

**MAINTENANCE
INSTRUCTIONS**

for

**LUCAS
ELECTRICAL
EQUIPMENT**



JOSEPH LUCAS LTD • BIRMINGHAM

THE BATTERY

About once every month, top up each cell with distilled water to bring the acid solution (electrolyte) level with the tops of the separators. Do not use tap water and do not use a naked light when examining the condition of the cells.

Keep the terminals clean. If they are corroded, scrape them clean and smear with petroleum jelly. Wipe away all dirt and moisture from the top of the battery and make sure that the connections and fixing bolts are clean and tight.

Occasionally check the condition of the battery by taking hydrometer readings of the specific gravity of the electrolyte in each of the cells. Specific gravity readings and their indications are as follows :—

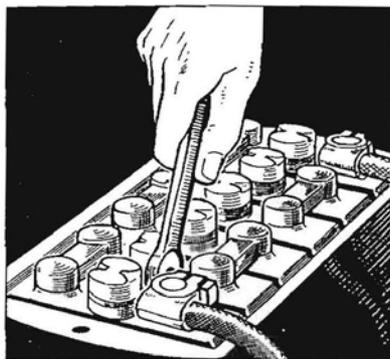
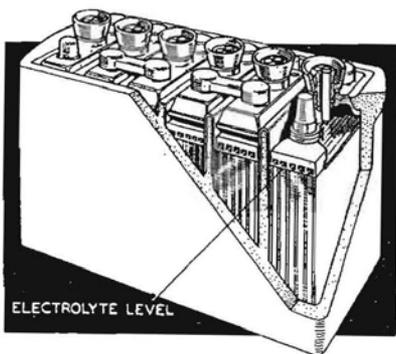
1.280—1.300	...	...	...	Battery fully charged.
About 1.210...	...	...	...	Battery about half discharged.
Below 1.150	...	...	...	Battery fully discharged.

The readings of all cells should be approximately the same. If one cell gives a reading very different from the rest, it may be that acid has been spilled or has leaked from this particular cell or there may be a short circuit between the plates. In this case the battery should be examined by a Lucas Service Agent or Depot.

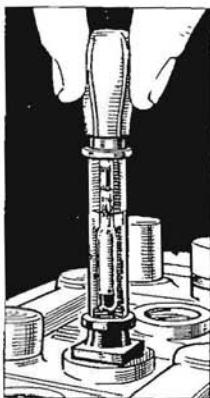
Never leave the battery in a discharged condition for any length of time. Have it fully charged and every fortnight give it a short refreshing charge.

Battery Charging.

On cars fitted with compensated voltage control equipment, the regulator unit ensures that the dynamo charges the battery at the rate best suited to its condition. It automatically provides a large charging current for a discharged battery and a low trickle charge for a battery in a fully charged state.



With cars having the third brush control system, the dynamo is arranged to give alternative outputs and a charging switch is provided which is usually fitted in the instrument panel. This switch has two positions marked "Low Charge" and "High Charge." For cars running under normal conditions, keep the switch in the "Low" position during the summer and in the "High" position during the winter. It is impossible to give more definite instructions on the use of the switch owing to the varying conditions under which vehicles are run. The driver should use the switch with discretion to ensure that the battery is kept in a healthy and charged state. The dynamo automatically gives its maximum output whenever the headlamps are switched on.



Taking Hydrometer Readings.

THE DYNAMO

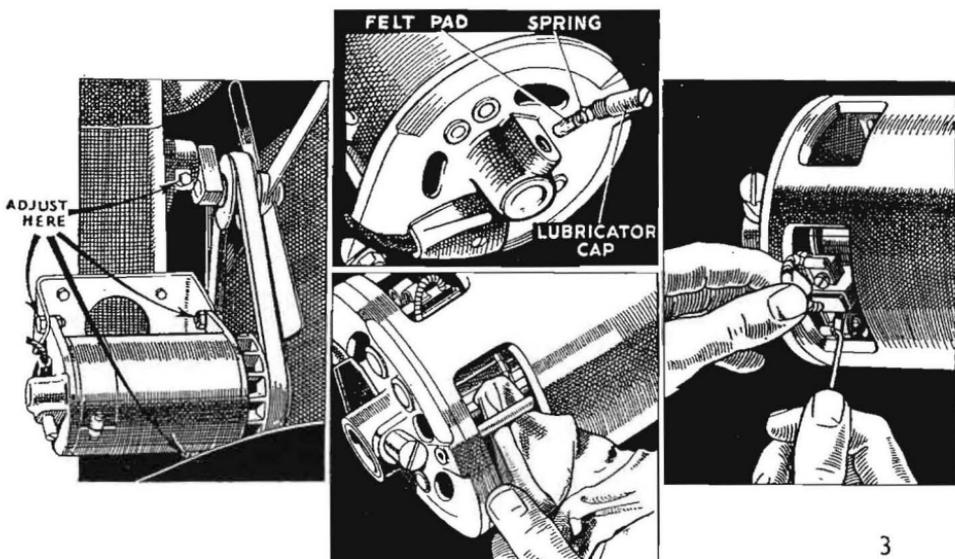
Many dynamos have a lubricator at the commutator end. Every 12,000 miles, unscrew the lubricator, lift out the felt pad and spring, and about half fill the lubricator with petroleum jelly. Replace the spring and felt pad and screw the lubricator in position.

Other dynamo bearings, not arranged for external lubrication, are supplied during manufacture with lubricant sufficient to last under normal conditions until the engine is taken down for a major overhaul. When this occurs, the dynamo should be taken to a Lucas Service Depot for cleaning, adjustment and replenishment of bearing lubricant.

About every 12,000 miles, or once a year, remove the cover band to inspect the brushes and commutator. Check that the brushes move freely in their holders by holding back the brush springs and pulling gently on the flexible connectors. If a brush is inclined to stick, remove it from its holder and clean its sides with a petrol moistened cloth. Be careful to replace brushes in their original positions in order to retain the "bedding." Brushes which have worn so that they will not bear correctly on the commutator must be replaced and properly bedded at a Lucas Agent or Service Depot.

The commutator should be clean, free from oil or dirt and should have a polished appearance. If it is dirty, clean it by pressing a fine dry duster against it while the engine is slowly turned over by hand. If the commutator is very dirty, moisten the cloth with petrol.

In the case of belt-driven dynamos, inspect the driving belt and see that it is not too slack. A loose belt may prevent the dynamo giving its full output. Adjust the belt tension by moving the dynamo in its mounting or by repositioning the cooling fan as illustrated (the actual method of adjustment will vary on different cars). The belt must not be over-tightened, and care must be taken to ensure that the dynamo is correctly aligned, otherwise undue strain may be thrown on the dynamo bearings.



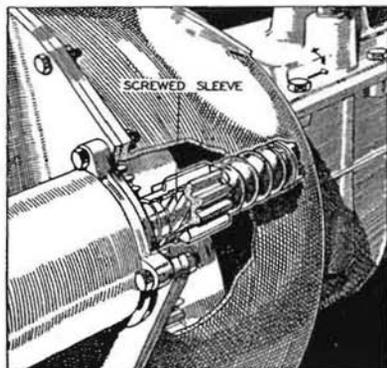
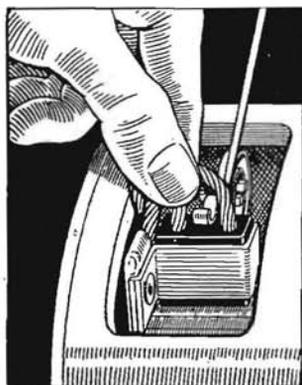
THE STARTER

To obtain the longest life from the starter and battery, the following points should be observed when starting :—

1. See that the controls are properly set—petrol turned on, ignition hand-control (when fitted) retarded, etc.
2. Operate the starter switch firmly and, of course, release it as soon as the engine fires.
3. Never operate the starter while the engine is still running. If the engine will not fire at once, allow it to come to rest before operating the switch again.
4. Do not run the battery down by keeping the starter on when the engine will not start.
5. In cold weather, depress the clutch pedal when starting, to relieve the starter of the considerable drag in the gearbox. (This does not apply on some cars, for example, those fitted with self-changing gearboxes).

About once a year remove the starter cover band in order to examine the brushes and commutator.

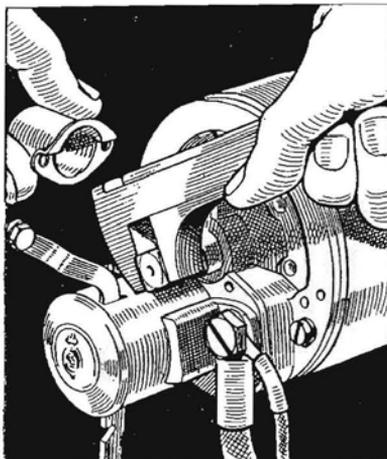
Check that the brushes move freely in their holders by holding back the brush springs and gently pulling the flexible connectors. If the movement is sluggish, remove the brush from its holder and clean its sides with a petrol moistened cloth. Replace brushes in their original positions in order to retain the correct "bedding." If the brushes are worn so that they do not bear properly on the commutator, they must be replaced by a Lucas Agent or Service Depot and correctly "bedded" to the commutator.



The commutator should be clean, oil and dirt-free and should have a polished appearance. If it is dirty, clean it by pressing a soft dry cloth against it while the starter is turned by hand. The square shaft extension at the commutator end can be used to rotate the starter. If the commutator is very dirty the cloth should be moistened with petrol.

If the starter drive is exposed, examine it to make sure that the pinion moves easily on the screwed sleeve. If necessary, wash the sleeve with paraffin.

Starters with extended shafts having square ends, as shown, can be rotated by means of a spanner in the remote possibility of the pinion becoming jammed in mesh with the flywheel for any reason. Access to the squared end is obtained by pulling off the metal cap which is usually secured by two screws.



