

July 3, 1928.

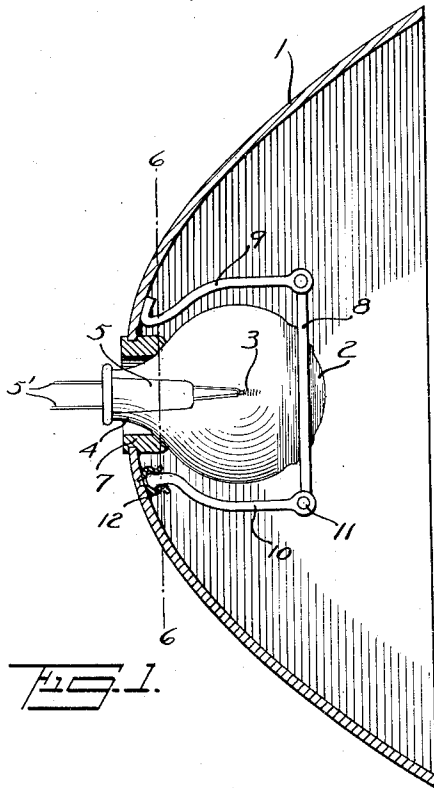
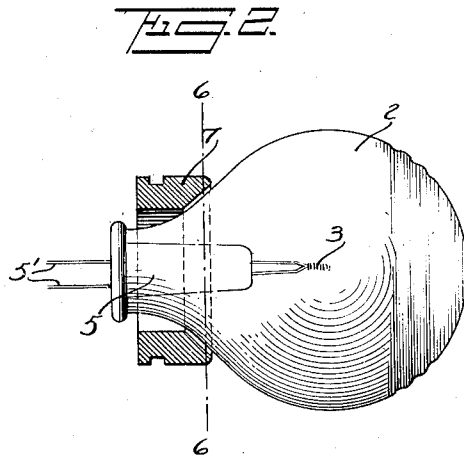
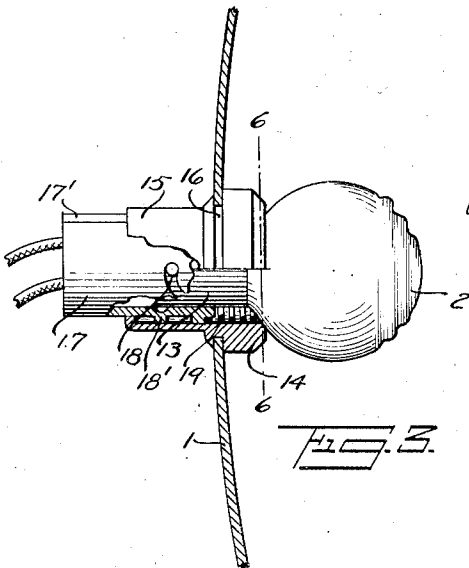
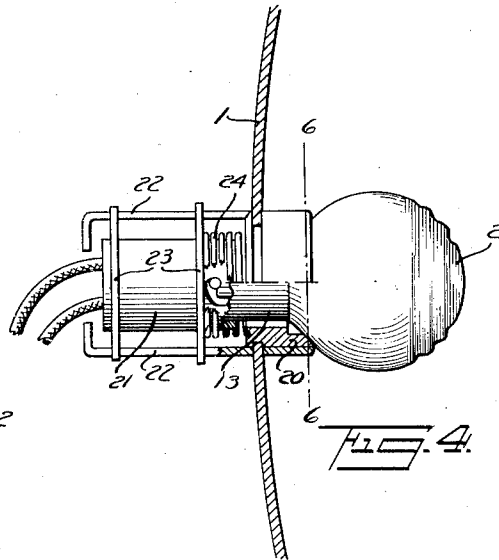
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C. C. BOHNER

