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PLURAL SOCKET TERMINAL ASSEMBLY

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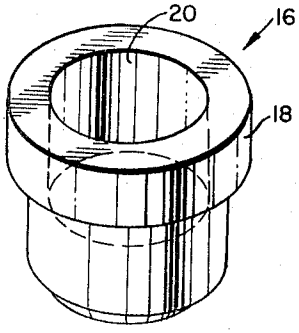


FIG. 1

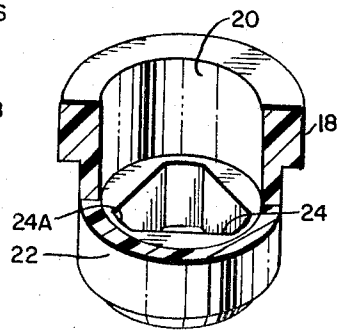


FIG. 2

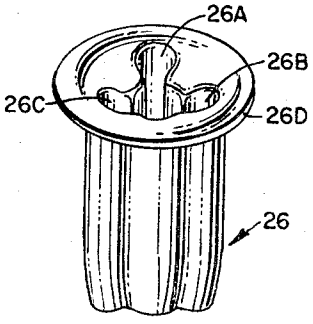


FIG. 3

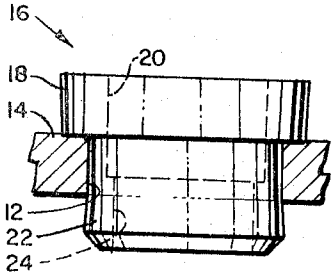


FIG. 4

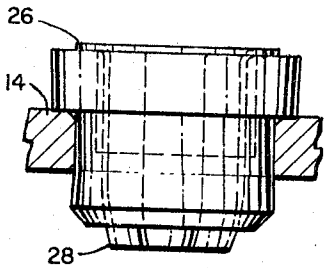


FIG. 5

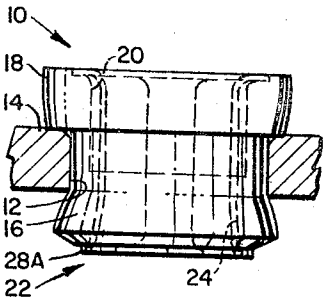


FIG. 6

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PLURAL SOCKET TERMINAL ASSEMBLY

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This invention relates in general to electrical terminal assemblies for mounting in a hole in a housing panel, baseboard panel and the like and into which there are placed connections to the ends of one or more lead wires that may be inserted into the assembly conductively secured therein. More particularly, the invention relates to a plural socket terminal assembly and a method of installing the same.

This invention represents an improvement to the electrical terminal assembly described in Patent No. 3,193,617, wherein there is shown a metal conductor element having a cross-sectional configuration that may be likened to a cloverleaf and which is held in an insulator or bushing. As such a terminal assembly is securely mounted in a hole in a baseboard, a housing and the like, it is important to fix quickly and economically, but nevertheless securely, the electric terminal assembly in the hole in the baseboard or housing.

Accordingly, the present invention provides an electric terminal plural socket assembly for mounting in a hole in a housing panel, baseboard panel and the like for making soldered connections to the ends of one or more lead wires that are inserted into the assembly. The assembly includes an outer insulating bushing for mounting in the hole and has a flange on one end from which there inwardly extends a cylindrical inner wall to a bottom section thereof. This wall defines an axial opening in the insulator and the bottom section of the insulator has a polygonal opening therein of a major dimension that is less than the diameter of the cylindrical opening. The insulator bushing has a length so that the bottom section is positioned on one side of the panel into which it may be inserted, opposite from that of the flange. Within the axial and polygonal openings of the bushing there is positioned longitudinally a tubular electrical conducting element that is formed to give the bore of the tubular element a cloverleaf configuration as viewed in an axial direction with as many lobes as there are sides of the polygonal opening in the bushing. The tubular electrical conducting element has one end flared to distend the end of the insulator bushing opposite that of the flange at the polygonal opening to provide an outside diameter of the insulator bushing which is greater than the hole in the panel so as to firmly retain the assembly in position.

