# Maintenance Instructions

# for

# LUCAS

# A.C. LIGHTING-IGNITION

# EQUIPMENT

*for motor-cycles*

JOSEPH LUCAS LIMITED · BIRMINGHAM · ENGLAND

# FOREWORD

Lucas Electrical Equipment is designed and manufactured to give long periods of service with the minimum of attention. As with other parts of the motor cycle, however, occasional minor adjustments, lubrication of moving parts and cleaning should be carried out to ensure that the equipment will operate with the utmost reliability and efficiency.

This Manual gives general information on the various items of equipment fitted to motor cycles having A.C. generators and describes the small amount of attention which is required. In addition the recommended procedure is set out for a systematic examination to be adopted in the event of the electrical equipment not functioning correctly.

Any further information will be supplied on application to Joseph Lucas Ltd., Great King Street, Birmingham 19, England.

# INDEX


| | Page |
|---|---|
| Introduction ... ... ... ... ... ... ... | 3 |
| Alternator ... ... ... ... ... ... ... | 5 |
| Rectifier ... ... ... ... ... ... ... ... | 6 |
| Battery ... ... ... ... ... ... ... ... | 6 |
| Coil Ignition ... ... ... ... ... ... ... | 8 |
| Magneto Ignition ... ... ... ... ... ... ... | 13 |
| Headlamp ... ... ... ... ... ... ... ... | 15 |
| Parking Light ... ... ... ... ... ... ... | 17 |
| Rear Lamp ... ... ... ... ... ... ... | 18 |
| Electric Horn ... ... ... ... ... ... ... | 19 |
| Location and Remedy of Faults ... ... ... ... ... | 20 |

# INTRODUCTION

The Lucas A.C. Lighting-Ignition Unit is a 6-pole alternator consisting of a permanent magnet rotor rotating within a laminated wound stator. The rotor is driven by an extension of the engine crankshaft and is built into the crankcase or chain case.

A rectifier is included in the circuit, this being a device for converting the alternating current output of the alternator to uni-directional current which is essential for battery charging.

Wiring diagrams for many Lucas equipped machines can be obtained on request to the Advertising Dept., Gt. King St., Birmingham 19. These diagrams are issued free on receipt of the appropriate information, namely, Make, Model and Year of Manufacture of motor cycle.

## Normal Running.

Under normal running conditions (i.e., ignition switch in IGN position) electrical energy in the form of rectified alternating current passes through the battery from the alternator. When no lights are in use, the alternator output is sufficient only to supply the ignition coil and to charge the battery. When the lighting switch is turned, the output is automatically increased to meet the additional load. On some machines an increase occurs both when the parking light is switched on and again when the main bulb is brought into use; on other machines, only when the main bulb is switched on.

## Emergency Starting.

An EMERGENCY starting position is provided on the ignition switch, for use if the battery has become discharged and a normal start cannot therefore be made. Under these conditions, the alternator is connected direct to the ignition coil, allowing the engine to be started independently of the battery. It should be noted that with the ignition switch at EMG and the engine running, the battery receives a charging current, so that its terminal voltage begins to rise. This rising voltage opposes the alternator voltage, and, on single-cylinder machines, in the event of a rider omitting to return the ignition key to IGN after an emergency start has been made, misfiring may occur. This will cease on turning the ignition key to the normal running position, IGN.

## Alternator Models

Two sizes of stator are made, one being of 5-in. diameter and the other, which is hexagonal, $5\frac{7}{8}$-in. The smaller is used, in different thicknesses, in alternator models RM13, 13/15 and 15 and the larger in model RM14. Model RM13/15 has an RM13 stator with the larger rotor used in RM15 and its output falls between the two. Models RM13 and 13/15 are designed

# INTRODUCTION

The Lucas A.C. Lighting-Ignition Unit is a 6-pole alternator consisting of a permanent magnet rotor rotating within a laminated wound stator. The rotor is driven by an extension of the engine crankshaft and is built into the crankcase or chain case.

A rectifier is included in the circuit, this being a device for converting the alternating current output of the alternator to uni-directional current which is essential for battery charging.

Wiring diagrams for many Lucas equipped machines can be obtained on request to the Advertising Dept., Gt. King St., Birmingham 19. These diagrams are issued free on receipt of the appropriate information, namely, Make, Model and Year of Manufacture of motor cycle.

## Normal Running.

Under normal running conditions (i.e., ignition switch in IGN position) electrical energy in the form of rectified alternating current passes through the battery from the alternator. When no lights are in use, the alternator output is sufficient only to supply the ignition coil and to charge the battery. When the lighting switch is turned, the output is automatically increased to meet the additional load. On some machines an increase occurs both when the parking light is switched on and again when the main bulb is brought into use; on other machines, only when the main bulb is switched on.

## Emergency Starting.

An EMERGENCY starting position is provided on the ignition switch, for use if the battery has become discharged and a normal start cannot therefore be made. Under these conditions, the alternator is connected direct to the ignition coil, allowing the engine to be started independently of the battery. It should be noted that with the ignition switch at EMG and the engine running, the battery receives a charging current, so that its terminal voltage begins to rise. This rising voltage opposes the alternator voltage, and, on single-cylinder machines, in the event of a rider omitting to return the ignition key to IGN after an emergency start has been made, misfiring may occur. This will cease on turning the ignition key to the normal running position, IGN.

## Alternator Models

Two sizes of stator are made, one being of 5-in. diameter and the other, which is hexagonal, $5\frac{7}{8}$-in. The smaller is used, in different thicknesses, in alternator models RM13, 13/15 and 15 and the larger in model RM14. Model RM13/15 has an RM13 stator with the larger rotor used in RM15 and its output falls between the two. Models RM13 and 13/15 are designed

for small capacity machines having low top gear ratios, whilst models RM14 and 15 are for large capacity machines having high top gear ratios. The additional output available from these two latter alternators permits the continuous use of larger capacity batteries (SC7E, GU11E, etc.) and of headlamp bulbs up to 36 watt rating.

## Alternative Battery Charging Rates.

The Lucas A.C. Ignition System is connected to ensure that the battery is maintained fully charged under all normal running conditions. Although alternator models RM13 and RM15 are very similar in outward appearance, the performance of the RM15 is considerably higher than that of the RM13. On some earlier machines fitted with the smaller model RM13 alternator, the charge rate may not always be found quite sufficient to meet the requirements of low-speed town work, the "running-in" period, short winter runs involving long periods of parking with the lights on, and similar conditions. In this event, the charge rate can be increased by interchanging two of the three alternator cables where these are joined by means of snap-connectors to the main harness. To do this, switch off the lighting and ignition switches and disconnect the Dark Green and Green-with-Yellow (formerly Medium Green) cables by pulling these cables from their snap-connectors. The Dark Green alternator cable must now be connected to the Green-with-Yellow (Medium Green on earlier models) harness cable, and the Green-with-Yellow alternator cable to the Dark Green harness cable.

If, due to a change in running conditions, the battery is found to be overcharged, as indicated by excessive gassing of the electrolyte and a frequent need for topping-up, the original connections must be restored, colour-to-colour.

# THE ALTERNATOR

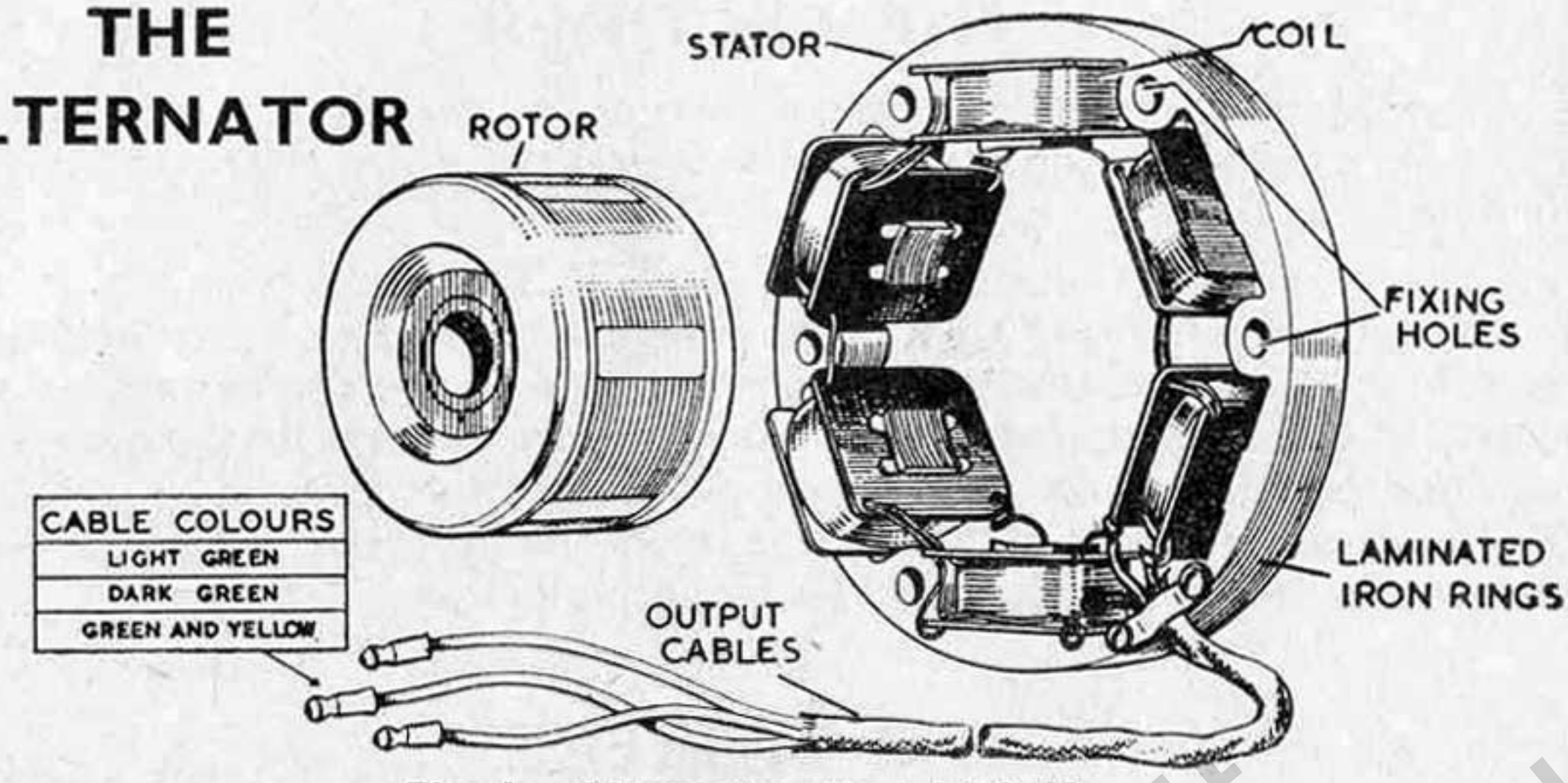


**Fig. 1. Alternator Model RM13.**

The alternator consists of a spigot-mounted 6-coil laminated stator with a rotor carried on and driven by an extension of the crankshaft. The rotor has an hexagonal steel core, each face of which carries a high-energy permanent magnet keyed to a laminated pole tip. The pole tips are riveted circumferentially to brass side plates, the assembly being cast in aluminium and machined to give a smooth external finish.

There are no rotating windings, commutator, brushgear, bearings or oil seals and consequently the alternator requires no maintenance apart from occasional checking that the snap-connectors in the three output cables are clean and tight.

If removal of the rotor becomes necessary for any purpose, there is no necessity to fit keepers to the rotor poles. When the rotor is removed wipe off any metal swarf which may have been attracted to the pole tips. Place the rotor in a clean place.