PROJECTOR LAMP FOR MOTOR VEHICLES

Filed Jan. 5, 1927

3 Sheets-Sheet 1



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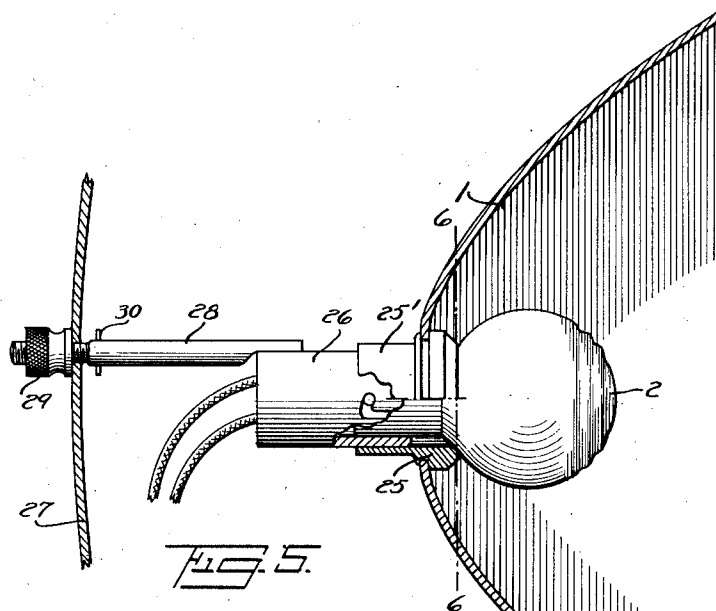
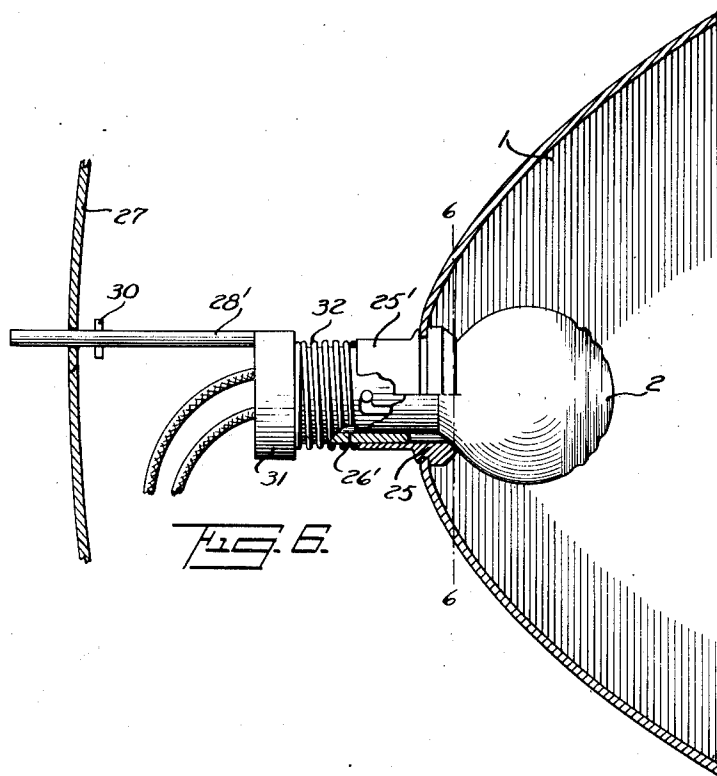
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3 Sheets-Sheet 2



