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WORKSHOP INSTRUCTIONS

ELECTRIC WINDTONE HORNS

MODELS
WT28, WT29, WT28U, WT29U, WT614, WT616 and WT618

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ELECTRIC WINDTONE HORNS

MODELS WT28, WT29, WT28U, WT29U, WT614, WT616 and WT618

1. GENERAL

Windtone horns depend for their operation on the vibration of an air column, excited at its resonant frequency, or a harmonic of it, by an electrically energised diaphragm. The horns are usually fitted in pairs, one horn having a higher note than the other. The high and low note WT614, WT616 and WT618 horns differ in note by a musical interval of a major third. Models WT28, WT29, WT28U and T29U differ in note by an interval of a minor third.

Horn models WT29, WT29U, WT614 and WT618 are finished in black for under bonnet mounting. Models WT28 and WT28U are for external mounting and have a chromium-plated finish.

Models WT28U and WT29U are extra loud horns, and are for use on 12 volts only.

Horn models are distinguishable by the shape of the trumpet flares (see Figs. 2, 3, and 4).

High and low note versions of these horns may be distinguished by the letters "H" and "L" marked inside the trumpet flares. The horns have sprung fixing brackets.

Model WT616 horns have long trumpets, chromium-plated for external mounting, or black for under bonnet mounting. The high note horn has a shorter trumpet than the low note horn.

On many vehicles a relay is used with the horns to minimise the current carried by the horn push contacts and also to reduce the voltage drop in the horn supply cables (see Fig. 1).

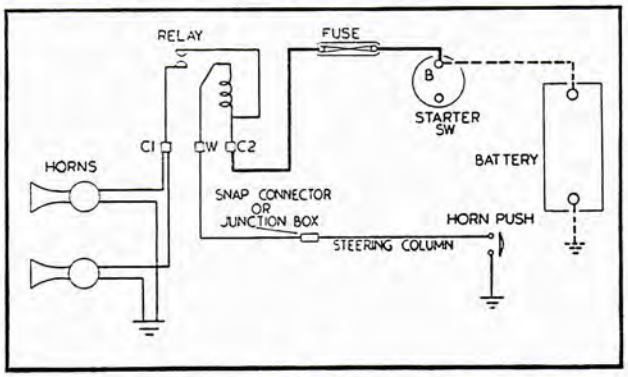

Fig. 1
Wiring of typical horn circuit with relay

2. SERVICING

A summary of possible faults referred to in the text is given in Table 1 below.

(a) HORN LOOSE ON MOUNTING OR INCORRECTLY MOUNTED

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.

Horns having coiled trumpets must be mounted with their bases horizontal and covers uppermost. Under no circumstances should they be mounted in the reverse position or sideways, as this may result in water collecting in the bends of the air column, to the general detriment of the horn performance.

Model WT616 horns must be mounted with the trumpets horizontal or inclined slightly downwards to prevent water draining into the horn body.

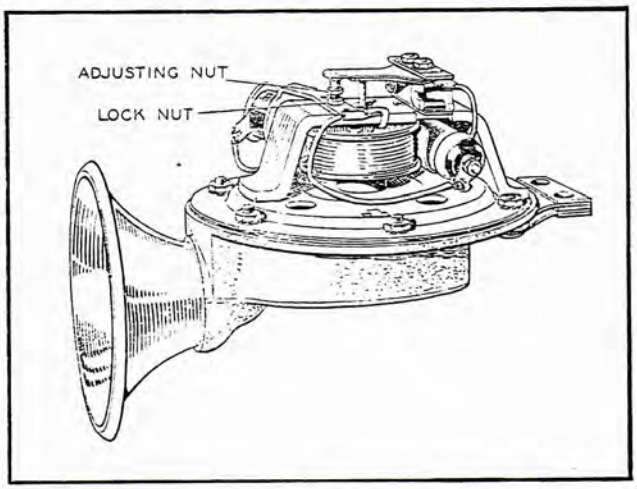

Fig. 2
Horn, model WT28U, with covered removed

Symptoms	Possible Causes	Reference
Note unsatisfactory	Horn loose on its mounting or incorrectly mounted	Para 2 (a)
	Horn out of adjustment	,, 2 (e) (i)
	Internal fault(s)	,, 2 (e) (ii-vii)
Horn will not operate	Faulty connection	Para 2 (b)
	Blown fuse	,, 2 (c)
	Faulty relay	,, 2 (d)
	Internal fault(s)	,, 2 (e) (ii-vii)

Table 1
Symptoms and possible causes of horn faults

(b) FAULTY CONNECTION

Examine the cables of the horn circuit, renewing any that are badly worn or chafed. Ensure that all connections are clean and 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 can be bent back into shape with a pair of pliers.