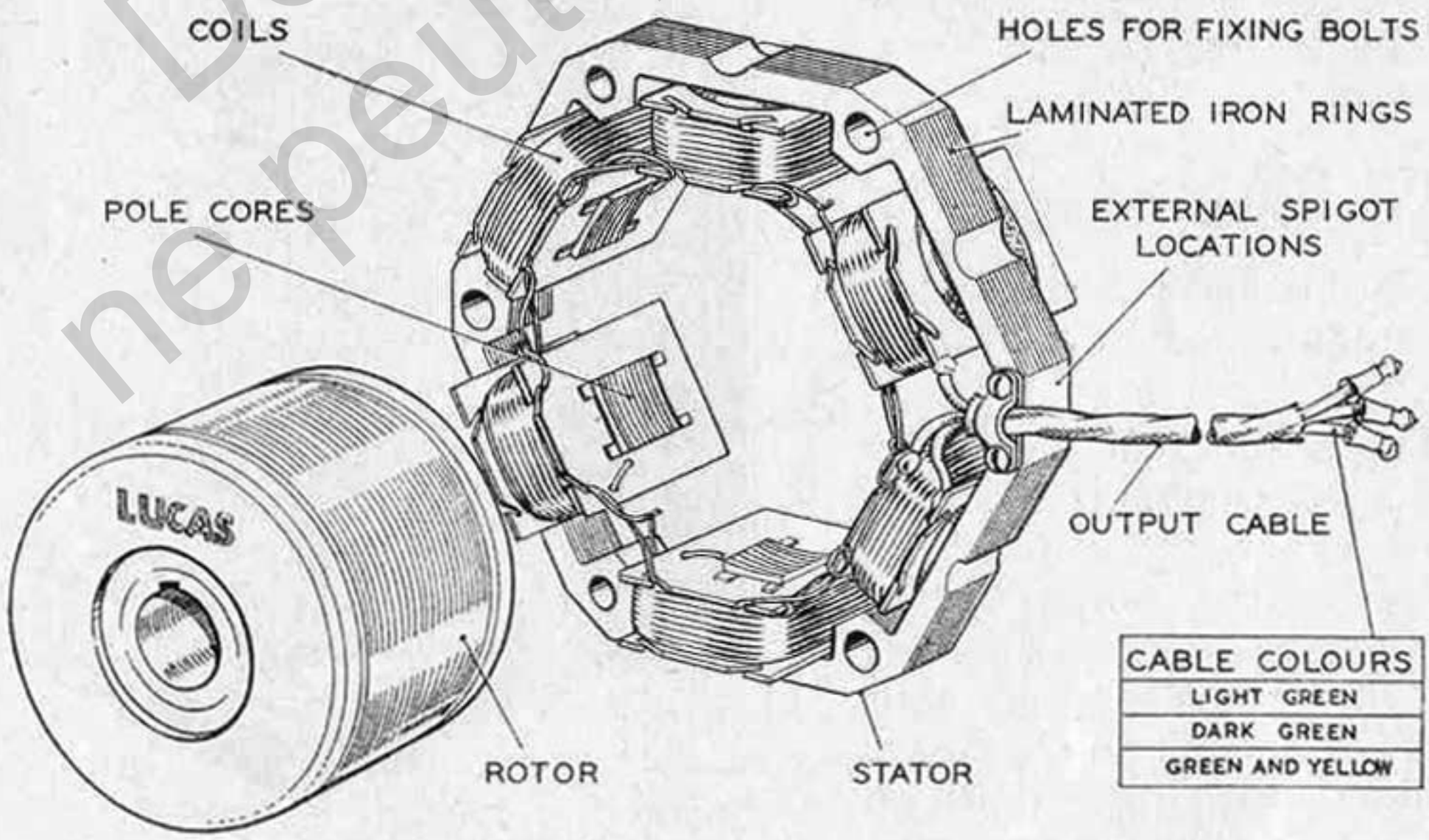


**Fig. 2. Alternator Model RM14.**

# THE RECTIFIER

The rectifier is a device to allow current to flow in one direction only. It is connected to provide full-wave rectification of the alternator output current.

The rectifier requires no maintenance beyond checking that the connections are clean and tight. **The nuts clamping the rectifier plates together must not under any circumstances be slackened, as the pressure has been carefully set during manufacture to give correct rectifier performance.** A separate nut is used to secure the rectifier to the frame of the motor cycle and it is important to check periodically that the rectifier is firmly attached to its mounting bracket.

# THE BATTERY

## Topping-Up.

During charging, water is lost by gassing and evaporation. Fortnightly, or more often in warm climates, check the electrolyte level in the battery cells. With the smaller capacity five-plate batteries, e.g., model PU5E fitted to certain lightweight motor cycles, make this examination weekly.

Remove the battery lid, unscrew the filler plugs, and, if necessary, add distilled water carefully to each cell to bring the electrolyte just level with the separator guard or, if visible, with the top edges of the separators. Do not use tap water.

The use of a Lucas Battery Filler will be found helpful in this topping-up process, since it ensures that the correct electrolyte level is obtained automatically and also prevents distilled water from being spilled over the battery top.

*Batteries with Correct-Acid-Level Devices.*

The fitting of these devices was discontinued in December 1957.

The correct acid level device consists of a central tube with a perforated flange which rests on a ledge in the filling orifice. When topping-up a battery fitted with these devices, pour distilled water round the flange (not down the tube) until no more drains through into the

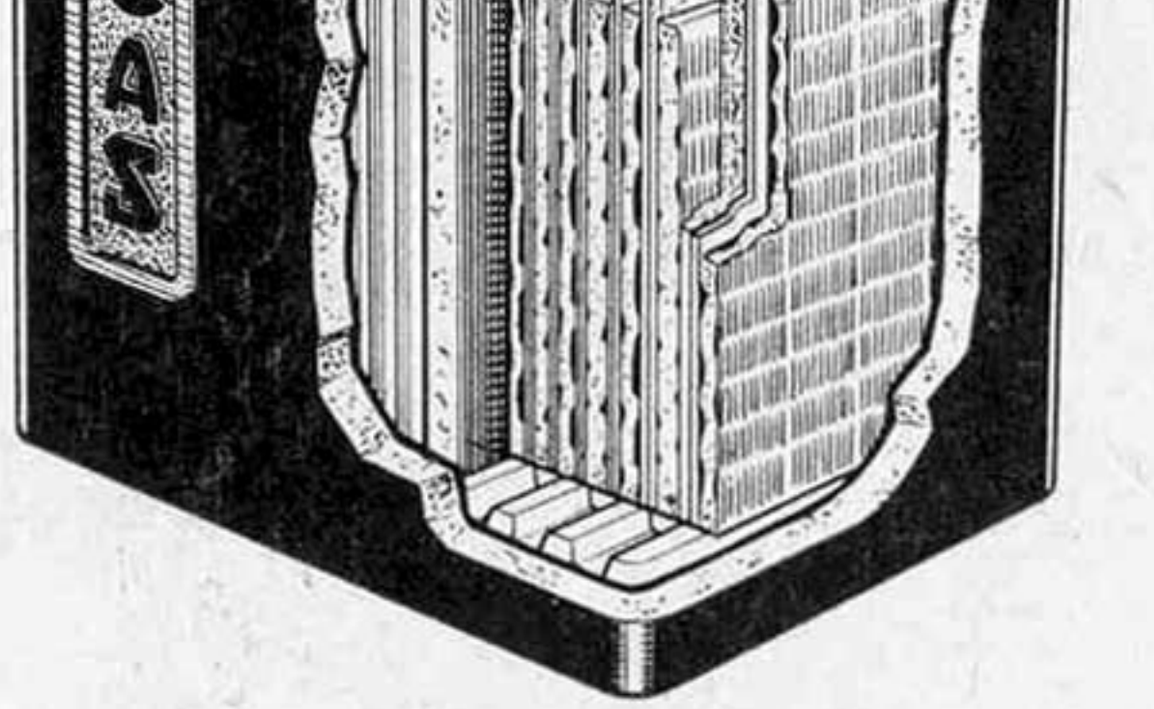


**Fig. 3. Battery Model PU7E/11.**

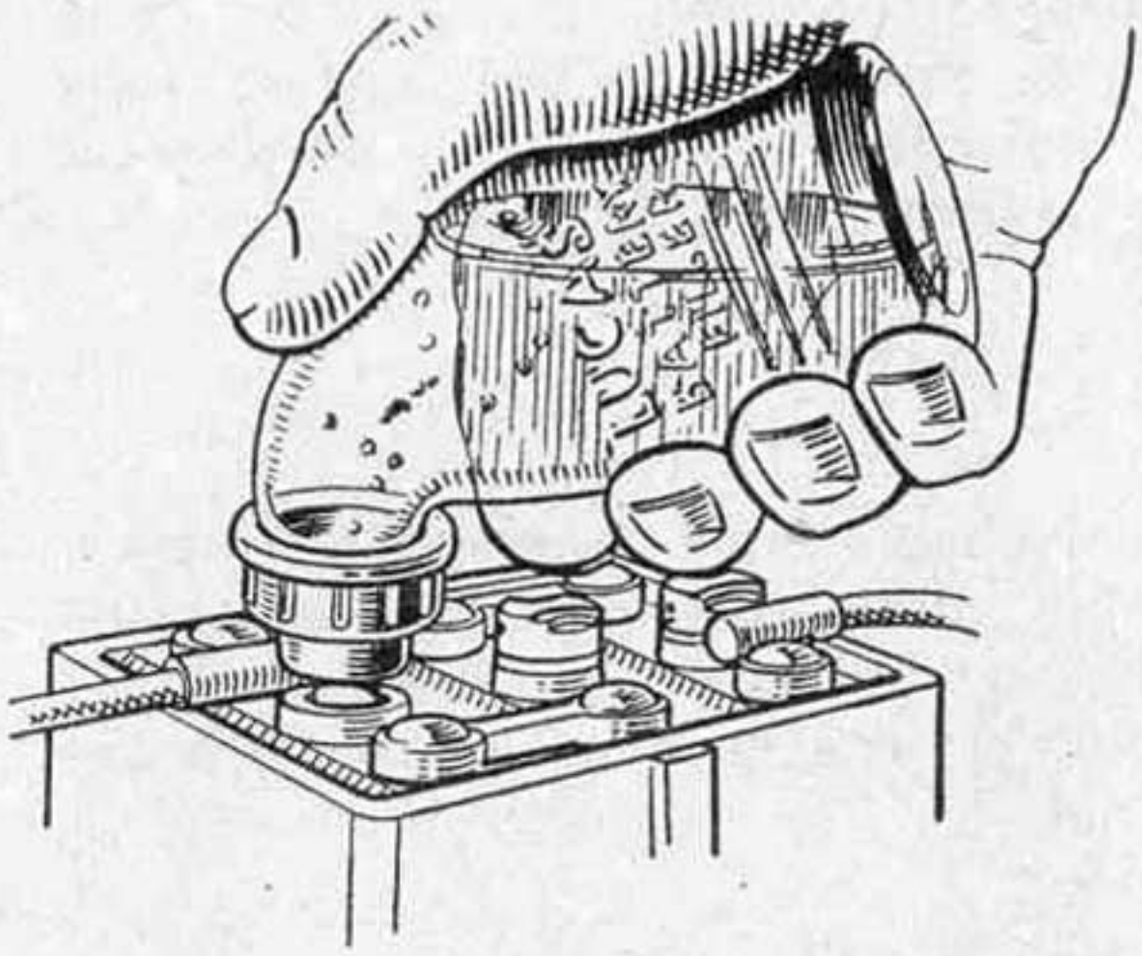

**Fig. 4. Using a Lucas Battery Filler.**

cell. This will happen when the electrolyte level reaches the bottom of the central tube and prevents further escape of air displaced by the topping-up water. Lift the tube slightly to allow the small amount of water in the flange to drain into the cell. The electrolyte level will then be correct.

## Cleaning.

Wipe away all dirt and moisture from the top of the battery.

## Checking the Condition of the Battery.

Occasionally check the condition of the battery by taking measurements of the specific gravity of the electrolyte in each of the cells. A small-volume hydrometer is required for this purpose — this instrument resembles a syringe containing a graduated float which indicates the specific gravity of the acid in the cell from which the sample has been taken. Do not take measurements immediately after topping-up the cells as the electrolyte will not be thoroughly mixed.

