

**Maintenance Instructions
for**



LUCAS
DIRECT CURRENT
EQUIPMENT

for motor-cycles

JOSEPH LUCAS LIMITED • BIRMINGHAM • ENGLAND



GUARANTEE

All usual and reasonable precautions have been taken to ensure excellence of materials and workmanship, and in the event of any defect which is not caused by wear and tear, misuse, accident, or negligence, being disclosed within six months (or twelve months in the case of magnetos or the ignition portion of Magdynos) of its being put into use, we will either supply new parts or components in exchange for those defective, or repair such defective parts or components, free of charge. We do not undertake to dismantle or reassemble, or bear the cost of dismantling or reassembling any such part or component on the vehicle or chassis. This undertaking shall be deemed to exclude any and every other obligation whatsoever and all liability for any loss or damage, howsoever or whensoever caused or arising, except the cost of replacement or repair in accordance with this undertaking.

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 D.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.

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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. This examination should be made weekly with battery models PU5E, MK9E, ML9E and SC7E as these are of reduced fluid capacity.

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.**

Warning: Never top-up models ML9E and MLZ9E above the coloured line denoting the maximum filling level.

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. These Fillers cannot be used to top-up models MK9E, ML9E and SC7E batteries.

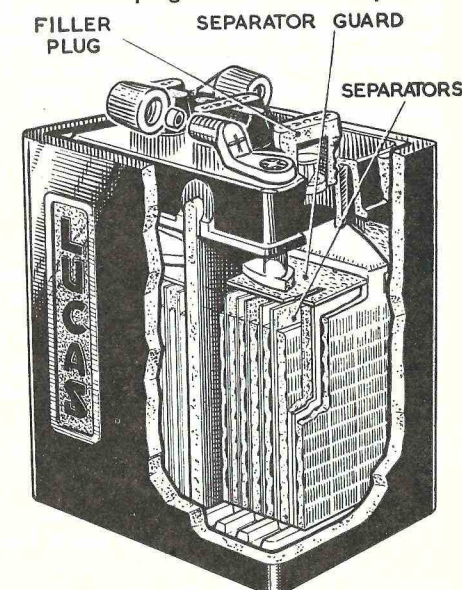


Fig. 1. Battery Model PU7E/11

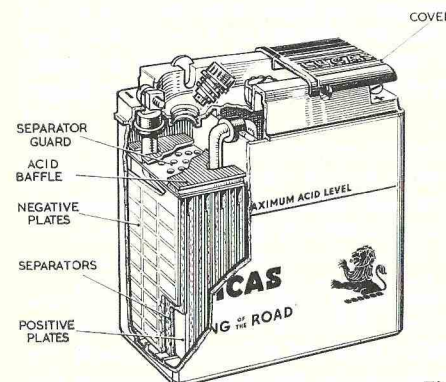


Fig. 2. Battery Model ML9E

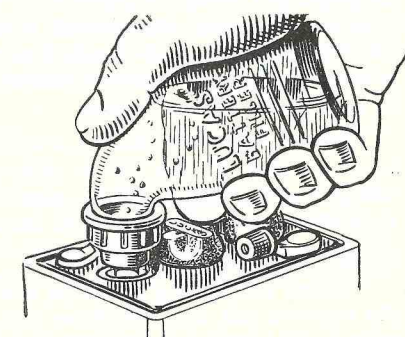


Fig. 3. Using a Lucas Battery Filler
(Not applicable to MK9E, ML9E or SC7E batteries)

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.

Note:—The fluid capacities of some batteries, including models MK9E, ML9E and SC7E, preclude the use of a hydrometer, while others require tilting to make accessible sufficient electrolyte above the separator guards.

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 from this cell and the remaining acid been diluted by subsequent topping-up. In this event further stronger sulphuric acid must be added until the correct electrolyte strength is obtained. Alternatively, an incorrect reading may result from a leaky cell or from defective plates. In either event the battery should be examined at a Lucas Service Depot or by a Lucas Battery 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.

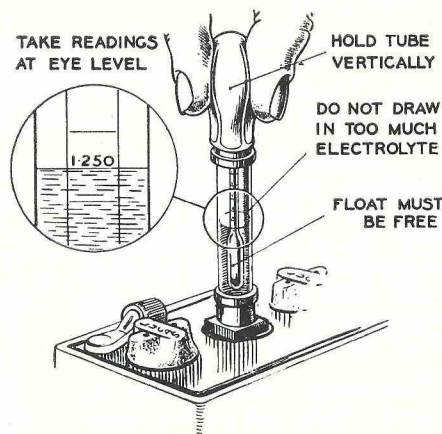


Fig. 4. Taking Hydrometer Readings
(Not applicable to MK9E, ML9E or SC7E batteries)

GENERATOR

Output Control

The generator is either a two-brush or a four-brush shunt wound machine and works in conjunction with a regulator unit to give compensated voltage control. Although combined structurally, the regulator and cut-out are electrically separate. Both are accurately adjusted during manufacture and should not be tampered with.

The regulator provides a completely automatic control. It causes the generator output to vary according to the load on the battery and its state of charge. When the battery is discharged the generator gives a high output, but if the battery is fully charged then the generator gives only a trickle charge to keep the battery in a good condition. In addition to controlling the output of the generator according to the condition of the battery, the regulator provides for an increase of output to balance the current taken by the lamps when in use.

The purpose of the cut-out is to connect the generator to the battery only when the engine speed is high enough to permit charging. When the speed drops to a low value the cut-out contacts open and prevent the battery discharging through the generator windings.

The regulator and cut-out are accurately set during manufacture and in normal service the battery will be kept in a good condition. If due to special running conditions you should find that the battery is not kept in a charged condition or is being overcharged, we advise you to have the settings checked by a Lucas Service Depot or Agent. Do not attempt adjustment yourself.

Ammeter Readings

Normally, during day-time running when the battery is in good condition, the generator gives only a trickle charge so that the ammeter needle should show only a small deflection to the "+" side of the scale.

A discharge reading may be observed immediately after switching on the headlamp. This usually happens after a long run when the battery voltage is high. After a short time the battery voltage will drop and the regulator will respond, causing the generator output to balance the lamp load.

Lubrication

Models E3H and E3HM are fitted with a lubricator on the commutator end bracket which must be given a few drops of high quality thin machine oil every 1,000 miles. The bearing at the driving end is packed with grease and will last until the machine is taken down for a general overhaul.

Models E3L, E3LM, E3N, C35S and C35SD. No lubrication is required to these models as ball bearings are fitted at both ends. These bearings are packed with grease during assembly and will last

until the machine is taken down for a general overhaul. Similarly, the gear drive to the distributor mounted at the driving end of the model C35SD generator should require repacking with grease only at overhaul.

Models MC45 and MC45L. Except in certain instances where the motor cycle manufacturer fits end-brackets to these models, no lubrication is necessary since the armature is mounted on a sleeve which fits over the end of the crankshaft, thus eliminating the need for bearings in the generator itself.

