

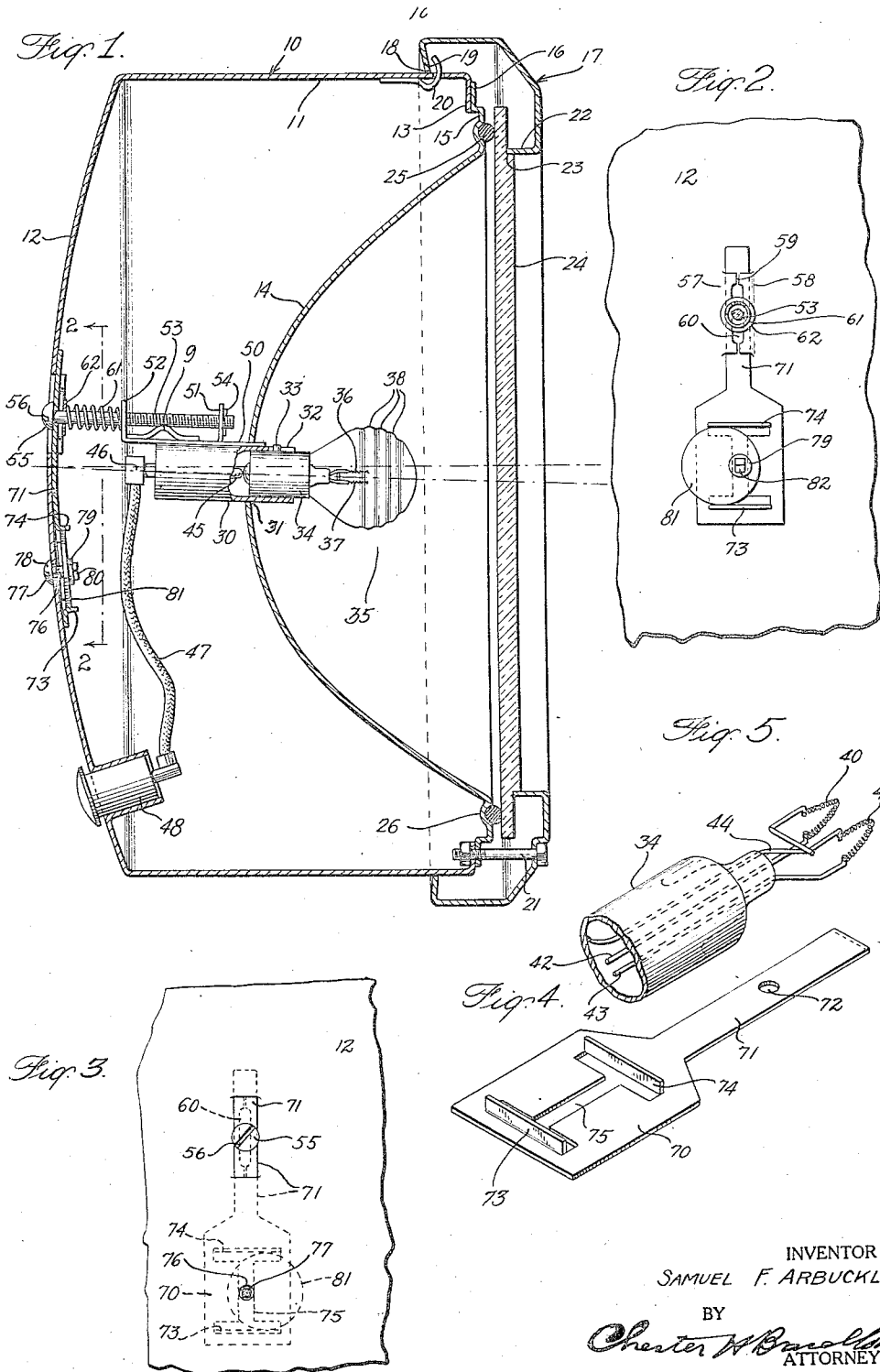
Dec. 30, 1930.

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1,786,814

LAMP FOCUSING MECHANISM

Filed Nov. 30, 1925



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LAMP FOCUSING MECHANISM

Application filed November 30, 1925. Serial No. 72,106.

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.

