



MAINTENANCE INSTRUCTIONS

FOR

LUCAS

"MAGDYNO" EQUIPMENT

ON

MOTOR - CYCLES

SUPPLIED TO H.M. FORCES.

JOSEPH LUCAS LIMITED.

MAINTENANCE INSTRUCTIONS FOR LUCAS "MAGDYNO" EQUIPMENT ON MOTOR-CYCLES SUPPLIED TO H.M. FORCES.

The equipment consists of the "Magdyno" itself, which is a combined unit incorporating the dynamo and magneto, the cut-out and regulator unit, the battery, the headlamp with lighting switch and ammeter, the tail lamp, and the electric horn.

BATTERY — Lead Acid Type

About once a month, remove the battery lid, unscrew the filler caps and examine the level of the acid in the cells. If necessary, add distilled water to bring the acid level with the tops of the separators. Do not use tap water as it contains impurities detrimental to the battery. When examining the cells, do not hold naked lights near the vent holes as there is a danger of igniting the gas coming from the plates.

Once a month examine the condition of the battery by taking hydrometer readings. There is no better way of ascertaining the state of charge of the battery. The hydrometer contains a graduated float which indicates the specific gravity of the acid in the cell from which the sample is taken. The specific gravity readings and their indications are as follows:—1.250—1.300 Battery fully charged, 1.150 — 1.250 Battery about half discharged, below 1.150 Battery fully discharged. These figures are given assuming the temperature of the solution is about 60°F.

The readings for each of the three cells should be approximately the same. If one cell gives a reading very different from the rest, it may be that acid has spilled or has leaked from this particular cell. or there may be a short circuit between the plates. In this case a replacement battery must be fitted.

Never leave the battery in a discharged condition for any appreciable length of time.

If the motor cycle is to be out of use for any time, see that the battery is fully charged and about every fortnight give it a short freshening charge to prevent any tendency to permanent sulphation of the plates.

DYNAMO

The dynamo is of the compensated voltage control type and works in conjunction with a regulator unit which is mounted together with the cut-out. The regulator and cut-out units are accurately set and do not require any adjustment.

What the Regulator does

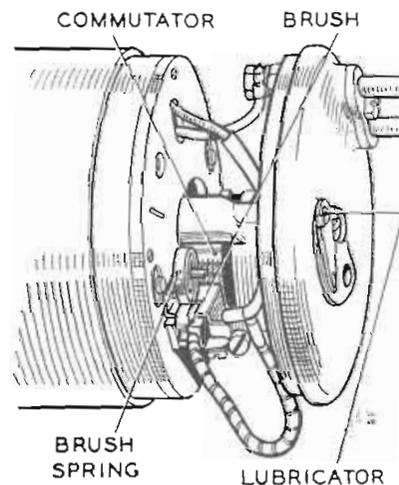
This provides a completely automatic control.

The regulator 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 lamps when in use.

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 readings will seldom be more than 1 or 2 amperes.

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.



Dynamo with cover removed.

Lubrication

The lubricator at the commutator end bracket must be given a few drops of good grade thin machine oil every 4,000 — 5,000 miles. The bearing at the driving end is packed with grease and will last until the machine is taken down for a general overhaul.

Inspection of Commutator and Brushgear

About once every six months remove the dynamo cover for inspection of commutator and brushes.

The brushes must make firm contact with the commutator. The brushes are held in boxes by means of springs; move the 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. Now 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 against it a fine dry duster while the engine is slowly turned over by hand. If the commutator is very dirty, moisten the duster with petrol.

Dynamo output

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 competent mechanic who is provided with the necessary special equipment. Do not attempt adjustment yourself.

