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LUCAS

**RUNNING INSTRUCTIONS
FOR THE
"MAGDYNO" LIGHTING AND
IGNITION SET & SEPARATE
DYNAMO LIGHTING SET
:: FOR MOTOR CYCLES ::
ADAPTED FOR WIRING WITH 5m/m IGNITION CABLE**



Running Instructions for the

LUCAS "MAGDYNOL"

LIGHTING AND IGNITION SET AND
SEPARATE DYNAMO LIGHTING SET
FOR MOTOR-CYCLES (SOLO & SIDECAR)
(ADAPTED FOR WIRING WITH 5 M/M LOW TENSION IGNITION CABLE)

DESIGNED AND MANUFACTURED THROUGHOUT BY

JOSEPH LUCAS LIMITED

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BIRMINGHAM

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STOKES SON & COMPANY ENGINEERS. DANNEVIRKE. BATTERY SERVICE STATION. 128 HASTINGS ST. WAPLE.

STOKES SON & COMPANY ENGINEERS. DANNEVIRKE.

RUNNING INSTRUCTIONS for The Lucas "Magdyno" (Reg) Lighting and Ignition System.

THE Magdyno comprises two independent units, i.e., a magneto for ignition and a dynamo for battery charging. The dynamo is a simple shunt wound machine, and for the sake of simplicity and compactness is housed within the magnet required for providing the necessary magnetic field for exciting the ignition armature winding. Power is transmitted to the dynamo by means of a train of gears which are driven from the magneto spindle.

The gear ratio between the magneto and dynamo is 3.7 : 1, but, as the Magdyno, in cases of single and twin engines, is usually run at half engine speed the effective gear ratio between the engine crank shaft and the dynamo is approximately 1.8 : 1.

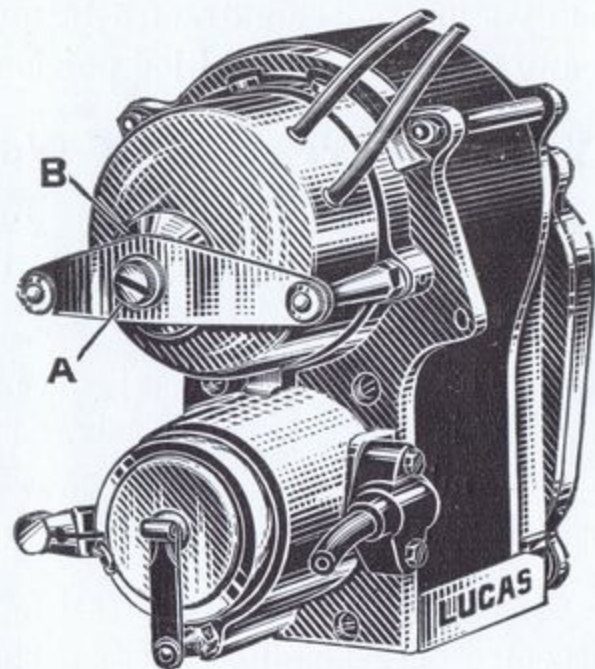


Fig. 1.

RUNNING INSTRUCTIONS—continued

All the bearings, together with the gear wheels, are well packed with grease before leaving our works, but after the motor cycle has run, say, 10,000 miles, the Magdyno should be dismantled for the purposes of thoroughly cleaning and to have the bearings repacked with fresh grease.

To remove the dynamo it is only necessary to loosen screw A (Fig. 1), then, by lifting strap B the dynamo can be extracted by pulling forward. Withdrawal of the dynamo does not interfere in any way with the ignition portion of the Magdyno.

DYNAMO—TYPE E.3 6 (Volt).

The dynamo commences to charge at about 1,000 r.p.m., its maximum output being 5.5 amperes. These particulars relate to the machine when cold, the output being slightly less after it has thoroughly warmed up.

The charging current does not increase above a predetermined maximum when the machine is run at high speeds, as the output is controlled by an extra brush placed approximately midway between the two main brushes and connected directly to the negative brush.

In order to obtain satisfactory running the brush gear and commutator should be inspected occasionally. These parts are readily accessible by unscrewing the hexagon nut which keeps the commutator end cover in place, when the cover can be withdrawn.

Brushes.

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1. All the brushes (A, B, C, Fig. 2) should slide quite freely in their holders.

