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HEADLAMPS AND AUXILIARY DRIVING LAMPS

INCORPORATING THE LUCAS LIGHT UNIT

JOSEPH LUCAS LTD : BIRMINGHAM 19 : ENGLAND

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HEADLAMPS AND AUXILIARY DRIVING LAMPS

INCORPORATING THE LUCAS LIGHT UNIT

1. GENERAL

The majority of driving lamps incorporate a Lucas Light Unit consisting of a combined reflector and front lens assembly. The 'prefocus' bulb is seated in a sleeve attached to the rear of the reflector to ensure preset positioning of the filament(s) with respect to the focal point of the reflector.

Driving lamps are designed either for flush fitting into the vehicle wings or for external mounting by means of a hollow stem located at some point around the lamp periphery (usually at 6 o'clock). With certain auxiliary driving lamps (models WFT and WLR) the stem protrudes from the rear of the lamp body. In every case, provision is made for lamp adjustment.

(a) HEADLAMPS

Flush-fitting headlamps are classified according to lens diameter and these are, in order of numerical importance, 7″, 7¾″ and 5¾″.

The 7″ range (F700) has evolved as follows:—

MK. I	Front rim secured by spring catch. 'Diamond' pattern lens Light Unit mounted in seating rim secured to two trunnion arms by nuts or screws. Upper edge of seating rim secured by adjustment screw and held in tension by coil spring at rear of Light Unit.
MK. II	Split front rim secured by transverse screw. 'Diamond' or 'block' pattern lens Light Unit secured in split seating rim by clamping bracket at bottom of rim. Seating rim carried on three spring-loaded adjustment screws.
MK. III	Front rim as MK. II but fitted with 'block' pattern lens Light Unit clamped to seating rim by unit rim and secured by three self-tapping screws. Adjustment screws as MK. II.
MK. IV	Front rim as MK. II but seating rim specially designed to comply with S.A.E. aiming requirements and to accept Sealed Beam Light Unit, compulsory in certain North American States.
MK. V	Not produced.
MK. VI	Front rim secured by countersunk screw. (Later MK. VI lamps have clip-on front rims). Fitted with 'block' pattern lens Light Unit secured as MK. III.
MK. VII	As MK. IV but front rim secured by external screw and tag.
MK. VIII	As MK. IV but front rim secured by recessed screw.

MK. III and MK. VI lamps can be fitted with P700 Light Units containing a triflex-supported bulb shield and either 42-watt or 60-watt bulbs. Other special forms of MK. VI lamps include the R700 and J700. The R700 is a 60-watt unit for Rolls Royce and Bentley cars, and is identified by its flat 'block' pattern lens, biflex-supported bulb shield and 'RR' or 'B' motif. The J700 differs from the R700 in having a 'J' motif and in the method of mounting the bulb shield which, in the J700, is screwed to the centre of the lens.

The 7¾″ range comprises models PF770 and RF770 headlamps which are larger than the F700 and have fluted reflectors and clear lenses. The PF770 has a triflex-supported bulb shield and the RF770 has a biflex-supported bulb shield.

As shown in Figs. 1 and 2, there are both MK. I and

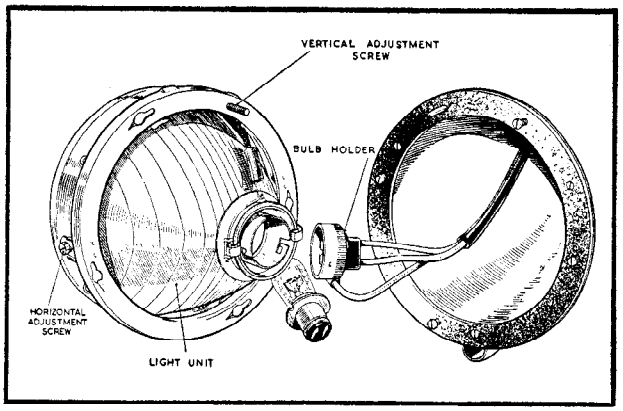

Fig. 1
Headlamp model PF or RF770 MK I dismantled for bulb renewal

MK. II PF and RF770 headlamps. The seating rim and method of adjustment of the MK. I lamp is the same as for the F700 MK. I whilst that for the MK. II lamp is the same as for the F700 MK. III. Certain of these lamps contain two 15 amp. fuses connected in series with the two bulb filaments.

