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**LUCAS**  
*Quality*

# EQUIPMENT

VOLUME 2

## WORKSHOP INSTRUCTIONS

### ELECTRIC HORNS

MODELS HF 1234 - 1235

(6 and 12 VOLT)



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# LUCAS WORKSHOP INSTRUCTIONS

## ELECTRIC HORNS

MODELS HF 1234 - 1235

(6 and 12 VOLT)

### GENERAL DESCRIPTION

These horns are of the high frequency type. The only difference between the two models lies in the finish: Model HF 1234 has a chromium-plated clamping rim and Model HF 1235 is all black.

The operation of the horn is based on the simple trembler principle. When the horn push is pressed, current flows through the closed contacts of the contact breaker and energizes 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-energizing 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.

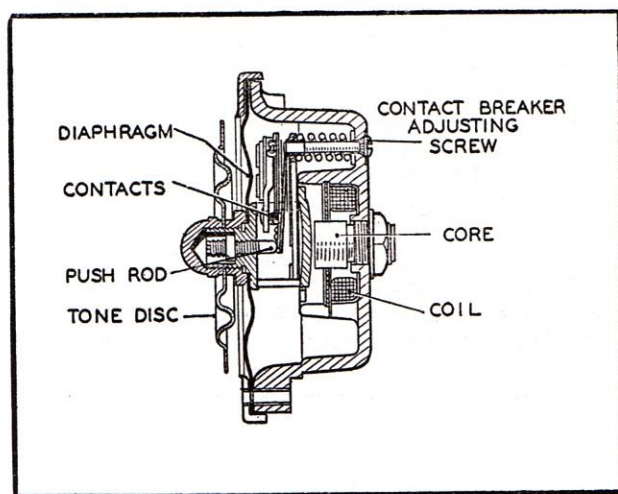


Fig. 1  
Internal arrangement of horn

### 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 paragraph 5.

#### 1. HORN LOOSE ON MOUNTING

Check that the bolts securing the horn bracket are 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.

### SERVICING SUMMARY

Symptoms	Possible Causes	Reference
Note unsatisfactory or operation intermittent.	(i) Horn loose on mounting ... ..	Para. 1
	(ii) Faulty wiring ... ..	" 2
	(iii) Incorrect contact breaker adjustment ... ..	" 3
	(iv) Internal faults:—	
	Faulty breaker ... ..	" 4 (a)
Push-rod adjustment incorrect ... ..	" 4 (b)	
Armature-to-core air gap incorrect ... ..	" 4 (c)	
Horn does not operate	(i) Faulty wiring ... ..	Para. 2
	(ii) Internal faults:—	
	Push-rod adjustment incorrect ... ..	" 4 (b)
Faulty coil ... ..	" 4 (d)	



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## 2. FAULTY 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.

## 3. CONTACT BREAKER ADJUSTMENT

Make sure that the poor performance is not due to the above causes before attempting any adjustment of the horn. Adjustment does not alter the tone of the horn. It merely takes up wear of the 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—10 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 for 6 volt horns, or 10 to 14 volts for 12 volt horns. The current consumption should at no time exceed 6 amps. for 6 volt horns, or 4 amps. for 12 volt horns, and a good clear high frequency note obtained over the full voltage range.

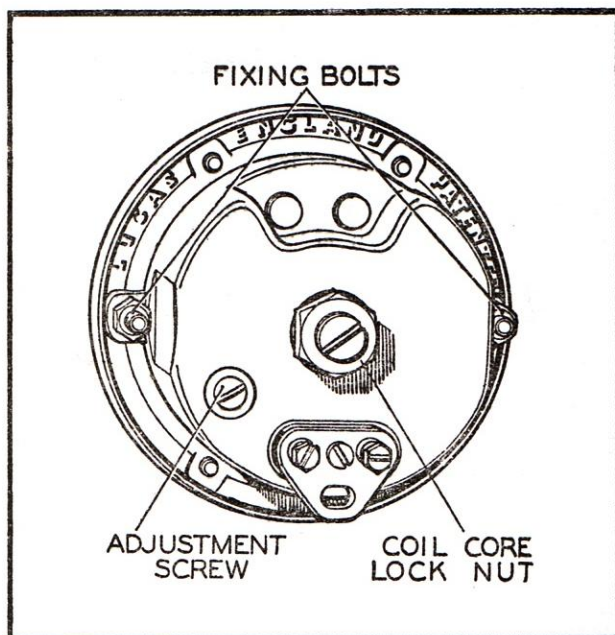


Fig. 2  
Rear view of horn

To adjust, turn the contact breaker adjustment screw (Fig. 2) in an anticlockwise direction until the horn just ceases to sound. Then turn the serrated adjustment screw clockwise six notches (a quarter of a turn) and

check the performance and current consumption. Further adjustment should be made by turning the adjustment screw one 'notch' at a time in a clockwise direction and re-checking.