2. The brushes should “bed” over the whole surface in contact with the commutator, and when in good condition this surface appears polished.

3. Worn brushes can be easily replaced by withdrawing the split pin at the end of the spring terminal, when the eyelet on the end of the flexible brush lead can be removed. The brush tension spring (D, Fig. 2) should then be held back out of the way when the brush can be withdrawn from its holder.

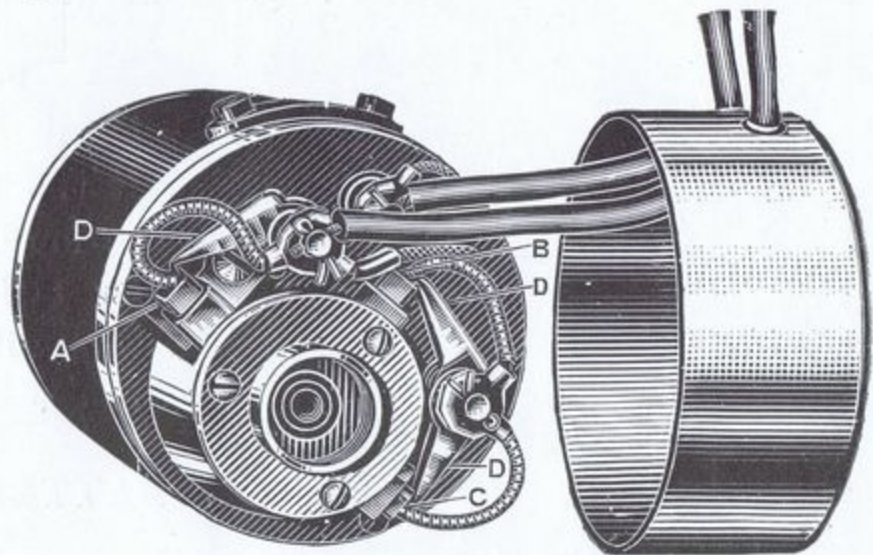


Fig 2.

A. B. C.—brushes.

D—brush tension springs.

Commutator.

The surface must be kept clean and free from any oil, brush dust, etc. Should

RUNNING INSTRUCTIONS—continued

any grease or oil work on to the commutator through over-lubrication it will not only cause sparking of the brushes, but in addition, carbon and copper dust will be collected in the grooves between the commutator segments ; therefore the latter should be examined occasionally, and if necessary, cleaned out by means of a thin saw blade or similar article.

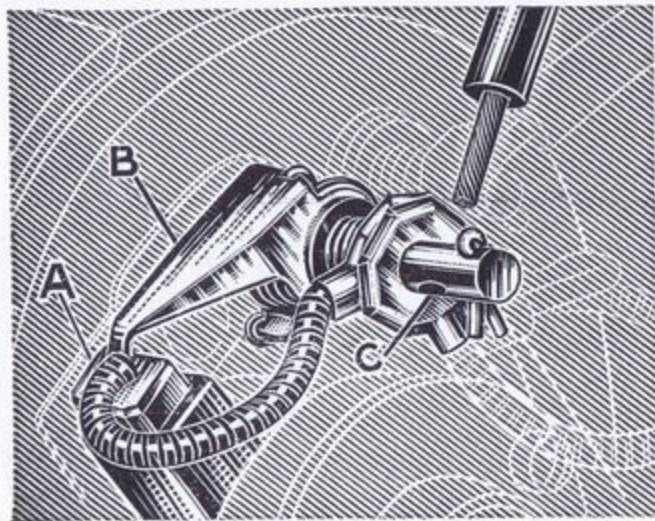


Fig. 3.

A—brush.

B—spring holding brush in position.

C—terminal hole.

Terminals.

For connecting up, spring terminals are provided for the positive brush and also for the field winding. It is only necessary to compress the spring when it will be found that a hole is drilled in the spindle (C, Fig. 3) for taking the cable, and on releasing the spring the wire will be securely held and good electrical contact made.

BATTERY.

Regular attention should be given to the Battery as neglect of same will cause unsatisfactory results and also materially shorten the life of the plates.

RUNNING INSTRUCTIONS—continued

The Battery should be inspected monthly for the purpose of checking the level of the electrolyte (pure dilute sulphuric acid) the correct height of the latter being approximately $\frac{1}{4}$ " above the top of the plates.

