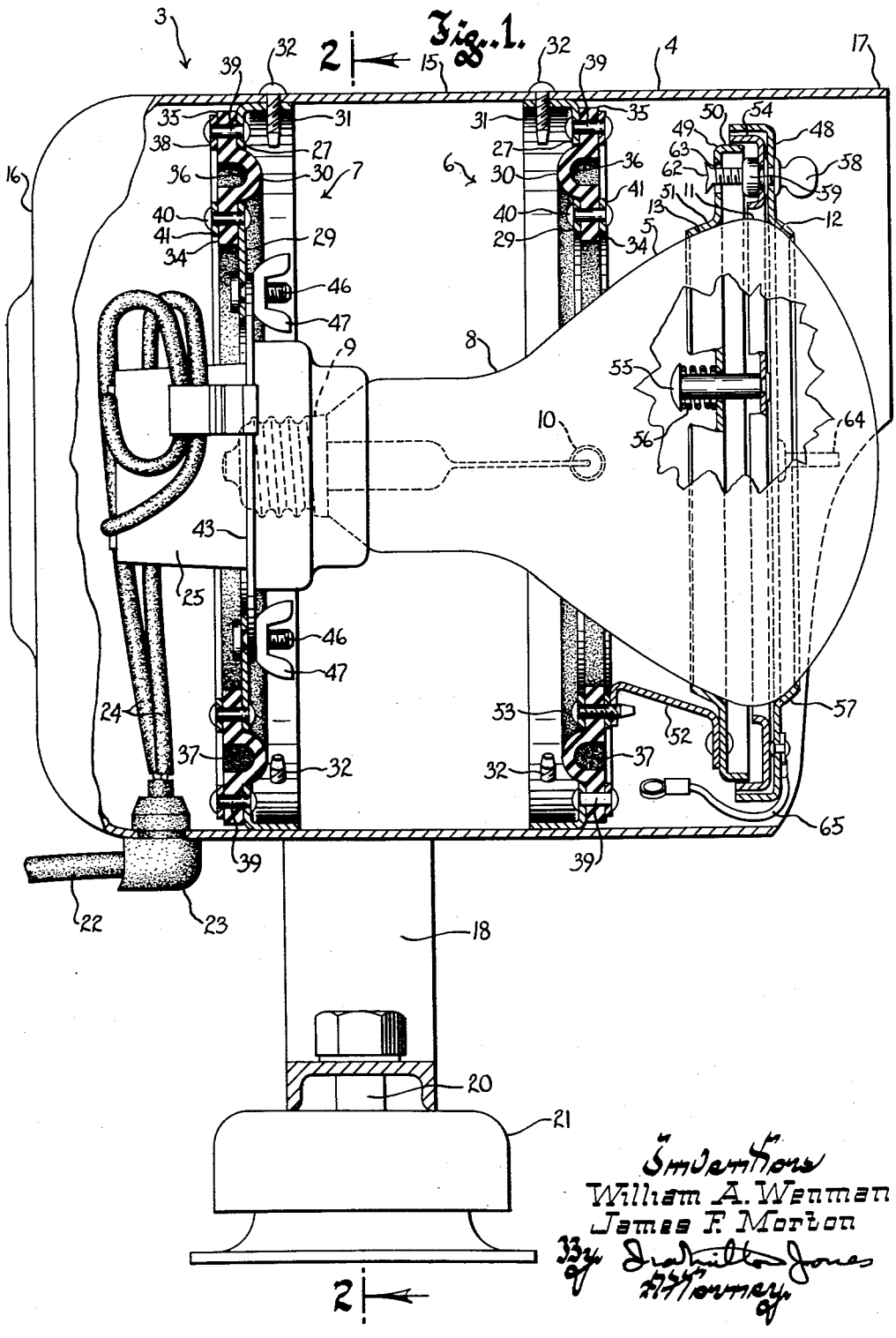
Jan. 23, 1962 W. A. WENMAN ETAL 3,018,365

SHOCK RESISTANT MOUNTING FOR LAMPS

Filed Oct. 3, 1960 3 Sheets-Sheet 1

Fig. 1.



