Feb. 7, 1928. 1,658,239

C. E. GODLEY

LAMP FOCUSING DEVICE

Filed Nov. 18, 1926 2 Sheets-Sheet 1

Fig. 1

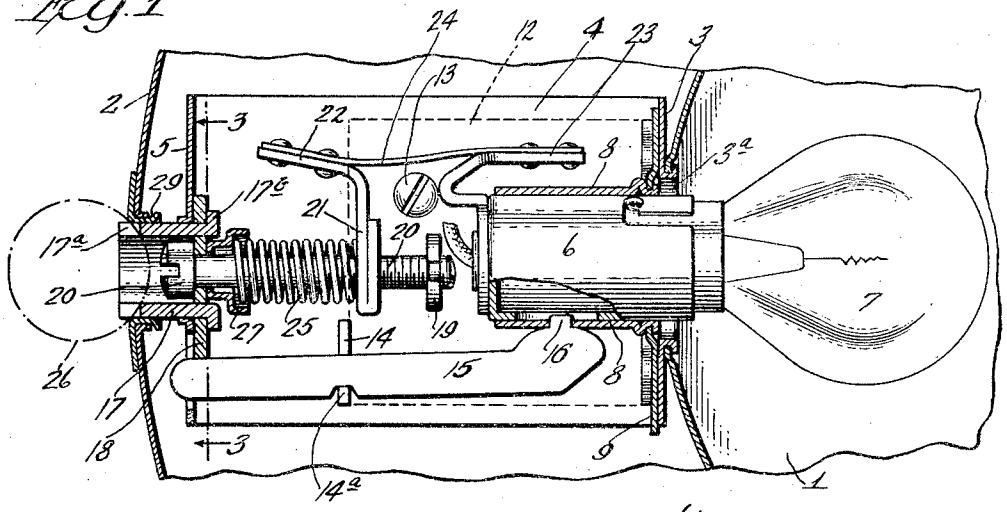


Fig. 2

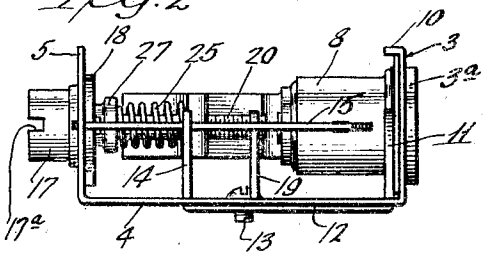


Fig. 3

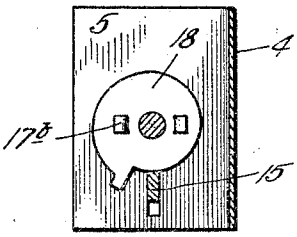


Fig. 4

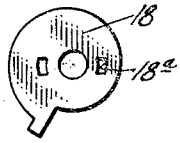


Fig. 5

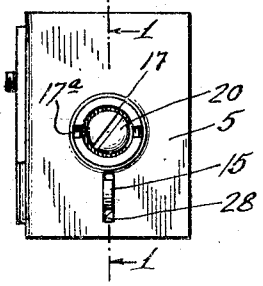


Fig. 6

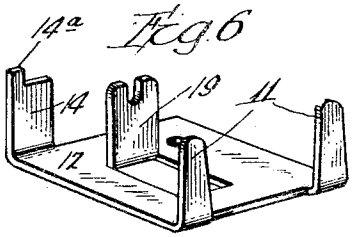


Fig. 7

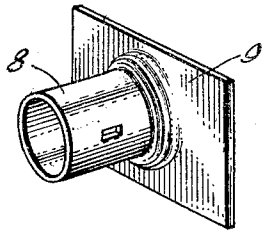
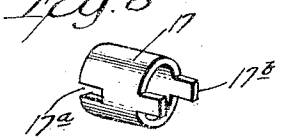


Fig. 8



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Filed Nov. 18, 1926 2 Sheets-Sheet 2

