Oct. 13, 1964 J. M. PISTEY 3,152,852

LAMP CONNECTOR

Filed April 17, 1962 2 Sheets-Sheet 1

Fig. 1.

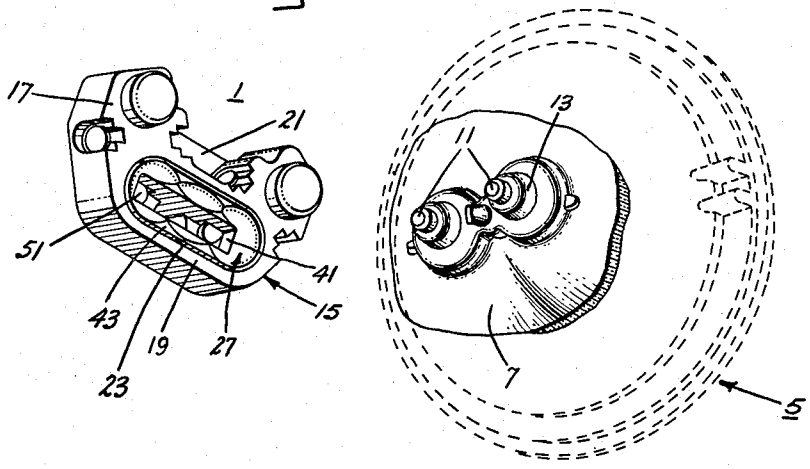


Fig. 2.

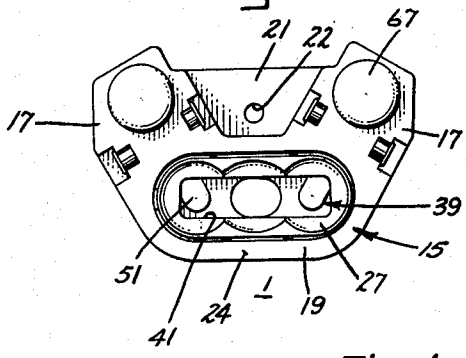


Fig. 3.

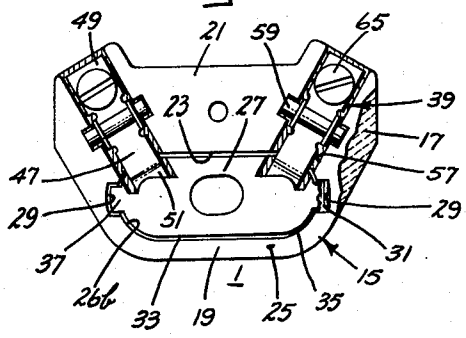
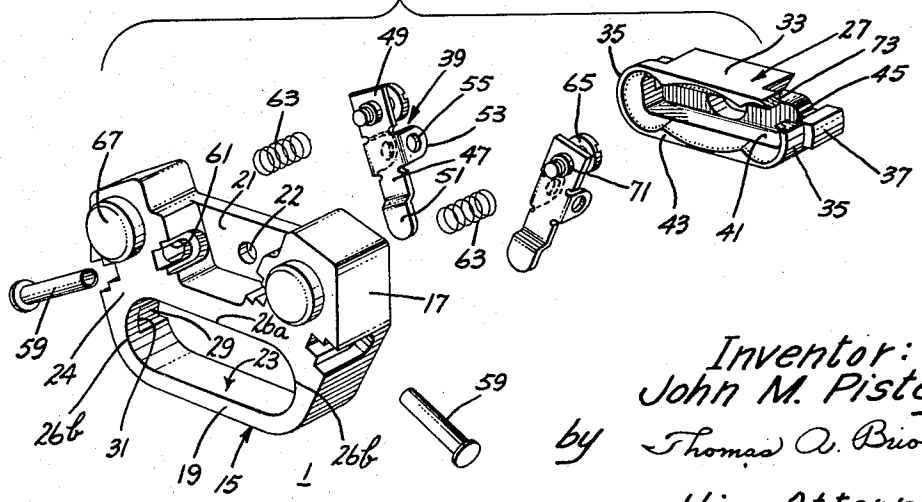


Fig. 4.



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Oct. 13, 1964 J. M. PISTEY 3,152,852

LAMP CONNECTOR

Filed April 17, 1962 2 Sheets-Sheet 2

Fig. 5.

