Maintenance Instructions for

LUCAS

ELECTRIC LIGHTING

and

IGNITION EQUIPMENT

With Compensated Voltage Control

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 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.

By reference to the Index on the next page you will be able to locate the information relating to the compensated voltage control dynamo equipment fitted on your motor cycle.

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

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"MAGDYNO" EQUIPMENT

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SEPARATE DYNAMO AND MAGNETO EQUIPMENT

THE BATTERY

Topping-Up.

During charging, water is lost by gassing and evaporation and this must be replaced to maintain the battery in a healthy condition. Once a month, or more often in warm climates, the level of the electrolyte in the cells of the battery must be examined ; if necessary, distilled water must be added to bring the electrolyte just level with the top edges of the separators. Do not use tap water as it may contain impurities detrimental to the battery. In the case of the smaller capacity five-plate batteries (indicated by suffix number 5 added to the Lucas type letters), fitted to certain lightweight motor cycles, it is advisable to make this examination weekly.

Never use a naked light when examining the condition of the cells, as there is a danger of igniting the gas coming from the active materials.

Batteries with Correct-Acid-Level Devices.

A 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 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. By lifting the tube slightly, the small amount of water in the flange will drain into the cell and the electrolyte level will then be correct.

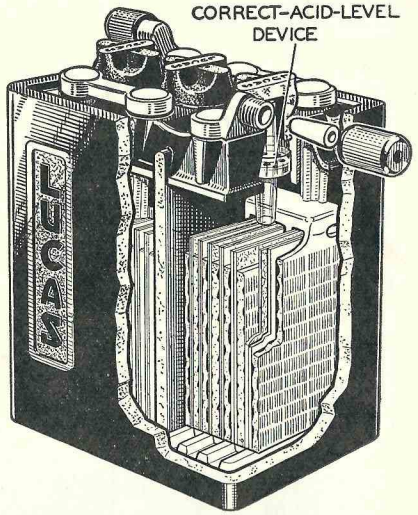


Fig. 1. Battery model PU7E/9.

Batteries without Correct-Acid-Level Devices.

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 top edges of the separators.

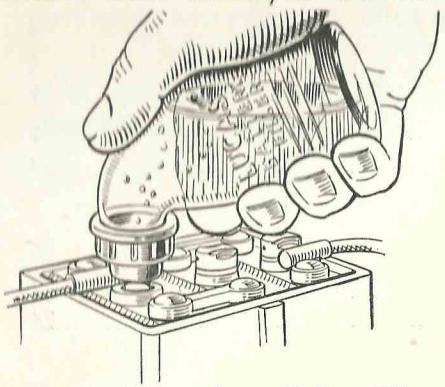


Fig. 2. Using a Lucas Battery Filler.

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

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. Measurements should not be taken immediately after the cells have been "topped-up," as the electrolyte will not be thoroughly mixed.

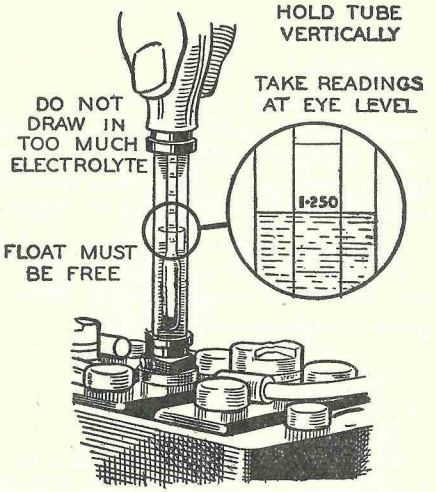


Fig. 3. Taking Hydrometer Readings.

The space between each separator is not wide enough to permit the nozzle of any hydrometer to be inserted. Before taking a sample, tilt the battery to bring sufficient electrolyte above the separators.

Specific gravity readings and their indications are as follows :—

1.280 — 1.300		Cell fully charged.
About	1.210	Cell about half discharged.
Below	1.150	Cell fully discharged.

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 any length of time have the battery fully charged and every fortnight give it a short refreshing charge to prevent any tendency for the plates to become permanently sulphated.

Detachable Cable Connectors.

When connecting batteries with detachable cable connections, unscrew the knurled nut and withdraw the collet or cone-shaped insert, noting that it is not interchangeable with the collet in the other terminal. Bare the end of the cable for about one inch and thread the bared end through the knurled nut and collet. Bend back the cable strands over the narrow end of the collet and insert the collet and cable into the terminal block. Secure the connection by tightening the knurled nut.

THE DYNAMO

Output Control.

The dynamo 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 dynamo to give an output which varies according to the load on the battery and its state of charge. When the battery is discharged the dynamo gives a high output, but if the battery is fully charged then the dynamo gives only a trickle charge so as to keep the battery in a good condition. In addition to controlling the output of the dynamo 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 cut-out is an automatic switch which connects the dynamo to the battery only when the dynamo voltage exceeds the battery voltage, or conversely, which disconnects to prevent the battery discharging through the dynamo windings.

The dynamo output is accurately set to suit the requirements of the motor cycle 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 regulator reset 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 dynamo gives only a trickle charge so that the ammeter needle should show only a small deflection to the "+" side of the scale.