Only distilled water should be added to replace the loss of electrolyte caused by the action of the charging current. If the loss is due to spilling it should be replaced by a dilute acid solution of 1.225 specific gravity at 60° F.

For further particulars regarding our batteries, including mixing of acid and charging rates, refer to separate "First Charge" instruction card which can be obtained on application.

If the equipment is laid by for several months, in order to keep the battery in good condition it should be charged up for an hour or so monthly from a separate source of electrical supply.

Under no circumstances should the electrolyte be removed from the battery and the plates allowed to dry as they will become chemically changed.

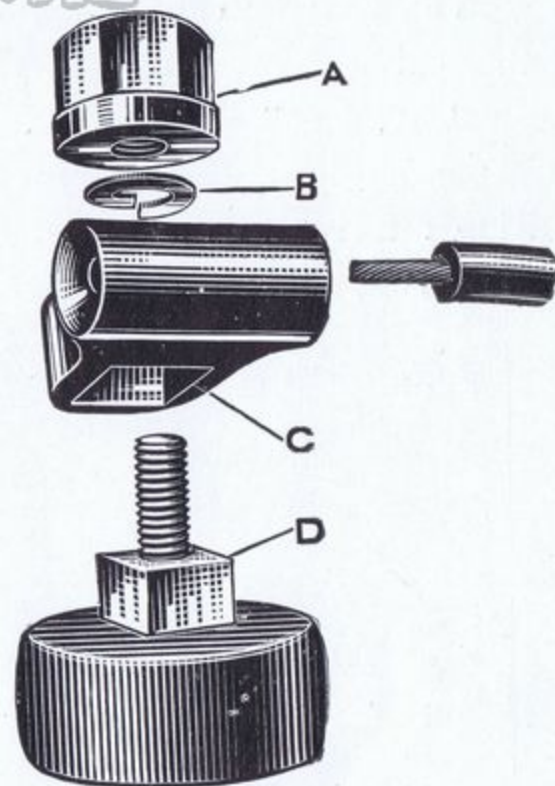


Fig. 4.

- A—lead covered brass nut.
- B—spring washer.
- C—recess which fits on to boss "D"

Battery Terminals.

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The battery cable should be securely soldered to the lead eyelet (i.e., pass the bared end of the cable right through the hole to the recess, spray out the ends of the cable and then solder, see "E," Fig. 5). The eyelet has a rectangular recess "C," Fig. 4, which fits the correspondingly shaped boss on the battery lug "D," ensuring that it must be replaced in a definite position relative to the battery lug. This also prevents the eyelet turning when tightening the hexagon lead covered brass nut "A."

Fig. 5 shows the terminal completely assembled.

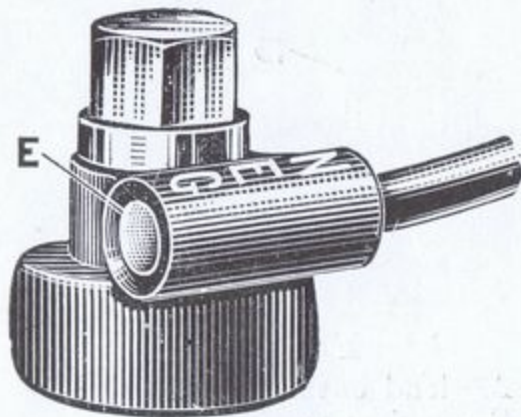


Fig. 5.

The lead lug and eyelet should be covered with vaseline before tightening. This obviates the possibility of creeping acid setting up corrosion inside the terminal.

Period for which Battery should be Charged.

It is difficult to lay down rigid instructions on this subject as the conditions under which motor cycles are used vary considerably, and obviously the amount of charging the battery will require is directly dependent on the extent to which the lamps are used. The battery being the reservoir

RUNNING INSTRUCTIONS—continued

of the system, any draining of its power has to be replenished by charging up from the dynamo.

The cut-out in the switchbox is to prevent the battery from discharging through the dynamo windings, and NOT for switching off the charging current when the battery is fully charged. (See Electro Magnetic Cut-out, Page 8). We therefore give the following hints as a guide for use with the majority of motor cycles.

1. Under normal conditions, providing the lamps are used a fair amount, the battery should be charged in the daytime for a period equal to that which the lamps are used at night time.

