May 12, 1931. S. F. ARBUCKLE 1,804,665

LAMP FOCUSING MECHANISM

Original Filed Oct. 12, 1926

Fig. 1.

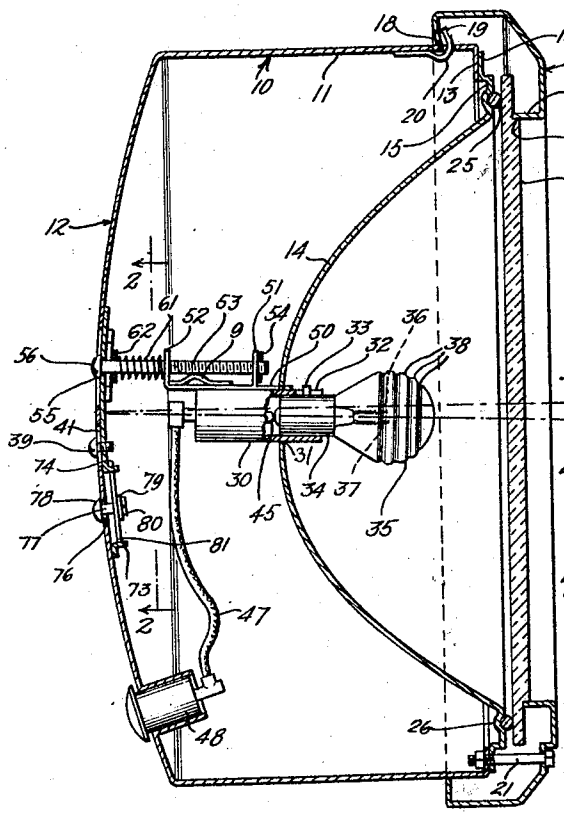


Fig. 2.

Fig. 5.

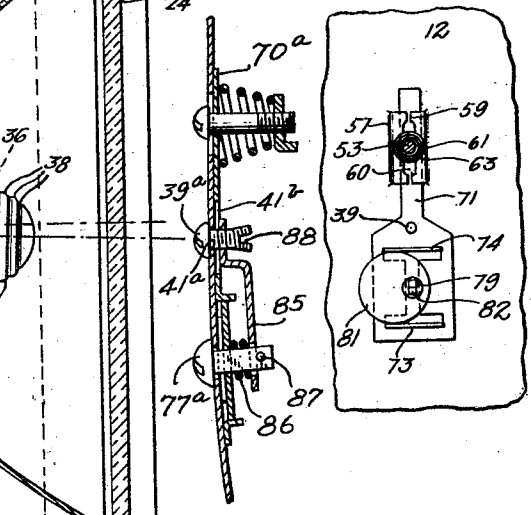


Fig. 3.

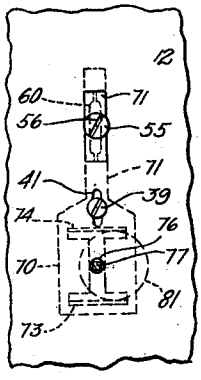
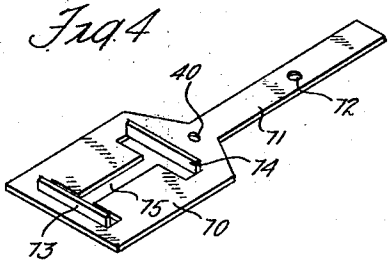


Fig. 4



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Patented May 12, 1931 1,804,665

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LAMP FOCUSING MECHANISM

Application filed October 12, 1926, Serial No. 141,054. Renewed May 17, 1930.

This invention relates to lamp focusing mechanism. More particularly, the invention relates to focusing mechanism adapted for use in electric headlamps for automobiles or similar automotive vehicles whereby the filament of the electric lamp is adjusted to give maximum lighting efficiency.

The invention is an improvement over my co-pending application for lamp focusing mechanism, Serial No. 72,106 of which it is a continuation in part, and consists in the use of a pivoted socket, adjustment of which is secured by means of an axially movable screw for the axial adjustment, and by means of a cam mounted on the casing and in engagement with the socket plate for imparting transverse movement to the socket.

Among the objects of the invention is the provision of adjusting mechanism which is exceedingly simple in construction and in operation, involving the smallest possible number of parts. Another important object is the utilization of frictional means and the provision of additional locking means for holding the socket in adjusted position. An object of the invention also is to simplify the means for causing transverse vertical movement of the adjusting plate, said means including a cam rotatably mounted on the casing and in engagement with the adjusting plate.