The 7¾″ diameter lamps are now superseded by the R700 and J700 headlamps. For a short time an intermediate lamp was made, which combined 770 size headlamp bodies with 700 size Light Units. These lamps can be identified by their large diameter (8⅞″) bodies.

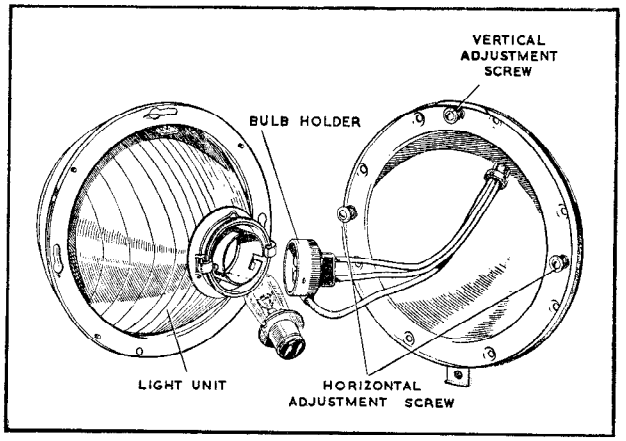

Fig. 2

Headlamp model PF770 or RF770 MK II dismantled for bulb renewal

The 5¾″ (F575) headlamps are similar in design to the 7″ (F700) headlamps but are smaller and have passed through only three development stages; these stages are as follows:

MK. I (F575P/1) 'Diamond' pattern lens Light Unit secured in outer rim by spring clips. Outer rim attached by pivoted side fixing to vehicle body. Lower edge of rim secured by sprung vertical trim adjustment screw.

MK. II and MK. III 'Diamond' or 'block' pattern lens Light Unit secured in split seating rim by clamping bracket at bottom of rim. Seating rim carried on three spring-loaded adjustment screws. Change to MK. III was one of nomenclature only.

When fitted with a pilot light in the reflector, these lamps are known as model F575P headlamps.

All externally fitted headlamps are similar in design and differ only in size, body shape and method of rim fixing.

The rims on S700 stem fixing and SS700 side-socket fixing headlamps are each secured by a single screw. The rim on the ML143 headlamp is secured by a spring clip.

(b) AUXILIARY DRIVING LAMPS

Auxiliary driving lamps include foglamps, long range driving lamps and special purpose spot lamps.

Foglamps have 'block' pattern or fluted lenses in clear or amber glass and are produced in stem-mounting and flush-fitting forms.

7″ diameter stem-mounted foglamps are produced in the following forms:

SFT700 Flat lens Light Unit clamped in shallow body shell by split front rim secured by transverse fixing screw. Lamp body is ball shell mounted on hollow stem.

CFT700 Light Unit as SFT700 clamped in special steel body and finished in black for commercial vehicles. Designed for stem and pendant mounting.

RSFT700 Light Unit has special fluted lens and stepped reflector projecting wide angle beam for Rolls Royce and Bentley cars. A shallow body shell similar to SFT700 is used.

5¾″ diameter foglamps are produced in the following forms:

SFT575 Light Unit has convex fluted lens and is secured in lamp body by screw-secured front rim. Lamp body is ball shell mounted on hollow stem.

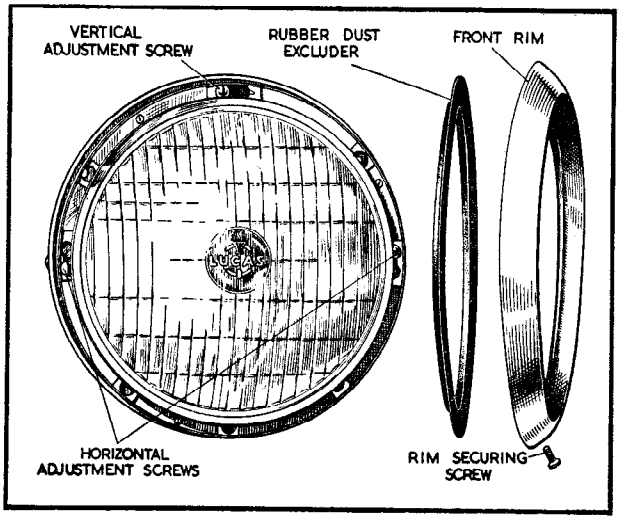

Fig. 3

Headlamp model F700 MK VI with front rim removed

FFT575 — Light Unit as SFT575 but flush-mounted. Light Unit secured in seating rim carried on three spring-loaded adjustment screws.