In order to prevent oil from the engine getting into the generator, an oil seal is fitted at the drive end of these generators. If required, replacement oil seals can be obtained from the engine manufacturer.

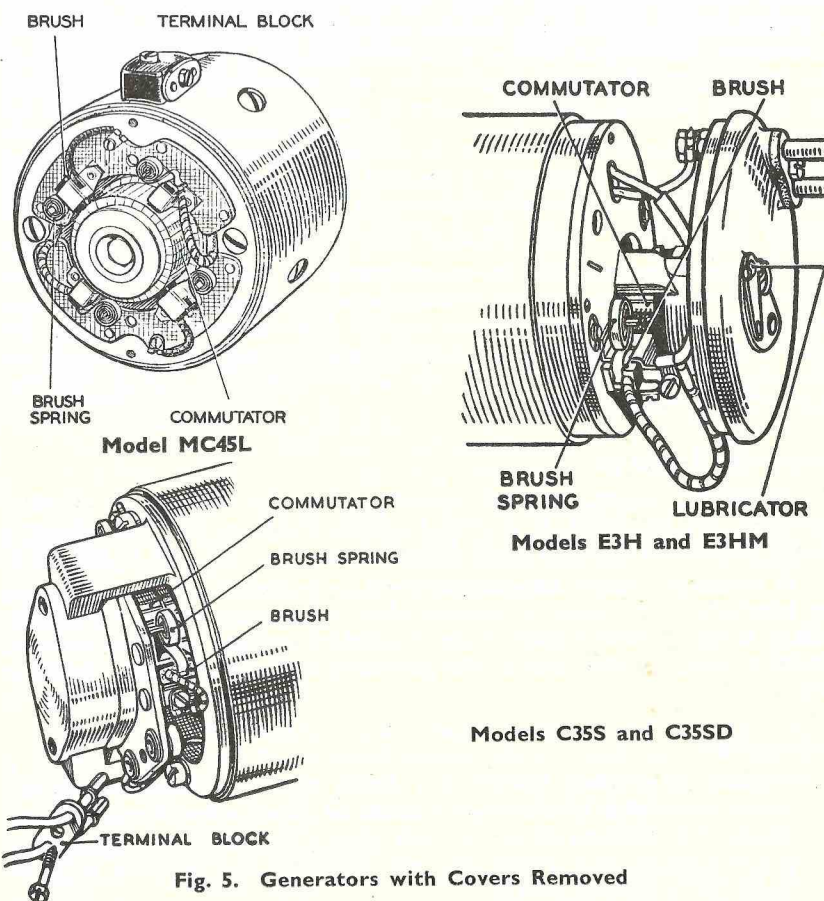


Fig. 5. Generators with Covers Removed

Inspection of Commutator and Brushgear

About every 6,000 miles remove the commutator cover and inspect the commutator and brushgear.

The brushes, which are held in boxes by means of springs, must make firm contact with the commutator. Move each brush to see that it is free to slide in its holder; if it sticks, remove it and clean with a petrol-moistened cloth. Care must be taken to replace the brushes in their original positions, otherwise they will not "bed" properly on the commutator. If after long service the brushes have become worn to $\frac{5}{16}$ " (or $\frac{9}{32}$ " with Models MC45 and MC45L) in length, replace them. Always use genuine Lucas brushes, which should be fitted by a Service Agent so that they can be properly bedded to the commutator.

Examine the commutator. It should be free from any trace of oil or dirt and should have a highly polished appearance. Clean a dirty or blackened commutator by pressing a clean dry cloth against it whilst the engine is slowly turned over by means of the kick starter crank. (It is best to remove the sparking plug before doing this). If the commutator is very dirty, moisten the cloth with petrol.

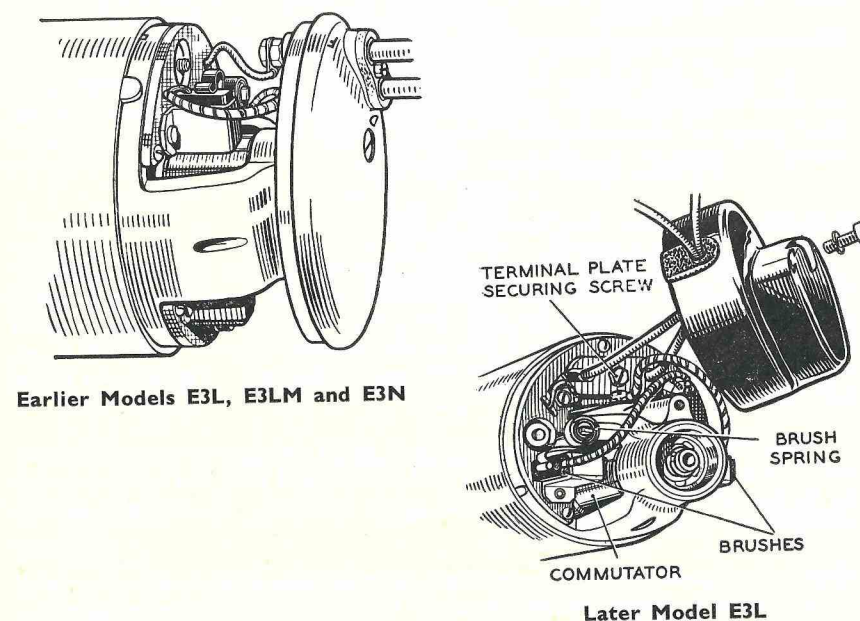


Fig. 6. Generators with Covers Removed

When replacing the cover on generators MC45 and MC45L, be careful to position the rubber seal between cover and yoke correctly.

Before tightening the cover of earlier E3L generators, a locating slot in the cover must first coincide with a projection on the generator body.

MAGNETO IGNITION

Two types of magneto are in use. These are known as rotating armature and rotating magnet magnetos, by reason of their differing construction. In the former, the windings and capacitor rotate and the magnet is stationary, but in the latter the reverse is true.

Both types are often fitted with a centrifugally operated mechanism that automatically varies the point of firing to suit differing engine speeds. Alternatively, some rotating armature magnetos, particularly when fitted to competition machines, carry a manual control of ignition timing. Such a control should be moved to the Retard position for starting and when the engine labours on full throttle. At all other times the control should be in the Advance position.

ROTATING ARMATURE MAGNETOS (Model K2F, etc.)

Every 3,000 miles

Checking Contact Breaker Gap

To check the contact breaker gap, remove the contact breaker cover and turn the engine over slowly until the contacts are fully open. A flat steel gauge of thickness 0.012"—0.015" (0.305—0.381 mm.) should be a sliding fit between the contacts.