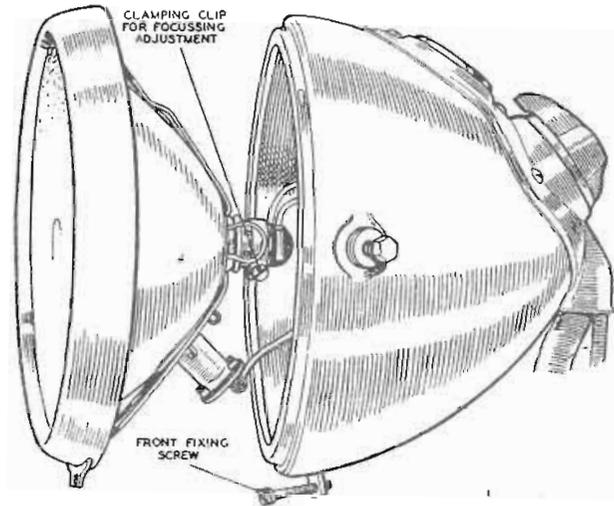
LAMPS

Headlamp — Checking the alignment

The best way to check the alignment is to take the motor cycle on a straight level stretch of road at night and examine the beam of the main driving light. Adjust the lamp by slackening the two fixing screws and moving the lamp until its beam is straight ahead and parallel with the road surface. Tighten the fixing screws after adjustment.

Focussing

In order for the headlamp to give the best results the driving light filament of the main bulb must be as near as possible to the focus of the reflector. Before the lamp is despatched from the Works the bulb is correctly focussed, and provided that the correct number genuine Lucas Bulb is fitted as a replacement it should not be necessary to disturb the



Headlamp opened to show connections.

setting. If for any reason a Lucas bulb is not obtainable, and an ordinary bulb has to be used, it may be necessary to refocus. To do this, remove the lamp front and reflector, slacken the clamping clip at the back of the reflector and remove the bulb holder backwards and forwards. After each adjustment note the effect with the reflector and front refitted.

When the best position for the bulb has been found see that the clamping screw is tightened.

Removing Headlamp front and reflector

To remove the lamp front and reflector slacken the fixing screw at the bottom of the lamp and swing it out of the slot in which it fits. When replacing the front locate the top of the rim first, then press on at the bottom and secure by means of the fixing screw.

To remove the bulb holder, press back the two securing springs.

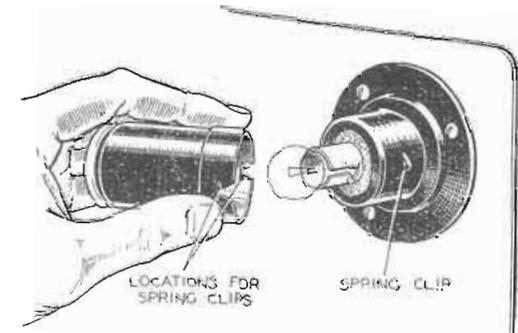
Sidecar Lamp



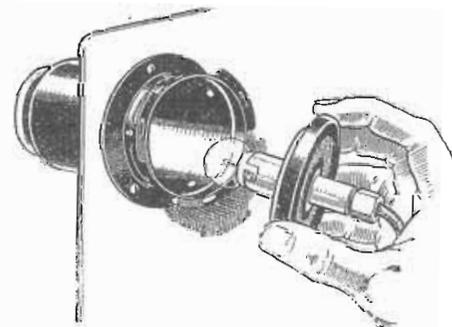
To gain access to the bulb withdraw the securing screw on the lamp stem and then pull the body away from the base. The bulb can then be removed from its holder. Replace the lamp body and secure with the screw.

Tail Lamps

The portion of this lamp carrying the red glass can be removed by giving it a half turn to the left. When refitting, engage the slots in the body with the two spring clips on the base and push home to secure the body in position.



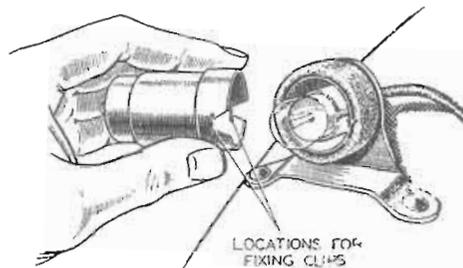
Type MT210.



Type MT110

The back of this lamp carrying the bulb holder can be removed by twisting to the left. To replace, engage the bayonet fixing and turn the lamp back until it clips into position.

To remove the cover carrying the red glass, twist and pull out of its mounting. When replacing, push the body into the lamp base between the rubber bush and the metal liner and turn it until the spring fixings are heard to clip into their locations.



Type L-WD-MCT1.

Replacement of Bulbs

When the replacement of a bulb is necessary, it is important not only that the same size bulb is fitted, but 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 it is impossible to focus correctly; for example, the filament may be to the one side of the axis of the bulb resulting in loss of range and light efficiency.

