

the radio from the ignition system. Care must be taken that in the event of a replacement coil being fitted, that the condenser is correctly

connected to the terminal marked S.W. and **not** to the output (C.B.) terminal of the coil.

The outside of the coil casing should be kept clean; misfiring is occasionally caused by an accumulation of dirt around the terminals.

### Ignition Timing.

If the ignition timing has been de-ranged, it can be reset by reference to the markings on the engine flywheel.

To carry out this operation, the crankshaft should be rotated until the mark "**IGN. TDC.**" on the flywheel

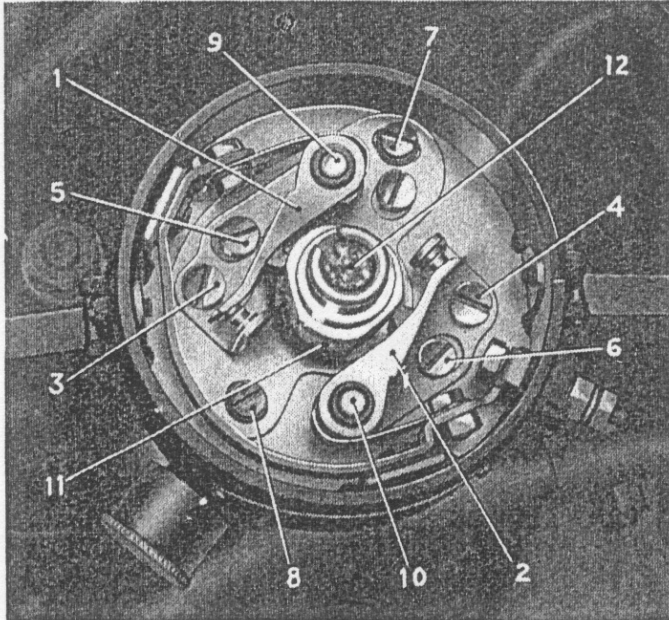


Fig. 44.—INTERIOR OF CONTACT BREAKER.

- |           |                           |
|-----------|---------------------------|
| 1 and 2.  | Rocker arms.              |
| 3 and 4.  | Locking screws.           |
| 5 and 6.  | Adjusting screws.         |
| 7 and 8.  | Synchronising adjustment. |
| 9 and 10. | Pivot pins.               |
| 11.       | Cam                       |
| 12.       | Felt wick.                |

registers with the small pointer attached to the lower bell-housing cover, when No. 1 piston is at the top of its firing stroke.

The car should be run up on a ramp or over a pit. Examination of the lower bell-housing cover (3, Fig. 22) will show the small inspection hole on the side.

The preferable method is to note the position of the pointer and then to remove the cover. Operate the starter motor to approximately line up the flywheel marking; replace the cover for a temporary check. Remove the cover and prise the flywheel round into correct position, then permanently replace the cover.

Another method is to use the starting handle to turn the engine, which obviates the need for removing the bell-housing cover. It must be remembered that the starting handle operates through the friction damped spring drive unit, and therefore allowance must be made for the wind-up of the spring drive unit. If it is decided to use this method, the timing should be set .300" early of the **IGN. TDC.** mark on the periphery of the flywheel.

The contact breaker should now be adjusted by rotating in an anti-clockwise direction, so that the cam is just on the point of causing the contact break when revolving in the normal direction, while at the same time the high-tension rotor is opposite No. 1 distributor

contact, the rotor being in the fully retarded position.

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 engine should be rotated until the required cam just breaks the contacts, as indicated by the reading of the ammeter.

The distributor head securing screw should then be securely tightened.

Ignition timing variation during running is entirely controlled by the centrifugal governor incorporated in the distributor, no hand control being provided.