Adjusting Contact Breaker Gap

Two types of contact breaker are in service. The present assembly, shown in Figs. 7 and 8, has a fixed contact plate secured by a single screw passing through a slotted hole in the plate. To adjust the gap, slacken this screw and, using a screwdriver in the manner shown in Fig. 8, move the fixed contact plate until the correct gap is obtained. Tighten the screw and recheck the gap.

The earlier assembly, shown in Fig. 9, has a contact screw and locking nut. To adjust the gap, slacken the locking nut and turn the contact screw by its hexagon head until the correct gap is obtained. Tighten the locking nut and recheck the gap.

Note:—The present contact breaker is interchangeable with the older pattern, provided the present shorter straight-shanked securing screw is fitted in place of the former longer screw, the shank of which has a 17° taper for $\frac{3}{16}$ " (4.76 mm.) below the head.

Lubrication

The cam ring is supplied with lubricant from a felt strip contained in a recess in the contact breaker housing. Oil reaches the inner surface of the cam ring by way of a small circular wick passing through the thickness of the cam ring.

Remove the contact breaker cover. Take out the central hexagon-headed securing screw and carefully withdraw the contact breaker from the tapered magneto spindle.

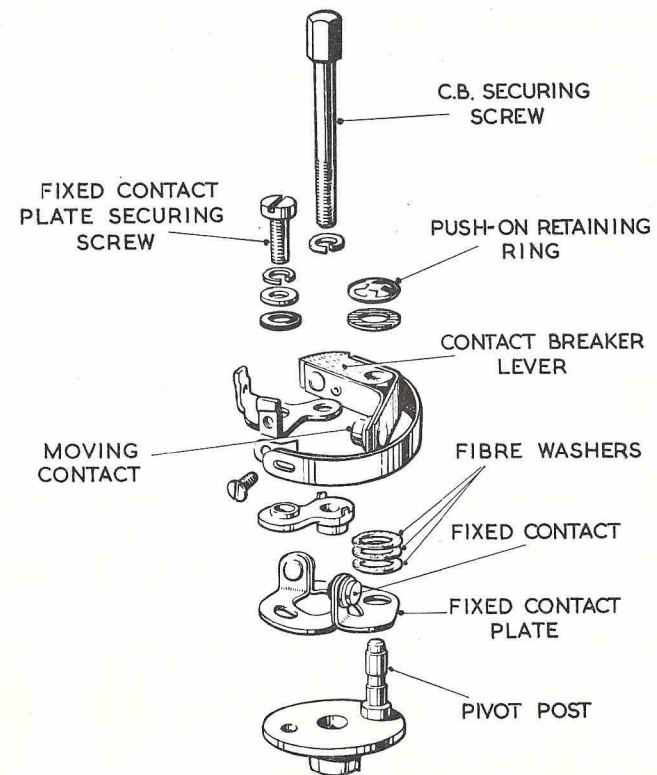


Fig. 7. Contact Breaker, dismantled

Withdraw the cam ring. It is a sliding fit in the contact breaker housing.

Note:—If a manual control of ignition timing is fitted, withdrawal and refitting of the cam ring will be made easier if the handlebar control lever is moved to the half-Retard position, thus taking the cam ring from its stop peg.

Clean the cam and lightly smear the inside and outside surfaces with Mobilgrease No. 2.

Add a few drops of thin machine oil to the felt strip and to the circular wick.

Remove the contact breaker lever and smear the pivot with Mobilgrease No. 2, applying sufficient grease to fill the annular groove.

Note:—The method of removing the contact breaker lever will be apparent by reference to Figs. 7 or 9, depending on the type. Since the push-on retaining ring shown in Fig. 7 may need renewal after removal, an alternative form of lubrication for this pivot post is to apply a spot of clean engine oil to the tip of the post. While this

will obviate the necessity of removing the lever, great care must be exercised to prevent any oil getting on or near the contacts.

The fibre washers shown in Fig. 7 are fitted below the contact breaker lever to ensure vertical alignment of the fixed and moving contacts.

Refit the contact breaker lever.

Refit the cam ring, taking care when manual timing control is fitted that the stop peg in the contact breaker housing and the spring loaded plunger engage with their respective slots.

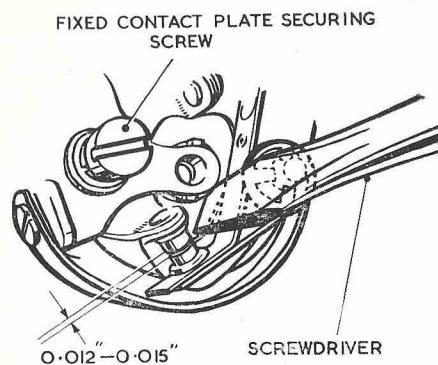


Fig. 8. Adjusting Contact Breaker gap

If an earthing brush is fitted at the back of the contact breaker base plate, see that it is clean and can move freely in its holder before refitting the contact breaker assembly in the cam ring.

Refit the contact breaker assembly, ensuring that the projecting key on the tapered portion of the contact breaker base plate engages correctly with the spindle keyway.

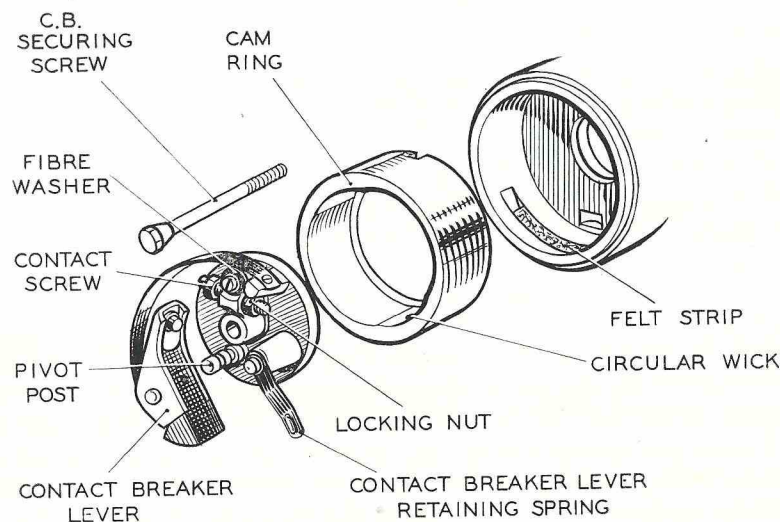


Fig. 9. Earlier type Contact Breaker, dismantled

Every 6,000 miles

Cleaning

Remove the contact breaker cover and high tension pick-up mouldings. Thoroughly clean the inside and outside of the magneto using a clean dry fluffless cloth, if necessary, moistening it with petrol to remove any grease from the high tension pick-up mouldings and contact breaker contacts. Ensure that the pick-up brush moves freely in its holder. Renew the brush if it is worn to $\frac{1}{8}$ " above the shoulder. Clean the slip ring track and flanges by pressing the cloth on them while the engine is cranked by hand.