SFT576 — Light Unit has convex 'block' pattern lens and is secured in lamp body by screw-secured tab at bottom of lamp. Lamp body is ball shell mounted on hollow stem.

WFT576 — Similar to SFT576 but has stem protruding from rear of lamp body for fitting directly to vehicle body without using a mounting bracket.

4½" diameter foglamps are produced in the following forms:

SFT462 — Light Unit has convex fluted or 'block' pattern lens and is secured in lamp body by screw-secured front rim. Lamp body is ball shell mounted on hollow stem.

FFT462 — Light Unit as SFT462 but sometimes has pilot light in reflector. Lamp body designed for flush-fitting with Light Unit secured in seating rim carried on three spring-loaded adjustment screws.

WFT462 — Similar to SFT462 but has stem protruding from rear of lamp body for fitting directly to vehicle body without using a mounting bracket.

Model 4FT foglamp is a 4" diameter stem-mounted lamp with a cowled rim and can be paired with the model 4LR long range driving lamp.

Long range driving lamps have plain convex lenses in clear or amber glass and are stem mounted or wing mounted in a similar fashion to the foglamps.

Model 4SM spot lamp is a 4" diameter pivot-fixing lamp with a convex mirror set at the rear of the body. It is designed for fitting to the windscreen pillar where it can be reached by hand from inside the car.

(c) THE LUCAS LIGHT UNIT

The construction of the Lucas Light Unit ensures that the reflector is permanently protected. The discolouring effect of dirt and water ingress is obviated by sealing the lens in the reflector and fitting a flanged 'prefocus' bulb. The outer surface of the lens is smooth to facilitate cleaning.

Earlier headlamp Light Units have a fluted lens known as the 'diamond' pattern. This was superseded by the 'block' pattern in which the lens surface is divided into small flutes and prisms. In conjunction with double filament (main and dip) bulbs, this lens produces a predetermined spread of light according to whether the beams are designed for dipping to the left, to the right or vertically. The letters LHD (Left Hand Drive), RHD (Right Hand Drive) or VERT (Vertical Dip), are moulded into the glass to facilitate identification of Light Units. While dip filaments are positioned above the main filaments, they are also displaced to the left in bulbs for LHD Light Units and to the right for RHD Light Units. It is thus important always to fit the correct replacement bulb.