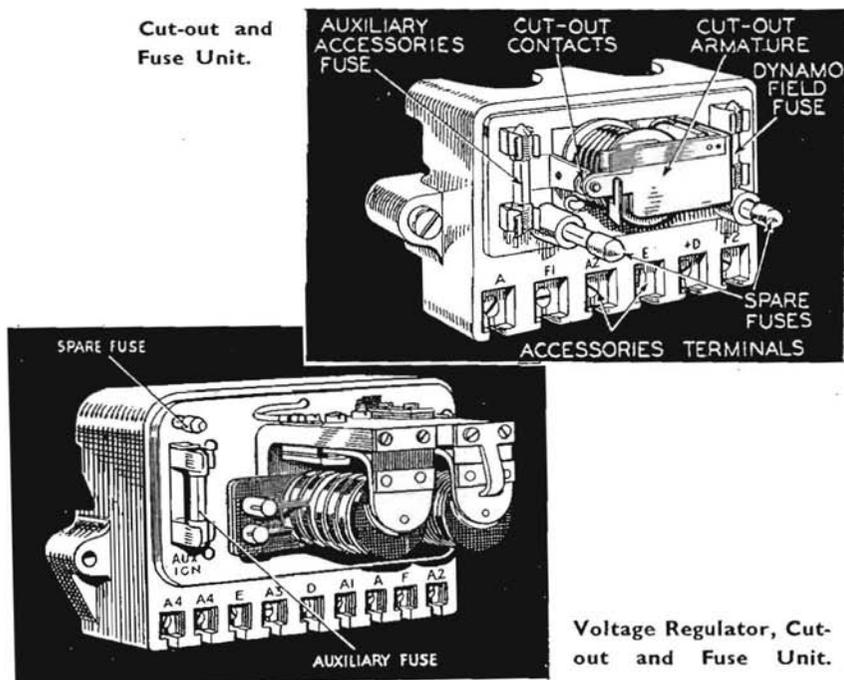
CONTROL BOX

The control box is usually mounted on the engine side of the dash and houses the cut-out, voltage regulator (when fitted) and fuses.

The fuse holders are clearly marked to show the circuits which the fuses protect and spare fuses are provided. When replacing a fuse it is important to use the correct replacement—the fusing value is marked on a coloured paper slip inside the tube.

A blown fuse will be indicated by the failure of all the units protected by it and is confirmed by examination of the fuse. If it has blown, the broken ends of the wire will be visible inside the glass tube. Before replacing a blown fuse, inspect the wiring of the units that have failed, for evidence of a short circuit or other fault which may have caused the fuse to blow and remedy the cause of the trouble. If it is not possible to locate the cause of the trouble and the new fuse blows immediately, the equipment should be examined by a Lucas Agent or Service Depot.

Cut-outs and regulator units are carefully and accurately set before leaving the Works and must not be tampered with.



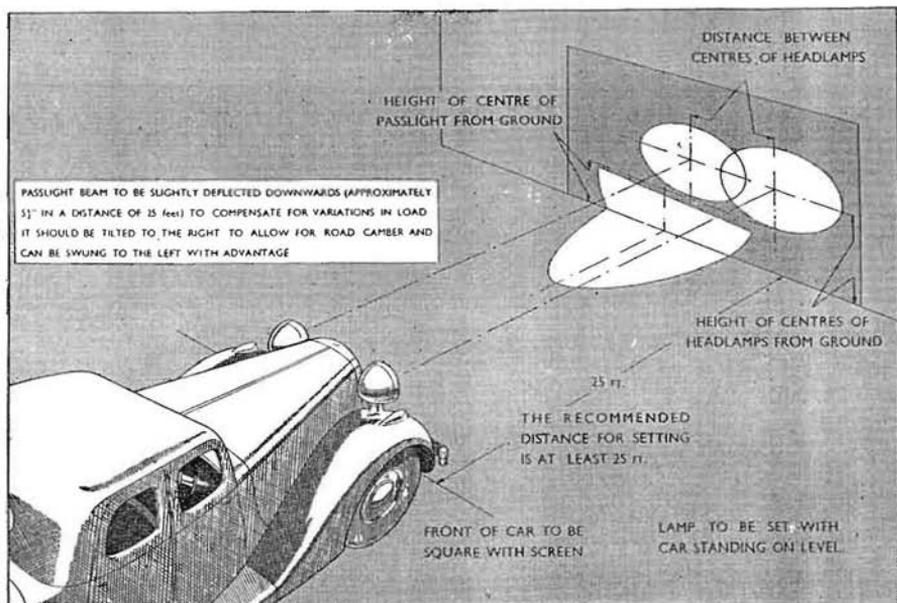
HEADLAMPS, PASSLIGHTS AND FOGLAMPS

SETTING

MINISTRY OF TRANSPORT LIGHTING REGULATIONS

The Lighting Regulations state that a lighting system must be arranged so that it can give a light which is "incapable of dazzling any person standing on the same horizontal plane as the vehicle at a greater distance than 25 feet from the lamp, whose eye-level is not less than 3ft. 6ins. above that plane."

To comply with the regulations the lamps must be set as shown. Check the setting by placing the car in front of a blank wall at the greatest possible distance, taking care of course, that the surface on which the car is standing is not sloping relative to the wall.



Headlamps.

The headlamps must be set so that the beams of light are parallel with the road and with each other. On lamps fitted with "Dip and Switch" reflectors or double filament bulbs, this will ensure that, when the dip switch is operated, the lamps will give a non-dazzling light.

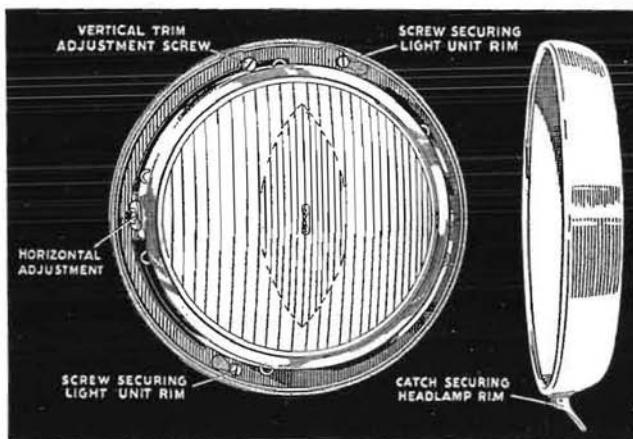
If adjustment is necessary, proceed as follows :—

Externally Mounted Lamps.

Slacken the single fixing nut on the fixing stem (usually at the base of the lamp) and move the lamp on its adjustable mounting to the required position. Finally, tighten the locking nut.

Flush Fitting Lamps (incorporating Lucas Light Unit).

Press down the catch at the bottom of the lamp front and lift off the front rim. Adjustment of the vertical setting can now be made by means of the vertical trim adjustment screw, which must be turned clockwise to raise the beam, or anti-clockwise to lower it.



Flush-Fitting Headlamp, with Front Rim Removed.

The adjustment of the horizontal setting is a factory operation, and further adjustment should be unnecessary. If, however, this setting should have become disturbed, slacken the horizontal adjustment nuts, move the Light Unit to the required position and tighten the nuts.

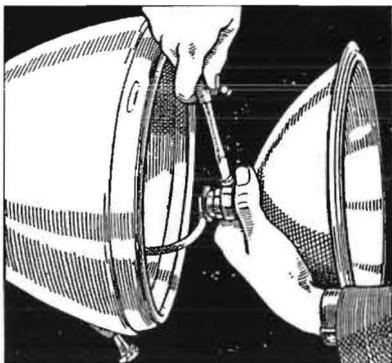
Foglamps and Passlights.

The lamp must be set so that the beam does not rise above the horizontal when the car is standing on level ground. To ensure this, dip the lamp very slightly to compensate for road inequalities or an extra heavy load in the rear of the car, and also tilt the lamp to the right to allow for road camber. In addition the lamp can be swung slightly to the left in order to give additional illumination on the nearside of the road. Adjustment of the setting is carried out in the same manner as that for the headlamps described above.

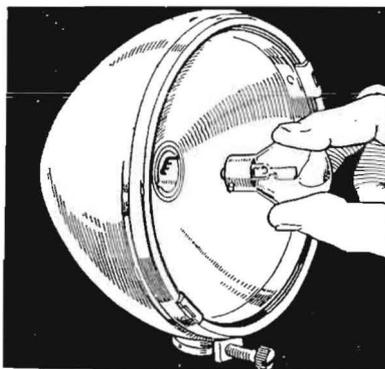
FOCUSSING.

In order that the lamps shall give the best results, the bulb filament must be as near as possible to the focal point of the reflector. If the bulb is out of focus, the lamps will have a poor range, and will cause dazzle to approaching traffic.

NOTE : The following information is not applicable to those lamps incorporating the Lucas Light Unit, in which a special prefocus cap bulb is employed to ensure that the filament is always at the focal point of the reflector.



**Sliding Bulb Holder Method
of Focussing.**



**Alternative Bulb Location
for Focussing.**

Before lamps leave the works, the bulbs are focussed to give the best results, and provided that Genuine Lucas Spare Bulbs are fitted as replacements, it should not be necessary to alter the setting. If, however, an ordinary bulb has to be fitted, it may be necessary to refocus by moving the bulb backwards or forwards until the best lighting is obtained.

When focussing foglamps, adjust the position of the bulb until any top light is removed, and until the semi-circular beam of light is of the greatest concentration, i.e., the area of the beam must be as small as possible.

When focussing headlamps, cover one lamp while testing the other. If the lamp does not give a uniform long range beam, without any dark centre, the bulb needs adjusting. To do this, remove the lamp front and reflector, slacken the clamping clip at the back of the reflector, and slide the bulb holder backwards or forwards. After each adjustment, note the effect with reflector and front refitted.

When the best position for the bulb holder has been found, the clamping screw must be tightened.

With some types of lamps, alternative positions are provided for the bulb in its holder. Try each position for the best results.