Fig. 9

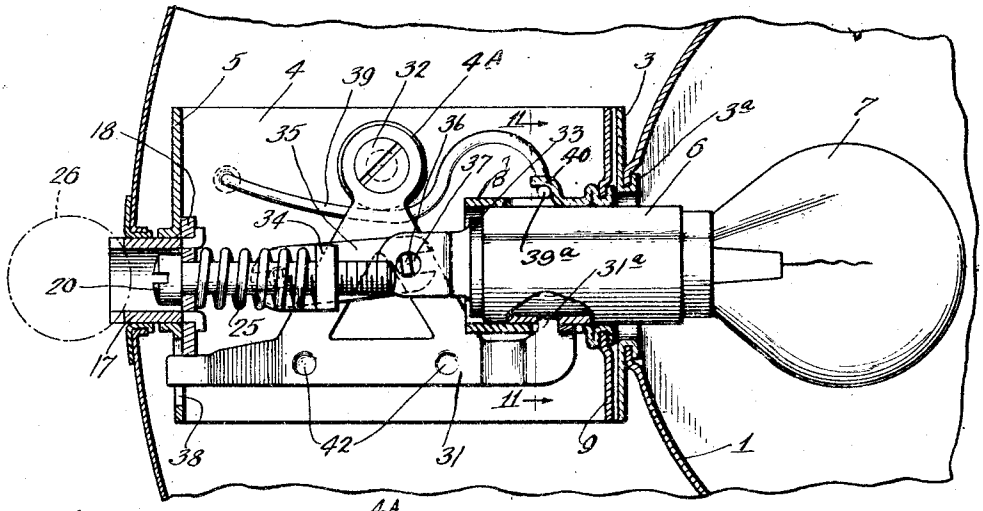


Fig. 10

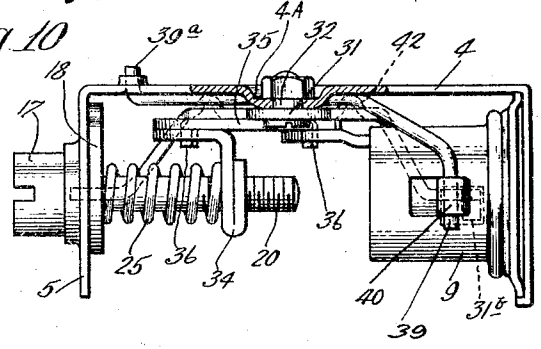


Fig. 11

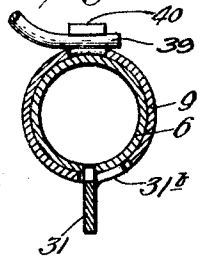


Fig. 12

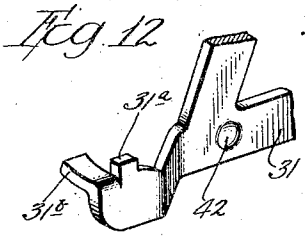


Fig. 13

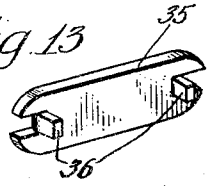
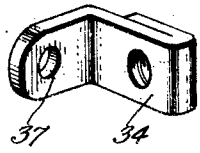


Fig. 14



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Patented Feb. 7, 1928. 1,658,239

UNITED STATES PATENT OFFICE.

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LAMP-FOCUSING DEVICE.

Application filed November 18, 1926. Serial 149,074.

My invention relates to means for supporting and focusing a lamp bulb with respect to a reflector and in one of its general objects aims to provide a cheaply constructed and easily manipulated bulb-supporting and focusing arrangement which will effect the vertical focusing without changing the direction of the axis of the lamp bulb, and in which very few fastening elements are required for retaining the various parts in their operative positions.

Furthermore, my invention provides a bulb-supporting and focusing arrangement supported as a unit by the reflector and adapted to have both of the adjusting means accessible through a single and small aperture in the back of the lamp casing, and also designed to afford a continuous closure for the reflector perforation through which the lamp socket extends.

More particularly, my invention provides a novel cam-actuated lever and slide arrangement for affording the vertical adjustment in a focusing lamp, provides novel means for retaining the lever in its operative position and for preventing rotation of the lamp socket, provides simple spring means for preventing lost motion and rattling between various associated parts, and provides novel means for guiding the lever. It also provides an arrangement for this purpose in which two screws effectively serve to hold all of the other parts of the device in proper assembly on the supporting or carrier member, and in which the device can easily be disassembled when these screws are removed.

Still further and also more detailed objects will appear from the following specification and from the accompanying drawings, in which

Fig. 1 is a vertical, longitudinal and substantially central section through a rear portion of an automobile headlight equipped with a focusing device embodying my invention.

