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TERMINAL LUG AND BLOCK FOR RELAYS

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FIG. 1.

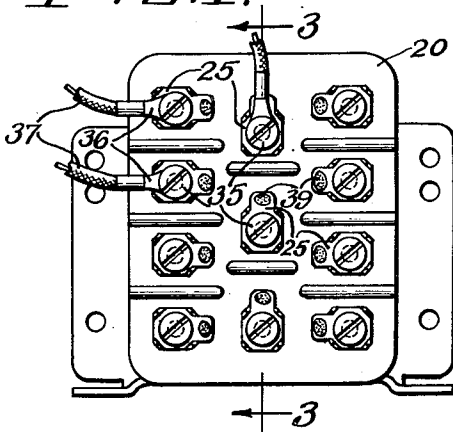


FIG. 2.

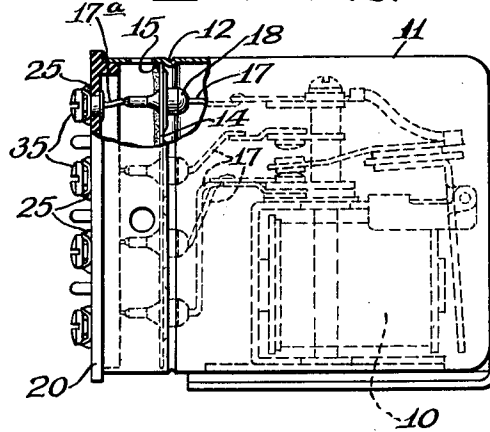


FIG. 3.

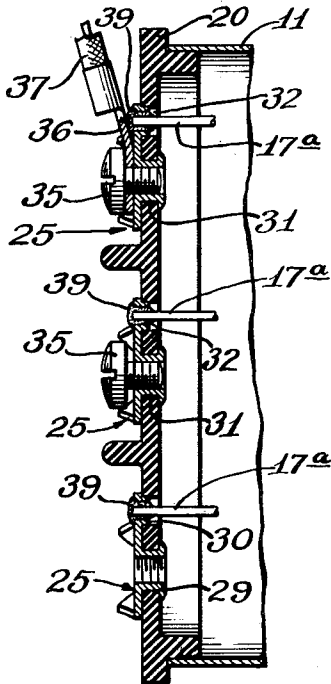


FIG. 4.

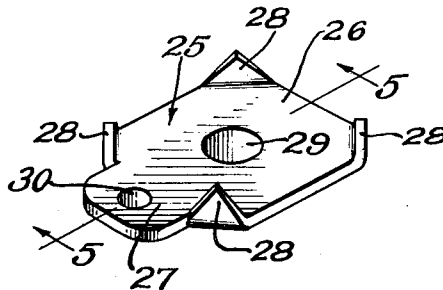
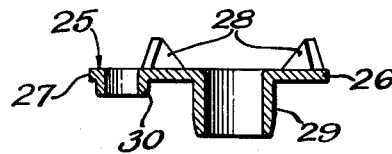


FIG. 5.



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TERMINAL LUG AND BLOCK FOR RELAYS

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1 Claim. (Cl. 339-220)

The present invention relates to a terminal lug of the type for use in conjunction with terminal blocks, such as, by way of example and not limitation, terminal blocks associated with hermetically sealed electro-magnetic relays. It is to be understood that the terminal lug embodying the present invention may be advantageously employed in connection with various other electrical structures or apparatus.

Hermetically sealed relays, as heretofore produced, include a relay component completely enclosed in a sealed chamber of a metallic housing or case, and conductor wires from the various sets of pole contacts of the relay and the terminals for supplying electrical energy to the coil of the relay have conductor wires associated therewith and extend in sealed relation through a bulkhead or partition wall of the case, and are connected to terminal lugs carried on a terminal block or mounting panel. Such terminal lugs, as heretofore employed, include a main depending tubular sleeve projected through a wall of the terminal block with its free end spun outwardly to provide a hollow, rivet-type of connection of the lug to the terminal block. The interior of the sleeve of such lugs are threaded for the reception of a terminal screw, by virtue of which the terminal clip, of a conductor wire of an electrical circuit, to be controlled by the relay, is fixedly attached to the terminal lug. By reason of the connection of the lugs to the terminal block in the manner above referred to, it frequently happens that the lug is caused to be rotated in the process of tightening the terminal screw.

