TRAFFICATORS

TYPES, FITTING, FAULTS AND REPAIRS

DIRECTION indicators are now fitted to practically every type and make of new car. It is proposed to deal with the types of direction indicator, their fitting and wiring, and finally with the remedy of any faults that are likely to develop.

This accessory is now more widely known as a trafficator, the object of the component being a visible indication to oncoming traffic and following traffic, enabling them to anticipate whether you are turning left or right, as the case may be.

The most favoured type of trafficator is the signal arm type, the original of which was the ordinary box enclosed model that could be fitted at any convenient point on the front pillars or dash of the car. Now most modern cars have flush-type trafficators usually fitted between the front and rear doors.

The principle of both the box type and the flush type is the same, with modifications in the wiring circuit of the trafficators to enable the use of warning lights and independent switching on of the trafficator bulb.

External Fitting or Box Type Trafficators

This type of trafficator consists of a signal arm pivoted at the top and anchored to a linkage movement, the other end of which is linked to an iron plunger operating in a solenoid. When the current is switched on it is fed into the positive side of the solenoid through the winding, creating a magnetic field which pulls the plunger downward and raises the signal arm through the linkage assembly. It is usual to put two wires, that is, a positive feed and negative return; as it is not always possible to get a good earth return through the body of the trafficator, the return or negative wire should be earthed at the most convenient spot in the case of an earth return system.

The Trafficator Bulb Circuit

The bulb in a trafficator is in parallel with the solenoid, that is, one end of the twin wire feeding the bulb is connected to one end of the solenoid, the other wire being connected to the further end of the solenoid; these remarks apply to an insulated return type of trafficator.

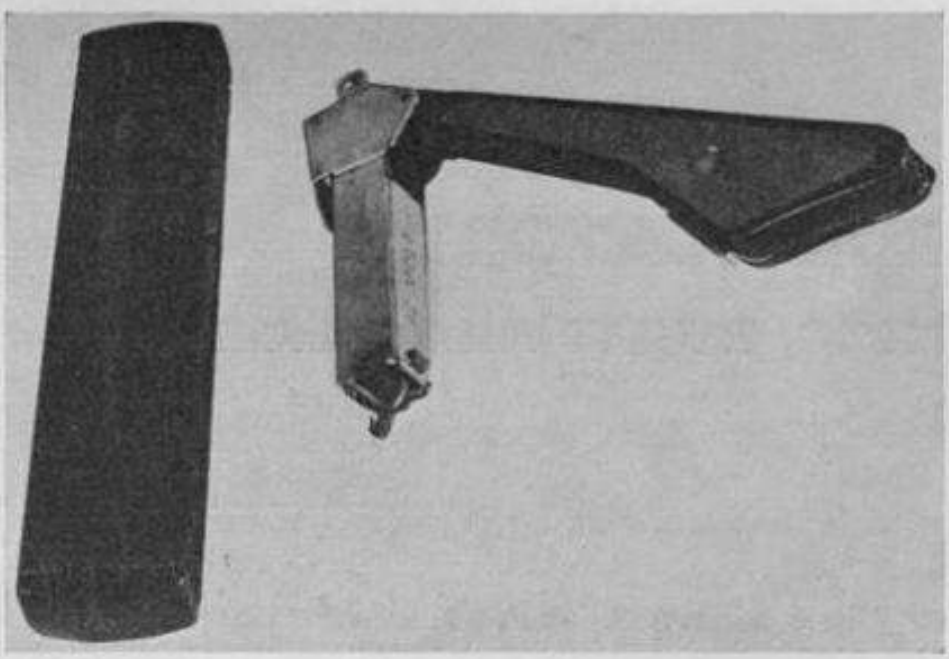

Fig. 1.—BOX TYPE OF TRAFFICATOR WITH MOVEMENT REMOVED.

The box enclosing the movement is fitted at any point on the front pillars or dash of the car.

