

CHAPTER VI

Coolant System

Collant Pump - Radiator Shutters - Coolant Level - Frost Precautions - Fan.

Coolant Pump.

The centrifugal coolant circulating pump is fitted with a special double packing gland.

A screw-down greaser is provided for lubricating the gland and bearings.

It should be filled one-third full of grease every 2,500 miles, as directed on page 19, and screwed right down, preferably when the engine is warm.

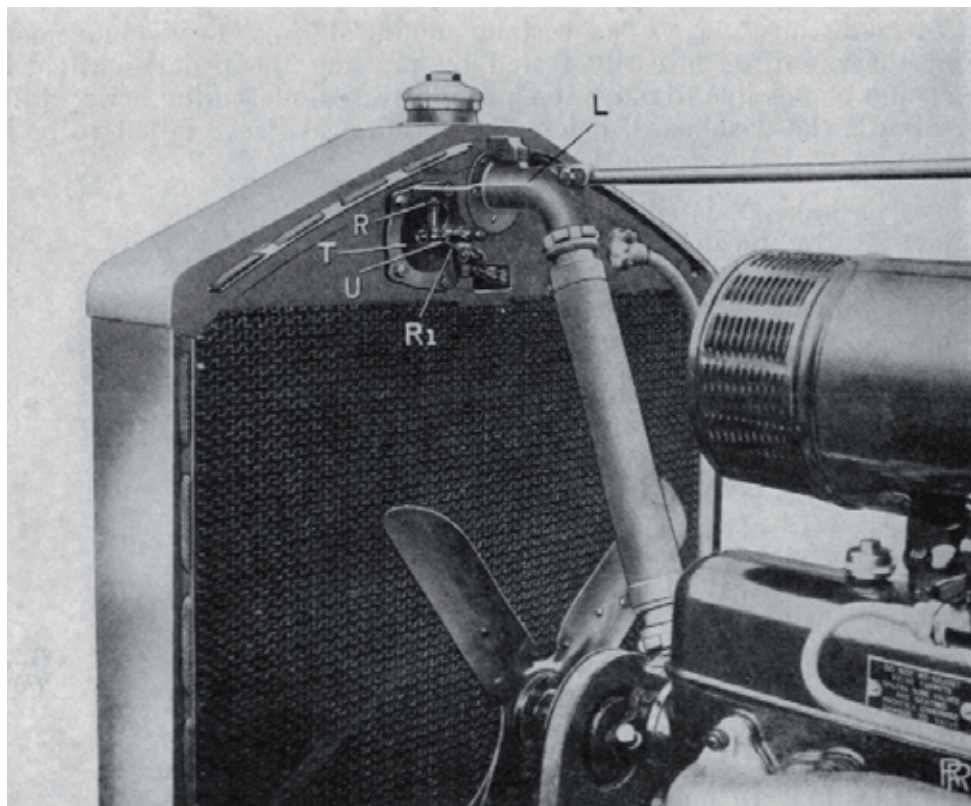


Fig. 21. - THERMOSTAT CONTROL OF RADIATOR SHUTTERS.

Radiator Shutters.

The thermostat which operates the radiator shutters is shown at **T**, in Fig. 21, and is arranged to maintain an average coolant temperature of approximately 78°C.

Reference to the instrument board thermometer will indicate that the thermostat is operating correctly and that there is no shortage of coolant.

In the event of faulty operation of the thermostat, the latter may be quickly disconnected from the shutters. This is effected by raising the spring-loaded pin, **R**, and disengaging the end of the lever, **R1** from the thermostat rod. A knob, **U**, is provided to facilitate re-engagement.

The shutters should then be pushed open by means of the lever, **R1**. They must not be moved by direct hand operation of the shutters themselves.

Coolant Level.

The coolant level should be inspected daily and maintained about half way across the upper radiator pipe, as shown by the white line, **L**, Fig. 21.

If an anti-freeze mixture is being used, the level should be maintained so as to just cover the upper tubes of the radiator core.

Frost Precautions.

Where plain water is being used as the coolant medium, and there is any likelihood of the car being exposed to low, frosty temperatures, with the engine not running, it is of vital importance that the cooling system should be drained by opening the drain tap on the pump inlet pipe and releasing the radiator cap. Also, after a frost and before attempting to start, or even move, the engine again, *hot water should first be poured over the water pump*, as otherwise damage may be caused to the pump rotor by the presence of particles of ice within the casing. Warm water can be used with advantage for refilling the radiator.