In my co-pending application, Serial No. 13,681, filed March 7, 1925, I have shown and described mechanism basically similar to the subject matter of the present application, in which both axial and vertical adjustment of the filament of the electric light bulb positioned in the lamp is secured. In this co-pending case, use is made of a transversely movable plate connected to the lamp socket which is pivotally mounted in the reflector, said plate having plural adjusting means extending to the rear of the casing. In my co-pending application, Serial No. 51,557, filed August 21, 1925, I have disclosed an improvement over the prior filed application in which pivotal movement of the socket of the electric lamp is secured by means of a screw bolt and a rack and pinion, the screw bolt imparting axial adjustment to the socket, and the operation of the pinion on the rack causing a transverse vertical movement of the socket.

The present invention is an improvement over the specific devices shown in the above mentioned co-pending applications 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 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 ad-

justing 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 drawing, 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 perspective of the base of the lamp showing the wiring arrangement of the double filaments employed.

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 drawing.

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 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. Figure 5 clearly brings out in perspective the construction of the filaments and the wiring of the lead-in wires in relation to the socket of the bulb. As shown, the filaments 36 and 37 are of the coiled-V type so as to give a concentrated light source. These filaments are placed one above the other and in symmetrical relation one to the other. The filament 36 is electrically connected to the base contact by wire 42, and the filament 37 is connected to the base contact by the wire 43. The opposite sides of both filaments are grounded on the base 34 by the common wire 44 so that only two base contacts are necessary for this lamp.

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 backwardly extends 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 slot 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.

Intermediate 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.

The operation of the mechanism 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 secondary adjustment may be made at both bolt heads until the filaments of the lamp bulb are in the proper focal position.

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 has been reached, and thereby causing 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.

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.

I claim as my invention:

1. In lamp adjusting mechanism, the combination of a casing; a reflector positioned within the casing; a socket positioned in an aperture formed in the axis of the reflector; a lamp bulb within the socket and reflector; means for axially adjusting said bulb within the reflector; means for vertically adjusting said bulb within the reflector, said last mentioned means being operable from without the casing and comprising a resilient plate connected to and movable with said axial adjusting means and adapted to have a normal curvature different from that of the casing, said plate being insertable intermediate a struck-out adjacent portion of the casing and a non-struck-out portion of the casing whereby the resilient plate is maintained in flexed position producing frictional contact with the casing.

2. In a lamp adjusting mechanism, the combination of a casing, the rear wall of which has a portion therein struck out in a forward direction and slotted; a reflector within the casing; a lamp bulb socket movable in an aperture formed in said reflector; and mechanism for vertically and longitudinally adjusting said socket comprising an adjusting plate positioned behind said struck-out portion of the casing and having ends terminating on either side of said struck-out portion and in front of the rear casing adjacent the struck-out portion; an adjusting screw

extending through the slot of the struck-out portion and through an aperture formed in said adjusting plate, the head of said screw terminating on the outside of said casing to permit rotation thereof; means for transversely moving said adjusting plate; and a screw-threaded member adapted to have threaded engagement with said adjusting screw, said member being fixed to the socket, said adjusting plate being resiliently maintained in deformed position against said casing by said struck-out portion whereby it is frictionally retained from movement relative to the casing.

3. In a lamp adjusting mechanism, the combination of a casing, the rear wall of which has a portion therein struck out in a forward direction and slotted; a reflector within the casing; a lamp bulb socket movable in an aperture formed in said reflector; and mechanism for vertically and longitudinally adjusting said socket comprising an adjusting plate positioned behind said struck-out portion of the casing and having ends terminating on either side of said struck-out portion and in front of the rear casing adjacent the struck-out portion; an adjusting screw extending through the slot of the struck-out portion and through an aperture formed in said adjusting plate, the head of said screw terminating outside of said casing to permit rotation thereof; means for transversely moving said adjusting plate; a screw-threaded member adapted to have threaded engagement with said adjusting screw, said member being fixed to the socket; said adjusting plate being resiliently maintained in deformed position against said casing by said struck-out portion whereby it is frictionally retained from movement relative to the casing; and resilient means intermediate the casing and threaded member adapted to maintain the adjusting screw to the limit of its forward movement.