Fig. 2 is a bottom view of the same focusing device, with the reflector and the lamp bulb omitted, but drawn on a smaller scale, showing the assembled focusing mechanism before it is attached to the reflector.

Fig. 3 is a transverse vertical section taken along the line 3—3 in Fig. 1, drawn on the same scale as Fig. 2.

Fig. 4 is an elevation of the cam member of my focusing device.

Fig. 5 is a rear view of my focusing device, or a view taken from the left of Fig. 1 with the lamp casing omitted, but drawn on a smaller scale than Fig. 1.

Fig. 6 is a perspective view of the auxiliary part of the carrier member which affords guides for the slide and fulcrums for both the lever and the screw.

Fig. 7 is a perspective view of the slidably mounted guide member.

Fig. 8 is a perspective view of the tubular part of the cam member, drawn on a smaller scale than Figs. 1 and 2 and showing this part before it is secured to the cam.

Fig. 9 is a section similar to Fig. 1, showing another embodiment of my invention, namely one having a single-piece carrier member, a jointed link connection between the nut and the socket, and a spring independent of this connection.

Fig. 10 is a plan view of the same embodiment.

Fig. 11 is an enlarged transverse section taken along the line 11—11 of Fig. 9, with the body of the socket omitted.

Fig. 12 is a perspective view, taken from the rear, of the forward lower portion of the rocking lever.

Fig. 13 is an enlarged perspective view of the link which connects the nut with the bracket on the socket.

Fig. 14 is a perspective view of the nut.

Referring first to the embodiment of Figs. 1 to 8 inclusive, Figs. 1 and 2 show portions of an automobile headlight including a reflector 1 and a casing back 2 separated from the rear end of the reflector by a considerable space. Disposed within this space and secured to one of the said spaced parts is a rigid carrier member which includes a front plate 3 secured to the reflector, a rearwardly extending vertical side portion 4, and a rear plate 5 which extends parallel to the front plate. The reflector has a rear end perforation considerably larger in diameter than the shell 6 of the lamp-socket which supports the lamp bulb 7 in operative relation to the reflector, and the front plate 3 has a perforation also freely housing the said socket shell; this latter perforation desirably being the bore of a forwardly directed tube 3^a on the plate 3, which tube extends

through the bore of the reflector and has its forward end flared outwardly as shown in Fig. 1 to clinch the said plate rigidly to the reflector.

The socket shell 6 slidably fits a guide tube 8 which is secured to a slide 9 to constitute a guide member which is supported by the carrier member with freedom for vertical sliding movement. To provide for this sliding, I am here showing the slide 9 as a flat plate which is laterally guided along one edge by the side plate 4 and along its other edge by a rearwardly directed flange 10 on the front plate 3. The slide 9 is held against the front plate 3 by fingers 11 formed upon an auxiliary plate 12 which is secured to the side plate 4 by a screw 13, and which also carries a fulcruming arm 14 disposed rearwardly of the socket and below the axis of the reflector, which auxiliary plate forms a part of the carrier member.

A rocking lever 15 is pivoted on this fulcruming arm for movement in a vertical plane and has its forward end engaging the bottom of the guide tube 8. This forward lever end also has a finger 16 projecting upwardly through alined longitudinal slots in the guide tube and the socket shell, while the rear end of the lever projects through a vertical slot 28 in the rear plate 5, whereby the latter slot guides the lever to restrict its movement to a vertical plane, while the engagement of the lever with the slot in the socket shell prevents the socket from rotating in the guide tube.

The rear plate 5 and the casing back 2 have alined perforations through both of which the tubular head 17 of a cam member extends, and this head has a transverse notch 17^a at its outer end so that it can be rotated by a large screwdriver, or by a coin 26 inserted in the alined notch portions. The tubular head 17 has arms 17^b extending through slots 18^a in a cam 18, and the free ends of these arms are bent over the forward face of the said cam to clinch the tubular head to it. The cam is held against the forward face of the rear plate 5 by spring means hereafter described, and the cam has an eccentric periphery engaging the top of the rear arm of the lever 15, so that rotation of the cam in one direction will rock the lever.

The auxiliary plate 12 also has an integral journaling arm 19 extending behind the socket and across the axis of the tubular head of the cam member. A screw 20 extends through the cam 18 and also has a contracted portion near its free end journaled in the forked free end of the journaling arm 19. This screw has its head disposed within the tubular head 17 and its shank threaded through a nut 21 which is connected to the socket 6 by connections which will transmit pulls and thrusts longitudinally of the socket while also permitting the socket to be raised or lowered by a vertical movement of the slide which carries the guide tube 8.