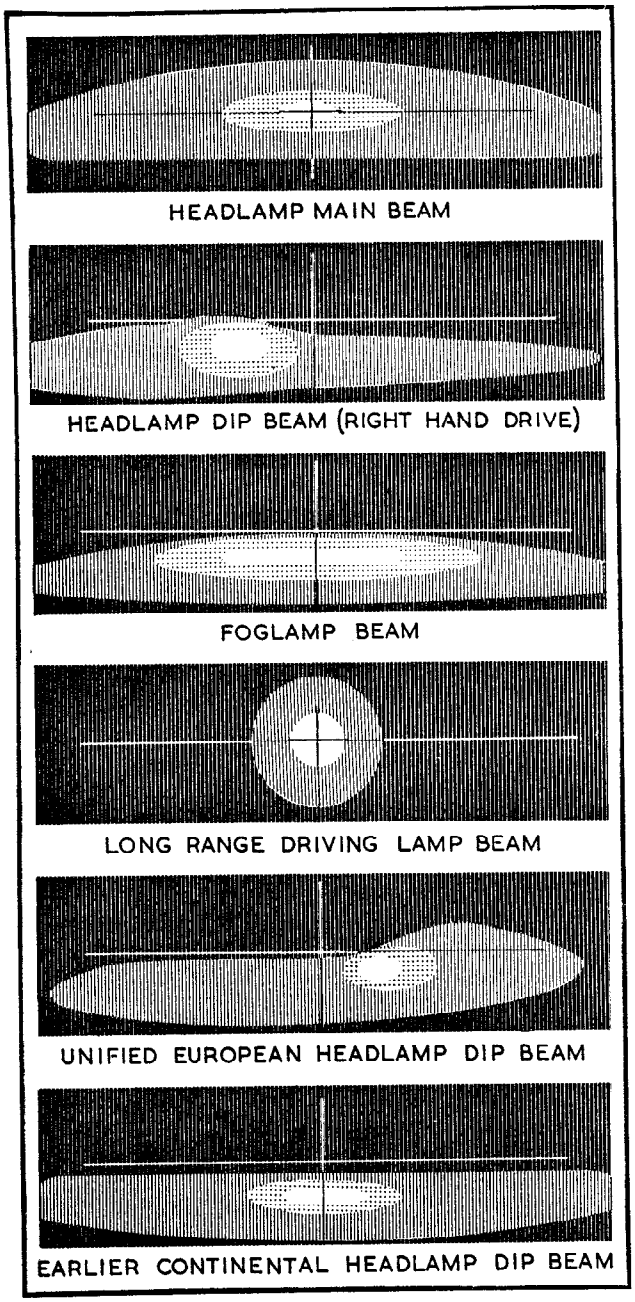

Fig. 4
Beam patterns

Light Units incorporating parking lights have a pilot bulb which is either located in a bulbholder attached to the main bulbholder and shines through a translucent window in the reflector, or is located in a separate bulbholder which plugs into a hole in the reflector.

The silver plating of reflectors has now been superseded by aluminising and care must be taken not to touch the reflecting surface.

Before the advent of 'block' pattern lenses the flat-topped cut-off of foglamp beams was achieved by using a 'stepped' reflector.

(d) BULBS

The 'prefocus' bulb eliminates the need for any focusing device in the lamp. 'Prefocus' bulbs are normally cylindrical in shape to reduce the overall diameter to a minimum, an important feature where the bulb is fitted through an aperture in the rear of the reflector. High wattage (60-watt) bulbs are made spherical because of the greater heat generated. French 3-pin Duplo bulbs and Unified European bulbs are also spherical.

Bulbs for headlamps and foglamps have transverse filaments to give wide spread beams, while bulbs for long range driving lamps and spot lamps have axial filaments to give narrow beams.

'Prefocus' bulb caps are carried on flanges accurately positioned in relation to the filaments. To ensure correct fitting of the bulbs in the Light Unit, a slot in the flange engages with a projection on the inside of the bulb sleeve at the rear of the reflector. Some earlier bulbs have two slots in the flange which is marked 'TOP' and care must be taken to fit it accordingly.

The bulb in 60-watt headlamps is carried on an adaptor plate which in turn locates in the reflector.

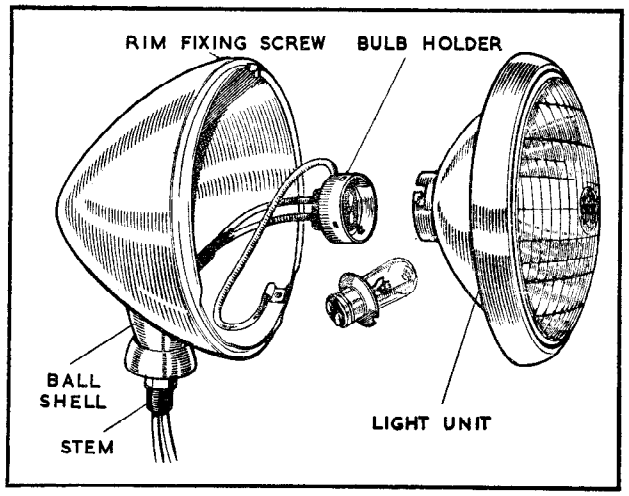

Fig. 5
Headlamp model S700 dismantled for bulb renewal

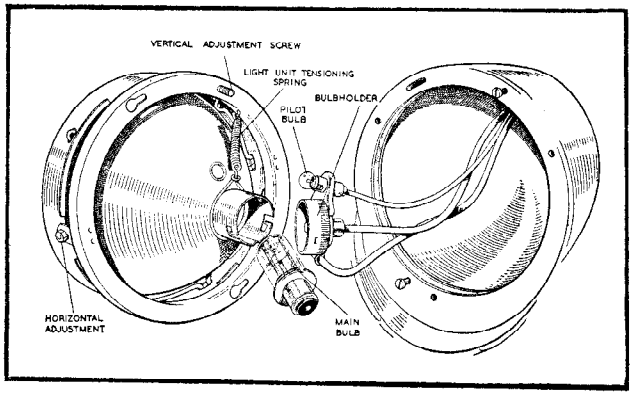

Fig. 6
Headlamp model F700 MK I dismantled for bulb renewal

Bayonet-fitting bulbholders with spring-loaded supply contacts secure the bulbs firmly in position.