An object also is the provision of lamp adjusting mechanism which is particularly adaptable to the focusing of a two filament lamp within a reflector.

Various other objects relating to the relationship of the adjusting means, the construction of the adjusting plate, the devices for securing a strong frictional hold of the movable parts, and factors bearing on the mode of assembly and method of manufacture will become apparent upon consideration of the description hereinafter detailed, and on inspection of the accompanying drawings, in which

Figure 1 is a vertical, sectional elevation of a headlamp showing the adjusting mechanism;

Figure 2 is a detail, showing the adjusting plate and the cam mechanism;

Figure 3 is another detail of the adjusting plate;

Figure 4 is a perspective of the adjusting plate showing the connection to the cam; and

Figure 5 is a sectional elevation of a portion of the headlamp, showing a modification of the locking means.

The invention, as previously indicated, has special adaptation for use in automobile headlamps and for purposes of illustration, the invention is described as applied to the ordinary type of automobile headlamp. Figure 1 shows a headlamp 10 having a cylindrical casing 11, the front end of which is open and the rear face of which is closed by a curvilinear shell 12. The front edge of the casing 11 terminates in an inwardly directed flange 13 which is designed to contact with and support the reflector 14.

To this end the reflector 14, which is of the ordinary paraboloid type, has its forward edge terminating in a radial flange 15, the outer periphery 16 of which is adapted to engage with and be held by the casing flange 13, hereinabove mentioned. The reflector is held in position, as specified, by means of a pivoted door member 17 which has pivotal engagement with the casing at 18 by means of the door prong 19 and casing hook 20, and which is secured in position by the bolt 21 passing through the door member 17 and the opposed reflector and casing flanges 16 and 13.

The door member 17 is annular in formation and possesses a backwardly directed flange 22 which is adapted to have bearing on a ridge 23 formed on the lens 24 of the reflector, as shown clearly in Figure 1 of the drawings.

Intermediate the outer edge of the lens and the reflector flange 15 is positioned the usual cushioning cord 25 which normally rests in the annular groove 26 on the front side of the flange 15.

It is thus seen that with the reflector, cushion cord, lens and door member 17 in position as held by the bolt 21, a unified, stable and rigid assembly is accomplished, suitable for automobile use.

The lamp bulb socket is positioned in an aperture formed in the axis of the reflector. As shown, the socket 30 is mounted so as to have either axial or pivotal movement in the aperture 31. The open socket end of the socket 30 extending within the reflector is formed with bayonet slots 32 adapted to receive the pins 33 mounted on the base 34 of the lamp bulb 35.

The lamp bulb, as shown, is of a special type having two concentrated filaments 36 and 37 positioned one above the other and adapted to be focused in the reflector so that they are equally displaced from the axis of the reflector and at the same time each lying approximately within the focal plane of the reflector. The forward spherical glass portion of the bulb is preferably constructed with annular variations in thickness, as shown, to produce the annular rings 38, the purpose of which is to break up the formation of an image of either filament brought about by reflection from the interior surface of the bulb.

The socket 30, on its back end, contains the spring held connecting pins 45 which end in the terminals 46. The flexible cord 47 connects the terminals 46 to the casing plug 48, at which electrical energy from an external source is applied to the electric circuit.

The specific adjusting mechanism will now be described. Fastened by any appropriate means to the upper side of the socket 30 is a plate 50 having upturned members 51 and 52, each of which is threaded to receive the axial adjustment screw bolt 53. This bolt is threaded through both plates 51 and 52 and is prevented from removal by the cotter pin 54 extending through the end of the bolt. The bolt extends backwardly to the exterior of the casing through the shell 12 and terminates in a screw head 55 having a transverse notch 56 for manipulation of the same.

At the point where the bolt 53 passes through the casing, the casing material is struck or pressed inwardly and slotted to form a forwardly extending depression with opposed wings 57 and 58 separated by the slot 59. The slot 59 has an enlarged portion 60 of a width approximately that of the diameter of the bolt 53, and this enlarged slot portion 60 also has an extended length so as to permit vertical adjustment of the bolt 53 within defined limits. The bolt is frictionally maintained in its position by means of a coil spring 61 which extends between the upstanding portion 52 of the socket plate 50 and a washer 62 adjacent the slotted wings 57 and 58.