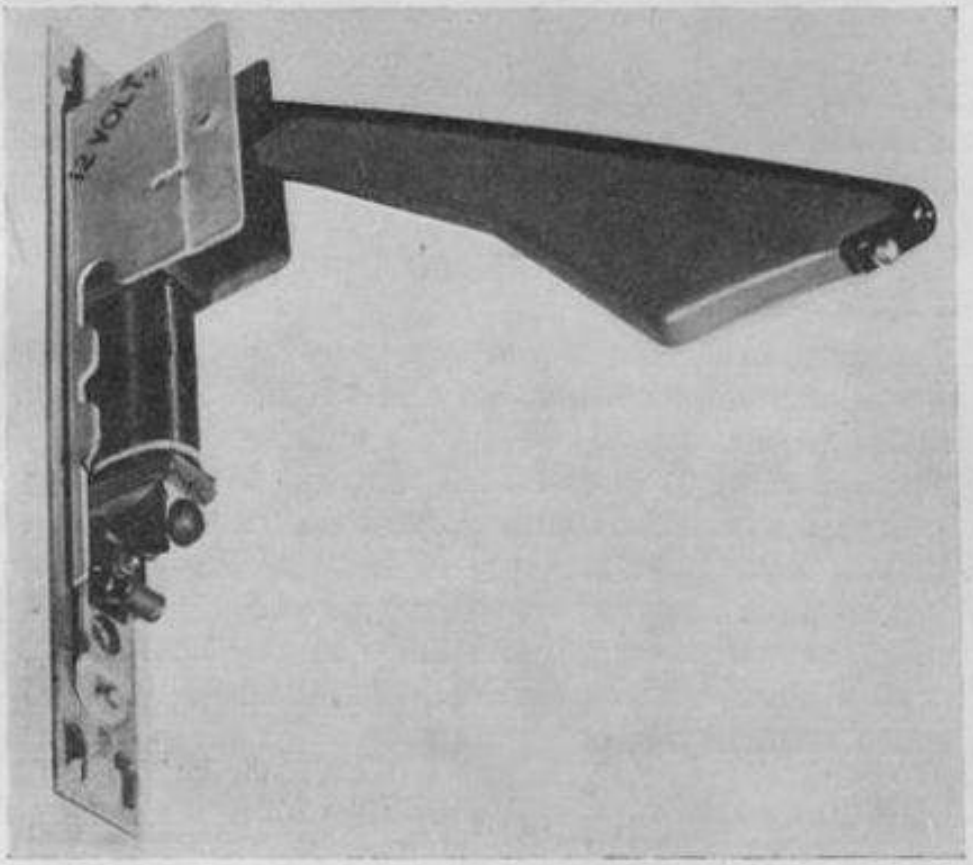

Fig. 2.—LATEST FLUSH TYPE TRAFFICATOR WITH EXPOSED SOLENOID WINDING.

This type has internal switch for trafficator bulb.

As we have already stated, most if not all trafficators are of the two-wire type; this does not mean, however, that they are not earthed within themselves. The fact is that most of the modern trafficators have one end of the solenoid earthed; this reduces the wires in the moving arm to one, a very important consideration in view of the limited space available; a feed wire is tapped off the positive side of the solenoid and led down the arm to the bulb, the other side of which is earthed to the frame of the arm, which in turn is in contact with the body of the trafficator to which the negative side of the solenoid is connected along with the negative return wire.

A glance at the circuit diagrams will make this clear.

Connecting up Trafficators

Care must be taken when connect-

ing up trafficators to the switch. If the wires become crossed—that is, you have the positive feed from the near-side trafficator and the negative return from the off-side connected to the switch—you will have a short circuit when you switch on the off-side trafficator if the body of the trafficator happens to be earthing to the framework of the car.

The type of switch used with the early external fitting trafficators was an ordinary two-way switch with an off position, as shown in diagram. This was followed by a time switch, which automatically switched off after a predetermined period, and consisted of a two-way switch with a semi-free handle coupled to a clockwork movement.