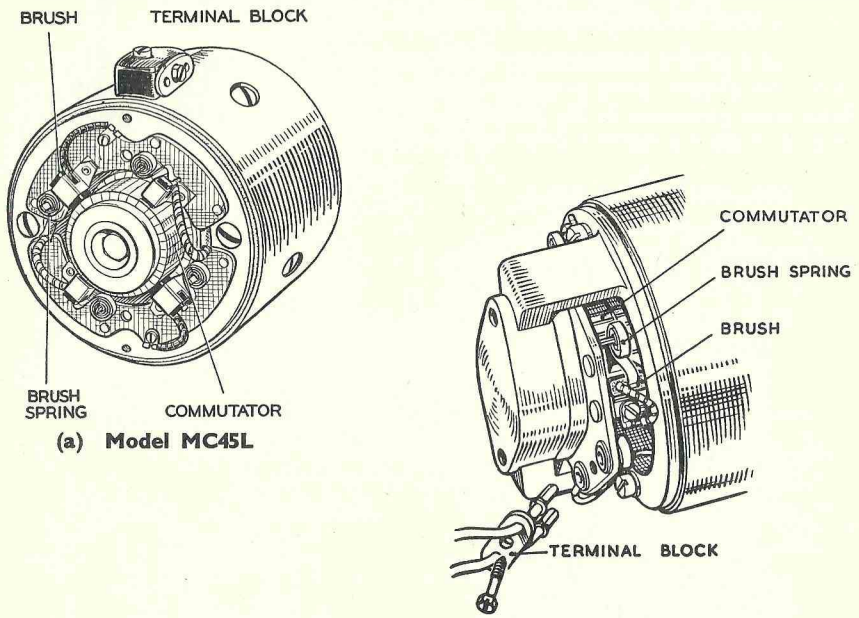
A discharge reading may be observed immediately after switching on the headlamp. This usually happens after a long run when the battery voltage is high. After a short time the battery voltage will drop and the regulator will respond, causing the dynamo output to balance the lamp load.

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 E3AR, 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 dynamo should require repacking with grease only at overhaul.



(a) Model MC45L

(b) Models C35S and C35SD.

Fig. 4. Dynamo, with Covers Removed.

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 dynamo itself.

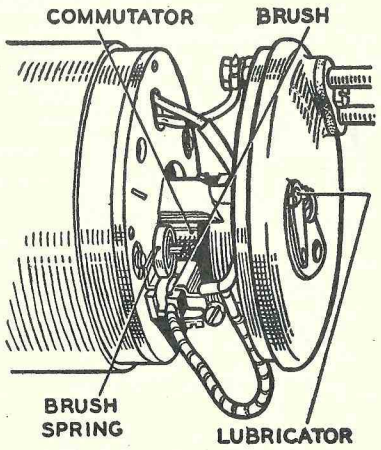
In order to prevent oil from the engine getting into the dynamo, an oil seal is fitted at the drive end of these dynamos. If required, replacement oil seals can be obtained from the engine manufacturer.

Inspection of Commutator and Brushgear.

About every six months 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 cloth moistened with petrol. Care must be taken to replace the brushes in their original position, otherwise they will not 'bed' properly on the commutator. If after long service the brushes have become worn to such an extent that they will not bear properly on the commutator they must be replaced. 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



(c) Models E3H and E3HM.

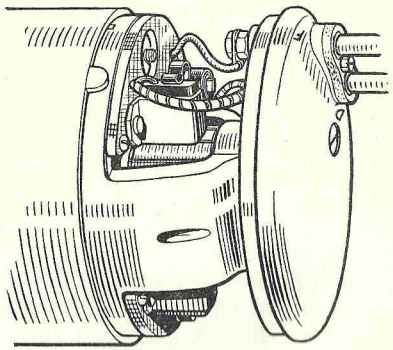

(d) Models E3L, E3LM and E3N.

Fig. 5. Dynamos with Covers Removed.

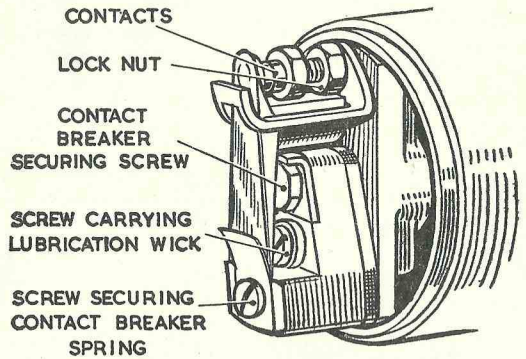
an advantage to remove the sparking plug before doing this). If the commutator is very dirty, moisten the cloth with petrol.

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

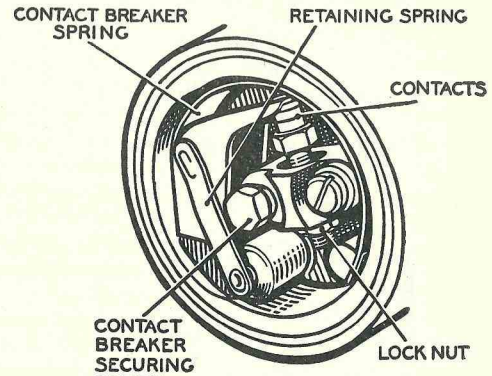
Before tightening the cover of an E3L dynamo, a locating slot in the cover must first coincide with a projection on the dynamo body.

ROTATING ARMATURE MAGNETOS

These magnetos have the magnet cast in the body and the armature and contact breaker rotate within the casting. Two designs of contact breaker are in common use, single cylinder magnetos usually employing the face cam type Fig. 6(a), while magnetos for twin cylinder engines have the ring cam type shown in Fig. 6(b).



