This invention relates generally to head- 5 lights, and particularly to replacement re- 10 flectors positioned within the headlight re- 15 flector and to means for adjusting and re- 30 taining the replacement reflector in proper position therein.

Hitherto, the practice in automobile main- 5 teinance has been where a headlamp reflector has become useless through wear of the reflect- 10 ting surface material, or where it has been found expedient to provide a special type reflector to reduce glare without the employment of a refraction lens, to remove the original reflector from the headlamp casing and substitute the new reflector. This operation generally entails considerable manipulation and annoyance and, moreover, especially in the case of the substitution of that type of glare correcting reflector known as "flat lite", involves important difficulties in adjustment so as to meet legal require- 20 ments and obtain the maximum lighting efficiency.

It is therefore one of the objects of this invention to provide a reflector unit which is adapted for insertion within the ordinary reflector, thereby obviating the necessity of disconnecting the original reflector from the headlight. Another important object is the provision of an adapting or adjusting connector between the head lamp casing and the inserted reflector which permits of easy and proper alignment of the lamp and co- 30 acting reflecting surfaces. Another object contemplated is the provision of means for readily adjusting within a headlight, a reflector having a vertically zoned surface such as the flatlite type.

An object of the invention also is to pro- 40 vide mechanism whereby a reflector inserted within another headlight reflector may be adjusted both transversely as to axis and longitudinally along the axis. Other objects are the provision of means for taking up vibration and the provision of adapters suitable for attachment to single or double circuit wires.

The above objects and others involving details of construction and methods of manufacture will be obvious on consideration of the embodiment of the invention herein described and illustrated in the accompanying drawing, in which...
ring 14 integral with the casing, whereby the reflector is maintained from lateral displacement. There is formed also in the front face of plate 12 a circumferential groove 15 adapted to receive a cushioning material 16 interposed between the plate and the lamp lens 17. The lens 17 and reflector 11 are maintained in assembled position within the headlight casing 10 by means of a cap ring 18, this cap including a ring portion 19 adapted to encase the casing edge ring 14, the plate portion so extending inwardly over the edge of the lens 17 and a backturned flange 21, the edge 22 of which is adapted to contact with the lens 17 and maintain it in place.

The connector 25, forming the connecting means between the lamp and the external electrical circuit is positioned in the tube 26 and fixed by any suitable means to the edge 27 of an aperture 28, formed in the casing base. The reflector 11 is similarly aperture as at 29 and extended in a ring 30, forming a continuation of the tube 26. The connector 25 is axially movable in the tube 26 and ring 30, the moving means including an outstanding lug 31 movable in a slot 32 by means of a machine screw 33. The screw 33 is accessible from without the casing 10, in which it turns freely and is screw-threaded in the lug 31, there being a cotter pin 34 in the inner end of the screw to prevent complete out screwing and a coil spring 35 around the screw intermediate the casing and lug 31 to maintain the connector at its inner limiting position as determined by the screw adjustment.

Each end of the connector is oppositely cut by bayonet slots 36 and 37, the outer slots 36 receiving pins 38 formed on the external circuit plug 39 and the slots 37 receiving ordinarily the pins 40 of the lamp base but in the invention described the pins 41 (Fig. 4) are formed on the cooperating end of the adapter 42. The adapter 42 is designed to form a connecting unit—mechanically and electrically—between the connector 25 and the lamp base 43. As illustrated (Fig. 3 and Fig. 4), one embodiment of the adapter is comprised in a socket member 44 secured by internal threads 45 to a plug member 46, there being a set screw 47 intermediate these parts to fix them in a given relationship. The plug 46 carries, as previously indicated, the attaching pins 41 adapted to contact with the bayonet slots 37 of the connector 25. The end of the plug is closed by the interned flange 45 and by the electrically insulating material 49 in which is imbedded the contact plate 50 and conductor 51. Inside the end 48 is an insulating washer 52 and adjacent the inner surface of the washer a metal plate 53 supported on and having direct electrical connection with the contact plate 50 by means of the conductor 51. The edges of the plate 53 are turned to form an annular retaining flange for one end of the coil spring 54, the other end of which engages the contact pin 55 as hereinafter described.

Abutting the inner end of the plug member 46 and contacting with the inner surface of the socket member 44 is an insulator washer 56, retained in position by a ridge 57 formed interiorly of the socket member adjacent the washer. The washer 56 carries at its center a bearing plug 58 apertured to receive in slidable relationship the pin 55 hereinafore indicated. The end of the pin 80 projecting into the plug interior is enlarged to form a centering element 59 for the inner end of the coil spring 54, and also carries a shoulder 60 fixed to the pin against which the spring 54 normally bears with yielding force, thus maintaining the pin 55 at the inner limit of its movement within the plug 58. The inner end of the pin 55 is adapted to contact yieldingly by virtue of the spring 54, against the contact plate 61 of the lamp socket, as will be apparent to those skilled in this art, said contact being mounted by the bayonet slot 62, engaging the lamp pins 40.

