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SELF-LOCKING FASTENER FOR TERMINAL POST

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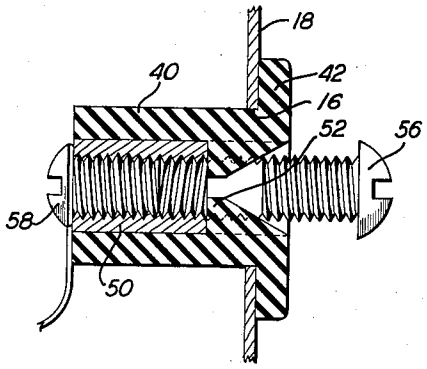


FIG. 1.

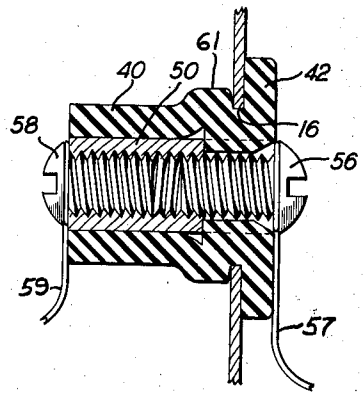


FIG. 3.

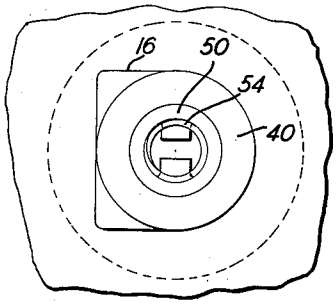


FIG. 2

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SELF-LOCKING FASTENER FOR TERMINAL POST

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This invention relates in general to electrical terminal connectors and more specifically to self-locking electrical connectors wherein a self-locking member is also a conductor in an electrical circuit.

Heretofore, the securing of an electrical terminal to a terminal plate or support member has required at least one fastening means for a terminal post assembly and additional means to secure electrical connectors to the terminal post. Such an arrangement has resulted not only in a duplication of parts, but requires large area terminal boards and requires a time consuming assembly operation.

A simpler, more compact terminal assembly is desired particularly by the automobile industry. Vehicle lighting and electrical control circuits have increased in number and as a result more electrical terminals are required in standard automobiles. The added equipment, however, has reduced the space available for terminal boards. In addition, many vehicle circuits necessarily require the transmission of electrical current through compartment walls and lighting enclosures. The present invention provides for the manufacture of compact terminal boards and further provides means for securing a terminal connector to metallic walls or enclosures such as are found on vehicles, and at the same time insulates a conductive path through these supporting members. This is accomplished by the insertion of an insulated terminal post assembly through a support aperture after which electrical leads or cables are secured thereto. The terminal post is automatically secured to the support at the same time that the leads are secured to the terminal post. This results in a reduction of assembly operations and a simple and space saving connector assembly.

Among the objects of this invention are to provide means for readily securing an electrical terminal post and associated connectors to a terminal plate member through the use of common securing means; to provide a conducting path through the terminal post by means of the common securing means; and to provide means for insulating the conducting path from the supporting member with the insulating means further providing a self-locking arrangement between the terminal assembly and the supporting member. In brief, the invention comprises an insulator member containing an electrical conductor member both of which are adapted to extend through an aperture in a supporting member. Fastening means for a conductor is insertable in the insulator member and into engagement with the conductor member. Upon tightening of the fastening means, the insulator member is compressed and expands on one or both sides of the supporting member to securely lock the assembly to the supporting member.

In the drawings:

FIGURE 1 is a sectional view of the individual parts comprising this invention in a partially assembled relationship;

FIGURE 2 is a left end view of FIGURE 1;

FIGURE 3 is a sectional view illustrating the invention as finally assembled.

Referring now to FIGURE 1, an insulator bushing **40** comprises a flange **42** that engages a terminal plate **18** immediately adjacent the edges of an aperture **16** in the plate **18**. The support aperture may be circular in

form but is preferably of a so-called **D** shape as shown in FIGURE 2. A conductor sleeve **50** having an outer diameter substantially equal to the inner diameter of the insulator bushing **40** snugly fits within the bushing **40**. The insulator bushing is provided with a plurality of laterally or inwardly extending lugs or camming surfaces **52** on its inner periphery and the conductor sleeve **50** contains a plurality of slots **54** to receive the lugs **52**. A first threaded member **56** threadingly engages the conductor sleeve **50** at the flange end of insulator bushing **40** and a second threaded member or screw **58** is inserted in the opposite end of the conductor sleeve **50** to result in a complete electrical terminal assembly through the support. Electrical leads **57** and **59** are connected to members **56** and **58** respectively and, accordingly, are electrically connected through the sleeve **50**. It is noted by comparing FIGURES 1 and 3 that upon the insertion of screw **56** into bushing **40**, the lugs **52** are forced radially outwardly to expand the bushing at **61** and lock the assembly to the support.