(a) Face Cam Type.



(b) Ring Cam Type.

Fig. 6. Magneto Contact Breakers.

Ignition Timing Control.

Some magnetos are provided with an automatic timing control which varies the firing point according to the speed of the engine, thus relieving the rider of the necessity for adjustment of a hand ignition control.

If, however, this automatic control is not provided, retard the hand ignition control for starting but advance it as soon as the engine is running at

speed. For normal running, the control should be kept in the advanced position, and should be retarded only when the engine is 'labouring' on full throttle.

Any slackness in the cable can be taken up by sliding the water-proofing rubber shroud up the cable and turning the exposed hexagon adjuster. After adjusting, return the rubber shroud to its original position.

Lubrication — Every 3,000 Miles.

Face Cam Type. The cam is lubricated from a wick contained in the contact breaker base. To reach the wick, take out the screw which secures the spring arm carrying the moving contact and lift off the backing spring and spring arm. The screw carrying the wick can then be withdrawn. At the same time, unscrew the contact breaker securing screw, 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. Lightly smear both sides of the cam with Mobilgrease No. 2. When refitting, take care that the stop peg in the housing and the plunger of the timing control engage with their respective slots. A recess is provided for the "eye" of the circlip. When replacing the spring arm see that the backing spring is fitted on top with its bent portion facing outwards (see Fig. 6a).

Ring Cam Type. The cam is supplied with lubricant from a felt pad contained in a pocket in the contact breaker housing. A small hole in the cam, fitted with a wick, enables the oil to find its way to the surface of the cam. Remove the contact breaker cover, turn the engine over until the hole in the cam can be clearly seen and then carefully add a few drops of thin machine oil. Do not allow any oil to get on or near the contacts. If the cam ring is removed, the wick should be taken out and soaked in thin machine oil. Wipe the wick to remove surplus oil, before replacing.

The contact breaker rocker arm pivot also requires lubrication and the complete contact breaker must be removed for this purpose. Take out the hexagon-headed screw from the centre of the contact breaker and carefully lever the contact breaker off the tapered shaft on which it fits. Push aside the rocker arm retaining spring, lift off the rocker arm and lightly smear the pivot with Mobilgrease No. 2 or an equivalent grease.

Remove the cam ring, which is a sliding fit in its housing, and lightly smear inside and outside surfaces with Mobilgrease No. 2. Removal and refitting of the cam can be made easier if the handle-bar control lever is half retarded, thus taking the cam away from its stop pin. Apply one or two drops of thin machine oil to the felt cam lubricator in the housing. Refit the cam, taking care that the stop peg in the housing and the timing control plunger engage with their respective slots.

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

When replacing the contact breaker, take care to ensure that the projecting key on the tapered portion of the contact breaker base engages with the keyway cut in the magneto spindle, otherwise the timing of the magneto will be affected. Replace the contact breaker securing screw and tighten with care.

The armature bearings are packed with grease during assembly and will not need attention until the motor cycle is dismantled for general overhaul, when it is advisable to have the magneto inspected by a Lucas Service Depot or Agent.

Adjustment of Contact Breaker Setting.

The setting of the contact breaker gap must be checked every 3,000 miles. To do this, remove the contact breaker cover and turn the engine until the contacts are seen to be fully open. Check the gap with a feeler gauge having a thickness of 0·012″—0·015″ (a gauge for this purpose is provided on the spanner usually supplied with each magneto). If the setting is correct, the gauge should be a sliding fit, but if the gap width varies appreciably from the gauge thickness it must be adjusted. Keep the engine in the position giving maximum separation of the contacts, slacken the locknut and turn the contact screw by its hexagon head until the gap is set to the gauge. Tighten the locknut and re-check the setting.

Cleaning Contacts.

Every 6,000 miles, take off the contact breaker cover and examine the contact breaker. Dirty or pitted contacts can be cleaned with a fine carborundum stone, or, if this is not available, very fine emery cloth may be used. Wipe away any dirt or metal dust with a cloth moistened with petrol. Contact breaker springs should be examined and any rust removed. To render the contacts accessible for cleaning, proceed as outlined below.

After cleaning, check the contact breaker setting.

Removal of Contacts for Cleaning.

Face Cam Type. Remove the spring arm carrying the moving contact by withdrawing the securing screw. When replacing, the order of assembly is : spring arm, backing spring (with its bent portion facing outwards), spring washer and securing screw.

Ring Cam Type. Unscrew the contact breaker securing screw. Carefully lever the contact breaker off the tapered shaft on which it fits. Push aside the locating spring and lift the rocker arm off its pivot, when it will be possible to clean the contacts. When replacing the contact breaker, check that the projecting key, on the tapered portion of the contact breaker base, engages with the keyway cut in the armature spindle, otherwise the timing of the magneto will be affected. Replace the contact breaker securing screw and tighten with care.

High Tension Pick-up.

About every 6,000 miles, remove the high tension pick-up, secured by means of a clip or two screws. Wipe the moulding with a clean dry cloth. Check that the carbon brush moves freely in its holder, but take care not to stretch the brush spring unduly. If the brush is dirty, clean it with a cloth moistened with petrol. If the brush is worn to within $\frac{1}{8}$-in. of the shoulder it must be renewed.

