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Taplin

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[54] **EDGE CONNECTOR**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** ..... **339/91,** 339/125 R, 339/176 MP

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

[58] **Field of Search** 339/17, 65, 66, 91, 125, 339/176

[56] **References Cited**

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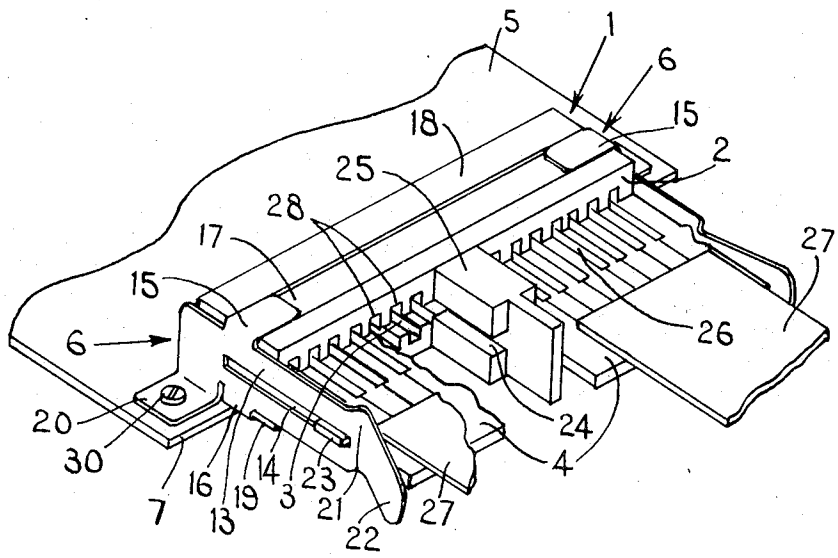
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[57] **ABSTRACT**

An electrical connector assembly includes an insulated connecting block secured along one edge of a support by a clip member having a pair of lugs engaging with the connecting block, a projection adapted to be fastened to the support and a resilient leaf spring member extending from the clip member which retains an electrical component in its operational position after connection with the block.

6 Claims, 3 Drawing Figures



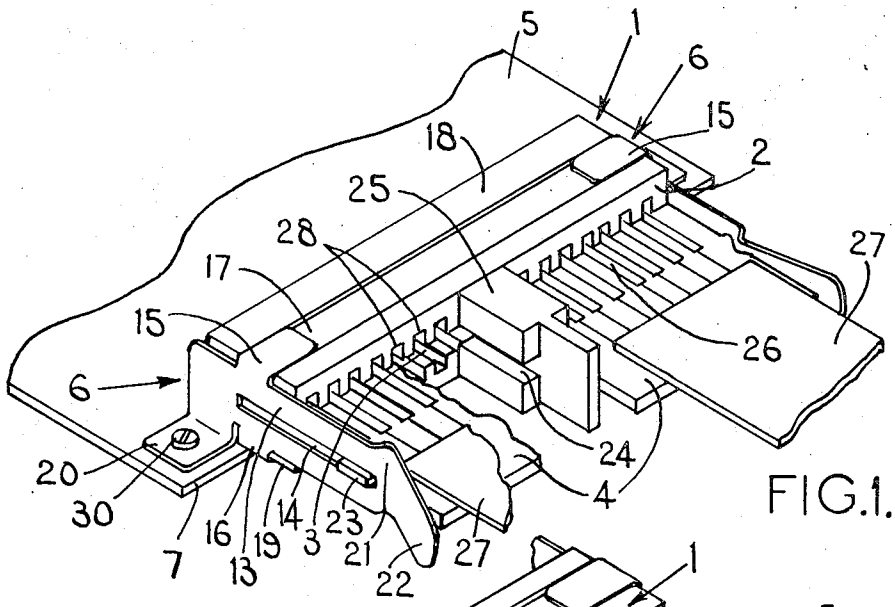


FIG.1.

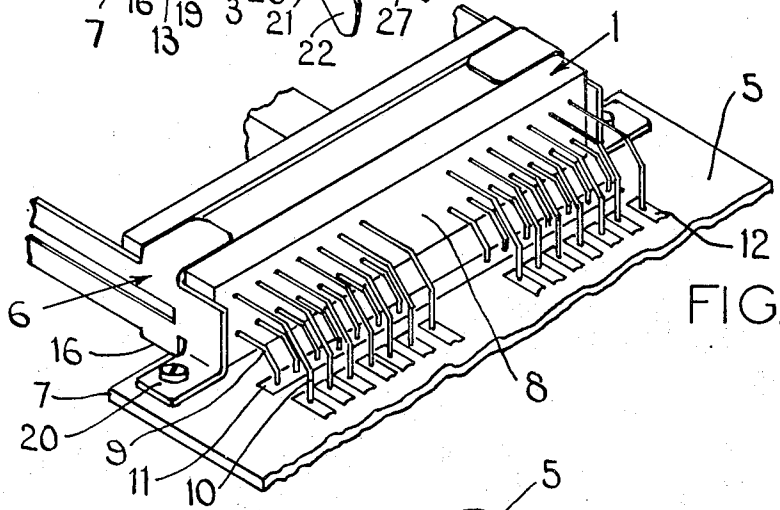


FIG.2.