Flush Type Trafficators

With the advent of flush type trafficators several modifications have been made in respect to switching and wiring.

The early types of flush type trafficators were wired up in simple form with a two-way switch; this was followed by the following modifications. The feed wire was taken from the coil side of the ignition switch so that the trafficators could not be operated unless the engine was switched on. A further improvement followed with the advent of finger-tip control; this was in the form of an automatic switch, worked by a cam on the steering column, which switched off the trafficator when the car was straightened up.

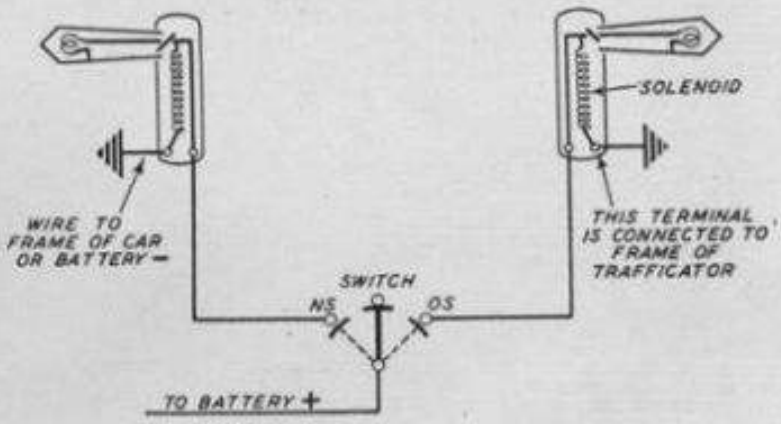

Fig. 3.—Simple trafficator circuit.

All the foregoing methods are included in the various wiring diagrams appearing on other pages.

Special Trafficator Circuits

If you study closely the various trafficator circuits shown in this article you will observe that in several instances a separate switch has been included in the trafficator itself, to switch the lamp on independently of the main current passing through the solenoid. This switch is located on the signal arm in the form of a small stud that makes contact with a wipe contact on the body of the unit. This arrangement has the advantage of doing away with the flexible wire which is used on the non-switch types. This flexible wire is often a source of trouble when it begins to fray.

Wolseley 16/60 h.p., 1933

This car was fitted with special direction indicators in the form of a right and left illuminated arrow just behind the front bumpers and a right and left illuminated arrow at the rear of the car; in consequence it was not possible for the driver to tell whether his indicators were working or not unless some indicating device was fitted on the dash or instrument panel. To overcome this difficulty a relay was incorporated in the trafficator as illustrated. The switch is two-way having a warning light bulb fitted in the centre behind a green glass. The circuit is as follows:—