It always pays you to fit bulbs recommended by the lamp manufacturers as these problems will then not arise.

When fitting a main headlamp bulb, care must be taken to insert it the correct way round, i.e., with the dipped beam filament above the centre filament.

Lucas Genuine Spare Bulbs

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.

Replacement bulbs are as follows :—

Headlamp (main bulb). Lucas No. 70, 6 volts 24/24 watts. double filament.

Headlamp (pilot bulb) tail lamp and side car lamp (when fitted) Lucas No. 200, 6 volts 3 watts.

Cleaning Reflectors

All Lucas reflectors are protected by a fine transparent and colourless covering, which enables any accidental finger marks to be removed by lightly polishing with chamois leather or a soft cloth. This will not affect the surface of reflector. Never use metal polishes on Lucas reflectors.

Dipper Switch

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

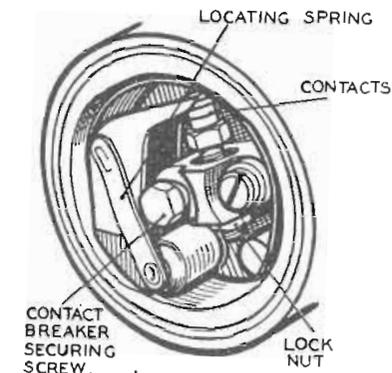
MAGNETO

Cleaning—

Dirty contacts can be cleaned with a fine carborundum stone, or if this is not available, fine emery cloth can be used. Wipe away any dirt or metal dust with a cloth moistened with petrol. Contact breaker springs should be examined and any rust wiped away. To render the contacts accessible for cleaning, proceed as follows :—

Ring type cam

Withdraw the contact breaker from its housing, by unscrewing the hexagon headed screw. The contact breaker can be pulled off the tapered shaft on which it fits. Push aside the locating spring and prise the rocker arm off its bearing, when it will be possible to begin cleaning the contacts. When replacing the contact breaker, take care to ensure that the projecting key, on the tapered portion of the contact breaker



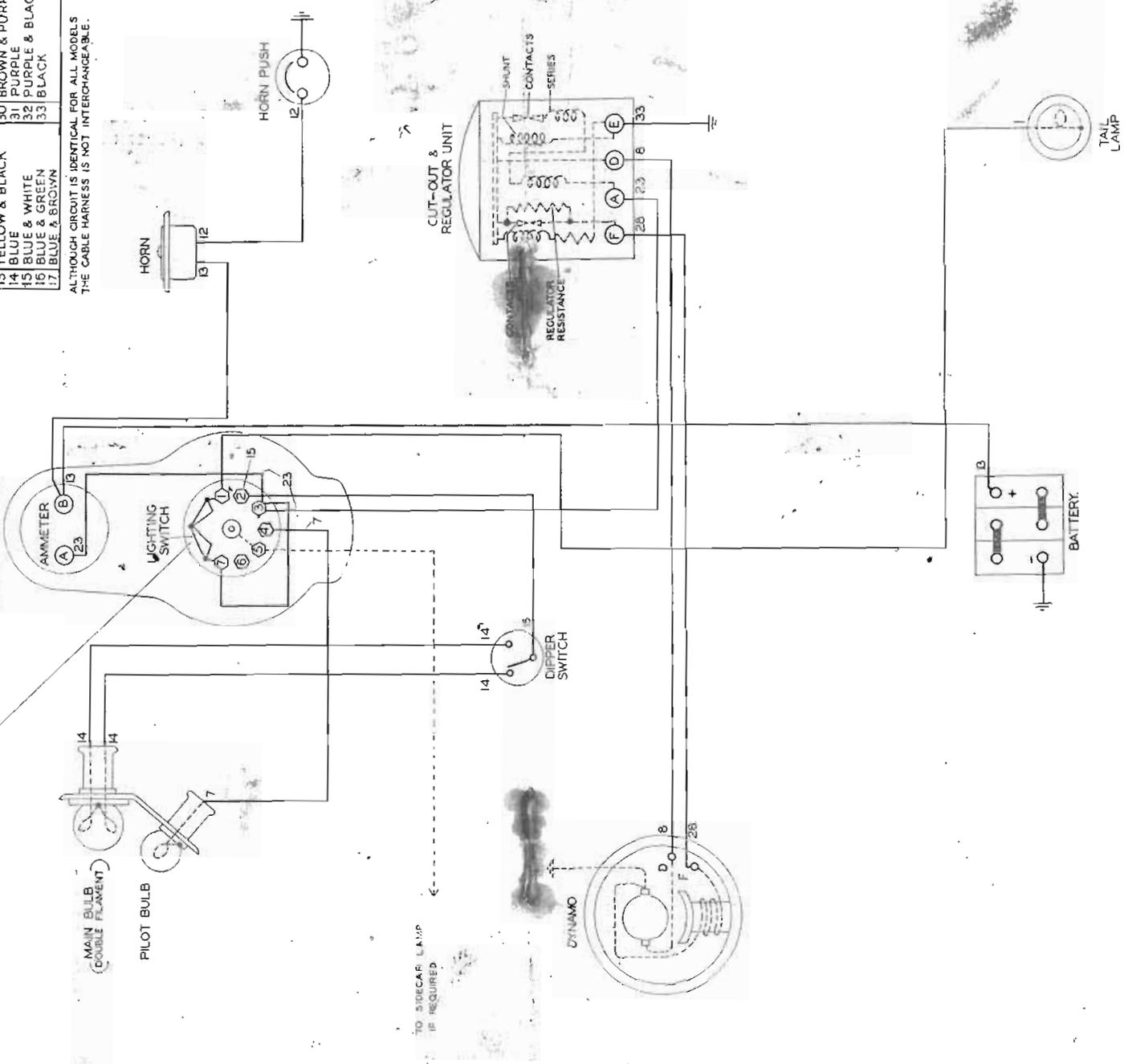
Ring Cam type Contact Breaker.

