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[54] ELECTRICAL CONNECTOR

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[52] **U.S. Cl.** .....**339/116 C**, 339/272 R

[51] **Int. Cl.**.....**H01r 13/54**, H01r 13/30

[58] **Field of Search**.....339/116, 242, 213, 272, 265, 339/237, 60; 151/24, 21 C; 174/72 R, 71 R, 18

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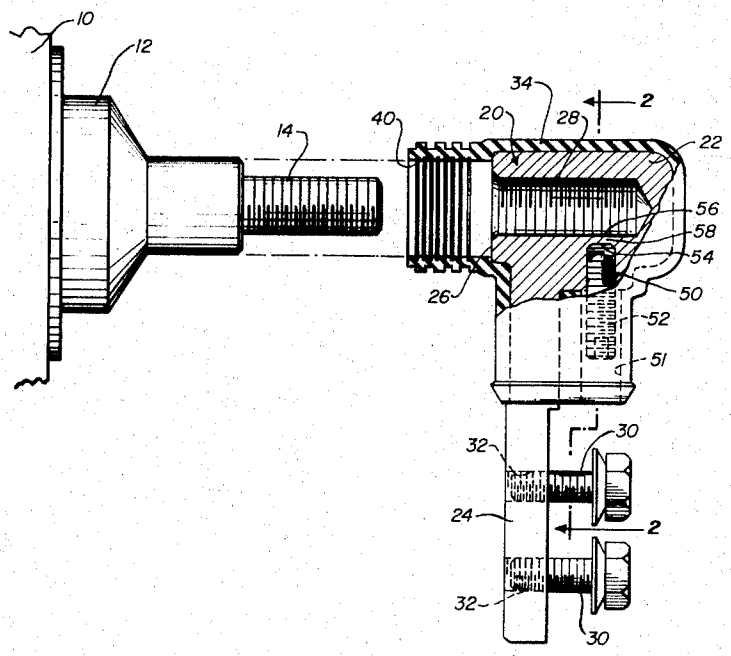
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[57] **ABSTRACT**

A connector for making an electrical connection to a threaded stud for power distribution applications such as transformer applications. A conductive connector threaded at one end to receive the stud is insulated with a protective jacket which mates with the stud bushing to enclose the connection. A set screw projects through the insulation into a threaded socket to bear against the stud when the set screw is tightened. The bearing surface may be a section of the wall of the body within the threaded area or may be an inset pressure pad, or plastic set screw tip. The free end of the connector may have a suitable connector for connection to a cable. A slideable insulating sleeve or boot fitted over the last mentioned connector may insulatingly cover the entire connection.

