warming of the engine will allow. Pull out to operate.

The hand throttle is marked " T " and is on the extreme right of the control panel. It is used to control the slow-running whilst the engine is warming up. Turn the knob counter-clockwise to increase the engine speed.

The ignition control is the second knob from the left on the control panel and is marked " I." It provides means for controlling the automatic advance under conditions of heavy load. It should be pulled out to retard the ignition slightly when the engine shows signs of " pinking."

The bonnet release controls are fitted at the outer ends of the glove trays. Pull to release whichever side of the bonnet is required to be opened. The catches are spring-loaded, and a downward pressure on the panels is all that is required to re-lock the bonnet top.



The instruments and switches.
The space between the lamp switch and the hand throttle control is occupied by the heater switch when this equipment is fitted.

INSTRUMENTS AND SWITCHES

The speedometer is situated on the right of the instrument panel and is provided with a total mileage indicator and a trip recorder. The setting control for the latter is below the panel and just behind the hand throttle.

The electric clock is on the left-hand side of the panel and is set by means of the knob below the panel and behind the ignition control.

The oil pressure gauge is the bottom right of the four square-shaped instruments on the instrument panel.

The fuel contents gauge is the instrument on the top right.

The ammeter is the instrument on the top left.

The water temperature gauge is on the bottom left.

The ignition warning light is the centre of three small lights in the middle of the instrument panel and its purpose is to show when the ignition is switched on. This light will be extinguished when the engine is running above a certain speed, thereby indicating that the dynamo is charging the battery.

The headlamp warning light is the upper of the three warning lights and it glows red when the headlamps are in the full beam position.

The heater warning light is the lowest of the three warning lights and it glows amber when the heater motor (if fitted) is in operation.

Switches on the control panel, reading from left to right, are :—

The panel light, marked with a " P." Turn on by moving in a clockwise direction. Continue to turn in order to decrease the brightness.

The fog-lamps, marked with an " F." Pull out to bring one lamp into operation. Turn clockwise and pull out again for both lamps.

The starter button, marked " S," is on the left of the ignition switch. Press to operate.

The ignition switch is in the centre and controlled by a removable key, which also locks the car door master lock and the boot lid lock.

The headlamp and sidelamp switch is marked " L " and should be pulled out to bring the sidelamps into operation. Turn clockwise and pull out again to switch on the headlamps.

The dip switch is close to the steering wheel at the end of the facia near the door. Press inwards to operate. It is of the repeating type, dipping the lamps on one operation and raising them on the next operation.

The horn button is situated in the centre of the steering wheel and is actuated by a downward pressure.

The Trafficator switch is located above the horn button and operates by movement of the lever in either direction. The switch is self-cancelling except when only a slight turn is made.

The windscreen wipers are brought into use by means of the " push-pull " switch on the top of the facia, above the centre of the panel.

The interior lights are operated by means of individual switches attached to each unit.

Note.—The sidelamps, roof-lights and panel lights are wired in the same circuit, and the effect of this is that the panel lights and roof-lights function only when the sidelamps are switched on.

The reversing lamp operates only when the ignition is switched on and when the gear lever is in the reverse gear position.

Access to Spare Wheel

The spare wheel is carried in a separate compartment below the luggage boot floor and is reached by raising the boot lid ; make sure the support catch is properly engaged.

This will reveal a lever parallel to the edge of the boot floor which actuates the transverse bolt rods of the number-plate panel. Raise the lever to release the number-plate panel and hinge the panel slightly rearwards and then upwards, taking care that the number-plate lamps clear the bumper bar.

Pull the number-plate upwards on its radius arms until the spring catch in its centre engages the rim on the boot floor. This holds the number-plate panel in position on the radius arms and gives access to the spare wheel.

The spare wheel is retained in position by a special plate and wing nut and is easily withdrawn when these have been removed.

Replacing the Spare Wheel

Slide the wheel into position in the spare wheel compartment and fasten it in position with the retaining plate and wing nut.

Release the central spring from the rear edge of the boot floor and carefully lower the number-plate panel, again watching that the lamps do not foul the bumper bar.

Engage the lower edge of the number-plate panel and push the upper edge forward into position. Move the bolt lever into the engagement position and lower the boot lid.

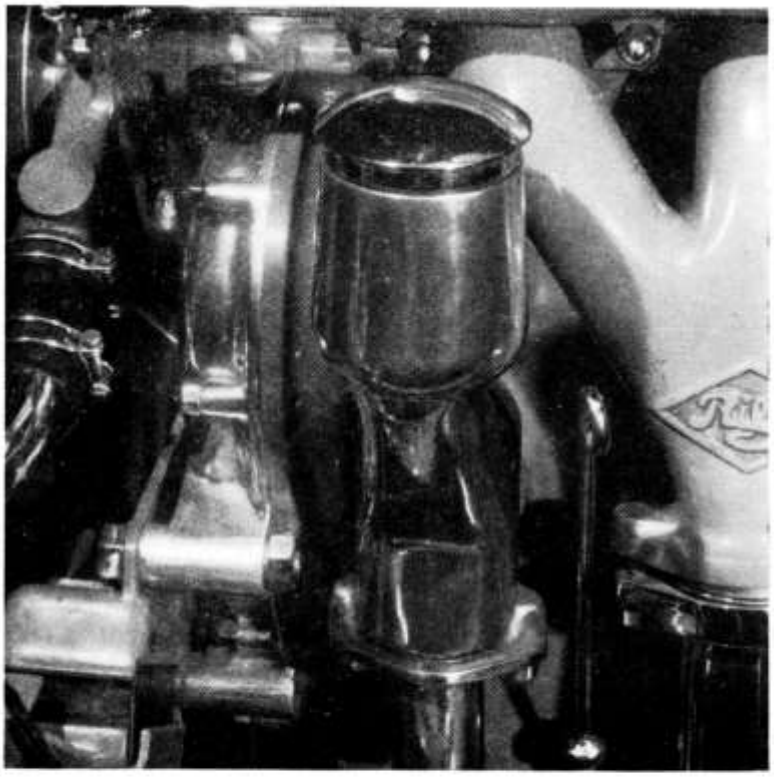
General Lubrication

It can be assumed that the initial lubrication has been undertaken before the car left the factory, but the wise motorist will commence his routine check from the day he takes over.

Lubrication is covered under the following headings :—Engine, Gearbox, Rear Axle, Chassis and the remaining individual parts.

Engine

The lubrication of the engine is maintained by a gear-driven, self-priming pump of high capacity, the oil being passed through a full-flow filter.



Location of the engine oil filler and dipstick.

All engine bearings are pressure fed.

The oil filler will be found on the left side of the engine. This filler also incorporates the engine breather.

Check the oil level in the sump and, if necessary, top up each 250 miles or 400 km., rather than wait until the level has become dangerously low.

The oil level dipstick is situated on the left side of the engine and just forward of the exhaust pipe. The dipstick is marked to indicate the maximum and minimum oil levels, and on no account should the level be allowed to drop below the minimum mark.

Before checking the oil level, the dipstick should be wiped on a piece of clean cloth, otherwise an incorrect reading may be obtained. When replenishing the oil, wait a short time before checking the level so that the new oil may reach the sump.

It is essential that after the first 500 miles or 800 km. the oil be drained from the engine, and for this purpose an oil drain plug is provided which will be found on the right-hand side of the sump base. When this has been done, the engine should be refilled with the correct amount of recommended oil (see page 72).

Provided the change recommendations are carried out regularly, there should be no need for flushing with any other fluid or oil.

NOTE.—Paraffin should never be used for flushing purposes.

The sump should be drained and refilled, as described above, at subsequent intervals of 3,000 miles or 5000 km.

Each 12,000 miles or 20000 km. remove the sump and clean its interior.

The oil pressure gauge may indicate 100 lb. per sq. in. (7 kg./cm.^{2}) when the engine and oil are cold. As the oil and engine warm up this pressure will drop, and

the following are pressures to be expected at the speeds indicated when the engine is in good condition :—

Speed	*Pressure*
Tick-over	12 lb. per sq. in. (·8 kg./cm.²)
50 m.p.h. (80 k.p.h.) in top gear	30 lb. per sq. in. (2·11 kg./cm.²)

The oil relief valve is correctly set at the works and is non-adjustable.

An external oil filter of the renewable element type is provided in the lubrication circuit. It is located on the right-hand side of the engine. Every 6,000 miles (10000 km.) the filter element should be renewed (see page 23). The element is a Tecalemit FG.2344 (Riley Part No. 166223).

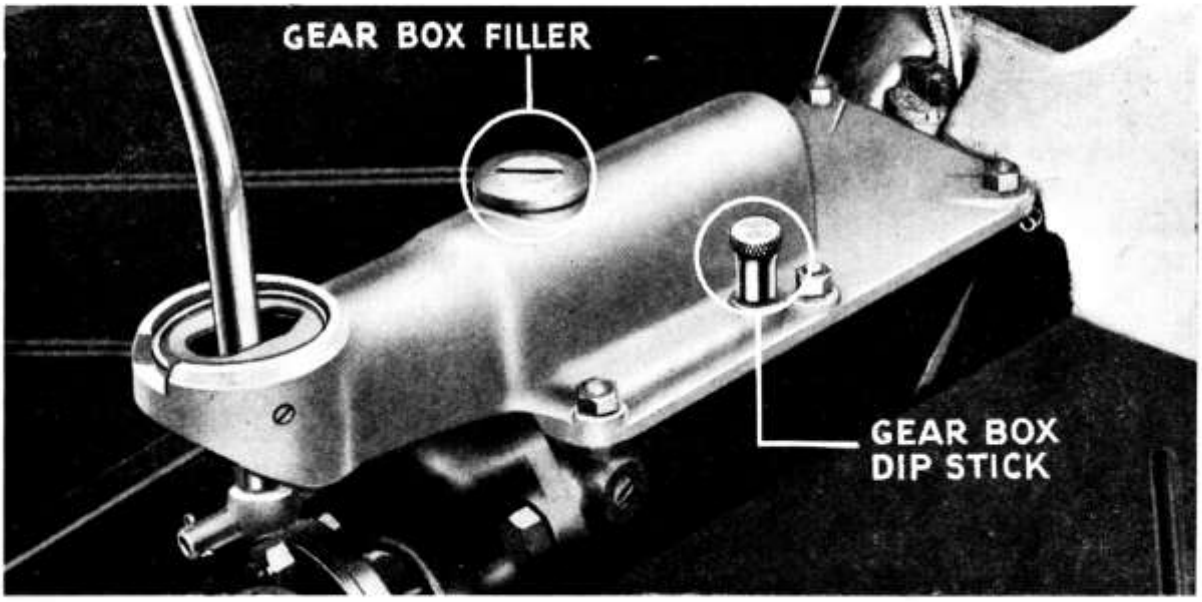
Clutch

This is of the single dry plate Borg and Beck type, and, as a special thrust ring is employed in the withdrawal mechanism, no lubrication is necessary other than regular attention from an oilcan to the various joints of the pins and toggle levers in the actuating mechanism, and the application of the grease gun filled with grease to Ref. D to the grease nipple on the clutch cross-shaft every 1,000 miles or 1600 km.

Gearbox

This should be drained after the first 500 miles or 800 km. The gearbox should then be filled with the correct amount of recommended oil to Ref. B (see page 72). The filler cap and dipstick are located just forward of the gear change lever and are reached by removing the gearbox tunnel over the top of the gearbox. The draining and refilling should be carried out at subsequent intervals of 6,000 miles or 10000 km.

Replenishment or topping up should take place at intervals of 1,000 miles or 1600 km., great care being taken to ensure that the gearbox is not filled above the "High" mark on the dipstick, and that when inserting the dipstick to check the oil level the locating peg engages the slot in the gearbox cover.



The gearbox filler and dipstick.

Rear Axle

As with the gearbox, this component should be drained and refilled after the first 500 miles or 800 km. with **HYPOID** oil to Ref. B (page 72). Replenishment should be made at subsequent intervals of 1,000 miles or 1600 km. if necessary. Thereafter the axle should be drained at intervals of 6,000 miles (10000 km.), and refilled with fresh oil.

Combined filler and level plug for the rear axle.

The filler cap will be found on the right-hand side of the differential casing; this also acts as a level plug, and is reached by jacking up the rear wheel on the right-hand side and removing the wheel. This permits the filler plug to be reached through the space between the spring and the frame. **The use of Hypoid oil to Ref. B (page 72) is essential.**

Note.—Do not rotate the road wheels during this operation, otherwise overfilling may result.

Dampers

The dampers are of the sealed telescopic type, and do not require replenishing. For further information see the general description of the dampers (page 28).

Hubs

The rear hubs are automatically lubricated from the rear axle and require no separate attention. The front hubs are packed with grease on assembly and only require attention at intervals of 6,000 miles or 10000 km., when the hub cap should be unscrewed, repacked with grease to Ref. C (page 72) and replaced.

Propeller Shaft and Intermediate Shaft

Every 1,000 miles or 1600 km. the grease gun should be applied to the grease nipples on the intermediate and propeller shaft universal joints and on the sliding joint. There are four nipples in all, one on the intermediate shaft and three on the propeller shaft (including the sliding joint).

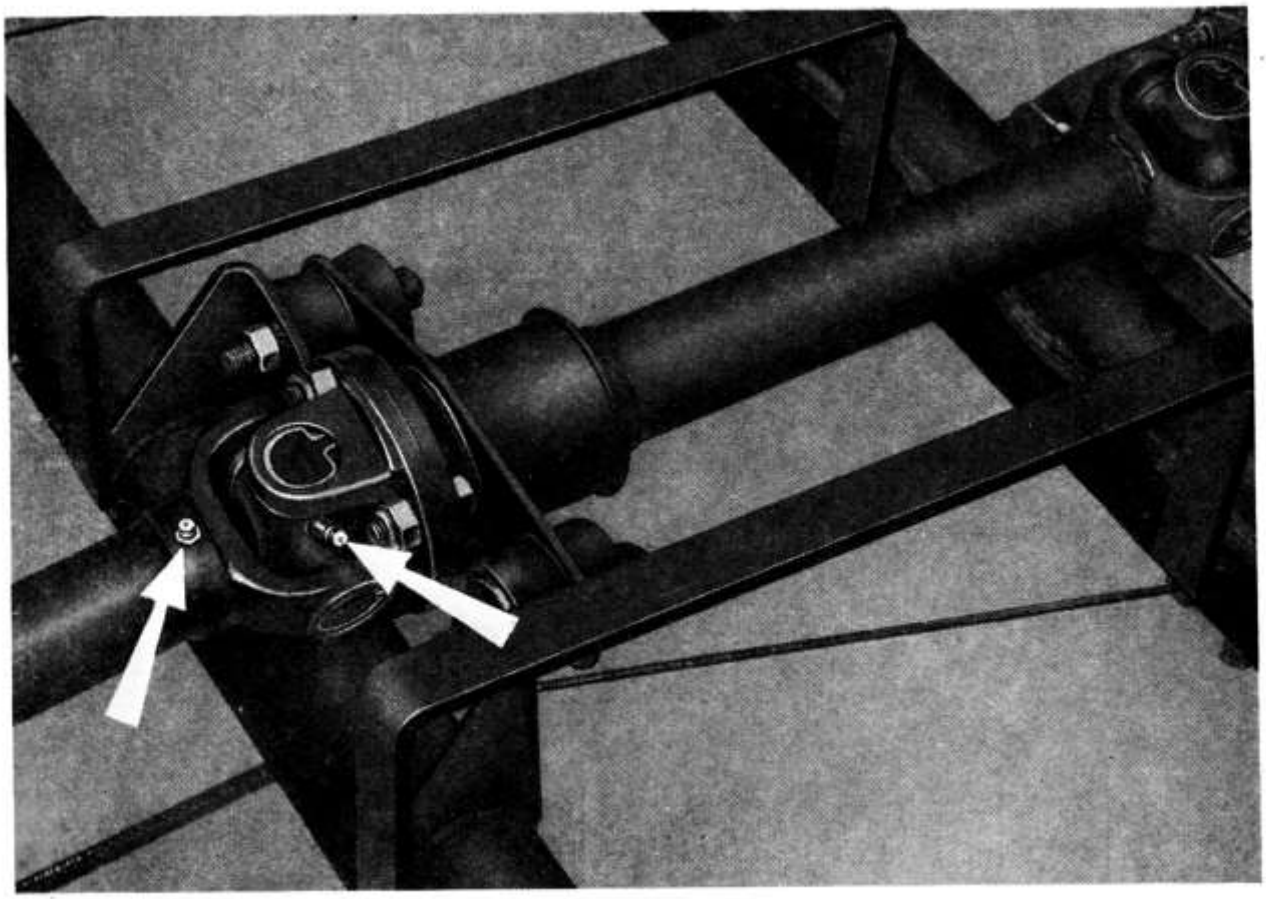
Use grease to Ref. D (page 72) in the grease gun for this purpose and give two or three strokes.

Water Pump

Every 1,000 miles or 1600 km. the grease gun filled with grease to Ref. C (page 72) should be applied to the grease nipple on the engine water pump casting and given two or three strokes.

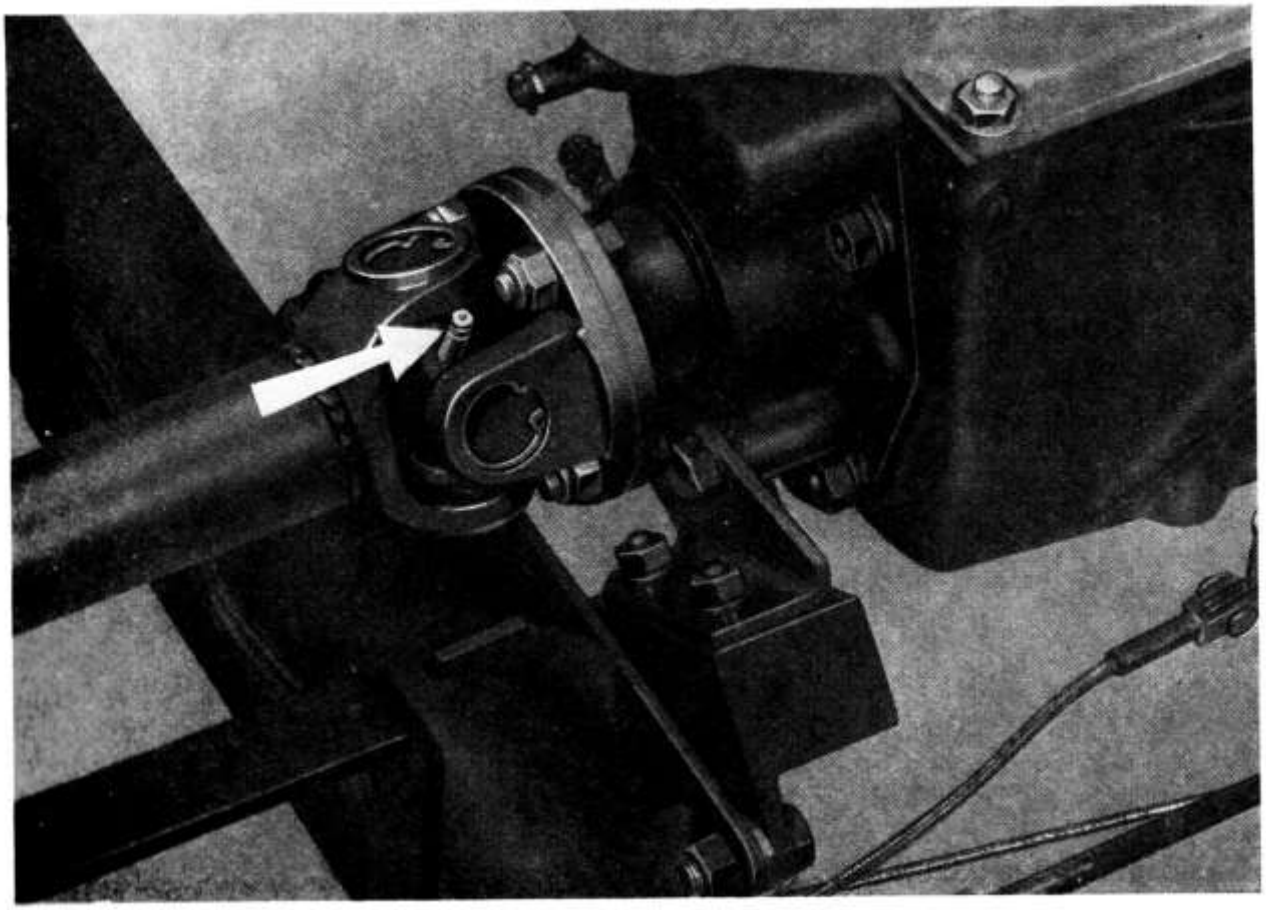
Independent Front Suspension and Steering Gear

On the " Torsionic " front suspension there are eight grease nipples which require



Above.—This is a view of the coupling between the intermediate shaft and the propeller shaft. Note the two grease nipples.

Below.—Rear flexible mounting for the power unit. Note the grease nipple on the intermediate shaft.



two or three strokes from a grease gun filled with grease to Ref. D (page 72) every 1,000 miles or 1600 km. These are located as follows :—

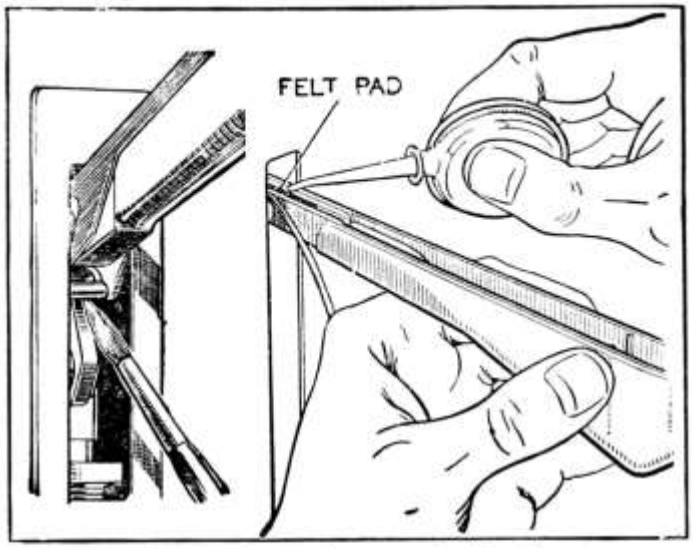
1. One at the top and one at the bottom of each steering swivel.
2. One at each end of both track-rods.

The steering box itself is packed with grease before leaving the factory and does not need any further attention until the car has travelled 30,000 miles or 50000 km. (see page 72).

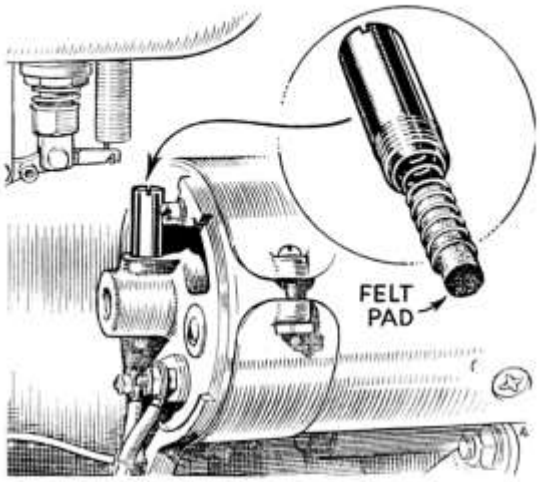
The inner and outer mountings of the tubular suspension struts are carried on special rubber bushes and require no lubrication.

Hand Brake

Give the hand brake cable casing one stroke with a grease gun filled with grease to Ref. C every 6,000 miles (10000 km.).



The lubrication points on the Trafficators.



The dynamo shaft lubricator.

Trafficator Lubrication

Every 6,000 miles or 10000 km. apply a trace of sewing-machine oil, with a brush, to the Trafficator catch pin. Withdraw the screw on the end of the arm, slide off the cover, move the connecting wire to one side and apply a drop of oil to the felt pad in the groove at the top of the arm.

Dynamo Lubrication

At the pulley end of the armature spindle the dynamo is provided with a ball race which is packed with grease on assembly and which requires no further attention between periods of general overhaul (12,000 miles or 20000 km.).

A lubricator is provided for the plain bearing at the commutator end which should be unscrewed every 3,000 miles or 5000 km., half-filled with grease to Ref. C (page 72), and replaced.

Distributor Lubrication

Every 3,000 miles or 5000 km. lightly smear the cam with a very slight trace of grease to Ref. D (page 72), or if this is not available, clean engine oil can be used. At the same time lift off the rotor from the top of the spindle by pulling it off vertically and add a few drops of oil (Ref. F, page 72) to the cam centre. Do not remove the screw exposed to view. There is a clearance between the screw and the inner face of the spindle for the oil to pass.

Replace the rotor with its drive lug correctly engaging the spindle slot and push it on the shaft as far as it will go.

The automatic timing control should also be given lubrication attention at intervals of 3,000 miles or 5000 km. by carefully adding a few drops of oil (Ref. F, page 72) through the hole in the contact breaker through which the cam passes.

A trace of oil should also be given to the pivot pin on which the contact breaker lever works.

Do not allow any oil to get on or near the contacts. Do not over-oil.

Carburetters

Every 1,000 miles or 1600 km. the oil cap nut should be unscrewed from the top of the suction chamber and a few drops of thin engine oil inserted into the opening. Use one of the oils indicated under Ref. F on page 72.

Lubrication Notes

General Notes on Lubrication

1. Oil should be drained from the engine, gearbox and rear axle when these components are warm after the car has returned from a journey; the oil is then in a more fluid state and is readily drained off.

2. When filling with oil or grease, make sure that there is no dirt around the grease nipples or filling points. If this is not done, dirt and grit may enter the mechanism, thereby causing rapid and unnecessary wear.

3. Make sure that all drain plugs and filler caps are replaced correctly and securely tightened.

4. Regular attention with an oilcan to such points as throttle rod fork ends, clutch-rod pins and toggles will be amply repaid by the absence of harsh operation and unnecessary wear.

5. The door hinges are fitted with small grease nipples and should receive occasional attention from the grease gun. The lock catches should also be lightly coated with grease at the same time.

