April 26, 1927. C. E. GODLEY 1,626,407

FOCUSING DEVICE

Filed June 17, 1926

Fig. 1.

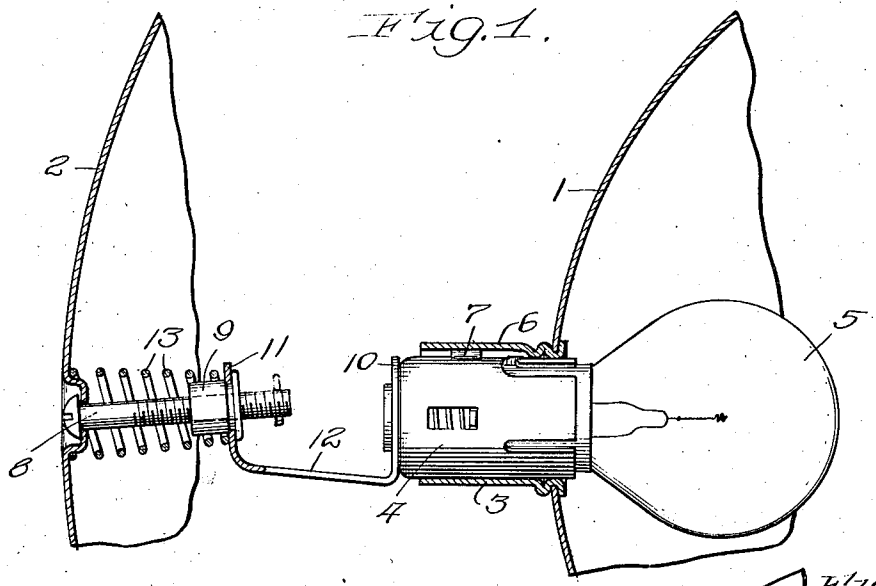


Fig. 2.

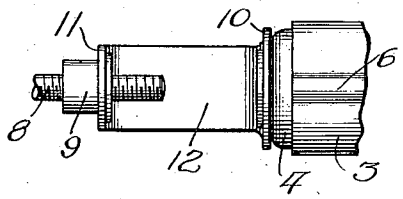


Fig. 7.

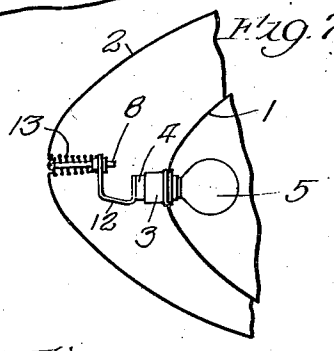


Fig. 3.

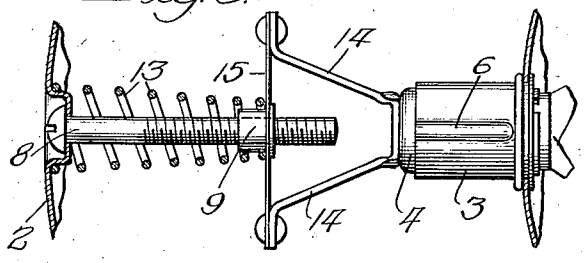


Fig. 4.

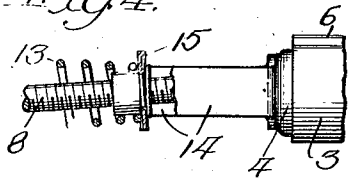


Fig. 6.

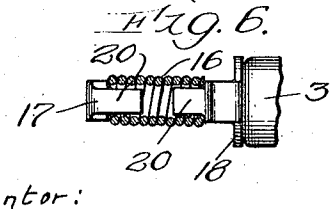
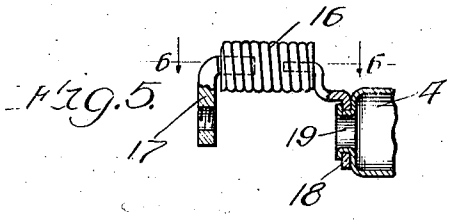


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES E. GODLEY, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO C. M. HALL LAMP COMPANY, A CORPORATION OF MICHIGAN.

FOCUSING DEVICE.

Application filed June 17, 1926. Serial No. 116,691.

My invention relates to focusing devices for automobile headlamps of the general class in which the lamp bulb only needs to be adjusted in position longitudinally of the reflector.

In some of its main objects, my invention aims to provide a simple and inexpensive socket-holding and socket-adjusting arrangement having these characteristics:

(1) Taking up any looseness of the lamp-socket in the guide tube in which the socket slides, by tilting the socket so as to raise the filament of the lamp bulb;

(2) Taking up all lost motion in other parts of the focusing device by spring means;

(3) Compensating for a displacement of the axis of the socket from the perforation in the lamp back through which the adjusting screw projects.