2. If the motor cycle is used very little for night work but for long runs in the daytime, it is advisable to charge for about one hour only after commencement of each journey, and then turn the switch to the "Off" position.

SWITCHBOX.

The Switchbox contains the electro-magnetic cut-out controlling switch, and forms the junction box

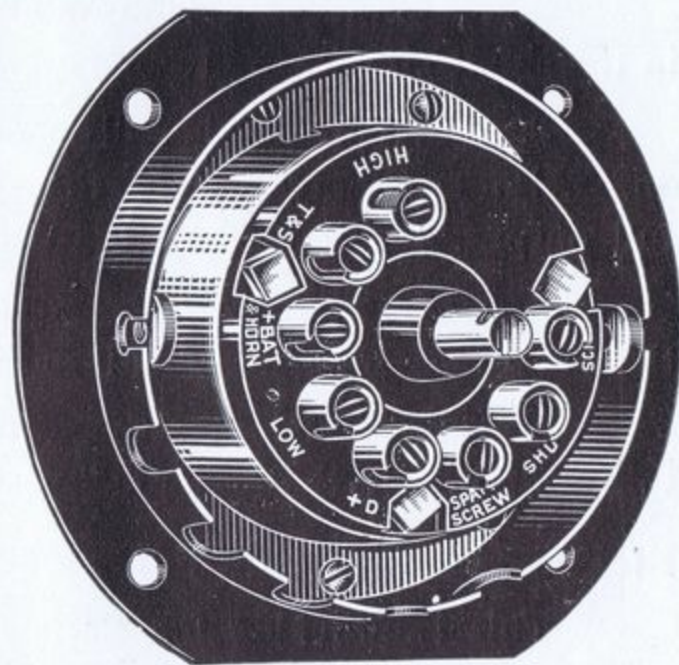


Fig. 6.

RUNNING INSTRUCTIONS—continued

for connecting up all the different circuits, Fig. 6 shows the switchbox with the front cover removed from which it will be seen that all the terminals are clearly marked so that it is practically impossible for a mistake to be made in wiring up.

The switch has four positions and at the extreme position in either direction a stop is provided to prevent further rotation of the switch handle. The positions are :—

1. “**Off.**”—Lamps off, dynamo off.
2. “**Charge.**”—Lamps off, dynamo charging, but arranged, by inserting a resistance in the shunt circuit, to give only one half its maximum output.
3. “**High.**”—High filament of head lamp, tail (and side lamp where fitted) switched on. Also resistance coil in the shunt circuit is cut out allowing the dynamo to give its full output.
4. “**Low.**”—With the exception that the low filament is on in place of the high filament the conditions are exactly as in position “High.”
5. For special cases the switchbox can be altered to enable the full output of the dynamo to be obtained in the “charge” position.

Electro-Magnetic Cut-out.

This is provided for closing automatically the generator to battery circuit as soon as the dynamo is driven at sufficient speed to cause its voltage to rise above that of the

RUNNING INSTRUCTIONS—continued

battery, and vice versa—the reverse action breaks the circuit, on the dynamo voltage falling below that of the battery, thereby preventing the battery discharging through the dynamo windings.

The cut-out is accurately set before leaving our works, and should not be tampered with or adjusted. Should the cut-out fail to close the circuit on accelerating the engine, the cause of the damage is likely to be found elsewhere on the system, and Fault Finding Table No. 1 should be referred to.

THE CUT-OUT IN NO WAY SWITCHES OFF THE DYNAMO WHEN THE BATTERY IS FULLY CHARGED, AND NO SUCH AUTOMATIC DEVICE IS PROVIDED.

In order to simplify the system as far as possible, no fuse is provided. As long as all the connections are kept clean and tight there is no possibility of any excess current causing damage to the apparatus.

HEAD LAMPS—TYPES R.40 AND R.510.

An exclusive and notable feature of these Lamps is our patented universally adjustable Mounting which enables the beam of light to be set to the best advantage on the road, by the adjustment of a single nut. The front of the lamp is secured by means of a bayonet fixing.

A good method of starting to undo the latter is to hold the sides of the Lamp (towards the back) with the fingers, press the front rim evenly with the thumbs and palms

RUNNING INSTRUCTIONS—continued

of the hands (see Fig. 7) and then rotate to the left as far as it will go, when the front may be withdrawn. This method prevents undue strain on the lamp mounting.