The correct lubrication of your car is of exceptional importance and the most vital part of the complete car is the engine. Due to the fact that different motor-car engines vary considerably in their characteristics, such as working temperature, clearances between moving parts, and other technical points, it is necessary that the lubrication should not be haphazard, but attended to with care and regularity, and that only the recommended lubricants be used.

Note.—It is most unwise to mix different brands of lubricant, and this practice is not recommended.

Extreme Cold Conditions

Where a car is operated in temperatures which are consistently below zero Fahrenheit (−18° C.) the use of an oil of lower viscosity than that recommended for normal use is desirable, and under such conditions the appropriate grade of engine oil shown on page 72 should be used.

Similar considerations apply in the case of the gearbox, rear axle and steering gearbox, where the recommended grades should be used when temperatures consistently below 10° Fahrenheit (−12° C.) are encountered.

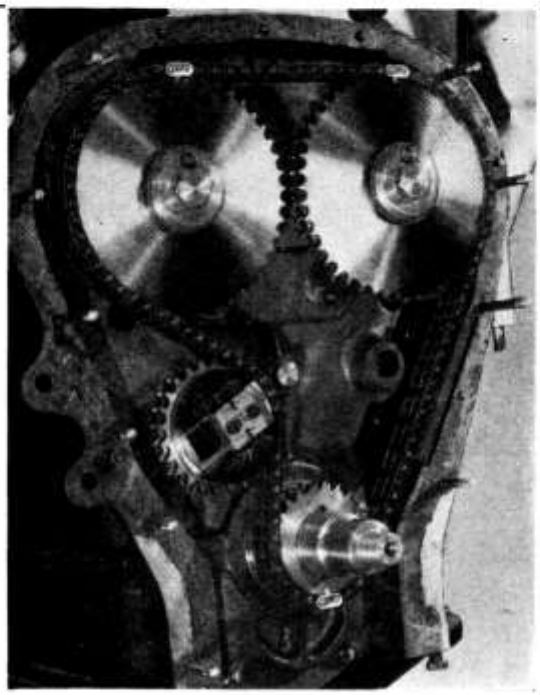
Description of Engine

Crankcase

This is cast in one piece with the cylinder block and is made of very high quality cast iron with the various bearing surfaces machined to close limits to ensure a high degree of interchangeability.

Tappets

These are of generous diameter with large bearing areas. They are made hollow, the object being to provide maximum strength with a minimum of weight.



Left.—This is a view of the front of the engine with the timing cover removed. The duplex driving chain and the automatic tensioner are clearly visible. Note also the fibre rubbing strip which helps to maintain chain tension and eliminate noise.

Below.—This is the inlet camshaft. The method of assembling the front bearing will be noted. The gears for driving the oil pump and distributor, which are machined in situ, can be readily seen.

Below.—The exhaust camshaft is similar to the inlet, the main difference being that this camshaft carries no gears.

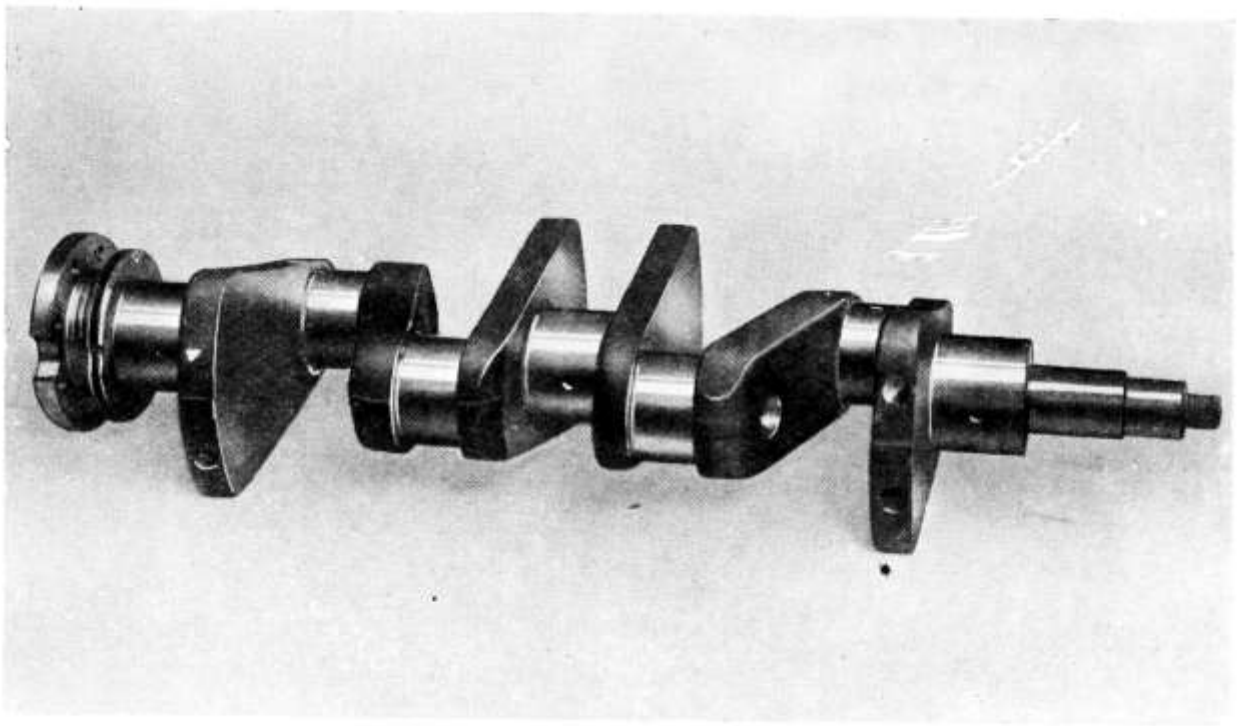
Camshafts and Timing Gear

The camshafts run the complete length of the engine and are carried in phosphor-bronze bearings at each end. The centre bearings are pinned in position in the block by means of set screws. All bearings are " line-reamered " in order to ensure perfect alignment and accurate action of the camshafts.

The front and rear bearings are located in the block by means of flanges and secured by set screws, the end thrust being taken on the front bearings.

The inlet camshaft has a helical gear machined at its centre for the oil pump drive. At the front end is a helical gear drive for the distributor.

The cams themselves, besides being designed to give the requisite valve opening, are also designed for quietness in operation, great care and precision being taken during manufacture. The camshafts are driven from the crankshaft by means of an endless chain running over an intermediate chain wheel which automatically maintains the correct chain tension.



The sturdy crankshaft.

Crankshaft

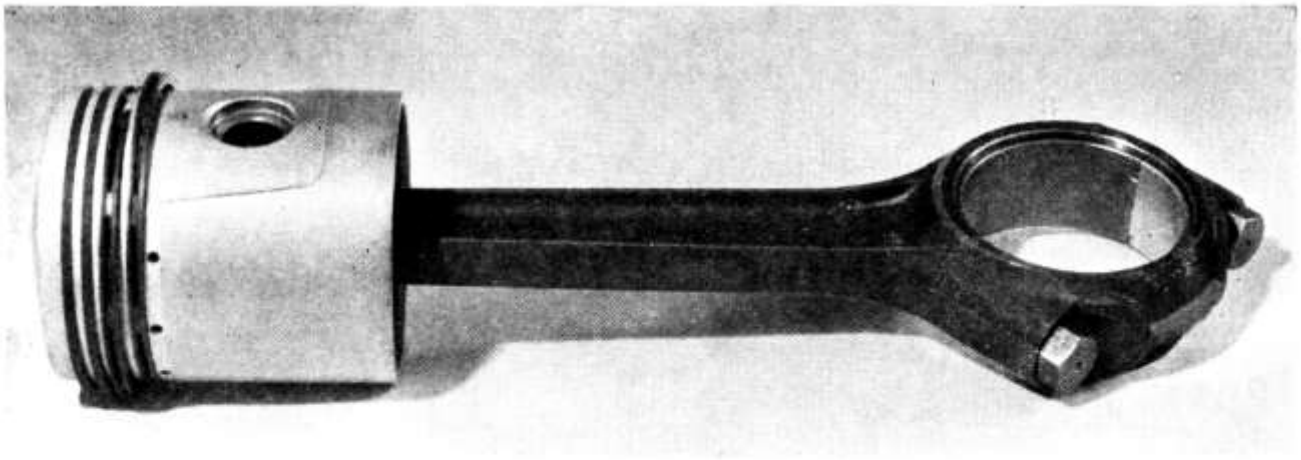
The crankshaft is so designed that the exact balance between lightness and strength has been achieved. The bearing areas are of generous size and are fed with oil at high pressure by means of oilways.

At the forward end of the crankshaft is the main timing wheel, keyed in position and clamped by the hand starter dog, which is also keyed and locked in position. An oil thrower is located between the timing wheel and starter dog.

The complete crankshaft is supported in three bearings of the split type, which are extremely rigid and of large diameter.

The bearings and caps are marked so that they may be reassembled in their correct positions should they be removed at any time.

Prior to the fitting of the crankshaft, all bearings are secured and " line-reamered " in position ; after this they are carefully hand fitted to the crankshaft. At its rear end there is a flange to which the flywheel is bolted.



Assembly of piston and connecting rod.

Connecting Rods

Made of H-section high-tensile steel and designed to provide great rigidity. At the upper end is the gudgeon pin bush which is made of phosphor-bronze and pressed into position. This bush is provided with an oilway.

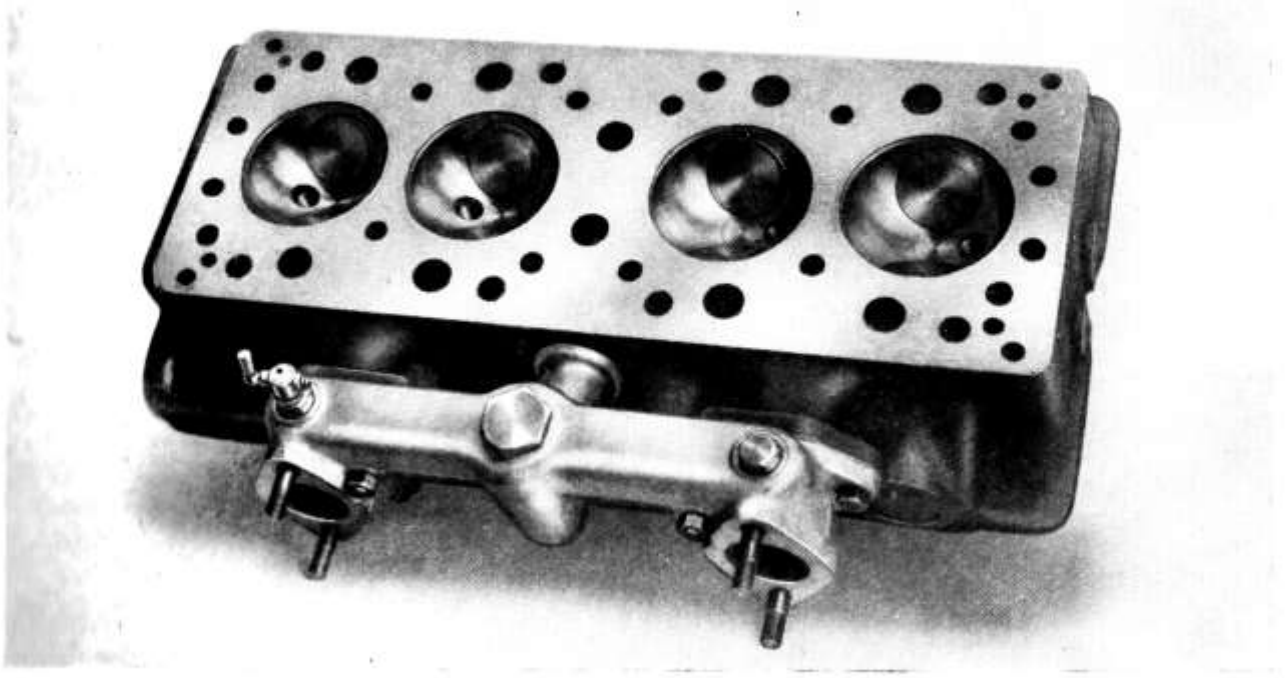
The detachable big-end bearings, ensure long life and the minimum of frictional losses. The big-end bearings are divided diagonally to allow the piston assembly to be withdrawn upwards through the cylinder bores.

If at any time the connecting rods are removed, it should be noted that they are marked 1, 2, 3 and 4, starting at the front end. The bearing caps are also marked in a like manner, and care should be exercised to see that they are replaced in the same position from which they were removed and that the caps are also correctly replaced.

Pistons

High-compression aluminium alloy pistons are used, with a T-slot on the exhaust side only. Four piston rings are fitted, two compression and two oil control.

The gudgeon pin is positioned in the piston by means of spring steel circlips. The pistons are numbered, so that they can be replaced in their correct bores, No. 1



The cylinder head and inlet manifold.

being at the front. It should also be noted that the T-slots on the side of the pistons must always be fitted on the exhaust side of the engine.

Sump

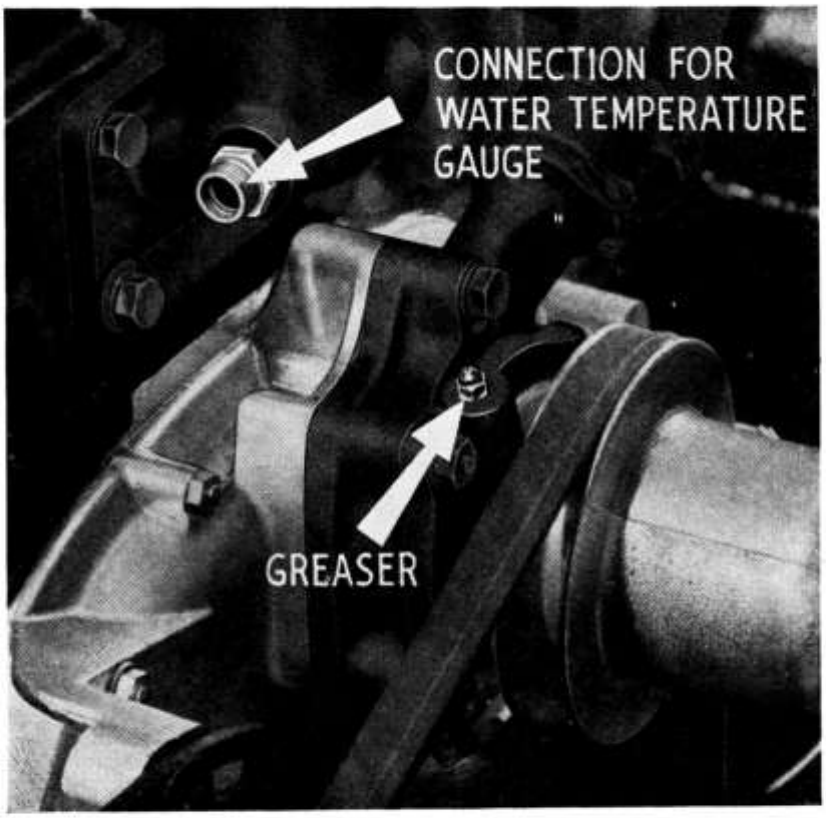
The sump, which is bolted directly to the crankcase, is made of aluminium and ribbed to assist oil cooling.

Cylinder Head and Valve Gear

The design of the engine is such that the cylinder head and valve gear form a complete unit.

The valves are inclined at an angle of 45° to the vertical, with the inlet and exhaust ports so designed that a very free and unimpeded gas flow is obtained. These facts, coupled with the machined hemispherical combustion chamber, provide efficiency of the highest order. The rockers are short and sturdy and are operated by means of stiff push-rods which are interposed between the base tappets and the rocker ball end. It should be noted that the push-rods have a socket at one end and a ball at the other. The ball end should always be in contact with the base tappet, the socket end locating itself on the adjustable ball end of the rocker. The adjustable ball end of the rocker is locked in position by means of a locknut.

A special cooling system is employed whereby a constant flow of cool water is directed around the hottest part of the engine, i.e. the exhaust valve seats. The rocker gear is protected from dirt and rendered oil-tight by means of laminated cork gaskets and aluminium covers, the latter being held in position by suitably placed studs and nuts.



This is a close-up view of the water pump and thermostat. Note the grease nipple on the water pump.

Water Pump and Thermostat

The water pump is situated at the front of the cylinder block, with the thermostat mounted on the front face of the cylinder head in the water outlet pipe. The pump is driven direct from the crankshaft, by a V-belt which also drives the dynamo.

The function of the thermostat is to ensure that the flow of cooling water is restricted until the engine has reached its normal working temperature. Whilst the engine is undergoing its initial warming up, the water is by-passed from the top of the thermostat direct to the suction side of the water pump. As soon as the cooling water has reached a temperature of 72° C. (162° F.), the main valve opens and the by-pass valve shuts. The cooling water then circulates throughout the cooling system in the normal manner. This ensures a rapid warming up of engine and oil, with beneficial results.

Ignition

This is supplied from a 12-volt battery and heavy duty coil, the distributor being fitted at the front of the engine on the right-hand side, and driven from the adjacent camshaft.

An automatic advance and retard mechanism is incorporated in the distributor, which works in conjunction with the manual control for special conditions. (See page 10.)

Starter

This is situated on the left-hand side of the engine and is securely mounted to the flywheel housing, the gear on the starter engaging with teeth on the rim of the flywheel as soon as the starter motor switch is operated.

Dynamo

The location of the dynamo is on the right-hand side of the engine. It is mounted so that the tension of the driving belt may readily be adjusted. (Further information on the dynamo, ignition, etc., will be found in the chapter on Electrical Equipment, page 44.)

Carburetters

Two S.U. H4 instruments are fitted. These are extremely efficient and remarkably simple in operation ; a detailed description will be found on page 39. An air silencer and cleaner is fitted to the intake of the carburetters.

Air Silencer and Cleaner

This should be cleaned out with petrol every 3,000 miles or 5000 km. After cleaning and drying, the filter element should be re-oiled with engine oil and allowed to drain before replacement.

Oil Filter

This is a Tecalemit filter and is fitted on the right-hand side of the engine. It receives the full flow of oil direct from the pump and filters the oil before it reaches the engine.

The filtering element consists of a felt strainer supported on a wire cage The normal life of the filter element is 6,000 miles or 10000 km., after which distance a replacement element should be obtained from any Riley Dealer. Should the filter at any time become choked, either through lack of care or using a type of oil that is not on the recommendation chart, the oil is permitted to by-pass the filter. Naturally the oil circulated is then unfiltered and in a poor condition and a new filter element should be fitted as soon as possible.

Fuel Pump

The S.U. electric fuel pump is mounted on the engine bulkhead. Further information may be obtained from page 37.

Description of Oiling System

The heart of the oiling system is naturally the pump, and in the Riley engine this is of the gear type and driven from the inlet camshaft. The pump, which is self-priming, works fully submerged in the oil sump from which oil is drawn through a floating strainer. The design of the pump is such that a more than adequate supply of oil is delivered at high pressure to all moving parts at all times. An oil pressure release valve is incorporated in the oil pump body.

From the pump, oil is delivered by an external pipe to the external full-flow oil filter. From the filter another external pipe leads the oil to the crankcase side and thence through oilways to the three main bearings.

The connecting rod big-end bearings are supplied with oil by means of oilways drilled in the crankshaft. The camshafts, timing chain and rocker-shafts are supplied by means of internal oilways drilled in the crankcase.

Description of Chassis

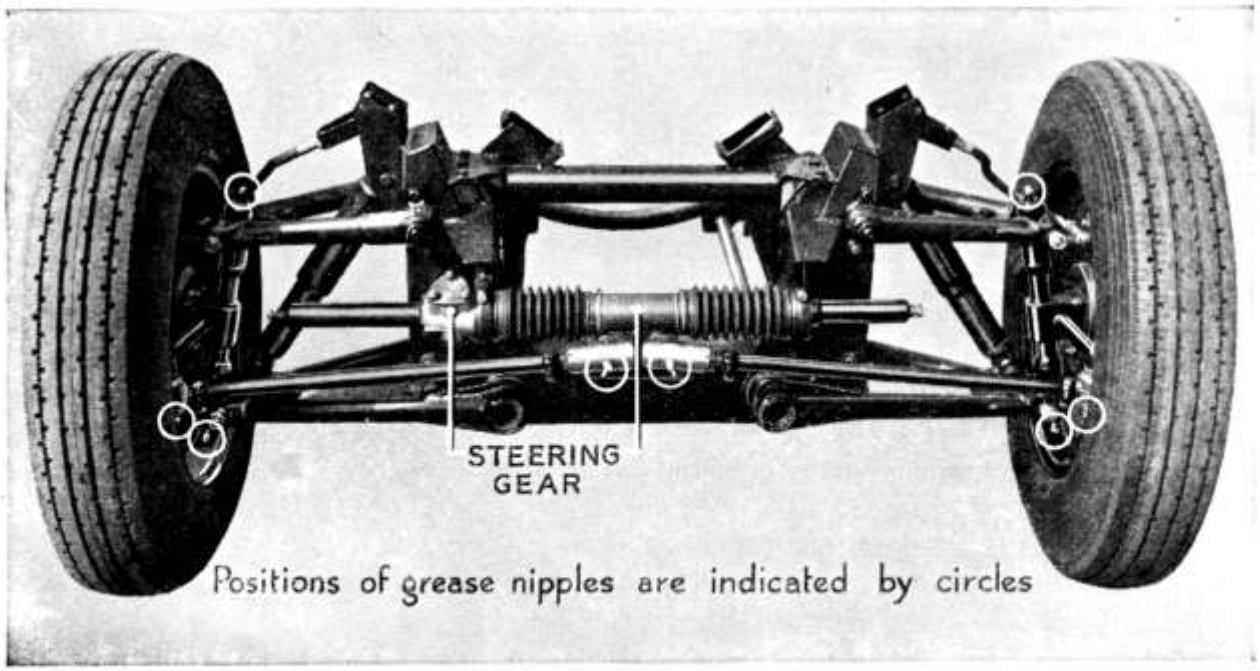
The front of the chassis is specially designed to take the front suspension and steering mechanism. The side-members, which are of deep box section and internally strengthened, are of welded construction and are braced by cross-members of tubular section.

Such items as floorboard supports, body supports, clutch-shaft bearing brackets, etc., are attached to the main structure by welding, thus ensuring that these parts will not work loose and set up rattles.

It will be seen that the chassis combines maximum strength and minimum weight, the result of long racing experience.

FRONT SUSPENSION

Riley " Torsionic " independent front suspension forms a complete unit, incorporating the steering mechanism, which results in an extremely rigid front end, providing accurate steering under all conditions.

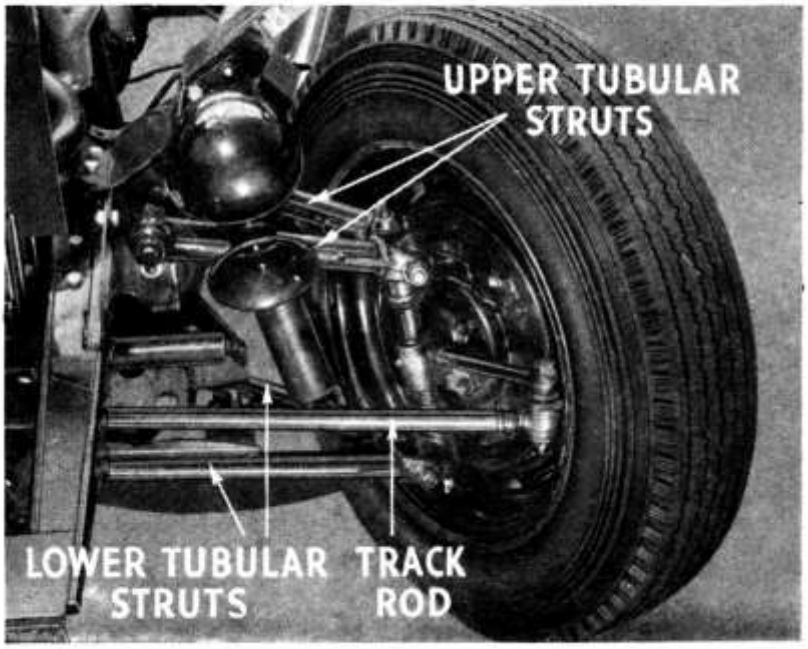


Front view of " Torsionic " independent front suspension.

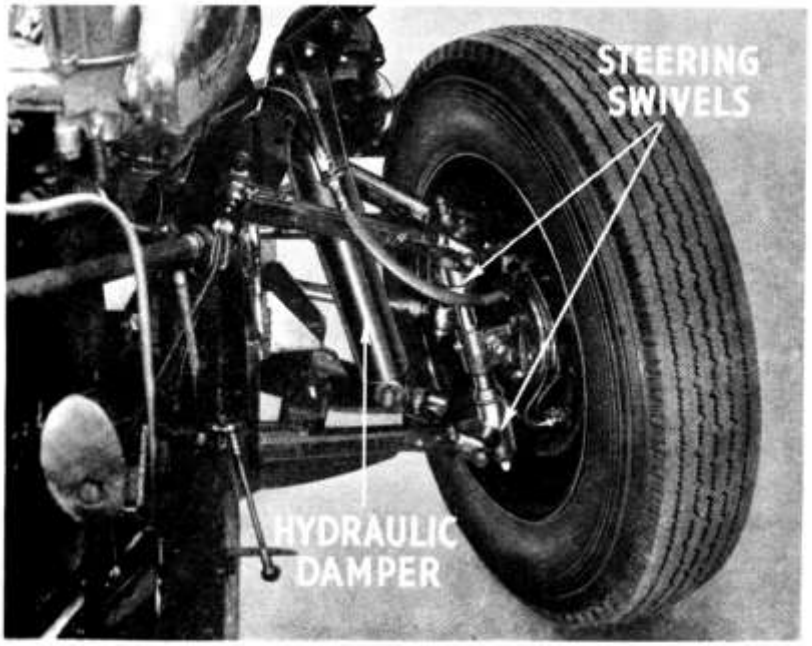
The suspension consists of tubular struts carried on a very robust box-section cross-member or cradle.