The invention further contemplates a method of installing the insulator bushing in which the cloverleaf electrically conducting element is flared after both the insulating bushing and the electrical element are placed in position in the housing panel, baseboard panel and the like.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification, but for a better understanding of the invention, its operating advantages and specific objects obtained by its use, reference should be had to the detailed explanations of the preferred embodiment of the invention along with the illustrations in the accompanying drawings.

In the drawings:

FIGURE 1 is a perspective view of the insulator bushing of the invention;

FIGURE 2 is another perspective of the insulator bushing shown in FIGURE 1 with a portion cut away to reveal the construction of the bottom portion thereof;

FIGURE 3 is a perspective of an electrically conductive tubular element used in the invention;

FIGURE 4 is a side view of the insulator bushing of FIGURE 1 installed in a hole in a housing;

FIGURE 5 is a side view similar to that of FIGURE 4 with the conductor element of FIGURE 3 assembled in the insulator bushing; and

FIGURE 6 is a side view of the electrical terminal plural socket assembly of the invention as finally secured in position.

The invention can best be described with reference to the drawings by a narration of the method steps that should be performed to finally produce the product.

An electrical terminal plural socket assembly **10** (FIGURE 6) is mounted in a hole **12** in a housing panel **14**, baseboard panel and the like, with the assembly comprising an outer insulating bushing **16** having a flange **18** on one end from which there inwardly extends a cylindrical wall **20** to a bottom section **22** wherein there is an opening **24**. Within the wall and opening **24** there is a tubular electrically conducting element **26** disposed longitudinally of the insulator bushing.

Preferably, the insulator bushing **16** is of an elastic material such as polytetrafluoroethylene, hereinafter called "PTFE," and may be generally described as a flanged closed bottom hat-shaped insulator bushing as shown in FIGURE 1, which has cut therefrom a polygonal opening **24** in the bottom portion. The polygonal opening has its corners, as at **24A**, rounded and the major dimension of the opening **24** is less than the diameter of the inner cylindrical wall **20** of the bushing. The bottom section **22** with its opening **24** is longitudinally placed at the opposite end from the flange **18** of the bushing with the length of the cylindrical portion of the bushing being such that when the bushing is in position in the hole **12** of the housing **14**, the increased cross-section of the bottom section **22** and the major portion of the opening **24** are disposed on the opposite side of the housing from that of the flanged portion **18** of the bushing.

In accordance with the aforementioned Patent No. 3,193,617, there is separately fabricated a generally tubular electrically conducting element **26** which is longitudinally elongated and formed to give a bore which has a cloverleaf configuration as viewed in an axial direction with as many lobes **26A**, **26B**, **26C**, as there are sides of the polygonal opening **24** in the insulating bushing **16**. The element may have on one end a flanged portion **26D** and on the opposite end may be tapered inwardly slightly, as shown in FIGURE 3, to facilitate entry of the element into the bushing. Further, if desired, the element may be formed so that there is an opening in the center portion of the element having a generally circular configuration in which there may be placed through terminal pins or the like. There is, of course, implicit in the arrangement, that the number of lobes in the electrically conducting element **26** may be as many as desired with it being also understood that the polygonal opening **24** in the bushing would be cut with as many sides as the selected number of lobes. The important feature of the assemblage is that the position of the bottom section **22** of the insulator bushing and the dimensions of the opening **24** yields a greater thickness of the bottom section **22** than the major portion of the wall of the bushing that is retained within the opening **12** in the housing **14**. Further, the length of the electrically conducting element **26** should be such that it extends slightly beyond the bottom end of the bushing as shown in FIGURE 5.

The next step in the assembly process is to insert the insulator bushing **16** into the hole **12** of the panel **14**.

This may be, if desired, an interference fit wherein the elastic material, such as PTFE, of the outside of the insulator is slightly constricted by the hole **12** so that it is held in position by its inherent elasticity while the bottom section **22** which is on the oposite side of the panel from the flange **18** tries to hold its natural shape and, therefore, appears as shown in FIGURE 4 as having a slight outward flare.