A suitable anti-freeze mixture is made by mixing soft water with either inhibited ethylene glycol or "Bluecol" in proportions dependent on the degree of frost likely to be encountered.

The following table gives an approximate indication of the amount of frost protection ensured by different strengths of mixture.

Freezing point	22° F.	12° F.	2° F.	-3° F.
Degrees of frost	10° F.	20° F.	30° F.	35° F.
I Inhibited Ethylene Glycol ...	4½ pts.	6¾ pts.	10 pts	11 pts.
2"Bluecol"	4½ pts.	6¾ pts.	10pts	11pts.

When changing from water to anti-freeze, the radiator system must be drained. New anti-freeze of the required amount should be mixed with an equal quantity of soft water before being poured into the radiator, the radiator being finally topped up with soft water.

The engine should then be run until normal operating temperature is reached, to ensure uniform distribution of the anti-freeze throughout the system.

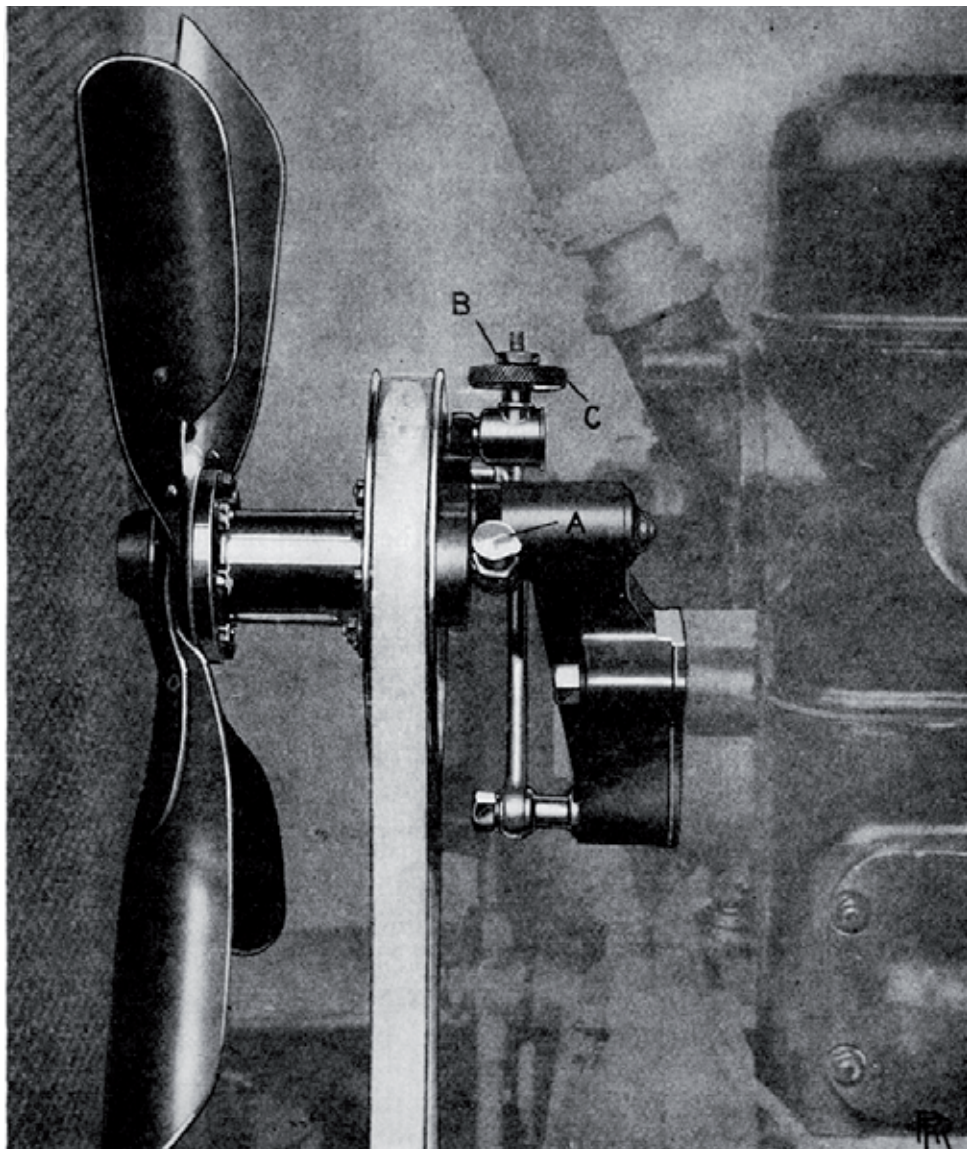


Fig. 22. - FAN BELT ADJUSTMENT.

