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2,997,530

THROUGH TERMINAL AND MOUNTING FOR SHEET ELEMENTS

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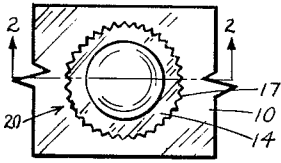


Fig. 1

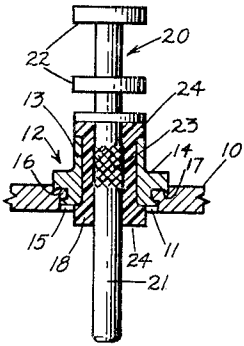


Fig. 2

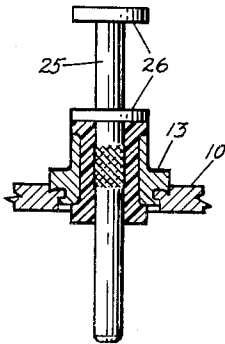


Fig. 3

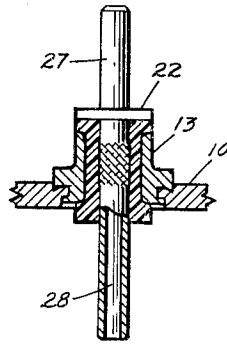


Fig. 4

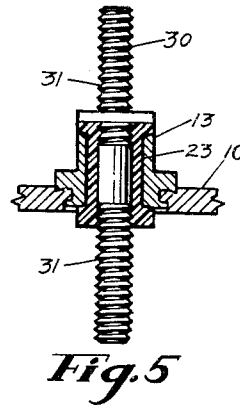


Fig. 5

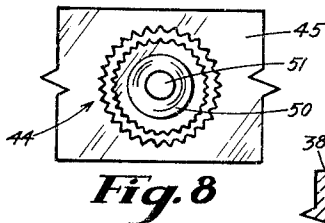


Fig. 8

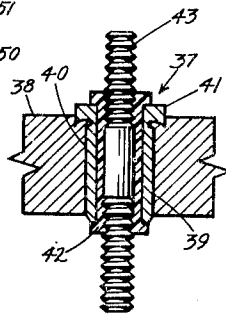


Fig. 7

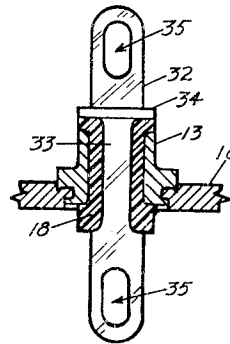


Fig. 6

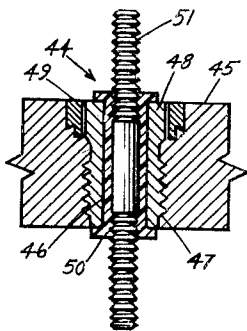


Fig. 9

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**THROUGH TERMINAL AND MOUNTING
FOR SHEET ELEMENTS**

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This invention relates to fasteners and more especially to a fastener unit for an electrical terminal which extends through and is secured to a sheet or panel element.

An object of the invention is to provide a simple, practical, and inexpensive terminal and mounting unit for sheet elements.

Another object of the invention is to provide a novel, insulated terminal mounting unit for application to a sheet-like or panel element.

Other objects and advantages will appear and be brought out more fully in the following specification, reference being had to the accompanying drawing wherein:

FIGURE 1 is a top or end view of a terminal and mounting unit comprising one form of this invention, shown in association with a sheet or panel element.

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

FIGURE 3 is a view similar to FIGURE 2 showing a modified form of terminal.

FIGURE 4 is a view similar to FIGURE 2 showing another modified form of terminal.

FIGURE 5 is a view similar to FIGURE 4 showing another modified form of terminal.

FIGURE 6 is a view similar to FIGURE 5 showing another modified form of terminal.

FIGURE 7 is a view similar to FIGURE 1 showing another modified form of terminal and mounting unit.

FIGURE 8 is a view similar to FIGURE 1 showing the terminal of FIGURE 7 with a modified mounting unit.