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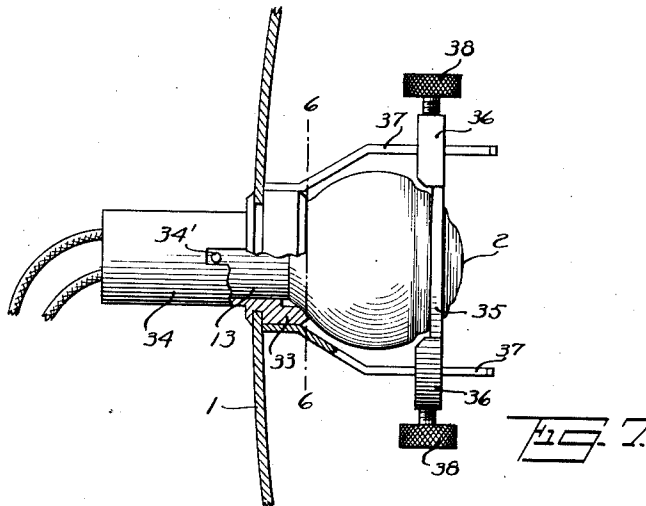
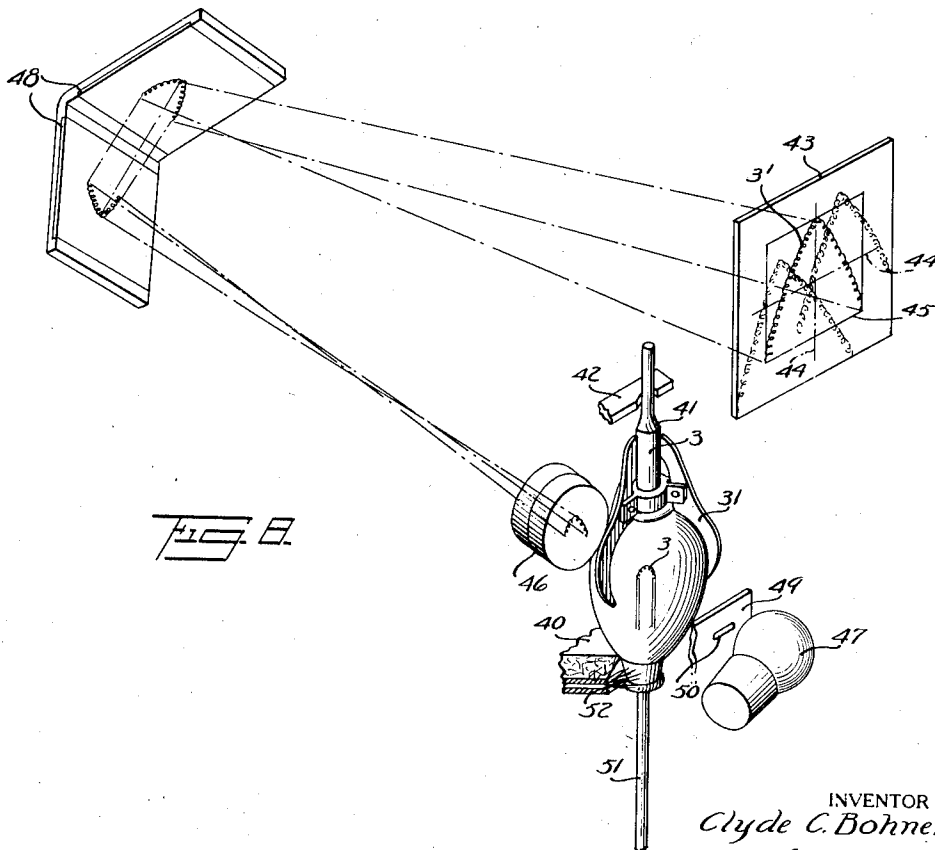
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UNITED STATES PATENT OFFICE.

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PROJECTOR LAMP FOR MOTOR VEHICLES.

Application filed January 5, 1927. Serial No. 159,041.

This invention relates to a projector or head lamp for motor vehicles and an incandescent lamp therefor.

The object of the invention is a novel projector or head lamp for motor vehicles which requires no initial focal adjustments upon the insertion of an electric lamp and which maintains permanently a fixed and proper relation between the incandescent lamp bulb and the reflecting or projecting surface, and the invention includes an electric lamp bulb which may be used either with my novel projector to obtain a permanent and fixed focal relation with reference to the reflecting surface, or may be used with equal facility in the standard projector or head lamps now being used on motor vehicles.

