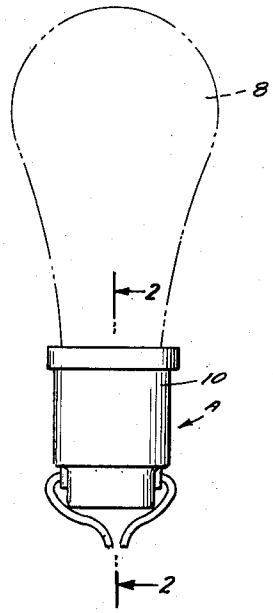
Dec. 20, 1960 P. P. DANESI 2,965,875

SOCKET FOR A BULB OR THE LIKE

Filed Feb. 26, 1957 2 Sheets-Sheet 1

FIG. 1



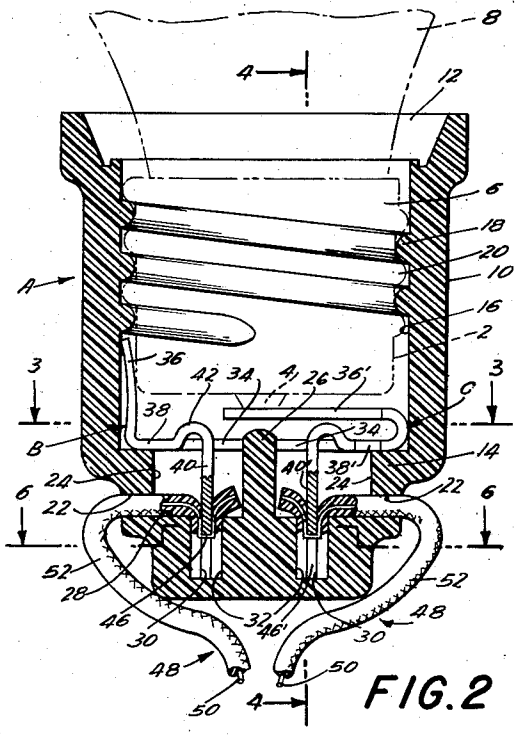


FIG. 2

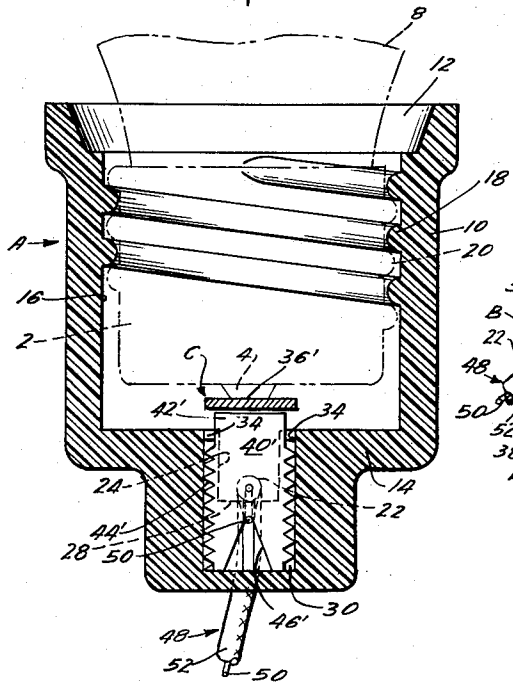


FIG. 4

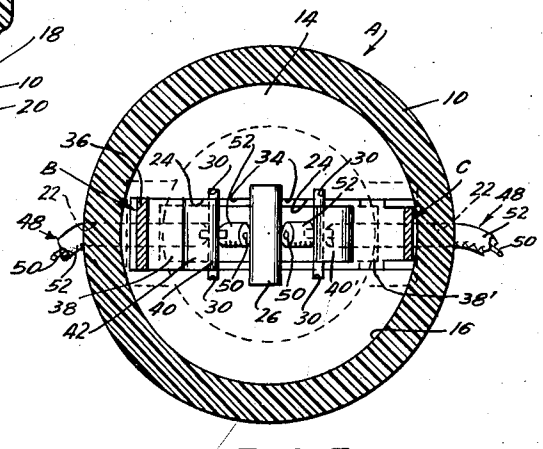


FIG. 3

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Dec. 20, 1960 P. P. DANESI 2,965,875