In addition, a yieldable metallic plate 9 is fastened to the plate 50 at one end, the other end being free to move, and the middle portion thereof being humped and slotted so that the sides of the slot have frictional bearing against the screw bolt 53 and tend to hold the same in adjusted position.

It is evident that rotation of the screw head 55 will cause axial movement of the socket 30 by reason of the connections and agencies above identified and described.

Mechanism for producing vertical movement of the lamp bulb socket is utilized as follows. Referring particularly to Figures 2, 3 and 4, there is shown the adjusting plate 70, this being of approximately rectangular formation and having a tongue member 71 extending from one edge thereof. The material of the plate is such as to permit a certain degree of flexing, and the width of the tongue 71 is such that it may be inserted back of the wings 57 and 58, and in front of the casing above and below the slotted portion, as clearly disclosed in Figure 2 of the drawing. There is an aperture 72 formed in the tongue which is of a size sufficient to receive the adjusting bolt 53.

The body of the plate 70 is formed with two struck-out tongues 73 and 74, as shown in Figure 4, to form flat opposing surfaces extending transversely to the axis of the plate, as determined by the tongue extension 71. The tongues 73 and 74 are on one side of the plate and are connected by a central axial slot 75. When in position with the bolt 53 in the aperture 72 of the tongue 71, the plate is adapted to rest on the forward side of the casing wall surface immediately adjacent an aperture 76 in which a bolt 77 is positioned. This bolt has an adjusting head 78, and the shank of the bolt extends through the slot 75 of the adjusting plate and is held in position by the washer 79 and nut 80.

Adjacent the forward face of the plate 70 between the tongues 73 and 74 is mounted a circular cam member 81 having an aperture 82 of rectangular formation therein adapted to conform to a portion of the bolt 77 so that a rigid connection exists between the cam and the bolt, and on rotation of the bolt the cam is correspondingly rotated. The diameter of the cam 81 corresponds approximately to the distance between the tongues 73 and 74 so that irrespective of the point of rotation of the cam, there will be constant bearing on both sides by the tongues against the edge of the cam. Attention is directed to the transverse width of the tongues 73 and 74 which is of sufficient extent so that the points of contact of the cam against these tongues is continuous, as the cam is rotated. This is of importance in the construction as preventing looseness and rattle, and inability to properly hold the focus of the lamp bulb.

It may be noted further that in the assembly of the adjusting plate 70 in position on the curvilinear shell wall 12, it is forced out of its normal flat position into a state of strain, which tends to maintain a strong

frictional bearing between the plate and the casing shell. This frictional bearing is of importance in maintaining the final adjustment of the lamp bulb filaments when once secured, and obviates the use of auxiliary holding means. However, the vertical vibration of an automobile in use, makes it necessary that this vertical adjustment be doubly secure against displacement and therefore an additional locking means may be provided if desired. This may take the form of a screw 39 threaded into a hole 40 on the plate 70. A slot 41 is provided in the casing 12 through which the screw is adapted to pass the head of the screw being on the outside of the casing.

A modification of the means for locking the adjusting plate is shown in Figure 6. In this modification the screw 39*a* passes through a hole 41*a* in the casing and through a slot 41*b* in the adjusting plate 70*a*. The screw 39*a* is threaded into an arm 85 which is anchored on the cam pivot 77*a*. A spring 86 may be provided between the arm and the cam to keep both parts in place and a pin 87 is inserted through the end of the pivot 77*a* to prevent the arm 85 from coming off. The screw 39*a* may be split as at 88 and spread apart to prevent it being screwed out of the arm 85.

The operation of the machanism as described will now be referred to.

With the parts assembled as shown in Figure 1 with the lamp bulb in position, axial adjustment of the lamp bulb filaments is secured by rotation of the screw bolt head 55, which rotation, depending upon the direction, causes axial movement of the socket 30 and lamp bulb 35. In accordance with usual focusing methods, the operator may readily determine when the filaments are approximately in the focal plane of the reflector. Adjustment is then made to bring one filament above and the other below the axis of the reflector, and equally spaced therefrom. This adjustment is secured by the rotation of the bolt head 78 which causes rotation of the cam 81 and a resultant vertical movement of the adjusting plate 70 with the connected bolt 53 and socket 30. The socket pivots in the aperture 31 and consequently the filaments are shifted vertically until their arrival at the desired position. After this primary adjustment, a second adjustment may be made at both bolt heads until the filaments of the lamp bulb are in the proper focal position. The screw 39, if provided, may then be tightened down against the sides of the slot, thereby locking the plate 70 against accidental displacement.