## 4. INTERNAL FAULTS

### (a) FAULTY CONTACT BREAKER

Intermittent operation may be due to worn contacts on the contact breaker, or 'pitting and piling' caused by incorrect operation. 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 32-40 oz.

### (b) PUSH ROD ADJUSTMENT

If the push-rod locking ring becomes loose the vibratory motion of the armature will slowly unscrew the push-rod and the current consumption of the horn will rise. To obtain correct adjustment of the push-rod proceed as follows:—Turn the contact breaker adjustment screw as far as possible clockwise, and then screw back anticlockwise for  $2\frac{1}{2}$  complete turns.

Remove the cover nut and tone disc, and loosen the push-rod locking ring. Adjust the push-rod, using a tool similar to that illustrated in Fig. 3; turning clockwise to decrease and anticlockwise to increase the current consumption. When the current consumption has been brought down to the figures

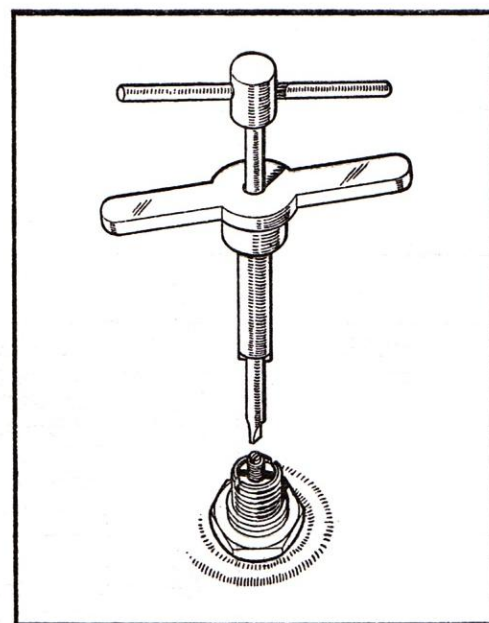


Fig. 2  
Push-rod adjusting tool



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quoted in Para. 3, tighten the locking ring, replace the tone disc and cover nut and, by means of the contact breaker adjusting screw, make final adjustment as in Para. 3.

## (c) ARMATURE-TO-CORE AIR GAP SETTING

Check the tightness of the core lock-nut on the rear of the body. Remove the cover nut and tone disc and check the tightness of the diaphragm lock-nut. Check and set the air gap between the armature and core faces as follows:—Turn the contact breaker adjusting screw several turns in a clockwise direction, so that the contacts remain closed when the armature is pulled flat against the core face. Energize the coil momentarily and measure the movement of the armature, by means of a clock indicator gauge bearing on the tip of the push-rod. The correct air gap between the armature and core faces is 0.010 and 0.012 in. for 6 volt horns, and 0.018 to 0.020 in. for 12 volt horns. To adjust the air gap, loosen the coil core lock-nut and, using a screwdriver, turn the core clockwise to decrease the air gap and anticlockwise to increase the air gap. While the contact breaker is rendered inoperative, energize the horn for **only a few seconds** at a time to prevent the coil over-heating.

## (d) FAULTY COIL

If no click is heard on energizing the horn and, when the horn is dismantled, the magnet is found to be inoperative, then the continuity of the coil and its connections must be checked. Connect an ohmmeter

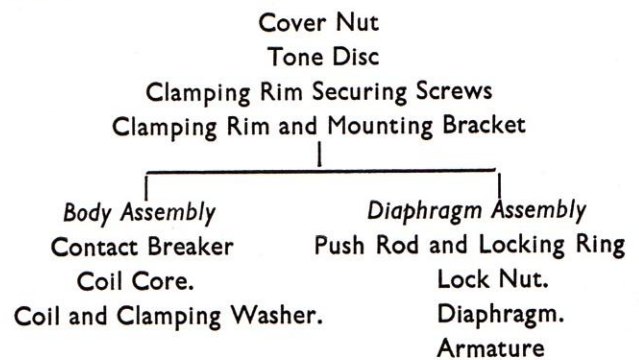
across the supply terminals and check the coil resistance. The correct coil resistance limits are 0.18 to 0.19 ohms for 6 volt horns, and 0.70 to 0.75 ohm for 12 volt horns.