Passing now to consideration of the replacement reflector 70, there is shown in Figures 1, 2 and 3 a preferred form of the same, there being an axial opening with a rearwardly flared rim 71 which is slotted to permit entry of the lamp pins 40, and an outwardly flared rim 72 adapted to rest at its edge against the forward edge of the original reflector. The reflector is preferably attached to the lamp base 43 by means of a spring clamp 73, encircling the flange 71. Set screws 74 are placed in the reflector rim 73, spaced preferably at angles of 120°, whereby a pivot adjustment of the reflector about its base support may be secured.

A coil spring 75 is inserted between front and rear reflectors to assist in maintaining the parts in a given set relationship as will be hereinafter detailed.

Note should be made of the bayonet slots 62 as having straight holding surfaces 63, extending approximately 45° about the shell. It should be observed also that while not fundamental to the invention, the replacement reflector 70 is illustrated as of the type having vertical zones, parabolic only in vertical planes, whereby a wider and more efficient light distribution is obtained and with less glare, than that normally obtainable from universally parabolic reflectors. In such a modified parabolic reflector, however, it is essential for proper illumination, that the plane of the lamp filament be transverse to the planes of the flat parabolic reflector sections, as illustrated in Fig. 1 and where the lamp and reflector of this type are
marketed as a unit, it is desirable that these members be clamped in proper relationship as above indicated.

The various elements and members of the headlight hereinabove described are assembled as follows. The lamp is mounted and clamped in the replacement reflector, the filament if a “flat lite” type reflector is employed being in a plane perpendicular to the zone planes of the reflector. The headlight rim and lens having been removed, the replacement reflector, with the flat zones in planes approximately perpendicular to the zone planes of the filament, is placed in the rear reflector and the pins 40 entered into the bayonet slots 62, the contact plate 61 of the lamp simultaneously compressing the pin 55. With the pins 40 contacting against the slot edge 63, adjustment by rotation is made until the reflector zone planes are vertical. Then the set screws 74 are set to a point where the reflector axis is at the desired angle. Finally, the set screw 83 is adjusted to take up slack intermediate the forward reflector and the casing. The above adjustments are supplemented by the coil spring 75 which tends to take up any looseness brought about by vibration and also assist in properly centering the movable elements.

Figures 6 and 7 illustrate a modified adapter designed for use in a two-wire circuit, there being indicated a one piece shell 80, having a shoulder 81 intermediate the socket 82 and plug 83, pins 84 and two contact base 85. The base 85 includes a metal cap 86, having an outturned sector 87 forming a contact grounded on the shell, and a contact 88 insulated from the cap 86 by insulation 89 and washer 90 and connected to the spring end plate 91 by means of wire 92. The contact 88 is in the form of a sector similarly, with contact 87 so that electrical contact with the headlight socket pins may be maintained throughout a limit rotation of the adapter determined by the length of the bayonet slots 37.

In the two-wire circuit adapter, it is, of course, apparent that the adapter shell serves as one circuit of the electric flow to the lamp intermediate the casing socket 51 and the lamp base 42, the other circuit being insulated. Instead of the reflector, as indicated in Figures 1, 2 and 3, with flared edges contacting adjacent the reflecting edge of the original or rear reflector, the replacement or forward reflector may be formed as in Figure 8 with the reflecting edge 95 terminating away from the edge of the forward reflector, and having a transverse flange 96, with a reverse right angled edge 97 adjacent the rear reflector surface. There is formed in the flange 96 a circumferential groove 98 in which a packing fabric 99 of cotton, rubber or the like is positioned so as to contact with the glass lens 17.

In this modified reflector, adjustment is made axially by forcing out the reflector by means of the screw 33 in the casing base 70 instead of bringing it toward the base as in the preferred form. The screw 33 (see Figure 3) is adjusted until the reflector fits snugly against the lens 17 and then the screws 74 (see Figure 2) are manipulated to obtain the correct transverse setting.

Figure 9 illustrates a modified construction in which the adapter unit has been simplified and the whole assembly compacted to a minimum degree. The adapter unit 110 is formed of a plug member 111 and a socket member 112, which may be interconnected in any suitable manner or formed integral with each other. One satisfactory connection is illustrated which permits rotatable adjustment of the parts and is formed by channeling opposite sides 113 and 114 of the connecting end 115 of the plug member along arcs of about forty-five degrees (Figs. 10 and 12). These channels receive the ends of set screws 116 and 117 movable within the engaging end of the socket member 112 and by setting the screws at different points along the grooves 118 and 114, different relative adjustment of the socket and plug members is obtained.