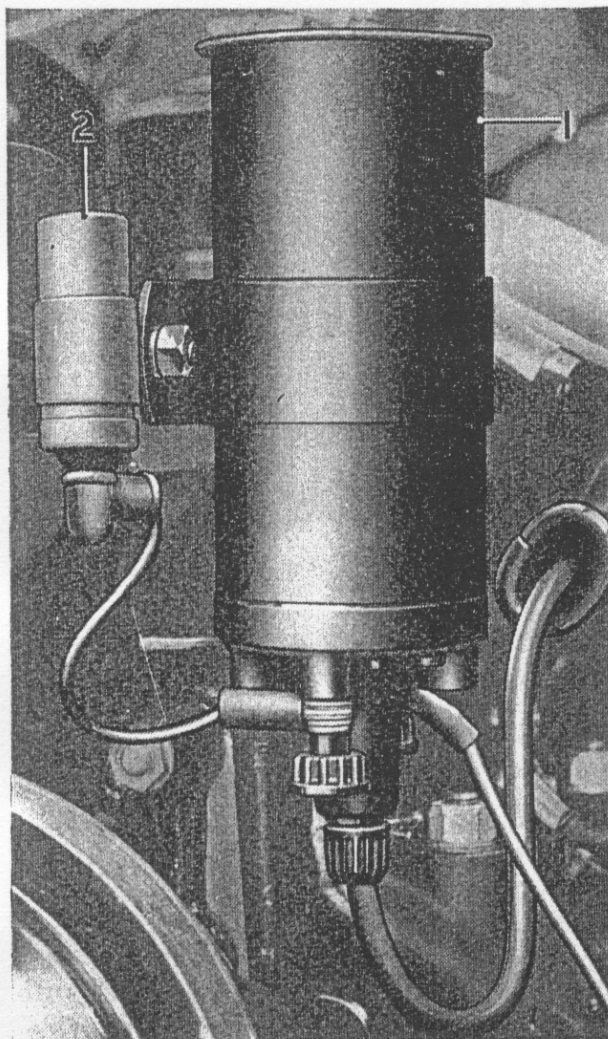


Fig. 45.—IGNITION COIL.

1. Coil.      2. Suppressor condenser.

### Firing Order of Cylinders.

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

### Sparking Plugs.

The sparking plugs are Champion Type N8B 14 m/m. non-detachable. Every 5,000 miles, as directed on page 33, they should be removed and cleaned. The width of the gaps should be checked, and, if necessary, reset to .025" (.635 m/m.).

### Starter Motor.

The starter motor is shown in Fig. 46. A small planetary reduction gear is arranged in a casing behind the motor, the effect of which is to provide a total reduction gear ratio between motor and crankshaft of 16.0 : 1.

A plug in the front cover of the gear casing should be removed every 10,000 miles, as directed on page 34, and oil "B" injected until it reaches the mouth of the plug orifice. This oil also lubricates the driving end bearing of the armature shaft.

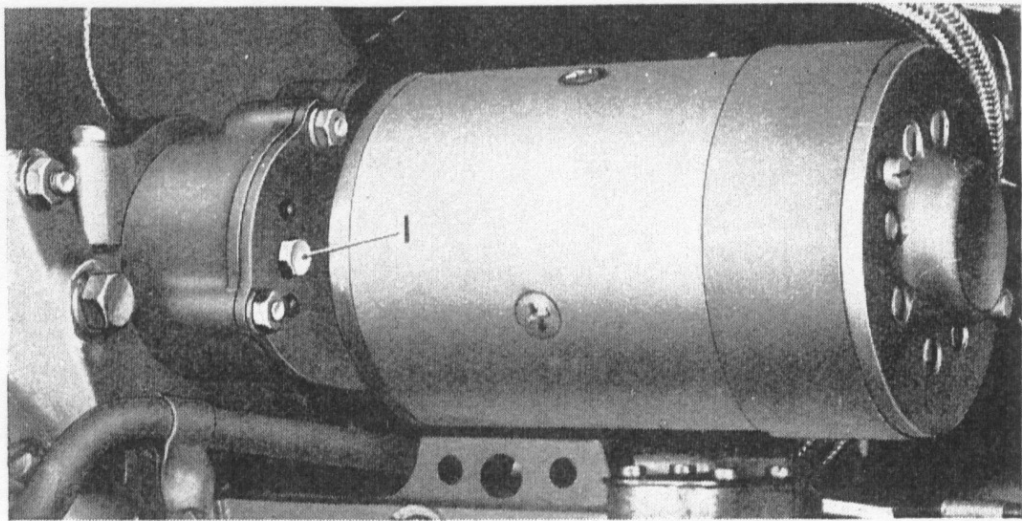


Fig. 46. STARTER MOTOR—UNDERNEATH VIEW.  
1. Oiling Plug.