For a better understanding of the invention, reference may be had to the accompanying drawings wherein:

Fig. 1 is a view partly in section of a head lamp or projector embodying my invention;

Fig. 2 is an enlarged view of my novel lamp bulb and a reflector part broken away;

Figs. 3 to 7 are views of modified projector structures, and

Fig. 8 illustrates a step in the manufacture of my novel electric lamp bulb.

Referring to the drawings I have illustrated one embodiment of my invention in Figs. 1 and 2, showing a projector or head lamp for motor vehicles, including a suitable reflector 1 and an incandescent lamp bulb 2. The incandescent lamp bulb 2 has a concentrated filament 3 and a conical neck portion 4, the filament 3 being carried by a mount 5 which is sealed into the glass bulb 2 in the usual manner. The bulb 2 has its filament 3 positioned and located in position with the bulb with reference to a plane passing through the bulb neck, which plane is at right angles to the axis of the bulb and is designated by the line 6—6. In this embodiment the bulb is supported entirely from the glass parts of the bulb and independently of any metallic base, and when the base is omitted the leading in conductors 5' may be connected with any suitable device (omitted for convenience) for effecting connections with an outside circuit. There is a fixed rear support 7 carried by the reflector 1 which support in the embodi-

ment illustrated is in the form of a ring engaging the bulb 2 at the points on the bulb neck disposed within the plane 6—6. The other support for the bulb is designated at 8 and preferably also consists of a ring which engages the spherical end of the bulb so as to properly center and position the same with reference to the support 7 and the reflector. This support 8 must engage and grip the bulb 2 firmly and hold the same tightly against the ring support 7. In the particular embodiment shown this support 8 is pivotally carried at one side by a bent arm 9 which extends forwardly from the rear of the reflector 1. The other side of the ring support 8 is held by an arm 10, as for example, being in the form of a clamp pivoted at 11 to the support 8 and having a catch at 12 for effecting a quick removal and replacement of the bulb. These supports 8, 9 and 10 are preferably sufficiently resilient to avoid breakage of the bulb when it is clamped in position. It is understood, however, that any suitable form of supporting means may be provided for holding the bulb 2 in its proper position with respect to the support 7 engaging the conical neck at points contained within the plane 6—6.

In the embodiment shown in Fig. 3 the lamp bulb is provided with a standard base 13 and the support for the outer or enlarged end of the bulb may be omitted. There is a support 14, however, which is in the form of a ring and corresponds to the support 7 of Fig. 1, this support 14 engaging the conical portion of the bulb neck at the planar points indicated by the line 6—6 when the lamp bulb is in position. The support 14 is made integral with a rearwardly extending sleeve or shell 15 which has a groove 16 into which fits the peripheral edge of the opening in the reflector 1. The socket for the base 13 is designated at 17 and is provided with the usual bayonet joint connection 18. This socket is movably contained within the sleeve or shell 15 and a coil spring 19 engages the shoulder of the ring support 14 at one end and at the other end engages the inner end of the socket 17, thereby normally tending to urge the socket 17 in a direction to hold the lamp bulb 2 tightly against the supporting member 14. The socket 17 may be prevented from turning in any suitable manner, as for example

by means of the spline 17' fitting in a key-way in the shell 15.

In the embodiment shown in Fig. 4 there is provided a supporting ring 20 similar to the supporting ring 14 of Fig. 3 which ring is similarly carried by the reflector 1. The socket 21 for the reception of the base 13 is movable back and forth on the guides 22, the latter being carried by the ring 20 and the socket 21 being provided with two guide members 23 which function with guides 22 to permit the socket 21 to move back and forth, toward and away from the ring 20; a coil spring 24 surrounds the inner end of the socket and engages at one end the ring 20 and at the other end the inner guide 23 and thereby normally holds the bulb 2 tightly against the ring 20 with the latter engaging the conical neck portion of the bulb 2 along the plane 6—6 with reference to which line or plane the filament is originally adjusted. In both the modifications of Figs. 3 and 4 the lamp bulb 2 may be inserted by moving the sockets forward against the tension of the springs far enough to enable the insertion of the bulb 2 with its base therein with the bayonet joint fastened in the usual manner.