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Filed Feb. 26, 1957 2 Sheets-Sheet 2

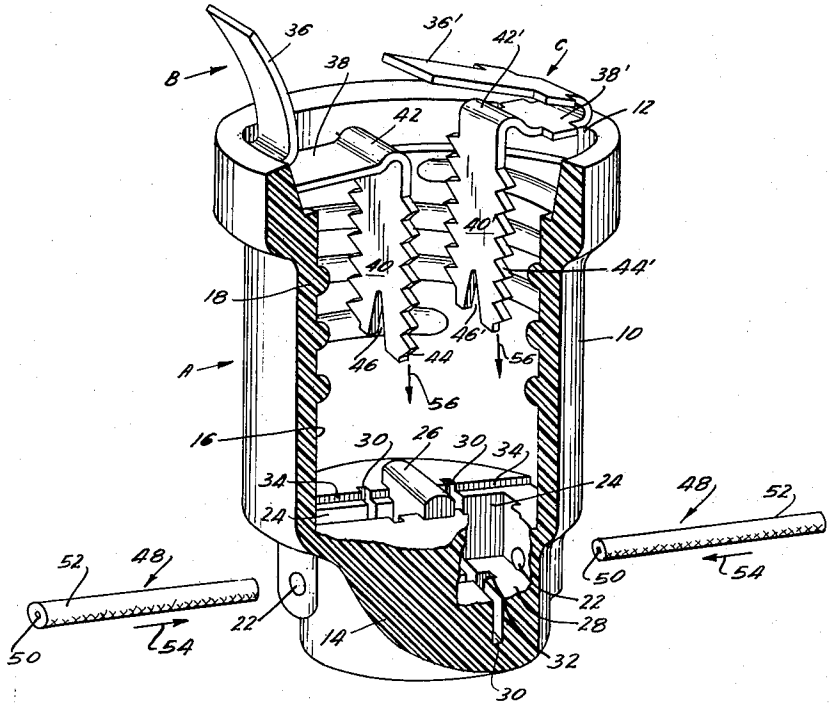

FIG. 5

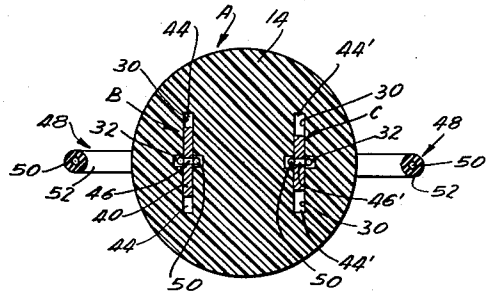

FIG. 6

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SOCKET FOR A BULB OR THE LIKE

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2 Claims. (Cl. 339—180)

The present invention relates to a socket of the type used to receive and make electrical connection to a lamp bulb or the like, and in particular to the manner in which the socket terminals are mounted therein and make electrical connection with the external leads.

In the past sockets of the type under discussion have usually been provided with binding posts to which the bared ends of external insulated leads are adapted to be connected, the lamp-engaging terminals being assembled in the socket, together with the binding posts, in a manner entirely independent of the connection of the external leads thereto. More recently structures had been devised which eliminate the necessity for baring the ends of the external leads, those structures including means which penetrate the insulation and make electrical connection with the conductive cores of the leads.

It is to a socket of the latter type that this invention is specifically directed.

In accordance with the present invention the lamp-engaging terminals and the housing defining the socket proper are so cooperatingly constructed, and the unbared ends of the external leads are adapted to be inserted into the socket in such a manner, that the very act of assembling the terminals with the housing causes the terminals to make electrical connection with the leads. The terminals, when once assembled with the housing, are reliably secured thereto so as to prevent their accidental displacement, but they may be removed from the housing when necessary in order to change or fix the electrical connection thereto. The external leads enter the housing and are engaged with the terminals in such a way that external stresses applied to those leads are transmitted to the lead-terminal connections only to a minimal degree, thus making for increased security of electrical connection and eliminating the need for any special strain-relief devices. Assembly of the terminals with the housing is accomplished very readily, involving but a simple pushing action, so that connection and disconnection may be carried out by persons with little or no mechanical skill and without requiring the use of any but the most elementary tools. In addition, the complete socket preferably comprises the housing and the terminals and nothing else, thus making for extreme simplicity and inexpensiveness. The housing is preferably formed of a single molded piece and the terminals may be shaped from strip material of appropriate characteristics, thus further reducing the cost of the socket.