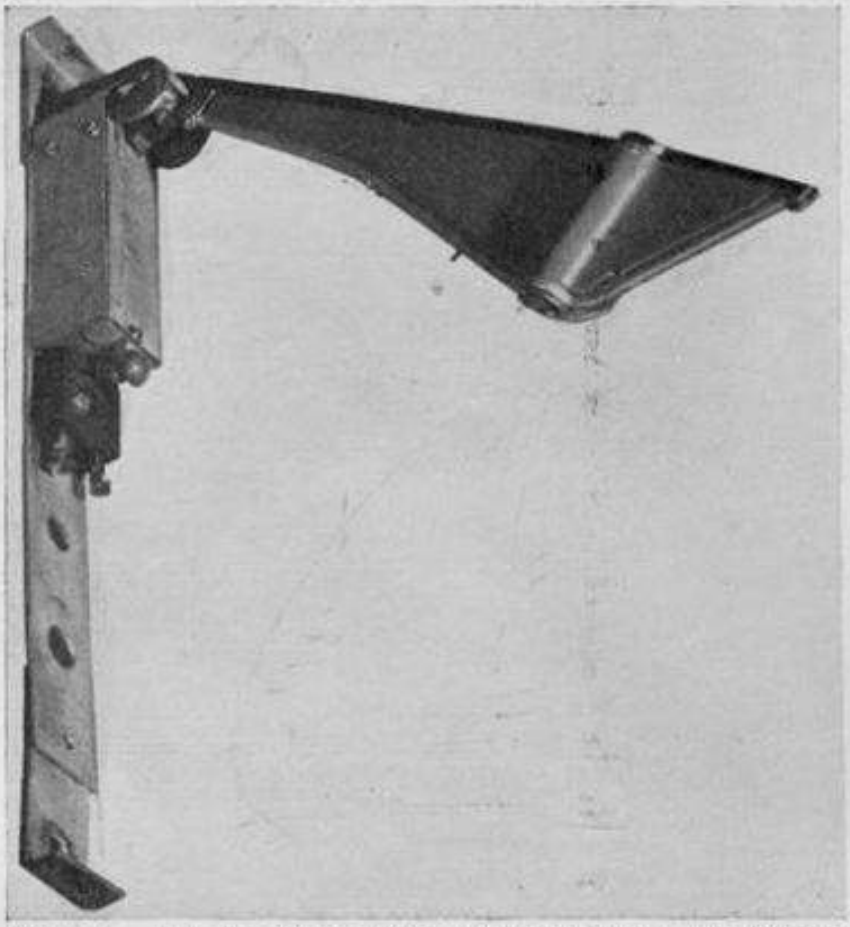

Fig. 4.—FLUSH TYPE TRAFFICATOR WITH ENCLOSED SOLENOID WINDING.

Note rubber buffer stop at base of solenoid case.

A feed wire runs from A terminal on the junction box to the positive terminal of the relay; this is connected to the A terminal of the relay *viâ* a fuse. This A terminal is an auxiliary terminal, and may be used for tapping off any other auxiliary circuit, such as electric horn or windscreen wiper. Actually it does not concern the trafficator circuit. You will note that connected to the wire from + terminal to the A terminal is a coil which is wound on an iron core to operate a pair of contacts connected across terminals A and W. The other end of the coil being connected to terminal SW from this terminal, a wire runs to the trafficator switch.

When you switch on, say, the off-side indicator you light a bulb in the off-side front indicator and one in the off-side rear indicator, the current feeding bulb flows *viâ* the + terminal on the relay box through the fuse, then through the solenoid winding to terminal SW, then to the indicator switch, thence to the bulbs which are single-pole, completing the circuit *viâ* the frame of the car. Now the points on the relay are held apart by a spring tension adjusted to close if both indicator bulbs light. Immediately they close you have a positive feed to the warning light in the indicator switch, the bulb in this case being a 2·5-volt ·2-ampere

must be used—an oil known as "Three in One" can be recommended for this purpose.

Trafficator Arm Free but Locks Closed

This defect is due in most instances to worn fulcrum pins, and cannot be satisfactorily remedied by repair, at least not economically. The better proposition is the fitting of an exchange replacement unit obtainable from any Lucas agents.

If the movement does not appear to be worn, then the trouble may be due to the rubber buffer stop having become misplaced and not allowing the arm to settle down in its proper place. A slight adjustment of the stop by bending it a fraction inwards will overcome this difficulty.

Sluggish Trafficators

When the action of a trafficator is sluggish, one of two defects are indicated: rusty solenoid spindle or voltage drop between battery and unit or low battery.

To test for voltage drop the trafficator should be switched on and a voltmeter reading taken at the trafficator terminals. If on a 12-volt unit you find you are only getting a 9 or 10-volt reading, then look for some high resistance in the circuit. The defect will be found in many instances due to a faulty earth return, or again to loose terminal connections on the trafficator and switch. There have been cases when a trafficator failed to operate after being renewed, both unit and circuit testing O.K. The trouble in such cases has been traced to voltage drop, due to the length of wire and the wire being under size.