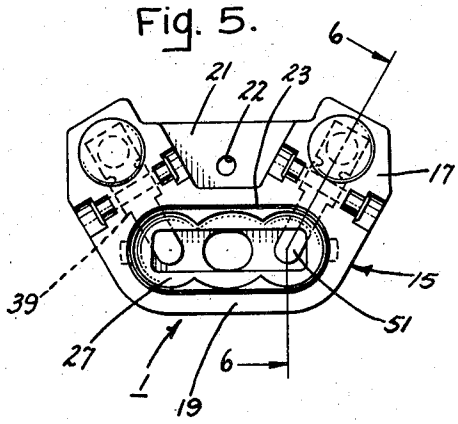
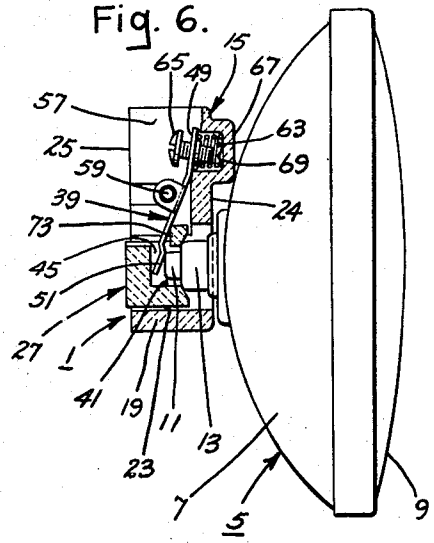


Fig. 6.



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LAMP CONNECTOR

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The present invention relates to connectors for electric lamps. More particularly, this invention concerns itself with connectors having a movable plunger to position the connector contacts for interengagement with cooperating contacts of high intensity electric lamps.

Certain prior art lamps of the incandescent type, such as photographic lamps, are specially constructed so that they are capable of operating at a very high intensity. As a consequence of their high intensity, these lamps also operate at a very high ambient temperature. One exemplary form of such lamps is the quartz iodine lamp. This lamp usually operates at a temperature approximating 400° C. and is utilized in various photographic applications. To effectively energize a lamp such as the quartz iodine lamp, it is essential that the connector or socket therefor be capable of withstanding the very high temperatures associated with the lamp. An important object of the present invention is to provide a new and improved lamp connector which is constructed to operate effectively under very high temperatures.

Another object of my invention is to provide an improved connector of the type equipped with a movable plunger to position the contacts for interengagement with a lamp.

A further object of my invention is to provide an improved lamp connector wherein the contacts are effectively protected from high temperatures.

A still further object of my invention is to provide an improved connector for use with a bi-pin lamp, which connector is of very simplified and rugged construction and relatively inexpensive to manufacture.

In carrying out my invention, in one form thereof, I have provided an insulating base with a cavity opening into front and rear walls thereof. A contact positioning plunger is arranged in the cavity for reciprocating movement relative to the insulating base. This plunger includes a recess in the front face thereof and a pair of spaced apart slots which extend transversely to the direction of movement of the plunger and open into the recess from the outer wall of the plunger. A pair of elongated contacts are pivotally supported in the base on the rearward side of the front wall. Each of these contacts is disposed in a direction transverse to the path of movement of the plunger and extends through an associated slot of the plunger into the recess to expose one end of the contact from the front wall of the base. The contacts are spring biased into engagement with the slots of the plunger to urge the plunger toward the front wall of the base and the ends of the contacts are positioned in the recess of the plunger for engagement with associated contacts of a lamp. With such an arrangement, the contacts of the lamp connector are substantially shielded from the front of the connector by means of the base and the plunger, and they are thereby protected from high temperatures. The improved connector incorporating this construction is thus enabled to efficiently operate under very high temperatures, such as the temperatures normally incident to association with high intensity lamps.

Further aspects of my invention will become apparent hereinafter, and the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which I regard as my invention. The invention, however, as to organization and method of operation, together with further objects and advantages thereof, may

best be understood by reference to the following description when taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of an improved lamp connector embodying my invention in one form thereof; also included in this figure is a quartz iodine lamp which may suitably interengage the connector, the lamp being shown partially by dotted lines and partially in full;

FIG. 2 is a front view of the improved lamp connector;

FIG. 3 is a rear view of the improved lamp connector;

FIG. 4 is an exploded view of the improved lamp connector with all its parts;

FIG. 5 is a front view of the improved lamp connector similar to that of FIG. 2, but showing the position of the pivoted contacts by means of dotted lines; and

FIG. 6 is a sectional view taken between the lines 6—6 of FIG. 5, and also showing the quartz iodine lamp in engagement with the lamp connector.