Ensure that the gasket between the pick-up mouldings and the magneto body is in good condition before reassembling.

Examine the contacts when the contact breaker is removed for lubrication. If the contacts are pitted or piled, they should be trimmed with a carborundum stone, silicon carbide paper, or very fine emery cloth.

Contacts do not retain a polished appearance when in use and, if operating correctly, will have a dull grey appearance.

Every Two Years

About every two years, or when the engine is given a general overhaul, the magneto should be dismantled at a Lucas Service Depot or Agent, where the weights, springs and toggles of the centrifugal timing control mechanism will be examined and lubricated, and the armature bearings repacked with grease.

Renewing High Tension Cables

When high tension cable shows signs of cracking or perishing, replace it using 7 mm. p.v.c.-covered or neoprene-covered vulcanised rubber-insulated ignition cable. To do this, pull back the rubber shroud (if fitted) and unscrew the moulded terminal from the pick-up moulding. Remove the split metal washer and moulded terminal from the defective cable. Prepare the new cable by cutting back the insulation for about $\frac{1}{4}$ " (6.35 mm.). Thread the cable through the rubber shroud (if fitted) and the moulded terminal. Pass the cable conductor through the metal washer and bend back the strands radially. Screw the moulded terminal into the pick-up moulding.

Magneto-to-Engine Timing

Whenever possible, follow the engine manufacturer's instructions when re-timing a rotating armature magneto to the engine. If, however, these instructions are not immediately available, the magneto-to-engine timing can (as a temporary measure only) be set as follows:

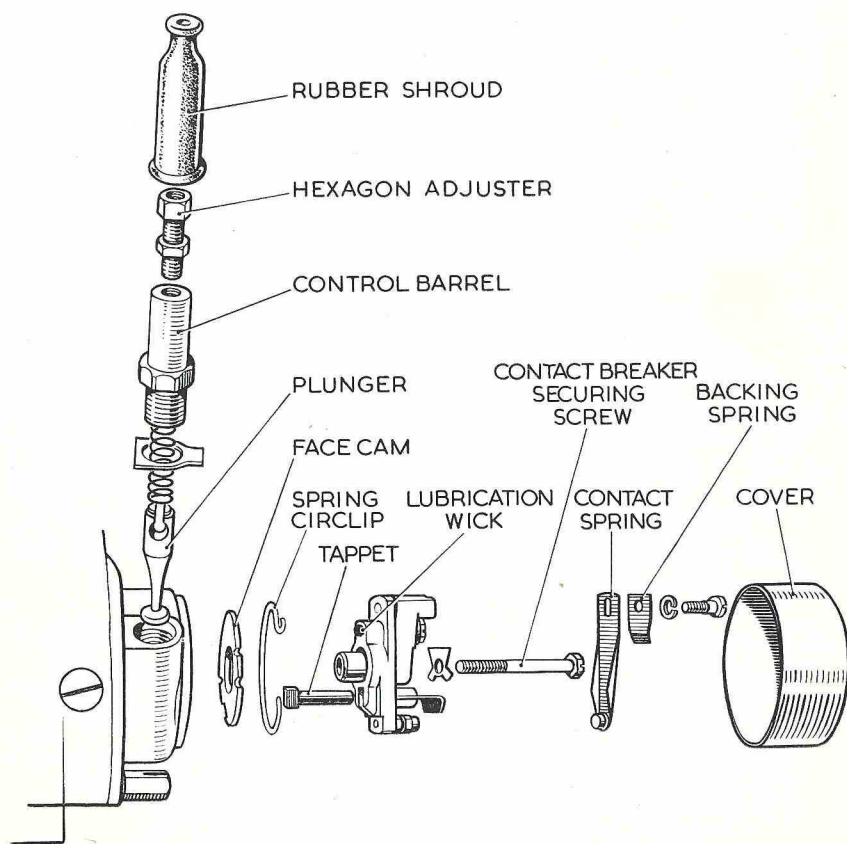
Magnetos fitted with or without centrifugal timing control (but excluding manual control):

Contact breaker to open when the piston in the cylinder under compression is at T.D.C.

SUPPLEMENTARY INFORMATION TO
LUCAS PUBLICATION No. 820L

FACE CAM CONTACT BREAKER

The contact breakers referred to on pages 8 - 11 of Publication No. 820L are actuated by a ring cam, as shown in Fig. 9, and are fitted to the majority of rotating armature type magnetos. However, some single-cylinder magnetos of this type carry the face cam actuated contact breaker illustrated below. These include model N1 magnetos and the magneto portion of model MO1 magdynos.



The method of adjusting or renewing the ignition advance/retard cable (when fitted) will also be apparent by reference to the illustration.

EVERY 3,000 MILES

Lubrication

The cam face is lubricated by a wick contained in the base of the rotating contact breaker. To gain access to this wick, withdraw the screw which secures the moving contact spring and lift off the backing and contact springs. Withdraw the hollow-hexagon headed screw in which the wick is located. Take care not to lose the insulating washer or tube. Moisten the wick with a few drops of thin machine oil and refit the hollow screw.

Withdraw the contact breaker securing screw and remove the contact breaker. Take the tappet, which operates the contact spring, from its housing and lightly smear with thin machine oil.

Extract the spring circlip and remove the face cam. When a manual timing control cable is fitted, removal and refitting of the cam is made easier if the control lever is moved to the half retarded position—thus taking the cam away from its stop peg. Clean the cam and lightly smear both sides with Mobilgrease No. 2.

Refit the cam, taking care that the stop peg in the housing and the plunger of the manual timing control (when fitted) engage with their respective slots. Note, also, that a recess is provided for the 'eye' of the spring circlip.

Thread the special tag washer on to the contact breaker securing screw, placing the flat edge of the washer against the location provided for it on the contact breaker body casting. Retighten the screw and lock it by bending the tag washer against one of the hexagon flats.

Cleaning Contacts

Before refitting the moving contact spring, clean the contacts with a petrol moistened cloth. If the contacts are pitted or piled, trim them with carborundum stone, silicon carbide paper or very fine emery cloth.

Refit the moving contact spring and backing spring, with the bent portion facing outwards. Tighten the spring arm securing screw.

Checking and Adjusting Contact Breaker Gap

Check the contact breaker gap at the point of maximum opening, when a gauge of 0.012"—0.015" should be a sliding fit between the contacts.

To adjust the gap, slacken the locknut and turn the adjustable contact screw by its hexagon head until the correct gap is obtained. Tighten the locknut and re-check the setting.

Magnetos fitted with manual timing control :

With the control lever set to the fully retarded position the contact breaker to open when the piston in the cylinder under compression is at T.D.C.

ROTATING MAGNET MAGNETOS (Models SR1, SR2, etc.)