(c) BLOWN FUSE

If a separate fuse is fitted to protect the horn circuit, it may have blown. Before replacing a blown fuse, examine the wiring for evidence of a short circuit, which may have caused the fuse to blow. A blown fuse may also be due to a horn being badly out of adjustment.

(d) FAULTY RELAY

When fitted, check the relay by connecting together terminals "C1" and "C2" ("H" and "B" on some relays) with a short length of heavy gauge 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 defect in the relay, which must be replaced. If the horn does sound, check the horn push circuit.

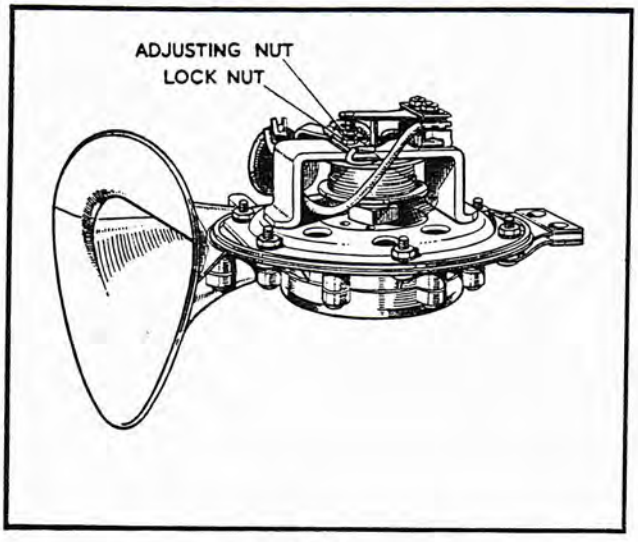

Fig. 3
Horn, model WT614, with cover removed

(e) INTERNAL FAULTS

(i) CONTACT BREAKER OUT OF ADJUSTMENT

Make sure that the poor performance is not due to one of the causes in paragraphs (a)—(d) before attempting any adjustment of the horn. Adjustment does not alter the pitch of the note, but takes up wear of the moving parts which, if not corrected, would result in loss of power and roughness of note.

The horn must not be used repeatedly when out of adjustment, as the resulting current may be excessive. The maximum current consumption of each model, in correct adjustment, is given in Table 2.

The total current consumption for a pair of horns will, naturally, be twice the figure quoted.

To check the current consumption of the horns, break the circuit at some convenient point and connect an ammeter, 0—30 amp. (0—50 amp. for 6-volt horns), in series with the horns. If the consumption is in excess of the figure quoted, it is necessary to adjust the horns, even if they are apparently operating correctly. The horns should be tested with the car stationary and the battery fully charged.

Model	6–volt	12–volt	24–volt
WT28 and WT29	11 amp.	5½ amp.	3 amp.
WT28U and WT29U	—	12½ amp.	—
WT614	11½–13 amp.	6–7 amp.	3–3½ amp.
WT616	13–14 amp.	8–8½ amp.	2½–3 amp.
WT618	10–12 amp.	7½–8½ amp.	4–5 amp.

Table 2
Current consumption for a single horn

Adjustment

Withdraw the cover securing screw and remove the cover and cover supporting strap. Disconnect the supply cable from one horn, taking care that it does not touch any part of the car and cause a short circuit. Horns must always be securely bolted down when carrying out an adjustment and, if it is necessary to remove the horn from the car for testing, it should be firmly clamped by its securing bracket for the test. When testing or adjusting, use a pure D.C. supply—not rectified A.C.