Referring first to FIG. 1 of the drawings, there is shown a connector or socket 1 which embodies one form of my invention. This particular connector 1 has been designed for efficient, simplified, and economical electrical interengagement with a quartz iodine lamp unit 5. The lamp unit 5, as shown in FIGS. 1 and 6, comprises a relatively thick glass reflector 7 (FIG. 1) and a lens 9 (FIG. 6) which are integrally associated to help hermetically seal the lamp filament and inleads (not shown) against moisture, dirt, and contamination. For electrically energizing the filament of lamp unit 5, a pair of contact pins 11 are projected outwardly from spaced apart lamp bases 13. The axes of these lamp pins 11 are parallel to the direction in which the lamp unit 5 faces, as illustrated for one of the lamp pins in FIG. 6. Upon energization of the lamp contact pins 11 by a suitable power source, the filament of lamp unit 5 incandesces to provide an illumination of high intensity.

For supporting lamp unit 5, it is designed to be seated against an appropriate ledge provided in a suitable fixture (not shown). The lamp unit 5 is secured to this fixture by means of a collar or clamp (not shown).

Turning now to an important aspect of the present invention, which concerns the provision of a new and improved lamp connector capable of withstanding very high temperatures, attention is directed in particular to FIGS. 2–4. To afford maximum simplicity, as shown best in FIG. 4, connector 1 comprises but six basic parts. Insulating base 15 is preferably constructed from a suitable ceramic material, such as for example, porcelain, and is therefore in my preferred embodiment, capable of effectively withstanding temperatures of over 1,000° C. As shown in FIG. 4, the base 15 has a generally U-shaped configuration, with the arms 17 extending outwardly in divergent fashion from opposite ends of body section 19. For fastening the lamp connector 1 to a fixture, base 15 also includes a connecting section or web 21 which integrally joins the inner rear sides of the arms 17 (FIG. 4) and includes a screw receiving aperture 22. The body section 19 of the insulating base 15 has a cavity 23 of generally oblong crosswise configuration (as shown in FIGS. 1 and 4) which extends between front side 24 and the rear side 25 thereof. More particularly, the cavity 23 comprises two opposed elongated walls 26*a* and cylindrically curved end walls 26*b*, being suitably dimensioned to receive a contact positioning plunger 27 which is reciprocably arranged therein.

As shown in FIG. 3, the cavity 23 of base 15 has a pair of opposed grooves 29 formed in the cylindrically curved end walls 26*b* thereof. These grooves extend from the rear wall 25 of base 15 toward the front wall 24 of the base, but terminate short of the front wall 24 of the

base at shoulders 31 (FIG. 3). The plunger 27 has an outer periphery which generally conforms to the crosswise configuration of cavity 23. Thus, as shown in FIG. 4, opposed elongated walls 33 and cylindrically curved end walls 35 fit within associated walls 25*a* and 25*b* of the base cavity 23 so that the plunger 27 assumes a complementary association with the cavity 23. To guide and limit the reciprocating movement of the plunger 27 in the cavity 23, plunger 27 has a pair of ears 37 formed at its respective ends. The ears 37 fit into the grooves 29 of the cavity 23 of the insulating base 15 for guiding the movement of plunger 27 therein. As shown in FIG. 3, shoulders 31 at the forward ends of the grooves 29 are engaged by the ears 37 and serve as stops for limiting movement of the plunger 27 toward the front wall 24 of the connector base.