Ordinarily, the brushes will last a long time. In the event of replacements being necessary, application should be made to Messrs. Bentley Motors (1931) Ltd., or one of their "Special Retailers".

The fitting of new brushes requires expert knowledge and care, and emphasis is laid on this point, as cases have arisen of faulty operation of the motor, due to the inexpert fitting of brushes.

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

### **Starter Motor Switch.**

The main starter switch is mounted on the front of the dashboard, and is relay-operated. Closing of the push-button switch on the instrument panel energises an electric magnet, which closes the main contacts.

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

### **Micro-switch.**

Situated at the base of the steering column, the unit incorporates two switches actuated by the gear change column control lever (see Fig. 25).

One switch is connected in the starter motor circuit (4, Fig. 25), and is closed only when the hand control lever is neutral. This ensures that the engine can only be started up in neutral.

The second switch (5) is the reversing light switch, and is closed when the hand control lever is in reverse.

### 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 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 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 to 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 from an external source.

### Electric Fuel Pumps and Gauge.

The electric fuel pumps should not need any attention over long periods of running, except, perhaps, the cleaning of the suction or delivery valves (see page 48); if an electrical fault is suspected, it is recommended that the necessary inspection and any work in connection with repairs should be carried out by Messrs. Bentley Motors (1931) Ltd., or one of their "Special Retailers".

Reference to the wiring diagram (Fig. 40), will show that they are supplied with current through the ignition switch, and, consequently, are only operative when the ignition switch is closed.

The fuel gauge is divided into two parts:—

- (a) An indicating instrument, mounted on the instrument panel, and marked "0,  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , and F".
- (b) A petrol tank unit, with a float for measuring the amount of petrol in the tank.

The indicating instrument has two actuating coils:—

1. A control coil, which is connected across the battery and so provides a constant torque on the pointer, tending to swing it over to the "Full" side of the scale.
2. A deflecting coil, which is connected in series with the battery and the tank unit rheostat, and so arranged to act in opposition to the control coil.

The tank unit consists of a variable rheostat, the sliding arms of which are operated by the up-and-down movement of the float, thus varying the circuit resistance from a minimum in the empty position to a maximum in the full position. With the float in the "empty" position the current in the deflecting coil is at a maximum, and its turning effort is of sufficient strength to move the pointer, against the opposing force of the control coil, back to the "O" position on the

indicating instrument. Thus, as the resistance is varied by the position of the float, the pointer indicates the petrol level in the tank.

A warning light is provided on the instrument panel, which is automatically illuminated when there is approximately three gallons or less of petrol in the tank.

### **Electric Horns.**

Two tuned, wind-tone horns are provided, operated through a sealed relay mounted on the front of the dashboard.

No adjustments should be attempted. In the event of derangement, or deterioration of the tone, Messrs. Bentley Motors (1931) Ltd., or one of their "Special Retailers", should be consulted.

### **De-misting and Air Conditioning.**

A large flexible duct from a grille in the front wing, to a manually operated trap in the driver's compartment, allows for fresh air ventilation as required.

For the windscreen, a separate air tube tapped into this ducting is taken through a special heater, fed from the engine cooling system and fitted under the front wing, to a booster motor mounted in front of the dashboard. Then, through suitable ducting to vents in the capping rail.

The normal forward motion of the car is usually sufficient to ensure adequate de-misting, and it is only under severe conditions or if de-frosting is required, that the booster motor need be used.

The vents are fitted with metal covers; these should normally remain open, but they may be closed if it is found that warmed air is being drawn into the car at unseasonable times.

To operate for normal de-misting, ensure the vent covers are open by gently pulling same rearwards. For severe conditions or de-frosting, switch on booster motor (11, Fig. 1), the operation of the switch being "Pull-on", "Push-off".

The rear window is of the electrically heated type, and contains a series of wires moulded into the glass. A switch on the facia board marked "R.W." controls this feature as required.

### **Direction Indicator Signals.**

The direction indicator control switch is mounted on the centre of the capping rail (see Fig. 1), the flasher unit being mounted on the valance plate.

When a right turn is to be signalled, the control switch lever is moved to the right, and the signal bulbs in the right-hand wing lamp and the rear stop lamp begin flashing, also a pilot lamp on the facia board. When a left-hand turn is to be made, the control switch lever is moved to the left.