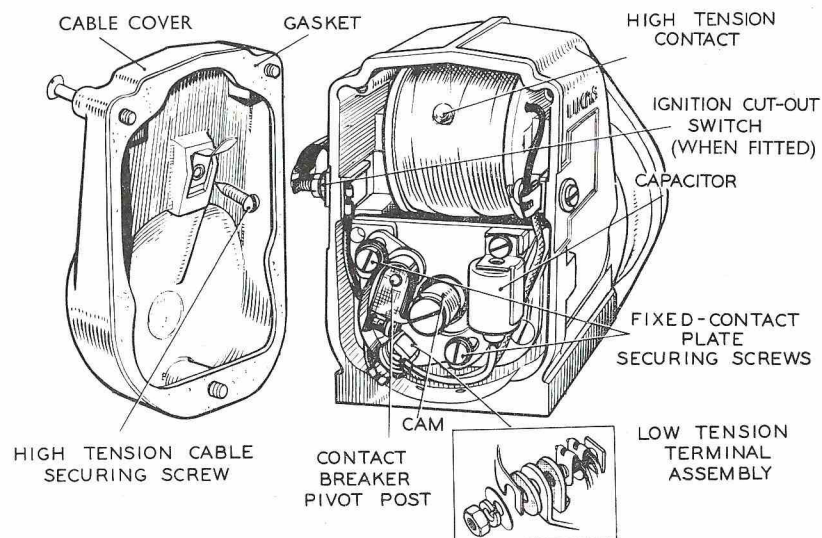


Fig. 10

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" (0.254—0.305 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 or an equivalent grease. When refitting the contact breaker, see that the components are assembled in the order illustrated.

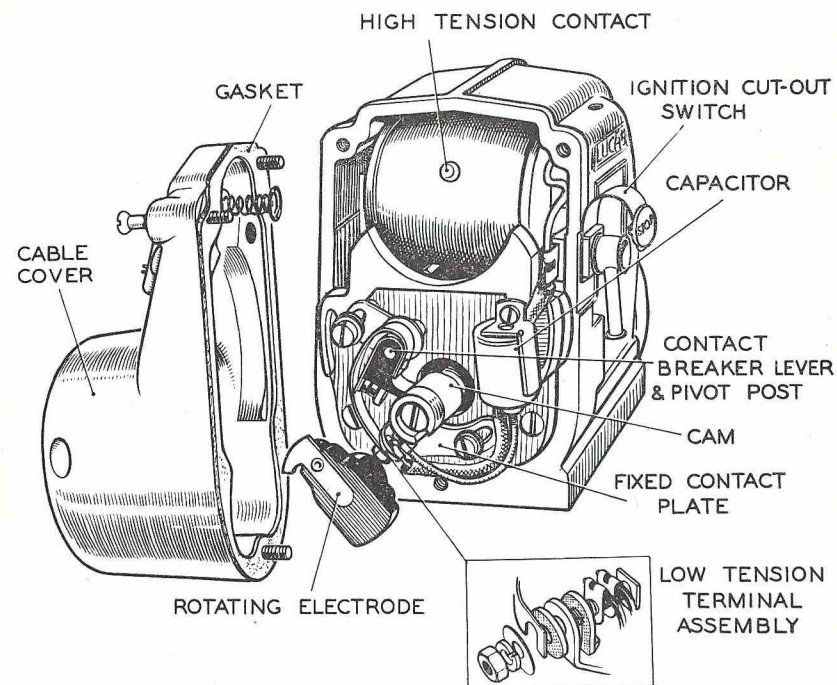


Fig. 11

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.

Magneto-to-Engine Timing

Whenever possible, follow the engine manufacturer's instructions when re-timing a rotating magnet magneto to the engine. If, however, such instructions are not immediately available, the magneto-to-engine timing can (as a temporary measure only) be set so that the contact breaker opens when the cylinder under compression is at T.D.C.

COIL IGNITION EQUIPMENT

Coil ignition equipment fitted to motor cycles comprises an ignition coil and a contact breaker, and in the case of twin and four-cylinder machines, a high tension distributor. Housed beneath the contact breaker base is a centrifugal timing control, which automatically varies the firing point according to the speed of the engine.

An ignition warning light is usually fitted in a prominent position (e.g., headlamp body) to remind the rider when the engine is stationary and the ignition is switched on. It will also light when the engine is idling. After long service the bulb may burn out. However, this will not affect the ignition system, but the bulb must be replaced as soon as possible as a safeguard for the ignition coil and battery.

When the lamp is mounted in an instrument panel it may be necessary to remove the panel front, when the bulb can be unscrewed from its holder. With other types the bulb can be removed when the chromium-plated bezel is unscrewed.

If the warning light is combined with the ammeter in the headlamp, remove the lamp front and reflector to gain access to the bulb.

Bulb replacement :

Lucas No. 998 6-volt 0.1-amp. M.E.S.

Note:—Earlier models were fitted with a 2.5-volt 0.2-amp. M.E.S. bulb, Lucas No. 970, which was used in conjunction with a series-wound resistor in the bulb holder.

After first 500 miles and, thereafter, every 6,000 miles

Smear the surface of the cam very lightly with Mobilgrease No. 2 or, if this is not available, with clean engine oil.

Apply a spot of clean engine oil to the visible end of the contact breaker pivot post. **Do not allow oil or grease to get on or near the contacts.**

If a lubricator is fitted on the distributor shank, add a few drops of thin machine oil.

Lubricate the centrifugal timing mechanism as follows :

D.K. types (similar to Fig. 12)

Unscrew the two screws securing the contact breaker base plate to the distributor, and lubricate with thin machine oil the centrifugal timing control thus exposed, paying particular attention to the pivots. Refit the base plate, and secure by means of the fixing screws.

Model DIA2 (Fig. 13)

Take the distributor off the machine and remove cover and rotor. Inject a little thin machine oil through the aperture between cam and contact breaker base plate.

To lubricate the cam bearing, remove the screw from inside the rotor boss and apply a few drops of thin machine oil to the tapped hole thus exposed. The spindle is drilled and cross-drilled to enable oil to find its way to the cam bearing.

Note:—If required, replacement oil seals, driving dogs or distance collars can be obtained from the engine manufacturer.