These connections are here shown as including a nut arm 22 extending rearwardly from the nut 21, a bracket 23 secured to the rear end of the socket shell 6, and a flat spring 24 riveted at its ends respectively to the bracket 23 and the nut arm 22. The parts to which the spring is riveted are out of alinement so that the spring is normally bowed upwardly, thereby causing the spring to press downwardly on the socket. This downward pressure takes up any vertical lost motion due to a loose fit of the socket shell in the guide tube and also presses downwardly on the slidably mounted guide member and hence on the forward arm of the lever 15, thereby holding the rear arm of the lever firmly against the periphery of the cam 18, so that the spring and the cam jointly control the position of the lever 15.

A compression spring 25 interposed between the cam and the nut 21 takes up any looseness in the threaded connection of the screw to this nut and also presses the cam against the rear plate 5 to hold the cam frictionally against accidental rotation.

With the focusing mechanism thus arranged, a rotation of the screw 20, which is easily reached by a screw driver inserted in the bore of the tubular member 17, will move the nut 21 forwardly or rearwardly according to the direction in which the screw is rotated. Since the spring 24 extends approximately parallel to the axes of the screw and the socket, this spring transmits the motion of the nut to the socket, thereby adjusting the lamp bulb longitudinally of the reflector. When the cam member is rotated in either direction, it either positively rocks the lever in one direction or permits the action of the flat spring 24 to rock the lever in the other direction, thereby imparting a corresponding vertical movement to the guide tube and hence adjusting the lamp bulb vertically. This rotation of the cam member is desirably effected by an ordinary coin engaging the notched end of its tubular head, as shown at 26 in Fig. 1, so as to rotate the cam without affecting the screw which is journaled in the cam and which is held against rotation by the pressure of the spring 25. In practice, I desirably interpose a dished washer 27 between the cam and the rear end of the spring to prevent the rear end of the coiled spring from catching on the cam.

With the above described construction, the slot in the rear plate and the slot in the guide tube cooperate in defining the position of the lever laterally of the mechanism, hence the fulcrum for the lever can be afforded by a finger 14^a at the free end of

the fulcruming arm. By constructing the fulcruming arm in this manner and by using a fork at the end of the thrust arm 19 as a fulcrum for the screw, I facilitate the assembling and disassembling of the mechanism and avoid the need of auxiliary fastening elements. Thus, in the above described form, the socket, nut, screw, spring and bracket parts can be assembled on the carrier member before the auxiliary part (shown separately in Fig. 6) is attached to the main part of the carrier member by sliding the four arms of the auxiliary member through corresponding perforations in the side plate 4 and inserting the screw 13. During this assembling, the fork of the arm 19 slips into the contracted shank part of the screw 20 and the fulcruming finger 14^a slides under the lever. Likewise, by detaching the screw 13 and withdrawing the said auxiliary part of the carrier member, I leave the screw 20 free to be unscrewed and withdrawn through the bore of the tubular head 17 of the cam member, after which the socket, the bracket 23, the spring 24 and the nut 21 with its arm 22 can be detached from the carrier member as a unit.

By forming and disposing the guide member (namely the slide plate 9 and the guide tube 8) as above described, I cause these to cooperate with the usual interior construction of the socket in sealing the perforation in the reflector, so that any dust which might enter the rear portion of the casing will not reach the interior of the reflector. To exclude dust from this rear casing portion I also desirably provide the back of the casing with a ferrule 29 into which the tubular head 17 of the cam member rotatably fits. However, I do not wish to be limited to the securing of my focusing mechanism to the reflector, since it would obviously function with equal advantage if it were otherwise supported in its same disposition with respect to the axis of the reflector.

Neither do I wish to be limited to the details of construction and arrangement as disclosed in the above described embodiment, since many changes might obviously be made without departing either from the spirit of my invention or from the appended claims.

For example, Figs. 9 to 14 show an embodiment of my invention in which the auxiliary part of the carrier member is omitted and in which the rocking lever 31 is fulcrumed on the side 4 of the carrier member by a pivoting bolt 32. This bolt extends through a boss 4^A formed on the said side 4 so as to hold the major part of the lever away from the said side, and the lever desirably has nubs 42 adapted to engage the side 4 adjacent to the lower edge of the lever so as to prevent any considerable portion of the lever from contacting with this side.