Fig. 7.

The reflector is also attached by a bayonet fixing, but it is only necessary to remove this for the purpose of connecting or disconnecting the cables from the terminals. When replacing the reflector, the word "TOP" stamped on the rim must be at the top of the lamp or else it will be subsequently impossible to fix the lamp front, as the fixing studs will not engage. Place the reflectors so that the studs pass through the slots in the body of the lamp, and then turn the reflector to the right until it comes against its stop and the arrows on the lamp body and reflector rim are opposite each other.

This lamp is fitted with a double filament bulb, the illumination of the filaments being controlled by the switch. It will be understood, however, that it will depend

RUNNING INSTRUCTIONS—continued

upon which way the bulb happens to be put into the lamp whether the switch will control the filament it is intended to, therefore care should be taken to see that in replacing the bulb it is inserted in the holder so that on turning the switch to "high" the full light is obtained.

Focussing Head Lamps.

The very accurate formation and particularly high polish on the surface of the reflector is the result of many years of research work, manufacturing experience, and prolonged night driving observations on the road. If, however, the bulb is not correctly focussed the advantages of this scientific design are lost; it is, therefore, essential that the filament should be approximately at the focus of the reflector. In order to arrange this the lampholder is provided with three notches so that by trying the bulb in the alternative positions it can be placed as near as possible to the correct focus.

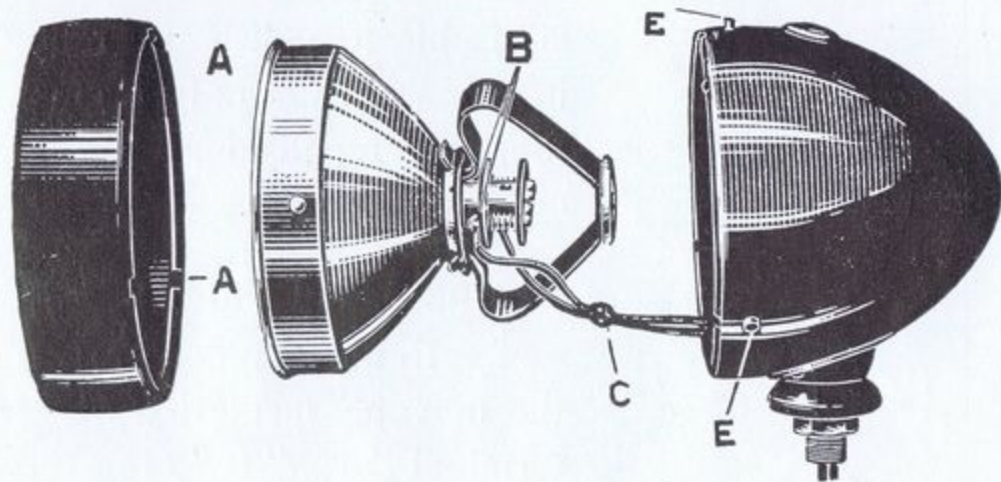


Fig. 8.

- A—slots in rim which engage with studs E.
- B—spring terminals.
- C—knot in cables to take strain from terminals.

The best way of carrying out focussing and setting is to take the motor cycle on to a straight level road, try the bulb in each of the three notches, and then move the lamp on its adjustable mounting until the best road illumination is obtained. The full light should be switched on when focussing is carried out.

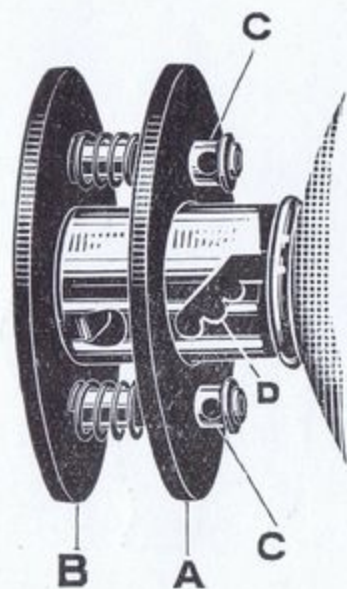


Fig. 9.

- A—movable fibre disc.
- B—fixed disc.
- C—terminal holes.
- D—focussing notches.

