

Considerable protection of consuming apparatus is afforded by the cartridge type field fuse in the dynamo field circuit, which will melt when the voltage is excessive, and save also the dynamo and cut-out from damage, but it will be understood that it is impossible to arrange this fuse to be a universally infallible protection without introducing the possibility of its failing in normal running.

In order to provide against such damage, when, for instance, the battery is removed or disconnected and the car is being run on the magneto, a notice is arranged on the battery box cover, and also on the dynamo, on which the following instructions appear :—

WARNING.

If battery disconnected, detach central (exciting) wire from dynamo, otherwise use of charging switch may cause serious damage.

The central wire is marked "C," and when disconnected should be secured under one of the thumb screws which hold the dynamo rear end cover in position. The dynamo and cut-out portion of the system is then inoperative should the switch be inadvertently moved to the charge position.

Battery Ignition. The battery ignition is in a very accessible position, as shown in Fig. 34, and consists of an ignition coil **W**, and combined low-tension contact breaker **X** and high-tension distributor **X1**.

A ballast resistance **Ri**, is connected in series with the low-tension winding of the coil. Its function is to limit the current taken by the coil at slow speed, or if the ignition switch be accidentally left on while the engine is stopped. It also secures practical equality of intensity of secondary spark at all speeds.

A condenser connected across the contact points is located in a pocket **X2** of this apparatus, the condenser case and the main body of the contact breaker unit being together in direct electrical connection with the chassis frame.

The insulated terminal of the condenser is connected to the insulated contact, and they are brought out together to the insulated terminal to which the external low-tension connection is made.

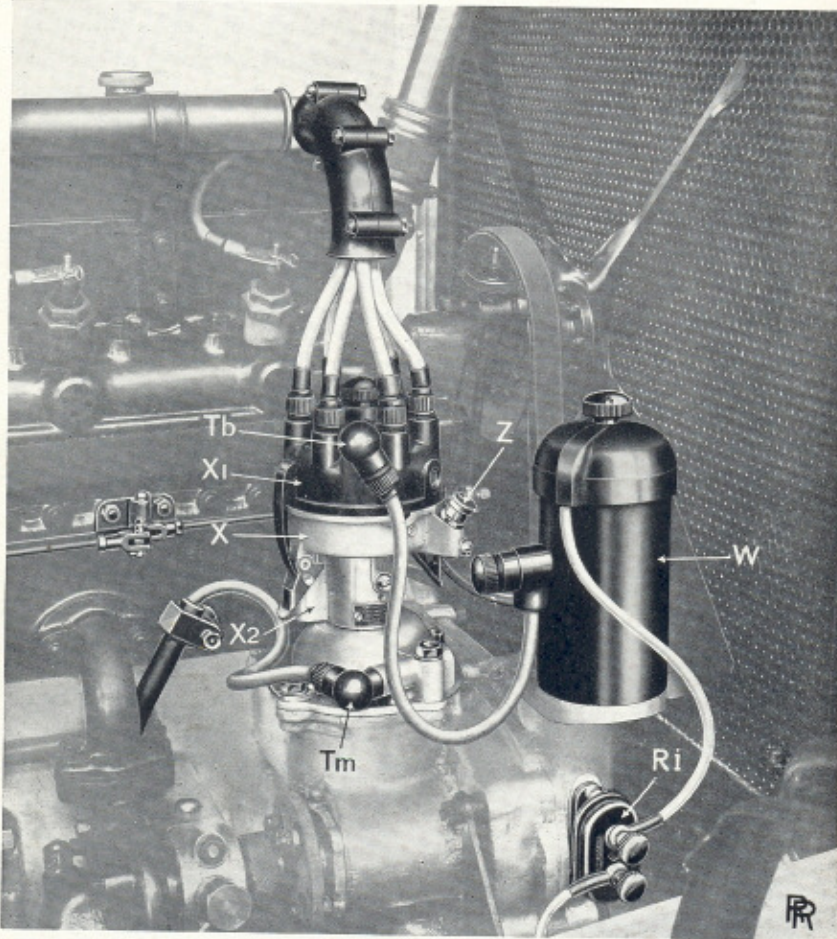


FIG. 34. IGNITION COIL, DISTRIBUTOR AND BALLAST RESISTANCE.

Every 5,000 miles, or half-year, as directed on page 132, it is advisable to clean the contacts by inserting the carborundum strip, supplied in the tool kit, between the points and withdrawing it, afterwards carefully removing every trace of grit. In setting the points, the gap opening should be $.017''$ to $.021''$.

The low-tension rocker arm should be removed and a little grease smeared on the pivot pin every 5,000 miles, as directed on page 131.

A few drops of engine oil should be injected into lubricator Z (Fig. 34) every 2,000 miles, as directed on page 129, in order to lubricate the centrifugal ignition timing mechanism. In addition, the oil so injected serves to maintain an oil seal arranged at the base of the ignition tower to protect the contacts from oily vapour from the crankcase, which is liable to cause pitting.

The high-tension distributor requires no attention beyond an occasional wiping of the interior with a clean, dry rag.

