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J. PARSTORFER

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THROUGH CLIP CONNECTOR FOR PRINTED CIRCUIT BOARD

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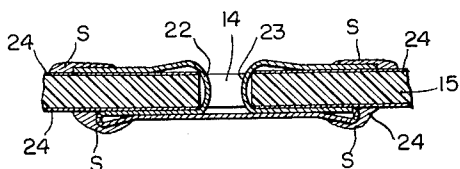
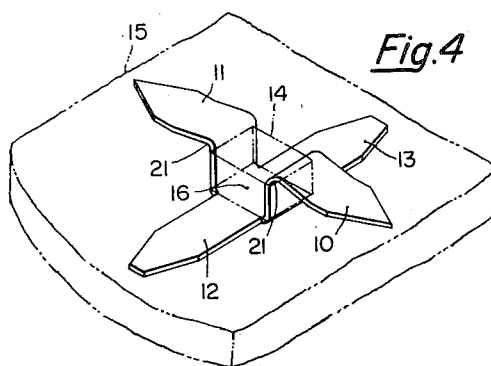
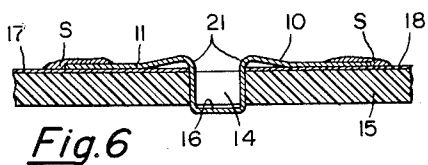
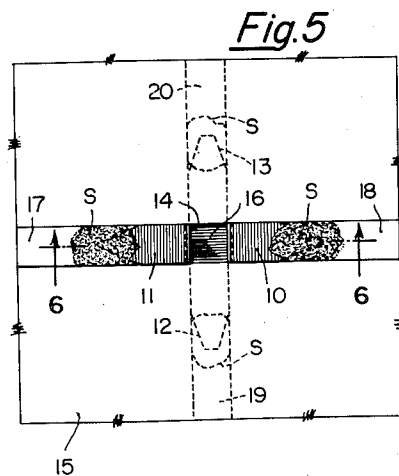
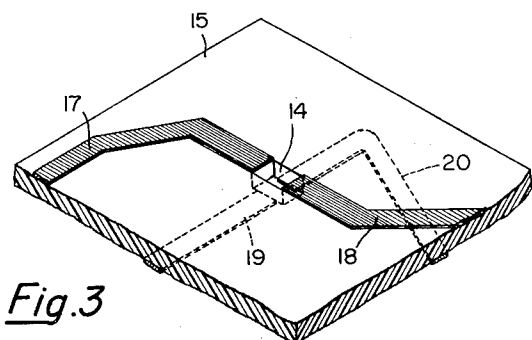
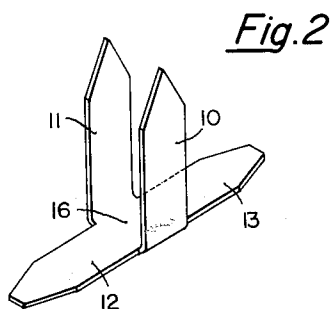
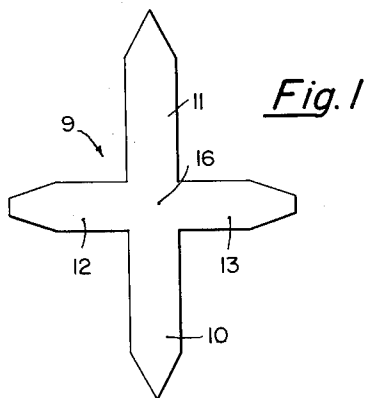


Fig. 7

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THROUGH CLIP CONNECTOR FOR PRINTED CIRCUIT BOARD

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2 Claims. (Cl. 339-17)

The present invention relates to printed electrical circuits and more particularly to through-connectors for completing or continuing circuits on opposite sides of an insulated base.

Connectors which function for a like purpose have heretofore been in the form of an eyelet or a rivet positioned in a prepared hole registering with printed or etched circuit parts to be conductively linked together, such eyelet or rivet then being headed in fixed position where its opposite ends are hand or dip soldered to the etched conductors. Such eyelet and rivet connectors have been found unsatisfactory in use due to solder breakage caused by differences of the expansion factors of the base material and the aforesaid metal connectors.

It is an object of the present invention to provide a through connector for printed circuits on opposite sides of an insulating panel wherein the disadvantages of such prior metal connectors are overcome.

Another object of the invention is to provide a metallic connector for printed circuits on opposite sides of an insulating panel wherein differences of expansion between the two different materials due to temperature changes are compensated so that circuit interruption is prevented.