These lugs, heretofore, have each been provided with an aperture through which extends a terminal portion of a conductor wire from the interior of the case of the relay, the end of which wire is then soldered in place to the lug. Such soldering of said wires to the terminal lugs is effected during fabrication of the relay in order to produce a complete, unitary, hermetically sealed relay structure. It has been found that when installing the relay in the "field," in the process of connecting conductor wires, of electrical circuits to be controlled, to the terminal lugs by means of terminal screws, the force employed in tightening such screws tends to place the said conductor wires soldered to the lugs under a shearing stress, and frequently results in shearing of such wires, thus rendering the total hermetically sealed relay component non-usable and necessitating re-working thereof for re-installation of new conductor wires from the pole contacts or the terminals of the relay coil.

Hermetically sealed relays are extensively employed in aircraft construction, and hence, when such components are rendered defective in the manner above indicated, such components are totally non-usable for the time being, and are required to be re-worked to provide new conductor wires from the contacts within the sealed chamber of the case, which results in delay, loss of time and substantial expense in the re-working operation.

One of the objects of the present invention is to provide a novel and improved terminal lug which totally eliminates the aforementioned objectionable conditions.

Another object is to provide a novel terminal lug of the character indicated which is provided with means in the nature of a key for cooperative engagement in an opening in a terminal block for precluding rotative movement of the terminal lug when it is secured to the block.

A further object is to provide an improved terminal lug of the character indicated which is formed with an opening for the reception of a conductor wire there-

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through, and having means for locking the lug against rotative movement relative to the terminal block to preclude possible shearing of the conductor wire.

Still another object is to provide a novel terminal lug in the form of a sheet metal stamping, having a pair of spaced apart, depending tubular sleeves, one of which is internally threaded for the reception of a screw, and the other being dimensioned for the reception of the conductor wire therein.

A still further object is to provide an improved terminal lug, for use in connection with terminal blocks, which is simple in construction, effective in use, and which insures against possible severance of a soldered connection with a conductor wire, and which is capable of being economically manufactured.

Other objects and advantages of this invention will be apparent from the following description, taken in connection with the accompanying drawings in which:

Figure 1 is a face view of a relay assembly having a terminal block provided with terminal lugs, embodying the present invention;

Figure 2 is a view in side elevation of the relay assembly, with certain portions broken away to show details of construction;

Figure 3 is an enlarged sectional view through the terminal block, taken substantially as indicated at line 3-3 on Figure 1, showing the novel terminal lugs mounted in operative relation to the terminal block;

Figure 4 is an enlarged perspective view of the terminal lug embodying the present invention, and

Figure 5 is a longitudinal sectional view through the terminal lug, taken substantially as indicated at line 5-5 on Figure 4.

The relay assembly, as illustrated in Figures 1 and 2 of the drawing, is of a conventional, hermetically sealed type, wherein a relay device, as indicated generally at 10 in dotted lines, is totally enclosed in a cup-shaped housing or case 11 formed of sheet metal. The case, adjacent the open end, is formed with an internal bead or shoulder 12, against which is seated a bulkhead 14 in the nature of a partition wall, the peripheral edges of which are sealed to the inner wall of the case, as by solder, as indicated at 15. It is to be understood that the bulkhead is provided with a suitable fitting, not shown, for conveniently evacuating the chamber in the case below the bulkhead, and for the introduction therein, if desired, of a suitable inert, non-inflammable gas, after which said fitting is sealed off so as to insure proper functioning of the relay proper under a wide range of temperature and humidity conditions.

Connected to the various sets of pole contacts of the relay and the terminals associated with the coil of the relay, are conductor wires 17 which extend through the bulkhead 14, and are sealed with respect thereto by conventional glass bead sealing devices, indicated generally at 18.

The outer end of the cup-shaped case 11 is closed by a terminal block 20, formed of suitable electrical insulating material. The free end portions 17a of the conductor wires 17, associated with the relay proper, extend through the insulating terminal block 20 as will be presently described.