| KEY TO CABLE COLOURS | |
|----------------------|-----------------|
| 1 | RED |
| 2 | RED & YELLOW |
| 3 | RED & BLUE |
| 4 | RED & GREEN |
| 5 | RED & BROWN |
| 6 | RED & PURPLE |
| 7 | RED & BLACK |
| 8 | YELLOW |
| 9 | YELLOW & BLUE |
| 10 | YELLOW & GREEN |
| 11 | YELLOW & BROWN |
| 12 | YELLOW & PURPLE |
| 13 | YELLOW & BLACK |
| 14 | BLUE |
| 15 | BLUE & WHITE |
| 16 | BLUE & GREEN |
| 17 | BLUE & BROWN |
| 18 | BLUE & PURPLE |
| 19 | BLUE & BLACK |
| 20 | WHITE |
| 21 | WHITE & GREEN |
| 22 | WHITE & BROWN |
| 23 | WHITE & PURPLE |
| 24 | WHITE & BLACK |
| 25 | GREEN |
| 26 | GREEN & BROWN |
| 27 | GREEN & PURPLE |
| 28 | GREEN & BLACK |
| 29 | BROWN |
| 30 | BROWN & PURPLE |
| 31 | PURPLE |
| 32 | PURPLE & BLACK |
| 33 | BLACK |

ALTHOUGH CIRCUIT IS IDENTICAL FOR ALL MODELS THE CABLE HARNESS IS NOT INTERCHANGEABLE.

NOTE: HAND SWITCH LEVER IS LOWERED IN LIGHTING POSITION. RIGHT HAND LEVER IS LOWERED IN ALL POSITIONS.

REAR VIEW OF PANEL. PANEL MOUNTED ON HEADLAMP

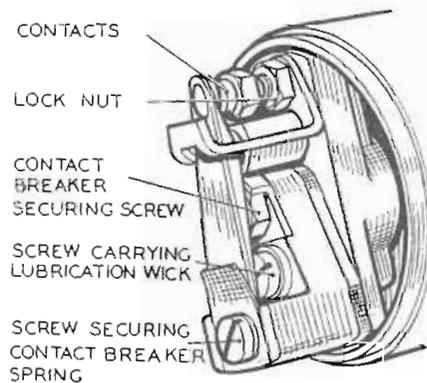


Wiring Diagram for Lucas "Magdyno" Equipment on Motor Cycles supplied to H.M. Forces.

base, engages with the keyway cut in the armature spindle, otherwise, the timing of the magneto will be upset. Tighten the hexagon headed screw with care — it must not be too slack, nor must undue force be used.