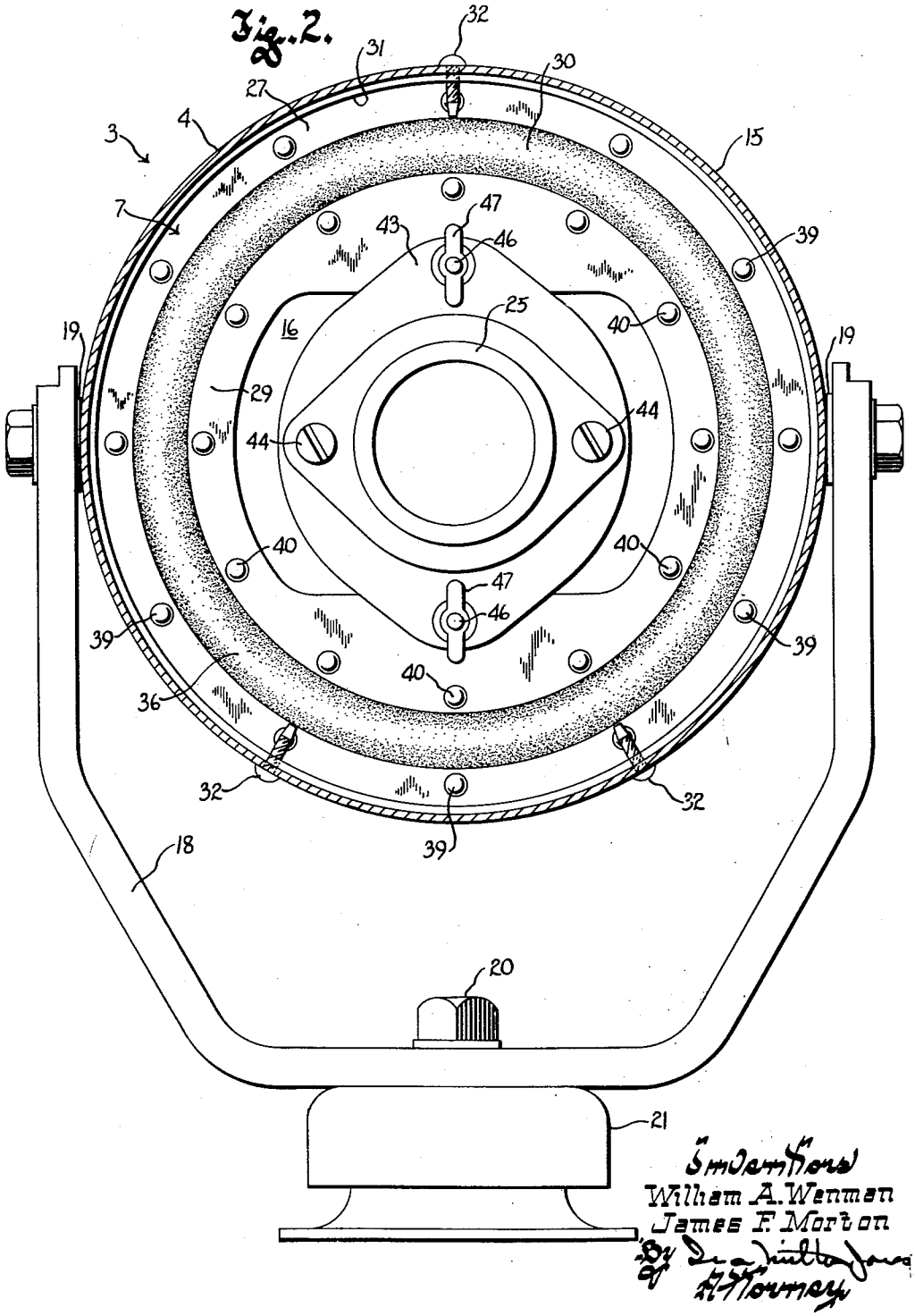
Inventors
William A. Wenman
James F. Morton
By Dudley Jones
Attorney.

Jan. 23, 1962 W. A. WENMAN ETAL 3,018,365

SHOCK RESISTANT MOUNTING FOR LAMPS

Filed Oct. 3, 1960 3 Sheets-Sheet 2

Fig. 2.