The socket of the present invention is therefore characterized by extreme simplicity and inexpensiveness, is particularly well adapted to quantity production, no assembly problems are involved in its manufacture, and yet it may be used with greater effectiveness than prior art structures of the same general type insofar as reliability and ease of electrical connection to external leads are concerned.

The socket proper is constituted by a housing having an open end through which an external element such as the base of a lamp is adapted to be introduced, the interior of the housing being hollow and closed opposite the open end by a wall. Slots are provided in that wall into which the depending ends of the socket terminal strips are adapted to be frictionally received, the upper portions of those terminal strips being so shaped and positioned as to make connection with the terminals on the external element when the latter is introduced into the housing. The housing is provided with a pair of holes extending inwardly from the exterior of the housing and communicating with the previously mentioned slots. It is through these holes that the ends of the external leads are adapted to be inserted. Those portions of the socket terminal strips which are adapted to be inserted into the aforementioned slots are so shaped as to engage the lead ends when the latter are inserted through said holes and to penetrate the insulation of those lead ends so as to engage and make electrical connection with the conductive lead cores, at the same time securing the leads in place. The holes through which the leads extend are preferably oriented substantially horizontally, the slots for the socket terminals are substantially vertical, and the leads proper are adapted to extend vertically from the housing. Consequently the bending of the leads from their horizontal position in the holes to their generally vertical position externally of the socket constitutes a built-in strain relief feature.

To the accomplishment of the above, and to such other objects as may hereinafter appear, the present invention relates to the construction of a socket as defined in the appended claims and as described in this specification, taken together with the accompanying drawings in which:

Fig. 1 is a side elevational view of the socket of the present invention with the leads attached and with a lamp bulb shown in phantom in position thereon;

Fig. 2 is a cross sectional view, on an enlarged scale, taken along the line 2—2 of Fig. 1;

Fig. 3 is a cross sectional view taken along the line 3—3 of Fig. 2;

Fig. 4 is a cross sectional view taken along the line 4—4 of Fig. 2;

Fig. 5 is a three-quarter perspective semi-exploded view, partially broken away, showing the manner in which the terminals and leads are adapted to be put into place; and

Fig. 6 is a cross sectional view taken along the line 6—6 of Fig. 1.

The socket is formed of but three parts, a housing generally designated A and a pair of terminal strips generally designated B and C and, in the form here specifically disclosed, adapted to make electrical connection respectively with the side and tip terminals 2 and 4 on the base 6 of a lamp bulb 8 adapted to be inserted into the housing A.

The housing A, which may be formed from a single piece of molded plastic insulating material, comprises an upstanding side wall 10 having an open top 12 and a bottom wall 14, the hollow interior 16 of the housing A having means 18 integrally formed thereon and adapted to engage with cooperating means 20 on the base of the bulb 8 in order to retain the latter within the housing A. In the form here specifically disclosed the means 18 and 20 are shown as cooperating screw threads.

A pair of holes 22 are provided in the sides of the bottom portion of the housing A, those holes being substantially horizontal and extending from the exterior of the housing A to the interior thereof, there communicating with recesses 24 extending downwardly from the upper surface of the housing bottom wall 14 and separated by partition 26. The bottom surfaces 28 of the recesses 24 are shown as in line with the lower extremities of the holes 22. The housing bottom wall 14 is also provided with a pair of vertical slots 30 of a width greater than the width of the recesses 24, each intersecting a

different one of the recesses 24 and extending from the upper surface of the housing wall 14 to points below the bottom surfaces 28 of the recesses 24. It is preferred that, as here disclosed, each slot 30 should extend somewhat beyond each side of the corresponding recess 24. Each slot 30 intersects the axis of one of the holes 22, and is here shown as perpendicular thereto. Considering the holes 22 as extending through the recesses 24 to the partition 26, as would be the case if the recesses 24 were not provided, it may be said that the slots 30 intersect the holes 22. Those portions of the slots 30 in line with the holes 22 and extending therebelow may be widened, as indicated at 32, but narrower portions of the slots 30 extend to either side of the thus widened portions 32. Additional laterally extending recesses 34 may be provided on the upper surface of the bottom housing wall 14 extending in opposite directions from the partition 26.