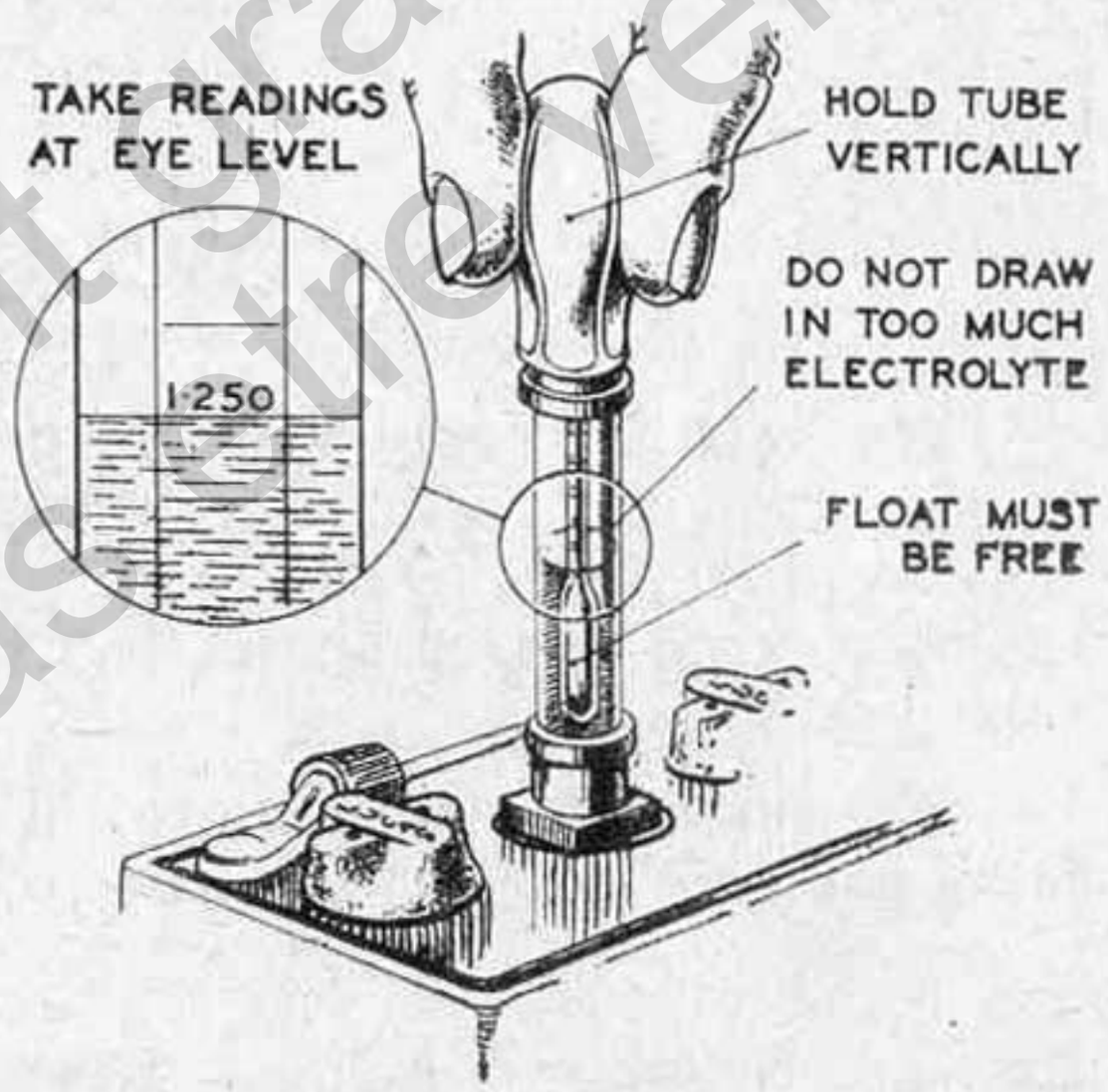


**Fig. 5. Taking Hydrometer Readings.**

Specific gravity readings and their indications are as follows :—

| Climates under 90°F. | | Climates over 90°F. |
|---|---|---|
| 1.270—1.290 | Cell fully charged | 1.200—1.220 |
| 1.190—1.210 | Cell about half discharged | 1.120—1.140 |
| 1.110—1.130 | Cell completely discharged | 1.040—1.060 |

The reading for each of the cells should be approximately the same. If one cell gives a value very different from the rest, it may be that acid has been spilled or has leaked from the particular cell, or there may be a short circuit between the plates, and in this case the battery should be examined by a Lucas Service Depot or Agent.

Never leave the battery in a discharged condition. If the motor cycle is to be out of use for a considerable period have the battery fully charged and every fortnight give it a short freshening charge to prevent any tendency for the plates to become permanently sulphated.

**Detachable Cable Connectors.**

When connecting batteries with detachable cable connectors, unscrew the knurled nut and withdraw the collet. Bare the end of the cable and thread the bared end through the knurled nut and collet. Bend back the cable strands, insert the collet and cable in the terminal and secure the connection by tightening the knurled nut.

**Battery Earth.**

**The A.C. Lighting-Ignition Unit has been designed for positive (+ve) earth systems. If the battery connections are reversed the equipment will be damaged.**

# COIL IGNITION

The ignition equipment comprises an ignition coil and a contact breaker unit, and in the case of twin and four-cylinder machines, a high tension distributor. The contact breaker, together with an automatic timing control, may be housed in a separate unit or built-in to the engine timing case.

The automatic timing control is centrifugally operated and varies the firing point according to the speed of the engine.

**Contact Breaker Setting — after first 500 miles and, thereafter, every 6,000 miles.**

To check the contact breaker gap, turn the engine over slowly until the contacts are seen to be fully open and insert a feeler gauge between the contacts. The correct gap setting is 0.014"—0.016" (0.35—0.4 mm.). If the gap is correct, the gauge should be a sliding fit.

To adjust the gap on all models except 15D1, keep the engine in the position giving maximum contact opening and slacken the screw(s) securing the fixed contact plate. Adjust the position of the plate until the gap is set to the thickness of the gauge, and tighten the locking screw(s).

*N.B.* Models 4CA and 4CC are twin lever units operated by a single-lobe cam and therefore, with these units, the engine must be turned before adjusting the second gap.

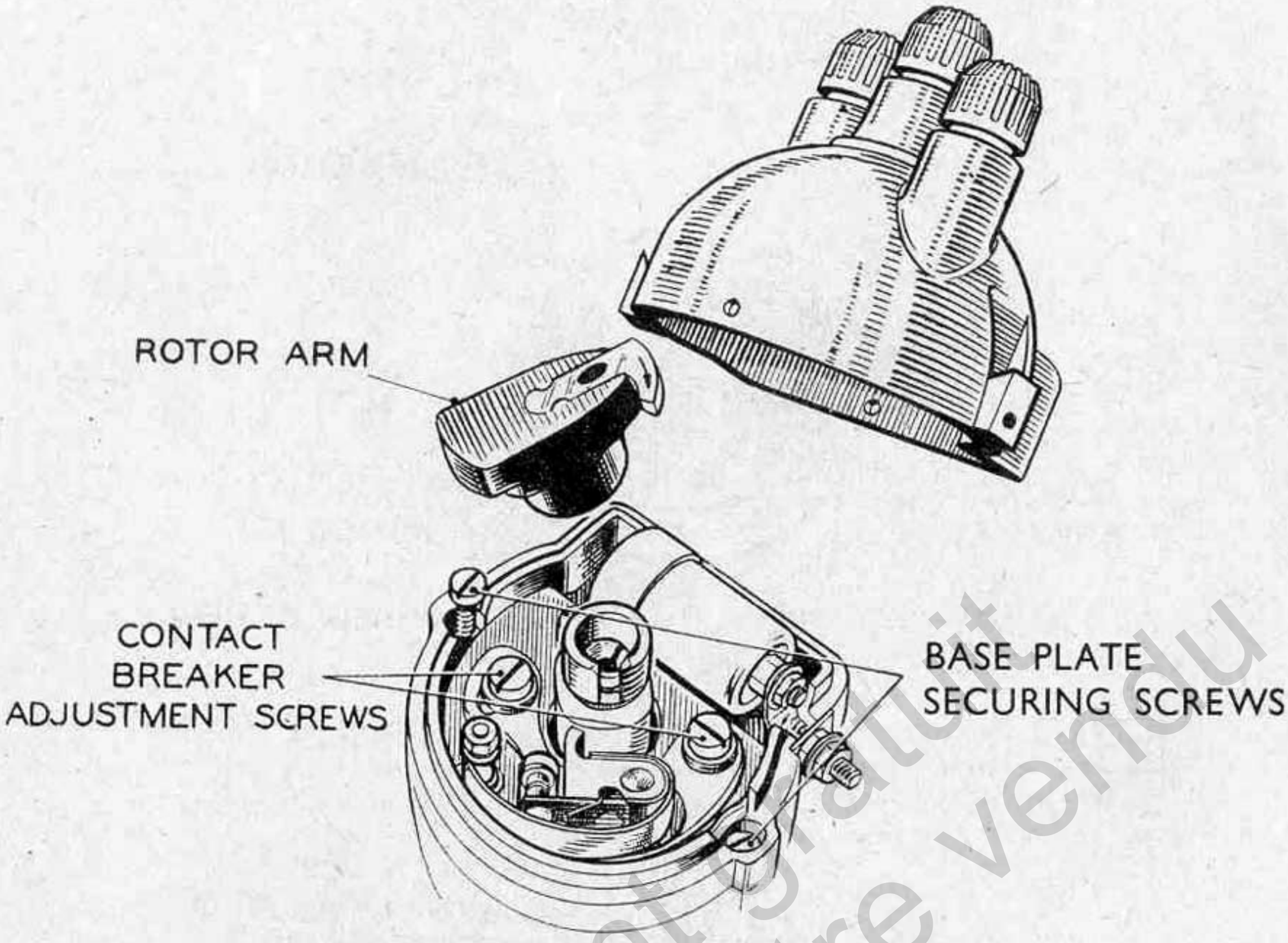


**Fig. 6. Distributor Model DKX2A with cover removed.**

On model 15D1, keep the engine in the position giving maximum opening and slacken the screw at the side of the fixed contact plate. Slide the fixed contact carrier in its slotted hole, until the correct gap is obtained. Retighten the screw.

**Cleaning — every 6,000 miles.**

Remove and clean the cover. On twin and four-cylinder units, pay particular attention to the spaces between the metal electrodes in the cover, and check that the small carbon brush moves freely in its holder.

Examine the contact breaker. The contacts must be free from grease or oil. If they are burned or blackened, clean with fine carborundum stone or very fine emery cloth, afterwards wiping away any trace of dirt or metal dust with a clean petrol-moistened cloth. Cleaning of the contacts is made easier if the contact breaker lever carrying the moving contact is removed.

To remove the moving contact from models DKX, CA1A, 2CA and 3CA, unscrew the nut securing the end of the spring and remove the capacitor connector (DKX excepted), spring washer and insulating bush. Lift the contact breaker lever off the pivot post. With model 2CA contact breaker unit, access to the contact breaker is gained by withdrawing the central bolt and removing the centrifugal timing control mechanism.