Before re-fitting the high tension pick-up, clean the slip ring track and flanges by pressing a soft dry cloth on the ring with a suitably shaped piece of wood, while the engine is slowly turned.

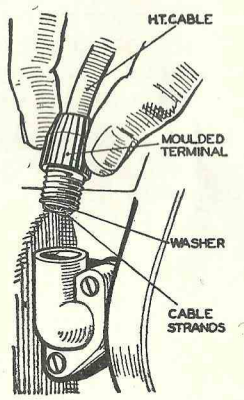


Fig. 7. Method of Fitting Cable to High Tension Pick-up.

Renewing High Tension Cables.

When high tension cables show signs of cracking or perishing, they must be replaced, using 7 mm. rubber covered ignition cable.

To replace a high tension cable 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 $\frac{1}{4}$-in. Pass the exposed strands through the metal washer and bend them back radially. Screw the terminal into the pick-up moulding.

ROTATING MAGNET MAGNETOS

In this magneto the less robust parts such as the coil, condenser, and contact breaker, remain stationary whilst the magnet and cam rotate. An automatic timing control is fitted on the driving shaft to vary the firing point according to the speed of the engine, thus relieving the rider of the necessity for adjustment of a hand ignition control.

Lubrication — Every 3,000 Miles.

Remove the moulded cover, slacken the nut securing the end of the contact breaker spring and lift off the spring and contact breaker lever. Smear the pivot pin with a *small* quantity of Mobilgrease No. 2 or an equivalent grease.

Take great care to prevent oil or grease getting on or near the contacts.

The ball bearings are packed with grease during assembly and will not need attention until the motor cycle is dismantled for general overhaul, when it is advisable to have the magneto inspected by a Lucas Service Depot or Agent.

Adjustment of Contact Breaker Setting.

The setting of the contact breaker gap must be checked every 3,000 miles. To do this, remove the moulded cover and turn the engine until the contacts are seen to be fully open. Check the gap with a feeler gauge having a thickness of 0.010″ — 0.012″. If the setting is correct, the gauge should be a sliding fit, but if the gap width varies appreciably from the gauge thickness it must be adjusted. Keep the engine in the position giving maximum separation of the contacts, slacken the two screws securing the fixed contact plate and adjust its position to give the required gap. Tighten the screws.

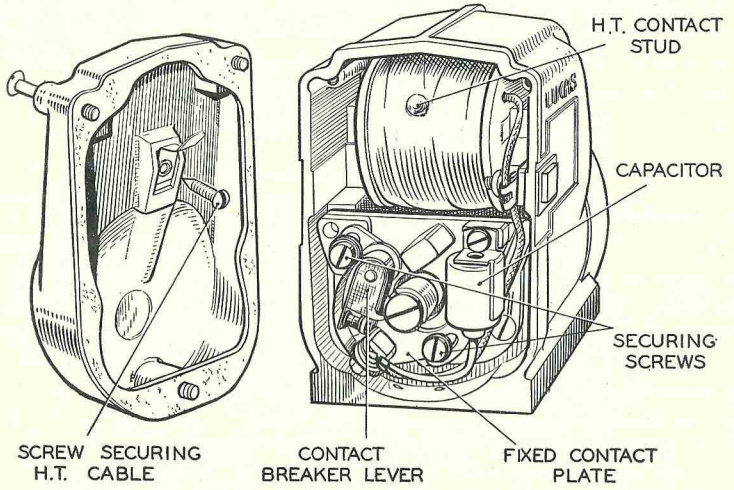


Fig. 8. Contact Breaker End View.

Cleaning Contacts.

Every 6,000 miles, take off the moulded cover and examine the contact breaker.

Dirty or pitted contacts can be cleaned with a fine carborundum stone, or, if this is not available, very fine emery cloth may be used. Wipe away any dirt or metal dust with a cloth moistened with petrol. Contact breaker springs should be examined and any rust removed. To render the contacts accessible for cleaning, remove the spring arm carrying the moving contact. After cleaning, check the contact breaker setting.

Renewing High Tension Cables.

When high tension cables show signs of cracking or perishing, they must be replaced, using 7 mm. rubber covered ignition cable.

To replace a high tension cable proceed as follows :

Remove the moulded cover, unscrew the pointed screw from the inside of the moulding and pull out the old cable. Push the new cable fully home and secure by tightening the screw, which will pierce the insulation and make good contact with the cable core.

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. The distributor is provided with an automatic timing control, housed beneath the contact breaker base, which automatically varies the firing point according to the speed of the engine. A warning light is usually provided which lights up when the engine is running very slowly or is stationary, to remind the rider to switch off.