The terminal strips B and C may be made by a stamping and forming operation from strips of conductive material having appropriate physical and electrical characteristics such that they will serve as electrical connectors and will also have a reasonable degree of resiliency. Various types of copper alloys are known to be suitable for this purpose. The terminal strip B, adapted to engage with the side terminal 6 of the lamp bulb 8, comprises a bowed upstanding top portion 36, a laterally extending base 38 and a downwardly extending end portion 40 connected to the base 38 by means of the curved portion 42. The width of the end portion 40 is closely the same as the width of the slot 30 in which it is adapted to be received, and the outer edges of the terminal end portion 40 may serrated, as at 44, in order to more firmly and reliably engage the end surfaces of the slot 30. The tip of the terminal end portion 40 is bifurcated or forked, as at 46, the bifurcation being in line with the hole 22 when the terminal strip B is put into place. The upper extremity of the bifurcation 46 is adapted, when the terminal strip B is in place in the housing A, to assume a position below the center of the hole 22 intersected by the slot 30 in which the terminal end portion 40 is received. As here specifically illustrated the upper extremity of the bifurcation 46 assumes a position appreciably below the bottom of the hole 22, but this precise position is not essential to the operation of the device. The width of the base portion 38 of the terminal strip B is preferably substantially the same as that of the recess 34 in the upper surface of the housing bottom wall 14 in which it is adapted to be received so as to make frictional engagement therewith and thus ensure proper positioning of the terminal strip B.

The construction and arrangement of the terminal strip C, adapted to make electrical connection with the tip terminal 4 of the lamp bulb 8, is essentially similar to that of the terminal strip B, and the same reference numerals are applied to corresponding parts thereof, distinguished, however, by being primed. The upper portion 36' of the terminal strip C, however, is bent over more than the upper portion 36 of the terminal strip A in order to perform its desired connective function.

Leads generally designated 48 are adapted to be connected to the socket. These leads 48, as is conventional, comprise a conductive core or wire 50 surrounded by a sheet 52 of insulation. The size of the holes 22 is so chosen that the leads 48, with the insulation sheath 52 thereon, may be slid through the holes 22 and the recesses 24 and up against the partition 26, all while the terminal strips B and C are removed from the slots 30 or are at least positioned well upwardly along those slots so as not to interfere with free entry of the lead ends into the housing A. After the leads 48 have been thus inserted, as indicated by the arrows 54 in Fig. 5, the terminal strips B and C are then moved downwardly, as indicated by the arrows 56 in Fig. 5, so as to enter the slots 30 and move substantially fully down therealong. This is accomplished merely by inserting the terminal end portions 40, 40' in the appropriate slots 30 and then passing them downwardly. The bifurcated portions 46 at the tips of the terminal strip end portions 40, 40' will engage those portions of the leads 48 which they intersect, they will penetrate the insulating sheath 52 so as to engage and make electrical connection with the conductive cores 50, and they will bend the conductive cores 50 to a greater or lesser degree, depending upon the final position of the upper extremity of the bifurcated portion 46, as shown in a perhaps exaggerated manner in Figs. 2, 4 and 6, thus firmly locking the leads 48 to themselves and to the housing A. The widened central portions 32 of the slots 30 facilitate this bending, and hence locking, of the conductive cores 50 of the leads 48. Since the end terminal portions 40 and 40' are frictionally received within the slots 30 they will be reliably retained in place, and the serrations 44, 44' digging into the end edges of the slots 30 will make such retention doubly secure. Since the bases 38, 38' of the terminal strips B and C are of substantially the same width as the recesses 34 in which they are received, they too will be frictionally retained in place.