The French Duplo bulb has three pressed-metal tags on the cap for bayonet-fitting in the bulbholder, the adaptor plate carrying the bulbholder being secured to the Light Unit reflector by two spring clips.

The Unified European bulb is secured in the rear of the Light Unit reflector by a simple wire clip.

2. SETTING

(a) REGULATIONS

Lamps must be set to comply with local lighting regulations.

Accurate and rapid checking of lamp settings is most easily effected by using a Beam Setter. When such facilities are not available, the lamps can be set by marking off a smooth wall or screen and shining the lamps on it from a distance of twenty-five feet.

(b) ADJUSTMENT

(*i*) **Flush-fitting lamps**

All MK. I lamps (Except model F575P/1)

Remove the front rim and rubber dust excluder. Adjust the vertical setting by turning the adjustment screw (see Fig.6) clockwise to raise the beam and anti-clockwise to lower it. Adjust the horizontal setting by slackening the two nuts (on some models screws are fitted) situated one each side of the Light Unit, and moving the Light Unit to the required position; afterwards firmly tighten the nuts or screws.

Headlamp model F575P/1

Adjust the vertical setting by turning the spring loaded trimming screw clockwise to raise the beam and anti-clockwise to lower it. To adjust the horizontal setting slacken the nut situated on the inner side of each lamp rim inside the car body and

move the Light Unit to the required position; afterwards firmly tighten the nut, and, if necessary, adjust the vertical setting.

All other lamps

Remove the front rim and rubber dust excluder. Adjust the vertical and horizontal setting by turning the three spring-loaded adjustment screws to which the Light Unit is mounted. Model F700 MKS. VII and VIII have only two adjustment screws and the Light Units are seated in special adjustable seating rims. Model R700 has an extension on the vertical adjustment screw, making possible adjustments without removing the front rim.

(*ii*) **Stem-mounting lamps**

Slacken the securing nut on the lamp stem and move the body shell on its ball mounting. After adjusting the lamp setting, firmly tighten the securing nut. On models 4FT and 4LR the securing nut is located at the rear of the body shell and the lamp slides vertically up and down the mounting bracket.

3. SERVICING

(a) REMOVAL OF FRONT RIM AND LIGHT UNIT

(*i*) **Flush-fitting lamps**

All MK. I lamps. (Except model F575P/1)

Remove the front rim and rubber dust excluder. Slacken the screws which secure the flange of the Light Unit assembly and turn it in an anti-clockwise direction to detach the flange from the securing screws. Lift the Light Unit assembly out of the lamp body.

Headlamp model F575P/1

Unscrew the vertical trim adjustment screw, taking care not to lose the tension spring inside the car body and remove the horizontal adjustment nuts