It is important that the outside of the coil casing should be kept clean. Also, the cover should occasionally be removed and the top of the coil cleaned with a dry rag. Misfiring is sometimes caused by an accumulation of dirt around the terminals and on the coil casing.

If the timing of the battery ignition should have been deranged, due, for instance, to removal of the cam operating the low-tension rocker, it can be re-set by reference to the flywheel markings which can be seen on removal of the clutch pit cover. ←

To carry out this operation the engine should be turned until No. 1 piston is approaching its firing stroke, when the letters B.A.I. (battery, advanced ignition) will be seen on the flywheel periphery. The flywheel should be set so that this B.A.I. mark registers with the mark on the casing.

Owing to the fact that a friction-damped spring drive is used for driving the valve gear and all auxiliaries, and that the starting handle operates to turn the crankshaft through the medium of this spring drive, it is important that the crankshaft be rotated for timing purposes from the *flywheel* end. Also, the starting handle should not have been used at all since the engine was last running.

With the ignition lever fully advanced, it is then necessary that the low-tension contacts should be just breaking, the high-tension distributor blade being meanwhile in a position which will bring it opposite No. 1 terminal of the distributor. A convenient method of determining precisely when the break takes place is by reference to the ammeter. With the ignition switched on, and someone watching the ammeter, the cam should be slowly rotated on the taper of its shaft in the normal direction of rotation until the required peak breaks con-

tact as indicated by the reading of the ammeter. The screw securing the cam should then be tightened.

Magneto Ignition. A special magneto (type R.W.1) is fitted as a stand-by, and is shown in Fig. 35. It is provided with oil-holes, and two or three drops of oil should be added occasionally when the magneto is in use. Excess of oil, however, must be carefully avoided, as it will interfere with the working. An oil-hole is also provided in the drive shaft, as shown at **G**, and a drop or two of oil should be inserted occasionally, when using the magneto, to lubricate the rear coupling.

A gauge for setting the contacts is provided on the magneto spanner.

The drive is carried by serrated couplings from the dynamo shaft, the forward coupling being quickly detachable by hand, in order to

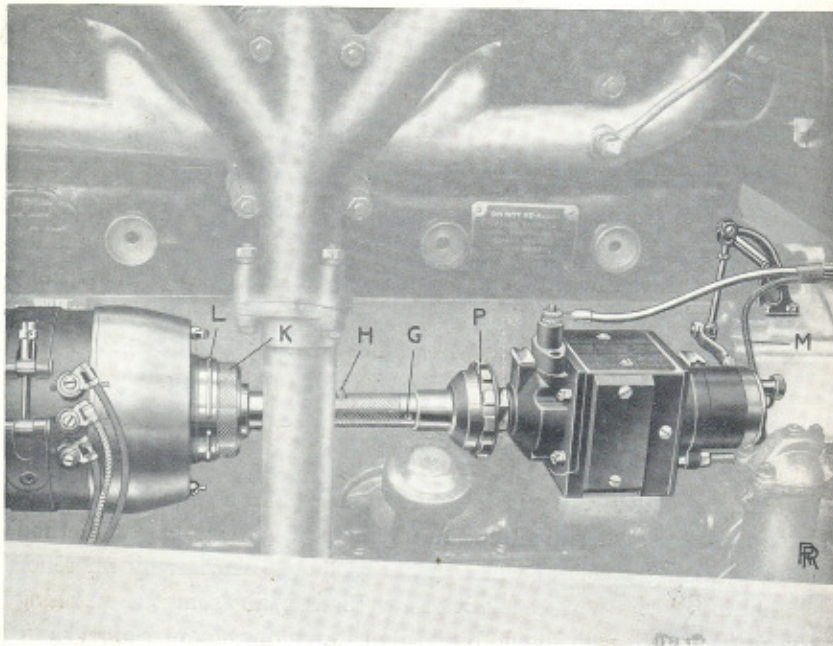


FIG. 35. MAGNETO.

avoid running the magneto save when it is required for ignition purposes. A tooth is omitted from this coupling, and the shaft is pressed forward by an internal spring, the coupling being normally held out of engagement by means of a catch shown at **H** in Fig. 35. The catch is released by pressing it inwards, when the shaft should be turned by hand until the serrated coupling is felt to be in engagement. The omitted tooth ensures that the timing is correct.

No high-tension distributor is provided on the magneto. It is arranged to deliver two high-tension sparks per revolution, and a single high-tension lead conveys these to the battery ignition distributor. The lead is fitted with a terminal which is interchangeable with that of the lead from the coil, and is normally carried in a holder on the ignition tower, as shown at **Tm** in Fig. 34. Thus, to put the magneto into service it is only necessary to engage the drive coupling as described, and change over these two high-tension terminals. It must be remembered that the magneto ignition is provided, not as an alternative ignition, but as a stand-by, to ensure reliability. The characteristics of its application to the engine are not such as will give as good power performance as the battery ignition, and this must not be expected. Usually, therefore, the magneto will only be used when there is no battery connected to the system, in which case, as elsewhere explained, there will be no supply of current. Should, however, circumstances call for use of the magneto in spite of the presence of the battery, it is then important to remove ignition fuse No. 3 from the distribution box and so independently cut off the supply that would otherwise go to the battery ignition in the on position of the switch. A dummy fuse holder is provided in the distribution box cover, as shown at **Y**, in Fig. 33, for the reception of fuse No. 3 when this is removed from its working position.