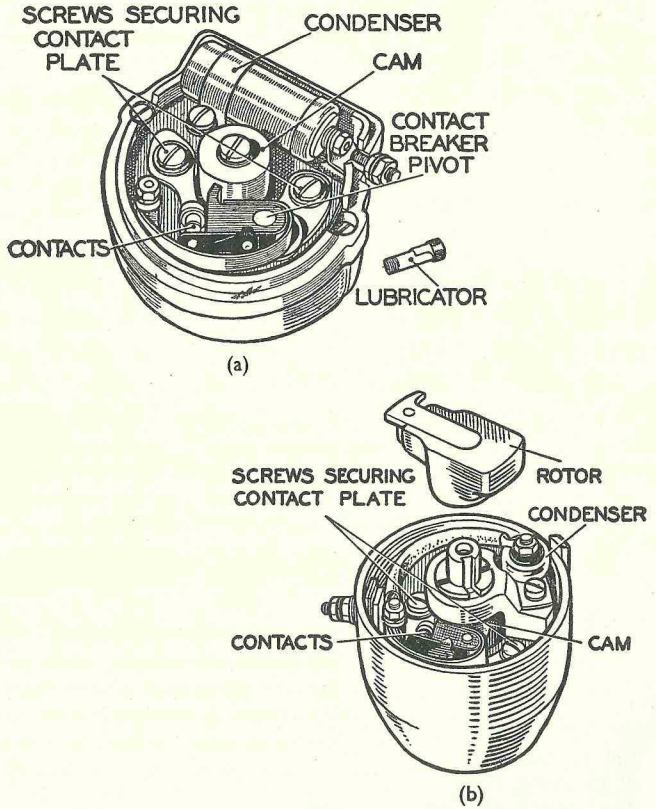


Fig. 9. Typical Contact Breakers incorporating Automatic Timing Control.

Lubrication — to be carried out every 3,000 miles.

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 may be used.

Place a small amount of Mobilgrease No. 2 or a spot of clean engine oil on the contact breaker pivot.

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

Automatic Timing Mechanism.

DK types (similar to Fig. 9a) : Unscrew the two screws securing the contact breaker base plate to the distributor, and lubricate the automatic timing control, thus exposed, with thin machine oil, paying particular attention to the pivots. Refit the base plate, and secure by means of the fixing screws.

Model DIA2 (Fig. 9b) : 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.

Cleaning — every 6,000 miles.

Remove the moulded cover and wipe it inside and outside with a soft dry cloth. 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 do this, unscrew the nut securing the end of the spring and remove the nut, spring washer and bush. Lift the contact breaker lever off its pivot. After cleaning, check the contact breaker setting.

Contact Breaker Setting.

The contact breaker gap is initially set at 0·014″ — 0·016″ before leaving the Works, and this setting should be reset to 0·010″ — 0·012″ after the first 500 miles running and subsequently every 6,000 miles. To check the gap, turn the engine over slowly until the contacts are seen to be fully open, and insert a feeler gauge between the contacts. If the gap is correct, the gauge should be a sliding fit, but if the gap width varies appreciably from the gauge thickness, the setting must be adjusted.

Note: On four-cylinder motor cycles made during and since 1952, the initial setting of 0·014″ — 0·016″ should be maintained in service, and not 0·010″ — 0·012″.

To do this, keep the engine in the position giving maximum contact opening and slacken the two screws 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 two locking screws.

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.

Renewing High Tension Cables.

When the high tension cable shows signs of perishing or cracking it must be replaced, using 7 mm. rubber covered ignition cable. To connect the cable, 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 $\frac{1}{4}$-in. Pass the exposed strands through the metal washer and bend them back radially. Screw the terminal into the pick-up moulding.

Warning Light.

The ignition warning light gives a red light when the engine is stationary and the ignition is switched on, in order to warn the rider to switch off. It will also light up when the engine is idling. After long service the bulb may burn out. However, this will not affect the ignition, but the bulb should be replaced as soon as possible as a safeguard for the battery.

When the lamp is mounted in an instrument panel it is sometimes necessary to remove the panel front, when the bulb may be unscrewed from its holder. With other types the bulb can be removed when the glass front 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. 970 2·5 volts, 0·2 amp. Miniature screw cap.

HEAD LAMPS

There are a number of different models of Lucas headlamps. Briefly, they can be divided into the following groups :—

1. Separate lens and reflector. Bayonet fitting bulb.
2. Combined lens and reflector, *i.e.*, Lucas Light Unit. Bayonet fitting bulb.
3. Lucas Light Unit. Prefocus bulb.

The above combinations are incorporated in either a lamp body or a nacelle-type extension of the motorcycle forks.

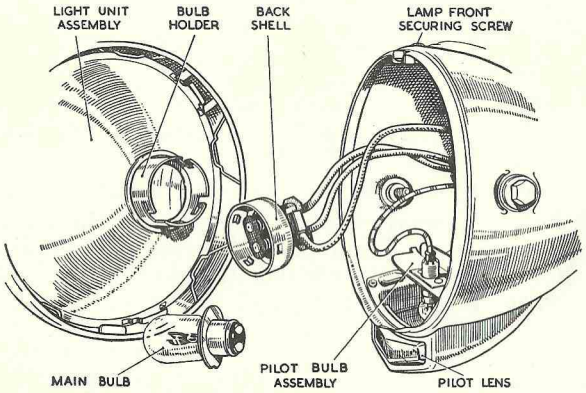


Fig. 10. Model "SSU" Headlamp with "Prefocus" Bulb and Underslung Parking Light.

Setting and Focusing.

The best way of checking the setting of the lamp is to stand the motor cycle in front of a light coloured wall at a distance of about 25 feet. If necessary, slacken the bolts securing the headlamp and move the lamp until, with the main driving light switched on, the beam is projected straight ahead and parallel with the ground. With the lamp in this position, the height of the beam centre from the ground should be the same as the height of the centre of the headlamp from the ground.

Focusing is unnecessary with headlamps carrying a "prefocus" bulb in the Light Unit assembly.