At this point it may also be mentioned that the efficiency of the head lamp depends not only on the shape of the reflector but on its surface. When the lamp is used under normal conditions it is not advisable to polish the reflector; should it, however, become tarnished in any way, use only a good quality chamois leather and finely divided rouge for repolishing. On no account should any metal polishes be used on our reflectors.

Wiring Head Lamps.

Remove reflector as described on page 10 and by compressing the movable insulating disc (A, Fig. 9) towards the fixed disc "B," the terminal holes "C" are exposed in the terminal bars. Thread the bared ends of each wire, that is full and dim lights respectively, through the holes and release the disc, when the coil spring operating along the terminal bars will cause the cables to be held firmly in position. To ensure that a "short circuit" will not be caused by the end of the

RUNNING INSTRUCTIONS—continued

wire making contact with any metal part of the reflector, care must be taken to see that the ends do not project more than 1/16" through the terminal holes.

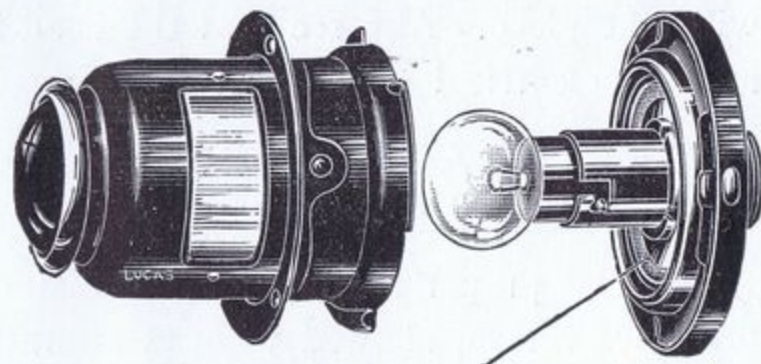
SIDE LAMP—TYPE R.330.

Except in size, this lamp is identical to the Head lamps R.40 and R.510 and the instructions already given for these apply to this side lamp as well.

As an "earth" return system is used, the lampholder is arranged for a single contact bulb.

TAIL LAMP—TYPE MT. IIO.

This lamp is a great improvement on all other types of electrical tail lamps for motor cycle use, insomuch that the bulb holder and bulb are mounted on a rubber diaphragm (Fig. 10) which prevents road and engine vibration being transmitted to the bulb filament, thus greatly prolonging its life. The lamp is fixed to a base plate which is readily removable by giving one third of a turn to the left, which enables it to be detached from the bayonet fixing.



Rubber Diaphragm.

Fig. 10.

RUNNING INSTRUCTIONS—continued

The lamp is usually mounted directly to the number plate, and besides showing the usual red light, it is provided with a side window to illuminate the number plate.

WIRING.

All the wiring is carried out by means of standard 5 mm. low tension ignition cable, obtainable at any garage. The connections are so arranged that no soldering or special eyelets are required, spring clips or screws being provided which form a secure and efficient means of coupling up the various electrical circuits.

An "earth return" system is used, and therefore care should be taken to see that the various cables are not chafed or cut in any way through being jammed in the frame, as any injury to the insulation is liable to cause a "short" and damage the battery through the heavy discharge which will take place. Also see that the head lamp, tail lamp, switchbox and negative connections are in good electrical contact with the machine frame.

MAGNETO ADJUSTMENT.

Contact Breaker Points.

The proper setting for the distance between the points is .012—.015", but a reasonable tolerance can be allowed without alteration being made.

Should it be necessary to remove the contact breaker for the purpose of examination or cleaning, the contact breaker cover and cam cage should first be taken off, when the

RUNNING INSTRUCTIONS—continued

centre securing screw can be extracted. If the rocker arm is working sluggishly it must be removed from its steel pin and should there be signs that it has been binding, due to rust, this should be carefully removed until the whole surface of the pin appears polished, care being taken to avoid reducing the diameter of the latter to any appreciable extent. The fibre on the rocker arm of all magnetos is liable to swell slightly, especially if the machine is working in a moist atmosphere. This point should always be remembered and looked for in the event of any trouble being experienced, due to failure of the ignition, particularly during the winter months.

See that the contact breaker points are kept clean, and as grease or dirt will cause sparking and rapid burning away of the points, these should be thoroughly cleaned with petrol when necessary. It is important that all surplus petrol should be allowed to evaporate before the contact breaker is replaced or the engine started.