The magneto coupling should not be left in engagement when the battery ignition is being utilised. It is easily disengaged by pulling the shaft rearwards by hand until the catch is felt to be holding it against the pressure of the internal spring. It will then be possible to turn the shaft freely.

Should it become necessary to remove the magneto from the engine at any time, this should be done without disturbing the rear drive

coupling, which would necessitate re-timing of the magneto. The forward coupling is easily demountable by unscrewing the knurled cover **K** (Fig. 35), but before doing this, catch **H** should be depressed to clear the cover. The spring locking ring **L** should then be removed and the cover unscrewed (right-hand thread). The magneto is held on its bracket by two set-screws, and after removing these, detaching the earth wire **M**, and disconnecting the control mechanism, the magneto, complete with its shaft, can be removed.

Firing Order of Cylinders. The firing order of the engine is 1, 4, 2, 6, 3, 5, No. 1 being the front cylinder.

Spark Plugs. The spark plugs should be removed and cleaned every 5,000 miles, and the width of the gaps, checked as directed on page 132. These should be .020".

Electric Horn. Either a high-frequency horn or a Klaxon horn is fitted.

If the high-frequency horn is supplied, this is located beneath the front apron. No attention is necessary other than a slight readjustment of the tone, which may alter a little as the contacts wear.

This adjustment is effected by turning the small slotted screw at the back of the horn casing.

An instruction pamphlet concerning the care and adjustment of the Klaxon horn is inserted at the end of this handbook.

Electric Fuel Gauge. On certain chassis an electric fuel gauge is fitted. A pamphlet concerning this gauge is inserted at the end of this handbook.

Addition of Electrical Apparatus. If current consuming apparatus be fitted additional to that provided on the car, this must on no account be connected to the system at one of the terminals of the ammeter.

Under such circumstances the new apparatus and additional wires are only protected by the comparatively heavy emergency fuse, consequently a short-circuit on the new system is likely to burn out the wiring and expose the whole car to the risk of fire.

On certain chassis a small accessory distribution box is provided on the rear of the dashboard adjacent to the steering column. All added electrical apparatus, such as a screen wiper, cigar lighter, etc., should be connected thereto, the other terminal of the apparatus being earthed to the chassis at any convenient point.

On chassis not having this accessory box, the only point at which any new apparatus should be connected is the No. 7 terminal, either that in the switchbox or in the distribution box, whichever may be more convenient.

When connected as described above, the additional apparatus is protected by the No. 6 fuse.

Starter Motor. The starter motor is shown at **A** in Fig. 36. The Bijur pinion engages with teeth on the engine flywheel in the usual manner, the gearing being totally enclosed, and giving a reduction ratio between motor armature and engine crankshaft of 8.4 : 1.

The motor bearings, like those of the dynamo, require little attention. When the chassis is overhauled, however, or the starter motor removed, they should be cleaned out and re-greased with only sufficient grease to occupy the spaces between balls and cage. Excess of grease may lead to trouble with the brush gear.

There is provision for additional lubrication at the driving end, in the form of a small oil cup (**B**, Fig. 36). Oil every 2,000 miles, as directed on page 129.

Every 5,000 miles, or half-year, as directed on page 132, the motor end cover should be removed, exposing the commutator and brushes. Deposits of brush dust should be suitably removed.

Should faulty running of the motor develop which is not traceable to the battery, it is possibly due to faulty contact of the brushes on the commutator, which may in turn be due to want of freedom of the brushes in their holders. Such want of freedom may result from bearing grease having found its way to the brush holder.

Ordinarily, the brushes will last a very long time. In the event, however, of replacements becoming necessary, application should be made to Rolls-Royce Ltd.

The fitting of new brushes requires expert knowledge and care. Consequently the work should be done by Rolls-Royce Ltd. Emphasis is laid on this point, as cases have arisen of faulty operation of the motor due to inexperienced fitting of brushes.

When replacing the starter motor in the chassis, it is important to be sure that clean and sound electrical connection of cable to motor is re-obtained, owing to the heavy current which this has to carry. This also applies to electrical connection of the motor carcase to the crankcase.

The starter should never be used unless the ignition advance lever has been fully retarded on its quadrant.

Starter Motor Switch. On some chassis this switch is as shown at **F** (Fig. 36). It is situated on the left rear engine foot.

Its working contacts are oil-immersed, and it is foot-operated. The switch should be kept full of ordinary engine oil, a plug, **D**, being provided for filling purposes.

A spring-loaded ball, **C**, on the top of the switch permits lubrication of the control lever. Oil every 2,000 miles, when lubricating the control mechanism as directed on page 129.

In order to avoid burning or sticking of the switch contacts the operating pedal must always be *fully* depressed when starting the engine.