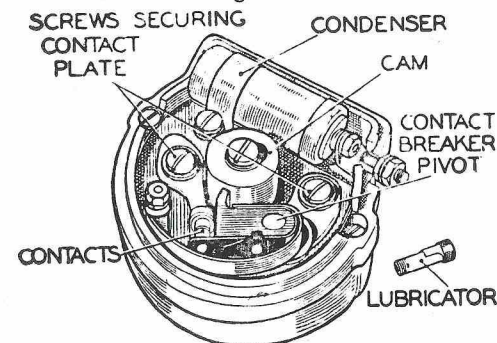


Fig. 12. Model DK type Contact Breaker

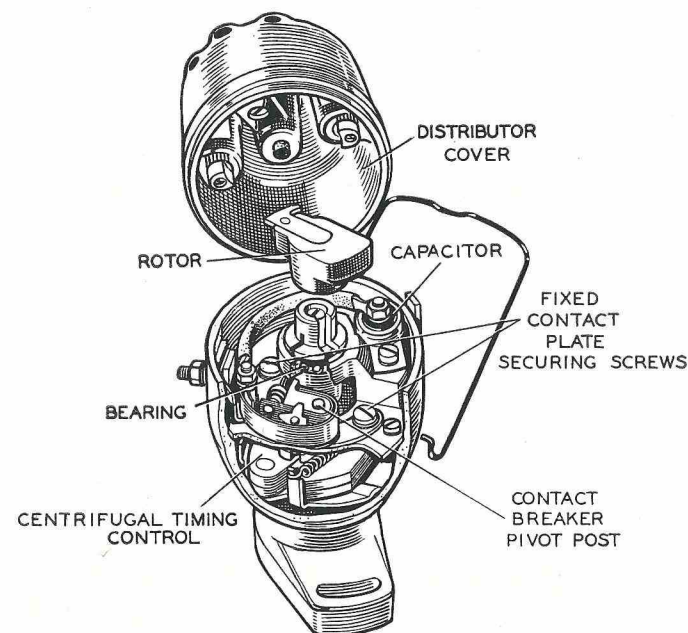


Fig. 13 Model DIA2 Distributor sectioned to show Centrifugal Timing Control

Cleaning

Thoroughly clean the inside and outside of the distributor using a clean dry fluffless cloth, if necessary moistening it with petrol to remove any grease from the high tension cover and contact breaker contacts. Ensure that the pick-up brush moves freely in its holder.

Examine the contacts. If they are rough or pitted, polish them with fine carborundum stone, silicon carbide paper or very fine emery cloth.

Afterwards, clean the contacts with petrol or methylated spirits (denatured alcohol).

After cleaning, check the contact breaker setting.

Contact Breaker Setting

Check the contact breaker gap after the first 500 miles' running, and subsequently every 6,000 miles. To do this, remove the contact breaker cover, slowly hand crank the engine until the contacts are fully open and insert a 0.014"—0.016" (0.35 mm.—0.40 mm.) gauge in the gap. The gauge should be a sliding fit between the contacts.

To adjust the gap, slacken the two screws securing the fixed contact plate and move the plate until the gap is set to the gauge thickness. After setting the gap tighten the securing screws and on two and four-cylinder models check the gap for other positions of the cam.

Apply a spot of clean engine oil to the visible end of the contact breaker pivot post.

Renewing High Tension Cable

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

To fit new cable to a high tension cover having vertical outlets, proceed as follows :

Remove the metal washer and moulded terminal from the defective cable. Thread the new cable through the moulded terminal and cut back the insulation for about $\frac{1}{4}$ ". Pass the exposed strands through the metal washer and bend them back radially. Screw the terminal into the high tension cover.

To fit new cable to a high tension cover having horizontal outlets, proceed as follows :

Slacken the screw on the inside of the high tension cover which secures the defective cable in the moulding.

Cut the new cable to the length required and push firmly home in the moulding. Tighten the cable securing screw, which will pierce the rubber insulation to make good contact with the cable core.

The Ignition Coil

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

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 holder is either a push fit in the rear of the Light Unit reflector, as shown in Figs. 14 and 16, or is carried in a separate lamp such as shown in Fig. 17.

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

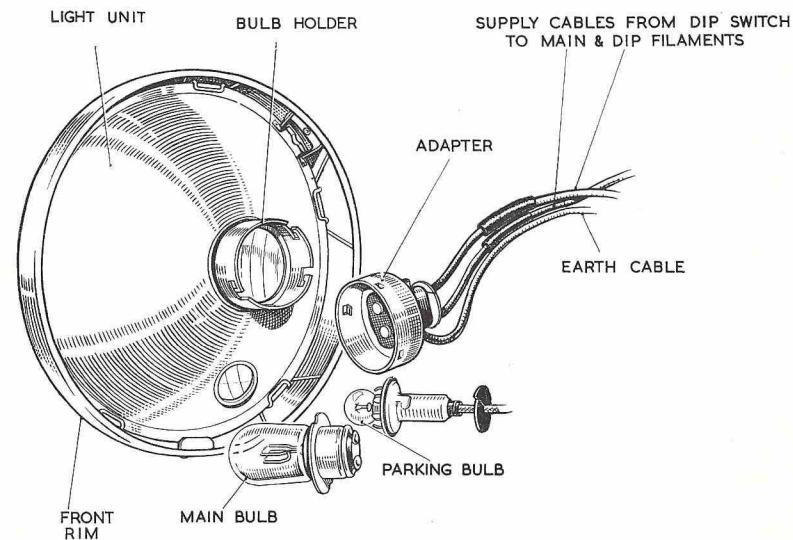


Fig. 14. Model F700P Light Unit and Rim removed from Lamp Body

Setting

Set the headlamp so that when the motor cycle carries its normal load the main or 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. 15.

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.

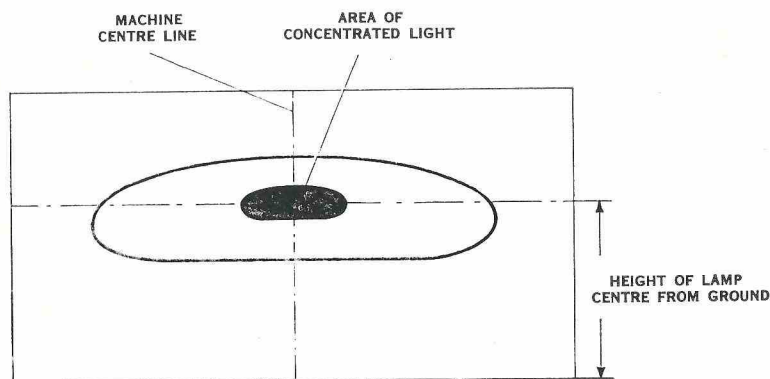


Fig. 15. Headlamp Main Beam Setting Diagram

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.

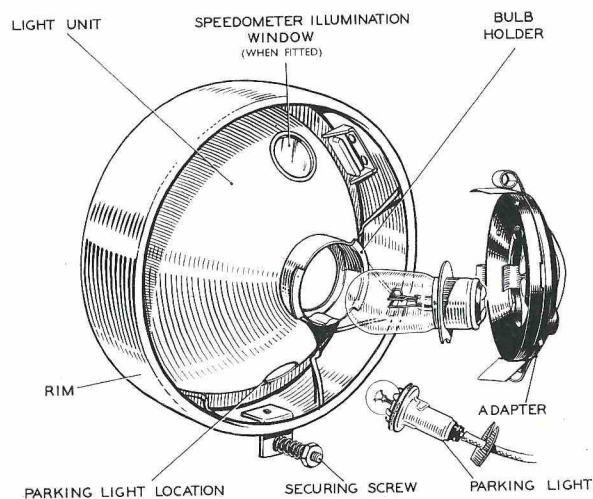


Fig. 16. Model F575P Light Unit and Rim removed from Lamp Body

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.