William A. Wenman
James F. Morton
By Dewitt Jones
Attorney

Jan. 23, 1962 W. A. WENMAN ETAL 3,018,365

SHOCK RESISTANT MOUNTING FOR LAMPS

Filed Oct. 3, 1960 3 Sheets-Sheet 3

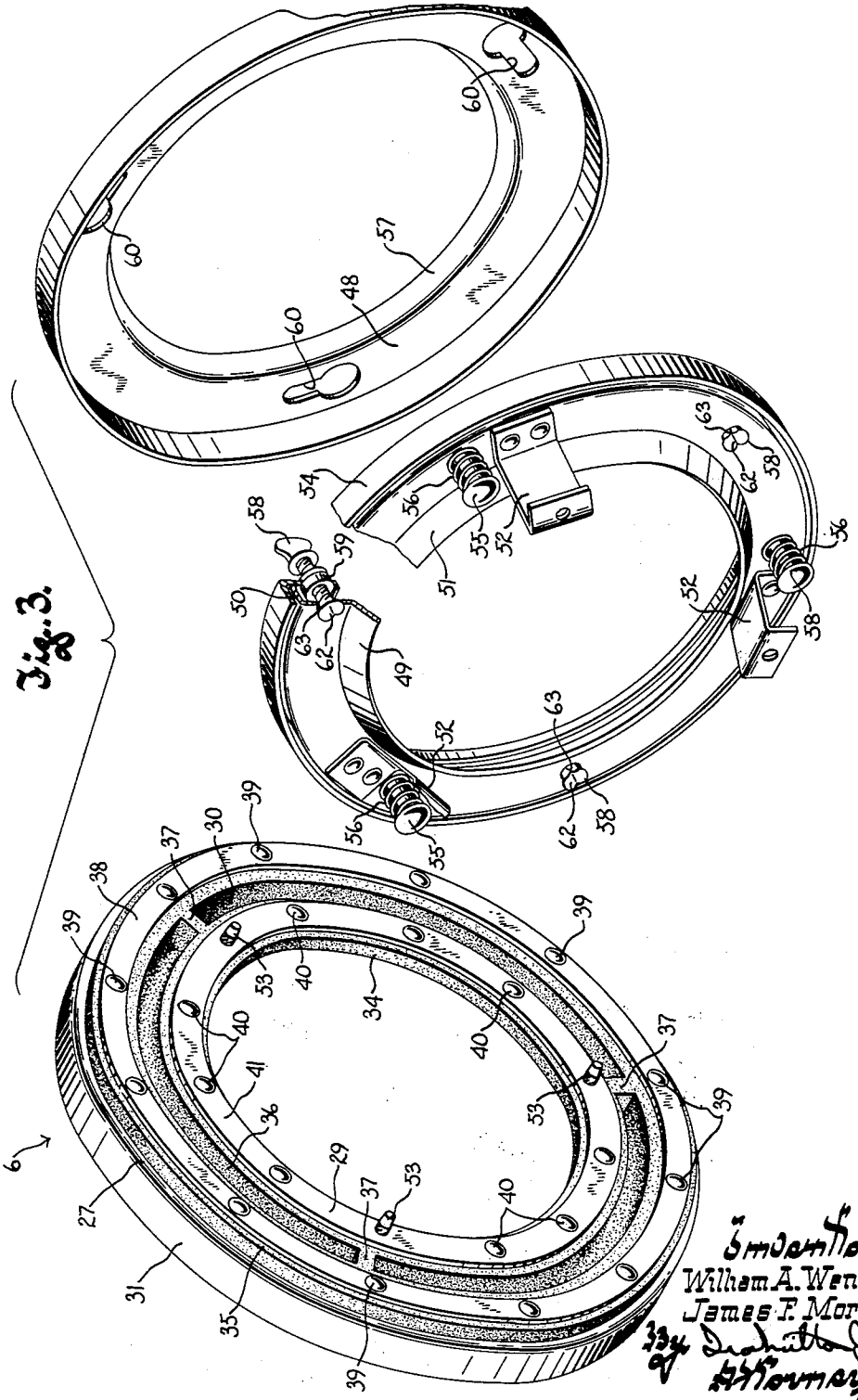


Fig. 3.