The beam projected by the type FT.37 passlights can be varied in regard to the amount of spread or penetration best suited for driving in different densities of fog by a focussing knob which is instantly accessible when the cap is removed from the back of the lamp, by turning it to the right. The focussing knob is provided with a "click" action and will not slip after once being set.

Dipping Reflectors.

Many headlamps are fitted with the electrically operated dip and switch scheme in which the nearside reflector is arranged to dip to the left, while at the same time the offside lamp is switched off.

The dipping mechanism calls for no attention whatever—there is nothing to adjust and no lubrication is required.

Changing over Dipping Reflectors for the Right-hand Rule of the Road.

In countries where the rule of the road is right-hand (instead of left-hand as in the U.K.) the dipping reflector in the majority of lamps can be arranged to dip vertically. This is usually done by removing the reflector securing screw from the top of the rim, and then turning the reflector in a clockwise direction until the reflector fixing screw locates in the alternative hole in the lamp body.

On lamps in which the reflector is secured by a rubber bead, the reflector is arranged to dip vertically when the projection on the reflector rim is fitted in the right-hand location at the top of the rim.

If the car is to be used for any length of time in a country where the rule of the road is right-hand, it is advisable to interchange the headlamp reflectors. This involves slight modifications to the wiring which are best carried out at a Lucas Service Depot.

Cleaning Lamps.

Care must be taken when handling reflectors to prevent them from becoming finger marked. If they do become marked however, a transparent and colourless protective covering enables any finger marks to be removed by polishing with a chamois leather or a very soft dry cloth. **Do not use metal polish on reflectors.**

Metal polishes must not be used for cleaning chromium plated lamp bodies. They must be washed with plenty of water and when the dirt is completely removed, the lamp bodies must be polished with a chamois leather or a soft dry cloth. Black or coloured lamp bodies may be cleaned with a good car polish.

Replacement of Bulbs.

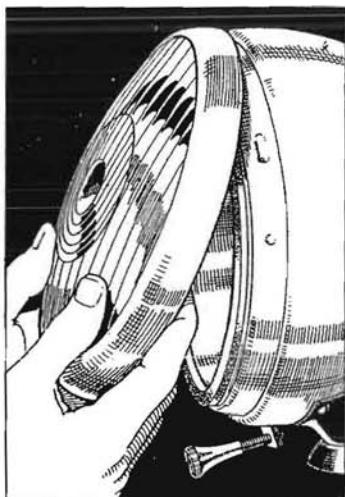
When replacing a bulb, it is important not only that the same size bulb is fitted, but also, that the bulb has a high efficiency and will focus in the reflector. Cheap and inferior bulbs often have the filament of such a shape that it is impossible to focus correctly. This will cause dazzle and will result in loss of range and light efficiency.

Lucas Genuine Spare Bulbs.

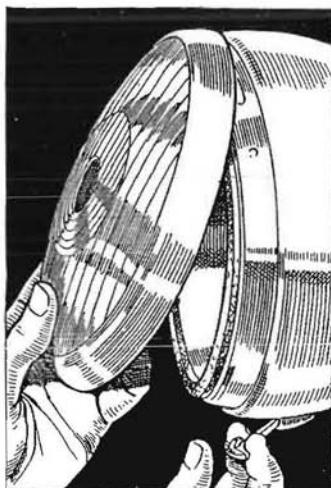
These bulbs are sold by any reputable garage, and are specially tested to ensure that the filament is in the correct position to give the best results with Lucas lamps. To assist in identification, Lucas bulbs are marked on the metal cap with a number. When fitting a replacement see that it is the same number as the original bulb.

It is advisable to replace bulbs after long service before they actually burn out, as often the filaments sag, making it impossible for them to be focussed properly.

REMOVING LAMP FRONTS AND REFLECTORS. HEADLAMPS.



Screw Fixing.



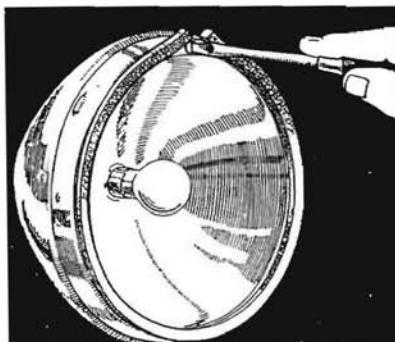
Catch Fixing.

Removing Lamp Front.

(a) Externally Mounted Lamps.

Slacken the single securing screw and move it downwards from the slot in which it fits, or, with other types, pull forward the fixing clip and swing it downwards. Remove the front from the bottom of the lamp first.

When replacing, locate the top of the rim first, then press on at the bottom and secure by means of either the screw or the fixing clip.



Reflector located by screw in rim.

(b) Flush Fitting Lamps (with Light Unit).

The front rim can be removed when the fixing catch at the bottom of the lamp is pressed downwards.

To replace, engage the tongue on the inside of the front rim in the slot at the top of the flange of the Light Unit, press it on fully at the bottom and secure by swinging the catch at the bottom of the lamp into the locked position.

Removing Reflector.

The method of removing the reflector, or in some cases, the Light Unit comprising reflector and front glass, varies with the different types of lamps; the most common methods are described and illustrated here.

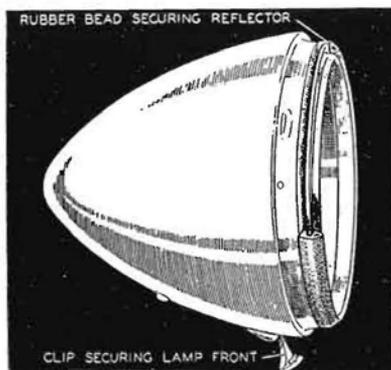
(a) "L" Type Lamps.

Turn back ends of cork washer as shown and remove screw opposite medallion in top of lamp. Turn reflector until markings "O" stamped on reflector rim and lamp body coincide; the reflector can then be withdrawn.

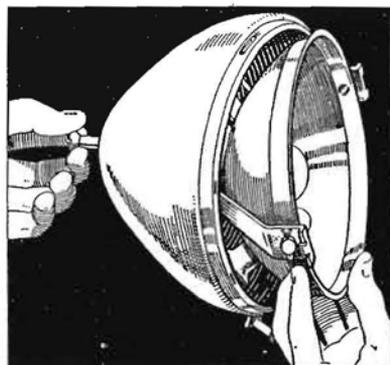
When replacing reflector, engage it with the lamp body, then turn it until the screw hole in rim is opposite to the left-hand screw hole on top of lamp body. Secure reflector by means of screw.

Some reflectors have two fixing screws under the cork washer at the top of the lamp. When these screws are removed, the reflector can be withdrawn.

To remove the dipping reflector on some lamps, withdraw the fixing screw at the back of the lamp body. This enables you to withdraw the reflector by dislocating the tongues of the two fixing brackets fixed to the reflector rim from the slots in the lamp body.



Reflector secured by rubber bead.



Dipping Reflector secured by screw at back of lamp.

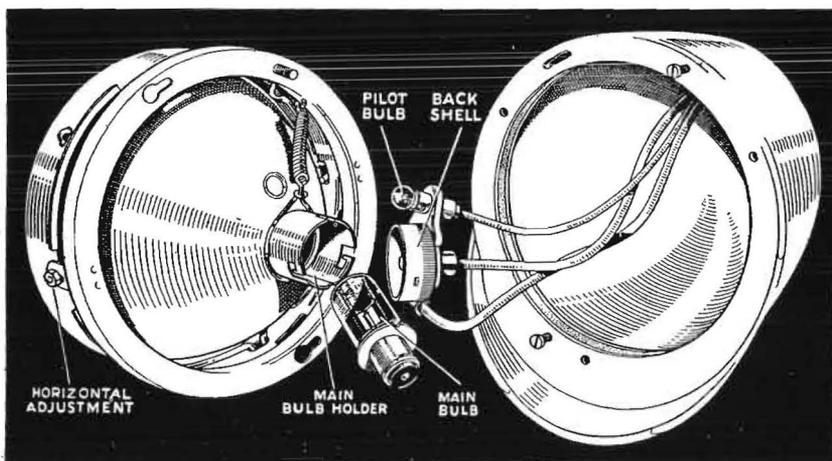
(b) "M" Type Lamps.

The reflector is secured to the lamp body by means of a rubber bead. The reflector can be withdrawn when the rubber bead is removed. When replacing the reflector the projection on the rim must fit into the left-hand location at the top of the lamp body. When refitting the rubber bead, locate its thinner lip between the reflector rim and the edge of the lamp body.

(a) Flush Fitting Lamps (with Light Unit).

Slacken the two screws which secure the flange of the Light Unit and turn it in an anti-clockwise direction to detach the flange from the securing screws, when the Light Unit can be lifted out of the lamp body.

It will be noted that, with this type of lamp, it is necessary to remove the Light Unit for bulb replacement, since the bulb is inserted into the Light Unit from the rear of the reflector.



Flush-Fitting Headlamp with Light Unit removed.

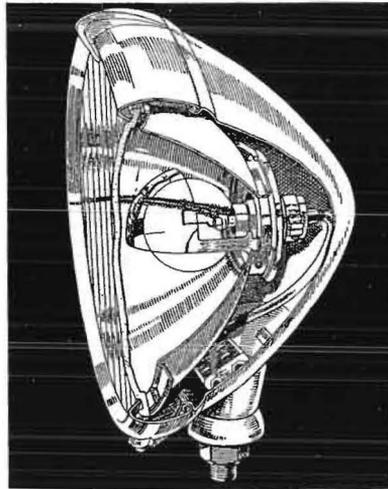
To replace a bulb, twist the back shell in an anti-clockwise direction and pull it off. The bulb can then be removed by inverting the Light Unit and holding one hand under the bulb holder so that the bulb slides into the hand.

Place the replacement bulb in the holder, taking care to locate it correctly. Engage the projections on the inside of the back shell with the slots in the holder, press on and secure by twisting it to the right.