As will be obvious from the previous description the insulator bushing **40** can be placed within the terminal plate or support aperture **16** either prior to or after the insertion of conductor sleeve **50** within its associated bushing. After the conductor sleeve has been placed within an insulator bushing and the assembly is inserted within a support aperture, the first threaded or screw member **56** is caused to threadedly engage the conductor sleeve to be retained therein. The first threaded or screw member is sufficiently tightened to draw on the insulator bushing and conductor sleeve assembly resulting in the collapsing of these members to expand the bushing at **61** thereby retaining the assembly within aperture **16** of support **18**. Since these expanded areas **61** are on a side of the support members remote from the insulator bushing flange **42**, it is apparent that the terminal assembly is firmly secured to the support. The use of threaded members to expand and collapse the insulator bushing and conductor sleeve is shown for purposes of illustration only. It will be apparent that a fastening member can be pressed within the conductor sleeve to expand an insulator for the purpose of securing electrical leads thereto while simultaneously rigidly affixing a terminal assembly to a support member. The second threaded member **58** can then be fastened within the remaining end of the conductor sleeve so as to couple electrical cables at each end of the terminal assembly if desired.

As will readily be seen, the above described electrical terminal connector provides an insulated conductive path through a supporting member and at the same time is secured thereto along with electrical leads without requiring additional parts or operations. The subject connector is merely inserted within a supporting member aperture and as the electrical leads or cables are secured to the terminal assembly by the member **56**, the insulator bushing expands to fasten the assembly to the supporting member. It should be apparent that the illustration described above is subject to modifications while remaining within the scope of the appended claims.

What is claimed is:

1. A self-locking electrical terminal connector comprising a support member having an aperture therein, a deformable insulator bushing having an outer cylindrical surface of a diameter substantially corresponding to that of said support aperture and extending therethrough, said deformable insulator bushing having an inner cylindrical surface of a predetermined initial diameter, said inner cylindrical surface having a plurality of inwardly extending lugs formed thereon, a flange portion integral with said insulator bushing and engaging said support member immediately adjacent said aperture, a metallic conductor sleeve within said insulator bushing

having an outer cylindrical surface of a diameter substantially equal to that of said inner diameter of said insulator bushing, said conductor sleeve having an inner cylindrical surface of a predetermined initial diameter and containing a plurality of slots receiving said inwardly extending lugs of said insulator bushing, said insulator bushing and said sleeve being assembled within said support aperture and extending therethrough, a first threaded member having a slotted head and threadedly engaging said inner cylindrical surface of said conductor sleeve, said first threaded member engaging said lugs expanding them laterally and being operative to circumferentially collapse said insulator bushing and draw the same against a side of said support member remote from said insulator bushing flange portion, and a second threaded member threadedly engaging said inner cylindrical surface of said conductor sleeve at an end remote from said insulator bushing flange to complete an electrical connection through said terminal connector.

2. A self-locking electrical terminal connector comprising a support member having an aperture therein, a deformable insulator bushing being received within and extending through said support aperture, said insulator bushing having an outer cylindrical surface of a diameter substantially corresponding to that of the support aperture, said deformable insulator bushing having an inner cylindrical surface of a predetermined diameter, said insulator bushing inner cylindrical surface having a plurality of laterally extending lugs thereon, a flange member integral with said insulator bushing and engaging

said support member immediately adjacent said aperture therein, a conductor sleeve fitted within said insulator bushing and having an outer cylindrical surface snugly engaging the inner surface of said insulator bushing, said conductor sleeve having an inner cylindrical surface of a predetermined diameter and containing a plurality of slots receiving said laterally extending lugs of said insulator bushing, a first threaded member threadedly engaging the inner cylindrical surface of the conductor sleeve, said first threaded member being operative to engage said lugs and expand them laterally to collapse the insulator bushing and draw the same against a side of said support member remote from said insulator bushing flange portion when said threaded member is actuated, and a second threaded member threadedly engaging the inner cylindrical surface of said conductor sleeve at an end remote from said insulator bushing flange to provide an electrical connection.

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