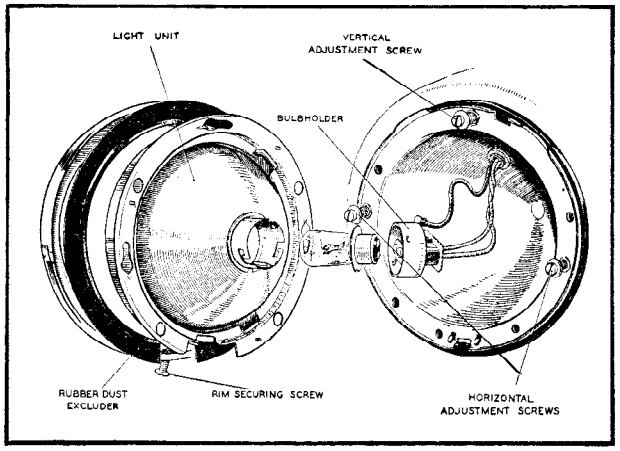

Fig. 7

Headlamp model F700 MK VI dismantled for bulb renewal

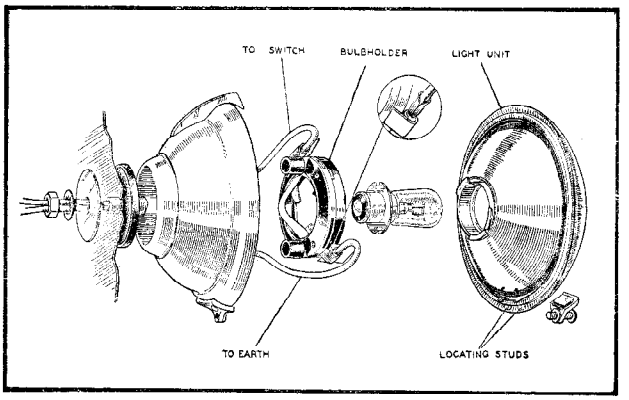

Fig. 8

Wing-mounting WLR or WFT auxiliary driving lamp dismantled for bulb renewal

and bolts. The Light Unit and rim assembly can now be withdrawn from its seating in the car body.

All other lamps

Unscrew the rim securing screw and lift off the rim and rubber dust excluder. Certain later headlamps have a clip-on rim which is removed, using a screwdriver or similar tool, by prising the lower edge of the rim away from the lamp body. Press the Light Unit against the tension of the adjustment screws and turn it in an anti-clockwise direction until the heads of the screws can be disengaged through the slotted holes in the Light Unit seating rim. Do not disturb the screws when removing the Light Unit or the lamp setting will be altered.

(*ii*) **Stem and wing mounting lamps**

Unscrew the rim securing screw (on some headlamps the rim is secured by a spring clip) and remove the rim and Light Unit assembly.

Models SFT576 and SLR576 have no rim, instead the Light Unit is secured in the lamp body by a single screw-secured tag.

(*b*) BULB RENEWAL

Replacement bulbs should be wiped before fitting and must never be handled by greasy fingers, otherwise the grease will evaporate in service and cause discolouration of the reflector.

(*i*) **Lamps with bayonet-fitting bulbholder**

Remove the Light Unit as described in para. 3 (a) and turn the bulbholder in an anti-clockwise direction until spring pressure disengages the holder locating pegs in the bulbholder. The bulb can now be removed and the new bulb fitted.

To refit the bulbholder engage the projections on the inside of the bulbholder with the slots or flanges in the bulb sleeve, press on and secure by twisting the bulbholder clockwise. If a pilot bulbholder is attached to the main bulbholder, it is so arranged that when the pilot bulb is fitted, it is adjacent to the window in the lamp reflector.

60-watt bulbs are retained on their adaptor plate by a spring clip which must be released to remove the bulb.

French three-pin Duplo bulbholders are secured in position on the rear of the reflector by two spring clips. Release these clips to remove the bulbholder.

(*ii*) **Lamps with bulb retaining clip and no bulbholder**

This arrangement is found in certain auxiliary lamps and in the Unified European Light Unit.

Release the bulb by squeezing together the two ends of the retaining clip and lifting it clear of the bulb sleeve.

The bulb can now be withdrawn from the bulb sleeve and the new bulb fitted.

To gain access to the pilot bulb in a lamp having a plug-in pilot bulbholder, pull the bulbholder away from the reflector.

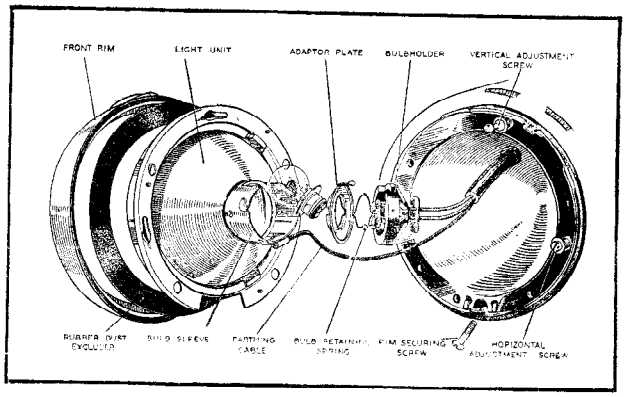

Fig. 9
Headlamp model PF770/700 dismantled for bulb renewal

(*c*) LIGHT UNIT RENEWAL

In the event of damage to either the front lens or reflector, fit a replacement Light Unit as described below.