The socket shell 6 is secured at its rear end to one arm of an angle-shaped bracket 33 which has its other arm extending rearwardly in the same plane with the rearwardly directed arm of a nut 34 through which the screw 20 is threaded. The said rearwardly directed arms on the bracket and nut are connected by a link 35 which has laterally directed fingers 36 fulcrumed respectively in a perforation 37 in the said arm of the nut and in a similar perforation formed in the rearwardly directed arm of the bracket 33. The lengths of the laterally extending parts of the nut and of the bracket 33 are such as to hold the link 35 loosely against the lever 31, thereby retaining the link in a position in which its fingers 36 are fulcrumed respectively in the said perforations of the bracket and the nut.

The forward end of the lever has an upwardly directed finger 31^a entering alined longitudinal slots in the bottom of the guide tube 8 and of the socket shell 6, so as to prevent the socket from rotating, and also to cooperate with the guiding of the rear end of the lever by a vertical slot 38 (in the rear plate 5 of the carrier member) for restricting the lever to movement in a vertical plane. Adjacent to this finger 31^a the lever also has a bent spring finger 31^b which engages the bottom of the socket shell to force the shell upwardly against the top of the bore of the guide tube, so as to compensate for any loose fit and to avoid rattling.

Extending under the boss 4^A on the side plate of the carrier member is a spring 39 which has at its rear end a finger 39^a extending through a perforation in the side plate. This spring has its forward portion bent to extend transversely of the said side plate and under a hook 40 on the top of the guide tube, so that this spring presses the guide tube forwardly to hold the slide plate 9 against the front plate 3 of carrier member. The spring is initially so formed that its said disposition flexes it and hence causes it to press downwardly on the guide tube, thereby continually tending to depress the slide 9 and tending to rock the rear end of the lever upwardly. This rear lever end engages a cam 18 fastened to a slotted tubular head 17, which head is fulcrumed on the rear plate 5 of the carrier member and houses the head of the screw 20.

By suitably proportioning the length of the link 35, I cause the spring 25 to press the cam 18 against the rear plate 5 with sufficient friction to prevent accidental movement of the cam. This spring also acts through the nut to draw the head of the screw against the rear face of the cam for affording an effective swiveling connection of the screw to this cam, so that no additional support for the screw is needed. Thus arranged, two threaded members—namely the screw 20 and the pivoting bolt 32—main-

tain the entire mechanism in its assembled disposition, thereby facilitating both the initial assembling and any disassembling if the latter should be desired.

I claim as my invention:

1. A bulb-supporting and focusing mechanism for interposition between the forwardly directed reflector of a lamp and the back of the lamp casing; comprising a carrier member having spaced front and rear plates, a guide member vertically slidable on the front plate and including a horizontal tube; a lamp socket slidable in the tube, means operatively interposed between the rear plate and the socket for sliding the socket in the tube; a rocking lever supported by the carrier member and movable in a vertical plane and having its forward end in engagement with the tube, and cam means engaging the other end of the lever for rocking the lever.

2. A mechanism as per claim 1, in which the tube and the socket have alined bottom perforations, and in which the lever has a portion extending into the said perforations to prevent rotation of the socket in the guide tube.

3. A mechanism as per claim 1, in which the tube and the socket have alined bottom perforations, and in which the lever has a portion extending into the said perforations to prevent rotation of the socket in the guide tube, the rear plate of the carrier member having a portion thereof engaging the rear end of the lever and cooperating with the entry of the said tube bottom perforation by the lever to prevent horizontal shifting of the lever transversely of the axis of the tube.

4. A mechanism as per claim 1, in combination with spring means continuously pressing the said tube against the lever, the spring means acting also to press the said other end of the lever against the cam means.

5. A bulb-supporting and focusing mechanism for interposition between the reflector of a lamp and the back of the lamp casing; comprising a carrier member, a guide member supported by the carrier member for vertical movement and indicating a horizontal tube; a lamp socket slidable in the tube; means interposed between the carrier member and the socket for sliding the socket in the tube; a lever fulcrumed on the carrier member and having one arm engaging a portion of the guide member, and a cam member mounted for rotation with respect to the carrier member and engaging the other arm of the lever.