When a pilot bulb is incorporated in the lamp, make sure that, when the back shell is refitted, the pilot bulb is in a position immediately behind the translucent window in the reflector.

Position the Light Unit in the lamp body so that the vertical trim adjusting screw locates in the slot in the body rim, and the heads of the two fixing bolts protrude through the holes in the flange of the Light Unit. Twist the Light Unit in a clockwise direction and secure by tightening the two screws.

FOGLAMPS, PASSLIGHTS & ANTI-DAZZLE CENTRE LAMPS

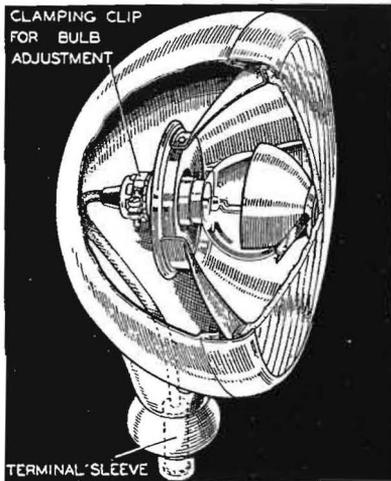


Type FT67.

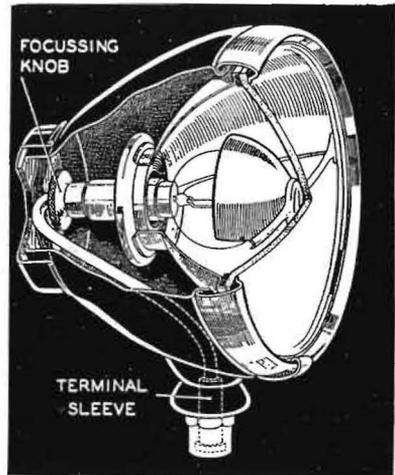
Types FT67.

Pull out the spring clip at the bottom of the lamp and swing it out of its location. Remove the front and reflector from the bottom of the lamp first. The bulb holder can then be pulled away from the back of the reflector.

When replacing the front and reflector, locate the top of the rim first, then secure by means of the spring clip.



Type FT57.



Type FT37.

Types FT57.

Pull out the spring clip at the bottom of the lamp and swing it out of its location, the front and reflector can then be lifted off. The bulb holder can be pulled out from the back of the reflector. When replacing the front and reflector, locate the top of the rim first, and then press front on to the lamp body and secure by means of the clip.

Types FT37.

Press back the spring clip at the bottom of the lamp and then lift off the front and reflector. When replacing, locate the top of the rim first and then press the front on to the lamp body and secure by means of the clip.

The bulb holder can be removed from the back of the reflector by turning to the left and withdrawing.

With some types, the lamp front can be removed when the spring clip is pressed back. The reflector is withdrawn by detaching it from its three supports when they are pressed slightly upwards.

When replacing the lamp front, locate top of rim first, and then press front on to the body, and secure by means of the clip.

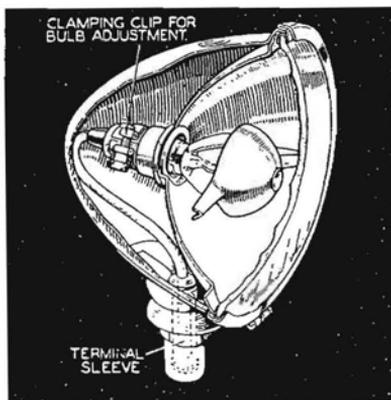
To replace the bulb, detach the bulb shield which is located in two slots in the rim of the reflector. The shield must be pulled out without undue force, by grasping the arms as near to the ends as possible, and when replacing care must be taken to ensure that the open part is at the bottom. The small metal shield located on one peg of the bulb must be replaced so that it is at the top of the bulb.

Types FT27.

Withdraw the screw from the fixing band which can be sprung off the lamp. The lamp glass and rubber can now be removed and the reflector withdrawn. When replacing, be certain that the shield and rubber band are carefully refitted.

Flush Fitting Types, with Light Unit.

These lamps are of similar construction to the flush fitting headlamps previously described.



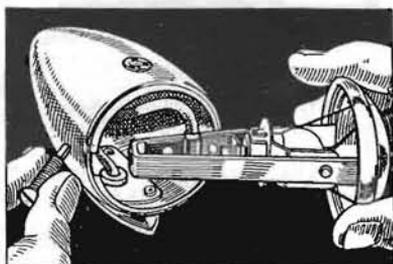
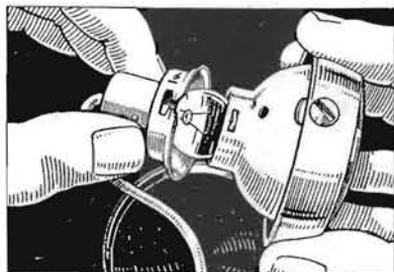
Type FT27.

SIDE LAMPS

The majority of side lamps are arranged so that they can be aligned in a manner similar to that described for the headlamps. In addition, with some side lamps, provision is made for focussing. The focussing arrangement consists of alternative positions for the bulb in its holder; try each position for the best results.

To Replace Side Lamp Bulbs.

The method of replacing the bulb varies with different types of lamps. The various methods are described below.

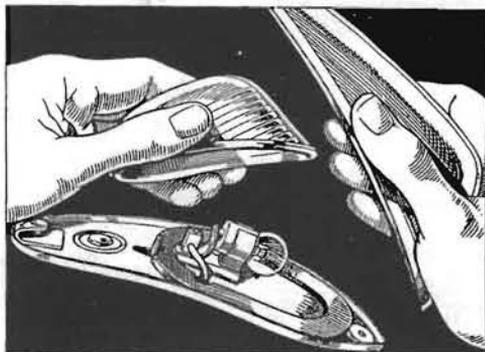


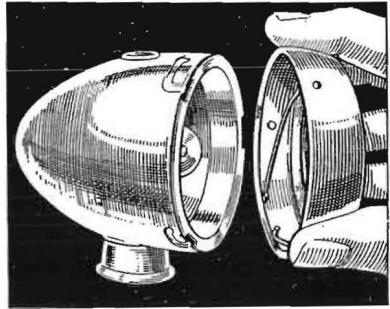
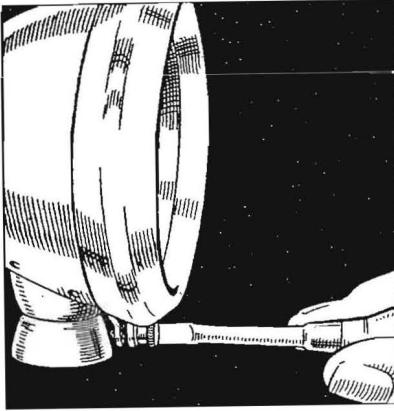
(1) Slacken the screw at the top of the lamp, and the front together with reflector can be withdrawn. The bulb holder is clipped on the back of the reflector, and should be withdrawn by twisting to the left and pulling off. When replacing the bulb holder, position it so that the slots in its rim will engage with the springs in the back of the reflector on pressing it home.

When refitting the front, locate the bottom first and secure with screw.

(2) To remove the rim, withdraw the fixing screw at the back of the lamp shell.

(3) Withdraw the two securing screws and lift the lamp body and glass from the base. When replacing, ensure that the rubber washer is in position so that glass will fit on it.



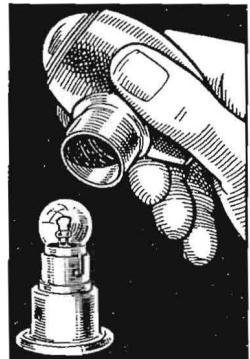
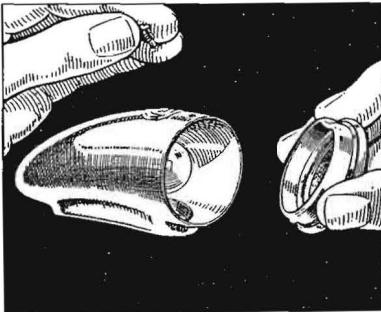


(4) Slacken the screw at the bottom of the lamp and withdraw the front and reflector. Pull the bulb holder from the back of the reflector.

When replacing the front, locate the top of the rim first, then press on at the bottom and tighten the fixing screw.

(5) Remove the fixing screw at the top of the lamp and withdraw the front. The bulb is then accessible in the lamp body.

When refitting the front, locate the bottom first and secure with the screw.



(6) Press in the lamp front and turn it to the left as far as it will go to detach it from its bayonet fixing. The bulb is then accessible. When replacing the front, press it on to the body and turn it until the mark on the rim is at the top of the lamp.

(7) Withdraw the securing screw on the lamp stem and then pull the body away from the base. The bulb can then be removed from its holder.

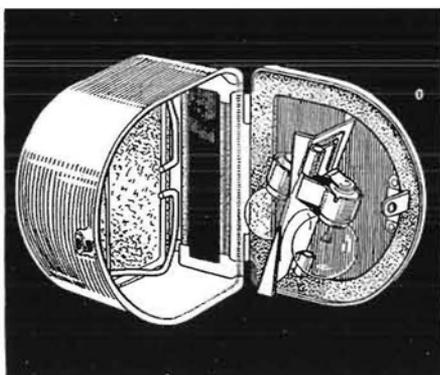
Replace the lamp body and secure with the screw.

REAR LAMPS

The method of removing the fronts for bulb replacement varies with different types of lamps.

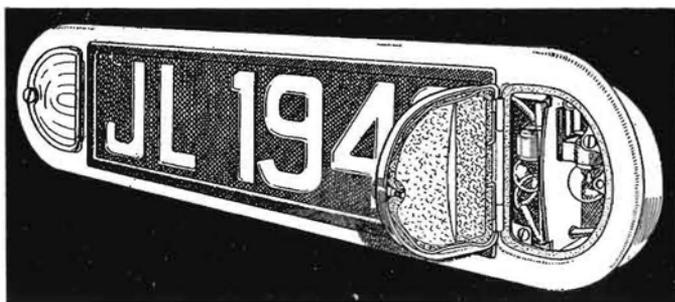
The various methods are described below :—

- (a) The front is removed by turning to the left and withdrawing from its base. When replacing front, see that the studs in the base locate with the slots in the lamp front and then push it home to lock the front in position.
- (b) The front is secured by a single securing screw or fixing clip.