To remove the moving contact from model 15D1, remove the terminal

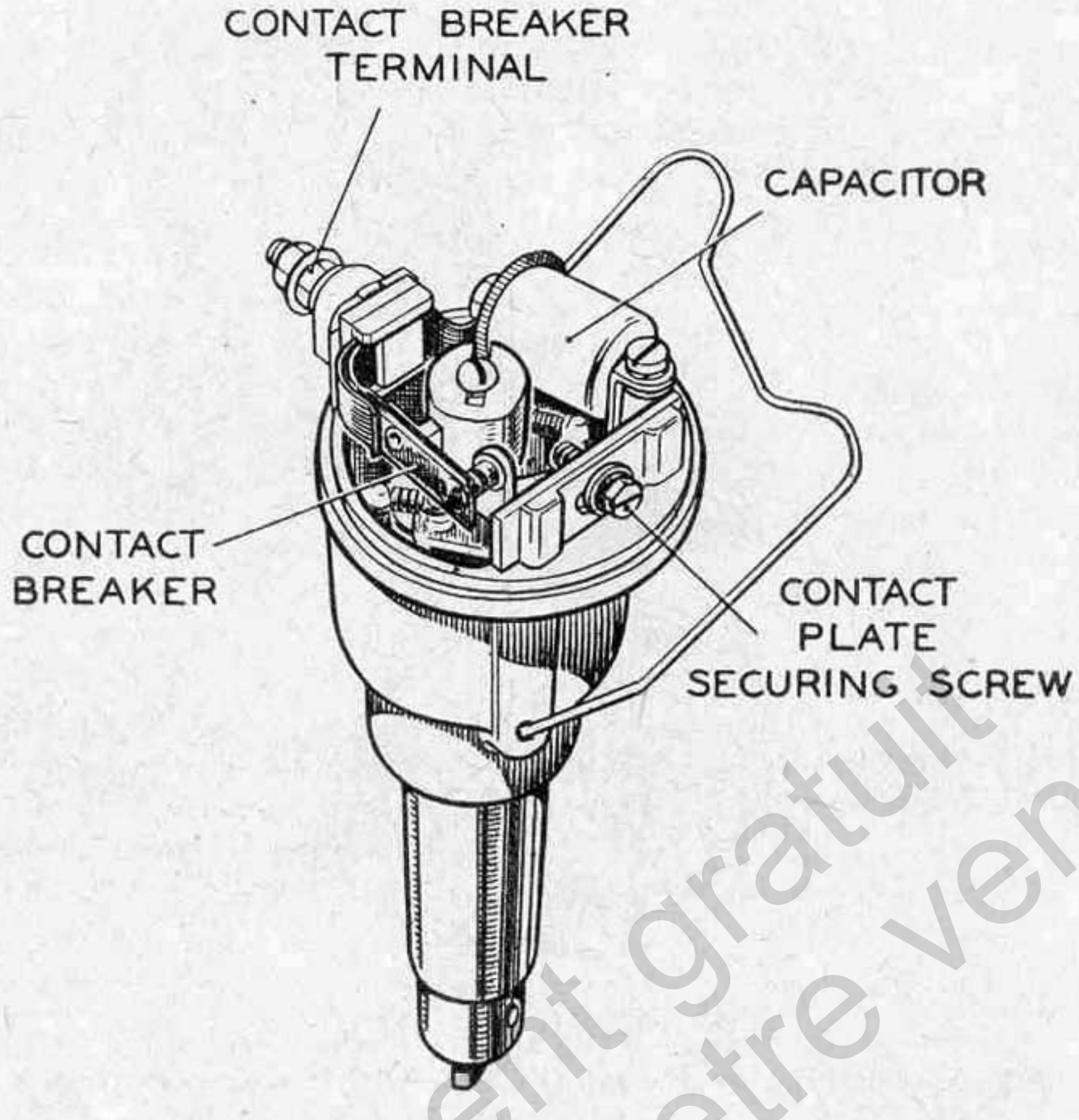


**Fig. 7. Contact Breaker and Automatic Advance Unit, Model 15D1, with cover removed.**

nut and withdraw the nylon washer. The contact breaker spring and heel can now be lifted out of the unit body.

To remove the moving contact from models 18D1 and 18D2, slacken the contact breaker terminal nuts and remove the nut and washers from the pivot post. Lift the contact breaker lever off the pivot post.

To remove the moving contact from models 4CC and 4CA, unscrew the nut from the capacitor terminal and withdraw the contact from the pivot post.

After cleaning, check the contact breaker setting.

**Lubrication — to be carried out every 6,000 miles except where indicated.**

**No grease or oil must be allowed to get on or near the contacts when carrying out the following procedure.**

Smear the surface of the cam very lightly with Mobilgrease No. 2, or, if this is not available, clean engine oil (S.A.E. 30—40) may be used.

Place a spot of clean engine oil on the contact breaker pivot post.

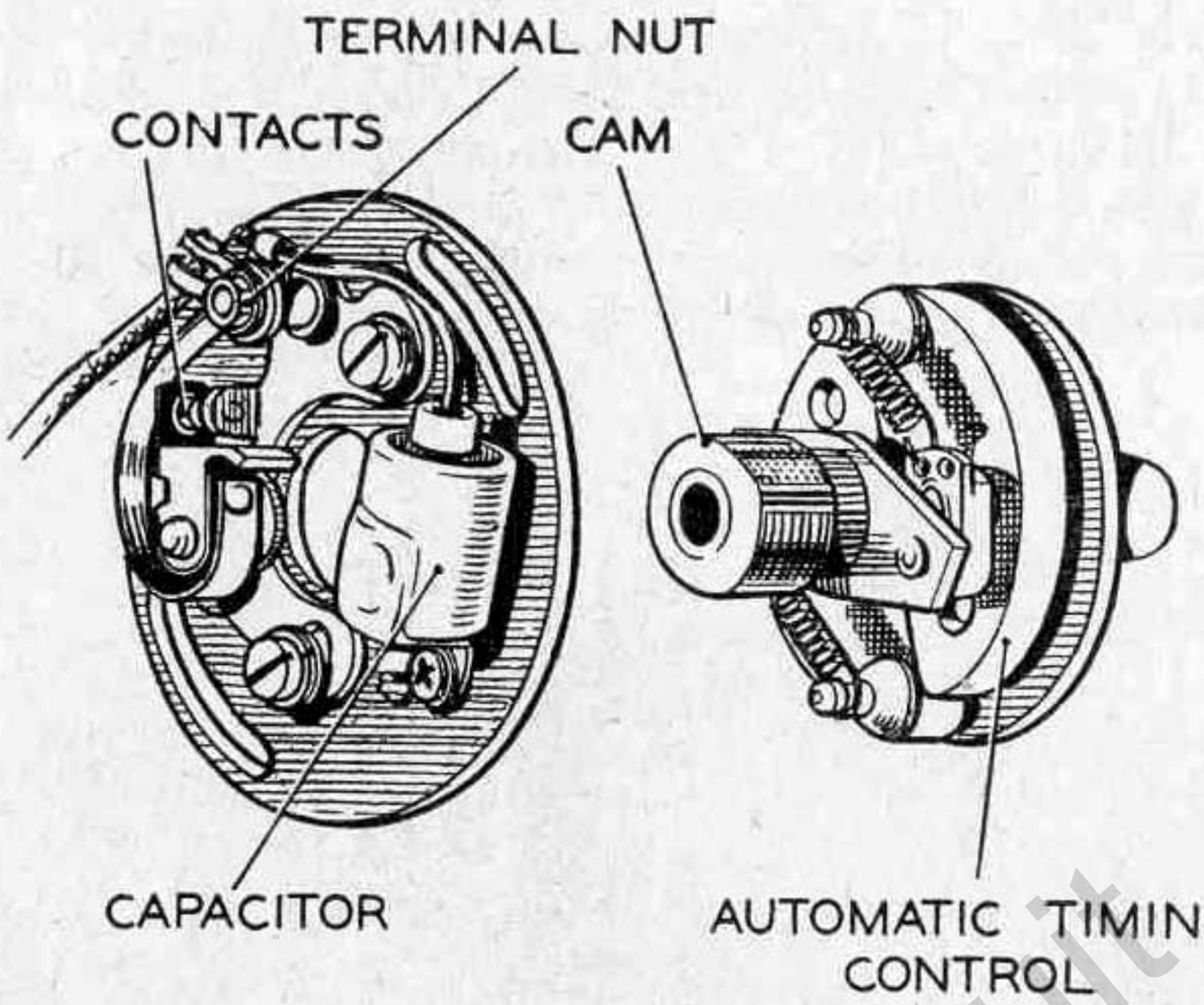


**Fig. 8. Contact Breaker and Automatic Advance Mechanism, Model CAIA, removed from engine. (Other contact breaker units include Models 2CA and 4CA. Also fixed ignition Models 3CA and 4CC).**

Automatic Timing Control.

Models DKX2A, DKX4A, 18D1 and 18D2 : Lift off the rotor arm, and unscrew the two screws securing the contact breaker base plate to the distributor. Lubricate the automatic timing control, thus exposed, with clean engine oil, paying particular attention to the pivots. Refit the base plate, and secure by means of the fixing screws. Refit the rotor arm.

Model 15D1 : Remove the contact breaker cover and use clean engine oil to lubricate the automatic timing mechanism in the base of the unit.

Models CAIA and 4CA : Every 3,000 miles remove the central fixing bolt and inject a small amount of clean engine oil into the hole thus exposed. When the fixing bolt has been replaced and the engine run for a few minutes, the oil will be forced out over the automatic advance mechanism by centrifugal force.

Model 2CA : Lightly lubricate the mechanism with clean engine oil.

**The Ignition Coil.**

The coil requires no attention whatever beyond keeping its exterior clean, particularly the terminals, and occasionally checking that the connections are tight.

**Renewing High Tension Cables.**

When the high tension cable shows signs of perishing or cracking it must be renewed, using 7 mm. p.v.c.-covered or neoprene-covered rubber ignition cable.

To fit new cable to ignition coils and distributors having vertical screw-type connectors, remove the metal washer and moulded terminal nut from the defective cable. Thread the new cable through the moulded terminal nut and cut back the insulation for about $\frac{1}{4}$-in. Pass the exposed strands through the metal washer and bend them back radially. Screw the terminal nut into the pick-up moulding.

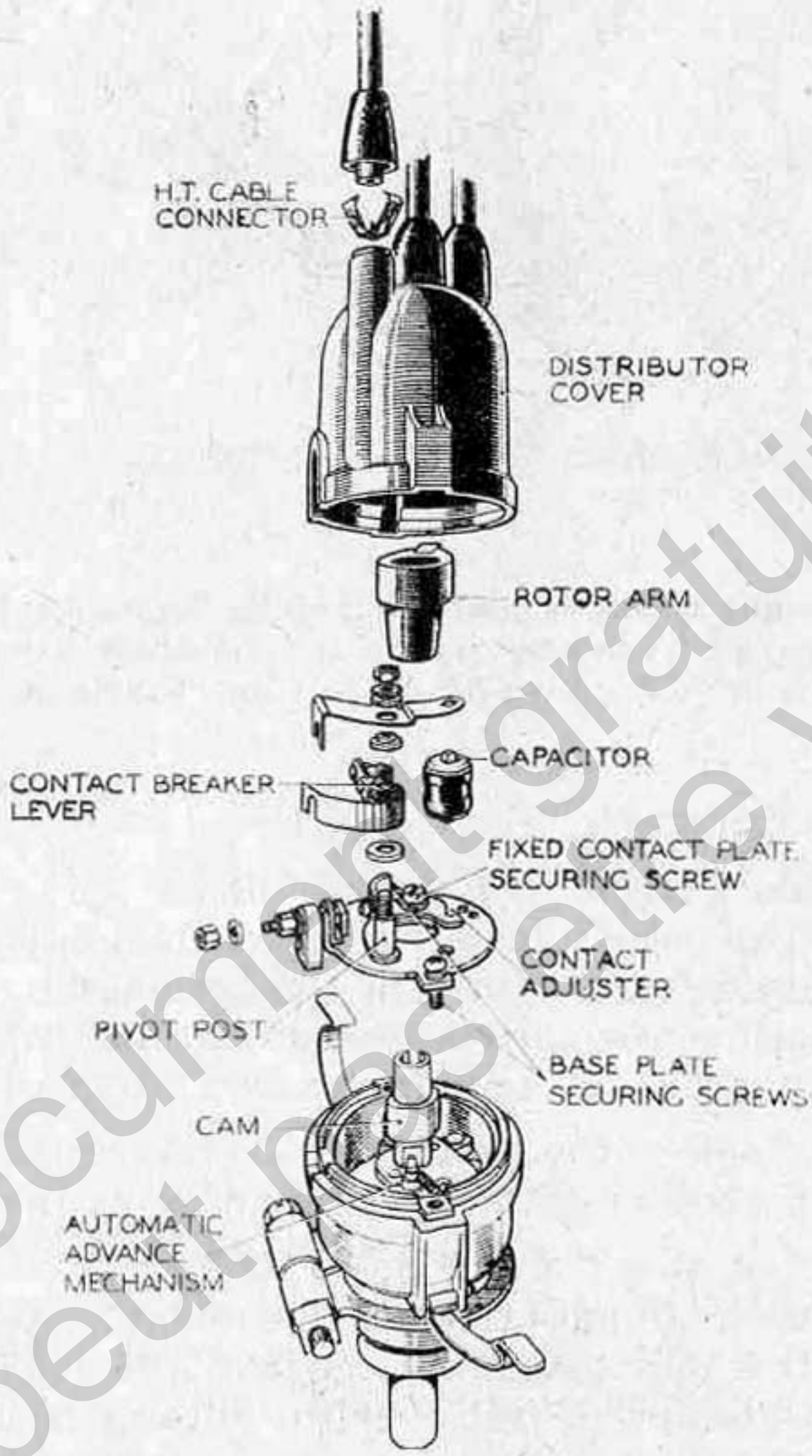


**Fig. 9. Distributor Model 18D2.**

To fit new cables to distributors having the horizontal type of outlet, remove the two screws securing the moulded cable cover on to the distributor cap. Cut the cables off flush to the required length and locate them in the recesses in the distributor moulding. Refit the cover. This presses the cables on to pointed metal studs which make good contact with the cable core.