The plunger 27 is preferably constructed of a suitable ceramic material, such as porcelain, to enable it to effectively withstand high temperatures in the same manner as described for base 15. For biasing the plunger 27 to its normal outermost position and making connections to the lamp pins 11, as shown in FIGS. 3 and 4, a pair of rigid contact blades 39 are provided. As an important aspect of my invention, these contact blades are specially arranged in the connector 1 so that they cooperate with the plunger 27 and are substantially shielded from the front side of the connector by the base 15 and the plunger 27. More particularly, as shown in FIG. 1, the plunger 27 includes an oblong recess 41 which opens outwardly into the front surface 43 thereof, and a pair of spaced apart slots 45 (FIG. 4) which extend transversely to the axis of movement of the plunger 27 and open into the recess 41 from near the curved end walls 35 thereof (as shown in FIGS. 4 and 6). The major and minor axes of the recess 41 of the plunger 27 are in consonance with the major and minor axes, respectively, of base cavity 23.

As shown in FIGS. 3 and 4, each of the rigid contact blades 39 is of elongated configuration and comprises a flat body section 47 which includes a terminal end 49, and a contact tongue 51 formed in parallel stepped relationship to section 47 on the other end thereof. Between the contact end and terminal end of each of the contact blades 39, a pair of opposed depending limbs 53 are formed in elongated sides of body section 47, as shown in FIG. 4. These limbs 53 provide a pair of aligned bearing apertures 55 for pivotally supporting each contact blade 39, as shall be described hereinafter.

More particularly, as shown in FIGS. 3 and 6, each of the arms 17 of base 15 has an elongated recess 57 formed therein behind front wall 24. The recesses 57 in the arms 17 are outwardly divergent and they communicate with the cavity 23 in which the plunger 27 reciprocates. Within each recess 57, as shown in FIG. 3, there is positioned the flat body section 47 of an associated contact blade. The contact blade 39 is pivotally supported in this recess 57 by means of a rivet 59 extended through aligned supporting apertures 61 formed in the side walls of the arms 17. To be more specific, rivet 59 is extended through supporting apertures 61 in the opposed walls of arm 17 and through bearing apertures 55 of the limbs of each contact, so that the contact is pivotally movable in trunnion-like fashion around the rivet.

As shown in FIG. 3, each of the contact blades 39 is pivotally supported by the insulating base 15 behind front wall 24 (FIG. 4), and it extends in a direction perpendicular to the path of movement of the plunger 27. The contact tongue 51 of each contact blade extends through an associated one of the transverse slots 45 of the plunger so that it enters into the oblong recess 41 of the plunger (as shown in FIG. 2) and is exposed thereby for engagement with one of the lamp pins 11. Each of the contact blades 39 is also pivotally supported by means of its limbs 53 for movement about an axis which is spaced outwardly in a transverse direction from the path of movement of the plunger 27. With such an arrangement of the contact blades 39 in my improved connector 1, the body sections 47 of the blades are located behind the front wall 24 of the base 15 and part of plunger 27 (as shown in FIG. 5), and are therefore effectively shielded from the lamp unit 5 with which the connector 1 is associated.

To bias the plunger 27 outwardly to its normal position and provide the desired contact wipe for each of the contact tongues 51, a coiled compression spring 63 has been provided for each contact blade 39. As shown in FIGS. 3, 4, and 6, a terminal screw 65 is in threaded engagement with the terminal end 49 of each of the contact blades 39. As shown best in FIG. 6, and also shown in FIGS. 2 and 4, a well 67 is formed adjacent the terminal ends 49 of the contact blades 39. The compression spring 63 extends from a seat 69 in this well 67, as shown in FIG. 6, to the inner surface of the terminal end of the contact blade. The compression spring 63 is laterally positioned at the blade 39 by means of an annular lip 71 (FIG. 4) around which one end of the spring 63 extends. The spring 63 runs in compression between the bottom of the well 67 and the inner surface of the terminal end 49 of the contact blade 39, as shown in FIG. 6, to normally bias each contact blade 39 in a counterclockwise direction of rotation about its rivet 59. The contact tongue 51 of each of the contacts 39 is thus biased outwardly toward the front side 24 of the lamp connector 1 for engagement with an associated lamp pin 11.

As previously mentioned, the contact blades 39 are arranged so that they extend through transverse slots 45 of the plunger 27. Due to the biasing forces imparted to the blades 39 by springs 63, these blades engage outer shoulders 73 of the slots 45 (FIGS. 4 and 6) to bias the plunger 27 towards its outermost normal position. Upon engagement of lamp bases 13 with plunger 27, as shown representatively in FIG. 6, the lamp contact pins 11 are inserted into engagement with contact tongues 51 of the connector 1, and these pins 11 act upon contact tongues 51 to pivot the two contact blades 39 in a clockwise direction of rotation (viewing FIG. 6) against the biasing forces of the springs 63 until they reach the position indicated in FIG. 6. After the contact tongues 51 have been initially engaged by the lamp pins 11, the plunger 27 then begins to move from its normal outer position to its innermost position. During this movement of plunger 27, the contact tongue 51 of each of the contacts is wiped into engagement with the contact pin 11 of the lamp unit 5.