3 Claims, 5 Drawing Figures



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SHEET 1 OF 2

FIG. 1

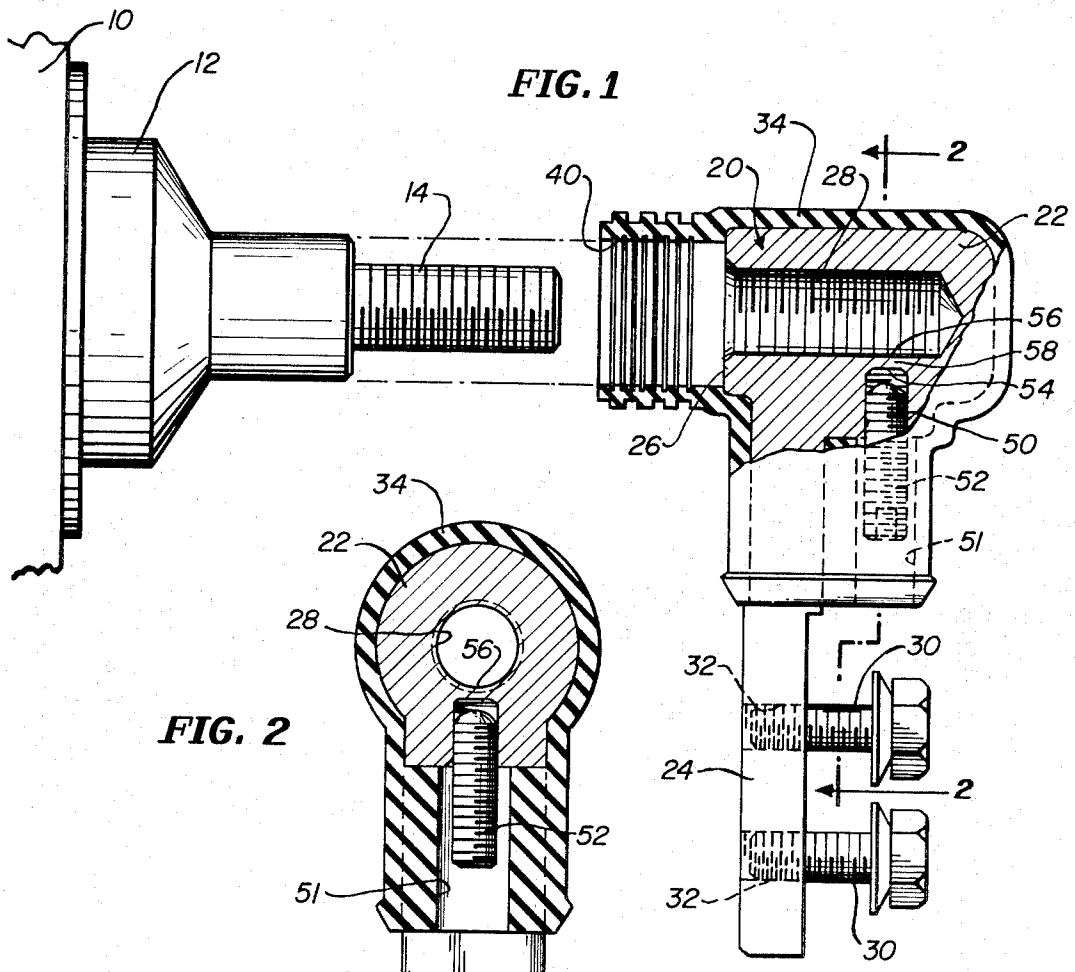


FIG. 2

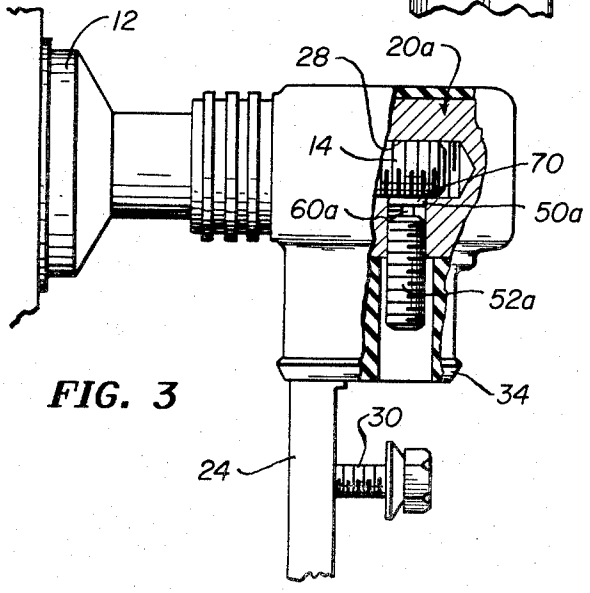


FIG. 3

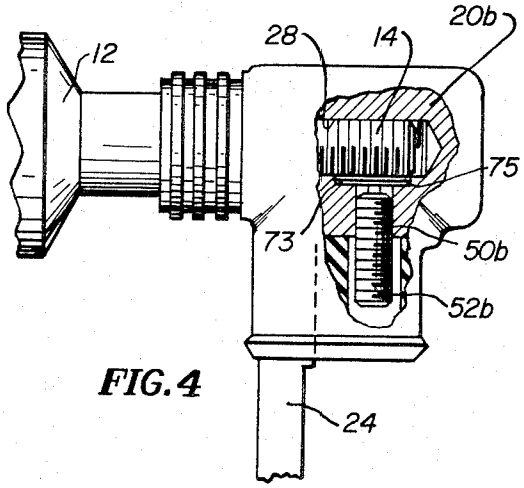


FIG. 4

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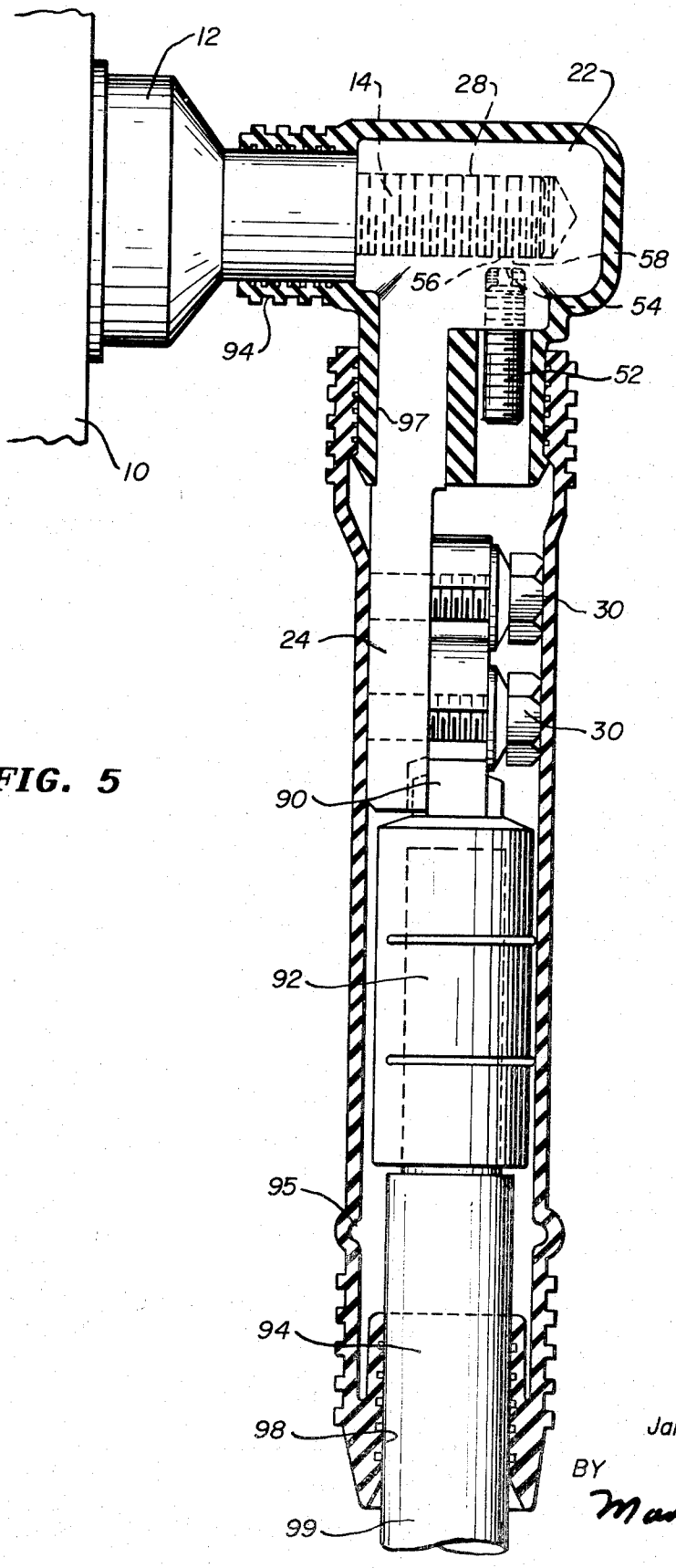


FIG. 5

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ELECTRICAL CONNECTOR

BACKGROUND OF THE INVENTION

In general usage, electrical connections from power system components such as transformers terminate in a threaded stud extending normally from the body of the transformer. In the usual condition, a cable is attached to an intermediate member which is in turn connected to the stud. The intermediate member may take the form of a threaded conductive sleeve with the cable soldered or otherwise entered into the opposite end. Another approach has been to mount a terminal member with either a threaded bore or clearance opening on the stud. In the latter case, a clamping screw or the like would be used.

In either of the cases noted, problems have arisen relative to firmness of the connection. Other problems arise relative to the assembly and possible disassembly of the connection. Of course a necessary condition is that a tight and firm electrical connection be made and that the connection be insulatable both electrically and against moisture entering the connection.

SUMMARY OF THE INVENTION

It is therefore an object of the invention to provide a new and improved terminal connector for electrically connecting a cable to a threaded stud.

It is a further object of the invention to provide a new stud-mounting connector which is readily assembled and holds the connection firmly and tightly without causing damage to the stud.

It is a further object of the invention to provide an improved stud-mounting connector which may be jacketed with moisture-proof insulation during fabrication and which may be insulated to cover the connection to the stud.

It is a still further object of the invention to provide a stud-mounted connector which may be readily removed from the stud and also be readily detached from a cable connected thereto.

The invention shown and claimed herein employs the principle of an internally threaded connector fitted on the mounting stud. A set screw socket is machined or otherwise formed in the connector body normal to the threaded stud-receiving passage. In one form, a web or desired thickness of material is retained as the socket end wall. The set screw on being tightened will then tighten the threaded area against the stud threads. By the use of the set screw, the connector alignment may be set as desired and maintained without causing any damage to the threads of the stud.

