SECTION K-2
ISSUE 1, AUGUST 1950

LUCAS

Quality

EQUIPMENT

VOLUME 2

WORKSHOP INSTRUCTIONS

ELECTRIC WIND TONE HORNS

MODELS
WT614, WT28, WT29, WT28U and WT29U

JOSEPH LUCAS LTD · BIRMINGHAM 19 · ENGLAND

Printed in England

ELECTRIC WIND TONE HORNS

MODELS WT614, WT28, WT29, WT28U AND WT29U

The Wind Tone horns depend for their operation on the vibration of an air column, excited at its resonant frequency, or a harmonic of it, by means of an electrically energised diaphragm. The horns are usually fitted in pairs, one horn having a higher note than the other.

The high note horn may be distinguished by its smaller air column casting, and by the yellow sleeving fitted to one of the internal connections (all the connections in a low note horn are fitted with red sleeving). WT614 horns are marked "H" and "L" inside the flare of the trumpet, for high and low note horns respectively. The high and low note horns differ in note by an interval of a major third in the case of model WT614 (which has a larger, deeply flared trumpet), and a minor third in the case of the other models.

Certain lighter cars, however, are fitted with one Wind Tone horn only.

Horns are available for use on 6 volt, 12 volt and 24 volt systems, with the exception of models WT28U and WT29U. The latter are extra-loud horns, and are made for use on 12 volts only.

Models WT614, WT29 and WT29U are finished in black, being usually mounted under the bonnet. Models WT28 and WT28U are for external fixing, and have a chromium-plated finish.

A relay is used on 6 volt systems, and with the extra-loud horns, in order to minimise the current carried by the horn push contacts and also to reduce the voltage drop in the cables supplying the horns. A relay may also be used with 12 volt horns, though in most cases the size of cable used will be adequate to prevent any undue voltage drop.

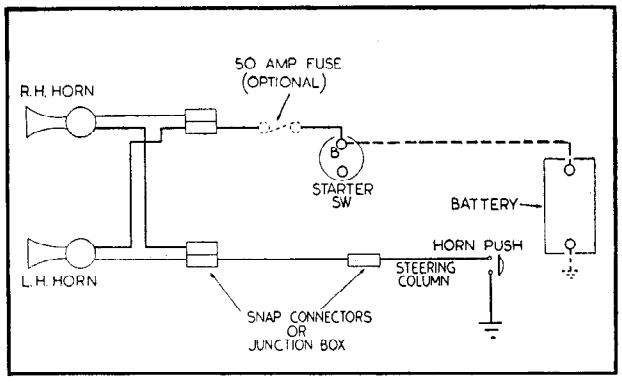

Fig. 1.
Wiring of typical horn circuit

The horns may be supplied either from the accessory supply terminal or directly from the battery terminal of the starter switch. The latter system is to be preferred because of the shorter lengths of cable involved. A separate fuse is usually (though not invariably) fitted to protect the horn circuit.

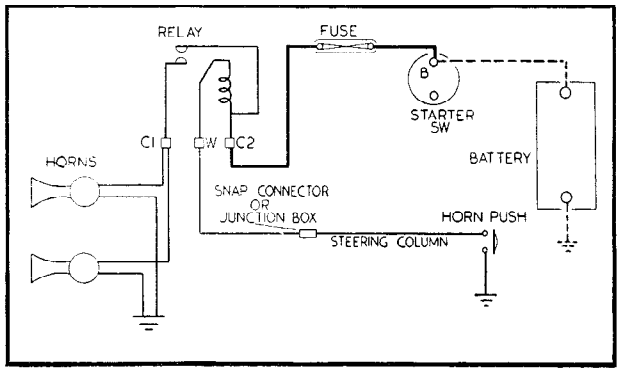

Fig. 2.
Wiring of typical horn circuit, with relay

SERVICING

1. NOTE OF HORN UNSATISFACTORY, OR OPERATION INTERMITTENT.

(a) Check that the bolts securing the horn bracket are tight, and that the body or flare 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 blown.

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 nipples are firmly soldered to the cables. On certain model WT614 horns, the contact clips in the terminal block may have become distorted as a result of allowing insufficient slack in the cable. They may be bent back into shape with a small pair of pliers. On later models the design of the terminal block has been altered in order to eliminate the possibility of this fault.

If a relay is fitted, connect together the terminals "C1" and "C2" ("H" and "B" on some relays) with a short length of 44/·012 cable. If the horns operate correctly, remove the cable and connect it between

the remaining relay terminal ("W" or "P") and earth: persistence of the fault indicates an internal fault in the relay, which must be replaced.

On models WT28U and WT29U, a condenser is fitted across the contact breaker points. It is possible, though improbable, that this condenser may develop an internal short circuit, or become open circuited. Either of these faults will impair the note of the horn. Check the condenser by replacement.