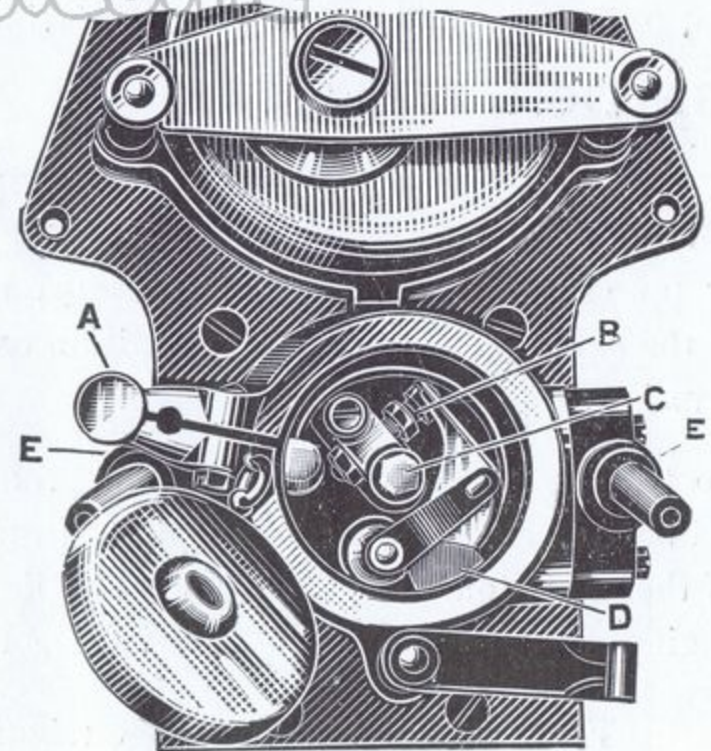


Fig. 11.

- A—contact breaker lever.
- B—contact breaker points.
- C—centre screw.
- D—fibre block.
- E—pick-ups.

RUNNING INSTRUCTIONS—continued

Should the points be badly pitted they should be dressed down by means of a dead smooth file, only the smallest amount of platinum being removed.

IGNITION FAULTS.

Before interfering with the Magdyno make sure there is a good spark occurring at the plug points and if not, examine the high tension cable carefully to see that it is free from any cracks or punctures through which the current is leaking. This applies particularly in wet weather. If the cable appears in good condition examine the contact breaker, and make sure that the rocker arm is working freely on its lever.

To test the Magdyno for sparking, remove the high tension cable from its plug and hold the cable so that the end is about $3/16$ " from the engine casing, and also so that there is no possibility of the cable touching the frame and allowing the current to leak to earth. On sharply turning the engine a spark should be obtained across the gap.

For detailed information on ignition faults see Fault Finding Tables at back of booklet.

As a general rule, if the engine behaves satisfactorily at slow speeds and is easy for starting, but erratic running or misfiring occurs at high speeds, the cause is usually due to either plug or carburetter setting being at fault, and Table No. 2 at back of booklet should be referred to.

INSTRUCTIONS FOR TIMING.

1. Connect up the H.T. terminals of the Magdyno to the correct sparking plugs on the engine. This applies particularly to V-type engines. The back cylinder of a V engine is always known as No. 1 cylinder and must be connected up to No. 1 terminal on the magneto.

2. Revolve the engine crankshaft by hand until No. 1 piston is at the top of its compression stroke (that is, on top dead centre). Most engine makers mark this position on the fly wheel, where the latter is visible.

3. Slacken the magneto coupling securing nut on the armature spindle, or any other screws as necessary, to enable the magneto spindle to be turned independently of the engine.

4. (a) In the case of twin cylinder engines, remove the pick-up marked No. 1 and turn the magneto spindle until the brass segment on the collector ring is visible, as the segment forms the means of correctly distributing the current to the respective cylinders.

(b) For single-cylinder engines, the method of connecting up is obvious (see paragraph 6 over page).

5. With magnetos provided with variable ignition, the contact breaker lever A (see Fig. 11) should be moved to the fully retarded position, that is, to the limit of motion in the same direction as that in which the armature revolves.