In this form of adapter, the plug member 111 does not utilize a spring as in the first described form. Within the plug shell 112 is included a moulded cylinder 118 retained at one end by the grooves 113 and 114 and at the other end by prongs 119 cut out from the edge of the shell. The cylinder 118 is non-conducting to electricity and is hollowed axially to receive a conductor rod 120, forming the electrical circuit between the lamp base and the lamp casing socket contact 121 and enlarged contact disks 122 and 123 are formed on either end of this rod to facilitate and improve contact. For purposes of assembly and to permit ready adjustment the rod 120 is preferably formed in separate parts 124 and 125, connected by a screw joint, as illustrated in Fig. 9, with a plurality of washers 129 set in between the engaging ends.

The pin 127 are formed preferably by striking out the shell surface or by other suitable means.

As previously indicated, the plug member 111 is attached to the socket member 112 by a screw and groove device. Inasmuch as the shell 130 of the socket is relatively thin a reinforcing ring 131 is provided for the set screws 116 and 117, which is secured to the shell 130 by forming four holes 132 around the periphery of the shell at points separated by approximately ninety degrees through two of which the screws 116 and 117 pass. The metal of the shell 130 is forced out into...
the remaining two holes and thus a secure interengagement of ring and shell is provided.

The end 134 of the socket 112 is corrugated annularly to form an outwardly opening groove 135 adapted to receive the edge of an aperture cut in the base of the replacement reflector 136.

Means for retaining the lamp in the shell 130 is provided for in a screw 137 adapted to hold the lamp in fixed position. A ring 138 gives reinforcement to the shell, said ring extending around the shell adjacent the groove 135, and having a plurality of holes 139 formed therein adapted to receive the outforced metal of the shell 130 to prevent movement relative thereto.

Means for permitting universal adjustment of the lamp socket is obtained by placing a sleeve 140 on the lamp base, there being two oppositely positioned axial slots 141 cut therein terminating in holes 142, whereby the sleeve is readily slipped over the lamp base pins 143 until the same enter the holes 142.

This construction forms a smooth plug member which may be readily adjusted either axially or rotatably, greatly facilitating the adjustment of the lamp in the replacement reflector 136.

There is illustrated in Figures 9 and 13 various means of engagement of the outer edge of the replacement reflector 136 with the parts of the ordinary headlight reflector 11 or the lens 17. In Figure 9 the edge of the reflector 136 is turned outwardly in a transverse plane as at 150 and then rearwardly in channelled formation, as at 151, and in this channel is placed a ring of yielding material, such as a fabric cord adapted to contact with the surface of the fixed reflector 11. In Figure 13, instead of forming the rim 150 integral with the reflector 136, it is formed separately as a loose ring 153 having an annular channel 154 adapted to rest against a narrow flange 155, formed on the reflector edge and retained in position by reason of its enlarged diameter relative to the rearward portions of the reflector 11.

It is, of course, obvious that instead of forming the rings 150 and 153 with outer channels 151 and 154, forward opening grooves may be employed adapted to hold cords contacting with the lens 17 of the reflector, a snug pressure between lens and reflector being obtained by adjustment of the focusing screw 33.

The form of construction as described relative to Figs. 9 to 13 has an important advantage in permitting a retraction of the lamp filament to a greater degree than is possible in the other forms because of the greater contraction of axial length of the adapter.

Moreover, because of this compactness of the device and of the few number of parts, and also because of the great ease of adjustment, all of the important difficulties normally associated with reflector replacement are obviated. Figure 14 illustrates the modified means of adjusting the shell 140 without the use of a reinforcing ring 139, there being employed two oppositely positioned screws 150, screw-threaded in the shell 112 contacting against the shell 140.

Various modifications, other than those described, may be evident to those skilled in the art to which this invention pertains and therefore it is not desired to limit the invention further than as defined in the claims hereto appended.

Having thus described the invention, what is claimed is:

1. In a lamp, the combination of a casing; a reflector within said casing, said reflector having parabolic zones lying in parallel planes; a monoplastic illuminant secured to said reflector, said illuminant lying in a plane normal to that of the reflector zones; means whereby adjustment of said reflector relative to the illuminant is secured; and means for securing lateral adjustment of the reflector.

2. An adapter replacement unit for headlamps comprising a replacement reflector having barred reflecting surfaces; a lamp having a monoplastic light source; and an adapter secured to said reflector on the axis thereof, said adapter having separable adjustable interengaging parts whereby an adjustable electrical connection may be provided through the adapter.

3. In a headlight, a casing; a primary reflector mounted in said casing; a light bulb; a replacement reflector; means to rigidly support said replacement reflector with respect to said bulb in any one of a plurality of positions; means to support said bulb and replacement reflector with respect to said casing; means to axially adjust said last mentioned supporting means; and additional adjustable supporting means for the outer edge of said replacement reflector.

4. In a headlight, a casing; a primary reflector mounted in said casing; a socket mounted in said primary reflector; a tubular member removably supported by said socket; a replacement reflector supported upon said tubular member; a light bulb removably supported in said tubular member; and a variable length electrical connector slidably mounted in said tubular member and adapted to electrically connect said socket with said light bulb.

In testimony whereof, I affix my signature.

SAMUEL F. ARBUCKLE.