When, as is here specifically disclosed, the lead-receiving holes 22 are horizontal and when, as is usually the case, the external portions of the leads 48 will extend downwardly therefrom or at any rate at an angle with respect to the holes 22, it will be apparent that any pull exerted on the external portions of the leads 48 will not be transmitted directly to the point of engagement between the socket terminal end portions 40, 40' and the conductive cores 50 of the leads. Instead, much or all of the pull or strain will be taken up by the housing A itself where the leads 48 bend around the outer ends of the holes 22. It will be apparent, therefore, that this arrangement provides for an inherent or built-in strain relief feature, and eliminates the necessity for utilizing any special or auxiliary strain relief device.

If for any reason it is desired to disconnect the leads 48, the terminal strips B and C, or either one of them, can be lifted from their fully assembled position, as by grasping the curved portions 42 thereof between the jaws of a pliers and pulling up. This will release the corresponding lead 48, permitting it to be withdrawn from its hole 22 and permitting a new lead 48 to be inserted therethrough, after which the appropriate terminal strip may be reinserted as before.

It will be further noted that since the partition 26 separates the recesses 24 within which the ends of the respective leads 48 are received, the proper positioning of the leads 48 is ensured and short circuits or arcing are effectively prevented, the partition 20 serving both as a positive stop determining the proper position of the leads 48 and as an effective insulation between them and between the terminal strips B and C.

The socket of the present invention will therefore be seen to consist of three simple and readily fabricated parts. Moreover, the assembly of these parts need not be done at the point of manufacture, thus greatly reducing the cost of the socket. Instead the terminal strips B and C may be assembled with the housing A at the point of use and after the leads 48 have been inserted through their respective holes 22. Assembly involves merely a simple pushing action and hence is well within the skill and abilities of the average user of such devices. When, as is often the case, sockets of the type under discussion are to be sold already connected to the leads 48, an assembly operation will be required at the point of manufacture, but the assembly operations involved with the structure of the present invention are so much simpler and more readily effective and so much more rapidly performed than the combined assembly and lead connection operations required by structures of the prior art that a very appreciable saving in cost is nonetheless effective.

While but a single embodiment of the present invention has been here disclosed, it will be apparent that many variations may be made all within the spirit of the invention as defined in the following claims.

I claim:

1. A socket comprising a bottom wall with upstanding sides defining a housing having an open upper end through which an external element is adapted to be passed into said housing, said bottom wall having a pair of upwardly opening recesses separated by a partition and also having a pair of holes each extending laterally outwardly from a different recess at a point above the bottom of said recess to the outer surface of said housing and oriented toward said partition, through which holes wire ends are adapted to be passed into said recesses, said partition being interposed between said holes, and conductive terminals in said housing adapted to make electrical connections with said external element, each of said terminals having a forked end portion received in an appropriate one of said recesses with the fork thereof oriented downwardly in line with and below the corresponding hole and the sides thereof engaged with the sides of said recesses, said forked end portions extending downwardly into said recesses, said forked end terminal portion being adapted to engage a wire end and make electrical connection therewith, said conductive terminals also comprising second portions connected to the end portions thereof and adapted to rest on and extend along the upper surface of said bottom wall, said upper surface being provided with additional laterally extending shallow recesses communicating with said first named recesses, said second terminal portions being frictionally received in said additional recesses.

2. A socket comprising a bottom wall with upstanding sides defining a housing having an open upper end through which an external element is adapted to be passed into said housing, said bottom wall having a pair of upwardly opening recesses separated by a partition and also having a pair of holes each extending laterally outwardly from a different recess to the outer surface of said housing, through which holes wire ends are adapted to be passed into said recesses, said partition being interposed between said holes, said bottom wall having slots extending laterally and downwardly from each of said recesses, and conductive terminals in said housing adapted to make electrical connections with said external element, each of said terminals having a forked end portion received in an appropriate one of said slot-recess combinations with the fork thereof oriented downwardly in line with and below the corresponding hole and the sides thereof engaged with the sides of said slots, said forked end portions extending downwardly into said slots and recesses, said forked end terminal portion being adapted to engage a wire end and make electrical connection therewith, said conductive terminals also comprising second portions connected to the end portions thereof and adapted to rest on and extend along the upper surface of said bottom wall, said upper surface being provided with additional laterally extending shallow recesses communicating with said first named recesses, said second terminal portions being frictionally received in said additional recesses.

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