For each terminal in the nature of a pole contact and each terminal connection for the coil of the relay proper, there are corresponding terminal lugs mounted on the outer face of the terminal block 20, and to which lugs may be attached the respective conductor wires of the electrical circuits to be controlled by the relay.

The terminal lugs embodying the present invention, and as clearly seen in Figures 3-5 of the drawing, and indicated generally at 25, are in the nature of sheet metal stampings, including a generally rectangular body portion 26, providing a flat mounting area with which there is contiguously formed a lateral extension 27. The corners of the rectangular body portion 26 are upturned to form ears 28, the purpose of which will hereinafter be described. Formed integrally with said body, within the rectangular area, is a depending tubular sleeve 29, and formed in the extension 27 is a depending tubular sleeve 30, which is of smaller diameter and considerably shorter in length as compared to the sleeve 29.

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The terminal lugs are adapted to be fixedly secured to the terminal block 20, and for each lug, there is provided a pair of apertures, 31 and 32, of a size adapted for snug reception of the two respective tubular sleeves 29 and 30. When the terminal lug is seated in cooperative relation to the terminal block, with the sleeves projecting into the respective apertures 31 and 32, the free end portion of the sleeve 29 is then spun or rolled outwardly, in the nature of a hollow rivet, as clearly seen in Figure 3 of the drawing, for firmly securing the lug in position on the terminal block. The interior wall of the large tubular sleeve 29 is internally threaded for the reception of a terminal screw 35, which serves to secure directly to the flat mounting area of the terminal lug, a correspondingly formed portion of a terminal clip 36, associated with the end of a conductor wire 37 of the electrical circuits to be controlled by the relay, or the circuits for supplying electrical energy to the coil of the relay. The clip is confined in position by the upstanding ears 28 of the terminal lug 25. As above mentioned, when the screw 35 is tightened in process of securing the terminal clip 36 firmly to the lug, there is a tendency to rotate the terminal lug with respect to the block 20. By virtue of the terminal lug construction embodying the present invention, the sleeve 30, when positioned in the aperture 32 of the block, functions in the nature of a key for maintaining the terminal lug in proper position on the terminal block, and opposing rotation of the lug in the process of tightening or loosening the terminal screw 35. Thus, the sleeve 30 tends to take up the normal thrust which may be imparted to the lug in the process of manipulating the terminal screw.

The terminal portions 17a of the conductor wires 17 which are connected to the contacts and terminals of the relay proper are telescoped through the tubular sleeves 30, and are secured in place by a mass of solder, as indicated at 39, and which connection serves to firmly secure the entire terminal block assembly 20 in place on the end of the case 11. Thus, by the construction above described, it will not be possible, in the process of tightening or loosening terminal screws 25 to impart any stress or shearing action to the end portions 17a of the conductor wires, and thus will eliminate the possibility of rendering the total relay assembly defective as a result

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of severance of conductor wires attached to the terminal lugs from the relay contacts or terminals.

Although I have herein shown and described my novel terminal lug in conjunction with a hermetically sealed relay, it will be manifest that said terminal lug is capable of use in connection with various types of electrical apparatus, wherein it is desired to obtain a secure attachment of the lug to a mounting in a manner to preclude rotative movement of the lug. While I have herein shown and described a preferred embodiment of my invention, it obviously is capable of modification without departing from the spirit and scope thereof. I do not wish to be understood, therefore, as limiting this invention to the precise form herein disclosed, except as I may be so limited by the appended claim.

I claim as my invention:

A terminal lug of the character described, formed as a sheet metal stamping having a body provided with a flat mounting area and having a tubular sleeve depending from said area, said sleeve being adapted for seating in an aperture formed in a terminal block with the free end of the sleeve extending beyond the undersurface of said block and adapted to be spun outwardly for firmly securing it to said block, said sleeve being internally threaded for the reception of a terminal screw for securing a conductor wire to said lug, and said body having a second depending tubular sleeve, spaced from the first mentioned sleeve, and adapted for snug seating engagement in an aperture in said block to lock said lug against rotative movement, said second sleeve being dimensioned for receiving a conductor wire therein for soldering in fixed position to said lug.

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