6. A mechanism as per claim 5, in which the carrier member and the guide member have slots respectively entered by the two arms of the lever, whereby the walls of the slots engage the lever arms to hold the lever fulcrumed on the carrier member.

7. A mechanism as per claim 5, in which the guide member includes a plate; and in which the carrier member includes a front portion secured to the reflector and slidably engaged by the said plate, a side portion upon which the lever is fulcrumed, and a rear portion upon which the cam member is rotatable and by which the lever is guided.

8. A bulb-supporting and focusing mechanism for interposition between the reflector of a lamp and the back of the lamp casing; comprising a carrier member having spaced front and rear plates, a guide member vertically slidable on the front plate and including a horizontal tube; a lamp socket slidable in the tube; a rocking lever supported by the carrier member and movable in a vertical plane and having its forward end in engagement with the tube; cam means engaging the other end of the lever for rocking the lever; a screw journaled in the cam member and swiveled upon the carrier member, and connecting means interposed between the screw and the socket whereby rotation of the screw slides the socket in the tube.

9. A mechanism as per claim 8, in which the connecting means include a spring continuously pressing the said tube toward the lever.

10. A bulb-supporting and focusing mechanism for interposition between the reflector of a lamp and the back of the lamp casing; comprising a carrier member having spaced front and rear plates, a guide member vertically slidable on the front plate and including a horizontal tube; a lamp socket slidable in the tube; a rocking lever supported by the carrier member and movable in a vertical plane and having its forward end in engagement with the tube; a cam member journaled on the carrier member on an axis parallel to the axis of the tube, the carrier member including a fork in alinement with the axis of the cam member; a screw journaled in both the cam member and the said fork, a nut threaded on the screw, and connecting means interposed between the nut and the socket for causing the socket to travel with a nut when the screw is rotated.

11. A bulb-supporting and focusing mechanism for interposition between the reflector of a lamp and the back of the lamp casing; comprising a carrier member having spaced front and rear plates, a guide member vertically slidable on the front plate and including a horizontal tube; a lamp socket slidable in the tube; a rocking lever supported by the carrier member and movable in a vertical plane and having its forward end in engagement with the tube; the carrier member comprising a main portion which includes the said front and rear plates, and a detachable auxiliary portion including a fulcrum for the lever and a fork

in alinement with the axis of the cam member; a cam member journaled on the carrier member on an axis parallel to the axis of the tube; a screw journaled in both the cam member and the said fork, and connecting means interposed between the screw and the socket whereby rotation of the screw slides the socket in the tube.

12. In a lamp, a reflector, a carrier member secured to the rear end of the reflector; a guide member mounted on the carrier member adjacent to the reflector for vertical sliding movement, the guide member including a horizonal tube; a lamp socket slidable in the said tube, the carrier member and the reflector each having a perforation substantially alining with the socket, the carrier member having a thrust wall disposed at some distance behind the socket, the carrier member including a rigid pivot arm disposed between the guide member and the thrust wall; a screw extending through and effectively swiveled on the thrust wall; means connecting the screw with the socket for causing rotation of the screw to slide the socket in the said tube, the said means including a spring continuously pressing the socket downwardly; a lever fulcrumed intermediate its ends on the pivot arm and having its forward end in engagement with the tube, and a cam member engaging the other end of the lever.

13. The combination with a reflector having a substantially axial perforation, of a rigid mechanism support comprising a front plate secured to the reflector, a side plate extending rearwardly from the front plate, and a rear plate extending across the axis of the reflector; an auxiliary part comprising a plate secured to the side plate and having a pair of arms extending parallel to the rear plate; a guide tube slidably mounted on the front plate for vertical movement, a lamp socket slidable in the tube; a cam member journaled in the rear plate; a screw journaled in the cam member and swiveled on one of the said arms; connecting means interposed between the screw and the socket whereby rotation of the screw slides the socket in the tube; and a rocking lever fulcrumed on the other arm and having its forward end in engagement with the bottom of the tube, the said connecting means including a spring continuously tending to slide the tube downward and serving also to press the tube against the forward end of the lever.

14. A mechanism as per claim 1, in which the lever has a finger engaging the socket to press the socket against the opposite wall of the bore of the guide tube.

Signed at Detroit, Michigan, October 28th, 1926.

CHARLES E. GODLEY.