To fit new cables to distributors having outlets similar to those illustrated in Fig. 9, pull the old cable and connector from the socket in the distributor cap and fit new cable and connectors.

# MAGNETO IGNITION

Some alternator-equipped machines are fitted with magnetos of the types shown in Figs. 10 and 11. With these machines, the only function of the alternator and rectifier is to charge the battery. Since magneto ignition is unaffected by battery condition, no provision is made for emergency starting.

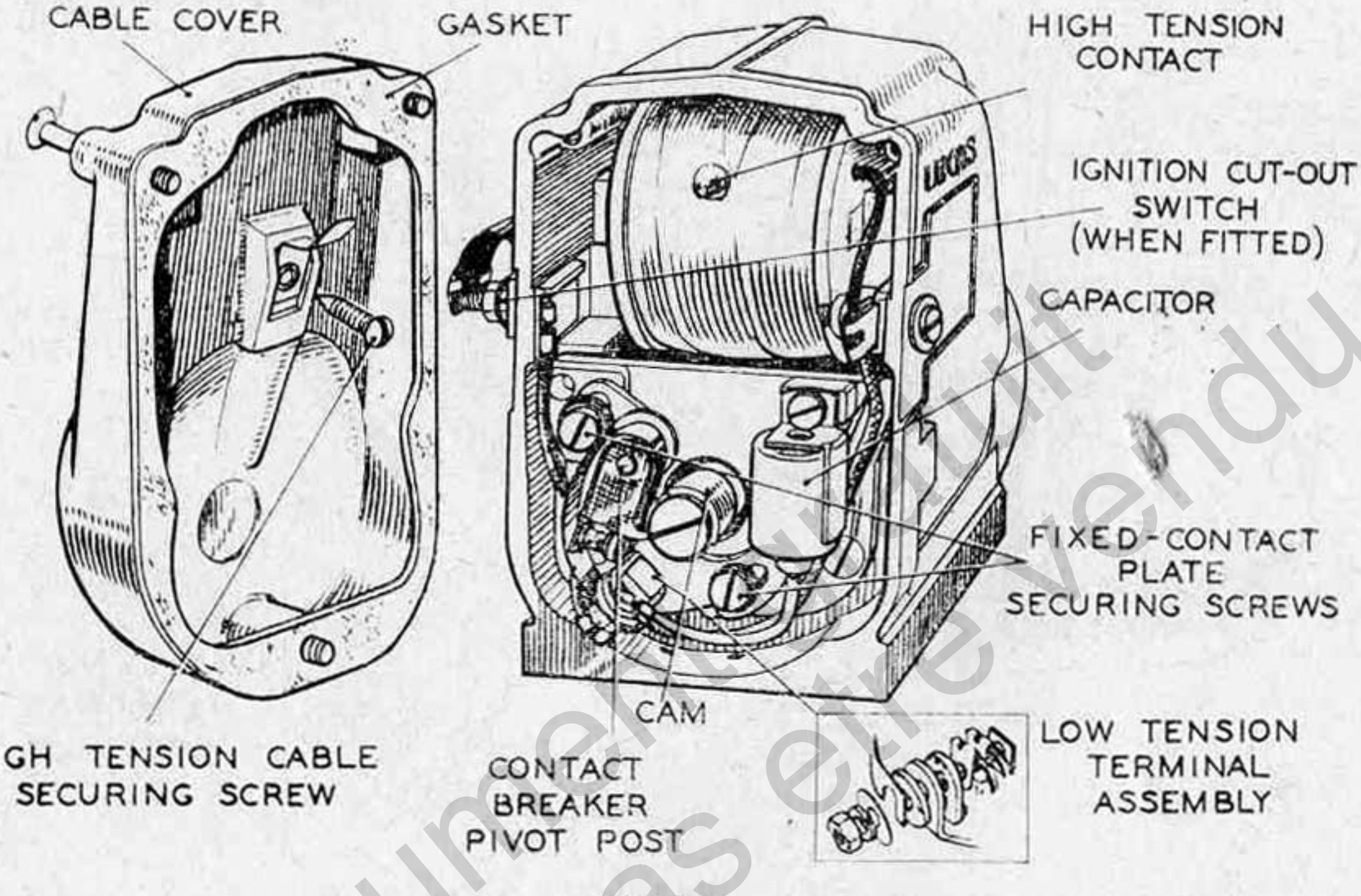


Fig. 10.

**After first 500 miles and, thereafter, every 3,000 miles.**

Check the setting of the contact breaker gap. To do this, remove the cable cover, turn the engine over slowly until the contacts are fully open and insert a 0.010″—0.012″ (0.25—0.3 mm.) feeler gauge in the gap. The gauge should be a sliding fit between the contacts.

To adjust the gap, slacken the two fixed contact plate securing screws and move the plate until the gap is set to the gauge thickness.

Apply a spot of clean engine oil to the visible end of the contact breaker pivot post. **No oil must be allowed on or near the contacts.**

**Every 6,000 miles.**

Remove the cable cover and clean the contacts. To do this, slacken the nut securing the low tension terminal assembly and withdraw the spring and contact breaker lever.

If the contacts are rough or pitted, polish them with fine carborundum stone, silicon carbide paper or emery cloth. Afterwards, clean the contacts with petrol or methylated spirits (denatured alcohol).

Smear the pivot post with Mobilgrease No. 2.

When refitting the contact breaker, see that the components are assembled in the order illustrated.

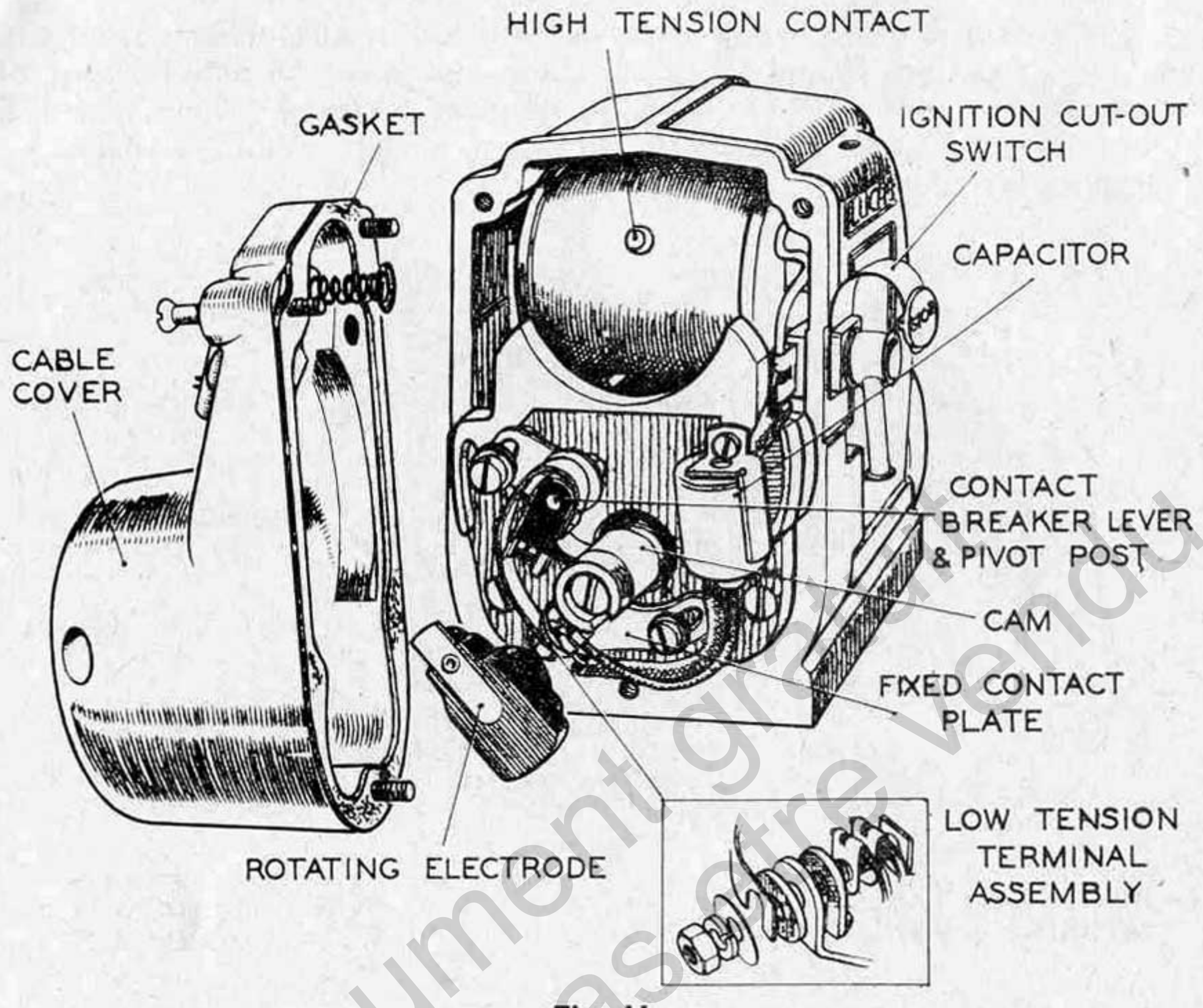


**Fig. 11.**

*Note*:—In some earlier magnetos, the rotating electrode shown in Fig. 11 was a common part with coil ignition distributors and the moulded portion carried the words "Remove to Oil." This instruction must be ignored on this magneto.

**Every two years.**

About every two years or when the engine is overhauled, the magneto should be dismantled at a Lucas Service Depot or Agent, where the weights, springs and toggles of the automatic timing control mechanism will be examined and lubricated with medium viscosity engine oil and the rotor bearings repacked with grease.

**Replacing High Tension Cable.**

When high tension cable shows signs of cracking or perishing, it must be renewed with 7 mm. p.v.c.-covered or neoprene-covered rubber insulated ignition cable. To do this, remove the cable cover, unscrew the cable securing screw and withdraw the defective cable. Cut the new cable to the required length and push one end well home into its terminal. Tighten the cable securing screw, which will pierce the insulation and contact the cable core.

# HEADLAMPS AND PARKING LIGHTS

Lucas motor cycle headlamps are all arranged to incorporate the Lucas Light Unit, which consists of a combined reflector and front lens assembly. A special " prefocus " bulb is used with the Light Unit, ensuring that when the bulb is fitted, the filament is correctly positioned in relation to the reflector, and no focusing is necessary. The parking light bulb is mounted either in the rear of the Light Unit, or behind a separate lens built into the headlamp mounting.

