

Feb. 23, 1965

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LAMP BULB STABILIZING FILAMENT CENTERING
TUBE WITHIN A SEALABLE CAPSULE

3,170,751

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2 Sheets-Sheet 1

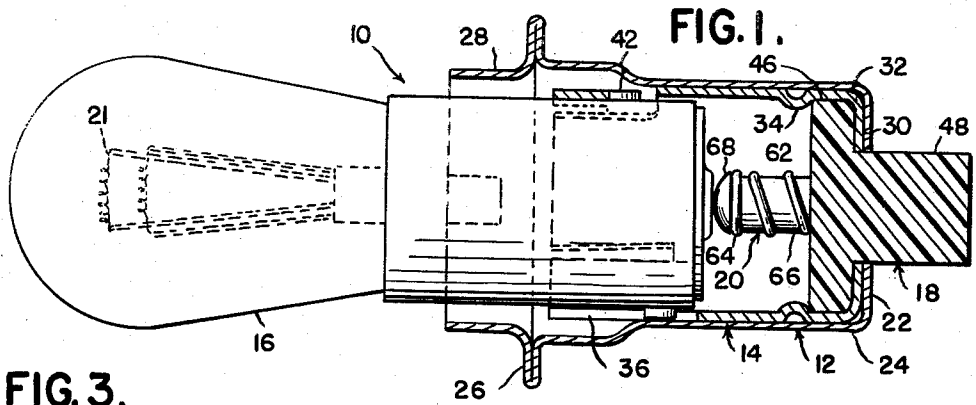


FIG. 3.

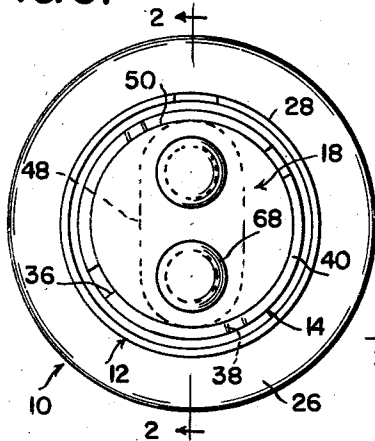


FIG. 2.

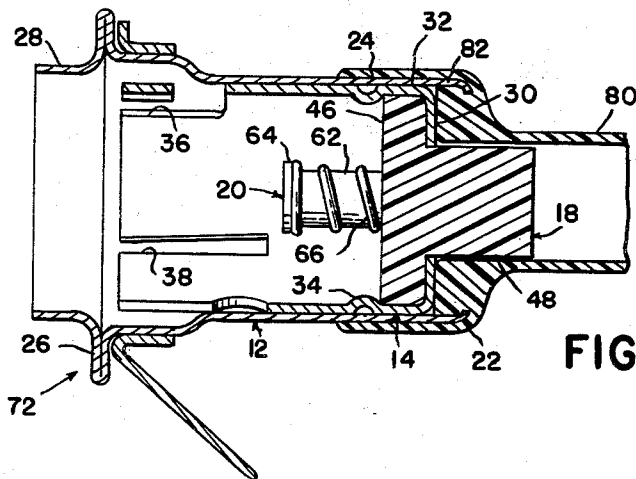
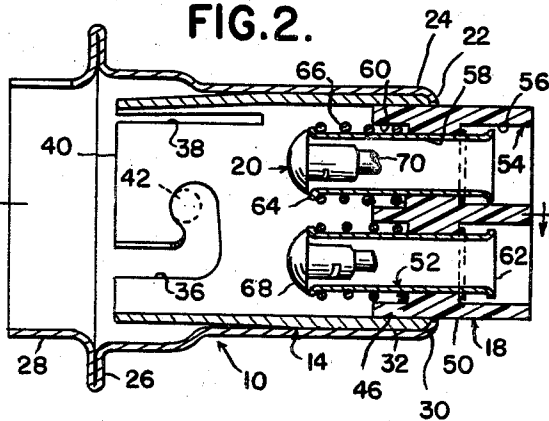


FIG. 4.