On other chassis, the starter switch is mounted on the front of the dashboard and is relay-operated.

Closing of the push-button switch on the instrument board energises an electro-magnet which closes the main contacts.

In order to protect the main copper contacts from damage due to sparking, auxiliary carbon contacts are provided to take the break. These make contact first and break last.

No attention should be necessary to the relay-operated switch between general overhauls of the chassis.

Use of Starter Motor. Careless use of the starter will reduce the life of the battery, whereas careful use will make very little difference to that life. That is to say, the heavy motor current is not detrimental to a healthy, charged

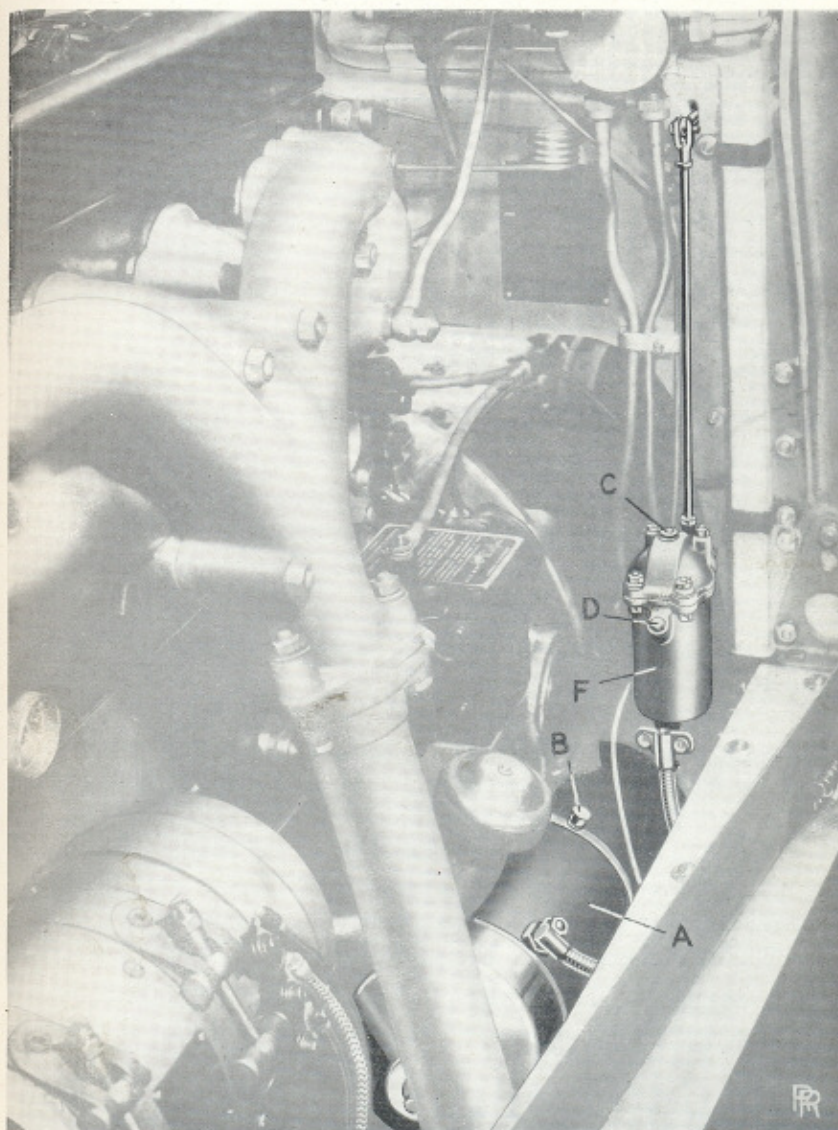


FIG. 36. STARTER MOTOR AND SWITCH.

battery—it only becomes detrimental to a cell which for any reason is low in charge, density or voltage. Several dozen starts may be made on a fully-charged healthy battery without detriment. On the contrary, it is very important, if the engine does not start reasonably quickly, to look for the cause rather than continue to use up the battery output, with the risk of damage to one or more cells, remembering that the battery may not always be fully charged at the time.

If the starter appears to be sluggish in its action, and such sluggishness is traceable to the battery, no further attempt should be made to use the starter until the battery has been duly inspected and fully charged in accordance with subsequent recommendations.

Battery Discharge. Care should be taken to avoid an inadvertent discharge of the battery.

Such a discharge may occur if there is an earth in the wiring system, or if the ignition switch be left on in error and the tungsten contacts of the make-and-break happen to be left on contact.

Always, when taking leave of the car, make a practice of checking that the ammeter does not show any discharge current, and that all switches are off.

Charging in Garage from External Source. It is possible to charge the battery in position on the car, making use of a flexible lead and two-pin plug, which fits the socket in the switch-box. The other ends of the flexible lead must be connected to the charging board terminals in such a way that the chassis ammeter indicates charge when the current is switched on. The chassis charging switch should be left off.

Be certain that the direction of current is correct. In the absence of experience, or in any uncertainty, an electrical expert should be consulted.