Face type cam

Remove the spring arm carrying the moving contact by withdrawing the securing screw. When replacing the arm, see that the small backing spring is fitted immediately under the securing screw and spring washer, with the bent portion facing outwards.



Face Cam type Contact Breaker.

Next examine the pick-up or high tension terminal. Wipe the moulding clean with a dry cloth. See that the carbon brush moves freely in its holder, being careful not to stretch the brush spring unduly. With the pickup still removed, clean the slipping track and flanges by holding a soft cloth on the ring while the engine is slowly turned by hand.

Adjustment

The gap to which the contact breaker contacts must be set, when they are fully opened, is about 12 thousandths of an inch. A gauge of this thickness is provided on the spanner supplied. Do not alter the setting unless the gap varies considerably from the gauge.

If the contacts need adjustment, turn the engine round slowly by hand until contacts are fully opened. Then slacken the locknut and rotate the contact screw by its hexagon head until the gap is set to the thickness of the gauge. Finally tighten the locknut.

Lubrication—

Ring type cam

The cam is lubricated by a length of felt contained in the contact breaker housing. A small hole in the cam, fitted with a wick, enables the oil to find its way on to the surface of the cam. Every 5,000 miles, withdraw the cam ring and add a few drops of thin machine oil to the cam. At the same time, push aside the locating spring, prise the rocker arm off its bearing and lightly smear the bearing with petroleum jelly.

Face cam type

The cam is lubricated by a wick contained in the contact breaker base. Add a few drops of thin machine oil to the wick every 5,000 miles. To render the wick accessible, remove the spring arm carrying the moving contact and withdraw the screw carrying the wick. At the same time, remove the tappet which operates the contact breaker spring and lightly smear with thin machine oil; when replacing, see that the small backing spring is fitted immediately under the securing screw and spring washer and with bent portion facing outwards.

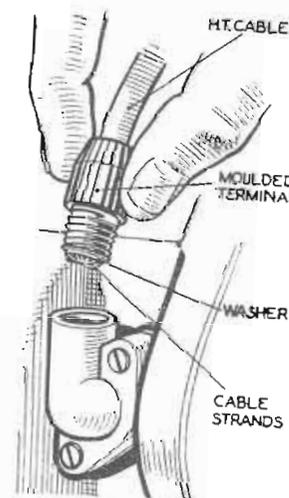
The bearings are packed with grease and will not need attention until the machine is dismantled for cleaning, adjustment and repacking the bearings with grease.

Renewing high tension cables

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

The method of fitting the cable is as follows :—

Thread the knurled moulded nut over the lead, bare the end of cable for about $\frac{1}{4}$ in., thread the wire through the metal washer provided and bend back the strands. Finally screw the nut into its terminal.



Method of fitting high tension cable.

ELECTRIC HORN

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 any attention; no subsequent adjustment is 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.

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

WIRING OF THE EQUIPMENT

Before making any alterations to the wiring or removing the switch from the headlamp disconnect the positive lead at the battery to avoid the danger of short circuits. The lead (about 1ft. long) from the positive battery terminal is connected to the lead from the switch by means of a brass connector. The connector is insulated by a rubber shield which must be pushed back to enable the connector to be unscrewed. Care must be taken that it does not touch any metal part of the frame as this will short circuit the battery. When connecting up again, do not forget to pull the rubber shield over the connector.

All leads to the headlamp 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 ends of all the cables are identified by means of coloured sleeveings. 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 $\frac{3}{8}$ in. of the cable, twist the wire strands together and turn back about $\frac{1}{8}$ in. so as to form a small ball. Remove the grub screw from the appropriate terminal and insert the wire so that the ball fits in the terminal post. Now replace and tighten the grub screw; this will compress the ball to make a good electrical connection.