Inventors
William A. Wenman
James F. Morton
By Dodge & Jones
Attorneys

United States Patent Office 3,018,365
Patented Jan. 23, 1962

3,018,365
SHOCK RESISTANT MOUNTING FOR LAMPS

William A. Wenman and James F. Morton, Milwaukee, Wis., assignors to Phoenix Products Company, Inc., Milwaukee, Wis., a corporation of Wisconsin

Filed Oct. 3, 1960, Ser. No. 60,175
6 Claims. (Cl. 240—90)

This invention relates to the mounting of electric lamps, and refers more particularly to a fixture for mounting a lamp in situations where the lamp is subjected to severe vibration and shock, as for example on heavy ground working equipment.

In general, it is an object of this invention to provide a light fixture of the type having a casing adapted to protectively house a lamp, and means in the casing for supporting a lamp in a manner which permits the lamp to have yielding limited movement relative to the casing, wherein the lamp supporting means comprises a pair of annular clamping members which are adapted to engage a lamp envelope circumferentially at axially spaced apart locations, and wherein one of said clamping members is connected with the casing by resilient shock absorbing means and the other clamping member is carried by said one clamping member and is biased toward the same to cooperate with it in clampingly gripping and floatingly supporting a lamp envelope.

It is another object of this invention to provide a shock resistance mounting fixture for an electric lamp wherein the lamp is protectively mounted in a casing having an opening at its front through which the lamp can shine and wherein resilient supports are provided for both the envelope of the lamp and the terminal base at its rear, so that the base can vibrate in unison with the envelope of the lamp, thereby avoiding the possibility of breaking the filament of the lamp as a result of relative vibratory movement between the base and the envelope.

A further object of this invention resides in the provision of a shock mounting of the character described having a pair of supporting rings which are adapted to circumferentially engage forwardly and rearwardly facing portions of a lamp envelope that are respectively forwardly and rearwardly adjacent to its maximum diameter portion, and wherein said rings are yieldingly biased toward one another so as to cooperate in confining the lamp envelope between them under yielding clamping force, but are nevertheless floatingly mounted in a casing which protectively encloses the lamp, and are readily separable to permit quick and easy replacement of the lamp.

Another and more specific object of this invention is to provide a shock mounting for an electric lamp wherein the portions of the mounting means which engage the envelope of the lamp are in contact with it around its entire circumference, both forwardly and rearwardly of the maximum diameter portion of the lamp envelope, to thereby assure that the forces exerted upon the lamp envelope by the supporting means will be substantially evenly distributed over its surface.

It will be seen from what has been said above that other objects of this invention include the provision of an improved shock mounting for lamps of the character described which permits of simple and easy replacement of a lamp, insures secure retention of the lamp under the severest conditions of vibration and shock, and affords such support to the lamp as best protects it from extreme shock and vibration forces in a vehicle or the like upon which it is mounted.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more

particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

FIGURE 1 is a side view, partly in elevation and partly in section, of a lamp fixture embodying the principles of this invention;

FIGURE 2 is a sectional view taken on the plane of the line 2—2 in FIGURE 1; and

FIGURE 3 is a disassembled perspective view of the lamp envelope supporting means or front shock mounting support of the fixture of this invention, portions being shown broken away.

Referring now more particularly to the accompanying drawings, the numeral 3 designates generally a light fixture of the type with which this invention is concerned, comprising in general a more or less cylindrical casing 4 which protectively surrounds a lamp 5 and encloses shock mounting supports 6 and 7 for the envelope 8 of the lamp and for the terminal base 9 at its rear, the base being of the male screw-in type.

As is usual, the envelope 8 of the lamp 5, which encloses its filament 10, has a maximum diameter portion 11 near its front, from which it tapers abruptly forwardly to provide a front surface 12, and tapers more gradually rearwardly to provide a generally rearwardly facing surface portion 13.