Slacken the lock nut on the fixed contact and rotate the adjusting nut a few degrees at a time in a clockwise direction to reduce the current, or anti-clockwise to increase the current. It must be remembered that the adjustment is a very critical one. Tighten the lock

nut before testing the horn after each trial adjustment. The contact spring on a correctly set horn should be more or less parallel with the surface of the magnet

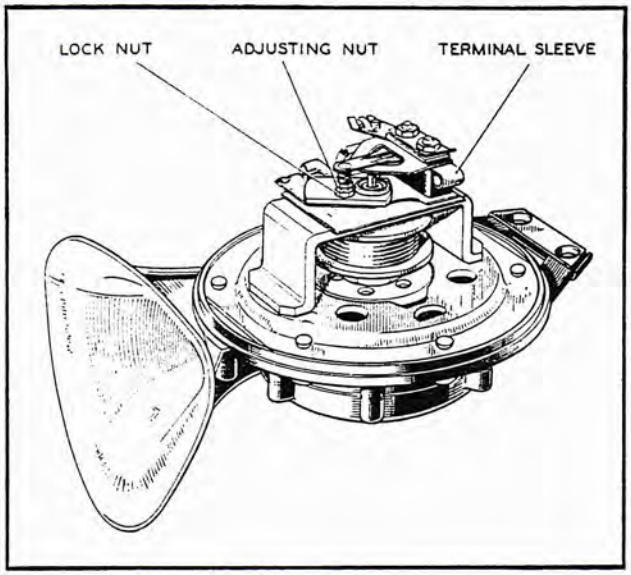

Fig. 4
Horn, model WT618, with cover removed.
(Note earlier models have base plate clamped to horn body by screws and nuts)

bridge, for the contacts to be in line. A clear steady note should be obtained over a voltage range of 5 to 7 volts for 6-volt horns, 10 to 14 volts for 12-volt horns and 20 to 28 volts for 24-volt horns.

(ii) BADLY WORN CONTACTS

If the contacts are so badly worn that correct adjustment is impossible, then a new set of contacts, i.e. moving contact and spring, and fixed contact, must be fitted and adjusted as described in paragraph (e) (i).

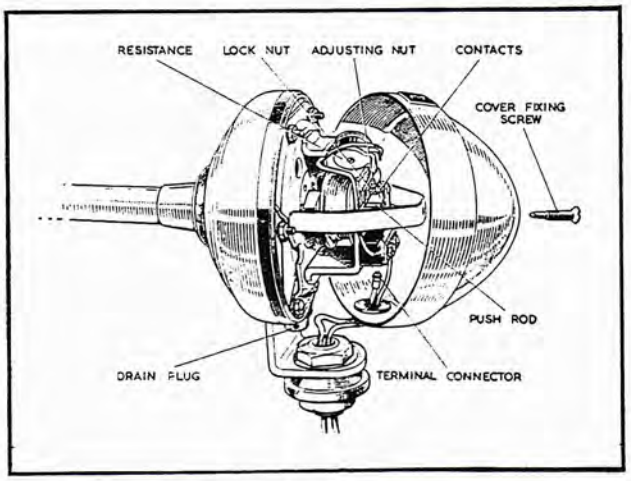

Fig. 5
Horn, model WT616, with cover removed

(iii) FAULTY RESISTANCE

To prevent excessive sparking as the horn contacts separate, a carbon resistance is connected across the horn coil. The resistance values vary according to the horn voltage. If the resistance becomes open-circuited the horn note will become rough, and fierce sparking will occur as the horn contacts separate. The correct resistance values are as follows:—

6–volt horns	...	3½ ohms
12–volt horns	...	8 ohms
24–volt horns	...	25 ohms

(24–volt WT618 horns are an exception, the resistance being 8 ohms).

On model WT618 horns, the contact breaker terminal block is manufactured from a resistive material and this serves as the spark suppressing resistance.

(iv) FAULTY CONDENSER (MODELS WT28U AND WT29U ONLY)

On these models a condenser is connected across the contact breaker. It is possible, though improbable, that this condenser may have developed an internal short circuit. or become open-circuited. Either of these faults will impair the note of the horn. Check the condenser by substitution.

(v) OPEN-CIRCUITED OR BURNT-OUT COIL

The horn coil can be easily checked for continuity by connecting an ohmmeter between the two coil supply cables. The resistance values of the coil windings vary according to voltage.

6–volt horns	...	0.054 ohm
12–volt horns	...	0.28 ohm
24–volt horns	...	1.4 ohms

If the coil is burnt-out, the windings will show visible signs of overheating. To replace a coil it is necessary to renew the complete base plate assembly. Do not attempt to remove the coil former from the pole piece.

(vi) INCORRECT ARMATURE SETTING

The armature setting can be checked by measuring the amount of push rod movement. To do this, screw back the contact breaker adjustable contact until the contacts are parted. Position a clock gauge on the spring of the moving contact directly above the push rod. Temporarily energise the coil, arranging the supply cables in such a way as to by-pass the contact breaker (as shown for the WT618 horn in Fig. 7) and note the reading on the clock gauge. Do not energise the coil for longer than is necessary to note the reading.