Other headlamps must be focused so that, when the main driving light is switched on, a uniform beam without a dark centre is given. If the bulb needs adjusting, remove the lamp front and reflector, as described below, and slacken the bulb holder clamping clip at the back of the reflector. Move the bulb holder backwards and forwards until the correct position is obtained, and then tighten the clamping clip.

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.

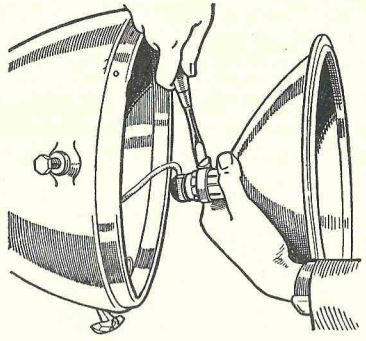


Fig. 11. Focusing Headlamp.

Removing Headlamp Front.

On earlier models remove the lamp front by releasing the spring catch at the bottom of the lamp. The reflector is secured to the lamp body by means of a rubber bead, and can be withdrawn when the rubber is removed. When refitting, locate the thinner lip of the rubber bead between the reflector rim and the edge of the lamp body. To replace the front, locate the metal tongue in the slot at the top of the lamp, press the front on and secure by means of the fixing catch.

On later models remove the lamp front by slackening the securing screw at the top or bottom of the lamp. It will then be possible to detach the front rim complete with Light Unit assembly. To replace, locate the

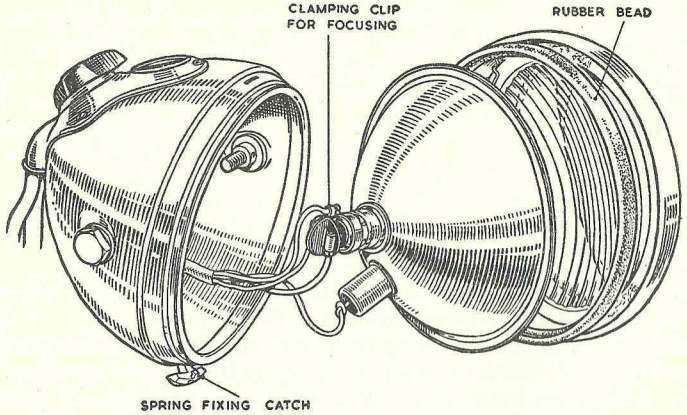


Fig. 12. "MU" Headlamp with Front and Reflector removed.

bottom of the Light Unit assembly in the lamp body, press the front on and secure in position by tightening the securing screw.

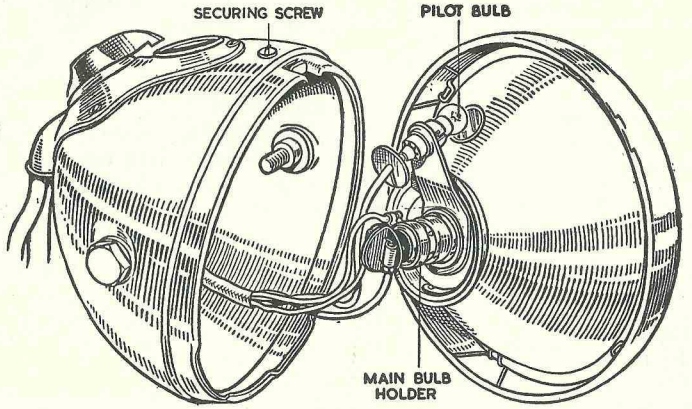


Fig. 13. An early Model "SSU" Headlamp with Light Unit and Bayonet Cap Bulb.

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 a 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.

When fitting a headlamp bulb care must be taken to insert it the correct way round, *i.e.*, with the dipped beam filament above the centre filament. To assist, bulbs are usually marked TOP on the metal cap. In the case of " prefocus " bulbs, there is usually only one location for the bulb, to ensure correct positioning.

On lamps having separate lens and reflector the bulb is accessible for replacement when the front rim and glass are removed.

On lamps incorporating the Lucas Light Unit the main bulb is accessible for replacement when the front rim and Light Unit are removed. To replace " prefocus " bulbs, twist the back shell in an anti-clockwise direction and pull 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 back shell with the slots in the bulb holder, press on and secure by twisting

to the right. Lamps fitted with bayonet cap main bulbs have the bulb holder fitted into the rear of the Light Unit. Detach the bulb holder, held in position by two spring loaded pegs, replace the bulb in the correct position, and refit the bulb holder.

Cleaning.

Care must be taken when handling lamps with separate lens and reflector, to prevent the reflector from becoming finger-marked. If it does become marked, however, a transparent and colourless covering enables any finger marks to be removed by polishing with a chamois leather or a very soft dry cloth. Do not use metal polish on the reflector. The lamp body can be cleaned with a good car polish, and the plated rim polished with a chamois leather or soft dry cloth, after any dirt has been washed off with water.

Lucas Light Unit reflectors do not require cleaning and no attempt should be made to do so.

Dipper Switch.

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

PARKING LIGHTS

On headlamps having separate lens and reflector, the parking light bulb is accessible for replacement when the front rim and lens assembly is removed.

On headlamps fitted with a Lucas Light Unit the parking light bulb is accessible for replacement when the front rim and Light Unit assembly is removed. The parking bulb is carried on a bracket on the main bulb holder, or on a small metal plate in the case of lamps with under slung parking lights. On more recent Light Units the parking light bulb holder is a push-fit in the reflector.