The rubber connections must be carefully examined and replaced if unsound, as any leakage will necessitate replenishment with anti-freeze mixture.

When using an anti-freeze mixture as described, a similar mixture should be used for topping up purposes.

Fan.

The fan and its bracket are shown in Fig. 22. A spring lid lubricator, **A**, is provided, and a few drops of oil "C" should be injected every 5,000 miles, as directed on page 21. At the same time the joints of the belt tensioning device should be lubricated with the oil can.

The tension of the belt should be such that one side, at a point equidistant from the pulleys, may be moved transversely with the fingers about $\frac{3}{4}$ ".

The adjustment should be checked every 2,500 miles, as directed on page 21.

Adjustment is effected by slackening the hexagon locknut, **B**, with a spanner and screwing down the knurled nut, **C**, with the fingers until the correct tension is obtained, afterwards securely relocking nut **B**.

CHAPTER VII

Electrical System

General - Battery - Battery Ignition - Sparking Plugs - Electrical Fault Location.

General.

The equipment comprises a dynamo, distribution box with fuses and automatic cut-out, automatic output regulator, switchbox, ammeter, a 12-volt approximately 60-ampere-hour battery, a starter motor with relay-operated switch, electric horn and fuel gauge, dual electric fuel pumps and battery ignition consisting of non-trembler coil with ballast resistance, and combined low-tension contact breaker and high-tension distributor and the necessary wiring encased in metal tubing.

Incorporated with the battery ignition is a governor, which effects automatic control of the battery ignition timing, the effect of the hand control being superimposed.

The wiring diagram, Fig. 23, shows the units with their electrical connections, the various wires being indicated in colours to correspond with those of their actual coverings.

Battery.

The battery recommended for use on this car is either: -

Exide ...	...	...	...	6-XCMRII-IRL or
Peto & Radford	...	...	...	6-HZDII-S

Specific Gravity of acid (at 60° F.)

In climates with air temperatures	Ordinarily below 90° F. (32° C.).	Frequently above 90° F. (32° C.).
Filling in acid for first charge	Exide 1.340	1.260
	P & R 1.350	1.260
Fully charged	Exide 1.280	1.201
	P & R 1.280	1.210

		Exide.	P. & R.
First charge current	... ..	3	6
Normal charge current	... ..	5	6
Capacity when fully charged: -			
Starting for 5 minutes	... ..	117 amps.	210 amps.
Lighting at 3 amperes	... ..	24 hrs. approx.	24 hrs. approx.
Voltage across terminals	... ..	12	12

Never allow the liquid in the cells to fall below the tops of the separators.

Inspect the battery at regular intervals, and top up with distilled water, so as to maintain the level of the liquid at ½" above the tops of the plates.

Do not inspect the battery with the aid of a naked light, and on no account disconnect any of the battery terminals or connections when any charge or discharge current is passing, for such a course incurs risk of explosion and involves personal risk.

Battery Ignition.

The battery ignition is in a very accessible position, as shown in Fig. 24, and consists of an ignition coil, **W**, and combined low-tension contact breaker, **X**, and high-tension distributor, **XI**.

A ballast resistance, **R1**, 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.

In setting the points the gap opening should be .015" to .018".

Every 5,000 miles, as directed on page 21, the pivot pin of the low-tension rocker arm should be lubricated by moving aside the retaining spring and putting one drop of oil on the exposed end of the pivot.

A few drops of oil "C" should be injected into lubricator, **Z**, every 2,500 miles, as directed on page 19, 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.

