SECTION L-7 Part B
ISSUE 1, FEBRUARY 1953

LUCAS

Quality

EQUIPMENT

VOLUME 2

WORKSHOP INSTRUCTIONS

MOTOR CYCLE ELECTRIC HORNS

MODELS

HF.1440—41—44

JOSEPH LUCAS LTD · BIRMINGHAM 19 . ENGLAND

Printed in England

ELECTRIC HORNS

MODELS HF.1440 — 41 — 44

GENERAL DESCRIPTION

These horns are of the high frequency type, the only difference between the three models being external and not affecting these instructions.

The operation of the horn is based on the simple electric bell principle. When the horn push is pressed, current flows through the closed contacts of the contact breaker and energises the coil. The coil core is thus magnetized and attracts the armature towards the core face. The contact breaker opens each time the armature is pulled down to the core, de-energising the magnet system and causing the cycle to be repeated at a frequency determined by the characteristics of the diaphragm.

The vibrating armature is coupled to a flexible diaphragm and to a rigid tone disc. The impact of the armature on the core face sets the diaphragm and tone disc into vibration, the diaphragm at a relatively low frequency (300-400 c/s) and the tone disc at a higher frequency determined by its size and the rigidity of its material. These two sets of vibrations combine together with their various 'overtones' to give the horn its characteristic note.

SERVICING

Before making any adjustments to the horn, make certain that the battery is in a good state of charge.
Do not dismantle the horn until the external checks and adjustments have been made.

Dismantling and re-assembly procedure is given in para. 6.

Servicing Summary.

Symptom	*Possible Causes*	*Reference*
Note unsatisfactory or operation intermittent.	(i) Horn loose on mounting. (ii) Faulty wiring. (iii) Incorrect contact breaker adjustment. (iv) Incorrect armature-to-core air gap setting. (v) Internal fault. Faulty contact breaker.	Para. 1. Para. 2. Para. 3. Para. 4. Para. 5 (*a*)
Horn does not operate.	(i) Faulty wiring. (ii) Incorrect contact breaker adjustment. (iii) Incorrect armature-to-core air gap setting. (iv) Internal fault. Faulty coil.	Para. 2. Para. 3. Para. 4. Para. 5 (*b*)

1. Horn Loose on mounting

Check that the bolt securing the horn bracket is tight and that the body of the horn does not foul any other fixture. See that any units fitted near the horn are rigidly mounted and do not vibrate when the horn is operated.

2. Wiring

Examine the cables of the horn circuit, renewing any that are badly worn or chafed. Ensure that all connections are tight and that the connecting eyelets, or ferrules, make good contact with the cables. In the event of complete failure of the horn, check the wiring for an open circuit.

3. Contact breaker adjustment

Make sure that the poor performance is not due to one of the above causes before attempting any adjustment of the horn. Adjustment takes up wear of moving parts which, if not corrected, will result in loss of power and/or roughness of tone.

Correct adjustment of the horn requires the use of a 0—5 amp. D.C. ammeter, and the procedure is as follows:—

The note of the horn is to be tested when the horn is cold, using a pure D.C. supply (rectified A.C. is not permissible) over a range of 4 to 8 volts. An indication of correct contact breaker adjustment is given by measurement of the current consumption of the horn,

which should at no time exceed 4 amps., and a good clear 'high frequency' note should be obtained over the full voltage range. If current is in excess of 4 amps., remove cover nut, slacken the push-rod locking ring and turn the push-rod, clockwise to decrease current consumption or anticlockwise to increase. Make only a small adjustment at a time, continuing until the correct setting is obtained. For adjusting the push-rod and tightening the locking ring, use a tool similar to that illustrated in Fig. 1.

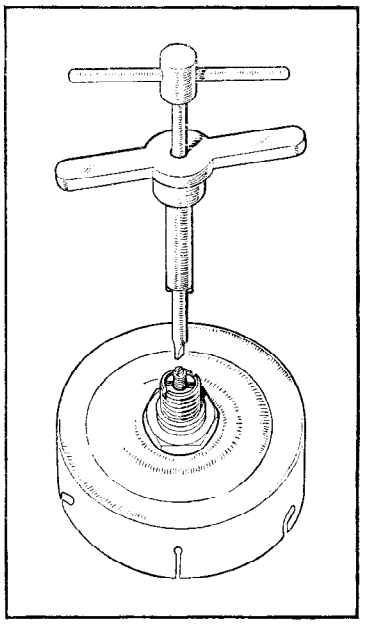

Fig. 1
Adjusting push-rod and locking ring.

4. Armature-to-core air gap setting

Remove the cover-nut, tone disc locknut and tone disc, and check that the diaphragm locknut and clamping band are tight. Then proceed to check and adjust the air gap as follows:—
Loosen the push-rod locking ring and turn the push-rod anticlockwise until on energising the coil only a click is heard, indicating that the contact breaker remains closed as the armature is pulled flat against the core face. Measure the movement of the armature, with the aid of a clock indicator gauge bearing on the edge of the armature sleeve, when the coil is energised momentarily. This measurement, corresponding to the air gap between the armature and core faces, should be between 0.011 in. and 0.013 in.

To adjust the air gap, loosen the diaphragm clamping band and twist the diaphragm clockwise for a smaller gap and anticlockwise for a wider gap. Retighten the band securely after adjustment.

While the contact breaker is rendered inoperative, energise the horn for **only a few seconds** at a time to prevent the coil overheating.

5. Internal fault

(*a*) Contact Breaker.
Intermittent operation may be due to worn contacts on the contact breaker, or 'pitting and piling' caused by the horn operating with incorrect setting. If the contacts are badly worn a replacement contact set must be fitted.