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FIG. 5.

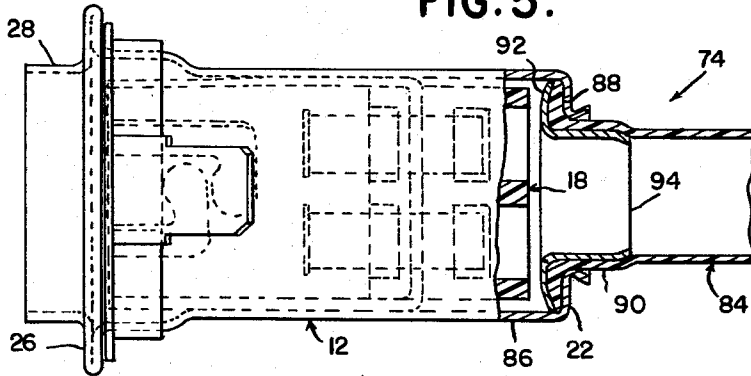


FIG. 6.

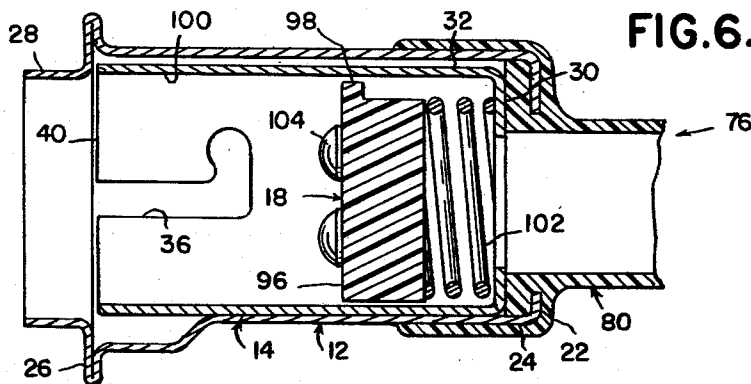
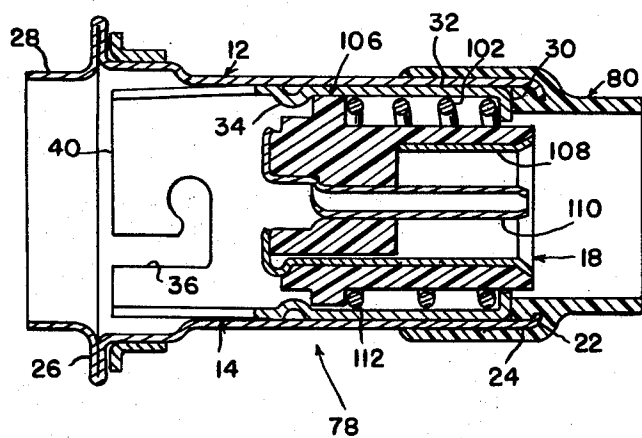


FIG. 7.



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LAMP BULB STABILIZING FILAMENT CENTERING TUBE WITHIN A SEALABLE CAPSULE

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5 Claims. (Cl. 339-188)

The invention relates to lamp bulb mounting apparatus and refers more specifically to a bulb socket including a sealable socket tube having a bulb stabilizing and filament centering sleeve secured therein.

In the past lamp bulbs and lamp bulb mounting apparatus have been manufactured with rather wide dimensional tolerances. Therefore, with prior bulb socket structures and lamp bulbs undesirable angular displacement between a lamp bulb mounted in a bulb socket and the bulb socket in which it is mounted has been possible. With higher intensity lighting systems and bulbs which are larger and brighter the optical requirements such as filament alignment and stability of light bulbs mounted on automobile, and similar moving devices are becoming more stringent.

Since bulb manufacturing techniques are not easily adapted to closer tolerances, it is desirable to provide a bulb socket which will prevent angular movement between a bulb mounted therein and the bulb socket and which will initially align the bulb socket and socket tube.