As previously mentioned, the lamp unit 5 is secured to a suitable fixture (not shown) by means of a collar or clamp (not shown). This collar or the clamp also may be arranged to press the lamp unit 5 into engagement with the connector 1 to provide the desired electrical energization for the lamp.

It will now, therefore, be seen that my new and improved lamp connector, such as herein illustrated, provides a simple and effective arrangement which is operable under very high temperatures. The construction of this connector is very compact, it conveniently lends itself to simplified installation and it is also low in cost. In addition, since the contact tongues 51 are positioned for engagement with the lamp pins 11 by means of a reciprocating plunger 27, the connector 1 embodying the present invention may be efficiently utilized with lamps having a broad range of tolerances. The connector of the present invention, therefore, has an improved flexibility of application. It should be realized that certain aspects of my invention may be efficiently and beneficially incorporated in numerous other types of lampholders.

While in accordance with the patent statutes, I have described what at present is considered to be the preferred embodiment of my invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from my invention, and I, therefore, aim in the following claims to cover

all such equivalent variations as fall within the true spirit and scope of this invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A connector for a lamp comprising an insulating base with a cavity opening into frontal and rear walls thereof, a contact positioning plunger arranged in said cavity for reciprocating movement toward and away from said frontal wall, said plunger having a recess formed in a frontal face thereof, a pair of spaced apart slots formed in said plunger, said slots extending transversely to the direction of movement of said plunger and opening into said recess from the exterior of said plunger, a pair of contacts pivotally supported in said base on the rearward side of said frontal wall thereby to shield portions of said contacts by means including said frontal wall, each of said contacts being disposed in a direction transverse to the direction of movement of said plunger and extending through an associated slot of said plunger into said recess for engagement with an associated contact of said lamp, and means for biasing said contacts into engagement with the slots of said plunger to urge said plunger toward the frontal wall of said base for positioning said contacts, whereby said base and said plunger substantially shield said contacts from said lamp.

2. A connector for a lamp comprising an insulating base with a cavity opening into frontal and rear walls thereof, a contact positioning plunger arranged in said cavity for reciprocating movement toward and away from said frontal wall, said plunger having a frontal and a back wall, with a recess being formed in said frontal wall thereof, a pair of spaced apart slots formed in said plunger, said slots extending through a side wall of said plunger and opening into said recess from the exterior of said plunger in front of said back wall, a pair of flat elongated contacts pivotally supported in said base on the rearward side of said frontal wall of said base thereby to shield portions of said contacts by means including said frontal wall, said contacts being disposed in generally coplanar relationship to each other in a plane normally parallel to said frontal wall of said base, each of said contacts being disposed in a direction transverse to the direction of movement of said plunger and extending through an associated slot of said plunger, one end of each of said contacts being disposed in said recess for engagement with an associated contact of said lamp, and spring means for biasing said contacts into engagement with the front edges of said slots in said plunger to urge said plunger toward the frontal wall of said base for positioning said contacts, whereby said base and said plunger substantially shield said contacts from said lamp.

3. The connector of claim 2 wherein the spring means includes two separate compression springs, each of said compression springs being arranged to act upon the end of an associated contact opposite to the end of said contact disposed within the recess of said plunger.