In another form, the set screw opening may be bottomed within the connected stud receiving bore. Either a plastic pressure pad interposed between the set screw tip and the stud bore or plastic-tipped set screw may be used to produce a compressive force against the stud holding it in place tightly in this way.

With any of these approaches, a moisture-proof insulating jacket may be molded onto the terminal connector allowing a set screw opening therein and providing an overhang area surrounding the stud-receiving opening. The connector may have one or a multiplicity of connecting adapters or terminal members extending therefrom for receiving a connection to one or more cables by means of screw tightened open end conducting hoods or the like. In one form, a molded sleeve may be mounted on the cable and slid over the terminal thoroughly covering the connection.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a side elevation of a connector, partially broken away, detached from a stud to which the connector may be attached;

FIG. 2 is a sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a side sectional view of a second embodiment of connector similar to that shown in FIG. 1;

FIG. 4 is a side sectional view of a third embodiment of a connector; and

FIG. 5 is a side view with the cover jacket sectioned of the embodiment of FIGS. 1 and 2 fully connected.

Turning to the drawings in detail, in FIGS. 1, 2, and 5, I show a first embodiment of my invention. There I show a transformer housing 10 from which protrudes a stud mounting insulator or bushing 12 tapered toward the stud 14 which may be embedded at its base within the insulator and which extends normally to the transformer housing 10. Such stud connections are quite well-known in the art and are in general usage.

For mounting a terminal connection on the stud, I provide a jacketed conducting connector 20 of copper, or aluminum, or other suitable material. Connector 20 includes a main body 22 and a terminal member 24, which as shown is angled therefrom. In another form (not shown) a terminal member rectilinearly disposed with respect to the connector body and using my inventive concept may be provided. The main body 22 is cylindrical and has incised in its end wall 26 a threaded stud receiving socket 28 centrally disposed within the main body 22. At right angle to the main body (in the form shown) is the terminal member 24 of circular segmental cross section. On the flat side of the terminal 24 are suitably threaded openings 32 each of which may receive a suitable cable attaching bolt 30. The main body 22 is jacketed within an insulating boot 34 which may be rubber or suitable flexible plastic and may be molded onto the connector body, terminating at the mounting end in an open mouthed tubular sheath 40.

When the connector 20 is mounted on the stud 14, the sheath 40 of the boot covers the stud 14 and the open mouth mates tightly with the transformer bushing thereby insulating the stud connection thoroughly against outside contact. Suitable reinforcing ribs on the exterior of the sheath may be provided, as is well-known.

Within the body 22 of the connector, a set screw socket 50 is cut by suitable means. The socket 50 is threaded to receive a set screw 52. A clearance opening 51 in the boot 34 allows the set screw 52 to be manipulated from the exterior of the boot. The socket base 54 is spaced a controlled distance from the adjacent surface 56 of the stud receiver socket 28 to create a web 58 of material between the tip of the set screw and the adjacent stud wall.

The thickness of web 58 is controlled during the machining or drilling operation forming the set screw socket. This thickness retained in such that the web will deform into the stud socket on tightening of the set screw tip against the web 58. In this way, the added force of the web as driven by the set screw is provided to retain the stud in the tightened position and prevent

rotation of the connector relative to the stud. The web of material has a large enough area of contact with the stud to prevent marring of the stud threads in response to the set screw pressure.

On tightening of the set screw, the generated pressure will tend to deform the web and cause it to cold flow into the thread grooves tightly locking the stud to the connector body, without marring or damaging the stud threads.

In FIG. 3, I show a second embodiment of my invention. In that figure, we show a transformed connected stud **14** and connector **20***a* similar to the one previously described. In this figure, a through passage **50***a* is cut for the set screw **52***a* such that the tip **60***a* of the set screw may travel into the receiving socket **28**. The set screw **52***a* will have affixed to its tip a plastic disc **70** with the disc diameter only slightly less than the diameter of the set screw. Thus, the disc will pass along passage **50***a* and on tightening of the set screw, the disc will enter the receiving socket **28** deforming against stud **14**, its grooves and threads. Again, with this embodiment, pressure generated by the set screw will not mar the stud threads. Pressure of the set screw will cause the softer, more ductile disc to cold flow into the grooves of the stud thereby tightly locking the stud in place.