Faults Common to Flush-Type Trafficators

The early flush-type trafficator, having a thin-ribbed metal back support and celluloid windows bellied out to take the bulb, suffered from a number of teething troubles, chief of which was the arm fouling the bodywork when opening. This defect was usually the result of the arm having been bent by misuse, or by the wind if the trafficator had been used in very rough weather. Another defect was sticking plungers; these are not so easy to get at as they are in the external type. The best method of oiling the plungers and fulcrum movement is to lift the trafficator arm partly and blow a few drops of "Three in One" oil into the movement from the end of a screwdriver, then lift the arm right up, put a little more oil on the end of your screwdriver and blow this well into the under part of the movement. The blowing of the oil from the end of a screwdriver or anything similar has more effect than squirting oil *ad lib.* from a pressure feed oilcan and generally gumming everything up. A scent spray can be used for the job with advantage.

Internal Short Circuits

Internal short circuits are usually caused by the feed wire to the bulb becoming chafed adjacent to the fulcrum pin. Later types employ a

miniature Edison screw pattern in series with a specially wound resistance, which is finally earthed *viâ* the E terminal of the switch.

Should one or both of the indicator bulbs fail, then the warning light will not light, as there would not be sufficient current passing through the relay coil to close the points. Care must be taken when replacing these bulbs to see that they are the correct type. There were two types fitted, namely, BAS No. 3 and BAS No. 10. It is quite easy to check up on the bulbs, as one BAS No. 3, that is a 12-volt 24-watt bulb, will close the relay points on a relay set to work with two BAS No. 10 lamps (12-volt 6-watt), whereas two BAS No. 10 bulbs should not close a relay set to work on two BAS No. 3 bulbs. A new warning light bulb may be fitted by unscrewing the green glass window and pulling the bulb out by means of the leatheroid tag provided. Do not forget to fit the correct bulb, No. 252 M.E.S., and do not push it into place without the leatheroid tag ; if you forget this you may have some difficulty in removing the bulb on a later occasion.

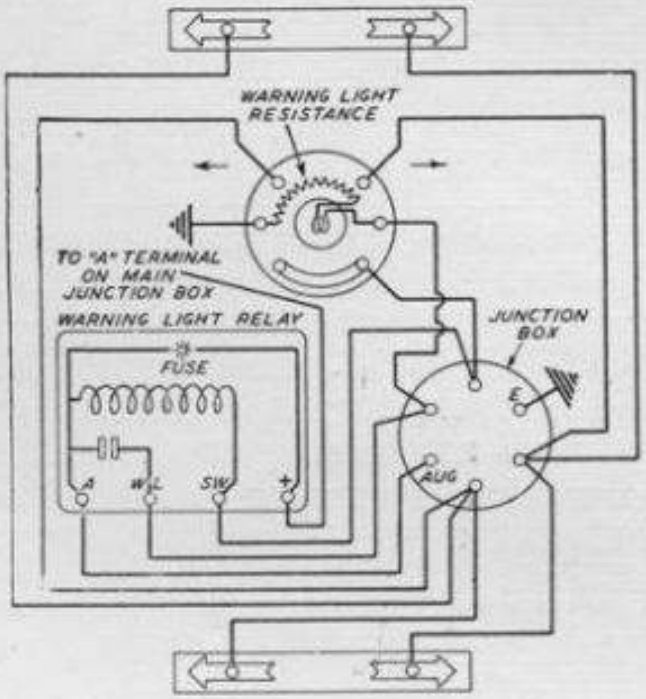

Fig. 5.—INDICATOR CIRCUIT ON WOLSELEY 16 H.P. (1933) CARS.

Note the terminal marked A is positive battery feed.