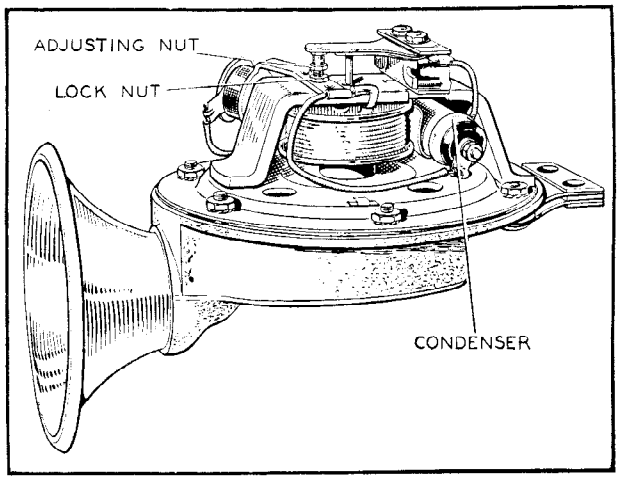

Fig. 3.
Model WT28U horn, with cover removed

(b) ADJUSTMENT

Adjustment of the horn does not alter the pitch of the note, but takes up wear of the moving parts which, if uncorrected, would result in loss of power and roughness of tone.

The horn must not be used repeatedly when out of adjustment, as the resulting excessive current may damage it. The maximum current consumption of each model, in correct adjustment, is given below.

MODEL	6 VOLT	12 VOLT	24 VOLT
WT28 / WT29	11 amps.	5½ amps.	3 amps.
WT614	13 amps.	6½ amps.	3½ amps.
WT28U / WT29U	—	12½ amps.	—

(These figures are for each horn : the total current, taken by both horns together, will naturally be twice the figure quoted).

If it is desired to check the current consumption of the horns, break the circuit at some convenient point and connect an ammeter, 0 — 30 or 0 — 50 amps., in series with the horns. (Note that the instrument panel ammeter, if one is fitted, cannot be used because (*i*) it is not normally calibrated with the degree of accuracy required, and (*ii*) in many modern cars the horns are fed from the battery side of the ammeter).

If the consumption is in excess of the figure quoted, it is necessary to adjust the horns, even if they are apparently operating correctly. Horns will normally be tested with the car stationary and the battery at roughly its nominal voltage — 6, 12, or 24 volts — but under running conditions with the battery charging the voltage may be appreciably higher, and may overload the horns if the latter are not in correct adjustment.

If the horns are badly out of adjustment, it will be necessary to short circuit the horn fuse, as otherwise the excessive current taken by the horns during the process of adjustment might result in its repeated blowing.

Withdraw the cover securing screws and remove the covers. Disconnect the supply lead from one horn, taking care that it cannot touch any part of the car and so cause a short circuit.

Horns must always be securely bolted down when carrying out an adjustment, and if it is necessary to remove a horn from the car for testing, it must always be firmly clamped by its securing bracket for the test or adjustment to be effective.

Slacken the locking nut on the fixed contact and rotate the adjusting nut in a clockwise direction until the contacts are just separated, as indicated by the horn failing to sound. Turn the adjusting nut **half a turn** in the opposite direction, and hold it while tightening down the locking nut. Check the current consumption of the horn, which must not exceed the figure quoted above for the appropriate model. If the current is incorrect, make further very fine adjustments

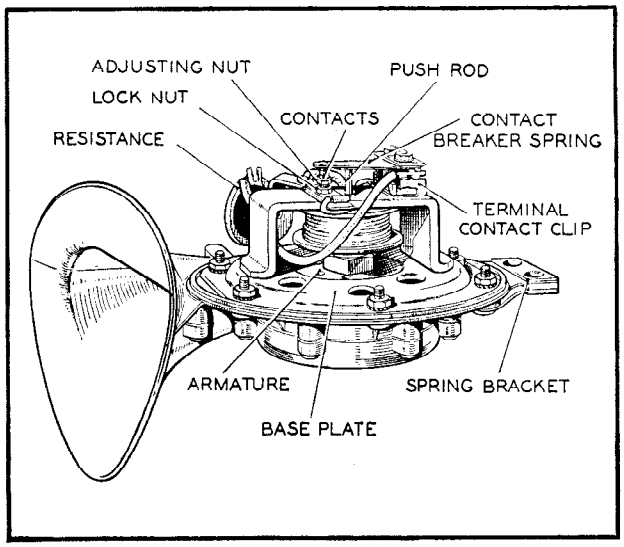

Fig. 4.
Model WT614 horn, with cover removed

to the contact breaker, turning the adjusting screw in a clockwise direction in order to decrease the current, and *vice versa*.

Adjust the other horn in a similar manner.

(c) INTERNAL FAULTS

If the note cannot be improved by adjustment of the contact breaker, examine the movement for the following faults :

Contacts badly worn, so that correct adjustment is impossible. A new set of contacts, i.e., moving contact and spring, and fixed contact and adjusting screw, must be fitted, and the horn adjusted as described above.

Incorrect spring pressure at contacts : if the spring pressure is too great, the horn will give a false note at high working voltages, while if too low the note will be weak and rough. The pressure required at the end of the spring just to separate the contacts should be :

Models WT28 and WT29 : $2\frac{1}{2}$ — 3 lb.

Models WT614, WT28U and WT29U : $3\frac{1}{2}$ — $4\frac{1}{2}$ lb.