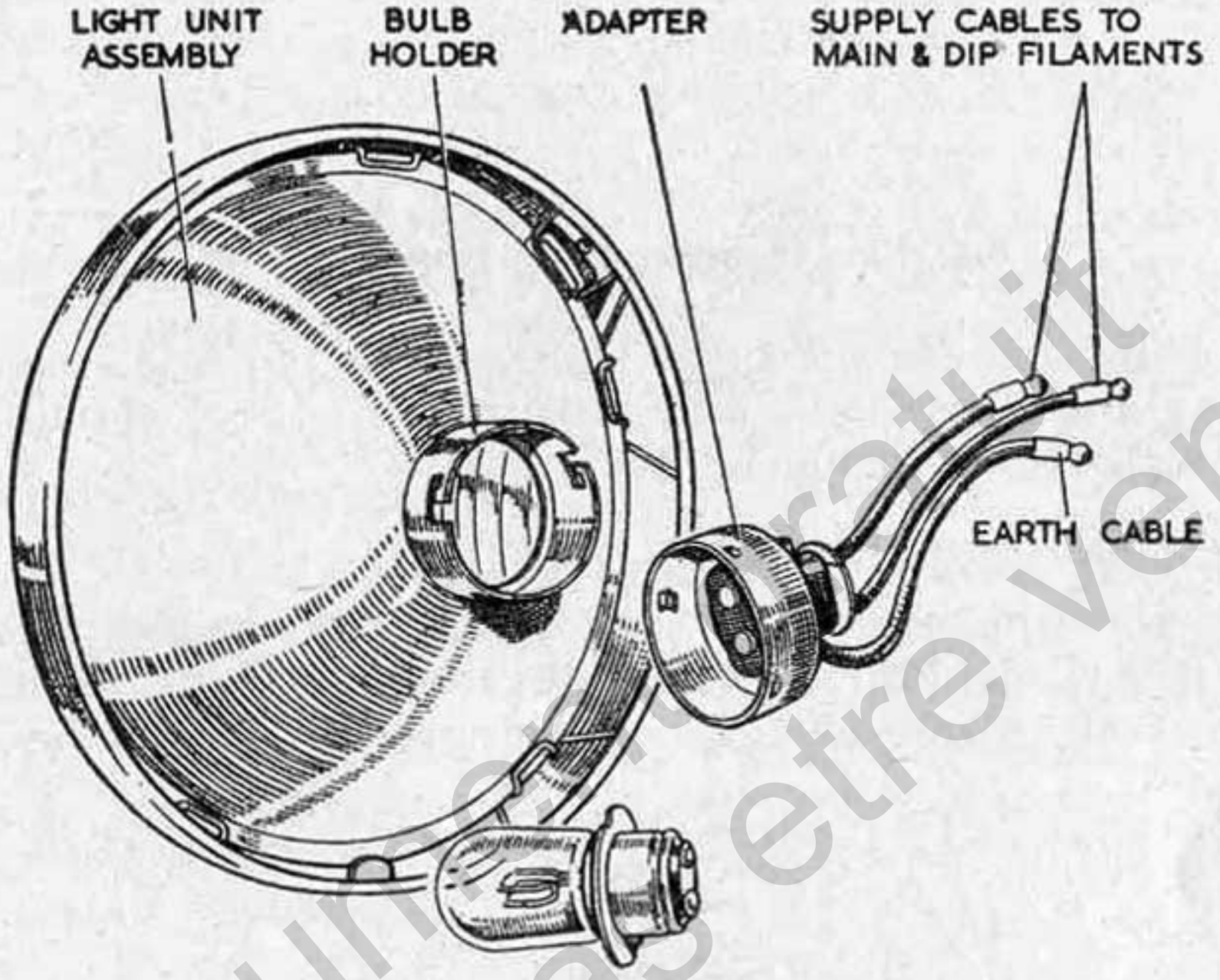


**Fig. 12. Model F700 Light Unit and Rim removed from Lamp Body.**

On some machines the headlamp body has been dispensed with and a nacelle type extension of the forks provides a housing for the Lucas Light Unit.

## Setting.

Set the headlamp so that when the motor cycle carries its normal load the driving beam is projected straight ahead and parallel with the road surface.

Many garages possess a Lucas Beamsetter. This is a scientific instrument enabling accurate beam setting to be effected. Motor cycle owners are strongly advised to make use of this service whenever possible. When such facilities are not available, the headlamp can be set by marking off a smooth blank wall and shining the lamp on it from a distance of 25 feet. Details are shown in Fig. 13.

When setting :—

(*a*) Front of motor cycle to be square with screen.
(*b*) Motor cycle to be carrying normal load and standing on level ground.
(*c*) Recommended distance for setting is at least 25 feet.

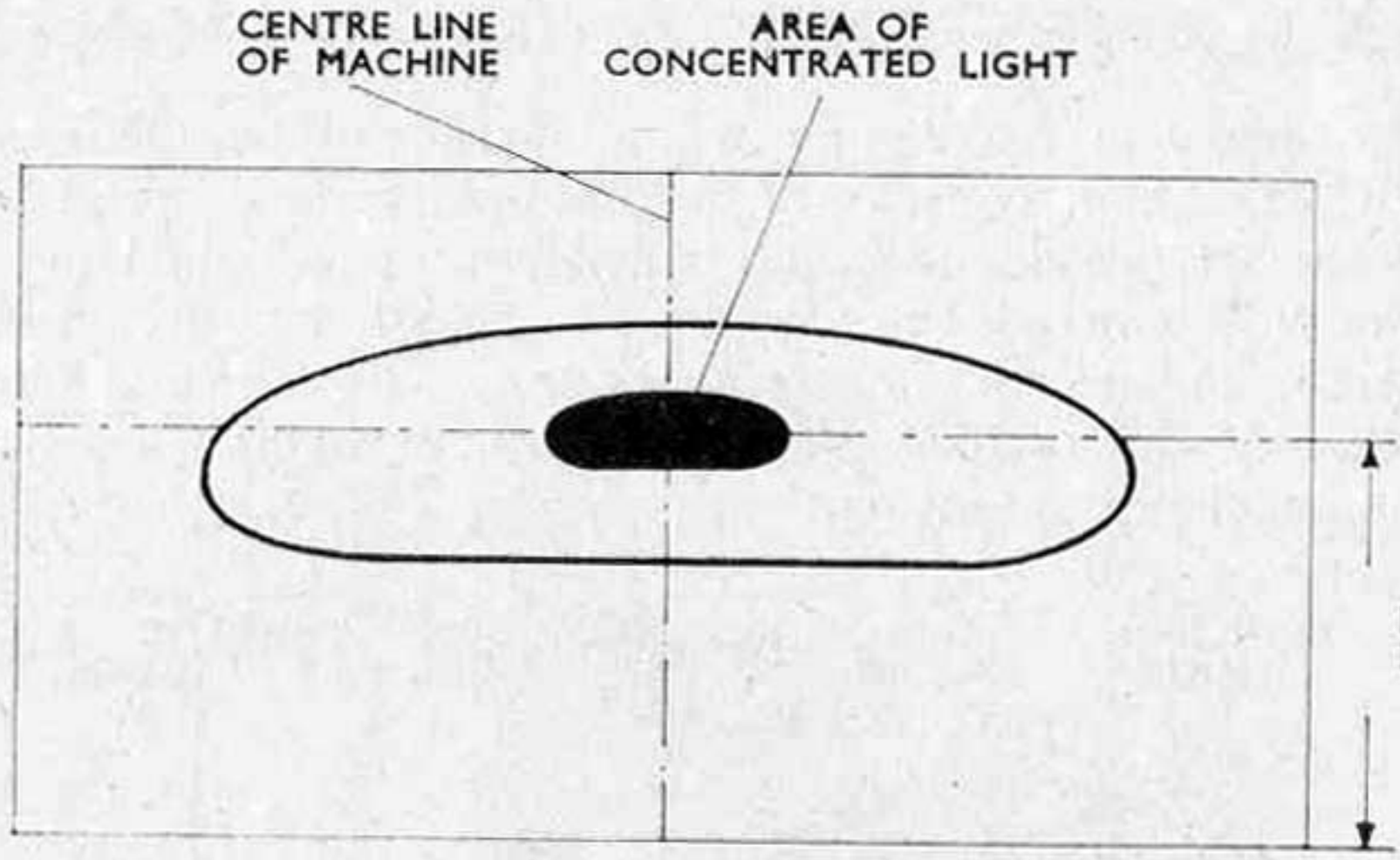


**Fig. 13. Headlamp Setting Diagram.**

On machines where the Light Unit is mounted in a nacelle or other special fitting, the motor cycle manufacturer's handbook should be referred to for instructions on setting the lamp.

## Removing Headlamp Front.

Slacken the rim securing screw located at the top or bottom of the lamp body. On model MCF575 headlamps the securing screw at the bottom of the lamp must be unscrewed completely to release the lamp.

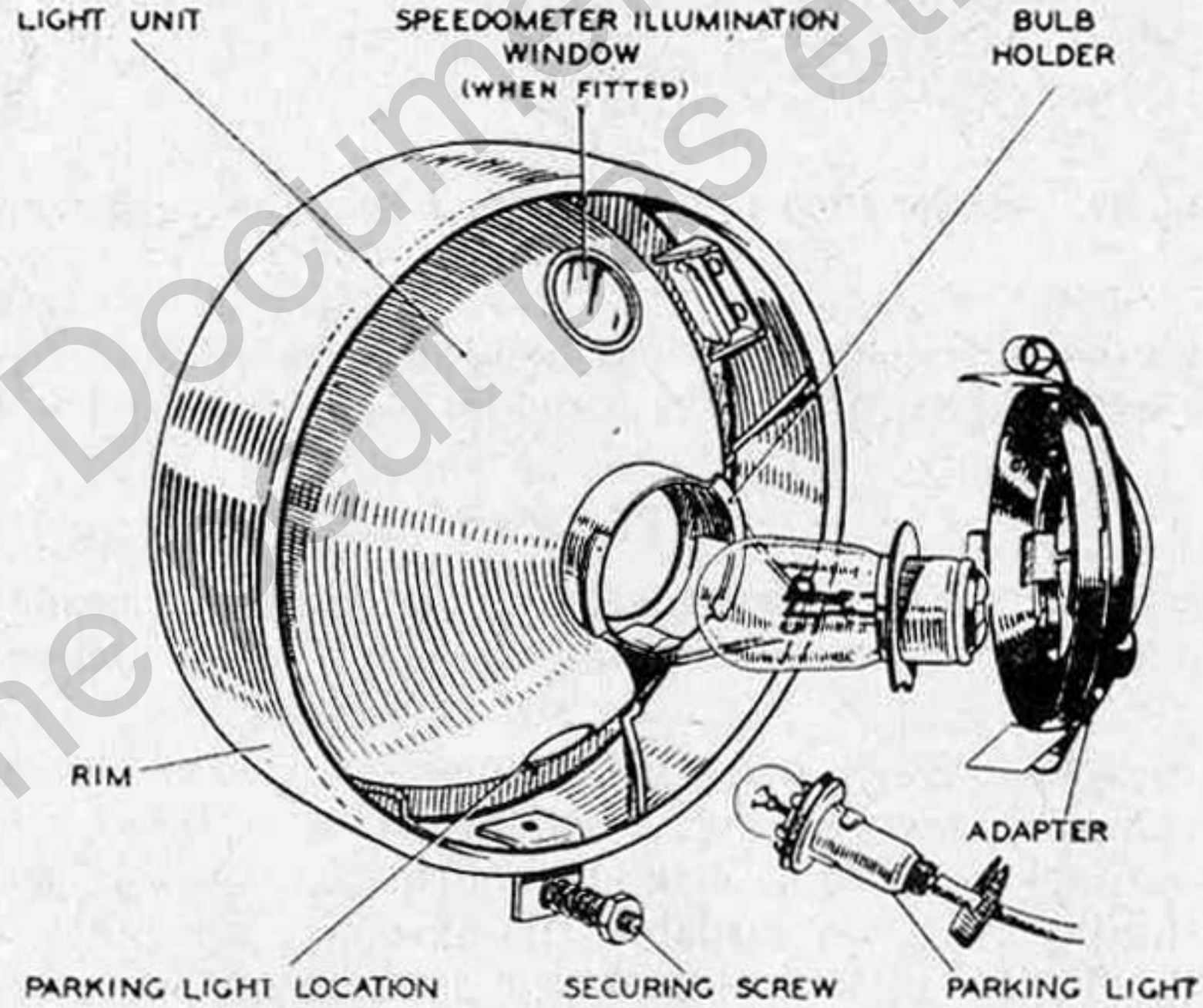


**Fig. 14. Model F575P Light Unit and Rim removed from Lamp Body.**

It will then be possible to detach the front rim complete with Light Unit assembly. To replace, locate the Light Unit assembly in the lamp body, press the front on and secure in position by tightening the securing screw.

## Replacement of Bulbs.

When the replacement of a bulb is necessary, it is important not only that the same size bulb is fitted, but also that it has a high efficiency and will focus in the reflector. Cheap and inferior replacement bulbs often have the filament of such a shape that correct focusing is not possible ; for example, the filament may be to one side of the axis of the bulb, resulting in loss of range and light efficiency.

**Lucas Genuine Spare Bulbs** are specially tested to check that the filament is in the correct position to give the best results with Lucas lamps. To assist in identification, Lucas bulbs are marked on the metal cap with a number. When fitting a replacement, see that it has the same number as the original bulb.

To gain access to the headlamp bulb, remove the front rim and Light Unit assembly as previously described. Push on the adapter and twist it in an anti-clockwise direction to take it off. The bulb can now be removed from the rear of the reflector. Place the correct replacement bulb in the holder, engage the projections on the inside of the adapter, press on and secure by twisting to the right.

To gain access to the parking light bulb (if it is situated in the headlamp reflector) remove the front rim and Light Unit assembly and withdraw the bulb holder from the reflector in which it is a push-fit.

Certain motor cycles have flush-fitting parking lights (see Fig. 15), pressed into sockets in the headlamp nacelle. To reach the bulb in these lamps remove the chromium-plated rim and peel back the rubber surround to release the frosted-glass lens.