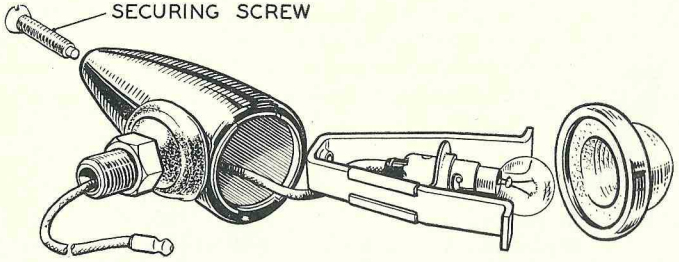


Fig. 14. Parking Light Model 516.

With parking lights of the type illustrated in Fig. 14 access to the bulb is gained by slackening the screw at the rear of the body shell and pulling the bulb holder rim and lens away from the lamp.

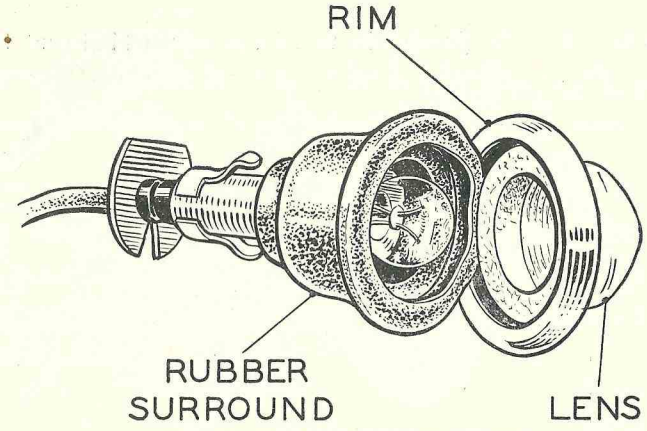


Fig. 15. Parking Light Model 550.

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.

Correct replacement bulbs are :

Headlamps, Models " M " and " MU " (separate lens and reflector). Lucas No. 200. 6-volt 3-watt Small bayonet cap.

All subsequent Headlamps, Models " SS," " SSU," etc. Lucas No. 988. 6-volt 3-watt. Miniature bayonet cap.

REAR LAMPS

Tail Lamps.

The method of gaining access to the bulb and its holder differs with various types of lamps.

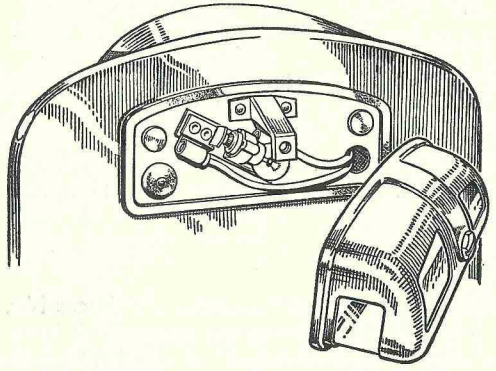


Fig. 16. Model 467/2 Tail Lamp.

Access to the bulb (Lucas No. 988. 6-volt 3-watt Miniature bayonet cap) is obtained by slackening the single securing screw. The cover and glass can then be withdrawn.

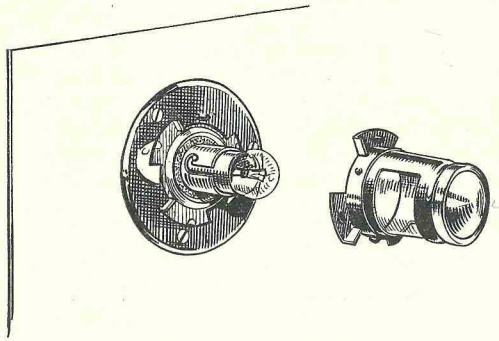


Fig. 17. Model 480 Tail Lamp.

Access to the bulb (Lucas No. 200. 6-volt 3-watt Small bayonet cap) is obtained by turning the front to the left and withdrawing. To replace, engage the projections on the front in the slots and turn to the right to secure in position.

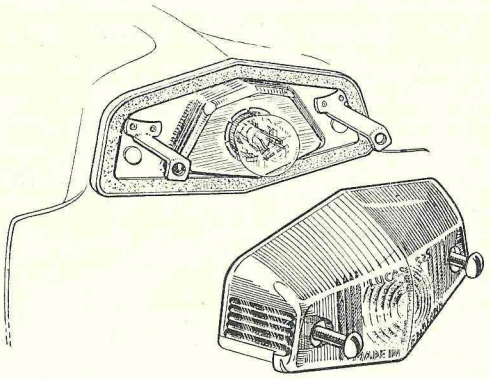


Fig. 18. Model 525 Stop-Tail Lamp.

Stop-Tail Lamps.

These lamps employ a double filament bulb (Lucas No. 352. 6v. 3/18w. Offset pins) the 3-watt filament being the normal tail lamp and the 18-watt coming into operation on the movement of the brake pedal. The bulbs for these dual purpose lamps are now made with offset securing pins to

prevent incorrect fitting. When replacing the bulb on earlier models, however, it is important to fit it in the correct position, i.e., so that the higher wattage filament is illuminated when the brake pedal is applied.

An early stop-tail lamp, model 477/1, is similar in construction to the tail lamp shown in Fig. 17 except that the body is conical in shape to allow for the larger size of bulb envelope. Later models having red thermo-plastic covers are illustrated by Figs. 18 and 19. The covers are shown removed for bulb replacement.