In the modification of Fig. 5, the holding ring 25 is carried by the reflector 1 in a similar manner to the ring 14 of Fig. 3 and the socket 26 is slidably retained in the outer end of the shell 25' formed integrally with the ring 25. The lamp casing is indicated at 27, and for providing for the ready insertion of lamp bulbs 2 and the removal of the same and for retaining the lamp bulb 2 in its proper position against the ring 25, there is provided an elongated retaining and push-rod member 28 extending rearwardly from the socket 26 and through the lamp casing 27, which member 28 has a screw-threaded end and an adjusting nut 29 thereon whereby the socket 26 may be withdrawn in a backward direction to hold the lamp bulb 2 tightly against the ring. A stop 30 is carried by the member 28 a short distance from the lamp casing to serve to limit the rearward movement of the socket 26. To remove or insert a lamp bulb 2 it is only necessary to loosen and move the nut 29 so as to permit the socket 26 to be moved forward (by pushing on end of rod 28) sufficiently to enable this to be done.

In the embodiment of Fig. 6 the socket 26' is provided on its outer edge with a shoulder 31 between which shoulder and the outer end of the shell 25' of the ring 25 there is provided a coil spring 32 which tends to retain the lamp bulb 2 tightly against the ring 25. In this case the nut 29 is not necessary since the coil spring 32 retains the bulb tightly against the holder 25, the latter engaging the conical portion of the bulb neck at points in the plane 6—6. The socket 26'

may be moved forward for insertion of another bulb by simply pushing on end of push-rod 28' which is carried by the socket and projects rearwardly through the lamp casing.

In the embodiment shown in Fig. 7 the holding ring is indicated at 33 and is carried by the reflector in a similar manner to the rings above described. In this instance the ring 33 and its rearwardly extending shell 34 are made with an internal diameter substantially equal to or slightly larger than the diameter of the base 13 of the lamp bulb, and the latter simply slides into the ring of the shell 34 with no rotary movement necessary for fastening, the shell 34 being provided with a slot 34' for the accommodation of the usual fastening pin of the base. The lamp bulb is retained in its position by a special ring support 35 engaging the outer bulbous or enlarged portion of the bulb 2. The ring support 35 includes two end supporting and adjusting parts 36 having openings therein for the accommodation of the two supports 37 which extend forwardly from the reflector 1 and the ring 33, the ends 36 of the support 35 having screw-threaded openings therein registering with the openings for the accommodation of the arms 37, and there are provided set screws 38 which are adapted to be screwed home to engage the arms 37 and hold the lamp in the fixed adjusted position.

One advantage of this projector construction is that the lamp bulbs 2 do not require any initial focal adjustments with reference to the reflecting surface of the reflector 1, the filaments 3 having been adjusted in the process of manufacture with reference to points of the conical neck contained in the plane 6—6 and the ring supports engaging the conical parts of the bulb necks at these reference points. The filament always maintains a fixed and proper relation with respect to the reflecting surface, there being no necessity for adjustments or adjustable parts in the projector. A true fixed focus projector is thereby provided and the bulbs 2 may be of various and sundry shapes and dimensions, especially in the modifications shown in Figs. 3 to 6 inclusive, without necessitating a change of projector construction. A further advantage of this construction is the added security of the support by reason of the shortening of the leverage by the rings engaging the conical portions of the bulb necks at points disposed in the plane 6—6.