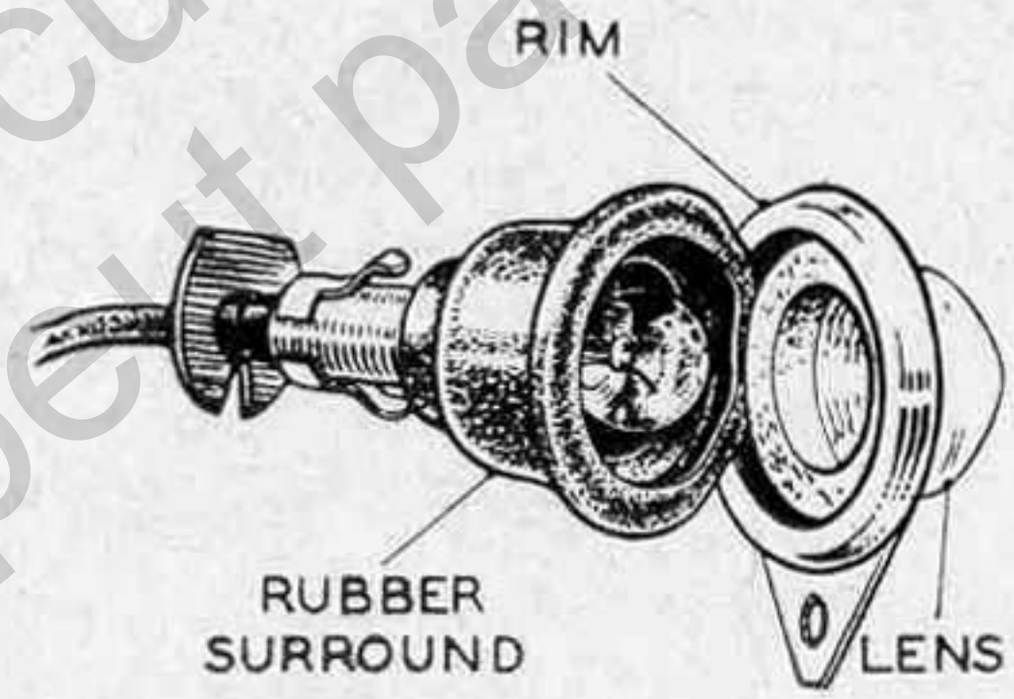


**Fig. 15. Parking Light Model 550.**

The correct parking light bulb replacement is Lucas No. 988 6-volt 3-watt miniature bayonet cap. The size of headlamp bulb varies with the type of alternator and the conditions under which the motor cycle is used.

## Dipper Switch.

Every 5,000 miles the moving parts of the dipper switch should be lubricated with thin machine oil.

# REAR LAMPS

**Replacement Bulbs.**

In the United Kingdom, the correct size of bulb to be used in rear lamps is based on the cubic capacity of the engine. Solo machines of 250 c.c. or less may be fitted with 3-watt bulbs. Combinations and machines exceeding 250 c.c. are required to be fitted with 6-watt bulbs.

Bulbs can be identified by number, usually stamped on the metal cap. When changing a defective bulb, the replacement should bear the same number as the original.

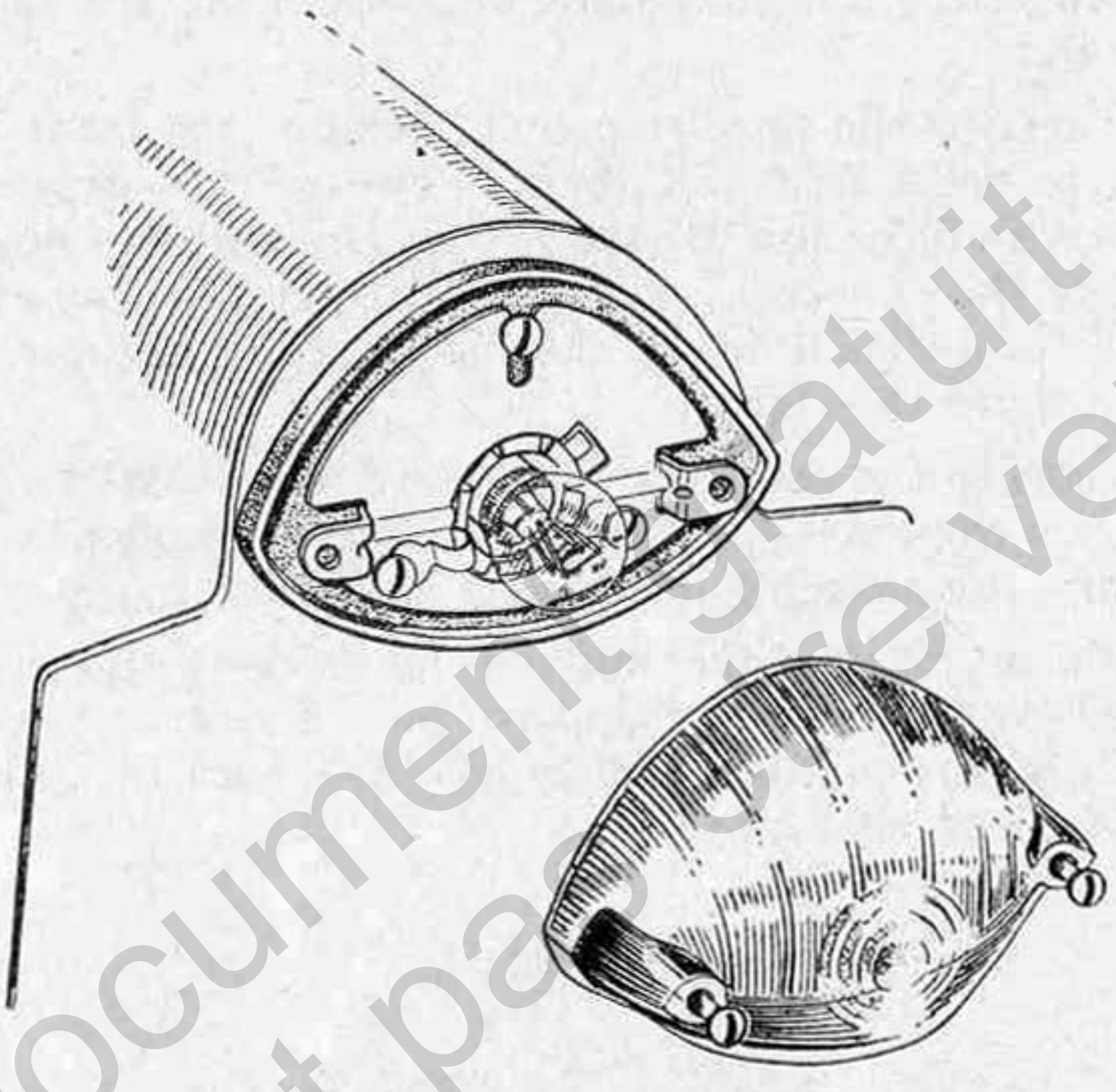

**Fig. 16. Stop-Tail Lamp Model 529.**

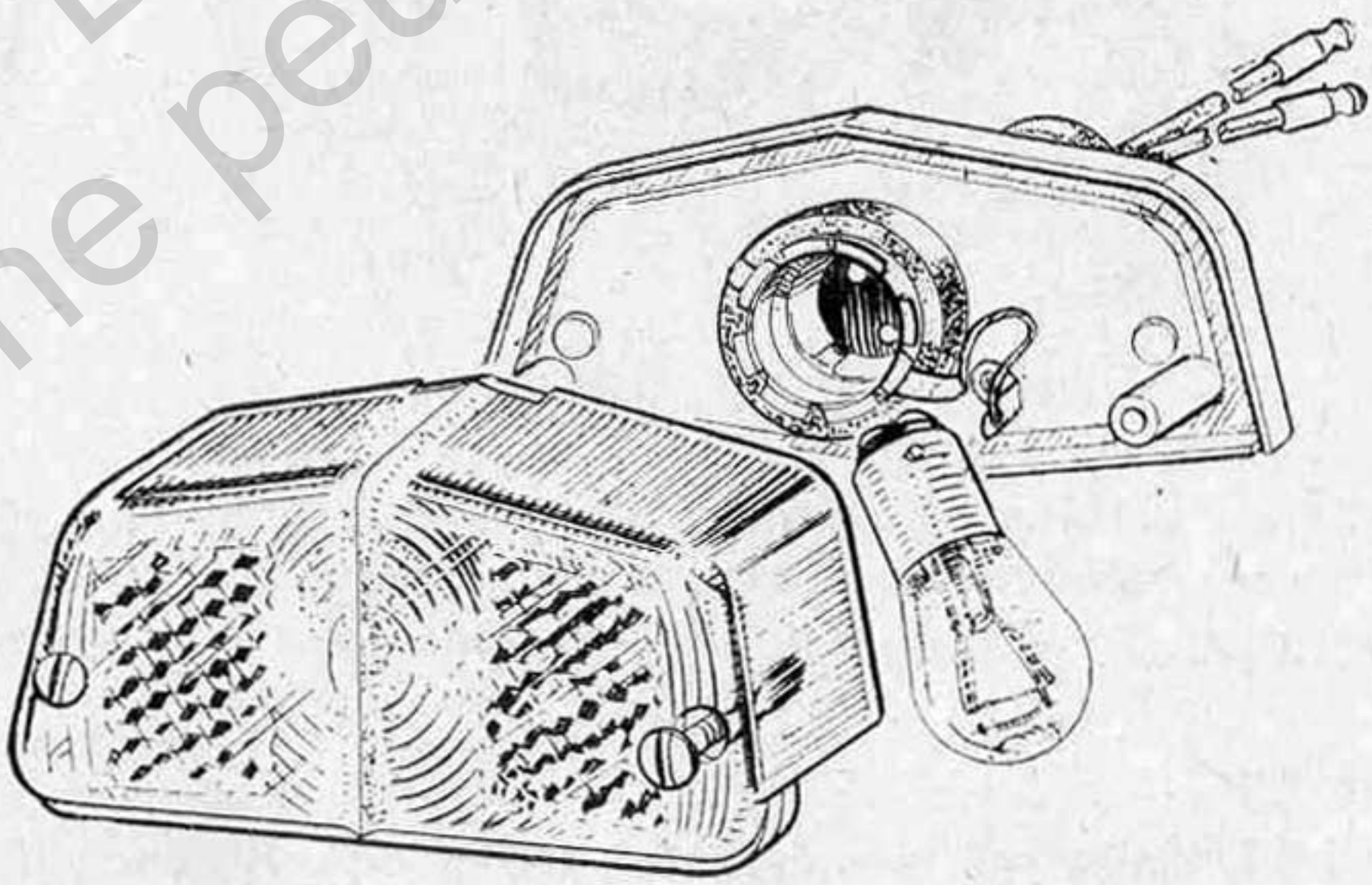

**Fig. 17. Stop-Tail Lamp Model 564 incorporating Reflex Reflector.**

# ELECTRIC HORNS

Horns are pre-set to give their best performance and, in general, no further adjustment is necessary.