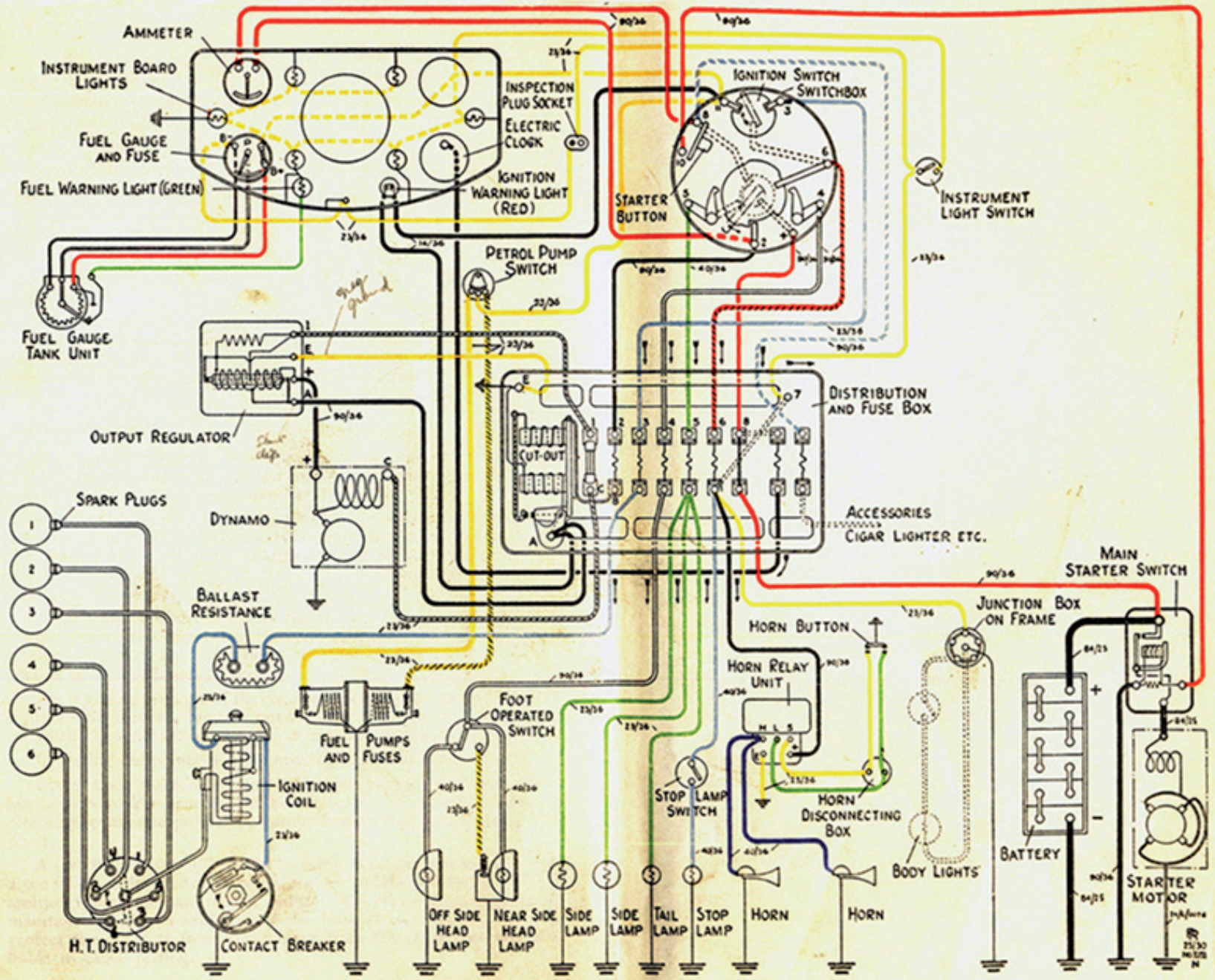


Fig. 23.—MODIFIED ELECTRICAL WIRING DIAGRAM.

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 some times caused by an accumulation of dirt around the terminals and on the coil casing.