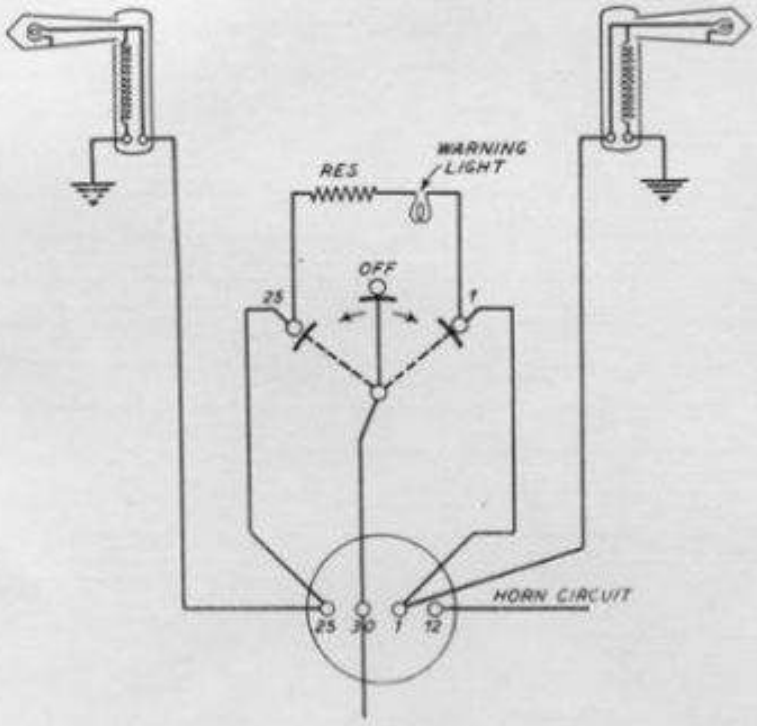

Fig. 6.—TRAFFICATOR CIRCUIT FOR 1936 MORRIS 10/4 (SERIES II) CARS.

Note warning light circuit.

Warning Light on Signal Type Trafficators

There are two methods of connecting up warning lights with signal type trafficators, as follows : Take, for instance, the method employed on the Morris Ten-Four and Twelve-Four (Series II). The switch is fed from a junction box to a common bus-bar in the switch ; now let us trace out the circuit when the near-side trafficator is switched on.

The current flows *viâ* the bus-bar to switch terminal 25, then *viâ* the junction box to the trafficator solenoid and then to earth. The trafficator bulb, you will note, is connected across the solenoid. The warning light is connected across the two trafficator switch terminals, Nos. 25 and 1. With the switch in the near-side position the warning light circuit is from terminal 25 *viâ* the warning lamp to terminal No. 1, then *viâ* the junction box to the off-side trafficator. The current then flows through the solenoid winding to earth, completing the warning light circuit, the warning light bulb being a 2·5-volt ·2-ampere M.E.S. bulb, passes only a small current, which is nowhere near sufficient to operate the off-side trafficator; also there is no tendency for the trafficator bulb to light as the path through the solenoid winding to earth is, of course, the one of least resistance. When the off-side trafficator is operated, the reverse conditions apply.

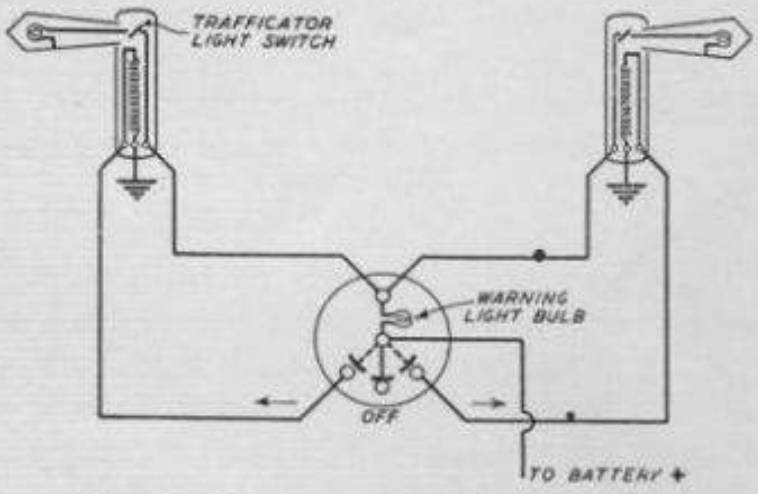

Fig. 7.—SPECIAL TRAFFICATOR CIRCUIT.