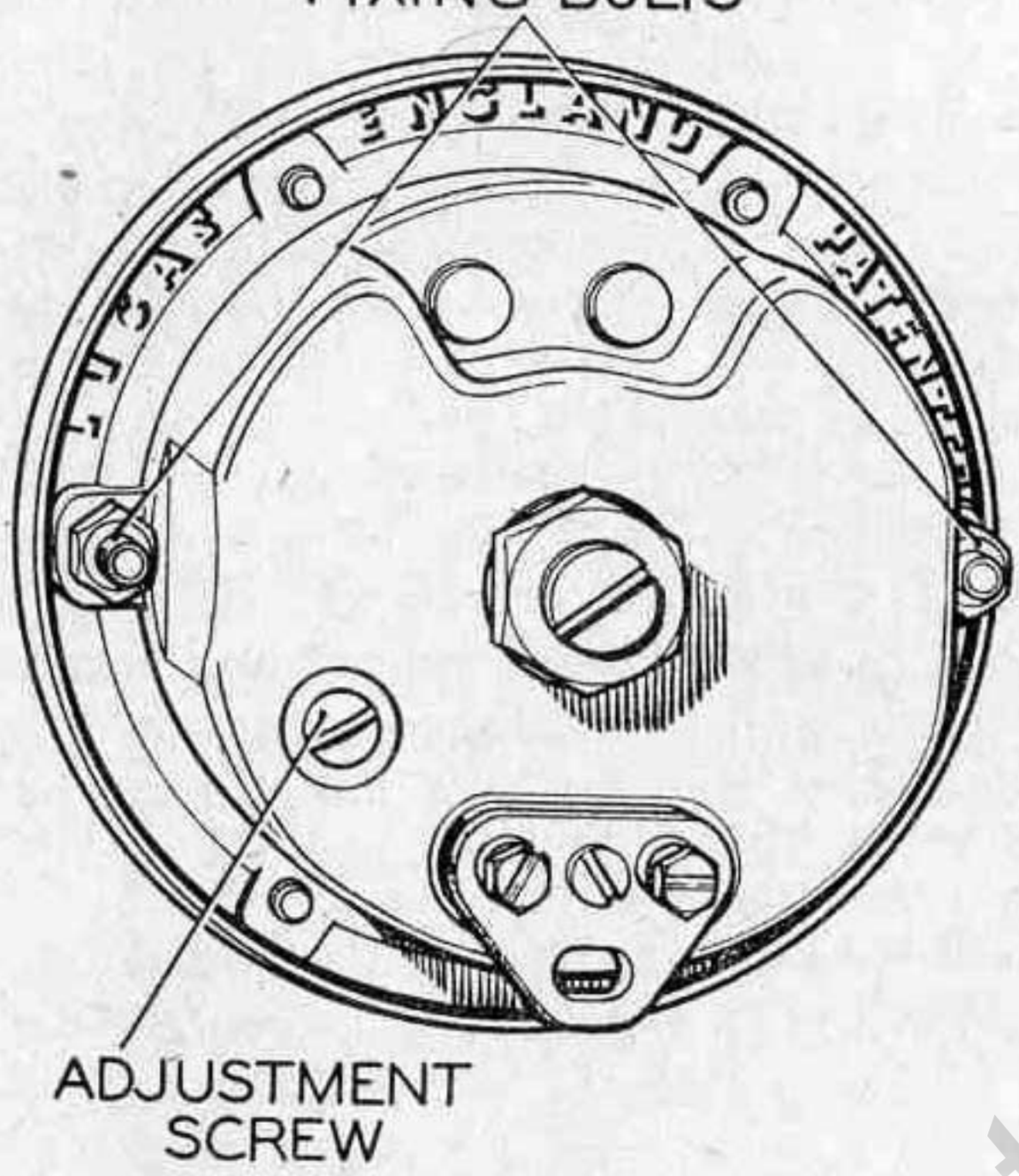


**Fig. 18. Rear view of Horn Model HF1234.**

If the horn becomes uncertain in its action, giving only a choking sound, or does not vibrate, it does not follow that the horn has broken down — the trouble may be due to a discharged battery, a loose connection, or short-circuit in the wiring of the horn. In particular, ascertain that the horn push bracket is in good electrical contact with the handlebars.

It is also possible that the performance of a horn may be upset by its mounting becoming loose.

**Adjustment (Model HF1234 only).**

The following adjustment will not alter the note of the horn. It will take up any wear of the moving parts which, if not corrected, may result in roughness and loss of power.

Accurate adjustment requires the use of specialised instruments and tools, but the owner-rider, who may not possess these instruments, can carry out the following procedure if the horn performance is considered to have deteriorated :—

Operate the horn push and turn the adjustment screw anti-clockwise until the horn just fails to sound. Release the horn push and turn the adjustment screw clockwise for six notches, i.e., a quarter of a turn, when the original performance should be restored. If further adjustment is necessary, turn the screw one notch at a time.

If the original performance cannot be restored by adjustment, do not attempt to dismantle the horn, but return it to a Lucas Service Depot for examination.

*Note:*—A few HF1234 horns made during 1950-51 were not provided with the above adjustment screw. No adjustment is therefore possible with these horns. Similarly, no adjustment is possible with Models HF1440 and HF1849 horns.

# 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 following pages set out the recommended procedure for a systematic examination to locate and remedy the causes of some of the more probable faults. The sources of many troubles are by no means obvious, and in some cases a considerable amount of deduction from the symptoms is needed before the cause of the trouble is disclosed.

When checking the continuity of circuits, a flashlamp battery and bulb should be used. On no account must the end of a live cable be flicked to earth against the motor cycle frame. This practice, known as " flashing," can cause heavy currents to flow round the alternator windings and result in the partial demagnetisation of the rotor and reduction of output. If a separate motor cycle battery is used, a low wattage test lamp must be included in the circuit.

If, after carrying out the examination, the cause of the trouble is not found, the owner is advised to get in touch with the nearest Lucas Service Depot or Agent.

## IGNITION CIRCUIT

**Engine will not start in IGN Position.**

(*a*) Turn switch to EMG position. If the engine will now fire, the alternator and rectifier are operating correctly and the indication is a discharged battery ; this can be confirmed by poor light from the lamps and hydrometer readings below 1.200. Recharge the battery if necessary.

(*b*) Remove the H.T. cable from the sparking plug terminal and hold the cable end about $\frac{1}{8}$-in. away from some metal part of the engine while the latter is slowly turned over. If sparks jump the gap regularly, the ignition equipment is functioning correctly. Check for engine defects or examine sparking plug.

(*c*) If sparks do not occur in test (*b*), check for a fault in the low tension wiring, i.e., from battery to switch, coil and contact breaker. If the wiring proves to be in order, examine the contact breaker ; if necessary clean the contacts and adjust the gap setting.

(*d*) If, after carrying out these checks, the ignition system is still inoperative, have it examined by a Lucas Service Depot or Agent.

**Engine will not start in EMG Position.**

(*a*) Remove the H.T. cable and test as described under (*b*) above : if sparks appear, then the trouble is due to engine defects, etc.

(*b*) If the ignition equipment is not operative in the above test, check the snap connectors, rectifier connections and other wiring. All connections must be clean and tight.

(*c*) Examine the contact breaker ; if necessary clean the contacts and adjust the gap setting.

(*d*) Make sure ignition timing is correct to engine maker's specification.

(*e*) See that the alternator rotor is fitted the correct way round on the engine shaft.

(*f*) If the ignition system is still inoperative, have the equipment examined by a Lucas Service Depot or Agent.

**Engine misfires.**

(*a*) Examine the contact breaker ; if necessary, clean the contacts and adjust the gap.

(*b*) Remove the sparking plug (or each plug in turn), rest it on the cylinder head and observe if a spark occurs at the plug points when the engine is turned. Irregular sparking may be due to dirty plugs, which may be cleaned and adjusted, or to defective high tension cables. Any cable on which the insulation shows signs of deterioration or cracking should be renewed.

(*c*) If sparking is regular at each plug when tested as described in (*b*), the trouble is probably due to engine defects, and the carburetter, petrol supply, etc., must be examined.

(*d*) If misfiring occurs after the engine has been running for some time, check that the ignition switch is in the normal IGN position. If run continuously in the EMG position, the rising voltage of the battery may eventually cause misfiring to occur.

## CHARGING CIRCUIT.

**Battery in low state of charge.**

(*a*) This state will be shown by poor or no light from the lamps when the engine is stationary, with a varying light intensity when the motor cycle is running.

(*b*) If the engine starts and runs in the EMG position, this indicates that the rectifier is functioning correctly.

(*c*) Check the condition of the battery with a hydrometer. Top up, if necessary, and have battery recharged.

(*d*) Check wiring from battery to switch, rectifier and alternator, tightening any loose connections or replacing broken cables.

(*e*) If the cause of the trouble is still not apparent, have the equipment examined by a Lucas Service Depot or Agent.

**Excess Circuit Voltage.**

(*a*) This will be indicated by burnt-out or blackened bulbs, and possibly poor engine performance due to burned ignition contacts.

(*b*) Examine all wiring for loose or broken connections.

(*c*) Check the earthing of battery and rectifier.

(*d*) Examine the battery, removing any traces of corrosion.

(e) If the ignition is affected, clean the contact breaker contacts or if necessary renew them.

(*f*) If the fault persists, have the equipment examined by a Lucas Service Depot or Agent.

THE BATTERY POSITIVE (+ve) TERMINAL IS EARTHED TO THE MACHINE. UNDER NO CIRCUMSTANCES MUST THE NEGATIVE (—ve) TERMINAL BE EARTHED.

## LIGHTING CIRCUITS

**Failure of lights (machine stationary).**

(*a*) If only one bulb fails to light, replace with new bulb.

(*b*) If all lamps fail to light, test the state of charge of battery, recharging it if necessary either by a long period of daytime running or by connecting to a suitable battery charger.

(*c*) Examine the wiring for a broken or loose connection, and remedy.

**Lamps light when switched on, but gradually fade.**

Test the state of charge of the battery, recharging if necessary.

**Brilliance varies with speed of motor cycle.**

Test the state of charge of the battery, recharging if necessary.

**Lights flicker.**

Examine the wiring for loose connections, or short circuits caused by faulty cable insulation.

**Headlamp illumination insufficient.**

(*a*) If the bulb is discoloured or filaments have sagged as a result of long service, a new bulb of the same type should be fitted.

(*b*) Check the setting of the lamp.

# LUCAS

## SERVICE DEPOTS

**BELFAST** ... ... ... ... ... **51-55 Upper Library Street**
Telephone : Belfast 25617 Telegrams : " Servdep, Belfast "

**BIRMINGHAM, 18** ... ... ... **Great Hampton Street**
Telephone : Central 5050 Telegrams : " Lucaserv, Birmingham "

**BRIGHTON, 4** ... ... ... **85 Old Shoreham Road, Hove**
Telephone : Hove 38993 Telegrams : " Luserv, Brighton "

**BRISTOL, 4** ... ... ... ... ... ... **345 Bath Road**
Telephone : Bristol 76001 Telegrams : " Kingly, Bristol "

**CAMBRIDGE** ... ... ... ... ... **Newmarket Road**
Telephone : Cambridge 51251 Telegrams : " Luserv, Cambridge "

**CARDIFF** ... ... ... ... ... ... **54a Penarth Road**
Telephone : Cardiff 28361 Telegrams : " Lucas, Cardiff "

**COVENTRY** ... ... ... ... ... **Coventry Road, Exhall**
Telephone : Bedworth 3077 Telegrams : " Luserv, Coventry "

**DUBLIN** ... ... **Portland Street North, North Circular Road**
Telephone : Dublin 46195 Telegrams : " Luserv, Dublin "

**EDINBURGH, 11** ... ... ... **60 Stevenson Road, Gorgie**
Telephone : Edinburgh 62921 Telegrams : " Luserv, Edinburgh "

**GLASGOW, C.3** ... ... **4/24 Grant Street (St. George's Road)**
Telephone : Douglas 6591-7 Telegrams : " Lucas, Glasgow "

**LEEDS, 8** ... ... ... ... ... ... **64 Roseville Road**
Telephone : Leeds 28591 Telegrams : " Luserdep, Leeds "

**LIVERPOOL, 13** ... ... ... ... ... **450/470 Edge Lane**
Telephone : Stoneycroft 4721 Telegrams : " Luserv, Liverpool 13 "

**LONDON** ... ... ... ... **Dordrecht Road, Acton Vale, W.3**
Telephone : Shepherds Bush 3160 Telegrams : " Lucas Dynomagna, London "

**LONDON** ... ... ... **Southend Road, Woodford Green, Essex**
Telephone : Wanstead 6271 Telegrams : " Luserv, Woodgreen Green, London "

**LONDONDERRY** **147 Strand Road, Londonderry, N. Ireland**
Telephone : Londonderry 3985

**MANCHESTER** ... ... ... ... **Talbot Road, Stretford**
Telephone : Longford 1101 Telegrams : " Lucas, Stretford "

**NEWCASTLE-ON-TYNE, 1** ... ... ... **64-68 St. Mary's Place**
Telephone : Newcastle 25571 Telegrams : " Motolite, Newcastle-on-Tyne "

---

**LONDON SALES OFFICE** ... ... **319 Regent Street, W.1**
Telephone : Langham 4311 Telegrams : " Guidepost, Wesdo, London "

**LONDON CENTRAL EXPORT DIVISION** **46 Park Street, W.1**
Telephone : Grosvenor 4491 Telegrams : (Inland) " Lucaslond, Audley, London "
(Overseas) " Lucaslond, London "

67



Publication No. 1093M. LF/1158/D P/259/D Printed in England