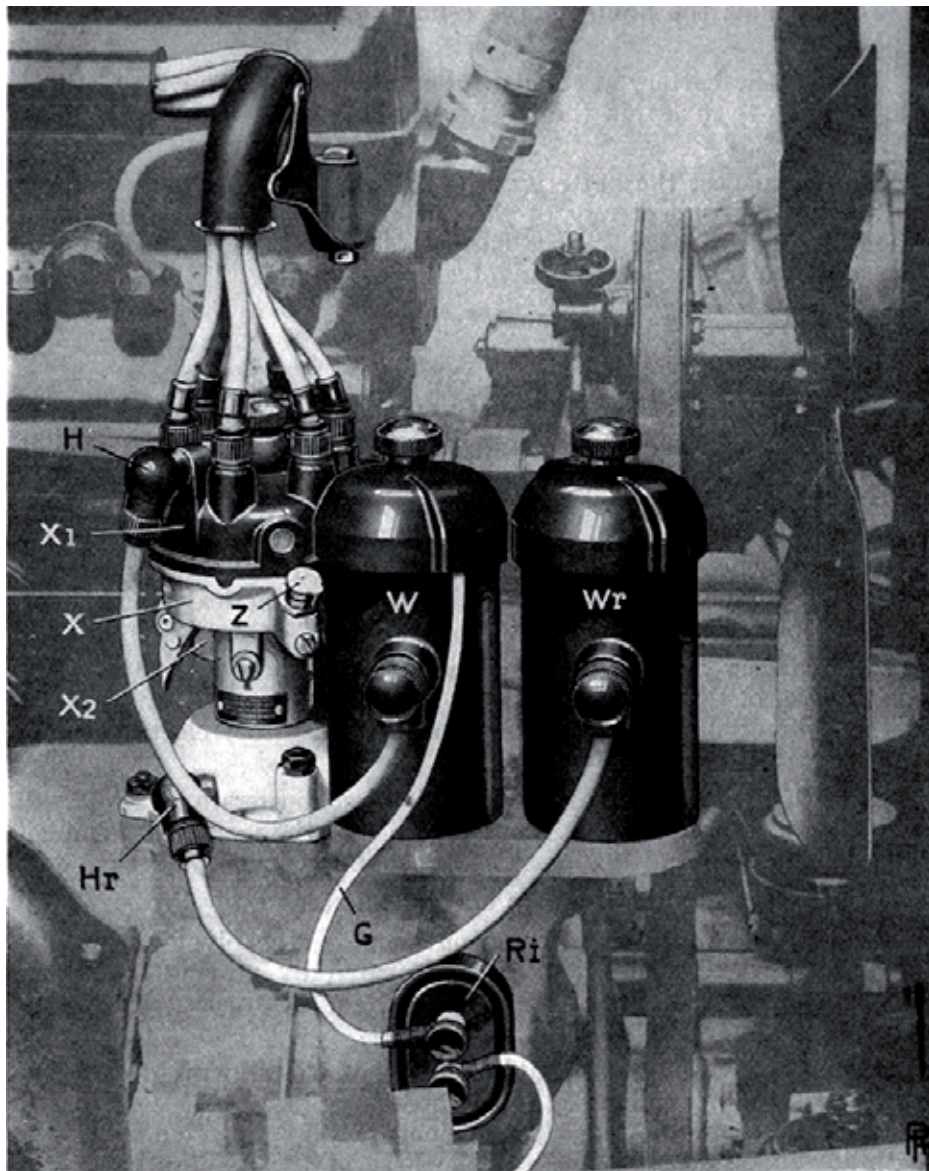


Fig. 24. - IGNITION COILS, DISTRIBUTOR AND BALLAST RESISTANCE.

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 crankshaft should be turned until the mark B.A.I. (battery, advanced ignition) on the flywheel registers with the mark on the casing when No. 1 piston is approaching its firing stroke.

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.

Fully advance the ignition lever, and then set the contact breaker cam to be just on the point of causing contact break (when turning forward) corresponding to cylinder No. 1.

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 tape of its shaft in the normal direction of rotation until the required peak breaks contact as indicated by the reading of the ammeter. The screw securing the cam should be tightened.

A spare ignition coil is provided as shown at **Wr**, Fig. 24. It is put into commission by interchanging the high-tension terminals, **H** and **Hr**, and changing over the two low-tension leads, one of which is seen at **G**, from one coil to the other.

A small casing on the dashboard, marked "Ignition Spares", contains a spare low-tension rocker arm complete with springs and contact point, and also a spare contact screw.

Sparking Plugs.

Either K.L.G. Type F.L.B. 30X or Champion Type LB.8, 14 m/m sparking plugs are recommended for this car. Plugs should be removed and serviced on special plug cleaning and testing machine, which should be available in all service stations, every 5,000 miles.

Reset gaps to .020".

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: -

I. Failure of any part of the system separately may be due to a blown fuse in the distribution box.

2. Failure of incorrect operation of the system may be due to the fusing of the emergency battery fuse due to an earth

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

If the dynamo does not charge: -

1. Ascertain whether dynamo or regulator is at fault by removing regulator cover and connecting terminal I to E, and terminal A to +. This will short-circuit the regulator. Then, start engine gently and increase speed slowly. If dynamo is in order, the output will be delivered and the defect will lie in the regulator.
2. Dynamo brushes may be sticking, due probably to oiliness. Clean brushes and holders with a rag moistened with petrol.
3. Cut-out contacts may be burnt or sticking.
4. Inspect armature fuse, No. 2, in distribution box.

If dynamo output is low, this may be due to battery being fully charged, but if low with lights on, i.e. ammeter indicates an abnormal discharge, the regulator may be sticking in such a manner as permanently to insert the field resistance.