The casing 4 which houses the lamp may be of any desired suitable shape and construction but it preferably consists of a metal shell having a cylindrical side wall 15 and an end wall 16 closing the rear thereof. The front of the casing is open, so that the lamp can shine therethrough, and preferably the upper portion of the front end projects beyond the lower part thereof to provide a hood 17.

A yoke 18 embraces the casing and is pivotally connected thereto at diametrically opposite points as at 19. The closed end or bight of this yoke is fixed to a spindle or stud 20 which is rotatable on a base 21 by which the entire fixture may be mounted upon a vehicle or apparatus with which the light is to be used. Preferably the mounting of the spindle upon the base incorporates some form of cushioning, but this forms no part of the present invention.

An electrical supply cord 22 enters the casing, preferably through a grommet 23 at its bottom, and inside the casing this supply cord is connected, by means of flexible conductors 24, with a socket 25 in which the base 9 or other terminal member of the lamp 5 is inserted, to thus connect the filament 10 of the lamp with a current source.

Each of the shock mounting supports 6 and 7 in the casing comprises an outer ring 27 which is secured to the casing, an inner ring 29 having an outside diameter substantially smaller than the inside diameter of the outer ring, and a resilient annular connecting member 30 which is secured to both the outer and the inner rings to mount the inner ring for yielding motion in all directions relative to the outer ring and thus provide a shock absorbing and vibration damping connection between the inner and outer rings.

Preferably the outer ring 27 has an axially extending circumferential flange 31 which closely fits within the cylindrical side wall 15 of the casing and into which screws 32 are threaded, through the side wall of the casing, to fasten the outer ring firmly to the casing.

The resilient connecting member 30 comprises a rubber ring or annular diaphragm having flat inner and outer portions 34 and 35 respectively, connected by an inter-

mediate portion 36 which is U-shaped in cross section and hence radially yieldable. Preferably, all portions of the ring or diaphragm have the same wall thickness, but at three circumferentially equispaced locations integral ribs 37 extend across the legs of the U-shaped portion of the rubber ring, as best seen in FIGURE 3. The flat outer portion of the resilient connecting member or diaphragm is confined between the outer ring 27 and a flat reinforcing ring 38, and rivets 39 or the like, extending through the outer ring 27, the flat outer portion 35 of the diaphragm, and the reinforcing ring 38, secure the annular diaphragm to the outer ring 27. The flat inner portion of the resilient diaphragm is similarly secured to the inner ring 29 by means of rivets 40 and a reinforcing ring 41. Hence the inner ring 29 of each of the shock mounting supports 6 and 7 is mounted for limited yielding movement in all directions relative to the casing.

The rear shock mounting support 7 of course carries the socket 25 in which the lamp base 9 is engaged and which may be of standard construction. The socket is fastened to a rigid base plate 43, as by means of screws 44, and the plate is in turn fastened to the inner ring 29 of the rear shock mounting support by means of screws 46 secured by wing nuts 47. It will be observed that this arrangement provides for quick and easy assembly of the device and permits the socket 25 to be readily removed from the casing through the open front thereof.

The inner ring 29 of the front shock mounting support 6 carries a pair of annular clamping members 48 and 49 which engage the lamp envelope at its surfaces 12 and 13 just ahead of and just behind its maximum diameter portion 11.

The rear clamping member 49 is stiffened and reinforced by an axially extending flange 50 around its outer circumference, and it has a frusto-conical inner marginal edge portion 51 which comprises a locating ring that is adapted to supportingly receive the rearwardly facing surface 13 on the lamp envelope. Rigid circumferentially spaced legs 52 extend rearwardly from the rear clamping member and are secured to the inner ring 29 of the front shock mounting support, as by means of screws 53 or the like.

The front annular clamping member 48 is detachably carried by the rear annular clamping member 49, and is yieldingly biased toward it. The connection between the two clamping members comprises an intermediate ring 54 which is coaxially carried by the rear clamping member 49, and to which the front clamping ring is detachably secured. Headed studs 55 fixed to the intermediate ring at circumferentially spaced apart intervals extend rearwardly therefrom through holes in the rear clamping member 49 to mount the intermediate ring 54 in front of the rear clamping member for axial motion toward and from the latter, and coiled compression springs 56, embracing the studs, react between their heads and the rear face of the rear clamping ring to bias the intermediate ring rearwardly.