Among the advantages of the construction above described may be mentioned that resulting from the possibility of continuous rotation of the cam 81. In prior constructions, it has been proposed to use means for moving the adjusting plate which had limiting stops, and the operator, in manipulating the adjustment, frequently would exert too great force on the adjusting means, not realizing that the limiting point had been reached, and thereby cause breakage of the parts. In this construction, as above presented, there are no stopping devices, the cam being freely rotatable. Another outstanding advantage of the construction resides in the continuous contact of the cam against the adjusting plate members which practically eliminates all lost motion and therefore permits very close adjustment of the lamp filaments. This is especially advantageous in the use of a two filament bulb, as variation of a small fraction of an inch of the distance of these filaments from the paraboloid axis frequently causes serious distortion of the emitted light beams.

This construction it will be noted, lends itself to compliance with certain laws which may prohibit the adjustment of the lamp in the vertical plane. If the lamp is used in a State having such a law, the slot through which the locking screw passes may be filled with solder after the lamp has been adjusted to comply with legal requirements and the vertical adjustment therefore, made permanent.

Note should be made of the fact that while a two filament lamp is specified and described in connection with the adjusting means, that the invention may be employed with effectiveness for any type of lamp bulb such as the ordinary one filament lamp.

Various modifications of the invention other than those hereinabove specified may be made by those skilled in this art, and consequently it should be understood that the disclosure is illustrative rather than definitive, the scope of the invention being defined by the claims hereunto appended.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. In a lamp adjusting mechanism, a casing, a reflector, a socket movably positioned in an aperture in said reflector, a member slidably mounted adjacent said casing, means connecting said socket and member, means to move said member with respect to said casing, an arm adjacent said member and on the opposite side thereof from said casing and means to draw said arm toward said casing whereby said member is gripped between said arm and casing.

2. In a lamp adjusting mechanism, a casing, a reflector, a socket movably positioned in an aperture in said reflector, a plate slidably mounted adjacent said casing, means connecting said plate with said socket, means to move said plate with respect to said casing, an arm loosely anchored to said casing and extending adjacent said plate and on the opposite side thereof from said casing, a

screw rotatably mounted in said casing and threadedly engaging said arm, whereby when said screw is rotated said plate is gripped between said arm and casing.

3. In a lamp adjusting mechanism, a casing, a reflector, a socket movably positioned in an aperture in said reflector, a plate slidably mounted adjacent said casing, means connecting said plate and socket, a pin rotatably mounted in said casing, a cam non-rotatably secured to said pin, means on said plate adapted to co-operate with said cam to cause movement of said plate when said cam is rotated, a screw rotatably mounted on said casing, an arm threadedly engaging said screw and extending adjacent said plate and loosely anchored to said pin, whereby when said screw is rotated said plate is gripped between said arm and said casing.

4. In a lamp adjusting mechanism, a casing, a reflector, a socket movably mounted in an aperture in said reflector, a plate slidably mounted adjacent said casing, said plate having a pair of vertical slots therein, means connecting said plate and socket, a pin rotatably mounted on said casing and passing through one of said slots in said plate, a cam non-rotatably mounted on said pin, means on said plate adapted to co-operate with said cam to cause movement of said plate when said pin and said cam are rotated, a screw rotatably mounted upon said casing and passing through the other of said slots, an arm loosely anchored to said pin and extending across said plate and threadedly engaging said screw, whereby when said screw is tightened into said arm, said plate is gripped between said arm and casing.

5. In a lamp adjusting mechanism, a casing; a reflector mounted within said casing; a socket movably positioned in an aperture in said reflector; a movable member adjacent said casing; means connecting said socket and member, said member being formed with a pair of substantially parallel projecting flanges; means to move said member with respect to said casing comprising a cam positioned between said flanges; means for rotating said cam; an arm adjacent said member positioned on the opposite side thereof from said casing; and means independent of said cam adjusting means operable to clamp said member between said arm and said casing for holding said member in adjusted position.

In testimony whereof I affix my signature.

SAMUEL F. ARBUCKLE.