4. In a lamp adjusting mechanism, the combination of a casing, the rear wall of which has a portion therein struck out in a forward direction and slotted; a reflector within the casing; a lamp bulb socket movable in an aperture formed in said reflector; and mechanism for vertically and longitudinally adjusting said socket comprising an adjusting plate positioned behind said struck-out portion of the casing and having ends terminating on either side of said struck-out portion and in front of the rear casing adjacent the struck-out portion; an adjusting screw extending through the slot of the struck-out portion and through an aperture formed in said adjusting plate, the head of said screw terminating on the outside of said casing for permitting rotation thereof; means for transversely moving said adjusting plate; a screw-threaded member adapted to have threaded engagement with said ad-

justing screw, said member being fixed to the socket, said adjusting plate being resiliently maintained in deformed position against said casing by said struck-out portion whereby it is frictionally retained from movement relative to the casing; resilient means intermediate the casing and threaded member adapted to maintain the adjusting screw to the limit of its forward movement; and frictional means for resisting rotational movement of the adjusting screw.

5. In a lamp adjusting mechanism, the combination of a casing, the rear wall of which has a portion therein struck out in a forward direction and slotted; a reflector within the casing; a lamp bulb socket movable in an aperture formed in said reflector; and mechanism for vertically and longitudinally adjusting said socket comprising an adjusting plate positioned behind said struck-out portion of the casing and having ends terminating on either side of said struck-out portion and in front of the rear casing adjacent the struck-out portion; an adjusting screw extending through the slot of the struck-out portion and through an aperture formed in said adjusting plate, the head of said screw terminating on the outside of said casing for permitting rotation thereof; means for transversely moving said adjusting plate; a screw-threaded member adapted to have threaded engagement with said adjusting screw, said member being fixed to the socket, said adjusting plate being resiliently maintained in deformed position against said casing by said struck-out portion whereby it is frictionally retained from movement relative to the casing; resilient means intermediate the casing and threaded member adapted to maintain the adjusting screw to the limit of its forward movement; a cam, rotatably mounted on the casing and comprising an eccentrically mounted disk, and tongues projecting from the adjusting plate, said tongues forming continuous bearings with the edge of the cam disk.

6. In a lamp adjusting mechanism intermediate the lamp socket and a lamp casing containing said socket, the combination of a casing having a slotted section thereof adjacent the axis of the socket stamped inwardly to form a bridged member on a plane displaced interiorly from the plane of the casing; a resilient adjusting plate adapted to have a normal curvature different from that of the casing insertable behind said stamped portion and in front of the adjacent portions of the casing, said plate being frictionally held from movement by the pressure of the plate against the stamped inward portion and the adjacent casing wall; a screw engaging member fixed to the socket; an adjusting connection screw positioned in an aperture of said plate and in said slot and extending toward said socket, the head of the

screw extending to the rear side of the plate and operable from the exterior of the casing, and the forward threaded portion of this screw having threaded engagement with the threaded member fixed to the socket; means for maintaining said screw in threaded relationship with said threaded member; and means for normally maintaining said screw at one limit of its axial movement, said screw being rotatable to give axial movement to the socket; and said screw being transversely movable to predetermined adjusted positions; and a cam rotatably mounted on the casing and contacting with the adjusting plate adapted to cause transverse movement of said plate and attached screw.

7. In a lamp adjusting mechanism, the combination of a casing having a curved rear wall, a portion of said wall being struck inwardly therefrom and having a slot therein, a reflector within said casing having an aperture through the axis thereof, a lamp socket movable within the aperture in said reflector, a lamp bulb in said socket within said reflector, a resilient plate slidably mounted on the rear wall of said casing and held in frictional contact therewith by said struck-in portion, said plate being inserted between said struck-in portion and the rear wall of said casing, a screw-engaging member attached to said socket, a screw rotatably mounted in an aperture in said plate passing through the slot in said struck-in portion of said casing wall and engaging said member whereby rotation of said screw affects axial movement of said socket and bulb, said screw having a head terminating on the outside of said plate to permit rotation of said screw, a pin rotatably mounted on said casing and having a head terminating on the outside thereof to permit rotation of said pin, a disc eccentrically attached to said pin, and a pair of horizontal parallel tongues attached to said plate and confining said disc whereby rotation of said pin causes the reciprocation of said plate and vertical movement of said bulb.

In testimony whereof, I affix my signature.

SAMUEL F. ARBUCKLE.