Due to differences in diaphragm stiffness, the amount of movement compatible with satisfactory horn performance can differ with individual horns of the same model and voltage. The armature movements listed overleaf are therefore nominal—the essential conditions being that an armature shall not impact against the pole piece (indicated by a sharp metallic click) or otherwise contact any part of the horn body.

Model WT28 and WT29:

High and low note settings are:—

0.040″ for 6-volt horns
0.045″ for 12-volt and 24-volt horns.

Model WT28U and WT29U:

High and low note settings are:—

0.050″.

Model WT614:

High note settings are:—

0.045″ for 6-volt horns
0.055″ for 12-volt horns
0.040″ for 24-volt horns.

Low note settings are:—

0.050″ for 6-volt horns
0.060″ for 12-volt horns
0.040″ for 24-volt horns.

Model WT616:

Settings are the same for all voltages.

High note settings are:—0.055″
Low note settings are:—0.060″

Model WT618:

Settings are the same for all voltages.

High note settings are:—0.050″
Low note settings are:—0.055″

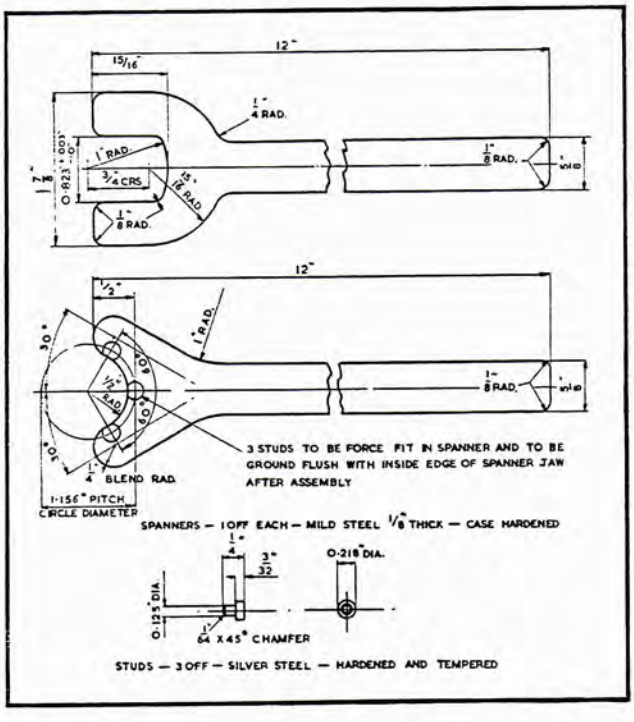

Fig. 6
Dimensional drawings of tools required for making armature adjustment on WT614, WT616 and WT618 horns

Adjust the armature setting on WT614, WT616 and WT618 horns by slackening the armature lock nut and re-setting the armature, using the tools shown in Fig. 6.

To reach the armature adjustment screw on WT28, WT29, WT28U and WT29U horns it is necessary to remove the rubber plug from the base of the air column. Adjustments can be made using a box spanner and screwdriver of appropriate size. When replacing the plug, locate the flame on the Lucas motif adjacent to the small location hole in the base of the horn. Smear the edge of the plug with rubber solution to ensure an air tight fit in the air column.

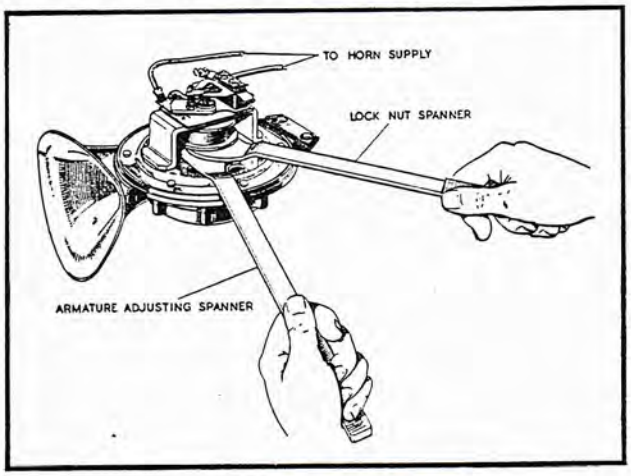

Fig. 7
Making armature adjustment

After adjusting the armature setting it will be necessary to re-set the contact breaker as described in paragraph (e) (i).