(*i*) **Flush-fitting lamps**

All MK. I lamps

Remove the Light Unit assembly from the lamp body and disconnect the bulbholder. Withdraw the bulb. Detach the end of the Light Unit tensioning spring from the hole in the fixing flange and lift the spring off the bulb sleeve. Unscrew the vertical trim adjusting screw, and unscrew the two nuts (or screws) securing the rim in which the Light Unit is mounted to two trunnion arms. (When nuts are fitted, it will be necessary to take out the two trunnion bolts). Remove the Light Unit together with its rim. Press the projections on the Light Unit securing spring from the slots in the rim and lift out the spring and Light Unit.

Position the new Light Unit in the rim so that the diecast projection at the edge of the Light Unit is slightly to the right of the location provided for the vertical trim adjusting screw.

Replace the securing spring which must fit over the projection on the reflector and locate in the slots in the rim. Place the fixing flange over the reflector so that the hole provided for the vertical trim adjusting screw lines up with the screw location in the rim.

Position the rim between the two trunnion arms and refit the two screws. (When nuts are fitted refit the two trunnion bolts and fit and tighten the two nuts). Clip the Light Unit tensioning spring over the bulb sleeve and insert the end into the hole in the Light Unit flange. Screw in the vertical adjusting screw.

Replace the bulb, etc.

Lamp models F700 MK. II and F575 MKs. II and III

Remove the Light Unit assembly and bulb. Remove the small clamping bracket on the Light Unit seating rim by bending back the two metal tags. Lift the Light Unit away from the seating rim.

Position the replacement Light Unit in the seating rim so that the diecast projection at the edge of the Light Unit fits into the indentation in the rim. Replace the rim clamping bracket, ensuring that the rim edges make a neat and secure joint. Replace the bulb, etc.

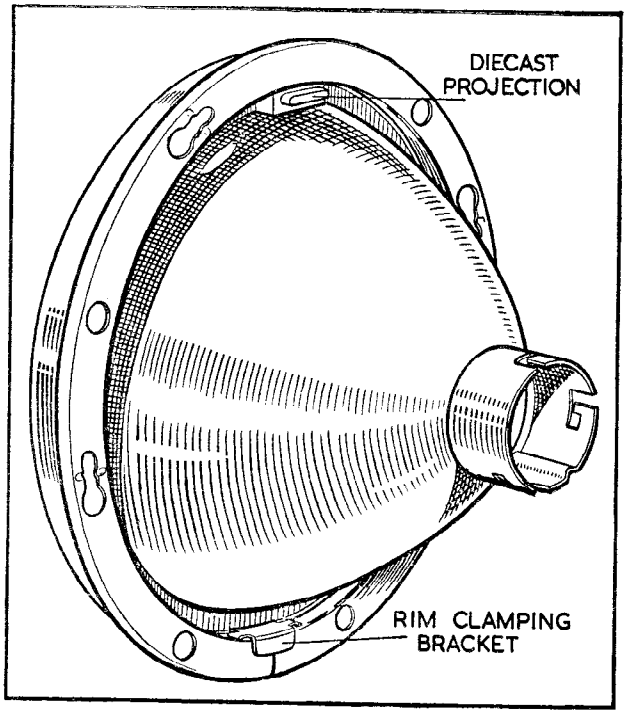

Fig. 10
Rear view of model F575 MK II or F700 MK II Light Unit assembly showing rim clamping bracket