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 sleeves in each terminal. Pass about 1 in. of cable through the holes in the clamping plate and bare the ends for $\frac{3}{8}$ in. Fit the metal sleeves over the cables, bend back the wire over the sleeves and push them well home into their terminals. Finally screw down the clamping plate. **The leads connected to the "D" and "F" terminals of the dynamo or 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.**

HOW TO LOCATE AND REMEDY TROUBLE — COMPENSATED VOLTAGE CONTROL DYNAMO EQUIPMENT

| SYMPTOMS. | PROBABLE FAULT. | REMEDY. |
|---|--|---|
| Battery in low state of charge. | Dynamo not charging, indicated by ammeter failing to show charge reading when running with no lights in use, due to: Broken or loose connection in dynamo circuit, or regulator not functioning correctly. | Examine charging and field circuit wiring. Tighten loose connection or replace broken lead. Particularly examine battery connections. If trouble persists, have equipment examined. |
| | Commutator greasy or dirty. | Clean with soft rag moistened in petrol. |
| | Dynamo giving low or intermittent output, indicated by ammeter showing low or intermittent charge reading, when running steadily in top gear, due to: | |
| | Loose or broken connections in dynamo circuit. | Examine dynamo wiring. Tighten loose connections or replace broken lead. Particularly examine battery connections. |
| | Commutator or brushes greasy. | Clean with soft rag moistened with petrol. |
| | Brushes worn, not fitted correctly, or wrong type. | Replace worn bushes. See that brushes "bed" correctly. Fit correct type brushes. |
| Battery overcharged, shows by burnt-out bulbs and frequent need for copping up. | Regulator not functioning correctly. | Have equipment examined. |
| | Dynamo giving high output, indicated by ammeter giving high charge reading when lights are in use, due to: | |
| | Regulator not functioning correctly. | Have equipment examined. |

If, after following the above table, the trouble cannot be rectified, have the dynamo, regulator and battery examined.

HOW TO LOCATE AND REMEDY TROUBLE — LIGHTING

| SYMPTOMS. | PROBABLE FAULT. | REMEDY. |
|--|---|---|
| Lamps give dim, flickering, or no light when the engine is not running. | Bulb filament broken. | Replace with new bulb. |
| | Bulb discoloured with use. | Replace with new bulb. |
| | Bulb out of focus. | Focus the bulb until the best illumination is obtained. |
| | Dirty reflector or bulb. | Clean dirty reflector with chamois leather or a soft cloth. |
| | Severed or worn cable, or loose connections at headlamp switch, dipper switch, dynamo or battery. | Tighten loose connections and replace faulty cables. |
| | Faulty earthing of headlamp or reflector. | Tighten loose connections, and replace faulty cable or make sure earthing clip is in good contact with reflector. |
| | Faulty earthing of battery. The cable from the negative battery terminal must be securely connected to a metal part of the machine. | Tighten loose connections and replace faulty cables. |
| Battery exhausted. Take hydrometer readings when acid level is correct and after a run when electrolyte is thoroughly mixed. When half discharged, readings are about 1.210. When fully discharged readings are about 1.150. | Machine should be taken on the road for a long daytime run, or battery charged from independent electrical supply. | |

HOW TO LOCATE AND REMEDY TROUBLE — MAGNETO IGNITION

| SYMPTOMS. | PROBABLE FAULT. | REMEDY. |
|--|---|---|
| Engine will not fire or fires erratically. | Remove plug and allow to rest on cylinder head. If a spark occurs at plug points when engine is slowly turned over, the ignition equipment is in order. | Look for engine defects and check ignition timing. |
| | If no spark occurs at plug points remove lead and plug, replace with new length of cable and test independently of plug by holding cable end about $\frac{1}{8}$ in. from metal part of engine. If magneto sparks, H.T. lead or plug is faulty. | Replace H.T. cable if perished or cracked. Clean plug electrodes, adjust gap to about 20 thousandths of an inch. |
| | If magneto does not spark, possible causes of trouble are :— Contact breaker gap out of adjustment or contacts dirty. | Clean dirty or pitted contacts with fine carborundum stone or fine emery cloth and afterwards with a cloth moistened with petrol. To adjust gap, turn engine slowly until the contacts are seen to be fully opened, then slacken locking nut and rotate fixed contact screw by its hexagon head until the gap is set to thickness of gauge. After the adjustment, tighten locking nut. |
| | Contact breaker rocker arm sticking (Ring Type Cam). | Remove contact breaker and prise rocker arm off its bearing. Clean steel pin if necessary with fine emery cloth and then, having removed all grit, lightly smear with Mobilgrease No. 2 before replacing the lever. |
| | Pick-up brush worn or broken. | Fit new brush. Before fitting, clean slip ring track. |