Typical Rear Lamp.

- (c) When the stop tail and reverse lamps are incorporated in the body of the car it will be necessary, in order to gain access to the bulbs, to remove the back plate either by removing the two fixing screws or by turning the cam in the centre of the plate.



Number Plate Box.

PANEL, DASH AND WARNING LIGHTS.

Panel lights are usually accessible from the back of the instrument panel. With some types, the bulb holders can be released from the back of the panel for bulb replacements by pulling them out or turning to the left (as viewed from the back of the panel). With other types, the bulb holders are mounted on hinged brackets which move upwards, leaving the bulb accessible.

The covers of dashlamps can easily be withdrawn from the lamp body for a bulb replacement.

To remove the warning lamp bulb in some panels, unscrew the front carrying the red glass. When the front is not detachable, release the bulb holder from the back of the panel by pulling out or by turning to the left.

WINDSCREEN WIPERS

The windscreen wiper requires practically no attention ; all moving parts are packed with grease during assembly, and no adjustment is required.

If the rubber squeegees become worn or perished, they can easily be replaced at very small cost.

Model C.W.

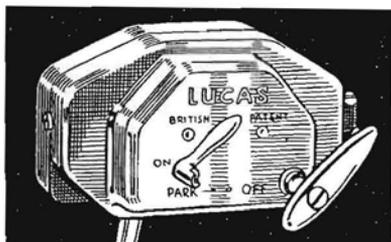
To start, pull out the handle and turn to disengage it from the switch. Then move the switch to " ON " position. To stop, move the switch to " OFF " position, pull out the handle and turn the end of the handle into the top of the switch control.

With dual-arm types, occasionally give the pivots on the coupling bar a drop of oil. Do not add more, otherwise oil may get on to the blades. About once a year, the second arm should be removed from its shaft, the spindle withdrawn and smeared with grease.

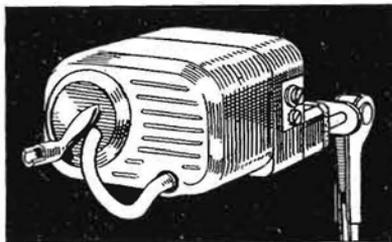
Model DW3 (with Hand Control) and DW4 (without Hand Control).

Most models have a hand control—a curved metal handle which also locks the switch. To start, pull out and swing aside the curved handle. Then move the switch clockwise. To stop, move the switch anti-clockwise, pull out the curved handle and insert the end of the handle in the top of the switch.

Models without hand control are started simply by moving the switch.



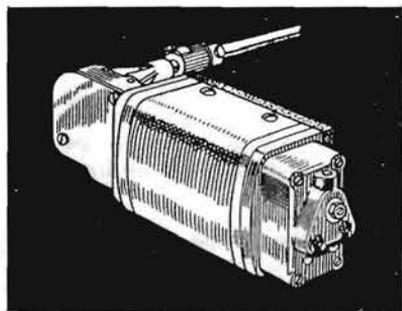
CW Model



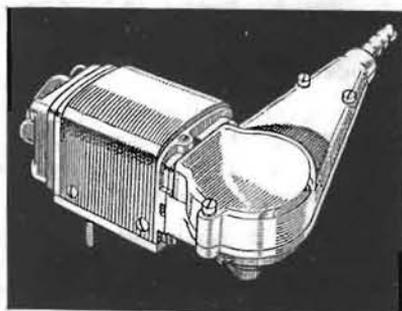
DW Model

WINDSCREEN WIPERS WITH UNDER-BONNET MOTOR.

There are two models of this type of windscreen wiper, SW and CR. They can best be identified by the motors, mounted on the engine bulkhead.



SW Model



CR Model

Models SW3 and SW4.

The switch is combined with the knob on the driver's side. To start some types pull out the knob and rotate it for a few degrees to release it from the parking platform. Release the knob and then turn it until the drive engages, when the arm will automatically operate.

Engage the drive to the arm on the passenger's side in a similar manner.

To switch off, pull out the knob on the driver's side and with it still pulled out, turn the knob until the arm lies on the scuttle.

To start other types, push in the knob and turn it to disengage from parking stop. Release the knob and then rotate it until the driving dogs engage.

To switch off, push in the knob and turn it until the arm lies on the scuttle.

Models CR.

There are several arrangements of this model.

- (a) Model CR1, incorporating a single large control knob, usually mounted centrally on the dash.

To start the wiper, the control knob must be rotated until the drive engages. To switch off, the control knob is pushed in and turned until the arms lie on the scuttle. To bring the wiper arms on to the screen, the control knob is rotated in the opposite direction to the movement of the arms. For instance, if the arms are parked so that anti-clockwise movement is necessary to bring them on to the screen, the control knob must be turned clockwise.

- (b) Model CR2, having separate control knobs on each wiper arm spindle, the switch being incorporated with the knob on the driver's side.

To start the wiper, push in the knob on the driver's side and turn it to disengage it from the parking platform. Release the knob and then rotate it until the drive engages. Engage the drive to the arm on the passenger's side in a similar manner. To switch off, push in the knob and turn it until the arm lies on the scuttle.

- (c) Model CR3, with separate switch and knob for hand wiping on driver's side only.

To start the wiper it is only necessary to move the switch to the "ON" position. Parking of the arms is effected by switching off at the end of the stroke.

- (d) Models CR4 and CR5, having a separate switch, and no provision of knobs on individual wiper arm spindles.

The wiper is operated in the same manner as described for Model CR3.

ELECTRIC HORNS

If a horn becomes uncertain in its action, giving only a choking sound, or does not vibrate, it does not necessarily mean that the horn has broken down. First determine that the trouble is not due to a blown fuse, discharged battery, loose connection or short circuit in the wiring of the horn. The note of a horn may also be affected by it becoming loose on its mounting or to some part adjacent to the horn becoming loose.

ALTO AND ALTETTE TYPES.

These horns are adjusted to give the best performance before leaving the Works and no subsequent adjustment is required.

MELLOTONE AND POSTHORN TYPES.

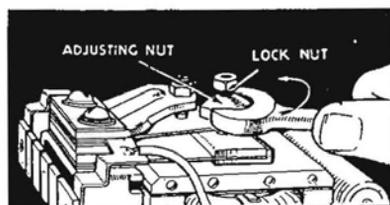
Adjustment should not be necessary until the horns have been in service for a long period.

Adjustment does not alter the pitch of the note, it merely takes up wear of moving parts. When adjusting the horns, short circuit the fuse, otherwise it is liable to blow. Again, if the horns do not sound on adjustment, release the push instantly.

When making adjustments to a horn, always disconnect the supply lead of the other horn, taking care that the end of the lead cannot contact any part of the chassis and so cause a short circuit.

Adjustment—Mellotone Type.

Take out the screw from the top of the horn, lift off the cover and detach the cover securing bracket by springing it from its fixing.



Adjustment must be made by the centre nut only.

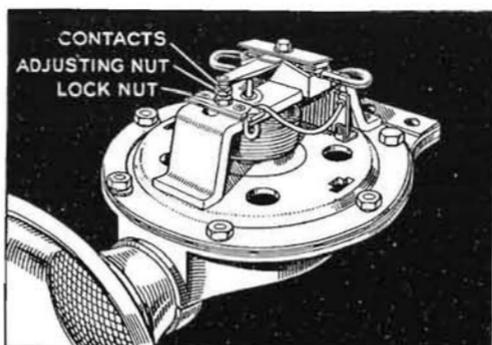
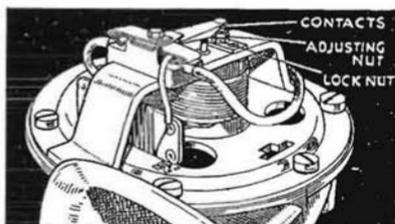
Slacken the locknut and turn the adjustment nut underneath, a few degrees at a time in an anti-clockwise direction. The adjustment is very sensitive. Tighten the locknut before testing the horns.

Adjustment—Posthorn Types.

Remove the fixing screw from the top of the horn and take off the cover. Detach the cover securing bracket by springing it out of its locations.

Some horns are provided with an adjustment screw which must be turned, one notch at a time usually in an anti-clockwise direction.

With other types, slacken the locknut on the fixed contact and rotate the adjusting nut until the contacts are just separated (indicated by the horn failing to sound). Turn the adjusting nut half a turn in the opposite direction and secure it in this position by tightening the locknut.



IMPORTANT.

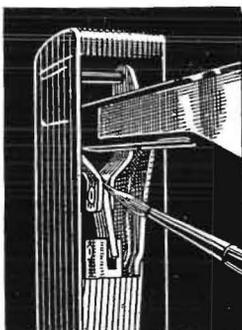
If after adopting the given procedure, the horn fails to operate or the note is unsatisfactory, do not attempt to dismantle the horn, but return it to a Lucas Service Depot for examination.

TRAFFICATORS

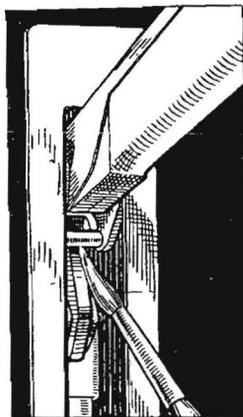
About every 6,000 miles, raise each arm and by means of a brush or other suitable article apply, as illustrated, a drop of thin machine oil, such as sewing machine or typewriter oil. Use only the merest trace of oil, as any excess may affect the operating mechanism. If any difficulty is experienced in raising the arms by hand, switch the Trafficator on and then supporting the arm in a horizontal position, move the switch to the "off" position.