When arm is down, trafficator light switch is open. It is understood that only one arm can be raised at a time.

Another Method of Connecting a Warning Light

A more complicated method of connections is used in a few isolated cases.

In the instance about to be described there are three wires from the trafficator: (1) a feed wire to the solenoid, (2) a feed wire direct to the trafficator bulb *viâ* an internally operated switch, and (3) an earth return wire common to both. An ordinary two-way on and off switch is used for operating the solenoids.

A glance at the diagram will show that when, say, the off-side indicator is switched on, the arm is lifted by the main current passing through the solenoid; this closes the switch contact at the fulcrum of the arm; the current for the warning light and trafficator bulb is fed from the live side of the switch through the warning light, which is in series with the trafficator bulb. Great care must be taken when renewing bulbs to see that the correct bulbs are fitted. The warning light bulb must be a 3·5-volt ·3-ampere M.E.S. and the trafficator bulb a 12-volt ·25-ampere or 6-volt ·25-ampere, as the case may be. Actually this system is only common on 12-volt equipment.

Trafficator Faults

With box type or externally fitted trafficators the common cause of failure is the ingress of water; this causes the solenoid plunger to rust and jamb in its tunnel. The only remedy is to dismantle the unit and thoroughly clean and oil the plunger. A very light and non-gummy oil

switch contact arrangement on the movement. This obviates to a great extent the possibilities of a short circuit at this point.

Removing Trafficators for Repair

To remove flush-fitted trafficators it is necessary to lift the trimming in the interior of the car. Means are provided by the car manufacturers, and a careful survey of the trimming should be made before attempting to remove it. In many instances the trafficator is fitted in the post between the front and rear doors. The trimming on this post is more often than not made removable in one strip, thus facilitating the removal of the unit. Do not attempt to bend the arms of the latest type units because the windows are made of a special material which is not so pliable as the original celluloid type, and any undue stress is likely to fracture it.

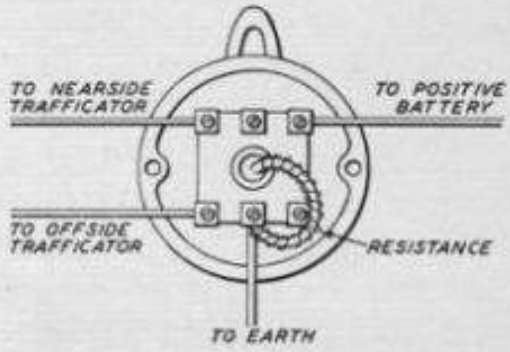

Fig. 8.—LUCAS TELL-TALE SWITCH WIRING DIAGRAM.

This switch will replace any ordinary two-way switch.

A Word about Repairs

External type units lend themselves to repairs more easily than flush-type units. The only repairs that can be made with any satisfaction are the removal of any short circuits or the fitting of a new arm. When fitting new arms great care must be taken not to fracture the die casting of the body; also see that the swivel pin is the correct size and that it is lightly riveted in place before assembling the unit. Owing to modifications that have taken place from time to time an exchange replacement unit is recommended because it will embody all the latest modifications.

Fitting a Warning Light Switch

There are a number of cars fitted with trafficators having the ordinary two-way switch. This may be substituted by a tell-tale switch having a warning light. After removing the existing switch, wire new switch according to diagram; it is essential that the bottom centre terminal is earthed by running a wire to the nearest point in contact with the frame of the car. If the switch is being fitted on a metal dash that is earthed the wire may be connected under one of the switch-fixing screws, after scraping the paint or enamel away to ensure good contact. If you examine the wire from the centre of the tell-tale switch you will note that it consists of a flexible core on which is wound a special resistance wire to drop the voltage across the warning lamp bulb, which is a 3·5-volt ·15-ampere M.E.S. bulb. This wire must not be replaced by ordinary copper wire if it should become broken at any time, otherwise you will blow the warning lamp bulb.