If dynamo gives an excessive charge and blows fuse (No. 2), when speeded up, this may be due to regulator sticking or to a break in the regulator shunt coil circuit. Check regulator wiring connections.

In the case of defective operation which is traceable to the regulator, the unit must be removed and returned for rectification to Rolls-Royce Ltd.

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 .015" to .018", if necessary.
3. If missing still continues, test ignition circuit as below
4. Dirty ignition coil casing.

(b) Fails.

1. With battery ignition switched on, see by ammeter, while engine is cranked, that the coil is taking current intermittently. If no current, test availability of battery voltage on ballast resistance terminals then at coil terminals.

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.

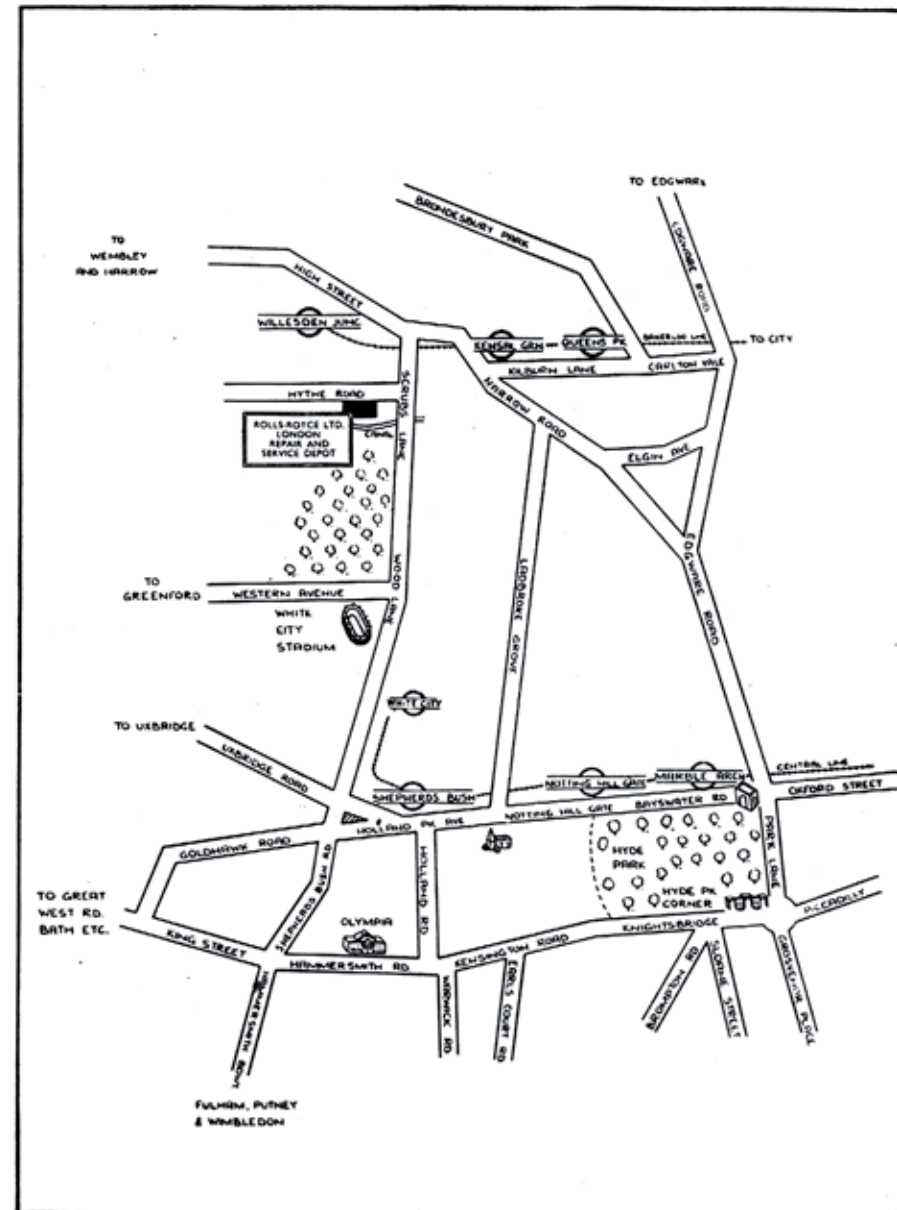


Fig. 25. - GUIDE TO LOCATION OF MAIN SERVICE STATION.