Where it is a frequent occurrence for the car to be parked for long periods in the dark, small consumption side lamp bulbs should be used, i.e., BAS. 10, 12/14 volt, 6 watts, or preferably bulbs of 4 watts only.

In the event of the battery becoming completely discharged due to a circuit having been left on by accident, it would be advisable to charge the battery from an external source before using the car.

Where a suitable direct current supply is available we recommend that it be made a rule to leave the battery on charge at trickle rate (about half an ampère) when the car is in the garage for any long period of time, as such a procedure will assist in keeping the battery in a thoroughly good condition. If the supply be alternating, a small capacity combined transformer and metal rectifier unit is especially suitable for this purpose. Care should be taken that the charging circuit be electrically sound and properly protected by a fuse.

(For full instructions concerning charging of the battery from a power source either on or off the car, refer to battery makers' pamphlet inserted at the end of this book.)

Electrical Fault Location. An electric torch hand-lamp should be carried when much night running is being done, in addition to an inspection lamp with a plug which may be connected to the switchbox.

In case of faulty operation, proceed to investigate as follows:—

- (1) Failure of any part of the system separately may be due to a blown fuse in the distribution box.
- (2) Failure or incorrect operation (see under Battery and Connections, page 102) of the system may be due to the fusing of the emergency battery fuse (V, Fig. 33), due to an earth.

Repeated failure of a properly fitted fuse indicates a fault on the system.

If dynamo does not charge, this may be due to:—

- (1) Brushes sticking, due probably to oiliness. Clean brushes and holders with rag moistened with petrol.
- (2) Melting of dynamo armature or dynamo field fuse, which latter may be due to:—
 - (a) Dirty cut-out contacts, which clean.
 - (b) Discontinuity or bad contact in dynamo battery circuit. See that lights are in order and examine battery terminal connections.
 - (c) Sticking dynamo negative brushes.

If, with the fuses intact, and the lights in order, the ignition :—

(a) Misses.

- (1) First confirm right condition of sparking plugs.
- (2) Assure correct condition of contact breaker points, and adjust gap .017" to .021", if necessary.
- (3) If missing still continues, test ignition circuit as below.
- (4) Dirty ignition coil casing. (See page 105.)

(b) Fails.

- (1) With battery ignition switched on, see by ammeter, while engine is cranked, that coil is taking current intermittently. If no current, test with pocket voltmeter (to frame) availability of battery voltage on ballast resistance terminals then at coil terminals.
- (2) Fault may be due to defective fuel gauge.

If, with battery in order, starter motor is sluggish or does not turn, examine commutator and brushes. Clean oily brushes and holders with a rag moistened with petrol. If motor turns without turning engine, examine Bijur drive.

If battery will not retain charge :—

- (1) Ascertain that no circuit is left switched on.
- (2) See that no cell of the battery leaks acid.

(For further notes concerning the battery, see battery makers' instruction pamphlet at the end of this book.)

Recommended Lamp Bulbs.

Head lamps—12/14 v., 36 w. gasfilled, centre contact S.B.C. cap, BAS. 4 S. (Osram No. S.7012).

Side, Tail and Instrument Board lamps—12/14 v., 4 w. vacuum, centre contact, S.B.C. cap (Osram No. S.7126).

Inspection lamp—12/14 v., 6 w. vacuum, double contact, S.B.C. cap, BAS. 10.D. (Osram No. S.7168).

Body lamp—12/14 v., 9 w. half opal, vacuum, double contact S.B.C. cap ; or 12/14 v., 6 w. festoon, vacuum (Osram No. S.7282).

INSTRUCTIONS
FOR
RUNNING AND MAINTENANCE

SECTION I.

Starting the Engine and Driving the Car.

Starting the Engine—Fuel Feed—Fuel Gauge—Running the Car—Gear Changing—Use of Charging Switch—Ignition Switch—Use of Magneto—Automatic Control of Radiator Shutters—Overheating—Slow Running—Water Level in Radiator—Frost—Use of the Brakes—Fitting of Chains.

The power unit consists of a six-cylinder engine, not overstressed as regards its power output, and therefore having a reasonable compression, ensuring freedom from pre-ignition troubles and giving a long period of running without decarbonising becoming necessary.

The sparking plugs have been placed in the cylinder head in such a position as to give the maximum advantage from the point of view of ignition, and be free from oiling up and detonating troubles. Rolls-Royce Ltd. have designed and manufactured a special battery ignition, which incorporates an automatic advance, and is so distinctly advantageous over ordinary magneto ignition as to have led them to adopt it as standard in preference to a magneto.

A magneto is provided, however, but it is intended for use solely as a stand-by in case of failure of the battery ignition system. Such a failure is found to be very rare and confined to failure of the battery itself due, probably, to neglect of the battery makers' instructions, or to careless use in tropical climates. These instructions will be found at the end of this book.

It is not possible to use both battery and magneto ignition systems simultaneously, and no attempt must be made to do this. The magneto ignition can be brought into service only by releasing the catch which normally holds its drive coupling out of engagement, replacing the battery high-tension lead with that from the magneto,

and removing the battery ignition fuse marked No. 3 from the distribution box, as more fully described later in this section.