The lower struts are attached to parallel torsion bars, which have a cam adjustment at the rear ends. The inner and outer mountings of the struts are special flexing rubber bushes, which do not require any lubrication.

The steering swivels—or king-pins—are of special design, the top and bottom bearings being 12 in. (30 cm.) apart — an exceptional distance—giving a bearing area 80 per cent. greater than the orthodox type of king-pin and plain bush. This ensures inherent stability and long life. There are grease nipples at the tops and bottoms of these swivels which require attention with the ordinary grease gun, filled with grease to Ref. D, page 72, every 1,000 miles or 1600 km.



Close-up of front suspension.



Close-up of front suspension.

The steering is provided with two track-rods, these having the normal steering ball mounting with a grease nipple at each end, which again require grease to Ref. D, page 72, applied with the grease gun every 1,000 miles or 1600 km.

The total number of greasers at the "front end" is eight, and attention every 1,000 miles or 1600 km. is the only maintenance necessary on the front end suspension and steering.

The steering rack housing is packed with grease when it leaves the factory, and does not require any further attention for 30,000 miles or 50000 km., when it should be repacked with grease to Ref. D, page 72.

Adjusting the "Torsionic" Front Suspension

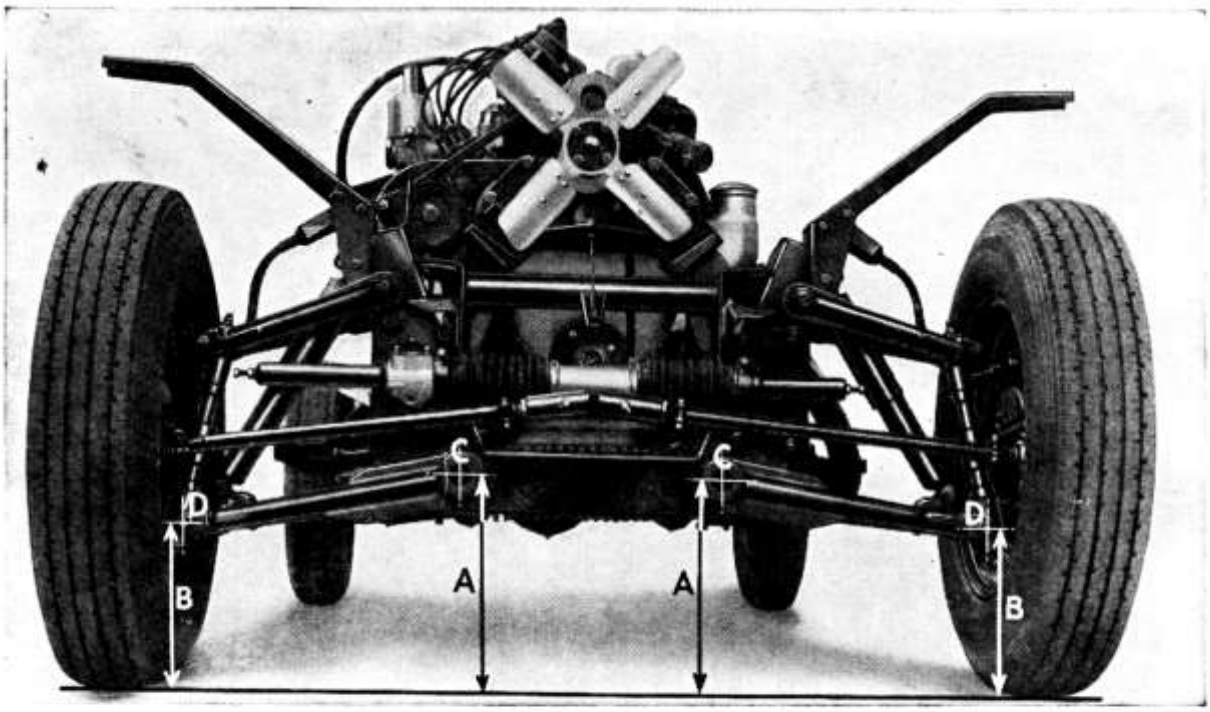
The following should receive attention at regular intervals, and particularly during the early life of the car.

With the car resting on its wheels, the tyre pressures should be verified and, if

necessary, set to the normal pressure of 24 lb. per sq. in. (1·7 kg./cm.^{2}) on the front and rear. The torsion bars should then be adjusted as indicated below, and the track checked. Checking of the track should be carried out at hub level at the same points on the wheel rims by wheeling the car to give a half-turn of the wheels. This will allow for manufacturing limits on the wheels.

Setting the Torsion Bars

Dimensions at " A," in the illustration below, should be 1½ in. (38 mm.) more than dimensions at " B," measurements being taken from the centres of attachments " C " and " D " to level ground.



If this difference in height is less than 1½ in. (38 mm.) the dimensions must be increased, the procedure being as follows :—

The front of the car must be jacked up until the wheels are completely clear of the ground ; the weight of the car will then be removed from the suspension gear. This point is very important, and on no account must any attempt be made to increase the dimensions at " A " with the weight of the car on its front wheels.

The adjusters at the rear ends of the torsion bars should now be screwed IN to effect the necessary alteration in height between " A " and " B."

The car must now be lowered onto its road wheels again and the springing allowed to settle by rocking the front end up and down a few times. Dimensions " A " and " B " should now be re-checked.

If the difference between " A " and " B " is now greater than 1½ in. (38 mm.) there is no need to jack the car up again in order to decrease this dimension. It is only necessary to screw the adjusters OUT until the correct measurement is obtained.

Important Note

The track should be set parallel (i.e. no "toe-in") with the struts set with a difference of $1\frac{1}{4}$ in. (32 mm.) between dimensions "A" and "B." Then each adjuster should be screwed in until the $1\frac{1}{2}$ in. (38 mm.) setting is obtained. This will mean approximately $1\frac{1}{3}$ turns on each adjusting screw. No further adjustment to the *track* should be made after setting at the $1\frac{1}{4}$ in. (32 mm.) setting.

Location of the adjusters.

Steering Gear

The steering mechanism fitted to the "Torsionic" front suspension is of the horizontal rack and pinion type.

The inner steering column is positioned by means of splines, circlip, and a screwed collar.

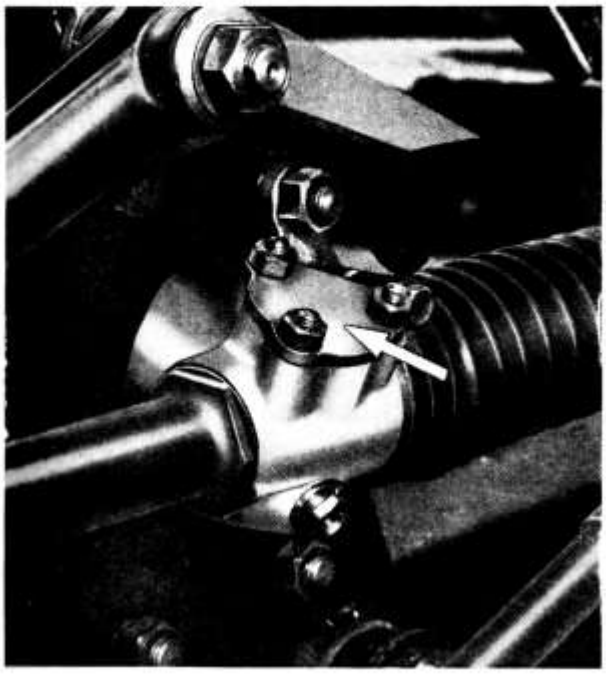
The steering gearbox is made of aluminium and houses a small pinion and integral shaft carried in taper bearings. This pinion is adjusted for position by means of shims of different thickness under the top bearing cap.

Running at right angles to this shaft and pinion is the housing for the horizontal rack gear, the gear itself being held in suitable bearings.

Pressure on the rack gear is applied by a spring-loaded plunger in order to eliminate backlash between the two gears.

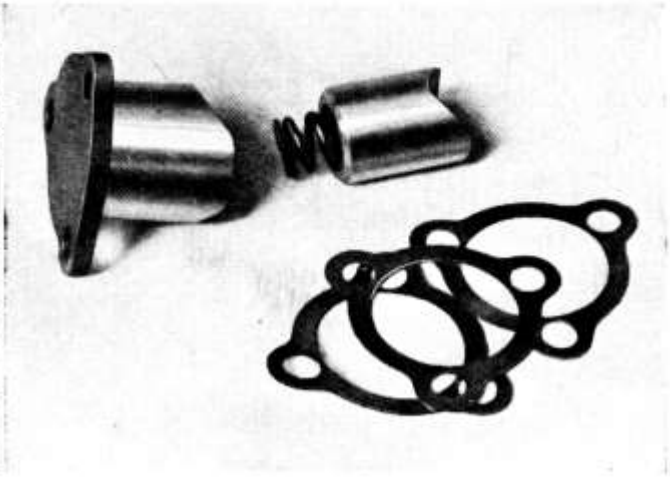
At either end of the steering unit are set screws and locknuts which control the turning circle of the car.

Lubrication of the steering gearbox is effected by removing the plunger housing

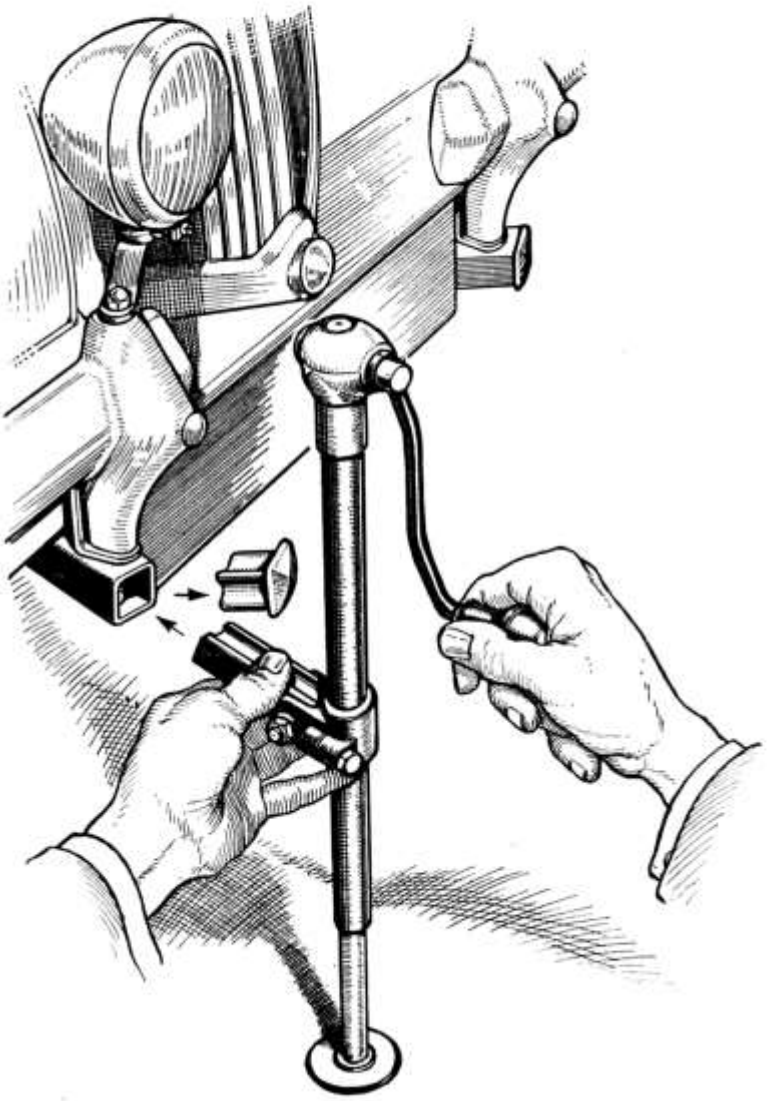


Left.—The arrow indicates the plunger housing, which must be removed prior to greasing the steering gear.

Below.—This photograph shows the plunger housing, spring-loaded plunger and packing shims used on the steering gear.



and plunger, shown in the illustration on page 27, and inserting grease to Ref. D (page 72) as the steering is turned from lock to lock. This greasing should occur each 30,000 miles or 50000 km. Care must be taken not to lose the shims under the housing flange and to see they are correctly in position when the housing is replaced.



The method of applying the jack is the same at the rear as at the front.

Jacking System

There are four jacking points on the car. They are located under the over-riders at the front and rear. Square-section tubes welded directly to the chassis are used to accommodate the special Riley jack, rubber plugs being inserted in the ends of the tubes when the jack is not in use. The special Riley jack is housed in the toolbox under the bonnet.

Dampers

The front dampers are of the hydraulic telescopic type and are situated between the outer end of the lower tubular struts of the front suspension and the side of the box-section front members.

Those at the rear are also of the hydraulic telescopic type, being securely attached to the chassis and connected by means of rubber-bushed attachment pins to the rear axle casing. They are mounted diagonally to stabilise the car and reduce sway.

The dampers are of the sealed type and require no maintenance. Every 12,000 miles (20000 km.) they should be removed from the car, tested for correct action and renewed if in any way defective.

Rear Axle

Removing or adjusting the rear axle is an undertaking for your Riley Dealer, and it is not proposed to give a detailed description in this book.

No trouble should be experienced as long as the recommended lubrication is carried out. **Remember that only Hypoid oil of a recommended grade should be used.**

Mounting of Power Unit

The engine and gearbox are mounted as a complete unit on three suspension points. At the front a large bracket is bolted to the timing case, and this rests on

two rubber blocks carried loosely in cups secured to the front cradle. At the rear there is a rubber mounting, attachments being provided on the gearbox and a chassis cross-member. Short lengths of steel cable are used at the front and rear to prevent excessive movement of the unit fore and aft.

Exhaust System

Between the engine manifold and the main silencer a short length of flexible pipe is interposed. This is done to obviate unnecessary stresses in the manifold and exhaust pipe due to the movements of the flexibly mounted engine.

From the engine the pipe leads to the main silencer, which is of large diameter and over 40 in. (102 cm.) long, the second silencer is connected by means of a short length of pipe to the first, and finally the exhaust gases escape to the atmosphere at the rear of the car.

Great care is taken to prevent the leakage of exhaust gases, and the complete system is flexibly mounted to eliminate vibration with its attendant noise and wear.

Rear Springs

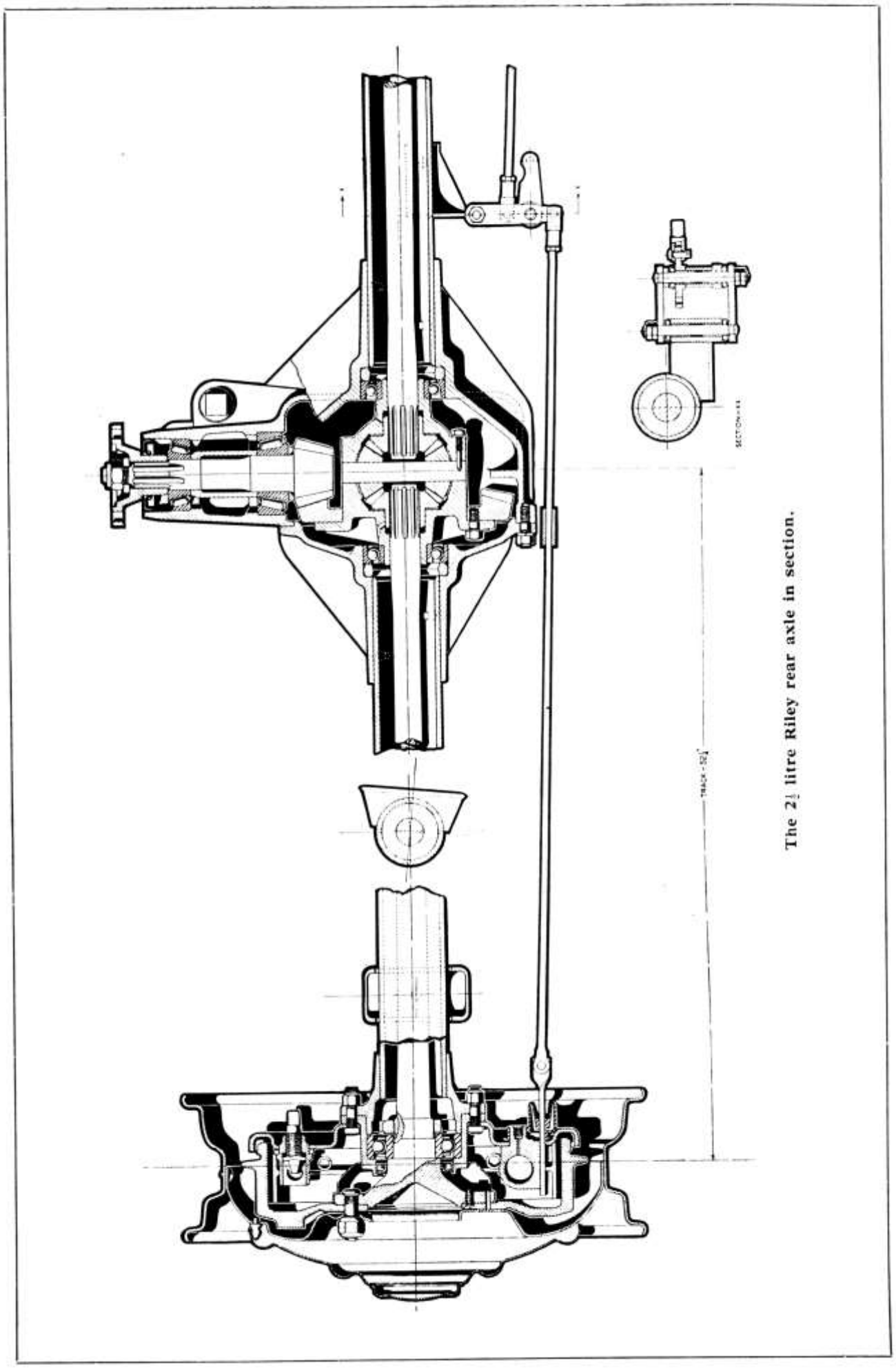
The semi-elliptic rear springs are of sturdy construction and are attached to the chassis by special shackles. The shackle attachment bolts are provided with a special type of self-locking nut, and this consequently eliminates the use of split pins.

The shackle bolts and anchorage bolts are mounted in special flexing rubber bushes, which require no lubrication.

Tyre and Wheel Balance

In the interests of smooth riding, precise steering and the avoidance of unpleasant reactions, Dunlop tyres are balanced to predetermined limits. By fitting the tyre so that the white spots near the cover bead coincide with the black spots on the tube a high degree of tyre balance is achieved. When using tubes which do not have the black spots, it is usually advantageous to fit the covers so that the white spots are at the valve position. The tyre and wheel assemblies must not be more than 28 in./oz. (1916 cm./gm.) out of balance. Assemblies exceeding this figure must be balanced with Dunlop rim weights to Part Nos. WBW/1 to 7 ($\frac{1}{2}$ oz. to $3\frac{1}{2}$ oz. or 15 gm. to 100 gm.) to within this limit.

It is imperative that any balance weights fitted are placed on the outside of the wheel. If fitted on the inside there is the possibility of damage to the brake flexible pipes.



The 2½ litre Riley rear axle in section.

Braking System

The braking system is of the Girling hydraulic type with the hand brake operating on the rear shoes by independent cable and pull-rod mechanism.

The brake-shoes of the front brakes are independently operated by separate wheel cylinders. The rear brakes are operated by a single wheel cylinder in each drum, to which is also connected the hand brake operating mechanism.

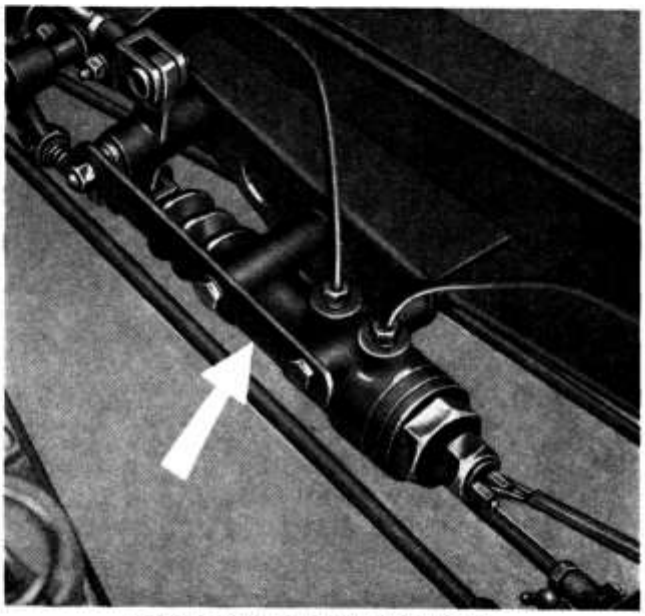
Since all the eight brake-shoes are operated through the same hydraulic system, perfect compensation and maximum braking effort is achieved.

The master cylinder and the system is maintained full of fluid from a supply tank mounted on the engine bulkhead on the right-hand side. The fluid level in this should be maintained at the level indicated on the supply tank.

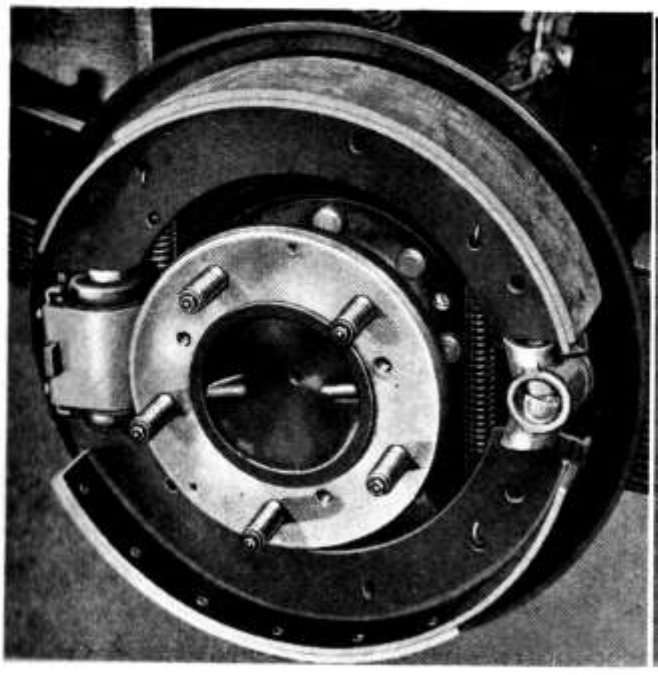
Use only genuine Girling Fluid or Wakefield WO.3 fluid. On no account must oil be introduced into the system or it will render the brakes inoperative.

Many of the troubles encountered with hydraulic brakes arise from the use of incorrect fluid. Remember that rubber seals are used in the system and that it is imperative that no fluid which has an adverse effect on rubber should be used.

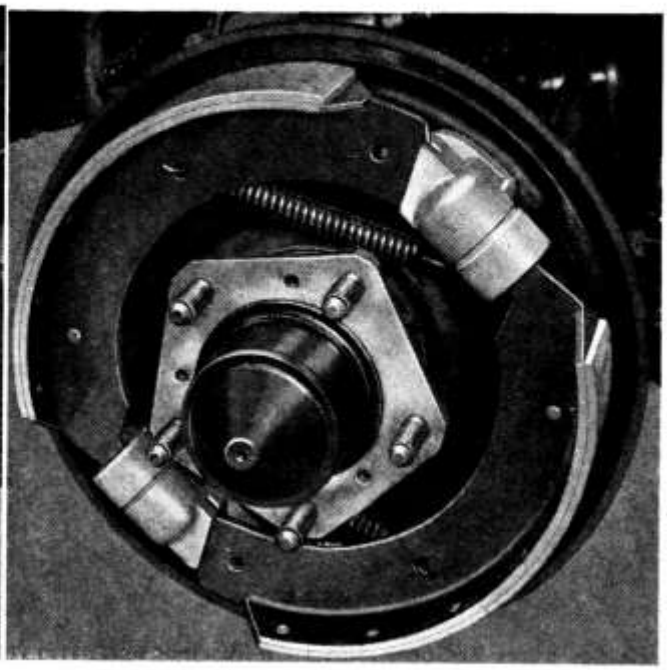
HEADER TANK ON ENGINE BULKHEAD



The brake master cylinder.



Rear brake assembly.

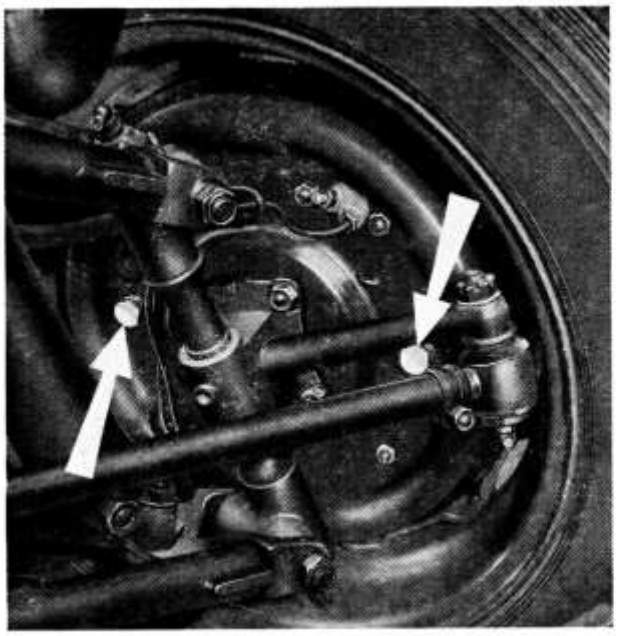


Front brake assembly.