4. A connector for a lamp comprising an insulating base with a cavity opening into frontal and rear walls thereof, said cavity having a generally oblong crosswise configuration, a contact positioning plunger of insulating material arranged in said cavity, said plunger having an oblong crosswise configuration and arranged in complementary engagement with said cavity for reciprocating movement in said cavity toward and away from said frontal wall, a recess formed in a frontal face of said plunger, a pair of spaced apart slots formed in said plunger, said slots extending transversely to the direction of movement of said plunger and opening into said recess from the exterior of said plunger, a pair of flat elongated contacts, bearing means for rotatably supporting said contacts intermediate the ends thereof, said bearing means for said contacts being disposed transversely outwardly from said cavity and said contacts being rotatably supported by said bearing means on the rearward side of said frontal wall thereby to shield portions of said contacts by means including said frontal wall, said contacts being disposed in generally coplanar relationship to each other in a plane normally parallel to said frontal wall of said base, each of said contacts being disposed in a direction transverse to the direction of movement of said plunger and extending through an associated slot of said plunger, one end of each of said contacts being disposed in said recess for engagement with an associated contact of said lamp, and a compression spring for biasing the other end of each of said contacts into engagement with one of the slots of said plunger thereby to urge said plunger toward the frontal wall of said base for positioning said contacts, whereby said base and said plunger substantially shield said contacts from said lamp.

5. A connector for a lamp comprising a generally U-shaped insulating base, said base including a body section with a cavity opening into frontal and rear walls of said base, and a pair of outwardly divergent arms integrally connected to said body section, said arms each including a recess disposed on the rearward side of said frontal and rear walls, the recesses of said arms being in communication with said cavity and outwardly divergent therefrom, said cavity having a generally oblong crosswise configuration, a contact positioning plunger of insulating material arranged in said cavity, said plunger having an oblong crosswise configuration and arranged in complementary engagement with said cavity for reciprocating movement in said cavity toward and away from said frontal wall, a recess formed in a frontal face of said plunger, a pair of spaced apart slots formed in said plunger, said slots extending transversely to the direction of movement of said plunger and opening into the recess of said plunger from the exterior of a side wall of said plunger, a pair of flat elongated contacts disposed rearwardly of the frontal wall of said base, bearing means for pivotally supporting each of said contacts, each of said contacts being pivotally supported by said bearing means between its ends within an associated one of the recesses of said arms, said bearing means for said contacts being disposed transversely outwardly from said cavity and said contacts being pivotally supported by said bearing means in said recesses of said arms thereby to shield portions of said contacts by means including said frontal wall, said contacts being disposed in generally coplanar relationship to each other in a plane normally parallel to said frontal wall of said base, each of said contacts being disposed in a direction transverse to the direction of movement of said plunger and extending through an associated slot of said plunger, one end of each of said contacts being disposed in said recess of said plunger for engagement with an associated contact of said lamp, and a compression spring for biasing the other end of each of said contacts into engagement with one of the slots of said plunger thereby to urge said plunger toward the frontal wall of said base for positioning said contacts, whereby said base and said plunger substantially shield said contacts from said lamp.

6. A connector for a lamp comprising an insulating base with a cavity opening into a frontal wall thereof, a contact positioning plunger arranged in said cavity for reciprocating movement relative to said base, a pair of contacts positioned in said base on the rearward side of said frontal wall, said contacts being disposed in directions transverse to the path of movement of said plunger, bearings pivotally supporting said contacts intermediate the ends thereof for a rotating motion about said bearings, said bearings being disposed transversely outwardly from said cavity and on the rearward side of said frontal wall, the front face of the inner end of each of said contacts being exposed by said plunger from the frontal wall of said base for engagement with the end of an associated contact of said lamp, a separate spring engaging each of said contacts outwardly of the associated bearing, said

springs rotating said contacts about said bearings to bias the inner ends of said contacts into engagement with said plunger, thereby to urge said plunger toward the frontal wall of said base and position the exposed ends of said contacts for engagement by said lamp contacts, with the frontal wall of said base and said plunger otherwise shielding said contacts from radiant energy emitted by said lamp.

7. A connector for a lamp comprising an insulating base with a cavity opening into a frontal wall thereof, at least one contact positioned generally parallel to and behind said frontal wall, a bearing rotatably supporting said contact intermediate its ends on the rearward side of said frontal wall, said bearing being disposed transversely outwardly from said cavity and on the rearward side of said frontal wall, said contact rotating about said bearing, and the inner end of said contact extending into said cavity, the front face of said inner end of said contact being exposed in said cavity from the frontal wall of said base for engagement with the end of an associated contact of said lamp, and a spring engaging the other end of said contact on the other side of said bearing and rotating

said contact about said bearing to bias said inner end of said contact into engagement with said associated contact of said lamp, said frontal wall shielding said bearing and the major portion of said contact from radiant energy emitted by the lamp.

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