When the signal system is operating properly, the lights flash about 90 times per minute. If either front or rear signal bulb is burned out, the reduced current in the circuit will increase the flasher speed and the pilot bulb will not light.

In addition to the pilot light, a clicking noise in the flasher unit makes an audible signal when the circuit is on. This is purposely created as an additional warning that the signal unit is operating. The signal flasher is a sealed unit and is non-adjustable, and if service is necessary, it must be by replacement.

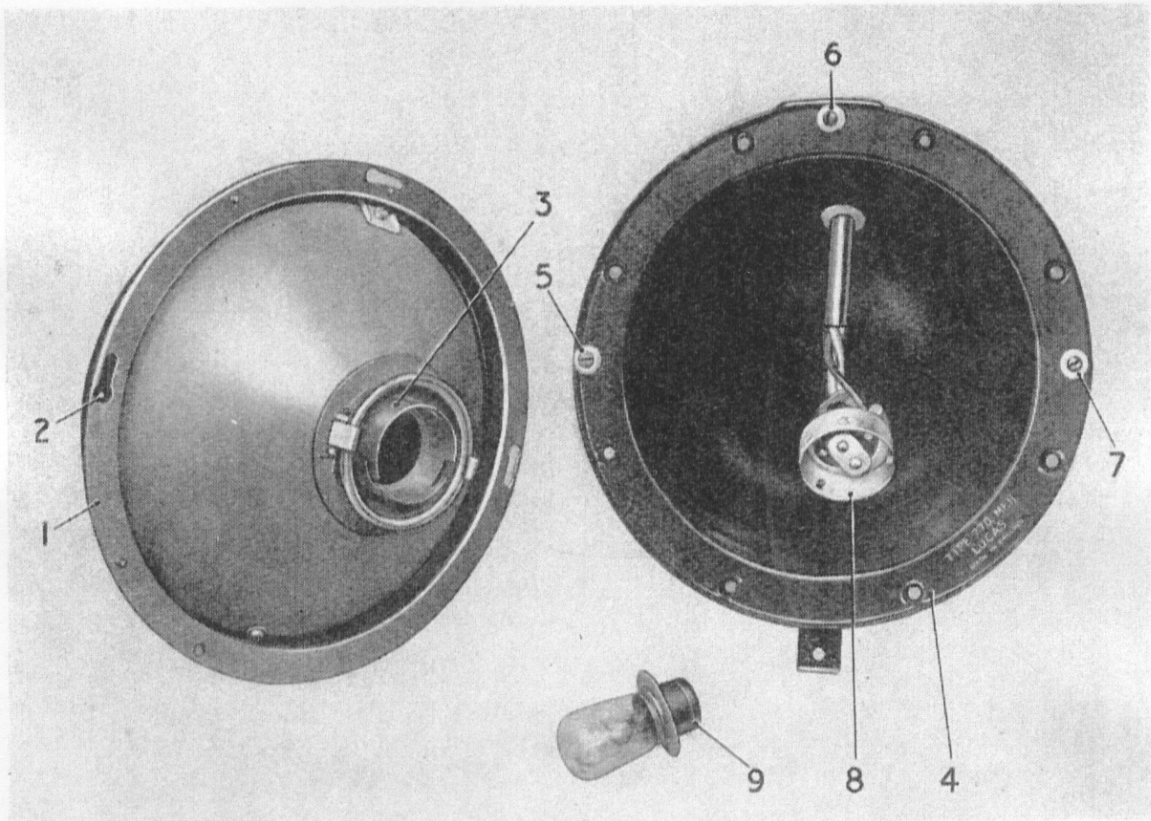


Fig. 47.—HEADLAMP—EXPLODED VIEW.

- |                                 |                                |
|---------------------------------|--------------------------------|
| 1. Light unit.                  | 6. Vertical adjustment screw.  |
| 2. Retaining screw slots.       | 7. Horizontal adjustment screw |
| 3. Bulb holder.                 | 8. Back shell.                 |
| 4. Lamp body.                   | 9. Bulb.                       |
| 5. Horizontal adjustment screw. |                                |

### Headlamps.

The headlamps are controlled by two switches, the master switch on the switchbox and a foot-switch for "beam" selection.