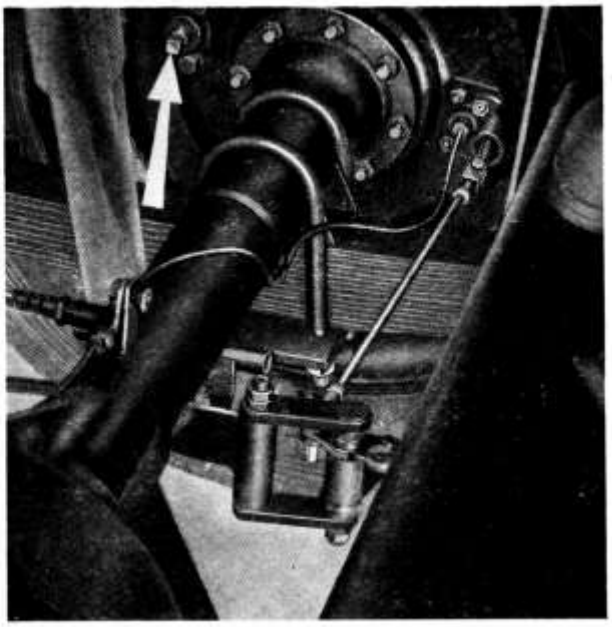
Maintenance of the Brakes

Maintenance has been reduced to the minimum, but the following points should be noted carefully :—

1. Check and, if necessary, top up the contents of the fluid supply tank which is situated on the engine bulkhead. Only Girling Brake Fluid or Wakefield W.D. 3 should be used.
2. Occasionally check the unions for leakage and the hoses for wear in the hydraulic part of the system.
3. Oil the link pins and other joints in the mechanical part of the hand-operating system.
4. Make sure that the connection between the master cylinder and the brake pedal is free, because it is essential that no binding should take place at this point, since the master cylinder piston, after each application of the brake, must be allowed to return unassisted by the brake pedal return spring. There should be a minimum of $\frac{1}{2}$ in. (12 mm.) of free movement at the pedal before it makes contact with the piston.



Front brake adjusters.



Rear brake adjuster.

Brake Adjustments

Rear : Starting at the rear wheels, it will be noted that on the inner face of the brake back plate on the forward side there is a square-headed adjuster which must be screwed in until an appreciable resistance is felt, as distinct from the resistance produced by the locating flats of the adjuster. This means that the brake-shoes have been expanded against the brake-drums. The adjuster must now be screwed out to the next nearest flat and the drum checked for freedom. The adjuster must be unscrewed to the extent of another flat if there is any sign of binding or rubbing. This is the only adjustment that is necessary on the rear brakes, and on no account must any adjustment be made to any of the tie-rods or links in the hand brake system.

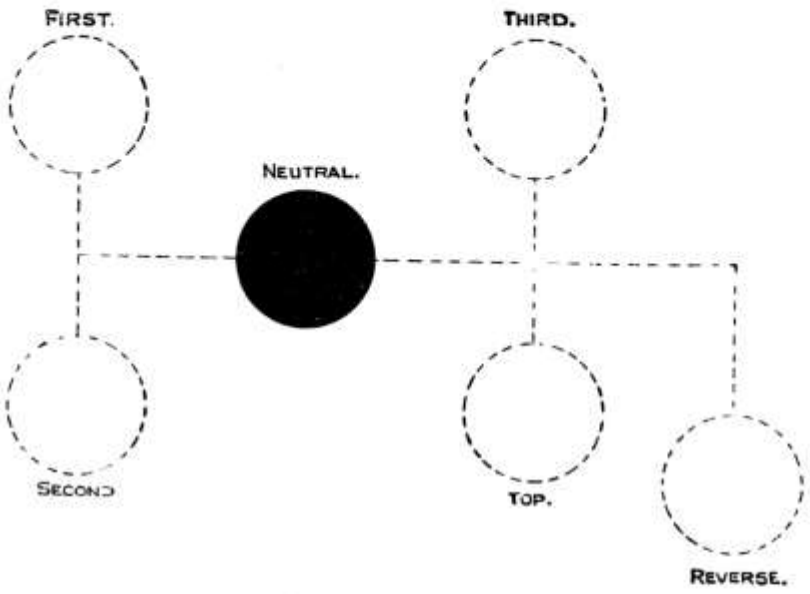
Front : On the front wheels the adjustment is somewhat different, due to the fact that **each brake-shoe has to be adjusted separately.**

The Girling two-leading-shoe system is used on the front brakes and the instructions on the next page should be noted when adjustments are being carried out.

The actual adjustments are effected by means of the two hexagon-headed bolts indicated by the arrows in the illustration on page 32. The illustration shows the back-plate of a left-hand-side front wheel. In order to move the shoes nearer the drums, so that compensation for wear may be obtained, the adjusting bolts must be turned **in the direction of rotation of the wheel** in the case of the left-hand wheel, and **against the direction of rotation** in the case of the right-hand wheel. The adjusters in each case must be turned clockwise when viewed from the centre of the car. Turn the bolts until a definite resistance is felt, and then slacken back to the point where no binding is experienced.

Make sure all nipples are tight, otherwise loss of fluid will result, and, subsequently, braking effort.

GEAR POSITIONS

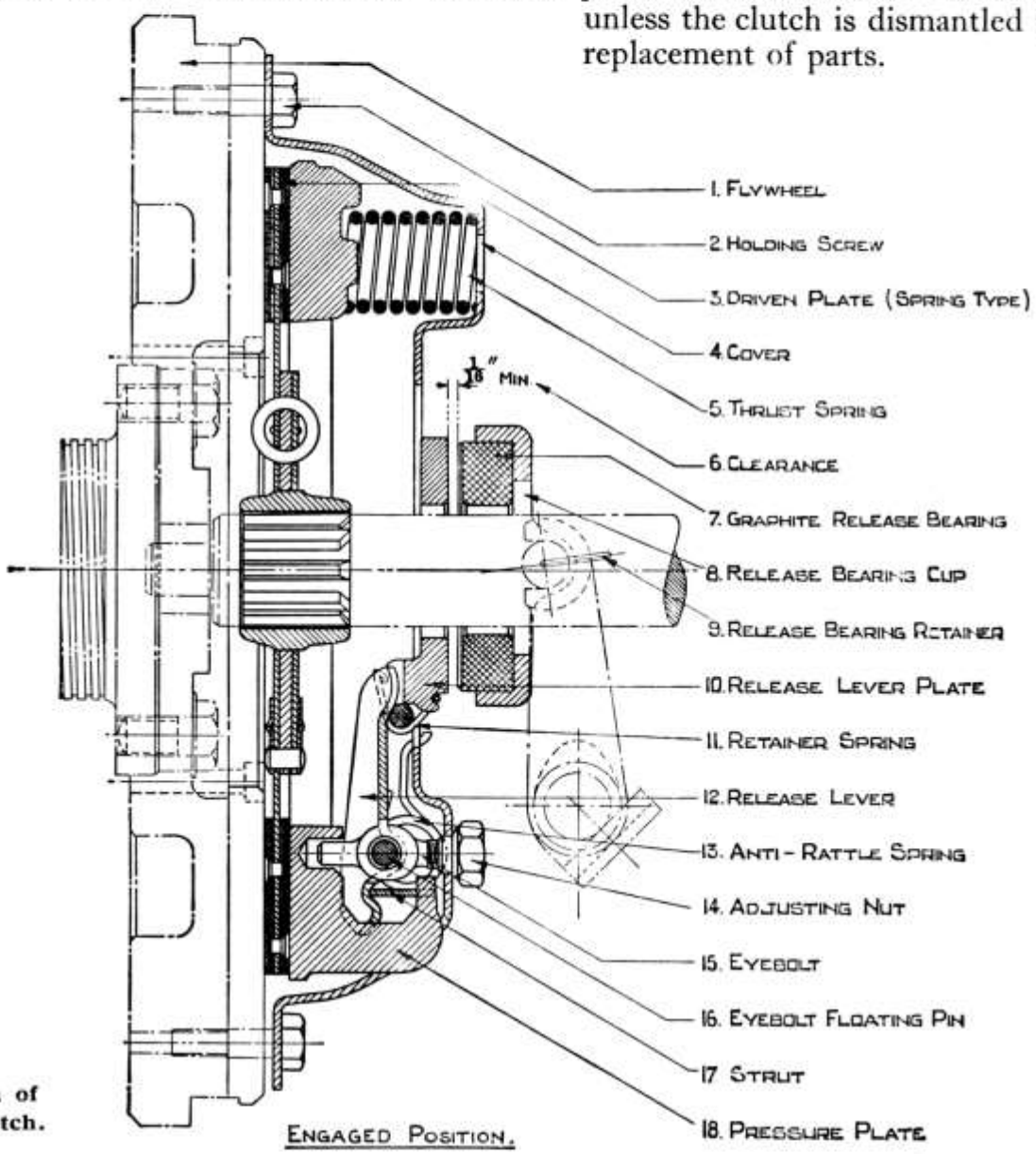


Central gear change.

The Clutch

The drive from the engine is transmitted to the gearbox and transmission system by a dry-plate clutch. The clutch is of the single-plate disc type and no adjustment for wear is provided in the clutch itself.

Individual adjustment is provided for locating each operating lever in initial assembly, but the adjusting nut is locked in place and should never be disturbed, unless the clutch is dismantled for the replacement of parts.



Section of the clutch.

As the clutch facings wear, the pressure plate moves closer to the flywheel face, however, and the outer or shorter ends of the release levers follow. This causes the inner or longer ends of the levers to travel farther towards the gearbox, and decreases the clearance between the release lever plate and the graphite release bearing. The effect on the clutch pedal is to decrease the backlash or free travel. Some free movement must always be maintained to prevent clutch slip. This free movement is restored by adjusting the clutch pedal, and there should be $\frac{3}{4}$ in. (19 mm.) of free or "lost" movement at the pedal before pressure on the release mechanism is felt; this is equivalent to $\frac{1}{16}$ in. (1·6 mm.) clearance between the release lever plate and the clutch withdrawal thrust bearing. Adjustment is effected by slackening the locknut on the forward end of the clutch-operating rod where it passes through the clutch-operating lever, and turning the adjusting nut in the appropriate direction. Do not forget to tighten up the locknut when adjustment is completed.

The Gearbox

From the clutch the drive is transmitted to the propeller shaft through the gearbox, which provides four forward gears and a reverse gear.

Neutral position is in the centre, in which position the engine turns the gearbox primary shaft, but no drive gears are engaged and the car consequently remains stationary although the layshaft and the gears in engagement with it are rotating.

To move off from rest after starting the engine, the driver should depress the clutch pedal fully, holding it in this position with the foot whilst moving the gear lever into the first gear position. The gear should engage without force ; if any difficulty is experienced, move the lever back into neutral and momentarily lift the foot from the clutch. Then again depress the pedal and select first gear as described previously. The hand brake should then be released and the clutch pedal gradually let up, simultaneously gently accelerating the engine with the right foot on the accelerator pedal. The car should then move smoothly away from rest.

As soon as the car is properly in motion it is advisable to change up into second gear. The second, third and top gears are all fitted with synchromesh, as a result of which gear changing is rendered perfectly simple.

To change up into any of these gears from the next lower gear, just depress the clutch pedal, momentarily ease the accelerator pedal and at the same time move the gear lever into neutral, pausing slightly to enable the synchromesh mechanism to balance the speed of the engaging gears before pushing the lever into the desired gear position, allowing the clutch pedal to rise and again accelerating.

Actually a slight resistance is felt between neutral and the engaged position in second, third and top gears. This indicates the position at which the synchromesh clutch engages, and the pause should be made against this resistance to ensure that the synchromesh functions properly.

Reverse gear is to the rear and the extreme right of the box, and care should be taken when changing from third to top to avoid forcing the gear lever into reverse position. This is guarded against by a special spring-loaded safety stop, the extra tension of which has to be overcome before reverse gear can be selected.

Always ensure that the car comes to complete rest before engaging a gear which will change its direction of travel.

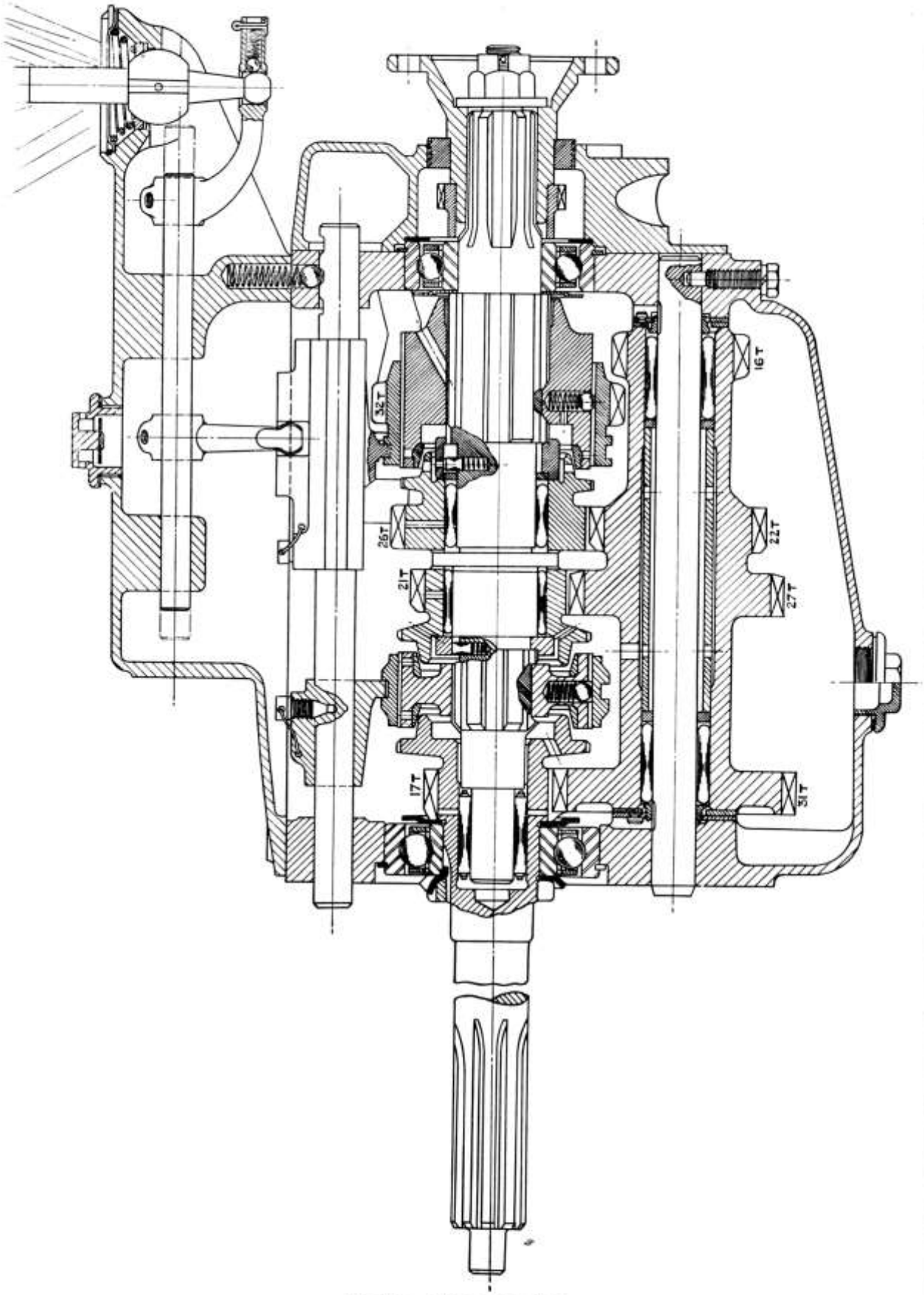
When changing down, the order is to some extent reversed, since it must be borne in mind that after depressing the clutch pedal the engine should be speeded up (approximately doubled) before the next lower gear is engaged.

On the few occasions when it is desired to change down from second to first, the clutch pedal should be depressed, the engine speed being maintained or slightly increased before moving the lever into first gear position and releasing the clutch.

For this change " double declutching " is beneficial and essential for a clean change. The novice should take an opportunity to have this demonstrated by a Riley Dealer, as it requires a little practice. The ability to change by double declutching is a distinct advantage.

When descending a hill that is known to be steep it is advisable to slow down and change into third or even second gear before the descent is commenced. This will result in the engine acting as a brake.

On no account should hills be descended in neutral or with the clutch pedal depressed. Such practices will cause unnecessary wear on the brakes and clutch withdrawal mechanism, apart from the danger of the procedure.



Section of the gearbox.

S.U. Electrical Fuel Pump

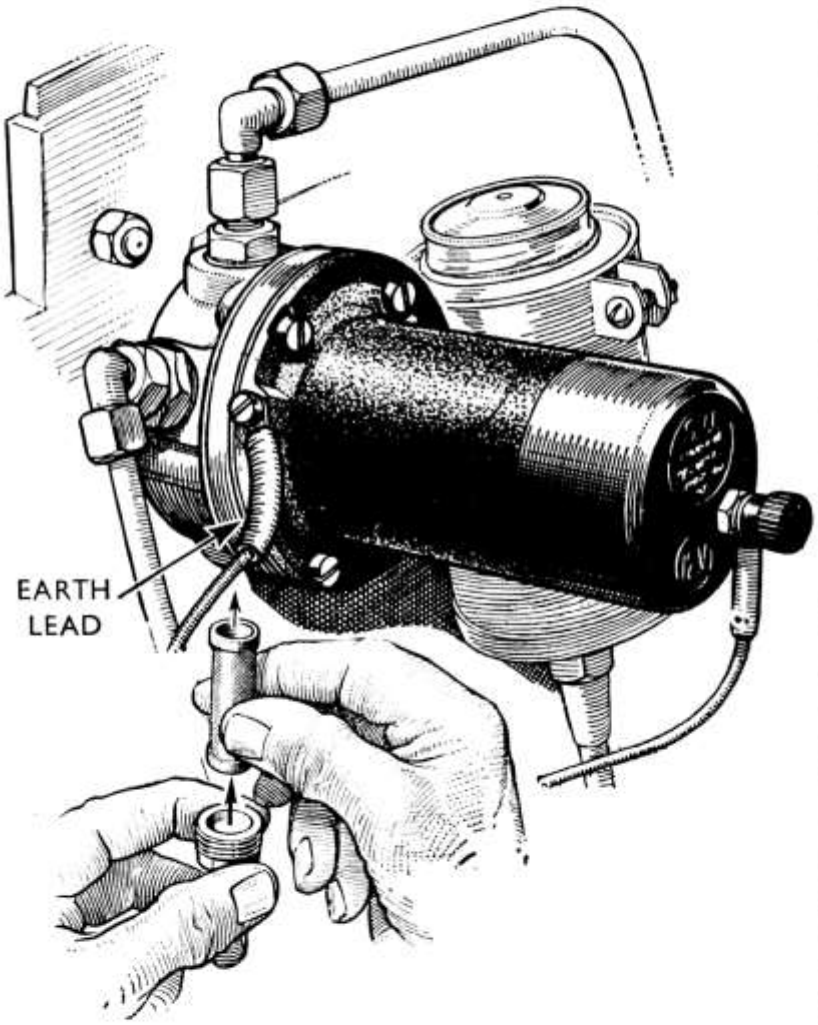
PRESSURE TYPE

This fuel pump is of the diaphragm type and its construction is such that it will give prolonged service with the minimum attention.

The only actual maintenance attention called for is the occasional removal and cleaning of the filter. The filter is inserted into the bottom of the pump body and can easily be withdrawn by unscrewing its hexagon attachment screw. When removed it should be thoroughly cleaned in petrol with a stiff brush ; *never use rag.*

Tracing Troubles

Should pump trouble be suspected, first disconnect the pump union of the pipe from the pump to the carburetter and switch on the engine. If the pump functions, the shortage is due either to blockage of the fuel pipe to the carburetter, or to the carburetter float needle sticking up. If the pump will not function after the union is undone, first remove the filter, which is held in position by the brass hexagon nut at the base of the pump, and see if this is clear. Then disconnect the fuel pipe leading to the tank and blow down this with a tyre pump to ensure the pipe being absolutely clear, and reconnect the fuel pipe.



The fuel pump filter.

If the pump still does not function or only works slowly, the stoppage may be due to a bad earth connection. To test for this, make definite metallic contact between the body of the pump and the car chassis. To ensure a good earth it may be necessary to scrape off a small portion of the black enamel with which the chassis is coated. If the pump then functions normally, the earth wire connections should be cleaned and remade.

A bad connection in the pump itself may sometimes be traced to the nut on the terminal inside the cover not being screwed down firmly.

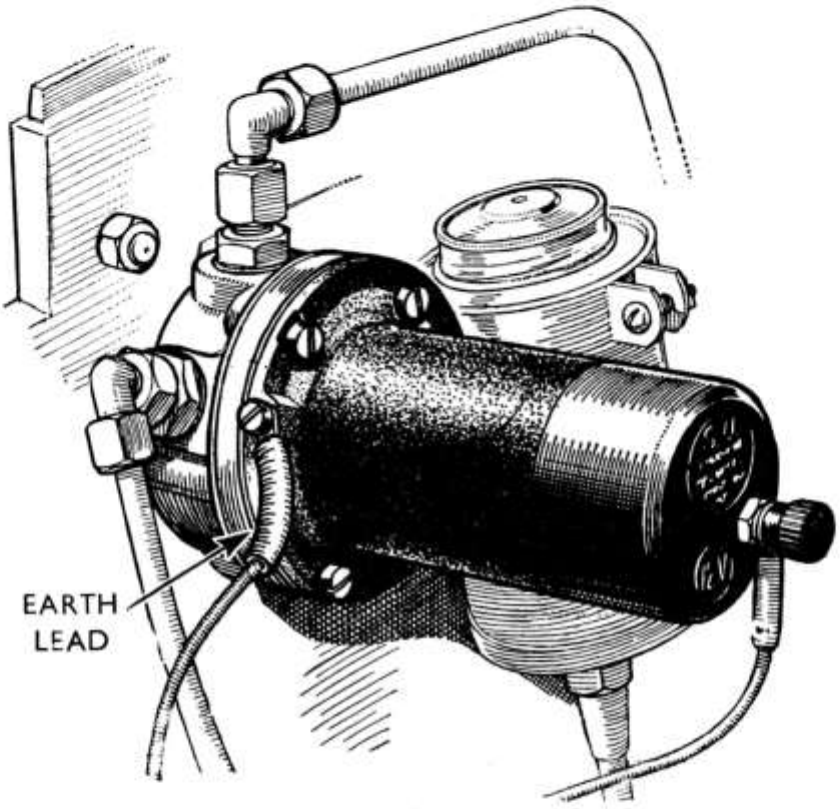
Should these points be found in order but the pump still does not work, the trouble is in the pump itself and the cause will be too much tension on the diaphragm or blackened contact points, produced by tensioning of the diaphragm. The remedy is to remove the cover from the contact points and pass a piece of thin card between the points while pressed together, so as to effect the necessary cleaning.

To release the tension on the diaphragm involves dismantling the pump and this work should be entrusted to your nearest Riley Dealer.

Should a pump work intermittently or not start clicking when switched on, it is an indication that this trouble is occurring and it should be given immediate attention to obviate final stoppage on the road.

The Filter

The filter is situated at the bottom of the pump body and is easily removed for cleaning purposes by unscrewing the hexagon plug holding it in position. It should be removed and cleaned in fuel with a stiff brush every 6,000 miles or 10000 km.



Keep the earth terminal tight.

A Noisy Pump

If the pump becomes noisy it is usually an indication that an air leak is taking place on the suction side of the pump. Check the level of the petrol in the tank and see that it is not too low; also check all the unions and joints, making sure that the filter union and inlet unions are quite airtight.

If the connections to the pump are in order and the trouble persists, then it is probable that an air leak has developed somewhere in the fuel feed pipe between the tank and the pump. The best way to test whether this is so, is to replace the feed pipe by a short length of temporary piping, the mouth of which can be inserted in a can of petrol. If the pump then functions properly it is obvious that a leak has developed somewhere in the feed pipe.

Failure to Deliver Petrol

Should the pump continue beating without delivering petrol it is very probable that some dirt has become lodged under one of the valves, in which case they should be dismantled by unscrewing the top or delivery union and lifting out the valve cage, when they can be cleaned and reassembled.

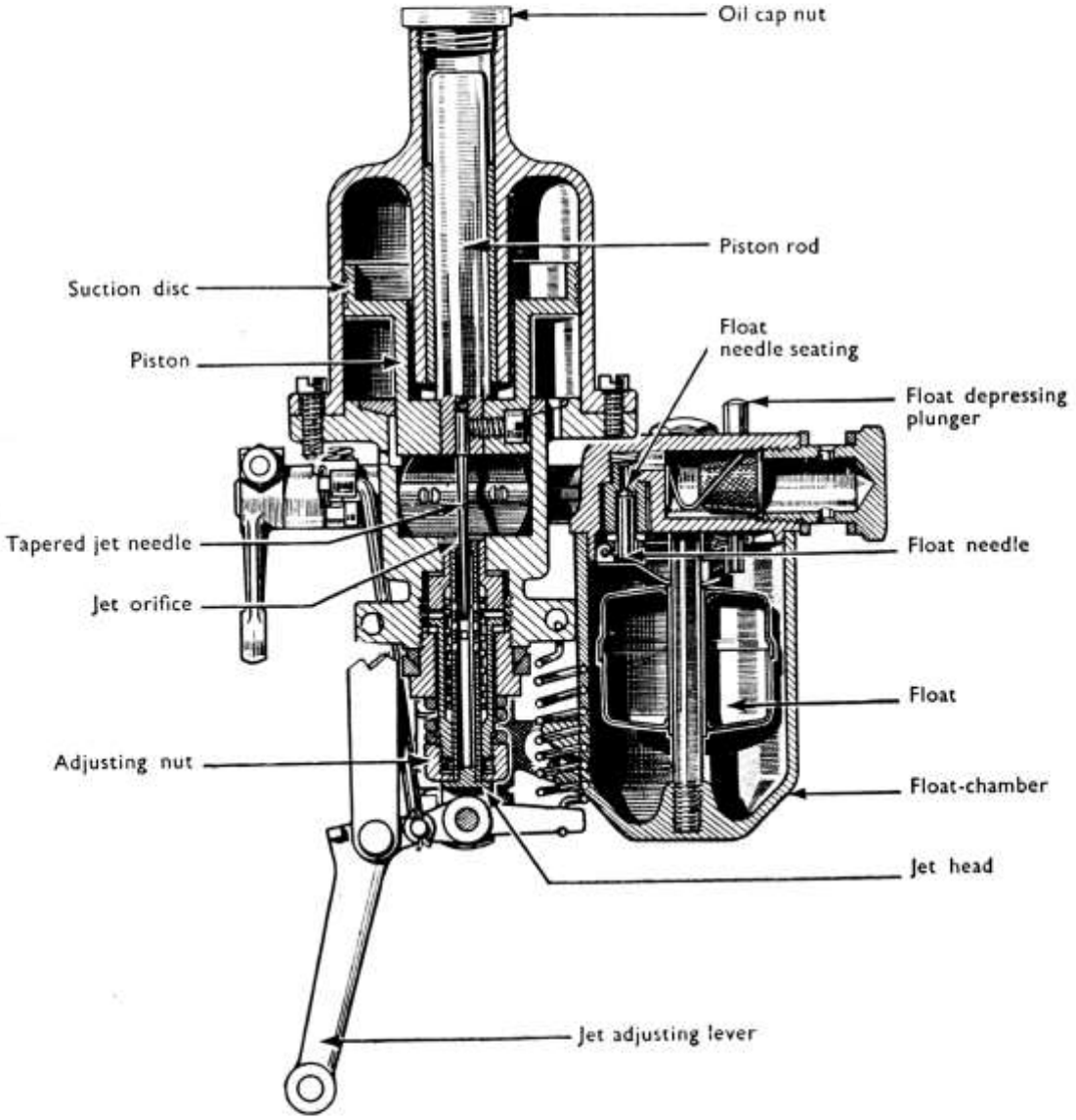
If, however, the pump struggles to pump and becomes very hot, it is probable that the pipe line has become obstructed or that the filter has become clogged.