(a)



(b)

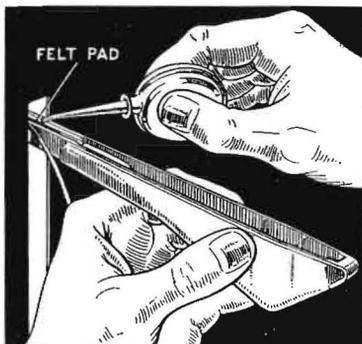


(c)

(a) With this model, apply a drop of thin machine oil to the brass knob or profile and to the small copper tongue spring and copper catch pin.

(b) With this model, apply a drop of thin machine oil to the two hinged joints between the arm and the operating mechanism.

(c) With this model, apply a drop of thin machine oil to the catch pin between the arm and the operating mechanism.



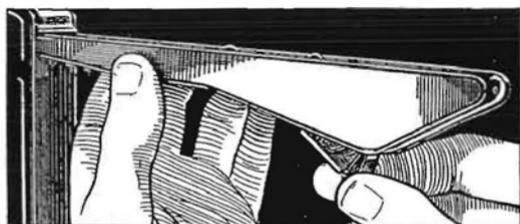
(d)

(d) More recent flush fitting designs have also a lubricating pad at the top of the arm to which a drop of thin machine oil should be applied at the same time as (c) is carried out. The pad is accessible when the arm cover is withdrawn as described below.

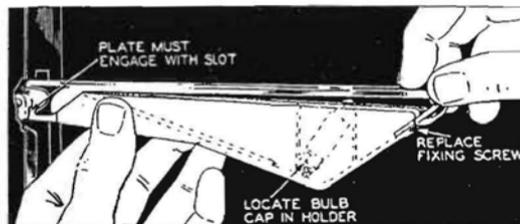
When replacing a Trafficator bulb, fit one of the same size and wattage as used originally. The methods of replacement are given below. Switch off the Trafficators before commencing to replace a bulb.

Externally Mounted "Trafficator." Withdraw the bulb holder which is clipped into the underside of the arm by means of the metal tongue provided. See illustration below.

Flush Body Fitting Model. Withdraw the screw on the underside of the arm and slide off the metal plate; the burnt-out bulb can then be replaced. To replace the metal plate slide it on in an upwards direction so that the side plates engage with the slots on the underside of the spindle bearing. Finally, secure the plate by means of its fixing screw. See illustration below.



Externally Mounted Trafficator.



Flush Body Fitting Model.

COIL IGNITION

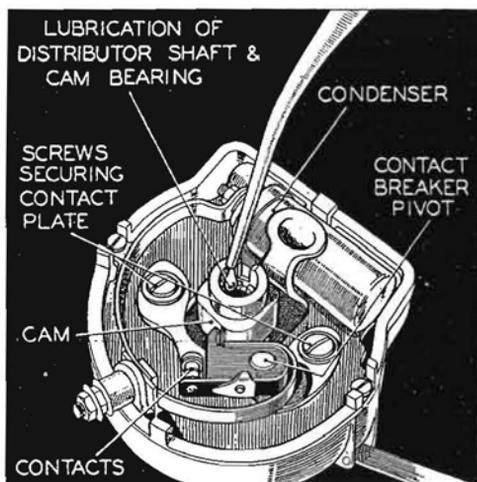
The ignition equipment will give satisfactory operation for long periods of service without any need for adjustment. The only attention necessary is lubrication, cleaning and checking of the contact gap, which should be carried out every 3,000 miles.

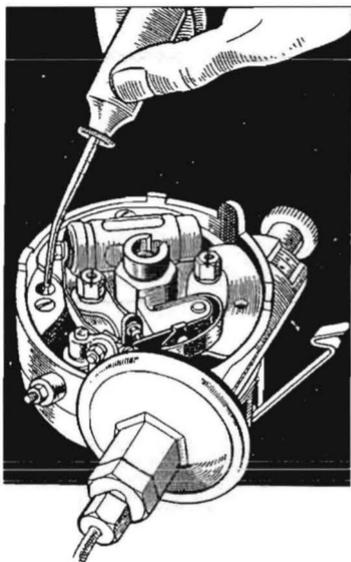
LUBRICATION.

1. **Distributor shaft.** Some distributors are provided with an oiler on the shank, through which a few drops of thin machine oil should be added.
2. **Cam.** Lightly smear the cam with a very small amount of Mobil grease No. 2, or if this is not available, clean engine oil may be used. Some distributors have felt cam lubricators to which the oil should be applied.
3. **Cam bearing.** Lift the rotor arm off the top of the spindle by pulling it off vertically and add a few drops of thin machine oil to lubricate the cam bearing. Do not remove the screw which is exposed to view as there is a clearance between the screw and the inner face of the spindle through which the oil passes. On some distributors the screw is drilled to allow a passage for the oil to lubricate the shaft bearing.

Take care to fit the rotor correctly and to push it on to the shaft as far as it will go, otherwise there is a risk of tracking and burning the moulding.

4. **Contact breaker pivot.** Place a small amount of Mobilgrease No. 2 or clean engine oil on the pivot on which the contact breaker lever works. Do not allow oil or grease to get on the contacts.





5. **Automatic timing control.** Some distributors are provided with an oil well in the contact breaker base for lubrication of the timing control. It should be lubricated by adding a few drops of clean medium grade engine oil.

With other types, the control should be lubricated by adding a few drops of oil through the hole in the contact breaker base through which the cam passes. Do not allow any oil to get on to the contacts.

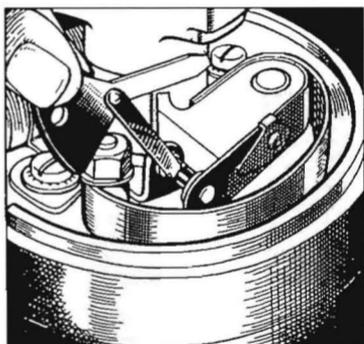
CLEANING.

Wipe the inside and outside of the distributor moulding with a soft dry cloth, paying particular attention to the space between the terminals. Clean the electrodes inside the moulding and also the electrode on the rotor arm with a petrol moistened cloth. See that the small carbon brush moves freely in its holder.

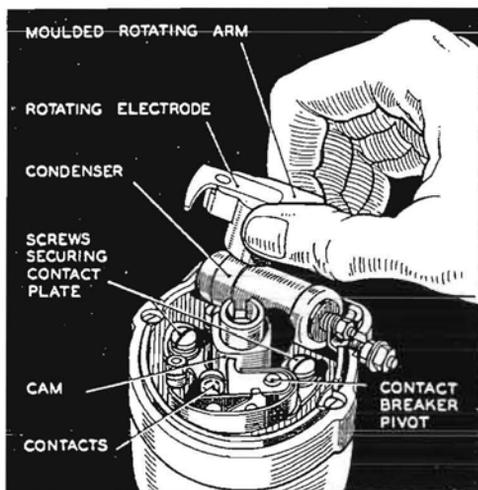
Examine the contact breaker. The contacts must be free from grease or oil. If they are burned or blackened, clean them with a fine carborundum stone or with very fine emery cloth. Afterwards wipe away any trace of dirt or metal dust with a petrol moistened cloth.

CHECKING AND ADJUSTING THE CONTACTS.

To check the setting, turn the engine by hand until the contacts are fully opened and insert the gauge (.010"—.012") provided between the contacts.



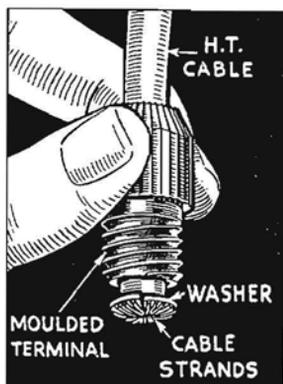
The gauge should be a sliding fit if the setting is correct. If the gap varies considerably from the gauge it must be adjusted. Keep the engine in the position to give maximum opening of the contacts and slacken the two screws or nuts securing the plate carrying the fixed contact. Move the plate until the gap is set to the thickness of the gauge and afterwards tighten the two screws or nuts.



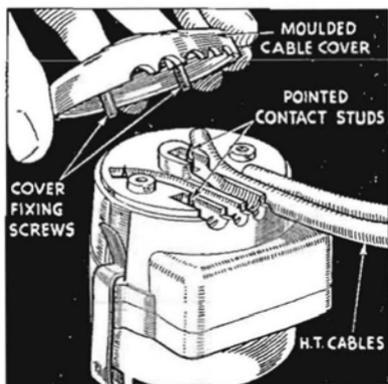
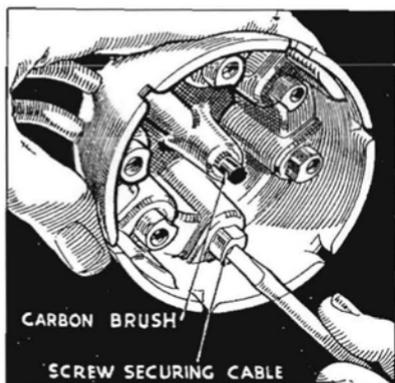
With double lever type distributors, both gaps must be maintained to the setting, otherwise the timing of one half of the cylinders will differ from the rest.

RENEWING HIGH TENSION CABLES.

The high tension cables are those connecting the coil to the distributor and the distributor to the sparking plugs. If these cables show signs of perishing or cracking they must be replaced with 7 mm. rubber covered ignition cable.



The methods of fitting high tension cable to the distributor and coil vary with different units. On coils and distributors in which the leads are taken from the unit vertically, the method of connecting the cable is to thread the knurled moulded nut over the lead, bare the end of the cable for about $\frac{1}{4}$ " , thread the wire through the brass washer provided, and bend back the strands. Finally screw the nut into its respective terminal.



With some distributors, the cables are secured by means of pointed fixing screws. To fit new cables, unscrew the pointed fixing screws on the inside of the moulding and push the cables, which should not be bared but cut off flush to the required length, well home into their respective terminals. The screw securing the centre cable is accessible when the carbon brush is removed.