A small red warning light, mounted in the speedometer, is illuminated whenever the headlamps are on the "Driving Beam" (full on).

The operation of the foot-switch, changing the "driving beam" to the "passing beam", extinguishes the warning light. Thus, when

driving on a lighted road, this warning light serves as a ready indication of the selected headlamp "beam".

When the car is used on the continent of Europe, the headlamp incorporates a Light Unit, which consists essentially of a reflector and front glass assembly provided with a mounting flange, by means of which it is secured in the body housing.

Normally, provision is made for the fitting of the flanged type pre-focused bulb, as illustrated in Fig. 47. For France, an adaptor and three-pinned type bulb is fitted. The bulbs are correctly positioned in relation to the focal point of the reflector and no focusing is required when a replacement bulb is fitted.

Certain lamps may be fitted with a fuse unit attached to the lamp shell; the fuses are rated at 15 amps.

For the North American continent, the regulation "Sealed Beam" unit is fitted.

### **Replacing a Headlamp Bulb—"Light Unit" Type.**

Remove the rim securing screw, lift off the rim and the dust-excluding rubber.

Press the Light Unit in against the tension of the adjusting screw springs and turn it in an anti-clockwise direction until the heads of the screws can be disconnected through the slotted hole in the flange.

The Light Unit can now be lifted out of the lamp body. Twist the back-shell in an anti-clockwise direction and pull it off. The bulb can now be removed.

Place the replacement bulb in the holder, engage the projections in the inside of the back-shell with the slots in the holder, press on and secure by twisting it to the right.

Position the Light Unit in the lamp body so that the heads of the vertical and horizontal adjusting screws protrude through the holes in the flange, press in and twist in a clockwise direction.

Replace the rubber dust excluder so that its thicker edge lays round the Light Unit rim. Refit the front rim and secure.

### **Aligning the Headlamps.**

The headlamps should be aligned so that they direct their beams straight ahead, i.e. parallel with the road and with each other.

The simplest way of checking the adjustment of the lamps is to take the car on a straight level stretch of road at night and examine the direction of the beams. If one appears to be out of adjustment, adjust as follows:—

Remove the rim securing screw at the bottom of the lamp and lift off the rim.

Vertical adjustment is made by operating the screw (6, Fig. 47); screwing in raises the beam and screwing out lowers the beam.

Horizontal adjustment is made by operating the screws (5 and 7, Fig. 47).

### The Side Lamps.

To change the bulb, remove the rim locking screw and the rim, and draw the lamp unit bodily forward.

To obtain access to the bulb, detach the front portion by holding firmly, and rotating the rear portion a quarter of a turn to release the spring catch.

The bulb is of the standard bayonet fitting type.

To replace, reverse the above instructions.

### Electrical Fault Location.

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 fuse box (Fig. 42).
2. Failure or incorrect operation of the system, may be due to the fusing of the main fuse (Fig. 42), due to an earth.

If the dynamo does not charge:—

1. Check correctness of ammeter by switching on headlamps, this should show a "discharge" reading.  
NOTE.—See that the main switch is in the "OFF" position, before making any change to the wiring connections.
2. Ascertain whether the dynamo or regulator unit is at fault by connecting together the regulator terminals F and D, this will short circuit the regulator. Start engine gently and increase speed slowly, engine speed should not exceed a fast idle. Observe ammeter; if dynamo is in order the ammeter will show a "charge" reading and the defect will be in the regulator unit.
3. To test dynamo, disconnect the wiring from both main terminals and connect these terminals together. Connect a lamp between one terminal and earth, and gently speed up engine as before. If the dynamo is in order the lamp will light.
4. Dynamo brushes may be sticking, due probably to oiliness. Clean brushes and holders with rag moistened in petrol.
5. Cut-out contacts may be burnt out or sticking.

If dynamo output is low, this may be due to the 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. Low output may also be caused by a slack driving belt.

If dynamo gives an excessive charge when speeded up, this may be due to the regulator sticking or to a break in the regulator shunt coil circuit. Check regulator wiring conditions.

*In the case of defective operation which is traceable to the regulator, the unit must be removed and returned for rectification to Messrs. Bentley Motors (1931) Ltd., or one of their "Special Retailers".*