The S.U. Carburetters

Type H4

The tuning of the S.U. carburetters is very simple if it is understood that the jets are of a standard size. The **only** adjustment possible is fitting the right size needles and the setting of the jet adjustment and throttle stop for the correct idling speed. **No** other adjustments are provided.

Should you suspect the carburetters of causing trouble, after giving good results, do not change the needles, for this cannot be the cause of the trouble.

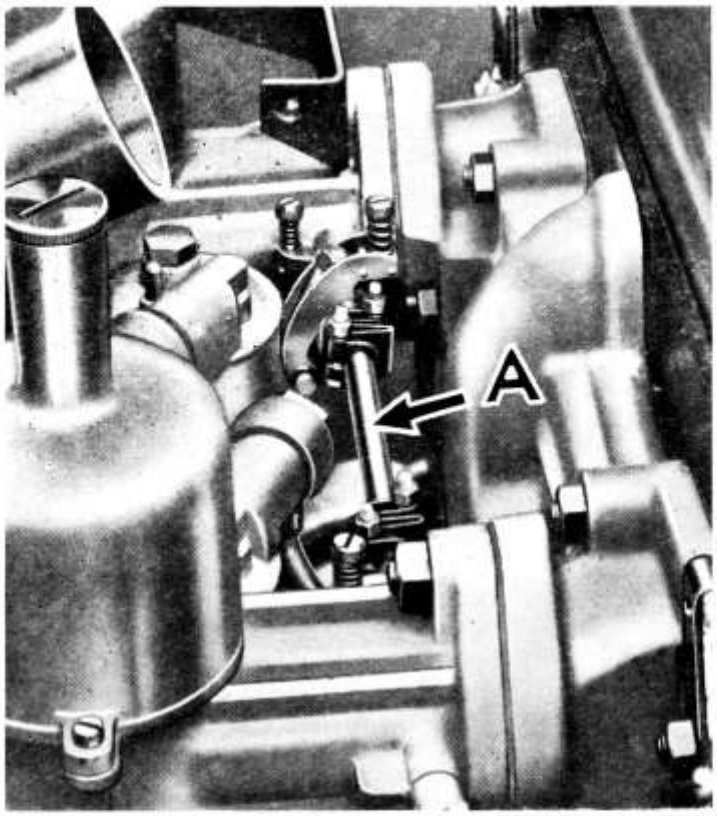


Section of the carburetter.

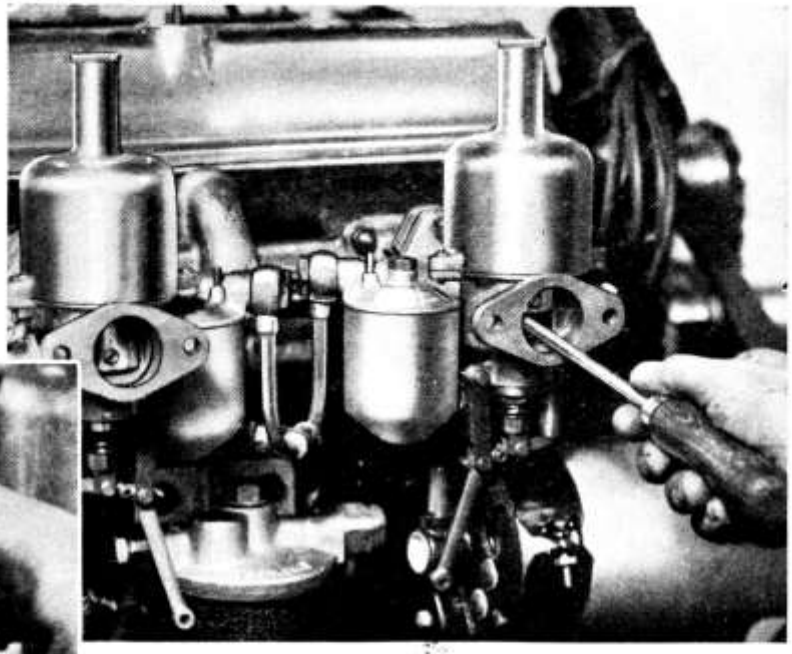
The correct way to adjust the carburetters is to set them for correct running at idling speed. The carburetters are then set throughout their range. This adjustment is made by means of the jet and the jet adjusting nut, in other words, the position of the jet is altered relative to the needle.

The engine should run as evenly as possible, and the exhaust note is a very good indication of this. If the exhaust has a rhythmic uneven beat (called " hunting ") and is sooty, a rich mixture is indicated. If the exhaust note is irregular, a weak mixture is indicated.

If this jet idling adjustment is not made, consumption and performance will not be up to standard. Separate and adjustable slow-running throttle stops are also provided.



Left.—This is a general view of the twin carburetters, showing the flexible joints between the two throttle butterfly valves and the throttle connecting rod. Note the spring-loaded slow-running throttle adjustment screws and the hand throttle attachment point. The throttle connecting rod "A" should be slackened off by releasing one of the universal coupling bolts before adjustments take place. This will allow each carburetter to be tuned individually.



Right.—Checking the piston for freedom of movement. If the piston fails to fall by its own weight, adjust the carburetter as explained on page 41.

Left.—Shows one of the carburetter filter assemblies. Note the correct positioning of the filter and spring with the open end of the filter outwards. The banjo bolt has had the washers reassembled in their correct relative positions, i.e. one either side of the union. Make sure the washers are perfectly clean when reassembling.

NOTE.—The carburetters must be accurately synchronised for perfect running. Information regarding their synchronisation may be obtained from the carburetter manufacturers.

Adjustment

The carburetters should be set when the engine has attained its normal working temperature, and the way to do this is to adjust the jets up to a weak mixture position and then screw the jet adjusting nuts down until the best possible running speed is obtained.

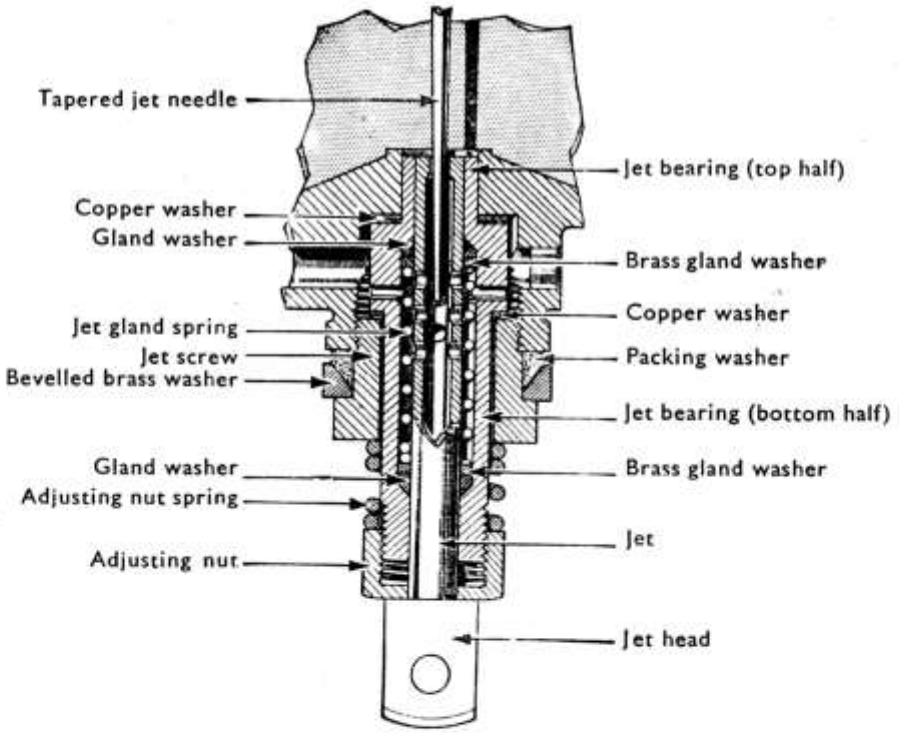
A simple way to check the mixture is to raise the piston approximately $\frac{1}{32}$ in. (·8 mm.) when the engine is idling with the throttle closed. If the engine speed increases momentarily, the setting is correct. If the engine speed continues at the increased rate, the mixture is too rich, and the jet adjusting nut must be screwed **up.** If the engine stops, the mixture is too weak.

The jet head **must** be kept in contact with the adjusting nut all the time while adjustment takes place. The jet adjusting nut is spring-loaded and self-locking.

CARBURETTER TROUBLES

1. Sticking Piston

This should be checked by lifting the piston with a screwdriver and allowing the piston to fall to its original position; if the action is sluggish or erratic, the assembly should be removed and carefully cleaned. A small amount of thin engine oil should then be applied to the **piston rod only** and the carburetter reassembled.



Section of the S.U. jet assembly.

2. Water or Dirt in Carburetter

When this condition is suspected, the following is the routine to be employed:—

(*a*) Lift the piston.

(*b*) Depress the tickler to flood the carburetter.

(*c*) Watch the jet.

(*d*) Observe the flow of petrol through the jet. If the flow of petrol is poor, the jet is blocked, in which case :—

(1) Start the engine.

(2) Open the throttle.

(3) Close the air intake with your hand.

(4) Keep the throttle open until the engine speeds up.

If the above procedure does not cure the trouble, the jet should be removed and cleaned.

Careful consideration of the following notes on the refitting and centring of the jet will ensure that this is carried out correctly. If this is not done, the carburetter will give a poor performance.

The jet and jet bearing assembly can be removed by unscrewing the jet holding screw, and as the jet is only slightly larger than the needle it will be obvious that great care must be taken in replacing the jet, particularly as the jet and needle must be concentric.

The following is the sequence for reassembly :—

(*a*) Screw the jet adjusting nut to its top position.

(*b*) Move the jet up until the jet head is against the adjusting nut.

(*c*) Refit the complete jet assembly with parts fitted as shown in the illustration on page 41.

(*d*) Check the piston for freedom of movement.

(*e*) If the piston is not free, the jet holding screw must be slackened and the procedure repeated. This may have to be done several times.

(*f*) Bring the jet adjusting nut back to its original position.

3. Flooding of Float-chamber

This is generally due to dirt on the guide of the needle valve and can usually be rectified by depressing the tickler—this allows a flood of fuel to flow through the valve.

4. Float Needle Sticking

This will cause lack of fuel at the carburetter, and the needle, together with the seating, should be removed and thoroughly cleaned with a brush.

Tyre Pressures

The importance of maintaining the correct tyre pressures cannot be too highly stressed, and the tyre pressures of your car should be checked and adjusted weekly. This adjustment of air pressure not only influences the wearing qualities of the tyres, but also vitally affects the running qualities of the car and its behaviour when on the road. For example, an under-inflated tyre induces more friction between tyre and road and increases the rolling resistance. In other words, the car will not move so readily along the road. Thus it will be seen that, under these circumstances, the engine of your car will have more work to do for a given road speed, and petrol consumption will obviously increase. In the case of the front tyres heavy steering will result. Tyre pressures have a direct bearing on brakes, steering and comfort.

The correct tyre pressures are :—

With driver and one passenger	Front	24 lb. per sq. in. (1·7 kg./cm.^{2}).
	Rear	24 lb. per sq. in. (1·7 kg./cm.^{2}).
With four up and luggage	Front	26 lb. per sq. in. (1·84 kg./cm.^{2}).
	Rear	26 lb. per sq. in. (1·84 kg./cm.^{2}).

Electrical Equipment

MAINTENANCE OF THE ELECTRICAL EQUIPMENT

Battery

A 12-volt, 63-amp./hour battery is fitted, and once every month the cells should be topped up with distilled water to bring the electrolyte to the correct level. Never use tap-water, and never inspect the cells with the aid of a naked light.

Each battery cell is fitted with a device which ensures that the batteries are filled to the correct level. To top up the level of the electrolyte remove one of the rubber plugs and pour distilled water round the plastic tube, which is in the filling orifice, until no more water will enter.

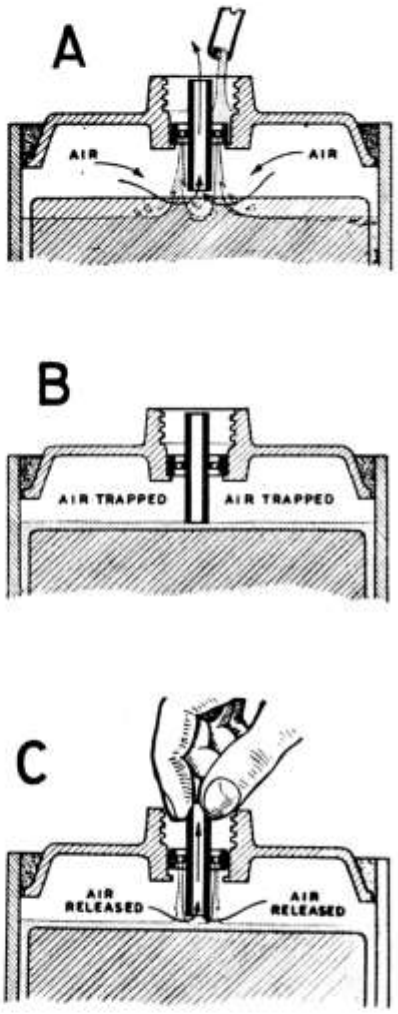
Lift the tube slightly to allow the visible water trapped in the filling hole to drain into the cell.

The acid level is now correct, and no more distilled water should be added.

Repeat this operation on each of the other cells and replace the plugs.

In temperate and cool climates these operations should not be necessary more often than once every 1,000 miles (1600 km.) or once a week.

Terminals should be kept clean, tight and lightly smeared with petroleum jelly. Occasionally the specific gravity should be checked with a hydrometer; this, normally, is a job for the Lucas Service Agent, but should the owner desire to take the readings, the following are the indications to be expected, assuming the temperature of the solution to be 60° F. (15·6° C.):—

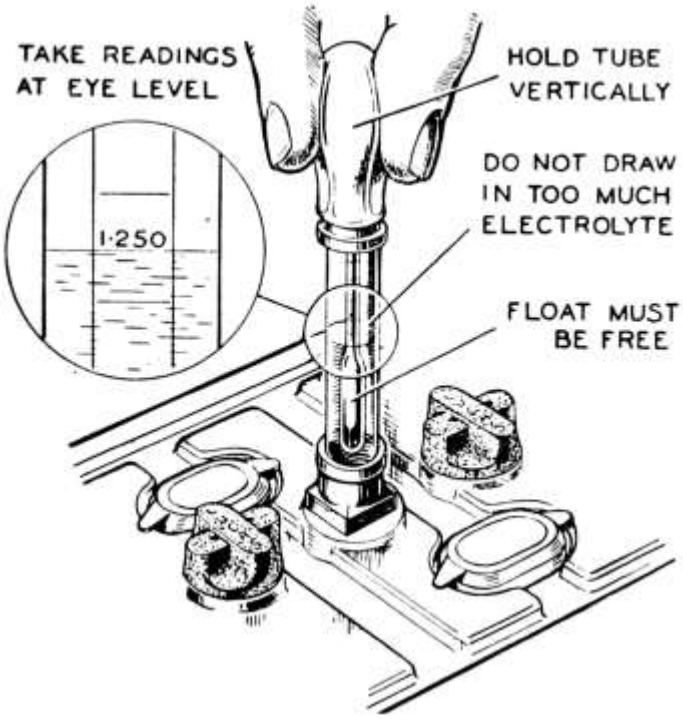


The method of using the correct acid level device.

Specific Gravity	*State of Battery*
1·280 to 1·300	Fully charged.
About 1·210	Half-charged.
Below 1·150	Fully discharged.

The readings of each cell should be approximately the same, and should they be different this indicates that (1) acid has been spilled, or (2) there is an internal short in the cell in question. In both cases the battery should be examined by a Lucas Service Agent.

The battery should never be allowed to remain in the fully discharged condition, as this leads to rapid deterioration.



Check the specific gravity of the electrolyte with a hydrometer.

Dynamo

This is designed to cope adequately with the charging of the battery under all conditions of load. During manufacture the dynamo drive bearing is packed with grease, and this is sufficient to last until the engine undergoes its major overhaul.

When this occurs, the dynamo should be inspected and overhauled by a Lucas Service Agent.

About once every 12,000 miles or 20000 km. it is necessary to remove the dirt-excluding band around the brush gear and the commutator, and check the brushes for freedom in their holders—this is done by raising the brush spring and moving the brush up and down. Should the brush be sluggish, its sides should be cleaned and, if necessary, polished on a very smooth file until freedom of movement is obtained. The commutator should be cleaned by pressing a petrol-damped rag against the segments whilst the engine is slowly rotated. The sides of the brush holders should also be cleaned.

Great care should be taken to see that any brushes that have been removed are replaced in their original positions. If a brush has become so badly worn that poor contact with the commutator is being made, or the brush flexible wires are showing through on the working face, the instrument should be taken to a Lucas Service Depot for rectification.

The dynamo belt should be checked periodically for wear and slackness. Belt tension is increased by moving the dynamo outwards ; this is done by slackening off the two lower pivot bolts and the attachment screw of the adjusting link. The correct amount of free movement in the belt is approximately $\frac{1}{2}$ in. (13 mm.) at the centre of its run.

If the driving belt is subjected to excessive tightening, a great strain will be placed upon the dynamo bearings, with consequent rapid wear and trouble.

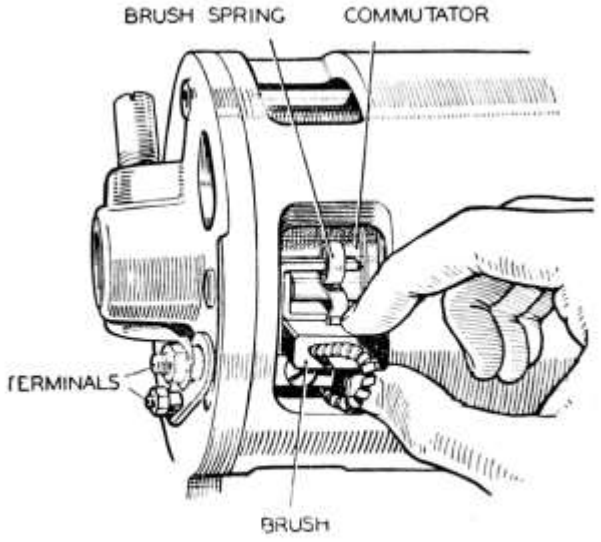
The Starter Motor

To obtain the best results from the starter motor, it is essential that the following points be observed :—

(*a*) See that controls are correctly set for starting.

(*b*) Operate the starter button firmly and, of course, release it as soon as the engine fires.

(*c*) Never operate the starter whilst the engine is in motion. If the engine does not fire at once, allow it to cease rotating before operating the starter button again.

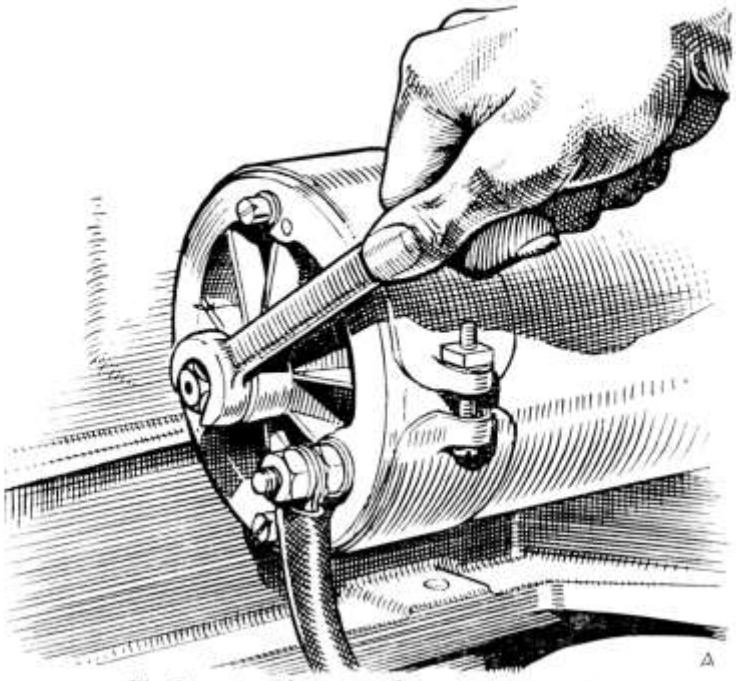


Checking the brushes.

(*d*) Do not strain the battery by keeping the starter button depressed if the engine does not start. Remember that the starter motor takes a very heavy current.

(*e*) In cold weather depress the clutch whilst operating the starter—this relieves the starter motor of the very considerable drag induced by rotating the gears.

Instructions regarding the brush gear, etc., are the same as for the dynamo, and the owner's attention is drawn to the notes on the dynamo.



Shaft extension on the starter motor.

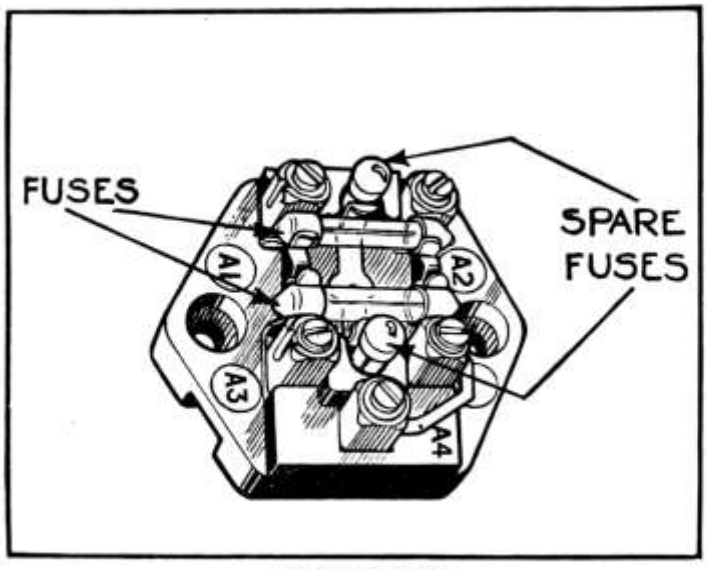
A square shaft extension is provided for hand rotation of the starter motor for cleaning purposes or to free a jammed starter pinion.

If the action of the starter motor appears sluggish or erratic, the motor should be removed from its mounting and the screwed sleeve and pinion examined for dirt. If it is dirty the parts should be cleaned in petrol.

Regulator and Voltage Control Unit

This is situated on the engine bulkhead, and houses the compensated voltage control unit. It is reached by lifting the left-hand bonnet top.

The object of the voltage control unit is to ensure that the dynamo supplies the correct charge to the battery under all conditions. For example, when the lights are on, a considerable strain is imposed on the battery and the dynamo charges automatically at a high rate. When the lights are off, it will be obvious that the drain from the battery is considerably less, and consequently the charging rate should also be less. The charging rate is automatically controlled by the unit, which provides a high charge when the battery is being heavily loaded and a low charge when the battery is lightly loaded.



The fuse box.

Note.—The regulator is very carefully and scientifically set by the manufacturers, and on no account should any adjustment be made to this instrument. The cover is therefore sealed.

Fuses

Two fuses are housed in the fuse box, one being indicated by the A3 and A4 terminals and controlling the stop-lamp, Trafficators, petrol gauge, wiper motor, and other components which only operate when the ignition is switched on. This is of 35 amp. rating.

The fuse across terminals A1 and A2 controls the horns. This is of 50 amp. rating.

A blown fuse will be indicated by a failure of the circuits which it controls, and by a visual examination of the fuse itself, the broken ends of the wire being clearly visible. If after renewing a fuse it immediately blows again, it is obvious that there is a serious short circuit or other fault in the wiring system and careful examination must be made for anything untoward. If it is not possible to see anything wrong, a Lucas Service Agent should be permitted to examine the car immediately and rectify the trouble. Make sure to use fuses of the correct value.

LAMPS

Headlamps

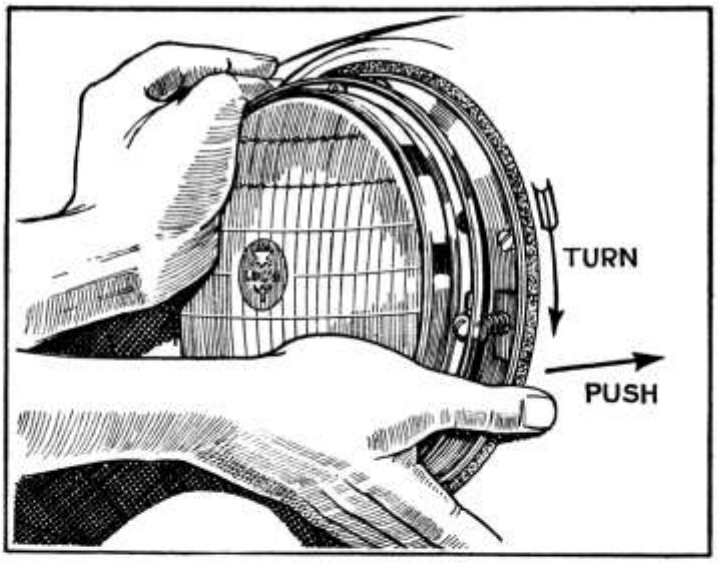
These are of special design and the procedure for removing a reflector to change a bulb is as follows :—

(1) Remove the chromium rim by extracting the screw on the underside of the lamp front—the rim can then be lifted off. Remove the rubber sealing ring.