If the spring pressure is outside these limits, it is necessary to fit a new spring and moving contact. When doing this, note the arrangement of the insulating and connecting strips on the terminal block, and take care to assemble them correctly. After fitting the new spring, adjust the contact breaker as described above.

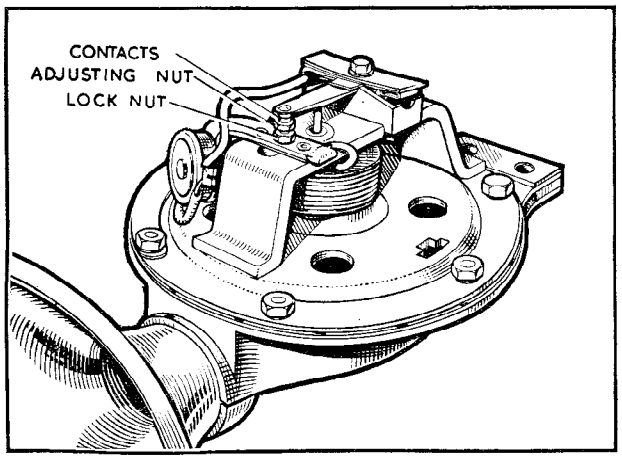

Fig. 5.
Model WT28 horn, with cover removed

Steel push rod stiff, or jammed in its bush. Remove the contact breaker spring, and work the push rod up and down to ease it. If necessary, clean the rod and bush with petrol to remove any accumulations of dirt or grease. The exposed portion of the rod should be smeared with a fairly thin grease (Duckham's H.B.B., or its equivalent), which will work down into the bush when the horn is blown.

Push rod too slack, causing rattle when the horn is blown. This will be due to the push rod having run dry of grease, with consequent excessive wear. A new push rod must be fitted. If, due to wear of the bush, the new push rod is also slack, no repair is possible and the horn must be replaced.

Armature fouling base plate. There should be a clearance of approximately ·020″ between the armature and the base plate. If the armature touches the base plate at any point, slacken the six screws securing the base plate and move the armature until it is centrally placed in the aperture. It is advisable to fit shims round the armature to hold it central while the securing screws are tightened.

2. BOTH HORNS FAIL TO OPERATE

Examine the fuse protecting the horn circuit. If it has blown, examine the wiring and horns for evidence of a short circuit. Renew any damaged leads, covering them with extra protective sleeving if necessary, and fit a new fuse into position.

If the fuse still blows, it is possible that the adjustment of one or both horns is badly out, and that as a result the current consumption is very greatly increased.

If a relay is fitted, listen for the click of the closing contacts when the horn push is pressed by an assistant. If no click is heard, connect together the "C1" and "C2" terminals ("H" and "B" on some relays) with a short length of 44/·012 cable. A fault in the relay or horn push is indicated if the horns now sound. To determine which is at fault, remove the short length of cable and connect the "W" terminal of the relay (sometimes marked "P") to earth. If the horns now sound, the fault must be in the horn push, or in the lead to it ; if not, the trouble is caused by an internal fault in the relay, and a new relay must be fitted.

3. ONE HORN FAILS TO OPERATE.

Disconnect one lead from the terminal block of the second horn, taking care that it is not allowed to touch any part of the car.

Remove the cover of the faulty horn and examine the movement for the faults enumerated in Para. 1(c).

Pay particular attention to the internal wiring of the horn, which may have broken or become unsoldered as a result of vibration, and see that chafed insulation does not cause a partial or complete short circuit.

Note.—All joints in the internal wiring of the horn must be firmly soldered, using a non-corrosive flux (and, in the extra-loud horns, a high-melting-point solder).

4. HORNS OPERATE CONTINUOUSLY.

This fault may be caused by a short circuit on the lead from the horns to the horn push, or by a fault in the relay if one is fitted.

Apart from any other consideration, the horns must not be allowed to go on blowing for long because of the severe drain on the battery and the risk of damage to the horns through over-heating. The easiest way of quickly isolating the horn circuit is to remove the horn fuse. If a battery safety switch is fitted, and is easily accessible, first switch to the "OFF" position.

Circuits not employing a relay : examine the cable from the horn push to the horns for signs of a short circuit. Disconnect this cable at the snap connector near the horns and momentarily bridge the horn fuse clips. If the horns operate, remove the covers and examine for stray ends of wire, etc., that may be causing a short circuit. If, however, the horns do not blow, re-connect the horn push lead and test in the same way at the junction box, snap connector or terminal of the horn push. When the fault has been located, fit a new length of cable or protect with suitable sleeving.

Circuits employing a relay : Test the lead from the relay terminal "W" (or "P") to the horn push, as described above. If the horns still sound when the cable is removed from the terminal, the relay is faulty and must be replaced.

Note. (a) If the horns are removed for bench testing or adjustment, it is advisable to carry out an insulation test before replacement, testing between each terminal and the body with a 500 volt test set or similar equipment.

(b) Under no circumstances must the movement be dismantled. If, after carrying out the above testing procedure, the fault has not been located, a new horn must be fitted.

(c) **Relays** are sealed during manufacture, and no attempt should be made to remove the cover.