To gain access to the bulb in Model 550 (see Fig. 17), withdraw the rim securing screw and remove the rim. Peel back the rubber surround to release the lens.

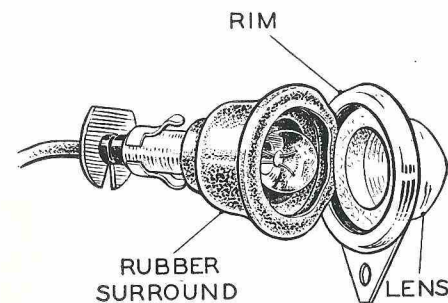


Fig. 17. Parking Light Model 550

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.

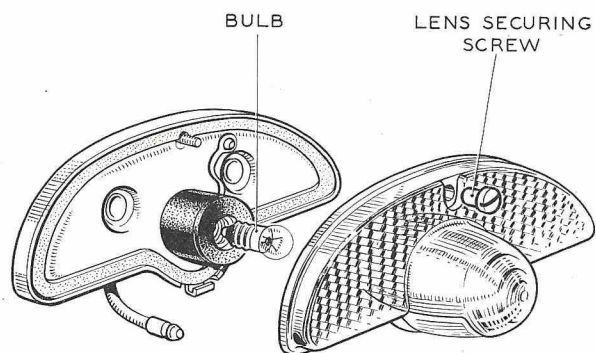


Fig. 18. Rear Lamp Model 590 incorporating Reflex Reflector

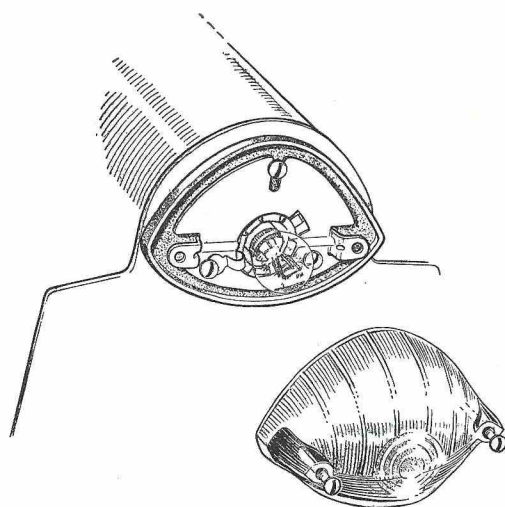


Fig. 19. Stop-Tail Lamp Model 529

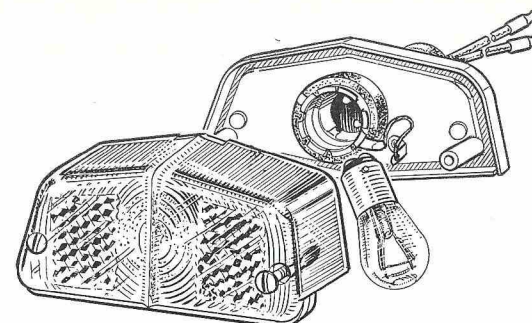


Fig. 20. Stop-Tail Lamp Model 564 incorporating Reflex Reflector

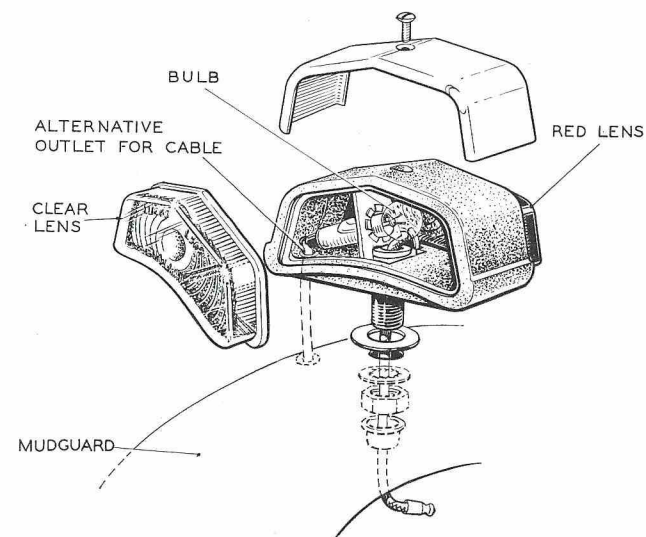


Fig. 21. Sidecar Lamp Model 569

ELECTRIC HORNS

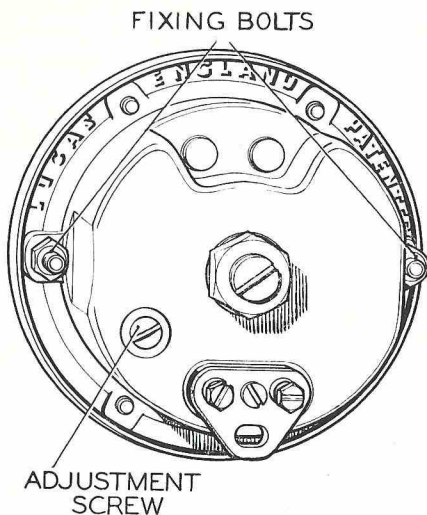


Fig. 22. Rear view of Horn Model HF1234

Adjustment of Models HF1234-5

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 HF1441.

Adjustment of Model HF1849

Service experience with this horn shows that a small amount of adjustment may be needed at infrequent intervals to ensure that the horn continues to give its best performance.

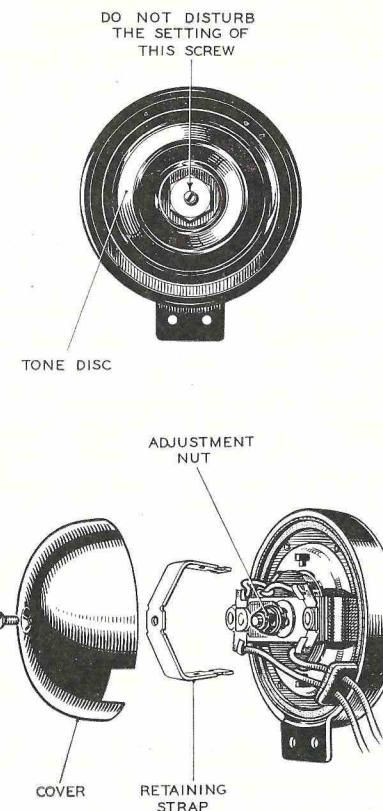


Fig. 23. Model HF1849 Horn with Rear Cover removed for Contact Breaker adjustment

To make this adjustment, first remove the cover and retaining strap from the rear of the horn. Then, with the horn operating and using a 2BA spanner, turn the adjustment nut slowly in an anti-clockwise direction until the best performance is obtained. Usually, only a very small amount of movement will be necessary.