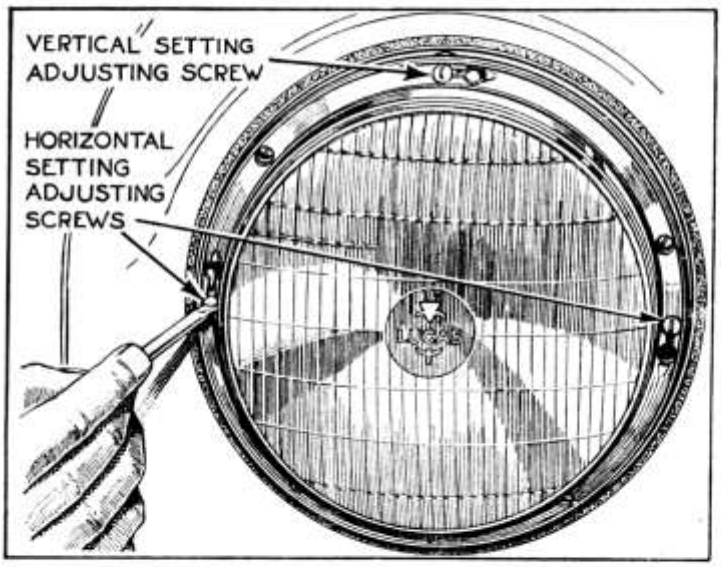
(2) Remove the reflector unit complete by pushing it inwards against the tension of the attachment springs and turning anti-clockwise so that the heads of the attachment screws pass through the enlarged ends of the slots in the rim.

(3) Remove the socket carrying the leads; this is a bayonet fitting.

(4) Pull out the bulb from the bulb holder.



The action of replacing the light unit. Removal is effected by rotation in the opposite direction.



The headlamp beams are set by means of the spring-loaded attachment screws locating the light unit.

The procedure is reversed for assembly, but care must be taken to see that the slot in the bulb flange engages the tongue in the bulb holder.

An adjusting screw is provided to enable the headlamps to be set in a vertical plane to give a horizontal beam, and two adjusting screws at the side of the lamp unit enable the beam to be controlled in the horizontal plane.

Sidelamps

Removal of the screw on the top of the lamp will permit the removal of the glass. The bulb has a bayonet fitting.

Tail-lamps

The cover is held in place by a screw, release of which allows the cover to be opened. The bulbs have a bayonet fitting.

Fog-lamps

Access to the bulb for replacement is obtained by slackening off the rim retaining screw underneath the lamp and swinging it downwards clear of the forked bracket on the rim. The lamp front can now be pulled forward at the bottom and the top locating tongue withdrawn from the slot in the lamp body. This exposes the lamp bulb, which is easily withdrawn from its bayonet holder. The bulb is a 12-volt 36-watt Lucas No. 162, and the correct replacement bulb should always be employed to ensure correct focus.

Should the lamp be out of focus it is necessary to remove the reflector to obtain access to the bulb holder for adjustment. This is achieved by bending back *one* of the small metal tabs which retain the reflector on each side of the lamp, thus permitting withdrawal of the reflector.

The focus of the bulb is adjusted by slackening the pinch bolt on the bulb holder clip and sliding the holder backwards or forwards as necessary to obtain optimum results. When you have obtained the desired results tighten up the clip bolt and replace the reflector, securing it in position by bending back the retaining tab.

Do not remove the reflector unless it is absolutely necessary.

Replacement of Bulbs

When replacing a bulb, it is important that bulbs of the same size and type are fitted, and that the bulb will focus properly in the reflector. Cheap and inferior bulbs often have a filament of such a shape that it is impossible to obtain the correct focus, and this will, of course, result in a loss of efficiency. A list of the bulbs will be found on page 5.

Windscreen Wipers

The windscreen wiper motor is packed with grease during assembly, and no adjustment is required. The motor should require no attention, the only parts to require renewal after some considerable time being the wiper blades, which can be renewed, at small cost, when they become inefficient.

The Ammeter

This is mounted on the instrument panel, and its purpose is to indicate the rate of charge to or from the battery. As explained in a previous paragraph, the dynamo is of compensated voltage control type and the ammeter readings will vary considerably even at the same road and engine speeds, since the dynamo charges at a high rate until the battery regains its normal fully charged condition; this is shown on the ammeter by a gradual decrease in the charging rate as the car is run, after a heavy load has been placed on the battery by use of the starter, for instance.

Trafficators

These are operated by a small lever at the centre of the steering wheel and are of the self-cancelling type.

To change a bulb the arm should be raised and the small screw at the end removed; the cover-plate can then be lifted outwards and upwards. The festoon bulb holder will then be exposed.

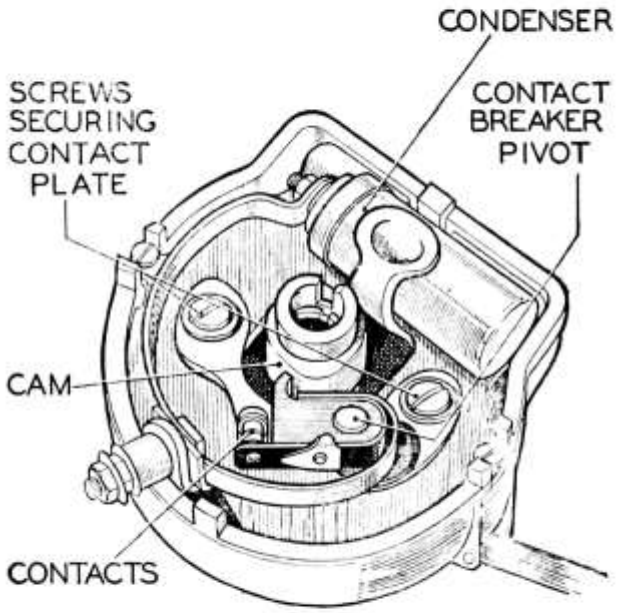
Coil Ignition

This will give satisfactory service for very long periods without the need for adjustment. Lubrication should be carried out at the intervals stated, but while the equipment is functioning satisfactorily it is not necessary for any additional maintenance to take place beyond occasional cleaning.

The following points should be lubricated each 3,000 miles or 5000 km. :—

(1) If the rotor arm is lifted off, the spindle will be exposed and a few drops of engine oil to Ref. F (page 72) should be inserted in its hollow end. It is not necessary to remove the central screw, as provision is made for oil to pass between the screw and the inner face of the spindle. Oil supplied at this point will also lubricate the distributor shaft.

(2) A smear of engine oil or grease to Ref. D (page 72) should be applied to the contact breaker arm pivot and on the face of the cam.



Component parts of the contact breaker assembly.

Cleaning Distributor

All parts of the distributor should be cleaned occasionally; if necessary, a petrol-moistened rag should be used.

Special attention should be directed to the following points when cleaning :—

1. The spaces between the terminals.
2. The electrodes.
3. The rotor arm.
4. Freedom of the carbon brush in its holder.

The contact breaker should be examined closely and the contacts must be kept absolutely free of grease and dirt.

If the points appear dirty or discoloured they should be polished with a piece of fine carborundum stone or fine emery cloth. All trace of dirt and metal dust must be removed.

Checking and Setting the Contact Points

Turn the engine until the contact points are fully open and check the gap, which should be between ·014 in. and ·016 in. (·36 mm. to ·41 mm.).

To set the gap, the two securing screws, as shown in the illustration above, should be slackened off and the points set to the correct gap. Care should be taken to see that the screws are securely tightened after the gap has been set.

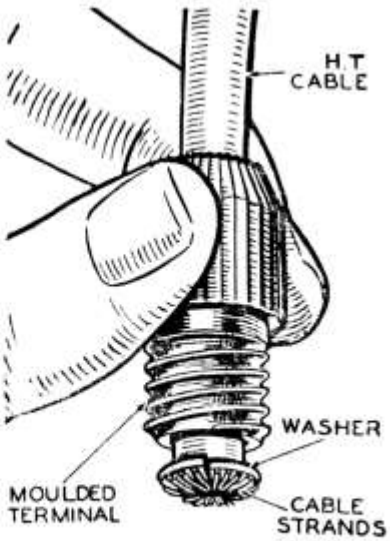
The Coil

The only attention this unit should receive is an occasional check to ensure that the terminals are tight and that the whole unit is clean, particularly between the terminals.

Location and Remedy of Faults

Although every precaution is taken to eliminate all possible causes of trouble, failure may occasionally develop through lack of attention to the equipment or damage to the wiring. The most probable faults are tabulated, according to the symptoms displayed in the fault-finding tables on pages 52-55.

It is recommended that a systematic examination is made by following the suggestions in the



Method of fixing high-tension cable to terminal.

fault-finding tables, as the sources of many troubles are by no means obvious. In some cases a considerable amount of deduction from the symptoms may be needed before the cause of the trouble is disclosed.

For instance, the engine might not respond to the starter switch; a hasty inference would be that the starter motor is at fault. However, as the motor is dependent on the battery, it may be that the battery is exhausted. This, in turn, may be due to the dynamo failing to charge, and the final cause of the trouble may be, perhaps, a loose terminal nut either at the battery or elsewhere in the charging circuit.

If, after carrying out an examination, the cause of the trouble is not found, get into touch with the nearest Lucas Service Depot.

A clean and efficient sparking plug.

A fouled and inefficient plug which will waste power and petrol.

This plug shows signs of oil-fouling, indicated by a wet, shiny black deposit on the insulator. This type of fouling may be caused by worn pistons, cylinders or gummed-up piston rings.

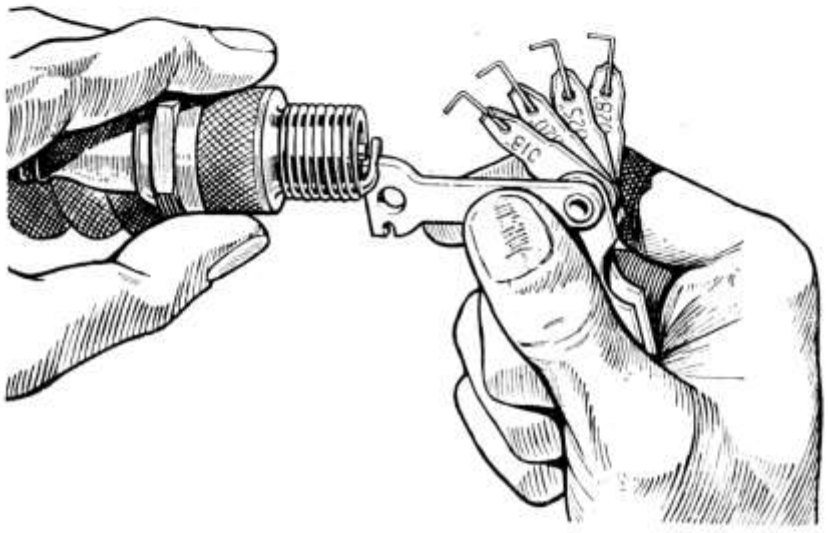
Above is shown a plug which has become fouled by a dry, fluffy black deposit and indicates faulty carburation or a defect in the ignition system.

Sparking Plugs

The full importance of periodic sparking plug inspection and cleaning cannot be too strongly stressed, as your sparking plugs play a vital part in the performance of your engine. We suggest that plugs be inspected and cleaned each time you have the engine oil changed, in order to maintain your Riley engine at the peak of its performance. The correct plugs are Champion NA8.

There is little to be gained by experimenting with different plugs, as those fitted as standard are best suited to the requirements of the engine and are the result of lengthy experience by the makers.

The gap between the points should be ·025 in. (·63 mm.). When adjusting the gap always move the side wire—never bend the centre wire.



Above.—The special setting tool with gap gauges obtainable from Champion sparking plug stockists.

Right.—The Champion NA8. sparking plug which is fitted as the standard plug on the 2½ litre Riley.

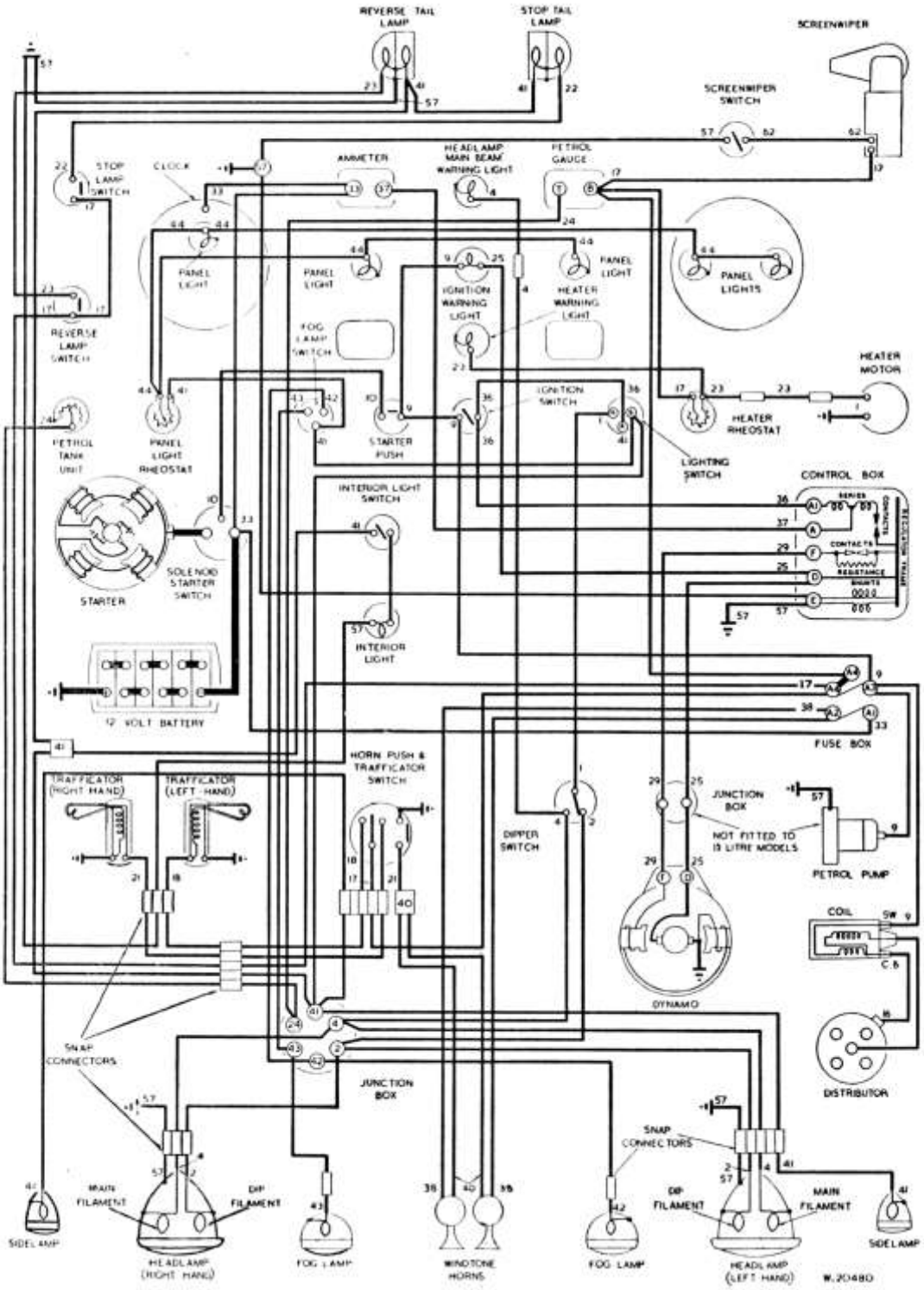
The Champion Sparking Plug Co. supply a special combination gauge and setting tool, the use of which is recommended.

To save petrol and ensure easy starting the plugs should be cleaned and tested at regular intervals of 3,000 miles or 5000 km., preferably by a garage with air blast equipment.

Every 12,000 miles or 20000 km. the plugs should be replaced by new ones to maintain engine efficiency. When refitting plugs make sure the copper washers are in good condition and screw the plug down by hand as far as possible before finally tightening down with a box spanner.

Take care not to damage the insulator.

WIRING DIAGRAM



KEY TO CABLE COLOURS

1 Blue	17 Green	33 Brown	49 Purple
2 Blue *with* Red	18 Green *with* Red	34 Brown *with* Red	50 Purple *with* Red
3 Blue *with* Yellow	19 Green *with* Yellow	35 Brown *with* Yellow	51 Purple *with* Yellow
4 Blue *with* White	20 Green *with* Blue	36 Brown *with* Blue	52 Purple *with* Blue
5 Blue *with* Green	21 Green *with* White	37 Brown *with* White	53 Purple *with* White
6 Blue *with* Purple	22 Green *with* Purple	38 Brown *with* Green	54 Purple *with* Green
7 Blue *with* Brown	23 Green *with* Brown	39 Brown *with* Purple	55 Purple *with* Brown
8 Blue *with* Black	24 Green *with* Black	40 Brown *with* Black	56 Purple *with* Black
9 White	25 Yellow	41 Red	57 Black
10 White *with* Red	26 Yellow *with* Red	42 Red *with* Yellow	58 Black *with* Red
11 White *with* Yellow	27 Yellow *with* Blue	43 Red *with* Blue	59 Black *with* Yellow
12 White *with* Blue	28 Yellow *with* White	44 Red *with* White	60 Black *with* Blue
13 White *with* Green	29 Yellow *with* Green	45 Red *with* Green	61 Black *with* White
14 White *with* Purple	30 Yellow *with* Purple	46 Red *with* Purple	62 Black *with* Green
15 White *with* Brown	31 Yellow *with* Brown	47 Red *with* Brown	63 Black *with* Purple
16 White *with* Black	32 Yellow *with* Black	48 Red *with* Black	64 Black *with* Brown

HOW TO LOCATE AND REMEDY COIL IGNITION TROUBLE

Symptoms	*Possible Causes*	*Remedy*
Engine will not fire.	Battery discharged. Starter will not turn engine and lamps do not give good light.	Start engine by hand. Battery should be recharged by running car for a long period during daytime. Alternatively, recharge from an independent electrical supply.
	Controls not set correctly for starting.	See that ignition is switched on, and everything is in order for starting.
	Test if coil sparks by removing lead from centre distributor terminal and holding it about $\frac{1}{8}$ in. (3 mm.) away from some metal part of the chassis while engine is turned over. If sparks jump gap regularly, the coil and distributor are functioning correctly.	Examine the sparking plugs, and if these are clean and the gap correct, the trouble is due to carburetter, petrol supply, etc.
	If the coil does not spark, the trouble may be due to any of the following causes. *Fault in low-tension wiring.* Indicated by (1) No ammeter reading when engine is slowly turned and ignition switch is on; or (2) No spark occurs between the contacts when quickly separated by the fingers when the ignition switch is on.	Examine all cables in ignition circuit and see that all connections are tight. See that battery terminals are secure.
	Dirty or pitted contacts.	Clean contacts with fine carborundum stone or fine emery cloth and afterwards with a cloth moistened with petrol.
	Contact breaker out of adjustment. Turn engine until contacts are fully opened and test gap with gauge.	Adjust gap to gauge.
Engine misfires.	Dirty or pitted contacts.	Clean contacts with fine carborundum stone or fine emery cloth and afterwards with a cloth moistened with petrol.
	Contact breaker out of adjustment. Turn engine until contacts are fully open and test gap with gauge.	Adjust gap to gauge.
	Remove each sparking plug in turn, rest it on the cylinder head, and observe whether a spark occurs at the points when the engine is turned. Irregular sparking may be due to dirty plugs or defective high-tension cables. If sparking is regular at all plugs, the trouble is probably due to engine defects.	Clean plugs and adjust the gaps to correct setting (·025 in. or ·63 mm.). Renew any lead if the insulation shows signs of deterioration or cracking. Examine carburetter, petrol supply, etc.

HOW TO LOCATE AND REMEDY LIGHTING TROUBLE

Symptoms	*Probable Fault*	*Remedy*
Lamps give insufficient illumination.	Battery discharged.	Charge battery either by a long period of daytime running or from independent electrical supply.
	Lamps out of alignment or bulbs incorrectly fitted.	Align lamps and fit bulbs correctly.
	Bulbs discoloured through use.	Fit new bulbs.
Lamps light when switched on but gradually fade out.	Battery discharged.	As above.
Brilliance varies with speed of car.	Battery discharged.	As above.
	Battery connection loose or broken.	Tighten connections or renew faulty cables.
Lights flicker.	Loose connection.	Locate loose connection and tighten.
Failure of lights.	Faulty cable or connection.	Examine wiring for faulty cable or connection and remedy.
	Battery discharged.	As above.
	Loose or broken connection.	Locate and tighten loose connection, or remake broken connection.

HOW TO LOCATE AND REMEDY TROUBLE WITH VOLTAGE CONTROL DYNAMO EQUIPMENT

Symptoms	*Possible Causes*	*Remedy*
Battery in low state of charge, shown by lack of power when starting. (Hydrometer readings less than 1·200.)	Dynamo not charging, indicated by ammeter not showing charge reading when running at about 20 m.p.h. (32 k.p.h.) with no lights in use. Due to :—	
	Broken or loose connection in dynamo circuit, or regulator not functioning correctly.	Examine charging and field circuits wiring. Tighten loose connection or renew broken lead. Particularly examine battery connections.
	Commutator greasy or dirty.	Clean with soft rag moistened with petrol.
	Dynamo giving low or intermittent output, indicated by ammeter giving low or intermittent reading when car is running steadily in top gear. Due to :—	
	Loose or broken connections in dynamo circuit.	Examine charging and field circuits wiring. Tighten loose connections or renew broken lead. Particularly examine battery connections.
	Brushes greasy or dirty.	Clean with soft rag moistened with petrol.
	Brushes worn, not fitted correctly.	Renew worn brushes. See that brushes "bed" correctly.
	Regulator not functioning correctly.	Have equipment examined by a Lucas Service Depot.
Battery over-charged, shown by burnt-out bulbs and very frequent need for "topping up."	Dynamo giving high output, indicated by ammeter giving high charge reading. Due to :—	
	Regulator not functioning correctly.	Return regulator to Lucas Service Depot for attention.

HOW TO LOCATE AND REMEDY STARTER MOTOR TROUBLE

Symptoms	*Possible Causes*	*Remedy*
Starter motor lacks power or fails to turn engine.	Stiff engine, indicated by inability to turn by hand.	Locate and remedy cause of stiffness.
	If engine can be turned by hand, then trouble may be due to :—	
	Battery discharged.	Start by hand. Charge battery either by a long period of daytime running or from independent electrical supply.
	Broken or loose connection in starter circuit.	See that connections to battery, starter and starter switch are tight, and that cables connecting these units are not damaged.
	Starter commutator or brushes dirty.	Clean.
	Brushes worn, not fitting correctly.	Renew worn brushes. See that brushes " bed " correctly.
	Starter pinion jammed in mesh with flywheel.	Rotate squared end of starter shaft with spanner to free.
Starter operates, but does not crank engine.	Pinion of starter drive does not engage with flywheel, due to dirt on screwed sleeve.	Clean sleeve with paraffin and add a few drops of thin machine oil.
Starter pinion will not disengage from flywheel when engine is running.	Starter pinion jammed in mesh with flywheel.	Rotate squared end of starter shaft with spanner to free.

Decarbonisation

The longest and most complicated operation likely to be undertaken by the average owner is that of decarbonisation. It must be stressed that the initial decarbonisation should take place after 3,000 miles or 5000 km. have been covered. Naturally the frequency of subsequent decarbonisations will be dependent upon the type of country in which the car is being used and the type of running upon which the car is employed. For example, if a car is being used for fast, long, main road runs, the intervals will be greater than if the car is being used in hilly country or exclusively for town work. In general, decarbonisation should take place at 6,000–8,000 miles or 10000–13000 km. One sure indication that a car needs decarbonising is when a marked falling off in power and a marked tendency to pinking is noted.