FIGURE 9 is a view similar to FIGURE 7 showing the mounting unit of FIGURE 8.

Referring more particularly to the drawing, the terminal and mounting unit of this invention is shown in association with a sheet metal element 10 which may be the top or wall of a cabinet or chassis of electrical apparatus or may be a panel or other wall which mounts electrical equipment. Sheet metal element 10 is typical of the type which is relatively thin and may comprise a relatively soft malleable metal such as aluminum, steel, or the like, and having one or more apertures 11 through which the terminal of the invention is to extend or into which other parts of the mounting unit may pass. The terminal and mounting unit of this form of the invention is indicated at 12 and comprises a tubular body 13 having a flange 14 which is adapted to overlie aperture 11 and has a second flange 15 which, together with flange 14, forms an annular groove or recess 16. Flange 14 is formed with a plurality of serrations 17 which have axially extending teeth provided with pointed end portions, as will be more fully described hereinafter.

As described above, the serrations 17 have projections or teeth, which extend in an axial direction toward the pilot flange. The ends of the teeth are pointed, and are joined to the side wall of the abutment flange 15 by sloping surfaces, as shown in FIG. 2.

The groove or recess 16 comprises a flat, axially extending, bottom wall, and a pair of parallel, radially extending side walls formed by the abutting side walls of the abutment flange 14 and pilot flange 15.

A sleeve 18 extends through body 12 and preferably comprises an insulator of a suitable character, such as a molded thermo-setting plastic or synthetic resin. A terminal 20 having an elongated shank 21 extends through

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sleeve 18 and may have one or more flanges 22 defining a configuration desired for the connection thereto of electrical wiring. A portion of shank 21 may be knurled as indicated at 23 for anchoring the terminal in sleeve 18. The mounting unit 12 is assembled by the molding of the plastic sleeve 18 in body 13 with the terminal 20 in the relationship shown in FIGURE 2, the molding preferably being under pressure in a manner to provide flanges 24 which serve to retain the sleeve in body 13. The unit 12, when thus assembled, may be positioned in aperture 11 in plate or sheet element 10, this aperture initially being of a size to admit flange 15 and, upon compression of flange 14 and sheet element 10, the material of the sheet element will flow or be deformed into groove 16 and the pointed ends of serrations 17 will bite into the material of the sheet element, thereby effecting a firm and non-rotation mounting of the unit to the panel or sheet element.

FIGURE 3 shows another form of the invention substantially similar to FIGURE 2 but differing therefrom in having a terminal 25, having a pair of flanges 26 defining a different form of terminal connection.

FIGURE 4 shows another modified form of terminal mounting unit which is similar to the units of FIGURES 2 and 3 except for the terminal 27 which has a bore 28 which extends partially or entirely through the terminal for facility in making a desired electrical connection thereto.

FIGURE 5 shows another modified form of terminal and mounting unit, generally similar to the previously described forms except that the terminal 30 has threads 31 at either or both ends for the attachment thereto of one or more mating elements for securing desired electrical wiring. In this form of the invention, the threads 31 extend partially into, or completely through, the insulating sleeve 23 and secure the terminal 30 against rotation therein.

FIGURE 6 shows another modified form of the invention wherein the terminal 32 has a plain shank 33 extending through the insulating sleeve 18 and has a pair of centering flanges 34 for the sleeve 18. Terminal 32 is shown as having one or more apertures 35 to facilitate the attachment thereto of appropriate or desired electrical wiring parts.

FIGURE 7 shows a modified form of terminal mounting unit 37 mounted to a plate or panel element 38 which may be considerably thicker than plate element 10. This plate element has an aperture 39 in which is positioned a modified tubular body member 40 which has a single flange 41 otherwise similar to flange 14. An insulating sleeve 42 having suitable end flanges, when formed, extends through body member 40 and secures a terminal 43, which may be of the type shown in FIGURE 5 or any of the figures of this disclosure.