The front clamping member 48 has a frusto-conical inner marginal edge portion 57 that comprises a retaining ring which is adapted to seat against the circumferential forwardly facing surface 12 of the lamp envelope. The front clamping member is releasably securable coaxially to the intermediate ring, so as to receive the rearward biasing force exerted upon the intermediate ring by the springs 56, by means of thumb screws 58 that engage in suitable threaded bosses 59 at circumferentially spaced locations on the intermediate ring. The front clamping ring has circumferentially extending keyhole shaped slots 60, each having its larger portion so located, and of such size, that the head of one of the thumb screws 58 can pass readily therethrough when the front clamping ring is coaxially aligned with the intermediate ring. The heads of the thumb screws 58 are of course larger than the narrow parts of the slots 60 in the front clamping ring, so that when the front clamping ring is rotated relative to the intermediate ring 54, to carry the thumb screws into the narrow portions of the slots 60, a bayonet connection is established between the front and intermediate rings. Tightening of the screws 58 after the bayonet connection is established firmly seats the retaining ring 57 against the lamp envelope and draws the intermediate ring forwardly, tensioning the springs 56 to thus impose rearward bias upon the front clamping ring.

To prevent the screws 58 from being completely removed from the bosses 59, the rear ends of the screws are enlarged, as at 62, by staking them outwardly. Suitable holes 63 may be provided in the rear clamping ring, in line with the bosses 59, so that the screws can be completely tightened without interference from the rear ring.

It is obviously a simple matter to remove a burnt out lamp from the fixture, since it is only necessary to loosen the thumb screws 58 to the point where the front clamping ring can be rotated relative to the intermediate ring, to disengage the bayonet connection. To facilitate such rotation of the front annular clamping member, it may be furnished with a pair of studs 64 which project forwardly at opposite sides thereof to provide handles. When the front clamping ring is detached from the intermediate ring, the lamp can be disengaged from the socket and drawn forwardly out of the casing. Misplacement of the front clamping ring is prevented by a tether 65 having its opposite ends connected to the front clamping ring and to the side wall of the casing.

From the foregoing description taken together with the accompanying drawings, it will be apparent that this invention provides a lamp mounting fixture wherein a lamp is floatingly supported by its envelope and by its terminal base, and wherein the envelope is circumferentially engaged directly ahead of and directly behind its maximum diameter portion by annular members which are yieldingly biased toward one another but which are constrained to vibrate in unison by reason of the fact that one of them is carried by the other.

What is claimed as our invention is:

1. An anti-vibration mounting for a lamp of the type having an envelope that encloses a filament and terminal means at the rear of the envelope for connecting the filament with a source of current, and wherein the envelope has a maximum diameter portion spaced forwardly of the terminal means and coaxial portions forwardly and rearwardly adjacent to the maximum diameter portion which respectively face toward the front and the rear of the envelope, said mounting comprising: a casing having a diameter larger than the maximum diameter of the lamp envelope and having an open front end; a locating ring having an inside diameter large enough to coaxially embrace the lamp rearwardly of its maximum diameter portion and providing a forwardly facing seat against which said rearwardly facing portion of the lamp envelope is adapted to coaxially engage; resilient means mounting the locating ring substantially coaxially in the casing, spaced from the ends thereof; an intermediate ring having an inside diameter larger than the maximum diameter of the lamp envelope; means coaxially mounting the intermediate ring on the locating ring, in front of the latter, and constraining the intermediate ring to axial movement toward and from the locating ring; biasing means reacting between the intermediate ring and the locating ring to urge the intermediate ring rearwardly toward the locating ring; a retaining ring providing a rearwardly facing surface adapted to coaxially engage against said forwardly facing portion of the lamp envelope; cooperating means on the intermediate ring and the retaining ring providing a bayonet connection between them whereby rotation of the retaining ring in one direction releasably locks it coaxially to the intermediate ring; and cooperating means on the re-

taining ring and the intermediate ring, including threaded means on one of said rings, for moving said rings relatively toward one another when the bayonet connection between them is established, so that the retaining ring is forced into egagement with the lamp envelope, by the rearward force of said biasing means exerted upon the intermediate ring and transferred thereby to the retaining ring, and so that the envelope is thus urged rearwardly by the retaining ring, into engagement with said forwardly facing surface on the locating ring.