In order to facilitate starting the engine from cold and to enable the car to be run almost immediately afterwards, a small high velocity jet carburetter is provided for starting purposes only, which, in combination with a hot-spot on the induction system to vaporise the mixture by exhaust heat, results in the car being available for service very quickly after starting up, even in the coldest weather.

Starting the Engine. To start the engine, first check that the change gear lever is in neutral, the hand brake lever on, and the fuel turned on. Then switch on the ignition by moving the right-hand thumb lever on the switchbox to position marked **I** (Ignition); fully retard the ignition and close the throttle by bringing both the levers on the steering column to their bottom positions; next open the starting carburetter by turning the lever on the instrument board to the position marked **On**, and set the mixture control lever over to **Strong**. Now depress the starter switch; this closes the main switch between battery and starter motor, and the latter will start up the engine. As soon as the engine commences to run regularly, move the throttle control lever on the steering column about half-way up its quadrant and turn back the starting carburetter control lever to the position marked **Off**. (On certain chassis a spring is provided in the control mechanism to ensure that the starting carburetter shall not be left on inadvertently.)

When starting the engine for the first time in the day it is a good plan to form the habit of depressing the chassis oil pump pedal lever *twice* at this stage. Subsequently it should be depressed *once* every 100 miles.

The starting carburetter should not be used for more than half a minute before changing over to the main carburetter, and it should only be used when the engine is cold.

Excessive use may lead to failure of the cylinder lubrication owing to dilution of the oil by petrol.

When the engine has warmed slightly the mixture control should be set half-way between **Strong** and **Weak**.

A starting handle is carried in the tool kit. In the event of it being used, it should be removed from the bracket and returned to the tool kit, otherwise it may drop out and become lost.

Difficult starting may be due to dampness in the H.T. distributor caused by condensation. The distributor should be removed under such circumstances and wiped out with a clean dry rag. The rotor should also be wiped dry. This trouble is only likely to arise when the car has been standing. The warmth of the engine will prevent such condensation normally.

It will be noticed that while the working pressure indicated on the oil gauge is only 15 to 20 lbs. when the engine is thoroughly warmed up, the gauge will show a considerably higher reading with the engine cold, due to the greater viscosity of the oil at low temperatures. The pressure will, however, fall to normal as soon as the oil becomes warmer.

Fuel Feed. The fuel feed is arranged on the system by which the vacuum induced in the inlet pipe of the engine raises fuel from the main tank situated at the back of the car to a small service tank on the engine side of the dash, whence it flows by gravity to the carburetter float chamber.

A cork-seated two-way tap operated by means of a thumb lever on the driver's side of the dashboard controls the reserve supply, and also enables the fuel to be shut off from the carburetter and from the main tank when the car is not in use.

The dial plate of this tap is marked **R** (Reserve), **O** (Off), and **M** (Main). Normally, it should stand at **M**. When the reserve is required a catch must be depressed before the tap can be turned to **R**, the object of this being to prevent inadvertent movement of the lever beyond the off position when turning from main.

It is important to observe that if the car be run with the tap in the **M** position until it stops through lack of fuel, the service tank on the dashboard will have been emptied and *the mere act of turning the tap to the R position will not be sufficient to re-prime this tank.* The engine must also be turned for a short time continuously, either by hand or by means of the starter motor with both the main throttle and the starting carburetter controls in the closed positions. The need for such turning of the engine will, of course, not arise if

care be taken to move the tap handle over to **R** before the engine actually stops through lack of fuel, as shown by reference to the fuel gauge.

Fuel Gauge. The fuel gauge on the instrument board is graduated to register the total quantity of fuel in the main tank, i.e., its reading includes the reserve supply.

There are two pamphlets dealing with the fuel gauge at the end of this book to suit the type of gauge which may be fitted.

Running the Car. When driving the car, the ignition lever should, normally, be advanced about three-quarters along its quadrant, and the throttle lever set to a position at which the engine will run as slowly as possible without risk of stopping when the clutch is withdrawn. For country driving, however, the throttle lever may with advantage be moved to its lowest position, when the throttle will be closed, and the engine can be used as a brake to assist in decelerating the car when it is required to slow up. Under these circumstances it must be borne in mind that the engine will stop if the accelerator pedal is released and the clutch withdrawn. Consequently, the throttle lever must be restored to its slow-running position when the necessity for such operations appears likely to arise.

The amount of advance on the battery ignition system is controlled partly by hand, as previously indicated, and partly automatically by means of a centrifugal governor operating on the distributor drive. This is capable of meeting 90 per cent. of the conditions due to varying road speeds, leaving only extreme conditions to be met by moving the hand control on the steering column.

The chassis oil pump lever should be depressed once every 100 miles. An extra charge should be given when traversing wet or muddy roads.

Gear Changing. The position of the gear lever for each of the four speeds and the reverse is shown in Fig. 37. When reverse is required, the button upon the top of the lever must be depressed. This releases a catch, and enables the lever to be moved into the gate marked **R**.