RUNNING INSTRUCTIONS—continued

6. Remove contact breaker cover and slightly turn the armature until the fibre block D (Fig. 11, page 15) rises on the inclined plane of the cam cage just sufficiently to separate the points B. This position is the firing point, and the magneto drive should be permanently fixed in this position.

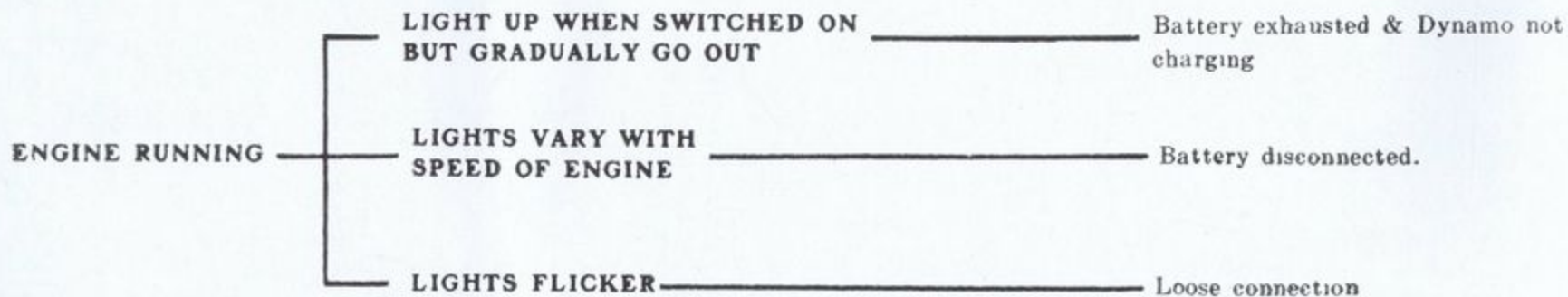
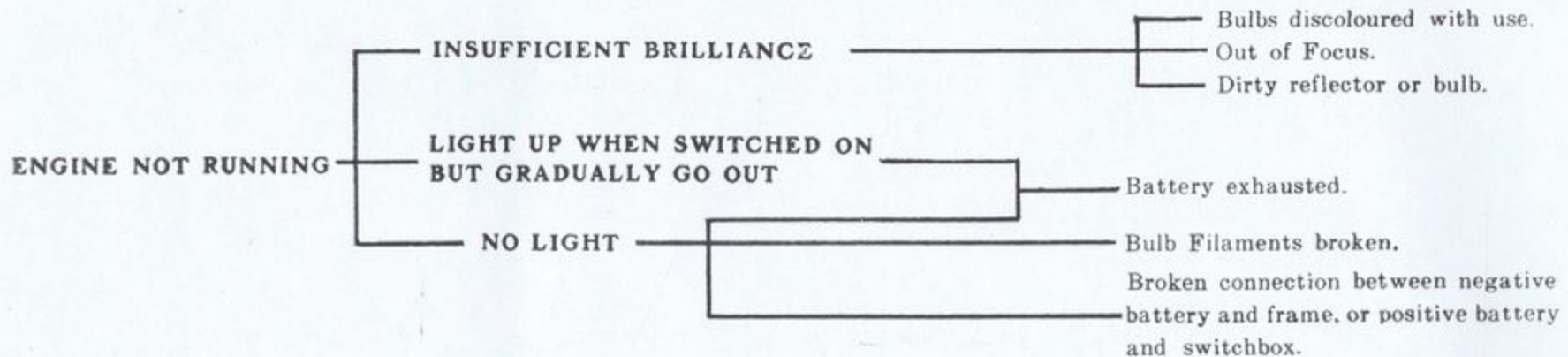
NOTE.—The above setting is standard for most types of engines, that is, the magneto is fully retarded when the piston is on top dead centre. In all cases, however, the engine makers' instructions should be consulted when retiming any magneto.

7. It is always advisable to check the timing after tightening up, to ensure that no movement has taken place.

Do not dismantle the apparatus needlessly. In the event of any difficulty we shall be only too pleased to give every assistance possible. In communicating or ordering spare parts, always give type and number of the machine in question, make and if possible date of the Motor Cycle on which it is fitted. Also do not forget that we have for your benefit Service Stations in the following towns:—

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"MAGDYNO"
FAULT FINDING TABLE FOR LIGHTING.



"MAGDYNO"
FAULT FINDING TABLE FOR IGNITION.