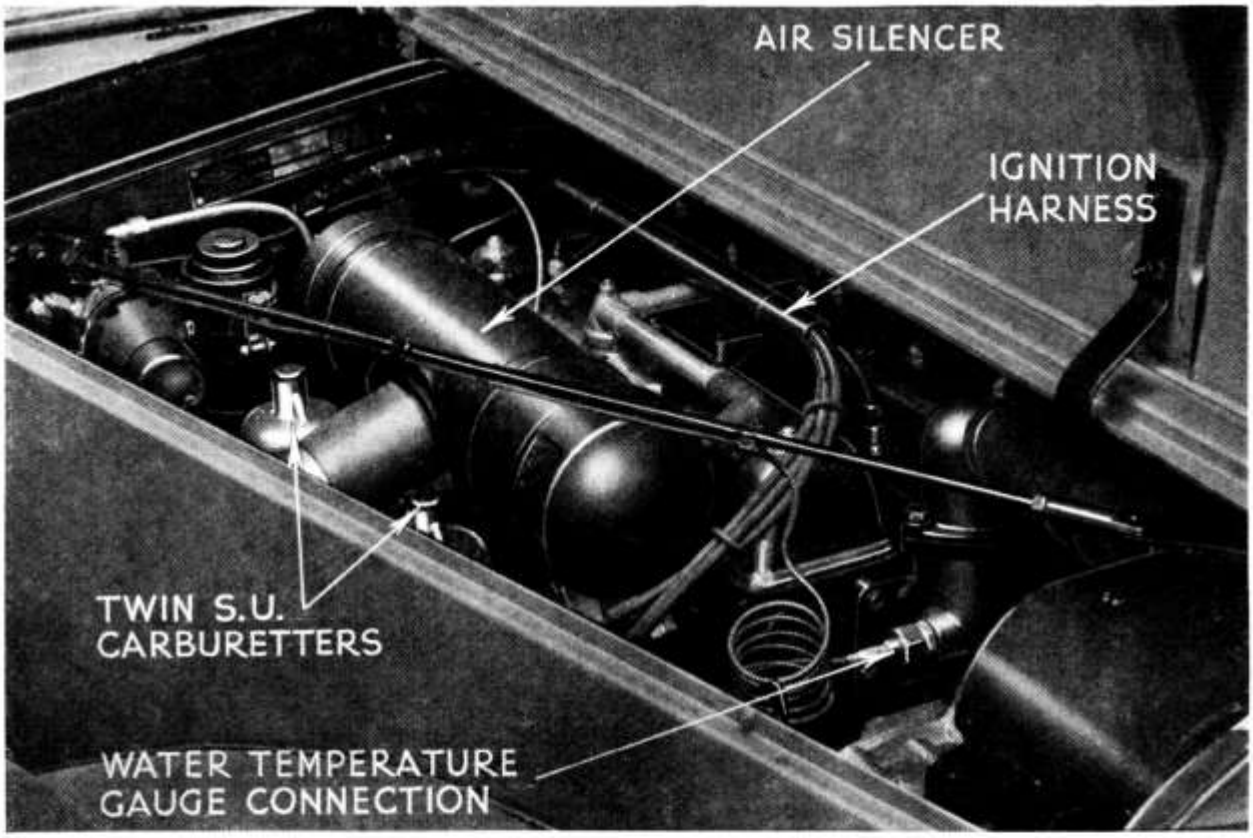
Before starting to decarbonise it is suggested that a large box or boxes be obtained in which to place the parts that are to be removed. It is a good plan to have two or three small boxes, such as tobacco tins, in which to place nuts, washers and other small parts which are liable to get lost. It is advisable to have a metal tray, such as a baking dish, in which to wash the various parts. It is also advisable to make sure that all tools are to hand, and that you have a good supply of clean cloth, some paraffin, all necessary gaskets and joints, and a clean stiff brush. Having obtained these necessary accessories, the sequence of operations is as follows :—

1. Remove the bonnet by slackening the two nuts attaching the bonnet centre panel to the radiator and removing the two attaching it to the scuttle.
2. Remove the bonnet sides by releasing the bolt at the front end and the two bolts attaching its attachment plate to the scuttle panel.
3. Remove the radiator steady rods after withdrawing their attachment bolts.
4. Drain the water from the radiator, cylinder block and hot-spot. (See page 62.)
5. With your brush, paraffin and rags, clean the cylinder head and its surrounding parts so that the unit is clean before work is started on the dismantling process.
6. Remove the air silencer and fume extractor pipe.
7. Remove the distributor head and ignition harness.
8. Detach the aluminium air intake casting between the two carburetters.

METHOD OF REMOVING THE BONNET

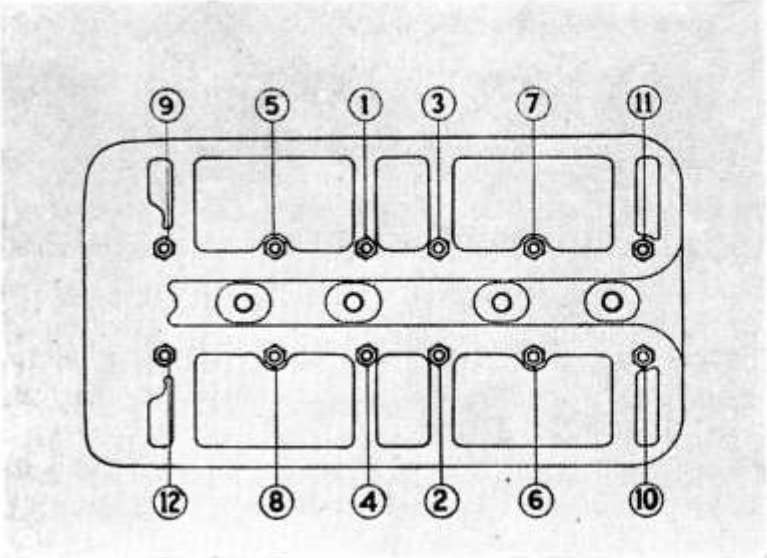
Below.—At the forward end of, and underneath, the centre panel are two nuts which require slackening off only. The panel is slotted at this point.

Below.—At the rear end of, and underneath, the centre panel are two nuts which must be removed prior to detaching the complete bonnet.



Off side of engine.

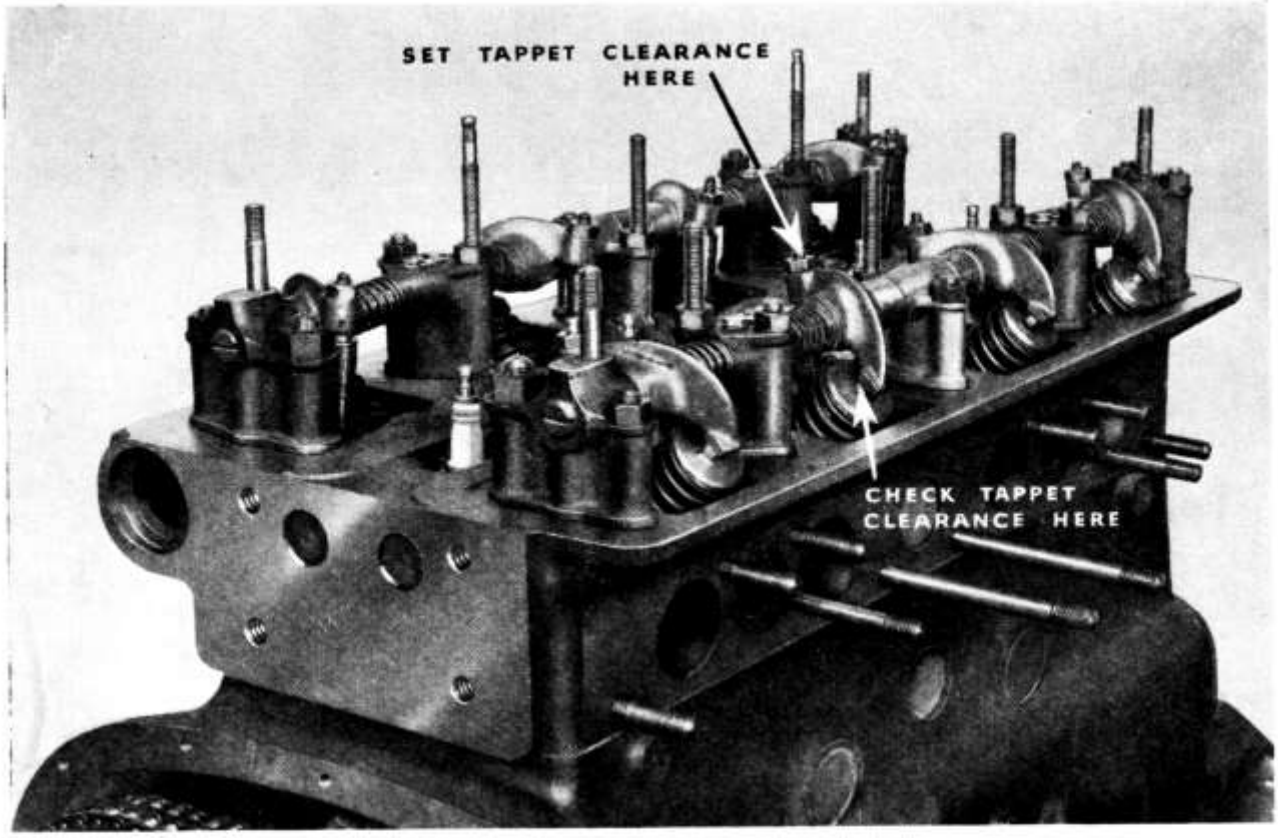
9. Detach the throttle control rod and also the slow-running cable from their attachment to the carburetters.
10. Disconnect the mixture control cable from the carburetter levers.
11. Disconnect the fuel line at the T-junction between the carburetters.
12. Remove the carburetters complete with their throttle intercoupling.
13. Remove the inlet manifold. Care should be taken at this point to note the rubber washers between the hot-spot and the cylinder head. These washers should be renewed each time the engine is decarbonised.
14. Disconnect the two water hose connections:
    (*a*) At the thermostat.
    (*b*) At the water pump.
15. Disconnect the water temperature capillary tube at its connection to the thermostat.



The tightening sequence for the cylinder holding-down nuts. It is important to tighten each nut a small amount at a time.

16. Remove the fan and dynamo driving belt. (See page 61.)
17. Disconnect the exhaust pipe at the manifold.
18. Remove the exhaust manifold and the cross-flow water pipe.
19. Remove both rocker covers.
20. Remove the sparking plugs.
21. Remove all push-rods by depressing each valve in turn with a lever and moving the rocker to one side. Mark the push-rods so that they can be replaced in their correct positions.
22. Remove the cylinder head holding-down nuts, care being taken to see that each nut is very slightly slackened off before complete removal of any individual nut.
23. Remove the cylinder head.
24. Remove the cylinder head gasket.

Note.—It is always a good plan to renew all gaskets and washers when decarbonising. If you decide to use the old washers make sure that they are in good condition, otherwise poor engine performance will result.



General view of cylinder head, showing valve gear.

Operations on the Cylinder Head

Having removed the cylinder head and placed it on the bench, it is necessary to remove the valves. These can be removed by various methods of improvisation, but the whole procedure will be simplified and be more satisfactory if a valve spring compressor be used.

When dealing with valves and springs it is essential that they be segregated and identified in sets so that they may be replaced in the positions from which they were removed.

Having extracted the valves, the stems should, if necessary, be cleaned with very fine emery cloth, an up-and-down motion along the stem being employed, with the emery cloth held between the finger and thumb.

Carbon should then be removed from the valve head with a knife or similar instrument, and then the head polished with emery cloth. Having cleaned the valves, the cylinder head should be dealt with in a similar manner.

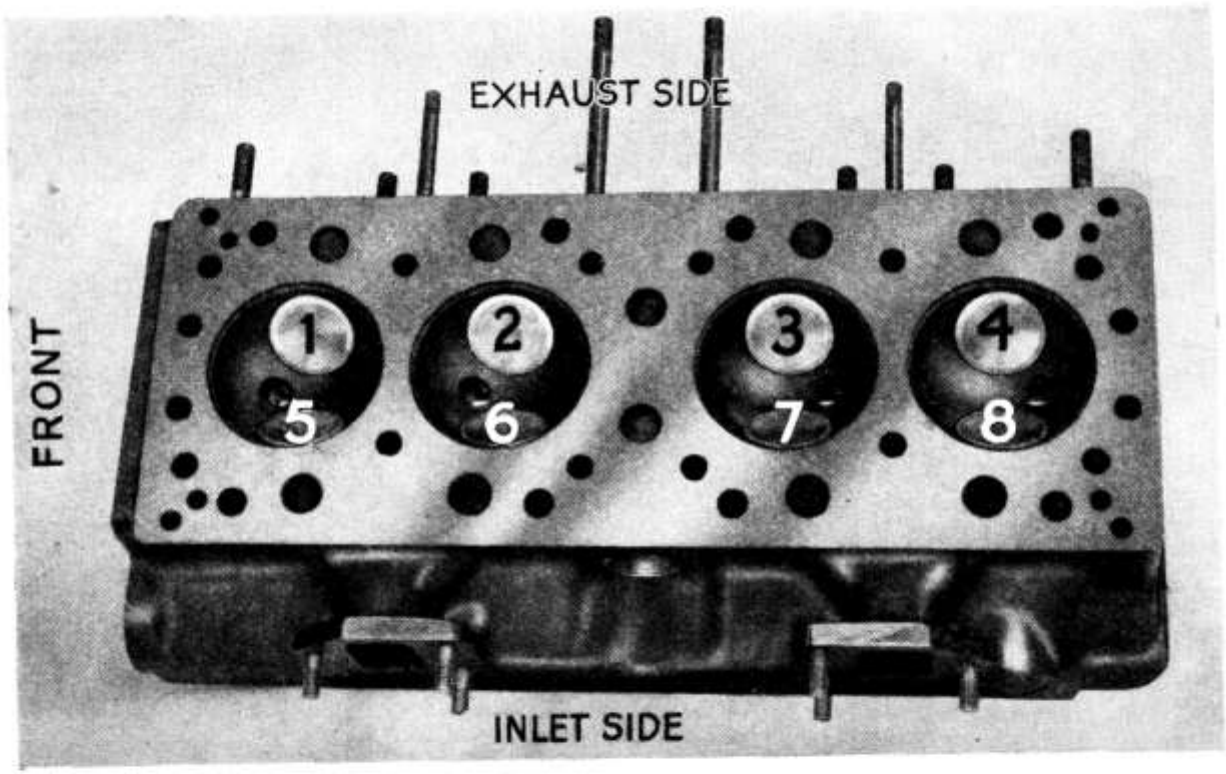
When cleaning the head make sure that you do not forget the exhaust and inlet passages.

With the head perfectly clean, the next thing to do is to grind in the valves, and for this a special suction tool may be obtained from most Dealers.

The object of grinding in the valves is to remove all surface imperfections in order to ensure a perfectly gas-tight joint between the valve and its seating. To achieve this it is necessary that a grinding paste be used ; this paste is obtainable in two grades, coarse and fine, but in general it should only be necessary to use the fine grade paste.

If the valves and seatings are badly pitted or distorted they should be replaced with a special refacing cutter to avoid unnecessary grinding away of the seating in the head.

The bevelled edge of the valve should be lightly smeared with paste, care being taken to see that none gets on the valve stem, and then the valve replaced in its guide.



Cylinder head, showing numbering of valves.

Next, the special suction tool should be fitted to the valve and the valve rotated back and forth—that is, with a reciprocating motion—meanwhile keeping a light pressure on the valve head.

The valve should be raised occasionally and moved into a different relative position, and the motion repeated. This procedure is to ensure perfect distribution of the grinding paste and so prevent the formation of grooves in the valve and its seating.

The valve should be ground until a continuous narrow ring, free of blemishes, is visible ; it is not necessary to obtain a broad seating.

After removing all traces of grinding compound, the valve should be assembled in the head, after a quantity of engine oil has been applied to the stem.

Should difficulty be experienced in keeping the valve collets in place whilst refitting, they may be smeared with grease or petroleum jelly to act as a retaining medium.

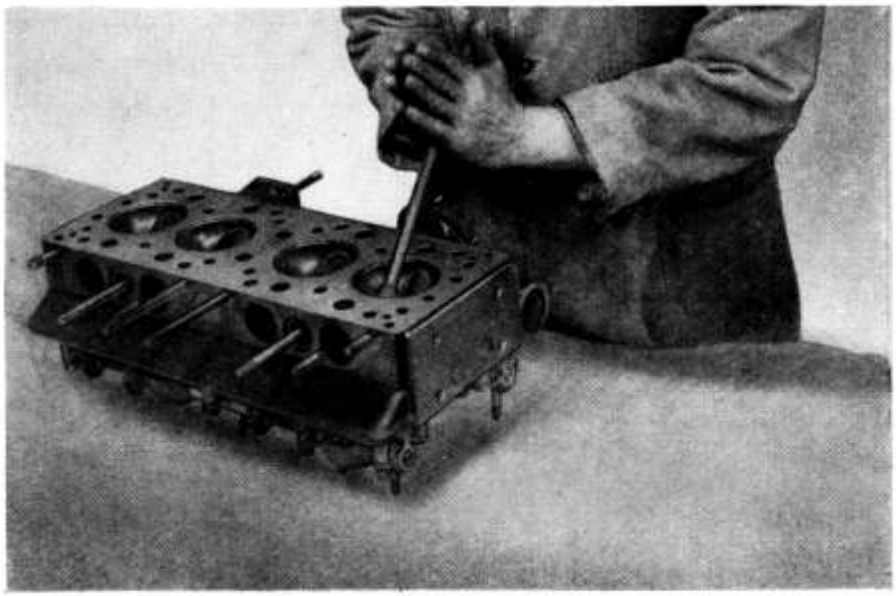
It should be noted that, to ensure a perfect seating, the exhaust valves generally need rather more grinding than the inlet valves.

Note.—The valve heads are numbered so that there may be no confusion as to their correct position in the head. (See page 59.)

After having finished with the cylinder head, attention should be directed to the piston crowns.

Turn the engine until any two of the pistons are at the top of their strokes, and then block up the remaining cylinders with clean cloth so that dirt and carbon do not find their way into the bores. Also seal the oil and water passages in the same way.

Do not on any account use a sharp tool to remove the carbon from the pistons, because this will cause deep scratches unless great care is taken. These scratches will cause carbon to adhere more readily and will render subsequent carbonising more rapid.



This photograph shows the method to be employed when grinding in the valves. The special tool used and the method of imparting a reciprocating motion to the valve should be noted.

The tops of the pistons should never be polished with emery cloth because of the danger of fine particles of emery finding their way between the piston and cylinder wall and causing unnecessary wear between piston and cylinder. When all pistons have been cleaned and all traces of loose carbon removed, a small amount of engine oil should be placed in each cylinder bore.

Having ascertained that the faces of the cylinder head and block are perfectly clean, also that the gasket is undamaged, the next operation is the refitting of the cylinder head.

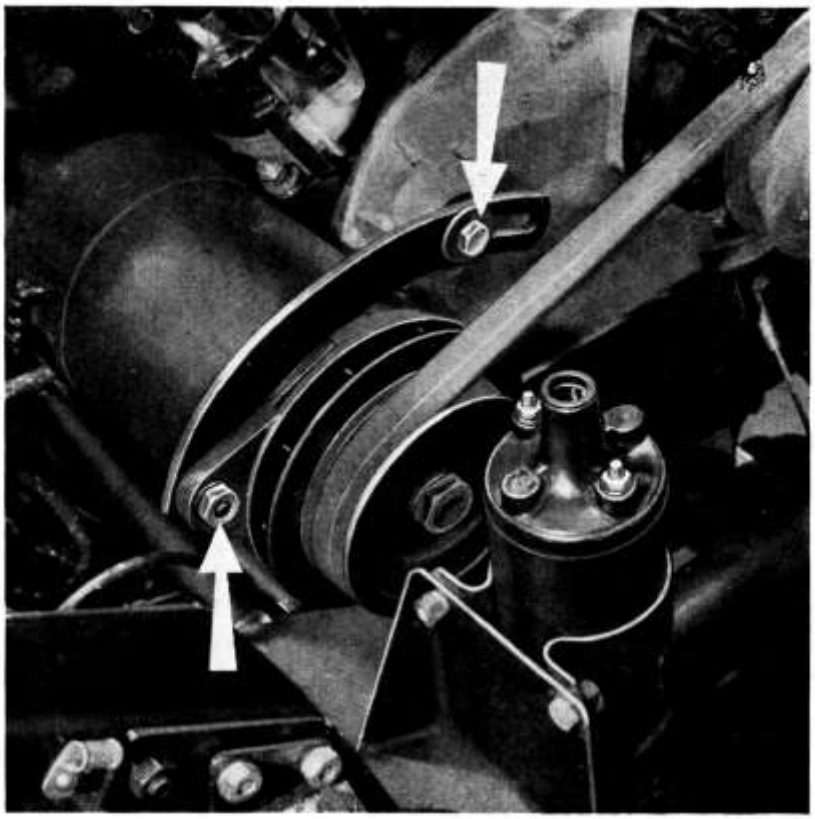
1. Make quite sure that you fit the cylinder head gasket correctly, otherwise vital water passages will be obstructed.
2. If any of the gaskets are damaged, renew them at once.
   The cylinder head should be replaced and securely tightened down, great care being taken to ensure that the nuts are tightened in the order shown in the diagram. As soon as the head has been tightened down, the sparking plugs should be replaced, otherwise foreign matter may find its way into the cylinder bores. Assembly is largely a reversal of the dismantling process.
   Make sure that the induction manifold gasket is perfectly clean, and lightly coat each face with jointing compound.

   Note.—Do not forget to fill the cooling system with the correct amount of water.

Naturally, as a result of grinding in the valves, the tappets will need setting. The procedure is to set them roughly with the engine cold and then start up the engine and run it until it has attained its normal working temperature. The tappets should then be set to their correct clearance, which is ·011 in. (·28 mm.) on the inlet and the exhaust valves.

After the car has run approximately 100 miles (160 km.), the rocker covers should be removed and a check made on the tightness of the cylinder head holding-down nuts; the tappets should be re-checked and, if necessary, reset. It is also worth while at this point to check the tightness of both the inlet and exhaust manifolds.

Dynamo Drive



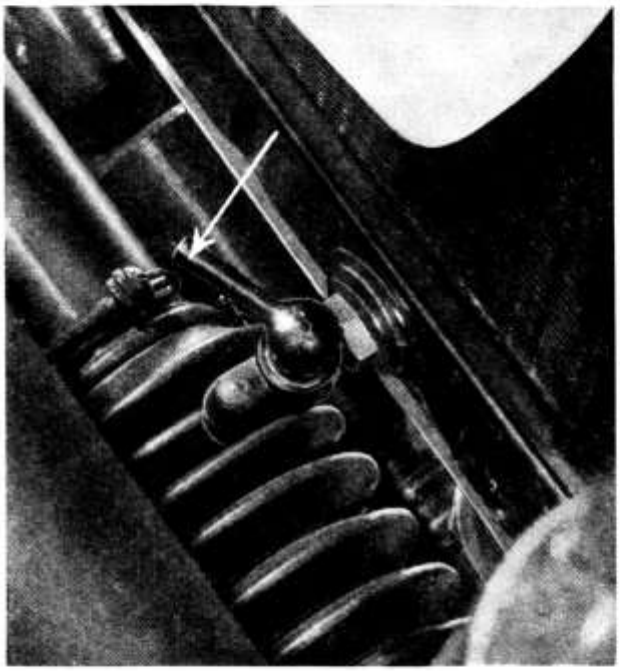
In order to remove the V-belt driving the dynamo the hexagon-headed screws indicated by the arrows, and the two bolts on which the dynamo pivots, should be slackened. This will allow the dynamo to move inwards giving easy removal of the V-belt, after the front engine steady cable has been disconnected.

Cooling System

Care of the cooling system is as important as care of all the other systems that make up your car.

The more common causes of trouble that are experienced are due to rust, corrosion and the formation of scale. This happens very slowly, and in time particles of foreign matter will adhere to the inside of the cylinder jackets, thereby preventing the proper transfer of heat from the engine to the cooling water. Occasionally small particles will break away and be carried along in the cooling water; this would not be dangerous but for the fact that they will clog the radiator tubes in which the passages are very small.

There are two methods of preventing this trouble. The first is to use rain-water. If this is not possible, tap-water, to which has been added a suitable rust inhibitor, should be used.



This is the radiator drain tap and is located on the right-hand side and at the bottom of the radiator block.

Here is shown the small drain tap fitted to the hot-spot on the induction system.

It should be noted that the filler cap for the radiator is under the bonnet, on the left-hand side of the car; the cap on the chromium-plated radiator shell is for ornament only. The system has three draining points located as follows :—

1. *Radiator Drain.* (This is located at the back of the radiator and on the right-hand side.)
2. *Cylinder Block Drain.* (This is located on the left-hand side of the engine, at the rear of the cylinder block.)
3. *Hot-spot Drain.* (This is located on the forward end of the balance pipe.)

Note.—The drain tap on the radiator does not allow the system to drain completely, due to the position of the water pump, and it is therefore essential that all three taps should be used. It is also essential to remove the radiator filler-cap to allow air to enter the system and thus allow the water to flow freely.

Cold Weather Precautions

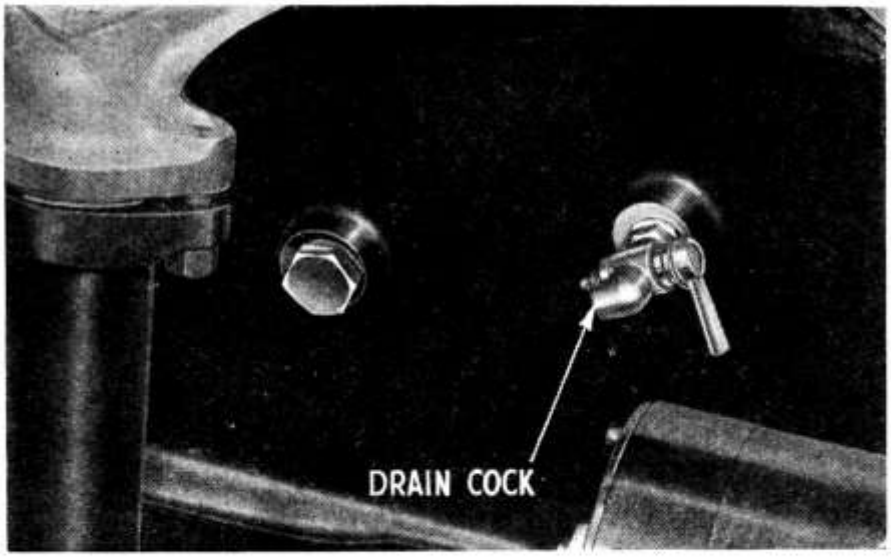
If the car is not stored in a warmed building, steps must be taken to prevent the cooling water from freezing during frosty weather. Water, upon freezing, expands,

with the result that there is a very considerable risk of bursting either the radiator or the cylinder block by the pressure generated. As a precautionary measure when frost is anticipated, the water should be drawn from the radiator and engine before the car is stored for the night, or, better still, an anti-freezing solution may be used in the radiator.

We recommend owners to use Smiths "Bluecol," Shell "Snowflake" or Filtrate "Nevafreze" non-erosive anti-freeze in order to protect the cooling system during frosty weather and reduce corrosion to a minimum.

The correct quantities of anti-freeze for different degrees of frost resistance are :—

Down to 7° *F.* (−14° *C.*)	*Down to* 0° *F.* (−18° *C.*)
15% solution	20% solution
Size 0+Size 1 (Bluecol)	Size 1A+1 (Bluecol)
Quantity : 3 pints (1·7 litres)	Quantity : 4 pints (2·27 litres)



The drain cock for the cylinder block is situated just above the forward end of the starter motor on the left-hand side of the car. It is fitted at an angle to allow the water to clear the starter when draining the system.