On certain chassis, owing to the provision of a special device within the gearbox there is no need to double clutch when changing down

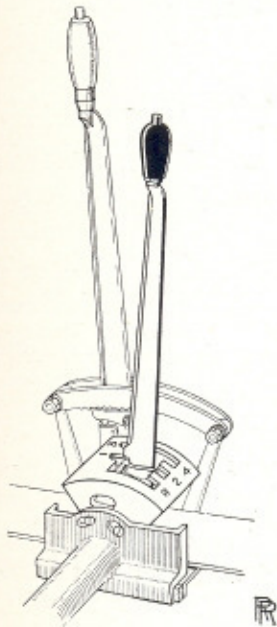


FIG. 37.
PERSPECTIVE VIEW OF GEAR
LEVER GATE.

from fourth, or top, speed to third speed. It is necessary only to de-clutch and move the gear lever from the fourth to the third speed position. Similarly, when changing up from second to third and also from third to fourth speeds there is no need to pause in neutral with the clutch pedal depressed.

The special mechanism within the gearbox ensures that the gear teeth are not clashed when making these changes.

All other changes of forward speeds, namely, down from third to second, and both up and down between second and first speeds, and all changes for chassis which are not fitted with the special mechanism, must be effected in the usual manner to ensure a silent change of gear.

When manoeuvring the car, no attempt must be made to engage reverse gear after moving forwards until the car has come to a standstill. Conversely, forward speed must not be engaged after using reverse until backward movement of the car has ceased.

Use of Charging Switch. For the switchbox with the ignition switch positions marked **I** and **I & C**, the following will apply:—

The position marked **I & C** (Ignition and Charging) on the switchbox for the thumb lever indicates that the ignition is on, and that the dynamo is charging the battery. This is the position recommended for most running conditions. When, however, the battery is known to be fully charged and the car is running at a moderate speed only, in the daytime, the charge may be switched off by turning the lever to the position marked **I** (ignition only).

Whenever the lamps are in use, and the engine is running, always have the switch in the **I & C** position.

Where the ignition switch positions are marked **I & C** (Summer) and **I & C** (Winter) the following will apply :—

With the switch in the **I & C** (Summer) position the dynamo output is reduced in order to avoid overcharging the battery, as the demands made upon it in Summer running conditions are usually less than in Winter. In the **I & C** (Winter) position, the output is increased.

If the battery is known to be in a well-charged condition it is inadvisable to keep the switch at **I & C** (Winter) for a long period.

When the head or side lamps are switched on, the dynamo output becomes increased, irrespective of the position of the ignition and charge switch. (For further information, see page 100.)

Ignition Switch. This should always stand at the off position when the car is not running. To avoid unauthorised use of the car, a lock is provided on the main switch-box, which, when locked, prevents either of the switch elements being moved.

Use of Magneto. The magneto is of a special type, having no high-tension distributor, but a single high-tension lead, the terminal of which is fitted to the centre of the battery ignition distributor in place of that from the standard ignition coil when required. The magneto is arranged to be put into service very quickly should the necessity arise, the following operations being performed in the order named :—

- (1) Remove the battery ignition fuse marked No. 3 from the distribution box, inserting same in the dummy fuse holder (**Y**, Fig. 33, page 98) in the cover.*
- (2) Pull out the high-tension terminal (**Tb**, Fig. 34, page 104) of the battery ignition from the distributor and replace with the high-tension magneto lead (**Tm**), which is carried in a special holder on the ignition tower when not in use. Insert the battery H.T. lead in the holder.
- (3) Press down the catch (**H**, Fig. 35, page 106) projecting from the magneto drive shaft and turn the shaft gently by hand until the teeth are felt to engage.

* This is not necessary if the battery is entirely disconnected and/or removed from the car (see Warning, page 103).

The engine is then ready for running on the magneto, the thumb lever on the switch-box being used for switching on and off in the same way as for the battery ignition.

Owing to the fact that the magneto is capable of giving a good spark when retarded, no attempt should be made to start the engine on the magneto ignition, either by hand or by the starter, without first fully retarding the ignition. Also, when running on this ignition it will be necessary, in order to obtain the best results, to use the ignition lever as the engine speed increases or falls off.

When changing back from magneto to battery ignition, the operations detailed in the preceding paragraphs (1), (2) and (3) must be reversed, the magneto drive being disconnected by sliding the shaft towards the rear against the pressure of an internal spring until it is felt that the catch is holding the engaging teeth clear of each other, when it will be possible to rotate the shaft by hand.

It is important that this uncoupling of the drive should be effected before running again on the battery ignition, in order to save wear of the magneto.

Automatic Control of Radiator Shutters. The radiator shutters are controlled automatically by means of a thermostat in the upper radiator tank.

The thermostat commences to open the shutters when the water reaches a temperature of about 60° C., and causes them to be wide open at about 90° C. Under normal running and atmospheric conditions the water temperature is maintained between 70° and 75° C.

A thermometer is provided on the instrument board to indicate that the shutters are operating properly and that there is no shortage of water.