Briefly described the invention comprises a connector in the form of an electrically conducting clip having a degree of flexibility, and traversing a preformed and properly located hole through a printed circuit panel with its ends in contact with and soldered to selected printed conductors on both sides of the panel.

In the accompanying drawings:

Fig. 1 is a plan view of a connector embodying one form of the present invention;

Fig. 2 is a perspective of the connector of Fig. 1 bent to one assembling condition;

Fig. 3 is a perspective view of a fragmentary portion of a printed circuit panel ready to receive a connector;

Fig. 4 is a perspective view of the connector of Figs. 1 and 2 as bent to operative assembled position, the board being shown in broken lines;

Fig. 5 is a plan view of a mounted connector as finally soldered;

Fig. 6 is a sectional view of the assembly taken along line 6-6 of Fig. 5 and

Fig. 7 is a section view similar to Fig. 6 but showing a modified form of the invention.

Referring now to the details of the drawings, one form of the invention comprises a metal clip connector 9, here shown of cross shape having two aligned and bendable arms 10 and 11 at right angles to two other aligned and bendable arms 12 and 13, preferably formed or struck from a single piece of sheet metal with all of the arms lying in a common plane. The arms are arranged to be selectively bent to traverse a prepared through-hole 14 of an etched board 15 to conform to the etched conductors to be connected. Illustratively, as seen in Fig. 2, arms 10 and 11 have been bent upwardly from the common central body 16 to lie in spaced parallel relation

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in order to be passed together through hole 14 for bending downwardly into abutting contact with selected conductors 17 and 18 on one side of panel 15 bringing arms 12 and 13 into contact with selected conductors 19 and 20 on the other side. When in such positions the arms are hand or dip-soldered to the respective conductors, as seen at S in Figs. 5 and 6. In the formation of the clip the several arms are formed of sufficient length to ensure a measure of flexibility upon the board, such flexibility being sufficient to compensate for any tendency to deform or become detached due to differences in expansion of the different materials while the arms may be arranged substantially flat against the conductors preferably, as seen in Figs. 4 and 6, they may be bent in a manner leaving portions 21 of the arms adjacent pole 14 bowed or spaced away from the panel whereby expansion and contraction of the clip may occur without straining the solder connection of the arms with the printed circuit conductors.

While the form of bending shown in Fig. 4 is illustrative of the invention, it is to be understood that the arms can be bent to pass through the hole 14 for connection to differently arranged conductors. Thus for example, arms 10 and 12 can be bent to traverse the hole 14 in order to connect conductors at right angles or for connection with special components.

In the modification of Fig. 7 a clip originally in the form of a linear strip is provided of such a length as will permit its ends to be bent through hole 14 with two oppositely disposed reverse loops 22 and 23, which straddle the board 15 respectively in contact with selected printed conductors 24 on opposite sides.

Further, it is preferable to drill or otherwise form the hole 14 to conform to the contour of the arms of the clip in order to provide a snug fit and therefore the hole is preferably square or rectangular in shape. Also where the hole 14 happens to pass through an etched conductor, the joint is repaired by the soldering operation.

It will now be apparent that a novel through-connector clip for printed wire circuits has been devised whereby soldered connections are maintained regardless of expansion factors. The relatively long projected and bent over portions of the clip arm introduce a factor of flexibility which compensates for temperature reaction.

In the claims:

1. A through connector for circuit conductors on opposite faces of a panel having a hole therethrough comprising a metal clip fitted into said hole and having a first pair of arms in contact with conductors on one face of said panel, and a second pair of arms extending through said hole with the outwardly extending ends thereof bent in a manner biasing them into contact with conductors on the other face of said panel at points removed from said hole, said bent portions also biasing said first arms into their contact with said conductors on said one face of said panel, the portions of said second pair of arms remaining within the hole being in engagement with opposite sides of the hole thus to provide a snug fit therewith preventing shifting of said clip relative to said panel, a portion of the outwardly extending ends of said second pair of arms adjacent said hole being bowed away from the panel on said other side thereof thus to permit flexure of said connector during expansion and contraction of the connector or the panel, or both, without breaking the contact of said arms with said conductors.

2. A construction according to claim 1 wherein the hole in the panel is shaped with opposite flat wall faces and wherein at least the said second pair of arms is formed by a pair of flat faced strips for snug face to face engagement with the opposite flat wall faces of said hole.

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