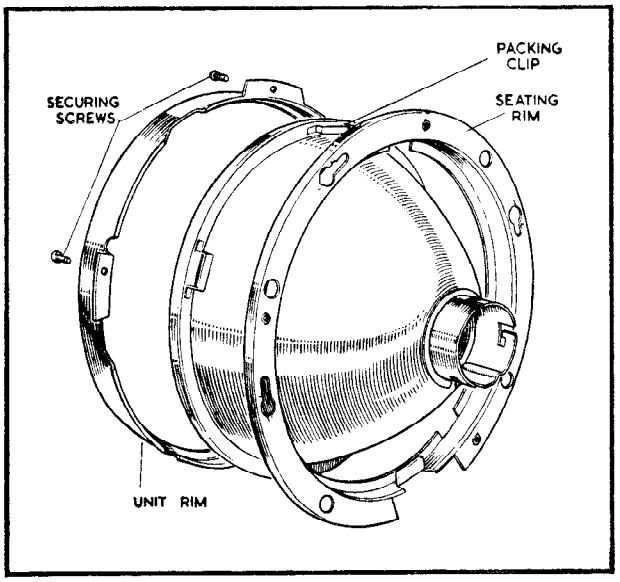

Fig. 11
Headlamp model F700 MK VI Light Unit assembly dismantled

All other flush-fitting lamps

Remove the Light Unit assembly and bulb. Withdraw the three self-tapping screws from the unit rim and remove the seating rim and unit rim from the Light Unit.

Position the replacement Light Unit on the seating rim, taking care to see that the diecast projection or locating tabs at the edge of the Light Unit fit into the slot(s) in the rim. Ensure that the unit rim is correctly positioned and finally secure in position by means of the three self-tapping screws.

Replace the bulbholders, etc.

(*ii*) **Stem and wing mounting lamps, and headlamp model F575P/1.**

Remove the Light Unit and rim assembly (when fitted) and disconnect the bulbholder.

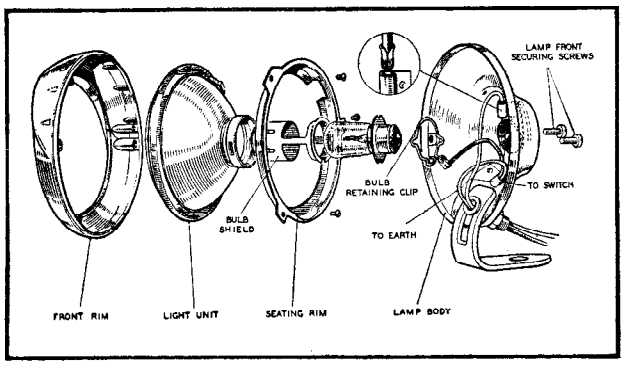

Fig. 12
Auxiliary driving lamp model 4LR or 4FT dismantled

Withdraw the bulb and (when applicable) the bulb shield.

Disengage the Light Unit securing springs (when fitted) from around the rim and detach the rim from the Light Unit.

Position the new Light Unit in the rim so that the clip(s) or projection(s) at the edge of the Light Unit fit into the locating slots or brackets in the rim. Refit the securing springs equally around the rim. Replace the bulb shield (if provided), bulb and bulbholder, and refit the assembly in the lamp body.

4. SEALED BEAM LIGHT UNIT

In certain States in the U.S.A., all vehicle headlamps must be fitted with Sealed Beam Light Units and the method of beam setting must comply with their particular regulations.

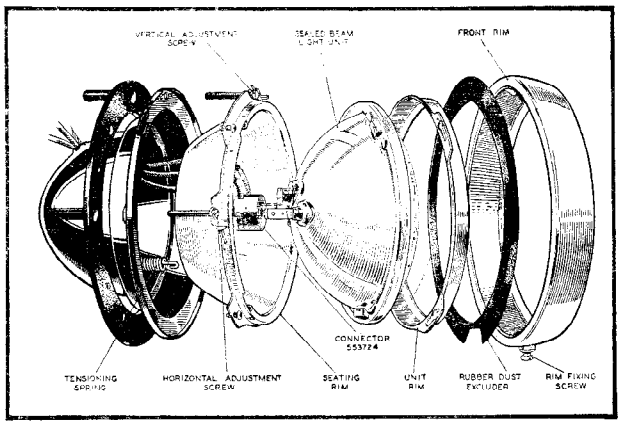

Fig. 13
Headlamp model F700 MK VIII dismantled for Light Unit renewal

Lucas model F700 headlamps MKs. IV, VII and VIII have been specially designed to meet these requirements and, when necessary, models F700 MK. III and VI can be converted to fit Sealed Beam Light Units, as follows:

(a) Remove the Lucas Light Unit as described in 'Light Unit Renewal'.

(b) Remove the two packing clips from the slots in the seating rim of earlier headlamps.

(c) Fit the Sealed Beam Light Unit, locating the three projections on the rim of the Unit in the slots in the seating rim.

(d) Disconnect the existing bulbholder and cables and fit the three-slot connector and cable assembly 553724 shown in Fig. 13.