(vii) PUSH ROD STICKING

Remove the contact breaker spring, and work the push rod up and down in its bush to ease it. If necessary clean the rod and bush with petrol to remove any accumulations of dirt or grease. After cleaning, lightly smear the rod with Duckham's HBB or an equivalent grease. Take care not to allow grease to get on or near contacts.

3. DISMANTLING AND REASSEMBLY

Unless a major fault occurs, such as a broken diaphragm or a burnt-out coil (both of which are very rare faults) dismantling of the movement itself is not advisable. If, however, dismantling is necessary, the sequence of removal operations for each horn is shown in Fig. 8. A dismantled horn is shown in Fig. 9. When a horn coil housing and base plate is clamped to the die cast body by rivets, the rivets must be drilled out. When reassembling these horns, the holes in the base plate must be enlarged to $\frac{7}{32}$ in. and the rivets replaced by 1 B.A. screws and nuts.

The assembly procedure is a reversal of the dismantling sequence shown in Fig. 8. The following points must be observed when the horn is being assembled:

(i) Ensure that a fibre packing washer is assembled between the diaphragm and the body die casting.

(ii) Note that high note horns have thinner armature plates than low note horns.

(iii) The diaphragm clamping nuts must be tightened to a torque not less than 30 lb.-in. for (WT616 horns this torque must be 50–60 lb.-in.).

(iv) Before re-fitting the drain plug on model WT616 horns, renew the rubberised-canvas washer beneath its head. To ensure effective sealing, tighten down the drain plug with a tommy bar so that its conical end beds into the aluminium seating.

(v) Re-set the armature with its upper surface approximately level with the surface of the horn base plate.

(vi) Lightly smear the push rod with Duckham's HBB or an equivalent grease.