The next step in the assembly is to insert the electrically conductive element **26** through the insulator bushing **16** so that it is positioned longitudinally in the bushing with one end extending through and closely fitting in the polygonal opening **24**, as shown in FIGURE 5. Further, the element has its lobes held securely by the round corners of the polygonal opening **24**.

To firmly and finally secure the terminal plural socket assembly in position, the extending end **28** of the electrical conductor **26** is flared outwardly by a flaring tool or staking device (not shown) so that the deformation of the element distends the bottom section **22** of the insulator outwardly against its inherent elasticity to create an even greater flare in the outside of the insulator as shown in FIGURE 6, and thereby to securely hold the assembly in position in the hole of the panel **14**. It is believed that the large section or quantity of elastic insulator material that is in the bottom section **22** of the insulator creates an effect very similar to that of the flange **18** on the opposite end of the insulator to lock the assembly in position. If desired, after flaring of the extended end **28** of the element **26**, it may be rolled over to form a flanged end **28A**, as shown in FIGURE 6, to further lock the electrical conductor in position in the assembly.

It is, of course, intended that the invention contemplates the use of any of the known elastic insulating materials as well as any of the known metals that are normally used in the electric terminal field.

Further, although the invention is illustrated with the insulator in an interference fit, the invention would work equally well if the insulator were just placed by hand in a reasonably loose fit within the hole **12** of the panel **14**. The important feature is that the flaring of the conductive element **26** at its end **28** against the elastic insulator material is the real locking force necessary to hold the assembly in position wherein the elastic insulator has a larger or heavier cross-section than the adjacent wall portion that is within the bounds of the hole of the panel.

It should also be understood that within the concept of this invention the electrical conductor could be preassembled into the insulator in an interference fit after which, when the assembly is placed in the hole in the panel, the electrical conductor end **28** is then flared to distend the heavier bottom section **22** of the elastic insulator outwardly to thereby lock the assembly in position. Alternatively, the invention contemplates the preassembly of the electrical conductor snugly within the insulator wherein the outside dimension of the bottom section **22** of the insulator has a dimension which is slightly greater than that of the hole **12** in the panel **14** so that when the whole assembly **10** is force fitted into the hole, the assembly is held by the constriction that the small diameter hole **12** has on the center and weaker portion of the insulator so that the resultant installed assembly would

have a configuration, in this alternative construction, which is similar to that shown in FIGURE 6 while being arrived at by a different method of installation.

While in accordance with the provisions of the statutes there has been illustrated and described herein a specific form of the invention now known, those skilled in the art will understand that changes may be made in the form of the product or the method of making it disclosed without departing from the spirit of the invention covered by the claims and that certain features of the invention may some times be used to advantage without a corresponding use of other features.

What is claimed is:

1. In combination with a housing panel, a baseboard panel, or the like of a predetermined thickness and having a hole therethrough, an electrical terminal plural socket assembly mounted in said hole for making soldered connections to the ends of one or more lead wires that are inserted into said assembly, said assembly comprising an outer insulating bushing mounted in said hole and having a flange on one end from which there inwardly extends a cylindrical inner wall to a bottom section, said wall defining an axial opening, said bottom section having a polygonal opening therein of a major dimension that is less than the diameter of said cylindrical axial opening, said bushing being of a length greater than said predetermined thickness to position said bottom section on a side of said panel opposite from that of said flange, a tubular electrically conducting element flanged at one end and longitudinally formed to give the bore of said tubular element a cloverleaf configuration as viewed in an axial direction with as many lobes as sides of said polygonal opening in said insulating bushing, said tubular element having an outer surface generally conforming to that of said polygonal opening and positioned longitudinally in said insulating bushing with the end opposite said flange flared to distend said tubular element and said bushing at said polygonal opening to provide a bushing outside diameter greater than the hole in said panel and retain the assembly in position.

2. An assembly according to claim **1** in which both ends of said tubular element extend to a greater diameter than said cylindrical axial opening in said insulator bushing.

3. An assembly according to claim **1** in which said bushing has an outer diameter that is slightly greater than said hole in said panel to allow an interference fit therewith.

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