The bases 13 of the bulbs 2 are preferably also located and positioned on the lamp bulbs so as to bear a predetermined relation with reference to the planar points of the bulb neck contained within the plane 6—6 when they are based. The lamp bulbs 2 may therefore be used interchangeably either in the projector illustrated to obtain a per-

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manently fixed focal adjustment, or they may be used in the standard reflectors (not illustrated) wherein the bulb is supported entirely by the base 13 and wherein there is no support corresponding to the ring supports engaging the conical portions of the bulb necks in the plane 6—6.

The filaments 3 of the lamp bulbs 2 may be positioned and located with reference to the bulb neck or the plane 6—6 passing through the bulb neck in any desirable manner, but I prefer the method illustrated in Fig. 8, according to which method the lamp bulbs have their filaments adjusted during the sealing-in of the mounts 5, that is, the necessary adjustments are effected after the sealing-in operation and before the seals have cooled sufficiently to become set.

Closely adjacent the sealing-in machine (not illustrated) and in convenient reach of the operator, there is disposed an apparatus including a holder or gauge 40, which is adapted to receive the conical neck 4 of the bulb 2 as the operator removes the same from the sealing-in machine, as for example by means of a suitable gripping holder 41. The holder 40 is ring-like in form with a section removed therefrom to permit the lateral positioning of the bulb neck there-within and includes a bearing or gauge edge 40' against which the reference line or points (plane 6—6) of the bulb neck firmly rests. Another guide 42 is positioned above the lamp bulb 2 and is of V shape for receiving the handle of the holder 41 to assure the approximate alinement of the holder 41 and the bulb 2 with respect to the ring holder 40. In conjunction therewith I have indicated diagrammatically in Fig. 8 an optical projecting system for projecting an enlarged shadow image of the filament 3 of the lamp bulb 2 upon a lighted screen 43, the latter containing the cross lines 44, and if desired, suitable boundary lines 45 forming a closed rectangle within which an enlarged shadow image 3' of the filament 3 is projected when the filament 3 bears the correct relation to that portion of the conical neck portion of the bulb 2 bearing against the holder or gauge 40. The projector system includes a standard lens 46, a light source 47 disposed on the opposite side of the filament 3 and the lamp bulb 2 from the lens 46, and the reflecting mirrors 48 arranged at right angles to each other and at a substantial distance from the lens 46 and the screen 43. The mirrors are arranged so as to reflect the image to the screen 43 which is disposed to one side of the optical axis of the lens 46 and above the level thereof. Preferably the lamp bulb 2 is closely adjacent the lens 46 and the light source 47 may also be conveniently near thereto. An opaque screen 49 is indicated between the bulb 2 and the light source 47 and contains a slit 50 in line with the filament

of bulb 47, the filament 3 and the axis of the lens 46. The operator in charge of the mount sealing-in machine grips by means of the holder 41 the bulb 2 while it is on the sealing-in machine, and in the manner indicated in Fig. 8 inserts it in the position indicated, while the seal is still plastic and hot with the conical neck planar reference line 6—6 bearing against the ring gauge 40 and the handle of the holder 41 resting within the V shaped guide 42 to properly align the lamp bulb. Upon the insertion of the lamp bulb in the holder, an enlarged image 3' of the filament 3 is projected upon the screen 43 and if this image 3' falls outside of the rectangle 45 or with the apex of the V offset from the vertical gauge line 44, as for example in any of those positions indicated in dotted lines, the filament 3 may be readily and quickly brought to its accurate and predetermined position with reference to the reference line or that portion of the bulb neck bearing against the gauge 40 by manipulating the exhaust tube 51, the correct position being indicated by the image 3' being contained within the rectangle 45 with the apex of its V disposed on the vertical line 44. Such manipulation and adjustment is made of course while the lamp bulb is held by one hand within the holder or gauge 40 and can ordinarily be effected before the seal has had time to cool and set. In fact, adjustment can be effected so quickly that it is desirable to facilitate the speeding up of the cooling and setting of the plastic seal while within the holder 40. This is conveniently effected by little air blasts playing upon the neck of the bulb and in the particular embodiment shown I have indicated a plurality of radially disposed blasts, these being directed from radially disposed openings 52 in the interior of the ring 40 which openings lead to a suitable air source. By the aid of this cooling blast the plastic seal becomes set almost immediately after any adjustment of the filament mount which may be necessary, and the latter adjustment can be made almost instantaneously after the positioning of the bulb with its plastic seal within the gauge holder 40. The method of adjustment and apparatus of Fig. 8 form the subject matter of application Ser. No. 73,303, filed December 5, 1925. The lamp bulbs which thus have their mounts sealed in and adjusted with reference to the reference line of the conical neck will have approximately the same adjustments within the special projectors illustrated in Figs. 1-7, the fixed ring holders of the projectors being of the same size as the ring bearing edge 40' and being accurately located and fixed with reference to the focal points of the reflectors 1 in the original manufacture thereof.