It is therefore one of the objects of the present invention to provide a lamp bulb stabilizing filament centering bulb socket.

Another object is to provide a bulb socket including a socket tube, a bulb socket stabilizing and filament centering sleeve secured within the socket tube, an insulating core mounted in the sleeve, electrical contact members extending through the core at one end of the sleeve and means for securing a lamp bulb in the other end of the sleeve.

Another object is to provide a bulb socket as set forth above wherein longitudinal slots and bayonet slots are provided in the other end of said sleeve.

Another object is to provide a bulb socket as set forth above wherein said other end of said sleeve tapers radially inwardly axially outwardly.

Another object is to provide a bulb socket as set forth above wherein a sealing boot is secured to the socket tube at the end thereof adjacent said one end of said sleeve.

Another object is to provide a bulb socket as set forth above wherein the contact members are supported within said core by individual tubular members extending through the core which are urged toward said other end of the sleeve by resilient means acting between the core and tubular members.

Another object is to provide a bulb socket as set forth above wherein the contact members comprise concentric cylinders mounted in the core and resilient means are provided acting between the sleeve and core to urge the core toward the other end of the sleeve.

Another object is to provide a bulb socket as set forth above wherein the contact members are button type contact members and wherein the core is urged toward the other end of said sleeve by resilient means acting between the core and sleeve.

Another object is to provide a bulb socket which is simple in construction, economical to manufacture and efficient in use.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings, illustrating preferred embodiments of the invention, wherein:

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FIGURE 1 is a longitudinal sectional view of a bulb socket constructed in accordance with the invention, taken substantially on the line 1-1 in FIGURE 2 and showing a bulb in combination therewith.

FIGURE 2 is a longitudinal sectional view of the bulb socket shown in FIGURE 1, taken substantially on the line 2-2 in FIGURE 3.

FIGURE 3 is an end view of the bulb socket shown in FIGURE 1, taken in the direction of arrow 3 in FIGURE 2.

FIGURE 4 is a longitudinal sectional view of a modification of the bulb socket illustrated in FIGURE 1 showing mounting means therefor and a sealing boot in conjunction therewith.

FIGURE 5 is a modification of the bulb socket shown in FIGURE 1, illustrating a separate sealing boot secured thereto.

FIGURE 6 is a modification of the bulb socket illustrated in FIGURE 1 showing a sealing boot secured thereto and a modified core and contact structure.

FIGURE 7 is a modification of the bulb socket illustrated in FIGURE 1, showing a sealing boot secured thereto and a second modified core and contact structure.

With particular reference to the FIGURES of the drawings, one embodiment of the invention will now be disclosed in detail.

As shown in FIGURES 1-3 the bulb socket 10 of the invention comprises a socket tube 12, a lamp bulb stabilizing and filament centering sleeve 14 secured within the socket tube 12 adapted to receive a lamp bulb 16 in one end thereof, an insulating core 18 secured in the other end of the sleeve and electrical contact structure 20 mounted in the core 18. In accordance with the invention the sleeve 14 functions to align the lamp bulb 16 with the socket tube 12 thereby tending to center the filament 21 of the lamp bulb. The sleeve 14 further functions to stabilize the lamp bulb within the bulb socket 10.

More specifically, the socket tube 12 is a generally cylindrical tube of conductive material. The socket tube 12 is formed as shown best in FIGURES 1 and 2 to provide the core retaining flange 22 at the end 24 thereof and the flange 26 at the end 28 thereof. It will be noted that since no lamp bulb securing means are provided in the socket tube in accordance with the invention that a single-piece socket tube is possible which may be economically and efficiently produced.

Sleeve 14, as shown best in FIGURES 1 and 3, includes the flange 30 at end 32 thereof operable in conjunction with the abutment 34 formed therein to retain the core 18 in a predetermined position in the end 32 of the sleeve. End 32 of the sleeve 14 is dimensioned to fit securely within the socket tube 12 so as to frictionally resist relative axial movement between the socket tube and sleeve.