Further objects will appear from the following specification and from the accompanying drawings, in which—

Fig. 1 is a fragmentary central, vertical and longitudinal section through an automobile headlight equipped with an embodiment of my invention.

Fig. 2 is a plan view of a portion of the parts shown in Fig. 1, namely the U-shaped resilient thrust member and portions adjacent to it.

Fig. 3 is a plan view of parts of a headlight equipped with another embodiment of my invention, namely one in which the thrust member has only its rear cross-bar resilient.

Fig. 4 is a fragmentary plan view of the parts shown in Fig. 3.

Fig. 5 is a view, partly in elevation and partly in section, showing another type of resilient thrust member, namely one employing a coiled spring.

Fig. 6 is a plan view of the parts shown in Fig. 5.

Fig. 7 is a reduced view, similar to Fig. 1, showing my invention as embodied in a headlight in which the reflector has its axis considerable below that of the casing.

In the drawings, Fig. 1 shows a reflector 1 spaced forwardly from the back 2 of the lamp casing, the reflector having the usual axial perforation. Extending rearwardly from the reflector in axial alinement with this perforation and clinched at its forward end to the reflector is a guide tube 3. A lamp socket 4 is slidably disposed in this guide tube and supports the lamp-bulb 5, and the tube is diametrically enlarged along one side to provide an inwardly open groove 6 fitting a projection 7 on the socket, so that the said projection and groove co-operate in preventing the socket from rotating in the guide tube.

Extending freely through a perforation in the back 2 of the lamp casing is an adjusting screw 8 which has the under side of its head bearing against the outer face of the said back and which is threaded through a nut 9. This nut is connected to the socket 4 by a thrust member which is designed so as to be operatively rigid longitudinally of the axis of the socket while permitting a tilting of the screw in the vertical medial plane of the reflector. For this purpose, Fig. 1 shows such a thrust member as formed of a single piece of flat resilient metal bent into a wide U-shape and having its shanks 10 and 11 secured respectively to the rear end of the socket 4 and to the nut 9, while its bight 12 extends in the general direction of the axis of the socket.

A compression spring 13 is interposed between the rear shank 11 of the thrust member and the back 2 of the lamp casing, so as to force the nut forwardly, thereby pressing the head of the screw against the back of the casing and taking up any lost motion between the nut and the thread of the screw. The forward pressure of the spring also urges the thrust member and the socket forwardly as far as the screw will permit, thereby positively determining the position of the socket longitudinally of the reflector. The thrust member is initially so formed that, before the screw is attached to it, the axis of the thread in the nut does not pass through the center of the perforation in the back of the casing. In threading the screw through the nut, the nut and the rear shank of the thrust member are tilted by flexing the bight 12 of the thrust member which bends more easily than the bends formed in the thrust member. To increase the stiffness at these bends, I desirably dispose the rear one close to the nut and also desirably dispose the bight portion of the thrust member at an acute angle to the axis of the socket.

However, the construction as so far described will not compensate for any loose-

ness of the socket 4 in the guide tube 3, such as occurs in practice owing to variations in the diameters of tubes of the same designated commercial size. In practice, this discrepancy between the outside diameter of the socket and the bore of the guide tube has two serious objections. One lies in that it permits the socket to vibrate in the guide tube, thereby causing both an objectionable rattling and a slamming which reduces the life of the filament of the lamp bulb. Furthermore, if this looseness of fit permits the socket to tilt forwardly downward, so as to lower the filament of the lamp bulb, the headlight becomes glaring.

To avoid both of these objections, I arrange my thrust member and the connection of this member to the adjusting screw so that the thrust member continuously tends to tilt the socket forwardly upward thereby taking up any looseness and doing this by raising the lamp filament. With the thrust member of Figs. 1 and 2, I accomplish this by forming the said member so that the nut 9 has its center disposed above the axis of the socket and above the casing back perforation through which the screw 8 extends. With the parts thus arranged, the pull of the screw on the nut (which is clinched to the rear shank 11 of the thrust member) tends to rotate the thrust member (and the socket which has its rear end secured to the other shank 10) so as to incline the socket forwardly upwards. The resiliency of the thrust member permits the latter to bend at the juncture of the bight 12 with the shanks 10 and 11, so that by disposing the screw 8 at an inclination greatly in execess of that required to take up the looseness of the socket in the guide tube, I can positively allow for this looseness. By making the thrust member of relatively stiff metal and by having its bight 12 extend in the general direction of the axis of the socket, I leave the thrust member operatively rigid in the said direction, so that the socket will respond readily to the adjustment afforded by rotating the screw 8 in either direction.