First decide what degree of frost protection is required before adding the anti-freeze to the radiator. If temperatures below 0° F. (−18° C.) are likely to be encountered, a mixture of at least 25% of anti-freeze must be used. Consult your local Dealer.

Before introducing anti-freeze mixture to the radiator it is advisable to clean out the cooling system thoroughly by swilling out the passages with a hose inserted in the filler cap, keeping the three drain taps open.

Only top up when the cooling system is at its normal running temperature, in order to avoid losing anti-freeze due to expansion.

Make sure that the cooling system is water-tight and examine all joints, replacing any defective rubber hose with new.

Air Conditioning System

The system consists basically of four units :—

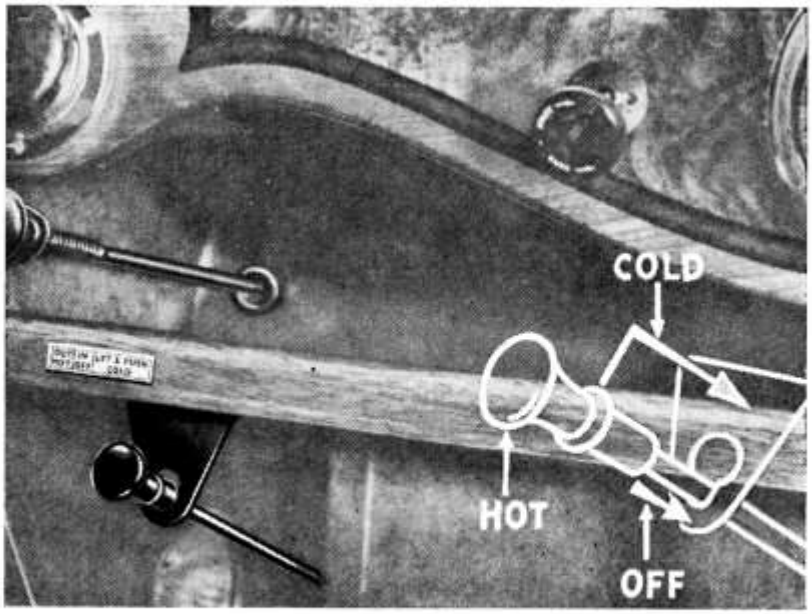
(*a*) The blower.
(*b*) The heater.
(*c*) The distributor.
(*d*) A demister.

The electrically driven blower is located between the radiator and the grille. This is most useful in hot weather, when the collection of cool and fresh air is of paramount importance.

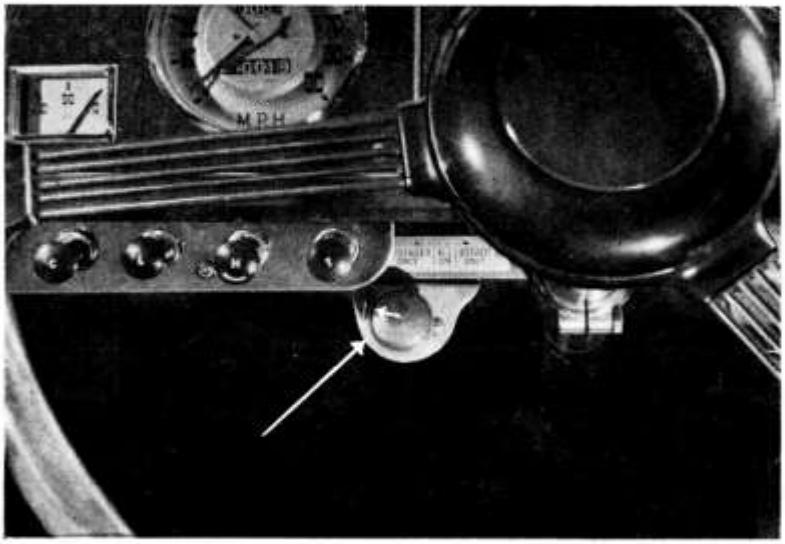
From the blower, air travels to the heater, which is fed with hot water from the main engine cooling system. The unit is secured to the engine bulkhead on the left-hand side and is fitted with a screw-down tap on the hot-water inlet. This tap may be closed in hot weather in order to isolate the heater unit.

Hot or cold air reaches the car interior via the distribution box, which is secured to the under side of the battery compartment.

Two controls are located inside the car. The one on the passenger's side is for controlling the admission of air. If the knob is pulled out, hot air enters ; if the knob is pushed forward, air flow ceases, whilst lifting the knob and pushing it still farther inwards allows cold air to enter the car at the various points mentioned in the following paragraph.



This knob controls the admission of air.



This is the selector control.

The second control is adjacent to the steering column and the central knob functions as a selector. With the knob turned fully counter-clockwise, all air is directed to the screen. Turning the control progressively clockwise gives air to the passenger only, to all positions and, finally, to the driver only.

On the control panel is the blower switch. When switched on, an amber light glows which serves the purpose of warning the driver that the motor is running.

Tracing Troubles

Engine Will Not Start

1. No petrol at carburetter. This may be due to one or several of the following causes :—
   (*a*) No petrol in tank.
   (*b*) Fuel pump damaged, leaking or not working.
   (*c*) An air lock in the fuel system.
   (*d*) Choked fuel line.
   (*e*) Choked filter.
2. Carburetter piston sticking.
3. Sparking plugs fouled with carbon or oiled up.
4. Sticking valves.
5. Damaged ignition leads. Look for :—
   (*a*) Cracks in the rubber casing.
   (*b*) Loose connection between coil and distributor.
   (*c*) Oil on the leads.
6. Contact breaker points dirty or loose, the remedy being :—
   (*a*) Clean with fine emery cloth.
   (*b*) Wash with petrol.
   (*c*) Reset to correct gap.
7. Defective coil, indicated by lack of sparking at the plugs.
8. Water or condensation on the plug leads.
9. Discharged battery.
10. Condensation on plugs.

Engine Misfires

1. High speeds only.
   (*a*) Sparking plugs fouled with carbon or oiled up.
   (*b*) Fuel shortage.
   (*c*) Sticking valves. If inlet, a spitting back through the carburetter will be noted ; if exhaust, detonation in the exhaust pipe and silencer will occur.
   (*d*) Contact breaker points loose or dirty.
   (*e*) Loose ignition leads.
   (*f*) Incorrect tappet clearances.
2. Low speeds only.
   (*a*) Tappet clearances incorrect.
   (*b*) Air leaks in the induction system.
   (*c*) Carburetter slow-running setting is incorrect.
   (*d*) Battery run down.
3. All speeds.
   (*a*) Plugs fouled with carbon or oiled up.
   (*b*) Tappet clearances incorrect.
   (*c*) Sticking valves.
   (*d*) Warped valve or valves.
   (*e*) Fuel shortage.
   (*f*) Loose ignition leads.
   (*g*) Contact breaker points loose or dirty.
   (*h*) Too rich a mixture (indicated by hunting).

Engine Runs Hot

1. Insufficient water in the cooling system.
2. Thermostat not operating.
3. Broken fan and dynamo belt. (Indicated by no charge).
4. Radiator blocked.
5. Mixture control maintained in rich position.
6. Incorrect lubrication.
7. Weak mixture setting.
8. Ignition incorrectly set.
9. Weak valve springs.
10. Pitted, worn or distorted valve seats.
11. Worn piston and/or piston rings.
12. Choked exhaust system.

Engine Lacks Power

1. Fouled sparking plugs.
2. Lack of oil.
3. Carburetter incorrectly set.
4. Tappet clearances either too great or too small.
5. Weak valve springs.
6. Sticking valves.
7. Brakes binding.
8. Worn piston and/or piston rings.
9. Excessive carbon deposit.
10. Pitted valve seats.
11. Punctured carburetter float.
12. Choked exhaust system.

Engine Stops Suddenly

1. Lack of fuel.
2. Ignition failure.
   (*a*) Broken lead at switch.
   (*b*) Broken lead from distributor to coil.
   (*c*) Failure of coil.
3. Choked jet.

Spitting Back in Carburetter

1. Weak mixture.
2. Sticking inlet valve or valves.
3. Air leaks in the induction system.
4. Inlet tappets set incorrectly.
5. Plug gaps set too wide.

Banging in Silencer

1. Sticking exhaust valve or valves.
2. Leak in exhaust system.
3. Incorrect mixture (too rich).
4. Throttles not fully shutting.

Lights Fail

1. Bulb or bulbs blown.
2. Fuse or fuses blown.
3. Loose battery lead.
4. Battery discharged.

Excessive Oil Consumption

1. High crankcase pressure, due to :—
   (*a*) Blocked breather.
   (*b*) Broken and/or worn piston rings.
   (*c*) Worn pistons.
2. Oil leaking.
3. Worn valve stems and/or guides.

Excessive Fuel Consumption

1. Fuel leaks at the various unions and at carburetters.
2. Damaged fuel pump.
3. Ignition set with insufficient advance.
4. Mixture control not returning to weak position.

Excessive Tyre Wear

1. Incorrect pressures.
2. Harsh driving methods.
3. Setting of front wheels and steering alignment incorrect.

Unusual Noises

Should you hear a noise of an unusual character it is only folly to run the car in the hope that this noise will cure itself. A noise or rattle generally indicates that something is broken or has become worn, and your car should be inspected at once by your Riley Dealer.

Maintenance Summary

After every 250 miles or 400 km. : Check oil level in engine sump, and top up if necessary (page 12).

After the first 500 miles or 800 km. : Drain oil from engine, gearbox and rear axle; refill with fresh oil (pages 12, 13 and 14).

Every 1,000 miles or 1600 km. : Apply grease gun filled with grease to Ref. D (page 72) to grease nipples at (*a*) the two universal joint grease points on the propeller shaft, (*b*) the sliding joint on the propeller shaft, (*c*) the grease point on the universal joint of the intermediate propeller shaft, (*d*) the four points on steering swivels, (*e*) the four points on steering track-rods (page 16), (*f*) one point on the clutch cross-shaft.

Inspect oil levels in gearbox and rear axle, and replenish if necessary (pages 13 and 14).

Apply grease gun filled with grease to Ref. C (page 72) to water pump grease nipple.

Top up battery with distilled water.

Every 3,000 miles or 5000 km. : Drain oil from engine and refill with fresh oil (page 12).

Apply a smear of grease or thin engine oil to distributor cam; apply thin engine oil or grease to contact breaker pivot; apply thin engine oil to automatic advance mechanism. Remove rotor arm and add a few drops of thin engine oil to Ref. F. (page 72) to screw exposed (do not remove screw).

Clean and re-oil the air cleaner.

Clean and test sparking plugs.

Unscrew dynamo lubricator, half-fill with grease to Ref. C and replace.

During the first 6,000 miles or 10000 km. : Check periodically the "Torsionic" front suspension (page 25).

Every 6,000 miles or 10000 km. : Fit new oil filter element (page 13); drain oil from gearbox and rear axle and refill with fresh oil; apply grease to front wheel hub grease caps (page 14).

Apply grease gun to greaser in centre of hand brake cable casing.

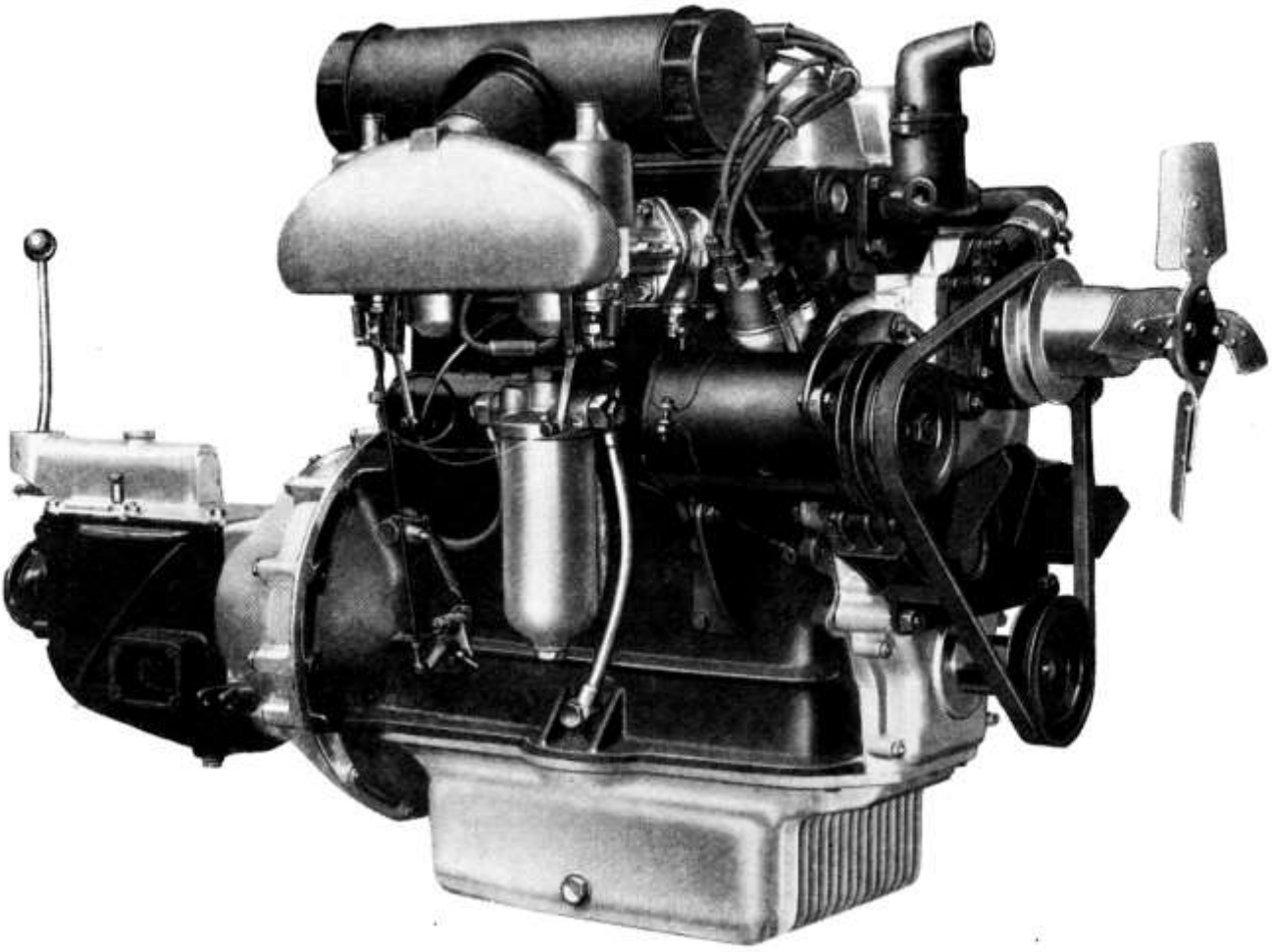
Lubricate Trafficators (page 16).

Every 12,000 miles or 20000 km. : Remove and clean out the engine sump (page 12); examine dynamo brushes (page 44); renew sparking plugs.

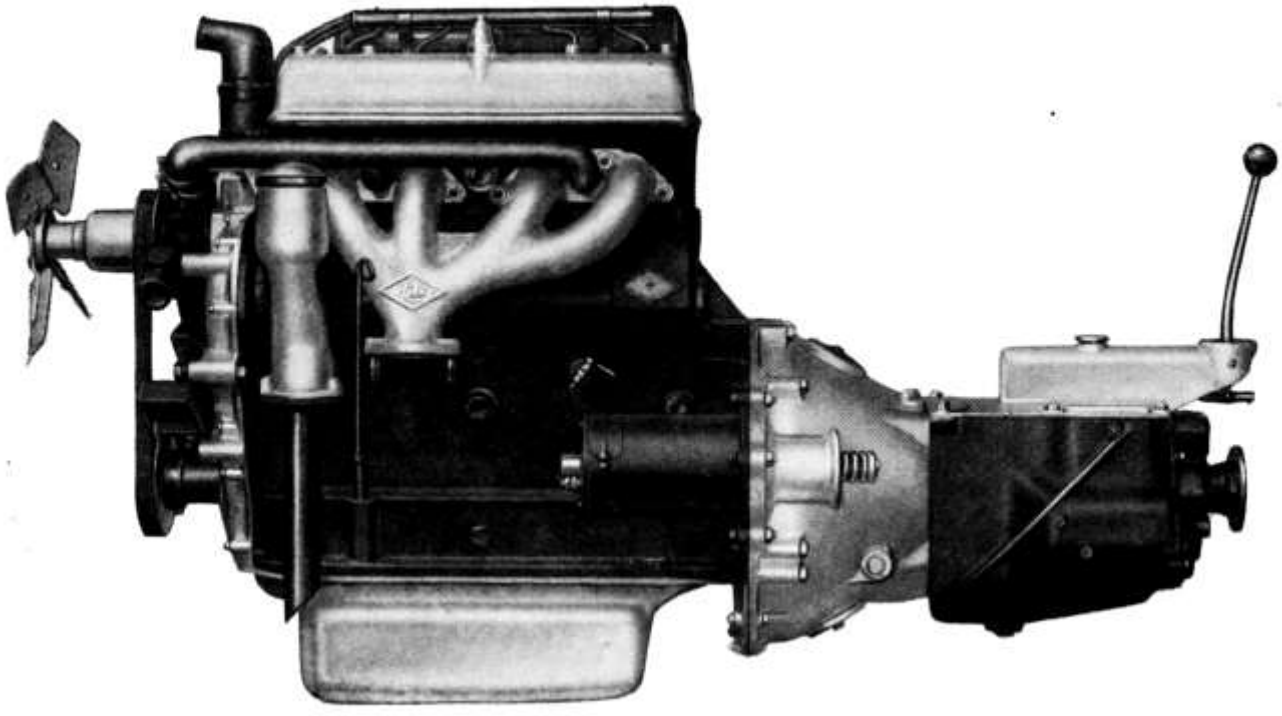
Every 30,000 miles or 50000 km. : Pack steering mechanism with grease (pages 27 and 28).

In addition to the above, oil and grease regularly the points indicated on page 17 **every 1,000 miles or 1600 km.**

The Engine



Right-hand side of engine.



Left-hand side of engine.

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Correct Postal Address

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Cables ... ... MOREX, OXFORD, ENGLAND
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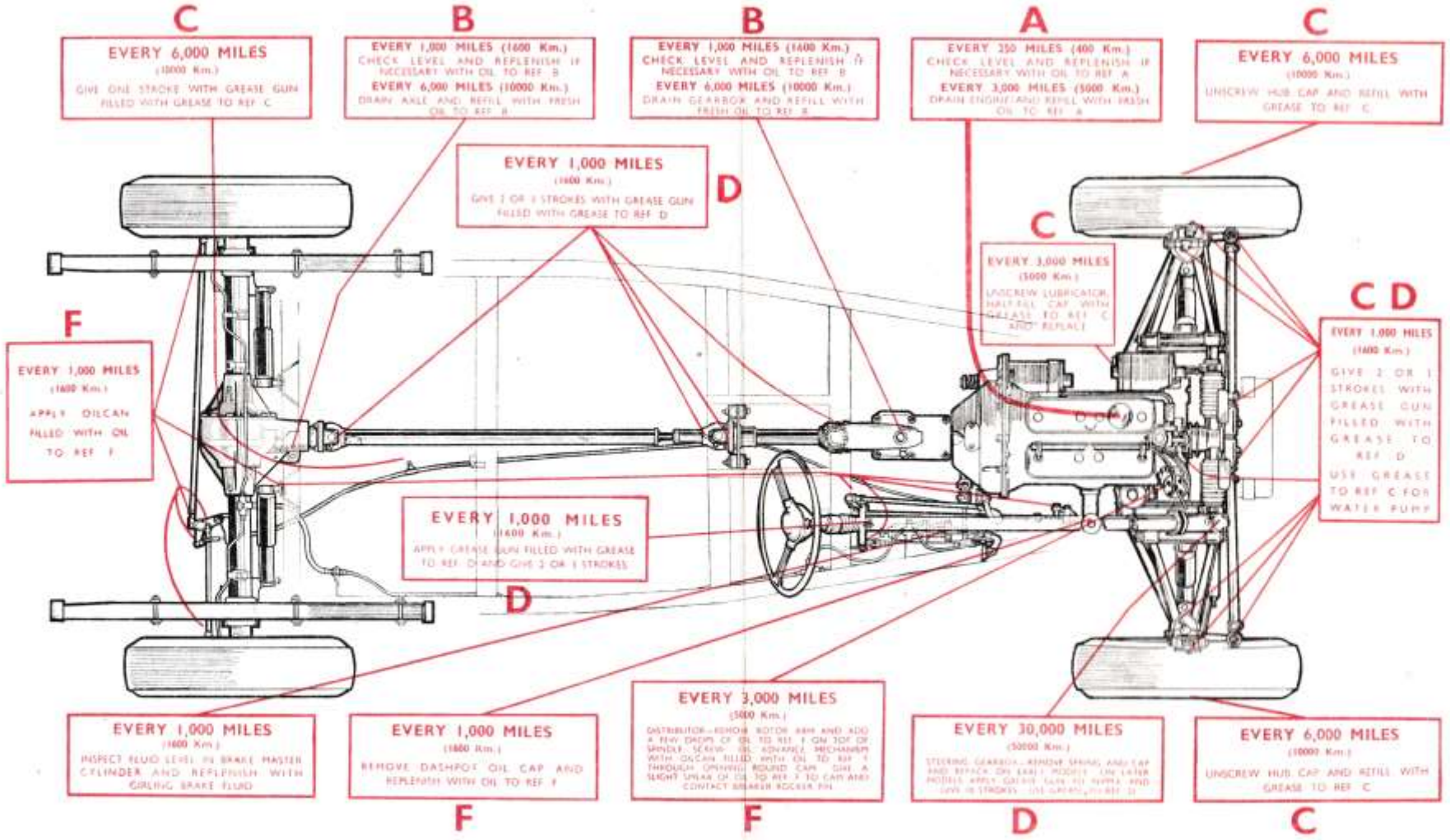
Key to Recommended Lubricants

EXPORT

Component	A			B		C	D	E	F
	Engine and Air Cleaner			Gearbox and Rear Axle (Hypoid Gears)		Wheel Hubs and Fan Bearings	Chassis Greasing Nipples, Steering Gearbox, etc.	Cables and Control Joints	Oilcan and Carburetter
Climatic Conditions	**Tropical and temperate down to 32° F. (0° C.)**	**Cold and extreme cold down to 0° F. (−18° C.)**	**Arctic below 0° F. (−18° C.)**	**Tropical and temperate down to 10° F. (−12° C.)**	**Extreme cold below 10° F. (−12° C.)**	**All conditions**	**All conditions**	**All conditions**	**All conditions**
"ESSOLUBE" (Esso Petroleum Co. Ltd.)	"Essolube" 30	"Essolube" 20	"Essolube" 10	"Esso" Expee Compound 90	"Esso" Expee Compound 80	"Esso" Bearing Grease	"Esso" Chassis Lubricant	"Esso" Chassis Lubricant	"Essolube" 20
"MOBILOIL" (Vacuum Oil Co. Ltd.)	Mobiloil "A"	Mobiloil "Arctic"	Mobiloil "Arctic" Special	Mobilube "G.X." 90	Mobilube "G.X." 80	Mobilgrease No. 5	Mobilgrease No. 2 or 4	Mobilgrease No. 2 or 4	Mobiloil "Arctic"
"ENERGOL" (Price's Lubricants Ltd.)	"Energol" Motor Oil S.A.E. 30	"Energol" Motor Oil S.A.E. 20	"Energol" Motor Oil S.A.E. 10	"Energol" Transmission E.P. S.A.E. 90	"Energol" Transmission E.P. S.A.E. 80	"Energrease" C.3	"Energrease" C.1	"Energrease" C.1	"Energol" Motor Oil S.A.E. 20
"SHELL" (Shell Mex & B.P. Ltd.)	"Shell" X—100 S.A.E. 30	"Shell" X—100 S.A.E. 20	"Shell" X—100 S.A.E. 10	"Shell" Spirax 90 E.P.	"Shell" Spirax 80 E.P.	"Shell" Retinax A	"Shell" Retinax A	"Shell" Retinax A	"Shell" X—100 S.A.E. 20
"FILTRATE" (Edward Joy & Sons Ltd.)	Medium "Filtrate"	Zero "Filtrate"	Sub-Zero "Filtrate"	E.P. "Filtrate" 90	E.P. "Filtrate" 80	"Filtrate" R.B. Grease	H.P. Solidified "Filtrate"	"Filtrate" A.F. Grease	Zero "Filtrate"
"STERNOL" (Sternol Ltd.)	"Sternol" W.W. 30	"Sternol" W.W. 20	"Sternol" W.W. 10	"Sternol" Ambroleum E.P. 90	"Sternol" Ambroleum E.P. 80	"Ambroline" R.B. Grease	"Ambroline" M.M. Grease	"Ambroline" A.F. Grease	"Sternol" W.W. 20
"DUCKHAM'S" (Alexander Duckham & Co. Ltd.)	Duckham's N.O L. "Thirty"	Duckham's N.O.L. "Twenty"	Duckham's N.O.L. "Ten"	Duckham's N.O.L. "E.P." Transmission 90	Duckham's N.O.L. "E.P." Transmission 80	Duckham's H.B.B. Grease	Duckham's H.P.G. Grease	Duckham's "Keenol" K.G. 16 Grease	Duckham's N.O L. "Twenty"
"CASTROL" (C. C. Wakefield & Co. Ltd.)	"Castrol" X.L.	"Castrolite"	"Castrol" Z	"Castrol" Hypoy	"Castrol" Hypoy 80	"Castrolease" Heavy	"Castrolease" Medium	"Castrolease" Brake Cable Grease	"Castrolite"

THE RILEY 2½ LITRE LUBRICATION CHART



Every 3,000 miles (5000 km.)—Overseas. Clean and re-oil engine air cleaner.
Every 3,000 miles (5000 km.). Clean oil filter element.
Every 6,000 miles (10000 km.). Fit new oil filter element.
Every 30,000 miles (50000 km.). Repack steering rack housing with grease to Ref. D.