Bayonet slots 36 and longitudinally extending slots 38 are provided in the end 40 of the sleeve 14 in accordance with the invention to permit securing of a lamp bulb 16 in the end 40 of the sleeve 14. Bayonet slots 36 function in conjunction with the usual lugs 42 on lamp bulb 16 to secure the lamp bulb in the bulb socket 10. The bayonet slots and longitudinally extending slots 38 also function to permit tapering of the end 40 of the sleeve 14 radially inwardly axially outwardly, as shown best in FIGURE 2, so that the diameter of the sleeve 14 at the end 40 is less than the diameter thereof at the end 32.

Sleeve 14 is constructed of a highly conductive material having elastic or spring qualities. Thus, a lamp bulb 16 inserted in the sleeve 14 will cause the end 40 thereof to cam radially outwardly slightly whereby the base of the lamp bulb 16 will be firmly held around its entire periphery in surface-to-surface contact with

the end 40 of the sleeve 14. This is especially true since the end 40 of the sleeve 14 and the base of the lamp bulb 16 are designed to have their radially inner and outer surfaces respectively, axially aligned within manufacturing tolerances in assembly.

Thus, it will be seen that a lamp bulb 16 secured in the bulb socket 10 will be much more rigidly held than has been the case with prior constructions wherein the lamp base and socket tube, both of which were permitted considerable tolerance, provided the connection therebetween. In accordance with the bulb socket structure of the invention the mounted lamp bulb 16 will be highly stable and will not be permitted to form an angle with the axis of generation of the socket tube whereby the filament of the lamp bulb may be centered within the tolerances of the light bulb whereas previously centering of the filament of the lamp bulb has been subject to the tolerances of both the socket tube and lamp and the resulting relative angle between their longitudinal axes.

The core 18, as shown in FIGURES 1-3, is constructed of insulating material and includes a cylindrical portion 46 held in a fixed axial position in the sleeve 14 between the flange 30 and abutment 34 as previously indicated and a non-circular portion 48 extending out of the end 24 of the socket tube 12 and end 32 of the sleeve 14. The portion 48 of the core 18 has substantially flat sides 50 engageable with the flanges 22 and 30 of the socket tube 12 and sleeve 14 respectively, operable to prevent rotation of the core 18 within the sleeve 14. Core 18 is further provided with the openings 52 and 54 extending therethrough parallel to the longitudinal axis of the bulb socket 10 each of which have variable diameter portions 56, 58 and 60 therein.

Contact structure 20, as shown in FIGURES 1-3, includes the tubular members 62 slidably positioned in the smaller diameter portions 58 of each of the passages 52 and 54 which are provided with flanges 64 on the ends thereof operable to prevent the tubular members from passing completely through the passages 52 and 54. In addition, individual springs 66 are provided acting between the core 18 and the individual tubular members 62, as shown in FIGURE 1, which are operable to bias the contact members 68 secured to electrical conductors 70 within the tubular members 62 toward the end 40 of the sleeve.

Thus, in assembly a lamp bulb 16 is inserted axially into the end 40 of the sleeve 14 of the bulb socket 10 with the lugs 42 thereon within the axially extending portion of the bayonet slots 36. During the axial insertion of the lamp bulb 16 the end 40 of the sleeve 14 is cammed radially outwardly to provide surface-to-surface contact between the base of the lamp bulb 16 and the end 40 of the sleeve 14. The lamp bulb 16 is then rotated slightly in the usual manner to align the usual contacts thereon with the contact members 68 of the bulb socket 10. The lamp bulb 16 is then securely held within the bulb socket 10 in a stable position with the filament of the lamp bulb centered with respect to the bulb socket within the dimensional tolerances of the lamp bulb.