However, my thrust member need not be made of a single piece as above described, and other features may also be varied without departing either from the spirit of my invention or from the appended claims. For example, Figs. 3 and 4 show a thrust member having a pair of rearwardly extending legs 14 and having a flat strip 15 of resilient metal spanning the rear ends of these legs and carrying the nut 9. In this case, the inclination of the axis of the screw with respect to the axis of the guide tube exerts a twisting action on the resilient strip 15.

Figs. 5 and 6 show another construction of the thrust member, namely one comprising a stiff (and desirably tightly coiled) spiral spring 16 and a pair of rigid metal end parts 20 each of which has a portion driven into the bore of the spring at one end of the latter. In this case the rear part has a portion 17 extending transversely of the spring and threaded to fit the adjusting screw, so that no separately constructed nut is required. The forward part has a corresponding transversely extending portion 18 provided with a perforation, and the socket 4 has a tubular rearward extension 19 clinched through this perforation so as to secure the forward end of the thrust member to the rear end of the socket. With this embodiment, the inclination of the adjusting screw (and hence of the axis of the thread in the part 17) with respect to the guide tube in which the socket 4 is sleeved, will bend the spiral spring.

With each of the illustrated embodiments, the rigid securing of the forward end of the thrust member to the socket cooperates with the engagement of the projection 7 by the groove 6 in preventing the thrust member from rotating about the axis of the guide tube. Hence the tilting action of my device on the socket is always in a predetermined direction, thus enabling me to make this raise the filament.

Moreover, since my focusing device does not require an axial alinement of the adjusting screw with the reflector, I can readily employ it also in headlights in which it is desirable to have the head of the adjusting screw displaced by a considerable distance from the axis of the reflector. For example, in lamps having bullet shaped casings, the ornamental design preferred by some users calls for a lens and reflector having their axes considerably below that of the casing. In such a case, the perforation for the adjusting screw can still be on the axis of the casing, so as to avoid an unsightly indentation below the extreme rear end of the casing, as the shape of my thrust member can readily be altered for such cases. For example, Fig. 7 shows how the embodiment of Fig. 1 can be employed under such conditions by suitably lengthening the rear shank of the thrust member.

I claim as my invention:

1. In a lamp, a casing having a perforation in its back, a reflector mounted in the casing, a guide tube fast on the reflector and extending toward the back, a lamp-socket slidable in the guide tube, a screw extending through the perforation in the casing and having its head engaging the outer face of the said back; a thrust member having a forward part secured to the socket, a rear part threaded on the screw, and an intermediate portion connecting the said forward and rear parts and adapted to bend more easily than the connections

of the intermediate portion to the said forward and rear parts; means associated with the socket and the guide tube for preventing rotation of the socket in the tube, and a compression spring interposed between the rear end of the thrust member and the back of the casing; the thrust member being resilient to permit a flexing of the same for adjusting to differences of direction between the axes of the screw and the socket, and being substantially rigid axially of the socket; the disposition of the said casing back perforation with respect to the axis of the socket and the shape in which the thrust member is formed being such that the assembling of the aforesaid elements distorts the shape of the thrust member and produces a strain in the thrust member to tilt the axis of the socket forwardly, upward and into firm engagement with the upper part of the forward end of the bore of the guide tube.

2. In a lamp, a casing having a perforation in its back, a reflector mounted in the casing, a guide tube fast on the reflector and extending toward the back, a lamp-socket slidable in the guide tube, a screw extending through the perforation in the casing and having its head engaging the outer face of the said back, a thrust member fastened at its forward end to the socket and threaded at its rear end upon the screw, means associated with the socket and the guide tube for preventing rotation of the socket in the tube, and a compression spring interposed between the rear end of the thrust member and the back of the casing; the thrust member being resilient to permit a flexing of the same for adjusting to differences of direction between the axes of the screw and the socket, and being formed so as to be substantially rigid axially of the socket; the thrust member comprising a nut, and a resilient U-shaped metal strip secured at its forward end to the socket and at its rear end to the nut and having its intermediate portion extending at an acute angle to the axis of the socket.

3. In a lamp, a casing having a perforation in its back, a reflector mounted in the casing, a guide tube fast on the reflector and extending toward the back, a lamp-socket slidable in the guide tube, a screw extending through the perforation in the casing and having its head engaging the outer face of the said back, a thrust member fastened at its forward end to the socket and threaded at its rear end upon the screw, means associated with the socket and the guide tube for preventing rotation of the socket in the tube, and a compression spring interposed between the rear end of the thrust member and the back of the casing; the thrust member being resilient to permit a flexing of the same for adjusting to differences of direction between the axes of the screw and the socket, and being formed so as to be substantially rigid axially of the socket; the thrust member comprising a resilient metal strip having two substantially parallel end portions bent to extend obliquely in the same direction from the intermediate portion of the strip, one of the said end portions being secured to the rear end of the socket; and a nut secured to the other of the said end portions.

Signed at Detroit, Michigan, June 3rd, 1926.

CHARLES E. GODLEY.