The hand-operated ventilators on the sides of the bonnet should be left open in hot weather.

There is provision for quickly disconnecting the thermostat from the shutters in the event of defective operation or in tropical climates or very hot weather. To do this the spring-loaded pin **R**, Fig. 28, should be raised, and the end of the lever, **R1**, disengaged from the thermostat rod. The shutters should then be left wide open.

a course is recommended because, if the car is standing on even a slight gradient, release of the hand brake might cause the car to move forwards or backwards, and render engagement of the required gear difficult.

Drivers should cultivate the habit of always releasing the brakes when actually turning a corner. The retarding power of the Rolls-Royce four-wheel brakes is so great that there should be no necessity for brake application under such circumstances if the speed is properly suited to the road conditions, and further, the road surface may be different just round the bend, becoming loose and slippery. The conditions then present if the brakes are applied all favour a serious skid. Further notes on the use of the brakes will be found on page 71.

Fitting of Chains. On no account must chains be fitted only to the rear wheels for driving over ice or snow. Such a course would be likely to result in loss of steering control on application of the foot brake because the greater adhesion of the rear wheels might cause the front wheels to become locked.

Chains should also be fitted to the near side front wheel. They must not be fitted to the off side front wheel, as they would be liable to foul the side steering tube on full lock.

If only two sets of chains be available, one should be fitted to the near side front wheel and the other to the off side rear wheel. This arrangement will be quite satisfactory except that the near side rear wheel may tend to "spin" when ascending a hill.

SECTION II.

Periodic Lubrication and Attention.**Lubricants Recommended.**

Engine.		Summer.	Winter.
	Either, Price's Motorine	C	M
	or, Wakefield's Patent Castrol	XXL	XL
	or, Vacuum Mobiloil	BB	A
	or, Shell	Triple	Double
	or, Duckham's Adcoidised	N.P.3	NPXX
Gearbox.	Same as for engine under "Summer" above.		
Rear Axle.	Price's Motorine Amber "A."		
Chassis Oil Pump.	Same as for engine under "Summer" above.		
Oil Gun.	Price's Motorine Amber "A."		
Hydraulic Shock Dampers.	Either, Wakefield's Patent Castrolite or, Vacuum Mobiloil "Arctic."		
Ball Bearings.	Hoffman Ball-bearing Grease, manufactured by Alex. Duckham & Co., Ltd.		

Arrangements have been made whereby Rolls-Royce Ltd. can supply promptly any quantity of the above lubricants (from one-gallon cans to forty-gallon barrels) at current retail prices, which include free delivery in London of any quantity. In the country, orders for five gallons and upwards are delivered free to the nearest station. Quotations will be submitted on application.

General.

In addition to the points supplied with oil by the Centralised Lubrication System (see Chapter I.), there are others which, for various reasons, it is impracticable to feed in this way, and which must therefore be oiled by hand.

In the notes which follow, these points are classified under mileages or periods, being arranged in a definite order, with due regard as far as possible to their relative location on the chassis.

It is important that careful attention should be given to their lubrication with a view to reducing wear and eliminating mysterious squeaks and rattles.

These notes are followed by others covering the periodic operations and adjustments which are necessary.

Reference to the plan view of the chassis given in Fig. 1 will be found of assistance in locating the various parts.

Cleaning Untarnishable Surfaces.

The radiator is of "Staybrite" steel, and other bright external fittings are chromium plated.

On no account should abrasives or polishing preparations of any kind be used on such untarnishable surfaces.

The proper course is to treat these surfaces exactly as one would treat high-class, varnished coachwork, namely, wash with clean water and polish with a clean wash-leather.

Any other procedure is very liable to scratch the surfaces.

Removing Bonnet.

To remove bonnet, raise one side and withdraw small bolt from bracket for hinge pin on radiator. External cap of bracket may then be removed and bonnet lifted off.

Daily.

1.—**Engine Oil.**—When engine is not running, inspect level indicator on left side of crankcase and maintain quantity of oil at one-and-a-quarter gallons. (See page 32.)

If necessary, add oil through filler by means of a strainer funnel.

Do not run engine with indicator showing less than three-quarters of a gallon.

2.—**Radiator Water.**—Inspect level and maintain half-way up return pipe. (See Fig. 28.) Use only clean, preferably *soft* water. When using an anti-freeze mixture, as described on page 91, fill just to cover upper tubes of radiator core.

3.—**Chassis Oil Pump.**—Depress pedal *twice* while engine is being started for first time in the day, and subsequently *once* every 100 miles.

Every 1,000 Miles or Two Weeks.

After the first 1,000 miles' running with a new car, drain engine crankcase, remove and clean crankcase oil strainer and refill crankcase with fresh oil to correct level. (See page 30.)

Also drain water system and refill with clean, preferably SOFT water. (See page 90.)

1.—**Dashboard Petrol Filter.**—Remove and clean, taking care first to turn off supply from vacuum tank. (See page 46.)

2.—**Battery.**—Inspect level of acid in each cell. This is most important. In tropical climates it should be done every 500 miles or each week. (See battery makers' instructions at end of book.)