Now tighten up the screws which will pierce the insulation and make contact with the cable core.

With other types of distributors with horizontal leads, the cables are held in position by a moulded cover which is secured by means of screws. The cables, which are cut off flush to the required length, are located in recesses in the distributor moulding and are pressed on to pointed terminal studs which pierce the insulation to make good contact with the cable core.

THE COIL.

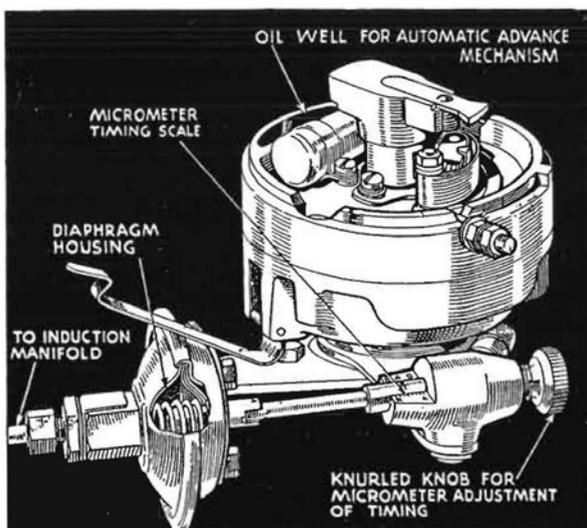
The coil requires no attention whatever beyond keeping its exterior clean, particularly between the terminals, and occasionally checking that the terminal connections are quite tight.

DISTRIBUTORS WITH MICROMETER TIMING ADJUSTMENT.

In order to obtain very fine timing of the ignition to the engine and to allow for altered engine conditions, e.g., state of carbonisation of engine, change of fuel, etc., a micrometer adjustment is provided on some distributors which allows fine adjustment to be made simply by the movement of a knurled knob.

With a clean engine, and using first grade fuel, the micrometer scale should be set at 0.

If the firing is found to be slightly too early or too late, adjust the knurled knob until the best engine performance is obtained. The adjustment should not be altered by more than half a division on the scale at a time.



LOCATION AND REMEDY OF FAULTS

Although every precaution is taken to eliminate all possible causes of trouble, failure may occasionally develop through lack of attention to the equipment or damage to the wiring. The most probable faults are tabulated, according to the symptoms displayed, in the fault-finding tables on the following pages.

It is recommended that a systematic examination is made by following the suggestions in the fault-finding tables, as the sources of many troubles are by no means obvious. In some cases, a considerable amount of deduction from the symptoms is needed before the cause of the trouble is disclosed.

For instance, the engine might not respond to the starter switch; a hasty inference would be that the starter motor is at fault. However, as the motor is dependent on the battery, it may be that the battery is exhausted. This, in turn, may be due to the dynamo failing to charge, and the final cause of the trouble may be, perhaps, a loose terminal nut either at the battery or elsewhere in the charging circuit.

If, after carrying out the examination, the cause of the trouble is not found, get into touch with the nearest Lucas Service Depot or Agent.

HOW TO LOCATE AND REMEDY COIL IGNITION TROUBLE

SYMPTOMS	POSSIBLE CAUSES	REMEDY
Engine will not fire.	Battery discharged. Starter will not turn engine and lamps do not give good light.	Start engine by hand. Battery should be recharged by running car for a long period during daytime. Alternatively, recharge from an independent electrical supply.
	Controls not set correctly for starting.	See that ignition is switched on, petrol turned on, and everything is in order for starting.
	Test if coil sparks by removing lead from centre distributor terminal and holding it about $\frac{1}{4}$ -in. away from some metal part of the chassis while engine is turned over. If sparks jump gap regularly, the coil and distributor are functioning correctly.	Examine the sparking plugs, and if these are clean and the gaps correct, the trouble is due to carburetter, petrol supply, etc.
	If the coil does not spark, the trouble may be due to any of the following causes :—	
	Fault in low tension wiring. Indicated by (1) No ammeter reading when engine is slowly turned and ignition switch is on ; or (2) No spark occurs between the contacts when quickly separated by the fingers when the ignition switch is on.	Examine all cables in ignition circuit and see that all connections are tight. See that battery terminals are secure.
	Dirty or pitted contacts.	Clean contacts with fine carborundum stone or fine emery cloth and afterwards with a cloth moistened with petrol.
Engine misfires.	Contact breaker out of adjustment. Turn engine until contacts are fully opened and test gap with gauge.	Adjust gap to gauge.
	Dirty or pitted contacts.	Clean contacts with fine carborundum stone or fine emery cloth and afterwards with a cloth moistened with petrol.
	Remove each sparking plug in turn, rest it on the cylinder head, and observe whether a spark occurs at the points when the engine is turned. Irregular sparking may be due to dirty plugs or defective high tension cables. If sparking is regular at all plugs, the trouble is probably due to engine defects.	Clean plugs and adjust the gaps to correct setting. Replace any lead if the insulation shows signs of deterioration or cracking. Examine carburetter, petrol supply, etc.

HOW TO LOCATE AND REMEDY LIGHTING TROUBLE

SYMPTOMS	POSSIBLE CAUSES	REMEDY
Lamps give insufficient illumination.	Battery discharged.	Charge battery either by a long period of daytime running or from independent electrical supply.
	Lamps out of alignment or bulbs out of focus.	Align lamps and focus bulbs. (See pages 7-9).
	Bulbs discoloured through use, or reflectors dirty.	Fit new bulbs or clean reflectors. (See pages 10-11).
Lamps light when switched on but gradually fade out.	Battery discharged.	As above.
Brilliance varies with speed of car.	Battery discharged.	As above.
	Battery connections loose or broken.	Tighten connections or replace faulty cables.
Lights flicker.	Loose connection.	Locate loose connections and tighten.
Failure of lights.	Faulty cable or connection, causing fuse to blow (when fitted).	Examine wiring for faulty cables or connections and remedy. Fit replacement fuse.
	Battery discharged.	As above.
	Loose or broken connection.	Locate and tighten loose connection, or remake broken connection.

HOW TO LOCATE AND REMEDY TROUBLE WITH VOLTAGE CONTROL DYNAMO EQUIPMENT

SYMPTOMS	POSSIBLE CAUSES	REMEDY
Battery in low state of charge, shown by lack of power when starting. (Hydrometer readings less than 1.200)	Dynamo not charging indicated by ammeter not showing charge reading when running at about 20 m.p.h. with no lights in use. Due to :—	
	Broken or loose connection in dynamo circuit, or regulator not functioning correctly.	Examine charging and field circuit wiring. Tighten loose connection or replace broken lead. Particularly examine battery connections. Return regulator to Lucas Service Depot or Agent for attention.
	Commutator greasy or dirty.	Clean with soft rag moistened in petrol.
	Dynamo giving low or intermittent output indicated by ammeter giving low or intermittent reading when car is running steadily in top gear. Due to :—	
	Loose or broken connections in dynamo circuit.	Examine charging and field circuits wiring. Tighten loose connections or replace broken lead. Particularly examine battery connections.
	Brushes greasy or dirty.	Clean with soft rag moistened with petrol.
	Brushes worn or not fitted correctly.	Have worn brushes replaced. See that brushes "bed" correctly.
	Regulator not functioning correctly.	Have equipment examined by a Lucas Service Depot or Agent.
Battery over-charged, shown by burnt-out bulbs and very frequent need for "topping-up" (Hydrometer readings high : see page 1)	Dynamo giving high output, indicated by ammeter giving high charge reading. Due to :—	
	Regulator not functioning correctly.	Return regulator to Lucas Service Depot or Agent for attention.

If, after following the above table, the trouble is not rectified, have the dynamo, regulator and battery examined by a Lucas Service Depot.

HOW TO LOCATE AND REMEDY DYNAMO TROUBLE THIRD BRUSH CONTROL DYNAMO EQUIPMENT

SYMPTOMS	POSSIBLE CAUSES	REMEDY
<p>Battery in low state of charge, shown by lack of power when starting. (Hydrometer readings less than 1.200)</p>	Dynamo not charging indicated by ammeter not showing charge reading when running at about 20 m.p.h. with no lights in use. Due to :—	
	Broken or loose connection in charging circuit, causing field fuse to blow. (When fitted.)	Examine charging circuit wiring. Tighten loose connections or replace broken lead. Particularly examine battery connections. Fit replacement fuse.
	Commutator greasy or dirty.	Clean with soft rag moistened in petrol. (See page 3.)
	Dynamo giving low or intermittent output, indicated by ammeter giving low or intermittent reading when car is running steadily in top gear. Due to :—	
	Loose or broken connections in dynamo circuit.	Examine charging circuit wiring. Tighten loose connections or replace broken lead. Particularly examine battery connections.
	Brushes greasy or dirty.	Clean. (See page 3.)
	Brushes worn or not fitted correctly.	Have worn brushes replaced. See that brushes "bed" correctly. (See page 3.)
	Control brush position altered.	Have control brush adjustment reset at nearest Lucas Service Depot or Agent.
<p>Battery being overcharged, shown by burnt-out bulbs and very frequent need for "topping-up." (Hydrometer readings high see page 1.)</p>	Dynamo giving high output, indicated by ammeter giving high charge reading. Due to :—	
	Loose connections in dynamo charging circuit.	Examine charging circuit wiring. Particularly battery connections. Tighten loose connections.
	Battery acid level low.	"Top-up" cells with distilled water. (See page 1.)
	Brushes not fitted correctly.	See that brushes "bed" correctly. (See page 3.)
	Control brush position altered.	Have control brush adjustment reset at nearest Lucas Service Depot or Agent.