FIGURES 8 and 9 show another modified form of terminal and mounting unit 44 mounted in a relatively thick or solid serrated body 45 and comprises a tubular insert 46 having external threads 47 for being run into a threaded bore hole in parent body 45. Insert 46 has a serrated flange 48 for engagement with a lock ring 49 which locks the insert 46 in the counterbore of the tapped hole, the flange and lock ring being of the type shown in my Patent #2,400,318. The unit includes insulated sleeve 50 and a terminal 51 which may be of any of the types shown and described herein above.

From the foregoing description, it will be clear that I have provided a secure, insulated terminal for mounting to and which may extend through, the aperture in a relatively thick sheet element or panel as described.

What is claimed is:

1. A terminal and mounting unit for installation in a sheet element having an aperture, comprising a tubular body adapted to extend into said aperture and having a

serrated abutment flange intermediate the ends, said flange having a diameter, said tubular body being adapted to fit freely in said aperture, a pilot flange on said tubular body axially spaced from the abutment flange and having a diameter to fit freely therein, the space between said flanges forming an annular recess having generally parallel radially-extending side walls, the material of said abutment flange and serrations being adapted to permit, upon the insertion of the pilot flange of the tubular body into the aperture with the abutment flange resting on the surface of the sheet metal element, and the application of opposed, evenly distributed, compressive forces on the abutment flange and on the sheet metal surrounding the aperture, the forcing of the abutment flange into the sheet metal element, causing a local deformation of the material of the sheet metal element surrounding the aperture and a displacement of some of the deformed material into the recess between the abutment flange and the pilot flange to completely fill the recess and to provide a bond between the mounting unit and the sheet metal element, the serrations penetrating the material of the sheet metal element to prevent relative rotation between the mounting unit and the sheet metal element, an insulation sleeve in said body, and a terminal member carried by and extending through said sleeve.

2. A terminal and mounting unit as recited in claim 1, in which the serrations include pointed teeth which extend axially in a direction toward the pilot flange and are made of a material such that, when the opposing forces are applied, the teeth penetrate, without deformation, into the material of the sheet metal element to provide a positive lock preventing relative rotation between the mounting unit and the sheet metal element.

3. A terminal and mounting unit as recited in claim 1, in which the serrations include pointed teeth which extend axially in a direction toward the pilot flange, the points on the teeth joining the adjacent side wall of the abutment flange by beveled surfaces, the material of the teeth and beveled surfaces being such that, when the opposing forces are applied, the teeth and the beveled surfaces penetrate, without deformation, into the material of the sheet metal element to provide a positive lock preventing relative rotation between the mounting unit and the sheet metal element, and also facilitating the radial inward flow of the displaced metal into the recess in the tubular body.

4. A terminal and mounting unit for installation in a

sheet element having an aperture, comprising: a tubular body having a portion adapted to extend into said aperture and having an aperture-overlying flange, a second flange having a diameter adapted to define with said aperture-overlying flange, a recess between said flanges on said body, said first flange having toothed serrations adapted to overlie the material surrounding the aperture whereby, upon the application of opposed forces of compression to said first flange and sheet element, the material of said element is forced into said recess, and the teeth of said serrations bite into and effect non-rotational engagement with said sheet element; an insulating sleeve in said body, said sleeve having end flanges lockingly engaging the ends of the tubular body, and a terminal member carried by and extending through said sleeve.

5. A terminal and mounting unit for installation in a sheet metal element having an aperture, comprising: a tubular metallic body having a portion adapted to extend into said aperture, a sleeve of insulating material disposed within said body, said sleeve being of greater length than said tubular body and having radial end flanges disposed beyond and engaging the ends of said tubular body; a terminal member of greater length than said sleeve carried by and extending completely through said sleeve; a flange carried by said terminal member intermediate the ends thereof and engaging one of said end flanges of said sleeve; and means carried by said tubular body and cooperating with said aperture for mounting said tubular body in said sheet metal element through cold flow displacement thereof.

6. A terminal and mounting unit as defined in claim 5, in which the terminal member has a flange at one extremity thereof.

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