It is understood that any usual and suit-

able gathering, spreading or other modifying lens or lenses may be used in conjunction with the reflector 1, these being omitted from the drawings for convenience in exposition.

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

1. A projector or head lamp for motor vehicles having a projecting reflector, an electric lamp having a conical bulb neck part and having its filament positioned and definitely located with reference to points about the bulb neck in a plane at right angles to the bulb axis, a centrally disposed fixed rear support adapted to directly engage the conical part of the neck of the electric bulb and cooperating supporting means holding said lamp tightly against the rear support with the latter engaging the neck at points disposed in the aforesaid plane.

2. In a projector lamp for motor vehicles, the combination of a reflector and an electric incandescent lamp bulb having its filament positioned and definitely located with reference to points on the conical portion of the bulb neck which are disposed in a plane at right angles to the bulb axis, with a rear ring support surrounding the reflector axis and engaging the conical part of the bulb neck at the aforesaid points and another support operative to hold the bulb tightly against said first support with the latter engaging the bulb at said planar points and the bulb neck disposed within the ring support.

3. In a projector lamp for motor vehicles the combination of a reflector and an electric incandescent lamp bulb having its filament positioned and definitely located with reference to points on the conical portion of the bulb neck which are disposed in a plane at right angles to the bulb axis, with a rear ring support surrounding the reflector axis and engaging the conical part of the bulb neck at the aforesaid points, a second support engaging the bulb neck and disposed rearwardly of the rear ring support and operative to align the bulb and hold it tightly against said ring support with the latter engaging the bulb at said planar

points and the bulb neck disposed within the ring support.

4. In a projector lamp for motor vehicles the combination of a reflector and an electric incandescent lamp bulb having its filament positioned and definitely located with reference to points on the conical portion of the bulb neck which are disposed in a plane at right angles to the bulb axis, with a rear ring support surrounding the reflector axis and engaging the conical part of the bulb neck at the aforesaid points, a second support disposed rearwardly of and axially movable with respect to the ring support and being connected with the bulb neck, and a spring disposed between said supports and operative to hold the bulb tightly against said ring support with the latter engaging the bulb at said planar points and the bulb neck disposed within the ring support.

5. A projector or head lamp for motor vehicles including a casing, a reflector supported therein, a fixed ring support disposed within the reflector, said ring support being fixed within an opening formed in the rear of the reflector with the ring support surrounding the reflector axis and having a forward bearing and supporting surface for surrounding and engaging an incandescent lamp bulb at points about the conical part of the bulb neck in a plane at right angles to the bulb axis, a second support disposed rearwardly of the ring support and movable axially of the reflector with respect to the first support, and means extending rearwardly from the second support whereby the latter may be moved axially of the reflector for the purpose set forth.

6. A projector of the character set forth in claim 5 wherein a compression spring is disposed between the two supports for yieldingly holding the lamp bulb firmly against the ring support.

7. A projector of the character set forth in claim 5 wherein the ring support has a rearwardly extending sleeve and the second support is a cylindrical sleeve disposed within the ring support sleeve.

In testimony whereof, I have signed my name to this specification.

CLYDE C. BOHNER.