Important : The slotted screw in the centre of the tone disc on the front of the horn is accurately set during manufacture, and is secured in position by a locknut. This setting must not be disturbed.

WIRING

On many older motor cycles the **NEGATIVE** terminal of the battery is earthed. More recent machines, however, have the **POSITIVE** terminal earthed.

Before making any alterations to the wiring or removing the switch from the headlamp or instrument panel, disconnect the battery to avoid the danger of short-circuits. Details of the terminal arrangement of King of the Road batteries are given on page 4. With other batteries a short length of cable is connected to the switch cable by means of a brass connector. The connector is insulated by a rubber sleeve which must be pushed back to enable the connector to be unscrewed. Take care to prevent the connector touching any metal part of the frame as this will short-circuit the battery. When connecting up again, refit the rubber sleeve over the connector.

All cables to "MU" and "SSU" headlamps are taken direct to the switch, incorporated together with the ammeter, in a small panel. The panel can be withdrawn when the three securing screws are removed.

The cables are identified by means of coloured braided insulation, coloured sleeving or coloured plastic insulation. The colour scheme and the diagram of connections are given on the wiring diagram. When making a connection to the switch, proceed as follows :

Bare about $\frac{3}{8}$ " of the cable, twist the wire strands together and turn back about $\frac{1}{8}$ ". Remove the grub screw from the appropriate terminal and insert the wire in the terminal post. Refit and tighten the grub screw.

To make a connection to the generator or regulator terminals, slacken the fixing screw on the terminal block and remove the clamping plate. Withdraw the metal ferrules from each terminal. Pass about 1" of cable through the holes in the clamping plate and bare the ends for $\frac{3}{8}$ ". Fit the metal ferrules over the cables, bend back the wire strands over the ferrules and push them well home into their terminals. Finally screw down the clamping plate.

The cables connected to the "D" and "F" terminals of the generator and regulator units must not be reversed. To prevent this occurring, the screw in the generator terminal block is off-centre and the screws which secure the regulator terminal clamping plate are of different size.

Copies of wiring diagrams for many British motor cycles can be obtained on request to the Advertising Dept., Great King Street, Birmingham, 19. These diagrams are issued free on receipt of the appropriate information, namely, Make, Model, and Year of manufacture of the machine.

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 notes set out the recommended procedure for a systematic examination should an electrical fault be suspected.

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.

CHARGING CIRCUIT

Battery in low state of charge

- (a) This state will be shown by poor light from the lamps and low hydrometer readings (see page 4). Check the ammeter reading when the motor cycle is running steadily in top gear with no lights in use. On motor cycles with coil ignition, the warning light will not go out if the generator fails to charge, or will flicker on and off in the event of intermittent output.
- (b) Examine the charging and field circuit wiring, tightening any loose connections, or replacing broken cables.
- (c) Examine the generator brushgear and commutator, cleaning if necessary. Have worn brushes replaced. (See page 7).
- (d) If the cause of the trouble is still not apparent, have the equipment examined by a Lucas Service Depot or Agent.

Battery Overcharged

This will be indicated by burnt-out bulbs, very frequent need for topping-up the battery, and high hydrometer readings.

Check the ammeter when the motor cycle is running steadily. With a fully charged battery and no lights or accessories in use, the ammeter needle should show only a small deflection to the "+" side of the scale.

If the ammeter reading is in excess of this value, it is advisable to have the regulator setting checked by a Lucas Service Depot or Agent.

LIGHTING CIRCUITS

Failure of lights

- (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, re-charging it, if necessary, either by a long period of daytime running or from an independent charging supply.
- (c) Examine the wiring for a broken or loose connection, and remedy.

Headlamp gives insufficient illumination

- (a) Test the state of charge of the battery, re-charging if necessary.
- (b) Check the setting of the lamp. See if the bulb is in focus (when "prefocus" bulb is not used).
- (c) If the bulb is discoloured as a result of long service it should be replaced. On lamps on which the reflector surface is accessible, see that the reflector is clean.

Lamps light when switched on, but gradually fade out

Test the state of charge of the battery, re-charging if necessary.

Brilliance varies with speed of motor cycle

Test the state of charge of the battery, re-charging if necessary.

Lights flicker

Examine the wiring for loose connections.

MAGNETO IGNITION CIRCUIT

Engine will not fire or misfires

- (a) See that the controls are correctly set for starting, petrol turned on, etc.
- (b) Turn off the petrol tap. Remove the sparking plug (or plugs), and place on the cylinder head. If a spark occurs regularly at the plug points when the engine is slowly hand-cranked, the magneto is in order. Look for engine defects and check ignition timing.
- (c) If a spark does not occur in (b), disconnect the high tension cable from the plug and hold the cable end about $\frac{1}{8}$ " from a metal part of the engine. If a spark occurs regularly when the engine is cranked, the plug is faulty. If there is no spark, disconnect the high tension cable at the magneto, replace with a new length of cable and test again as before.
- (d) Should there still be no spark, possible causes of trouble are : contact breaker gap out of adjustment or contacts dirty; contact breaker rocker arm sticking (on ring cam types); pick-up brush worn or broken, or slip ring track dirty. Remedy as described.

Engine Misfires

- (a) Check as in paragraphs (b) and (c) above to eliminate engine defects, faulty high tension cable and sparking plug.
- (b) Check magneto as in paragraph (d) above.

COIL IGNITION CIRCUIT

Engine will not fire

- (a) See that the battery is in a charged condition, either by means of a hydrometer or by checking that the lamps give good light.

In emergency, a start can be obtained with two flash lamp batteries connected in series (i.e., the short terminal strip of the one battery connected to the long strip of the second). On "positive earth" machines, connect the negative battery terminal (usually the long strip) to the coil terminal "SW" and the other battery terminal to the frame. As soon as the generator begins to charge, the flashlamp battery can be removed.

- (b) See that the controls are correctly set for starting, ignition switched on, petrol turned on, etc.
- (c) Turn off the petrol tap. Remove the high tension cable from the sparking plug terminal and hold it about $\frac{1}{8}$ " 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.
- (d) If sparks do not occur in test (c), check for a fault in the low tension wiring. This will be indicated by (i) no ammeter reading when the engine is slowly cranked and the ignition switch is on, or (ii) no spark occurring between the contacts when quickly separated by the fingers with the ignition switched on. Examine all cables in the ignition circuit and see that all connections are tight.
- (e) If the wiring proves to be in order, examine the contacts; if necessary, clean them and adjust the gap.

Engine misfires

- (a) Examine the contacts; if necessary, clean them and adjust the gap.
- (b) Turn off the petrol taps. 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 should be cleaned and adjusted, or to defective high tension cables. Any cable showing 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.

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