In FIG. 4, I show a structure similar to those previously described with a transformer stud **14**. Here, I employ a set screw **52** similar to that shown in FIGS. **1** and **2**. The set screw passage **50***b* is a through passage entering into the stud socket **28**. The joinder of the passage **50***b* to the stud socket **28** is enlarged in dimension for a short depth to form a cavity **73** open to both the stud socket **28** and the set screw passage **50***b*. This cavity may be circular and concentric with the set screw passage or it may be rectangular, hexagonal or any suitable shape. In the first case with a circular cavity, a plastic disc **75** of greater diameter than the set screw **52** may be inserted into this cavity; with any other shaped cavity, a suitable shaped pad of rigid plastic or ductile metal material will be fitted into the cavity. This disc or strip acts as a pressure pad forced against a stud **14** by the tightening of the set screw. Again, the pressure pad will compress against the stud and will be deformed by the threads and cold flow into the thread grooves thereof locking the stud once again. In other forms, the dimensions of the pad must allow its insertion through either the set screw passage or the stud socket prior to assembly of course.

In FIG. 5, I show a fully assembled connector of the embodiment of FIGS. **1** and **2** completely jacketed with moisture-proof insulation. The transformer housing **10** has its bushing **12** protruding therefrom, the bushing having an exterior insulating surface from which extends the conductive stud **14**. The stud is mated within the receiving socket **28** of the connector main body **22**. Extending angularly from the body **22** is the terminal **24**. An insulating exteriorly ribbed boot **34** covers the body and the extension of sheath **40** covers a portion of the bushing **12** completely insulating the stud **14** and connector body **22**.

A set screw **52** within a socket **50** in the body and in a like passage **80** through the boot **34** impinges against the socket base **54** spaced a distance from surface of socket **28** to form therebetween the deformable web **58**. Tightening of the set screw, as mentioned previously upsets the web into the grooves holding the stud **14** tightly.

Connected to the terminal **24** by suitable bolts **30** is the dual, open-hook lug **90**. Lug **90** has an enlarged tubular body **92** crimped or otherwise affixed to the jacketed cable **94**. A tubular sleeve **95** of moisture-proof, waterproof, insulating material is fitted over the lug and cable and engages the outside of the angled extension **97** of boot **34** covering the terminal-lug connection. The extreme end of the sleeve **95** has a gripping member **98** tightly gripping the jacket **99** of cable **94** in a manner known in the art.

While there has been shown what is at present thought to be the preferred embodiment of the invention, it is understood that modifications may be made therein such as using a rectilinear connector body, in place of the angled body shown, and it is intended to cover in the appended claims, as such modifications which fall within the true spirit and scope of the invention.

I claim:

1. A connector for making an electrical connection to a threaded conducting stud, the invention comprising:

a terminal member of high current carrying capacity including a body having a suitably threaded socket for receiving the stud,

a terminal end of said body extending therefrom,

means for exerting compressive force on the stud mated within the body,

said exerting means comprising a set screw, and

an intermediate member disposed between the tip of said set screw and the body of a stud, and wherein

said intermediate member responds to pressure from said set screw to cold flow between the threads of said stud, and

wherein said intermediate member comprises

a deformable member of greater surface than set screw diameter to provide contact with the stud greater than the area of the tip of said set screw,

said deformable member comprised of material softer than said stud and than said set screw.

2. A connector as claimed in claim **1**, wherein said intermediate member comprises

a blind, threaded socket in said body disposed toward and spaced from said stud socket for receiving said set screw, and wherein

said intermediate member comprises a continuous, solid web of material of said body within the space between said set screw tip and said stud socket.

3. A connector for making an electrical connection to a threaded connecting stud extending from an enlarged conductive mounting the invention comprising:

a terminal member of high current carrying capacity including

a conductive body having a suitably threaded socket for receiving the stud,

a water-proof, insulating flexible housing covering said body,

a first opening in said housing for receiving said stud,

a mouth of said opening cooperating with said insulating member for water-proofing the connection of said body to said stud,

a terminal end of said body extending therefrom externally of said housing,

a threaded socket in said body,
means for exerting compressive force on the stud mated within the body,
said exerting means comprising a set screw disposed within said last-mentioned socket, and
an intermediate member disposed between the tip of said set screw and the body of a stud,
said intermediate member having a larger surface area in contact with a stud than said set screw tip, and
said intermediate member comprising
a continuous portion of the sidewall of said socket, said portion upsettable into the threads of said stud to tightly hold said stud against rotation in the stud socket, and
a waterproof sleeve member covering said terminal and sealingly mating with said housing to fully waterproof and enclose said connector.

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