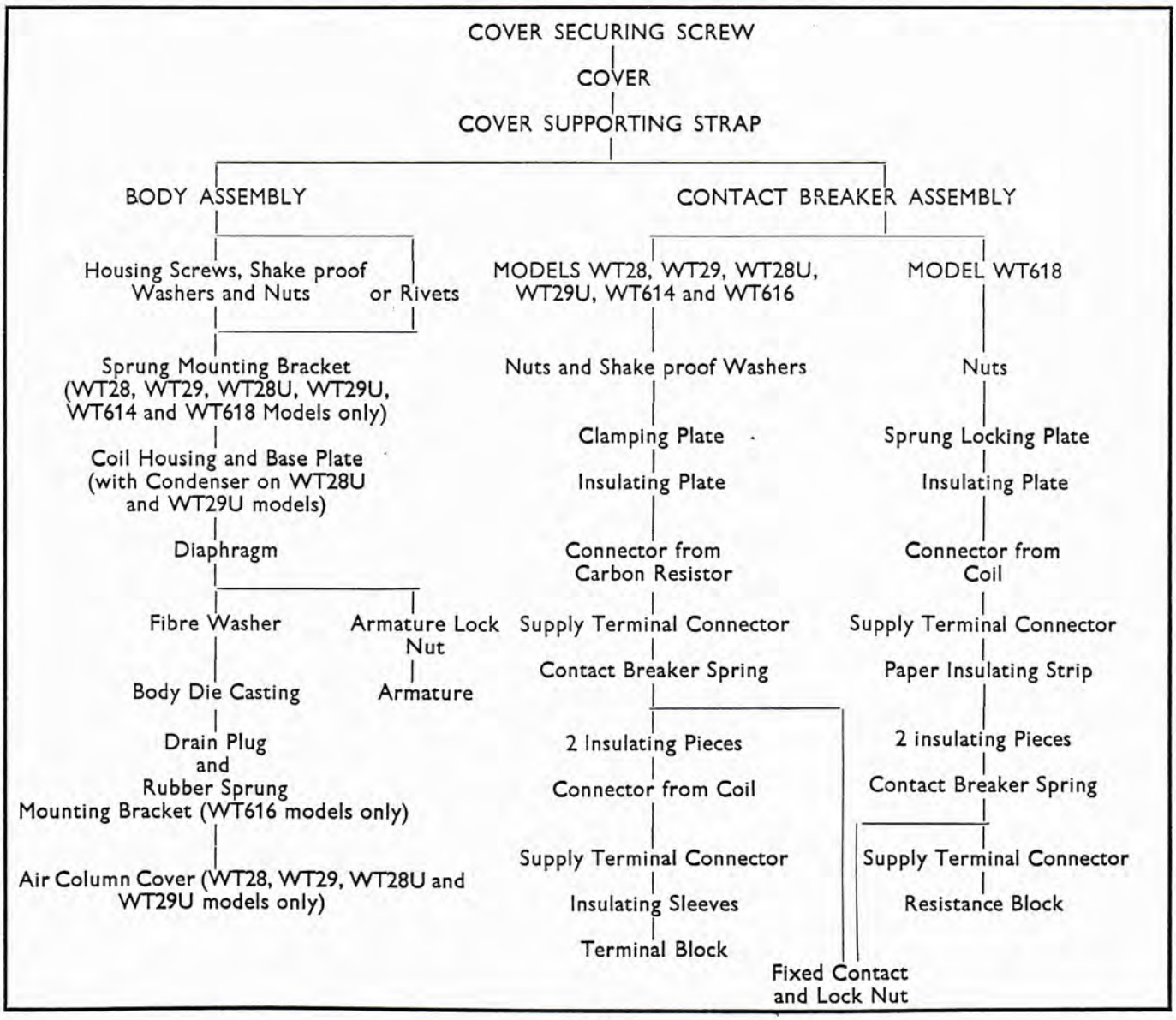

Fig. 8
Sequence of dismantling and re-assembly

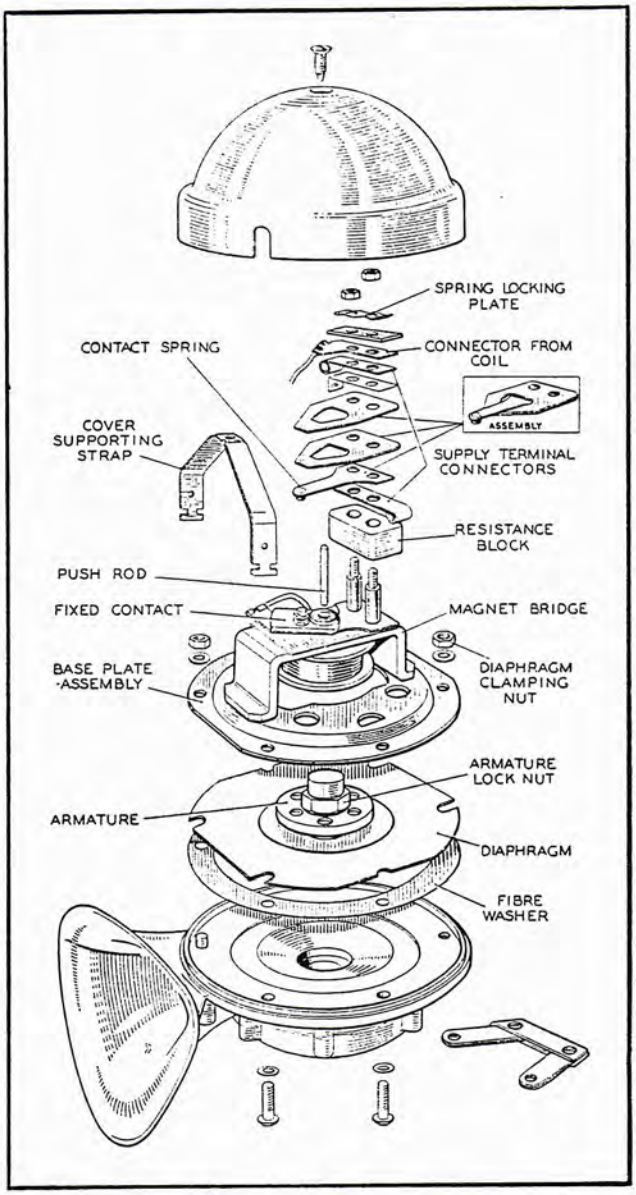

Fig. 9
Horn, model WT618, dismantled

(vii) On model WT616 horns arrange the contact breaker terminal block next to the horn mounting bracket. On other models arrange the contact breaker terminal block diametrically opposite to the horn flare.

(viii) After long service the spring locking plate on the model WT618 terminal block assembly loses its spring tension and a new plate must be fitted.

(ix) The terminal block assembly nuts on model WT618 horns must be tightened to a torque of 30 lb.–in. to obtain consistent horn performance.

(x) Carry out an insulation test before connecting a supply to the horn. Test between each terminal and the horn body with a 500-volt insulation tester.

(xi) Re-set the armature and contact breaker settings in accordance with the instructions given in paragraphs 2 (e) (vi) and 2 (e) (i).