If the continuity of the coil is not satisfactory, then the horn must be dismantled. Before replacing the coil ensure that the connecting wires to the coil are in order.

## 5. DISMANTLING AND REASSEMBLY PROCEDURE

### (a) TO DISMANTLE

Remove the various components in the following order:—



To assist removal of the diaphragm assembly from the body, loosen the push-rod locking ring and turn the

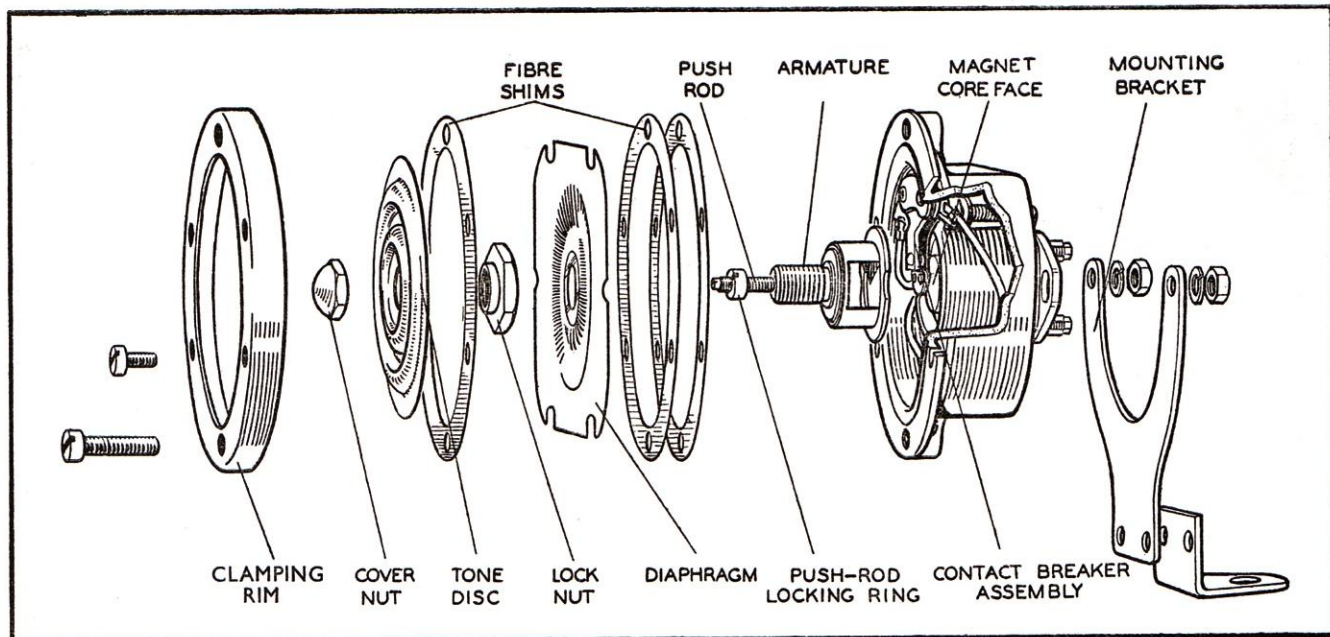


Fig. 4

Dismantled view of horn with section of body removed to show contact breaker and core



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push-rod anticlockwise until the assembly can be withdrawn from the body.

To remove the coil winding it may be necessary to destroy the clamping washer as it is a force fit in the body.

**(b) TO ASSEMBLE**

Reverse the dismantling procedure given above, including, where indicated, the following adjustments: Coil core, washer and lock-nut to be assembled loosely in the body.

After the coil has been positioned, and tightly clamped with the brass clamping washer, it must not be possible to move the washer by pressing tangentially with a screwdriver. Before placing the diaphragm assembly

on the horn body, adjust the contact breaker assembly to lay parallel with the diaphragm, when the latter is fitted. To avoid short circuits due to chafing of cable insulation through vibration, the cables from the coil and contact breaker must be coiled smoothly to follow the curve of the body, but not to touch it.

The diaphragm clamping nuts must be tightened to a torque exceeding 30 lb.

Before replacing the tone disc and cover nut, the air gap and push rod settings must be carried out in accordance with the instructions given in Para. 4 (b) and (c).

When the air gap adjustment has been made, the coil core lock-nut must be tightened to a torque of 200-250 lb. ins.