The modified bulb socket structures 72, 74, 76 and 78 illustrated in FIGURES 4-7, respectively, are in many respects exactly the same as the bulb socket structure 10 illustrated in FIGURES 1-3. Therefore, the same elements in bulb sockets 72, 74, 76 and 78 have been given the same reference numerals as the identical elements in the bulb socket 10. The identical elements and the function thereof will not be considered in the modified bulb socket structures in view of their detailed description provided above.

The modified bulb socket structure 72 illustrates the addition of a dipped vinyl sealing boot 80 in conjunction with a bulb socket such as bulb socket 10. In the modified structure of bulb socket 72 it will be noted that the socket tube 12 has been extended to provide a portion 82 ex-

tending axially outwardly of the end 32 of the sleeve 14. The sealing boot 80 is then produced on the end 24 of the socket tube 12 by the well known dip process.

In the modified bulb socket structure 75 illustrated in FIGURE 5 a sealing boot 84 which is manufactured separately is secured to an extension 86 of the socket tube 12. The separate sealing boot 84 is secured to the socket tube 12 by providing a flange 88 on the end 90 of the socket tube 12 and the annular flange 92 of a separate annular member 94 as shown in FIGURE 5.

The modified bulb socket structure 76 illustrated in FIGURE 6 differs from the modified bulb socket structure 72 illustrated in FIGURE 4 primarily in the provision of a cylindrical core 96 having a projection 98 thereon movable axially in a groove 100 provided in the sleeve 14 to prevent rotation of the core 96 in the sleeve 14 in conjunction with a single spring 102 acting between the sleeve 14 and the core 96 to bias the core 96 toward the end 40 of the sleeve 14. In addition, button type contacts 104 are provided which may be rigidly secured in the core 96 and to electrical conductors in the usual manner. The sealing boot 80 of the modified bulb socket structure 76 is a dipped vinyl sealing boot similar to the boot 80 of the bulb socket 72 illustrated in FIGURE 4.

Similarly, the modified bulb socket structure 78 illustrated in FIGURE 7 provides a different core 106 having the concentric cylindrical contact members 108 and 110 secured therein which core is biased toward the end 40 of sleeve 14 by a resilient member 112 acting between the sleeve 14 and core 106. Again the sealing boot 80 of the modified bulb socket structure 78 is a dipped vinyl sealing boot similar to the boot 80 of the bulb socket 72 illustrated in FIGURE 4.

Thus, it will be seen that the lamp bulb stabilizing filament centering sleeve 14 is suitable for use in conjunction with bulb socket structures having a wide variety of cores and contact members.

While one embodiment and several modifications of the present invention have been considered in detail, it will be understood that other embodiments and modifications of the invention are contemplated. It is therefore the intention to include all such embodiments and modifications of the bulb socket disclosed above within the scope of the invention as defined by the appended claims.

What I claim as my invention is:

1. A bulb socket comprising a single piece cylindrical socket tube having relatively wide manufacturing tolerances and including a radially inwardly extending flange at one end thereof and a radially enlarged portion adjacent the other end thereof, a part of the radially enlarged portion extending radially outwardly and being close returned to provide a radially outwardly extending flange to aid in securing the socket tube in an opening, a single combined bulb stabilizing and filament centering sleeve having relatively narrow manufacturing tolerances secured within the one end of the socket tube and having a radially inwardly extending flange at one end thereof adjacent said radially inwardly extending flange at the one end of the socket tube, bayonet slots in the other end of the combined bulb stabilizing and filament centering sleeve for securing a light bulb in said other end of the sleeve, said other end of said bulb stabilizing and filament centering sleeve also having axially extending slots therein and being tapered radially inwardly axially outwardly, an insulating core positioned within the one end of the bulb stabilizing and filament centering sleeve and socket tube having a non-circular portion extending out of said one end of the socket tube and sleeve, a pair of passages in said core extending axially of said socket tube and sleeve having enlarged portions at the opposite ends thereof, a separate tube positioned in each of the passages having flared ends thereon extending into the enlarged diameter portions of the passages and one end of which is movable within the one end of the socket tube and

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sleeve, separate spring means operable between the flared one end of each of the tubes and the enlarged diameter portion at the adjacent end of the passages in the insulating core for urging the tubes toward said other end of the socket tube and sleeve and contact members passing through the tubes including enlarged head portions positioned within the one end of the sleeve and socket tube in engagement with the one end of the tubes.