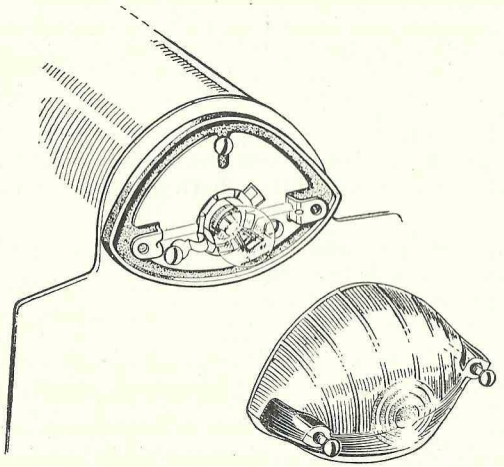


Fig. 19. Model 529 Stop-Tail Lamp.

The lamp shown in Fig. 19 is also produced as a tail lamp only, the correct bulb replacement being Lucas No. 988. 6-volt 3-watt. Miniature bayonet cap.

ELECTRIC HORNS

These horns, before being passed out of the Works, are adjusted to give their best performance, and will give a long period of service without attention ; no subsequent adjustment should be required.

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. First ascertain that the trouble is not due to some outside source, e.g., 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.

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

Accurate adjustment requires the use of a 0-10 amp. d.c. ammeter—the maximum permissible current consumption being 6 amperes at 6 volts—but the owner-rider, who may not possess one of these instruments, can carry out the following procedure if the horn note 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 seems to be necessary, turn the screw one notch at a time clockwise.

Note: A few horns made during 1950-51 were not provided with the above adjustment screw. No adjustment is therefore possible with these horns.

If the cause of the trouble cannot be found, do not attempt to dismantle the horn, but return it to a Lucas Service Depot for examination.

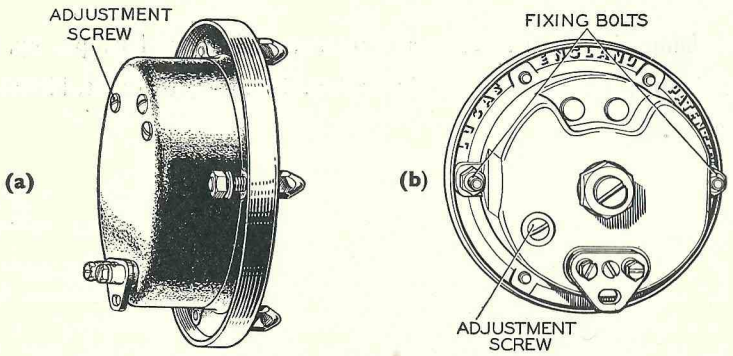


Fig. 20. Rear view of horn, showing position of adjustment screw fitted to (a) Pre-1951 models and (b) Post-1951 models.

WIRING OF EQUIPMENT

On many 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 positive cable (for negative earth equipment) or the negative cable (for positive earth equipment) from the battery to avoid the danger of short circuits. Details of the terminal arrangement of King of the Road batteries are given on pages 5 - 6. 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. Care must then be taken that the connector does not touch any metal part of the frame as this will short circuit the battery. When connecting up again, do not forget to refit the rubber sleeve over the connector.

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

The cables are identified either by means of their coloured braided insulation or by coloured sleeving. 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. Replace and tighten the grub screw.

To make a connection to the dynamo 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 dynamo and regulator units must not be reversed. To prevent this occurring, the screw in the dynamo terminal block is off-centre and the screws which secure the regulator terminal clamping plate are of different size.

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.

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 hydrometer readings below 1·200. 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 dynamo 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 dynamo brushgear and commutator, cleaning if necessary. Having worn brushes replaced.

(*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 tested, and adjusted if necessary 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, recharging it if necessary either by a long period of daytime running or from an independent electrical 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, recharging if necessary.

(*b*) Check the setting of the lamp and that 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 it is clean.

Lamps light when switched on, but gradually fade out.

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.

MAGNETO IGNITION CIRCUIT

Engine will not fire.

(*a*) See that the controls are correctly set for starting, petrol turned on, etc.

(*b*) Remove the sparking plug (or plugs), and allow to rest on cylinder head. If a spark occurs regularly at the plug points when the engine is slowly turned over, the magneto is in order. Look for engine defects and check ignition timing.

(*c*) If a spark does not occur in (*b*), disconnect the H.T. cable from the plug and hold the cable end about $\frac{1}{8}$-in. from a metal part of the engine. If a spark occurs regularly when the engine is turned, the plug is faulty. If there is no spark, disconnect the H.T. 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 para. (*b*) and (*c*) above to eliminate engine defects, faulty H.T. cable and sparking plug.

(*b*) Check magneto as in para. (*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 case of 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). Connect the positive battery terminal (usually the short strip to the coil terminal marked "SW") and the other battery terminal to the frame. As soon as the dynamo begins to charge, the flash lamp battery can be removed.

(*b*) See that the controls are correctly set for starting, ignition switched on, petrol turned on, etc.

(*c*) Remove the H.T. cable from the sparking plug terminal and hold it 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.

(*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 turned and the ignition switch is on, or (*ii*) no spark occurring between the contacts when quickly separated by the fingers when the ignition is switched on. Examine all cable 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*) 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 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.

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