Rough operation and high current consumption may be due to a faulty contact spring. The pressure just to open the contacts, measured at the tip of the contact spring, should be 32 to 40 oz. Rough operation and high current consumption may also be caused by excessive wear of the striker pad riveted to the contact breaker spring.

(*b*) Faulty Coil.
If no click is heard on energising the horn and, when the horn is dismantled, the magnet is found to be inoperative, then the continuity of the coil and connections must be checked. Connect an ohmeter across the supply terminals and check the coil resistance. The correct coil resistance limits are 0.38—0.42 ohm. If there is an open circuit in the coil windings, it must be replaced. Before replacing the coil, ensure that the connecting wires to the coil are in order.

6. Dismantling and reassembly procedure

(*a*) To dismantle:
Remove the various components in the following order:—

Cover Nut.
Tone Disc Lock Nut.
Tone Disc.
Push Rod and Locking Ring.
Diaphragm Lock Nut.
Diaphragm Clamping Band.
Diaphragm.
Armature.
Contact Breaker.
Coil and Clamping Washer.

To remove the diaphragm lock nut, the armature must be held stationary while the lock nut is turned. A suitable tool for this operation is illustrated in Fig. 2. Failure to prevent the armature rotating as the lock-nut is turned will cause the contact breaker arms to be damaged. To remove the coil it may be necessary to destroy the clamping washer, for it is a very tight friction fit in the body.

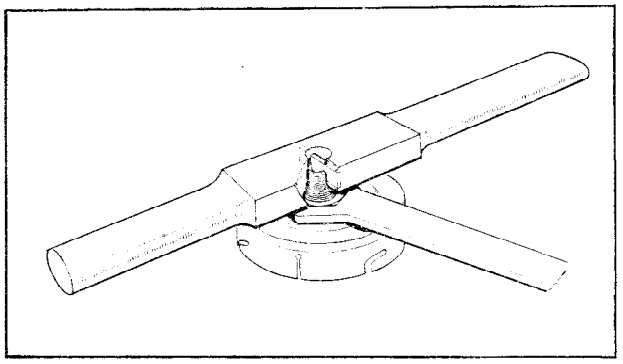

Fig. 2
Diaphragm lock-nut adjusting tool.

(*b*) To assemble:
The coil must be positioned in the magnet cup and clamped firmly with the brass washer, so that pressure applied tangentially to the washer with a screwdriver will not move it.

The contact breaker components must be carefully assembled and tightly riveted into the body. The contacts must meet squarely and must be parallel with the diaphragm when the latter is fitted.
To replace the armature, diaphragm and lock-nut proceed as follows:—

Place the armature on the pole piece and turn clockwise until the contact breaker arms prevent further movement. Locate the diaphragm on the three pegs in the horn body and tighten the lock-nut finger tight. The armature will now be correctly positioned with relation to the diaphragm and, using the tool illustrated in Fig. 2, the diaphragm lock-nut can be fully tightened while the armature is held in position. The diaphragm lock-nut must be tightened to a torque of 450 lb. ins.

When the push-rod and locking ring have been replaced, setting must be carried out in accordance with the instructions given in paras. 3 and 4.
When the final adjustments have been made, securely tighten the diaphragm clamping band.

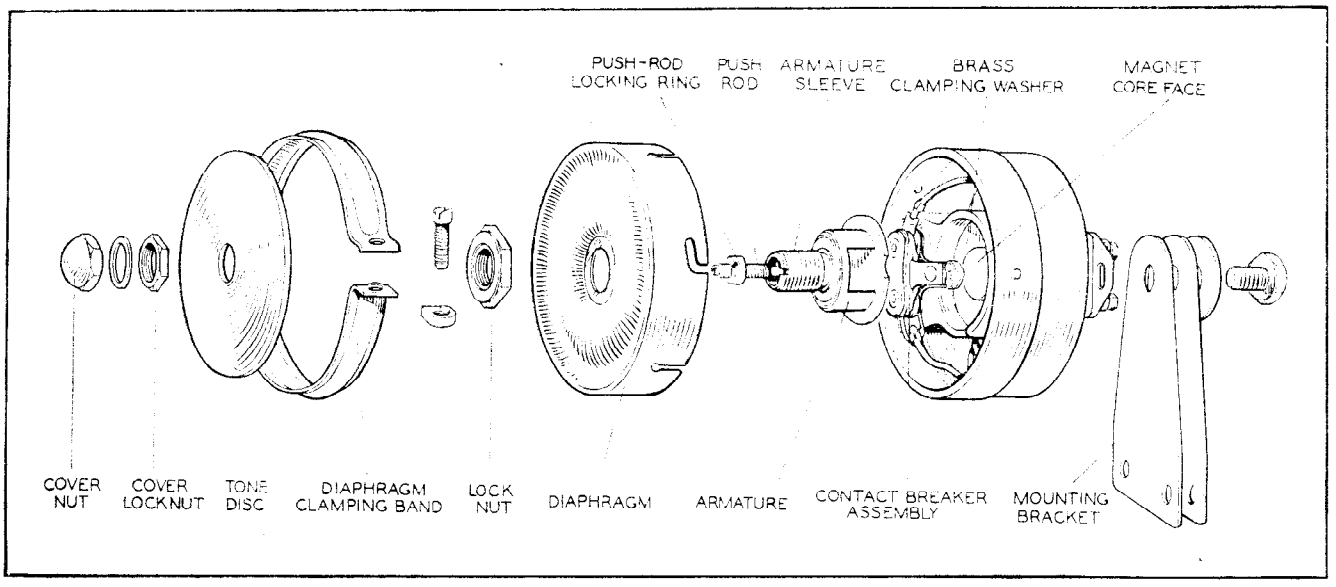

Fig. 3
Horn, dismantled view.