HOW TO LOCATE AND REMEDY STARTER MOTOR TROUBLE

SYMPTOMS	POSSIBLE CAUSES	REMEDY
Starter motor lacks power or fails to turn engine.	Stiff engine, indicated by inability to turn by hand.	Locate and remedy cause of stiffness.
	If engine can be turned by hand, then trouble may be due to :—	
	Battery discharged.	Start by hand. Charge battery either by a long period of day-time running or from independent electrical supply.
	Broken or loose connection in starter circuit.	See that connections to battery, starter and starter switch are tight, and that cables connecting these units are not damaged.
	Starter commutator or brushes dirty.	Clean. (See pages 4-5.)
	Brushes worn or not fitted correctly.	Have worn brushes replaced. See that brushes "bed" correctly. (See page 4.)
Starter operates, but does not crank engine.	Starter pinion jammed in mesh with flywheel.	Rotate squared end of starter shaft with spanner. (See page 5.)
	Pinion of starter drive does not engage with flywheel, due to dirt on screwed sleeve. (This will not apply in the case of starters on which the drive is totally enclosed.)	Clean sleeve with paraffin. (See page 5.)
Starter pinion will not disengage from flywheel when engine is running.	Starter pinion jammed in mesh with flywheel.	Rotate squared end of starter shaft with spanner. (See page 5.)

LUCAS

SERVICE DEPOTS

BELFAST	51/55, Upper Library Street
Telephone: BELFAST 25617	Telegrams: "SERVDEF, BELFAST"
BIRMINGHAM, 18	Great Hampton Street
Telephone: CENTRAL 8401	Telegrams: "LUCAS, TELEX, BIRMINGHAM"
BRIGHTON, 4	85, Old Shoreham Road, Hove
Telephone: HOVE 1146	Telegrams: "LUSERV, BRIGHTON"
BRISTOL, 4	345, Bath Road
Telephone: BRISTOL 76001	Telegrams: "KINGLY, BRISTOL"
CARDIFF	54a Penarth Road
Telephone: CARDIFF 4603	Telegrams: "LUCAS, CARDIFF"
DUBLIN	Portland Street North, North Circular Road
Telephone: DUBLIN 76195	Telegrams: "LUSERV, DUBLIN"
EDINBURGH, 11	60, Stevenson Road, Gorgie
Telephone: EDINBURGH 62921	Telegrams: "LUSERV, EDINBURGH"
GLASGOW, C.3	4/24, Grant Street (St. George's Road)
Telephone: DOUGLAS 3075	Telegrams: "LUCAS, GLASGOW"
LEEDS, 8	64, Roseville Road
Telephone: LEEDS 28591	Telegrams: "LUSERDEF, LEEDS"
LIVERPOOL, 13	450/456, Edge Lane
Telephone: STONEYCROFT 4721	Telegrams: "LUSERV, LIVERPOOL"
LONDON	Dordrecht Road, Acton Vale, W.3
Phone: SHEPHERDS BUSH 3180	'Grams: "DYNAMAGNA, EALUX, LONDON"
LONDON	757/759, High Road, Leyton, E.10
Telephone: LEYTONSTONE 3361	Telegrams: "LUSERDEF, LEYSTONE, LONDON"
MANCHESTER	Talbot Road, Stretford
Telephone: LONGFORD 1101	Telegrams: "LUCAS, STRETTFORD"
NEWCASTLE-ON-TYNE, 2	64/68, St. Mary's Place
Telephone: NEWCASTLE 25571	'Grams: "MOTOLITE, NEWCASTLE-ON-TYNE"

IN ADDITION THERE ARE LUCAS OFFICIAL BATTERY SERVICE AGENTS
AND SPARES STOCKISTS IN IMPORTANT CENTRES THROUGHOUT
THE COUNTRY. LISTS ON APPLICATION.

HEAD AND PASS LAMPS WITH LUCAS LIGHT UNIT

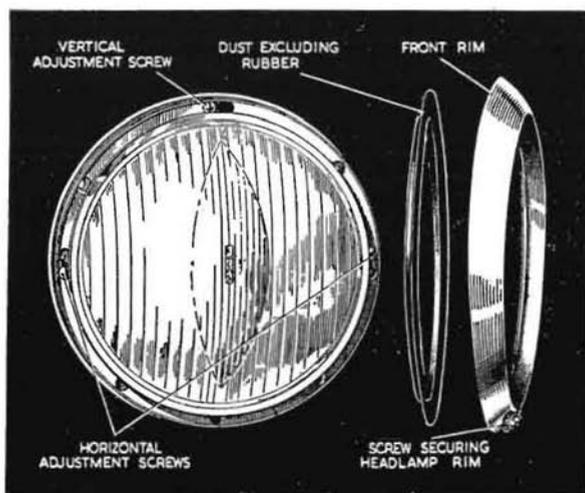
SUPPLEMENTARY INFORMATION.

FLUSH FITTING LAMPS.

Lamps similar to those described in Publication No. 675, but incorporating minor differences in design, are being fitted to some vehicles. Instructions for setting and bulb replacement are given below.

Setting.

If adjustment to the headlamps is necessary, proceed as follows:—
Unscrew the single securing screw at the bottom of the front rim and lift off the rim, which is split to facilitate removal. Now take off the dust excluding rubber.



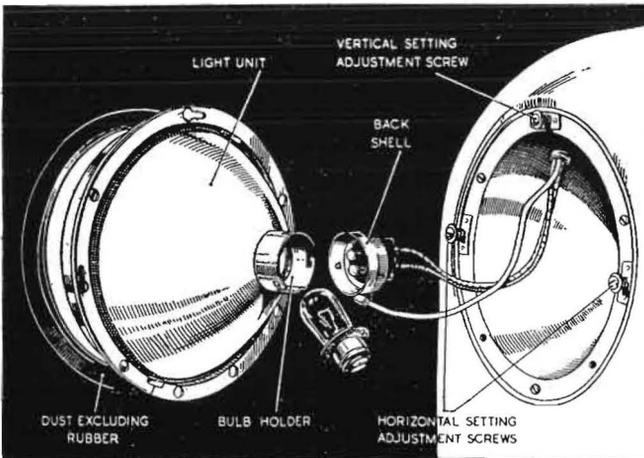
Flush Fitting Headlamp, Mark II, with Front Rim Removed.

If vertical adjustment is required, set the Light Unit to the correct position by means of the vertical adjustment screw at the top of the reflector unit. Turn the screw in a clockwise direction to raise

the beam and in an anticlockwise direction to lower it. If horizontal adjustment is required, set by means of the two adjustment screws (one on each side of the Light Unit).

Bulb Replacement.

Remove the front rim and dust excluding rubber as described previously. Now remove the Light Unit assembly by pressing it against the tension of the three springs on the horizontal and vertical adjustment screws and turn in an anticlockwise direction until the heads of the screws can be disengaged through the slotted holes in the flange of the Light Unit rim. To gain access to the bulb, remove the back shell by twisting it in an anticlockwise direction and pulling off. The bulb can now be withdrawn from the rear of the Light Unit.



Flush Fitting Headlamp, Mark II, with Light Unit Removed.

When replacing the Light Unit assembly, position it so that the heads of the adjusting screws protrude through the slotted holes in the flange. Press the Unit in and turn in a clockwise direction (do not disturb the setting of the adjustment screws). Replace the dust excluding rubber so that its thicker inner edge rests in the recess around the Light Unit rim.

Refit the front rim, locating the top of the rim first and securing by means of the screw.

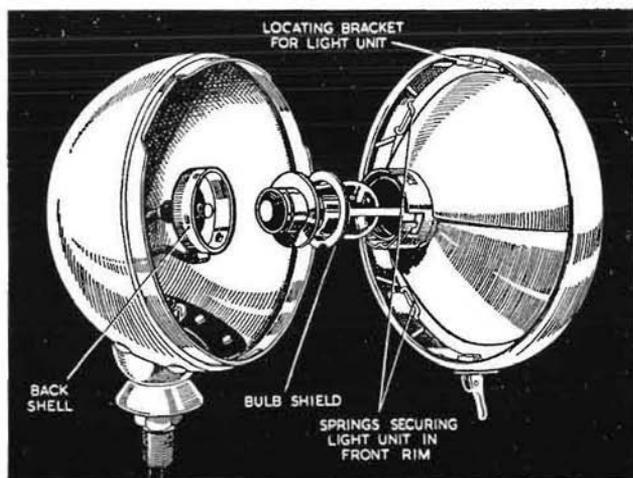
STEM-FITTING LAMPS.

Setting.

The setting of these lamps is as already described in Publication No. 675, that is, by slackening the single fixing nut and moving the lamp to the required position.

Bulb Replacement.

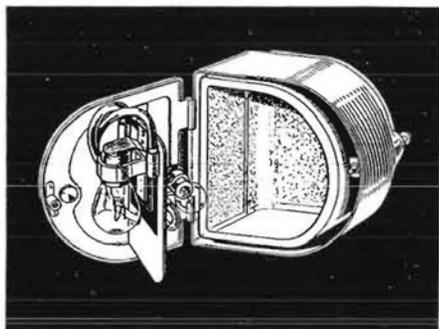
The rim and Light Unit assembly can be removed from the lamp body when the screw or clip at the bottom of the lamp front is undone or, in some cases, when the fixing screw on the top of the lamp body is slackened.



Stem Mounted Type Pass Lamp.

To fit a replacement bulb, remove the back shell from the Light Unit as described previously. It will be noticed in the case of pass lamps, that a bulb shield is provided to prevent the emission of direct light rays from the bulb.

STOP TAIL LAMP & REVERSE TAIL LAMP.



A new rear lamp is now being fitted to some cars. It differs in design to the types described in Publication No. 675.

The front can be swung open for bulb replacement when the securing screw is slackened.

CONTROL BOX.

A new model of control box (illustrated below) is now being fitted to the majority of cars.

It incorporates two auxiliary fuses, which are accessible without removing the cover protecting the cut-out and regulator unit. The internal connections and the number of terminals are the same as for the previous type of control box, but the terminal arrangement is different.

Another control box, similar in design is being fitted to some cars. This model does not incorporate fuses and consequently has only five terminals.

On both these models, the cover protecting the cut-out and regulator unit is sealed.