2. Structure as set forth in claim 1 wherein the one end of the socket tube extends axially outwardly of the one end of the combined bulb stabilizing and filament centering sleeve and further including a sealing boot secured to said one end of the socket tube including a relatively thin exterior portion extending for a distance over the exterior of said one end of the socket tube substantially greater than its extent on the interior of the socket tube and extending on the interior of said socket tube between the radially inwardly extending flange on said one end of the socket tube and the radially inwardly extending flange on said one end of the sleeve.

3. Structure as set forth in claim 1 wherein said one end of the socket tube extends axially outwardly beyond the one end of the bulb stabilizing and filament centering sleeve and a cylindrical sealing boot is provided including a radially outwardly extending flange about one end thereof positioned within the one end of the socket tube with the flange thereof in contact with the radially inwardly extending flange on the socket tube and a hat-shaped member positioned within the one end of the socket tube including an axially extending portion within the sealing boot and a radially outwardly extending flange positioned on the opposite side of the radially outwardly extending flange of the sealing boot from the radially inwardly extending flange of the socket tube to clamp the radially extending flange of the sealing boot in a predetermined position.

4. A bulb socket comprising a single piece cylindrical socket tube having relatively wide manufacturing tolerances and including a radially inwardly extending flange at one end thereof and a radially enlarged portion adjacent the other end thereof, means at the other end of said socket tube for securing the socket tube in an opening, a single combined bulb stabilizing and filament centering sleeve having relatively narrow manufacturing tolerances secured within the one end of the socket tube and having a radially inwardly extending flange at one end thereof adjacent said radially inwardly extending flange at the one end of the socket tube, bayonet slots in the other end of the combined bulb stabilizing and filament centering sleeve for securing a light bulb in said other end of the sleeve, said other end of said bulb stabilizing and filament centering sleeve also having axially extending slots therein and being tapered radially inwardly axially outwardly, an insulating core positioned

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within the one end of the bulb stabilizing and filament centering sleeve and socket tube, at least one passage in said core extending axially of said socket tube and sleeve having enlarged portions at the opposite ends thereof, a tube positioned in the passage having flared ends thereon extending into the enlarged diameter portions of the passage and one end of which is movable within the one end of the socket tube and sleeve, separate spring means operable between the flared one end of the tube and the enlarged diameter portion at the adjacent end of the passage in the insulating core for urging the tube toward said other end of the socket tube and sleeve and a contact member passing through the tube including an enlarged head portion positioned within the one end of the sleeve and socket tube in engagement with the one end of the tube.

5. A bulb socket comprising a single piece cylindrical socket tube having relatively wide manufacturing tolerances and including a radially enlarged portion adjacent one end thereof, means at said one end of the socket tube for securing the socket tube in an opening, a single combined bulb stabilizing and filament centering sleeve having relatively narrow manufacturing tolerances secured within the other end of the socket tube, bayonet slots in one end of the combined bulb stabilizing and filament centering sleeve adjacent the radially enlarged portion of the socket tube for securing a light bulb in the one end of the sleeve, one of said socket tube and sleeve having a radially inwardly extending flange at the other end thereof, the one end of the bulb stabilizing and filament centering sleeve also having axially extending slots therein and being tapered radially inwardly axially outwardly, an insulating core positioned within the other end of the bulb stabilizing and filament centering sleeve and socket tube, at least one passage in said core extending axially of said socket tube and sleeve, a contact member extending through said passage movable axially within the other end of the socket tube and sleeve and spring means for urging the contact member toward the one end of the socket tube and sleeve.

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