2. The anti-vibration mounting of claim 1, further characterized by: a socket supporting ring; a socket coaxially fixed on said socket supporting ring and in which the terminal means of the lamp is adapted to be engaged; and resilient means coaxially supporting the socket supporting ring coaxially in the casing, spaced behind said first designated supporting ring.

3. The anti-vibration mounting of claim 1, wherein said cooperating bayonet connection means on the intermediate ring and the retaining ring comprises: flange means on the retaining ring located radially outwardly of said rearwardly facing surface thereon and having circumferentially extending keyhole shaped slots; headed screws, the heads of which are small enough to pass through the large portions of said slots but are larger than the narrower portions thereof; and means on the intermediate ring into which said screws are threaded with their heads projecting forwardly.

4. The anti-vibration mounting of claim 1, further characterized by the fact that said resilient means for mounting the locating ring comprises: an outer fastening ring rigidly coaxially secured to the casing, at the interior thereof; an inner fastening ring having an outside diameter smaller than the inside diameter of the outer fastening ring; means coaxially securing the locating ring to the inner fastening ring; and a resilient annular connecting member fixed to the inner and outer fastening rings and extending radially between them.

5. An anti-vibration mounting for a lamp of the type having an envelope which has a maximum diameter portion and coaxial portions forwardly and rearwardly adjacent to its maximum diameter portion which respectively face toward the front and rear of the lamp, said mounting comprising: a casing having a maximum diameter larger than the maximum diameter of the lamp envelope and which is open at its front; a rear retaining ring having a forwardly facing surface adapted to circumferentially engage said rearwardly facing portion of the lamp envelope; a front retaining ring having a rearwardly facing surface adapted to circumferentially engage said forwardly facing portion of the lamp envelope; means

resiliently mounting one of said rings coaxially in the casing, intermediate the ends thereof; cooperating means on said rings providing a bayonet connection between them whereby the other ring is coaxially carried by said one ring, said means also mounting said other ring in a manner constraining it to axial movement toward and from said one ring when the bayonet connection is established; and means including biasing means reacting between the front and rear retaining rings when the bayonet connection between them is established to urge said other ring axially toward said one ring so that the maximum diameter portion of the lamp envelope is clampingly confined between said retaining rings.

6. An anti-vibration mounting for a lamp of the type having an envelope which has a maximum diameter portion spaced forwardly of its rear end and which has coaxial portions forwardly and rearwardly adjacent to said maximum diameter portion and which respectively face toward the front and rear of the lamp, said mounting comprising: a casing having a maximum diameter larger than the maximum diameter of the lamp envelope and which is open at its front; a locating ring having a forwardly facing surface adapted to supportingly engage the rearwardly facing portion of a lamp envelope; resilient means supporting the locating ring in the casing, intermediate the ends thereof; a retaining ring having a rearwardly facing surface adapted to supportingly engage the forwardly facing portion of a lamp envelope; cooperating means on the locating ring and the retaining ring providing a bayonet connection between them which is established upon rotation of the retaining ring in one direction relative to the locating ring, said means disposing the retaining ring coaxially in front of the locating ring and providing for axial movement of the retaining ring toward and from the locating ring when the bayonet connection is established; and biasing means carried by one of said rings and reacting against the other when the bayonet connection is established, to bias the retaining ring toward the locating ring, so that a lamp envelope having its maximum diameter portion confined between the rings will be gripped by them with a yielding clamping force.

References Cited in the file of this patent

UNITED STATES PATENTS

2,225,981	Casson	Dec. 24, 1940
2,762,908	Gaither	Sept. 11, 1956
2,824,214	Bertsche	Feb. 18, 1958
2,826,682	Folge	Mar. 11, 1958
2,910,576	Meese	Oct. 27, 1959