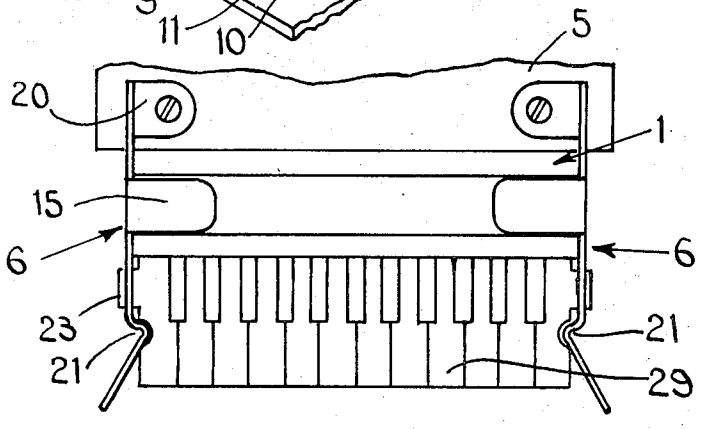


FIG.3.

EDGE CONNECTOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to devices for releasably connecting the edges of two electrical circuit boards together such that the relationship of the boards is resistant to accidental movement while the circuitry of the boards is maintained in electrical continuity.

2. Description of the Prior Art

It is known from U.S. Pat. No. 3,399,372 to connect a first printed circuit board or component carrying board to a second circuit board by means of an edge connector fastened to the first circuit board adjacent to an edge thereof, the edge connector having resilient connector means adapted to grip opposed surfaces of the second circuit board and provide electrical connection between conductive tabs on the first and second boards. However the grip between the edge connector and the surface of the second circuit board is insufficient to prevent this board from accidental movement thus endangering the electrical continuity between the first and second boards. The edge connector of the present invention provides means for physically locating the second board relative to the first board and for releasably locking the pair of boards in position.

SUMMARY OF THE INVENTION

According to one aspect of the invention there is provided a clip device for retaining an electrical connector assembly on a support, the device including; means for enabling the device to be attached to the support; clip means for so engaging with a first part of the assembly that the first part is retained on the support when the device is attached to the support; the clip device integrally incorporating resilient means for retaining a removable second part of the assembly in its operational position with respect to the first part.

According to a second aspect of the invention there is provided an electrical connector assembly including; a first part for mounting on a support; a second part adapted for releaseable connection with the first part and a clip device, the clip device including means for enabling the device to be attached to the support; clip means for so engaging with a first part of the assembly that the first part is retained on the support when the device is attached to the support; the clip device integrally incorporating resilient means for retaining a removeable second part of the assembly in its operational position with respect to the first part.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 shows an isometric view of an edge connecting assembly including the clip device of the present invention;

FIG. 2 shows a further partial isometric view of the clip device and edge connecting assembly of FIG. 1 and,

FIG. 3 shows a plan view of a further construction of the clip device.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIGS. 1 and 2 there is shown a connecting block 1 of substantially rectangular cross-section having a face 2 in which are a pair of co-linear slots 3, each of which slots is adapted to accept a plug board 4. The connecting block 1 is secured to a printed circuit board 5, by a resilient clip 6 at each end of the connecting block 1, in a position such that the face 2 of the block 1 overhangs the edge 7 of the printed circuit board 5. The face 8 of the block 1 opposed to the face 2 is pieced by connector elements 9, 10 which are internally connected to connecting sockets (not shown) within the block 1. The connector elements 9, 10 are connected to conductive strips 11, 12 respectively on the printed circuit board 5, for example by soldering or welding in order to produce electrical connections therebetween.

Each resilient clip 6 has an elongate main body portion 13 which has a centrally disposed slot 14, and a pair of clamping lugs 15, 16 engaging in respective grooves 17 in each of the remaining pair of opposed faces 18, 19 of the substantially rectangular block 1, the faces 18, 19 lying in planes normal to the planes containing the faces 2 and 8. The clamping lugs 15, 16 are adapted to be an interference fit in the grooves 17 and hence to grip the block 1 securely. A mounting flange 20 extending outwardly from the main body portion 13 adjacent to the lugs 15, 16 in a direction parallel to and away from the face 19 is used to attach the clip 6 to the board 5 by a screw 30.

The end of the main body portion 13 beyond the slot 14 is formed firstly into a detent 21 directed towards and arranged to engage with the adjacent plug board 4 and secondly into a finger hold 22 by which the detent may be disengaged from the respective plug-board 4.

Extending from the face 2 of the connecting block 1 is a support member 25 which may be moulded integrally with the block 1 or may be bonded thereto. The support member 25 has on each side facing a clip, a slot 24. In the embodiment illustrated in FIGS. 1 and 2 the support member 25 is positioned centrally between two resilient clips 6 and hence two similar plug boards 4 may be located in the connecting block 1 between the respective clips 6 and the adjacent slots 24.

Each plug board 4 has at the forward end which is inserted in a slot 3 of the connecting block 1, a plurality of conductive fingers 26 to which are connected the conductors of a cable shown schematically at 27 while at the rear end of the plug board 4 is a pair of tongues 23, one of which engages in the slot 24 of the supporting member 25 while the other engages in the slot 14 of the elongate main body 13 of the corresponding clip 6. The detent 21 adjacent to the slot 14 engages with a recess in the edge of the plug board outward of the tongue 23 (FIG. 3) or may engage behind the rear edge of the plug board to form a locking catch, releasable by moving the finger hold 22 away from the plug board 4 and thus releasing the detent 21 and also disengaging the tongue 23 from the slot 14, thus permitting the respective plug board 4 to be withdrawn.

The slots 3 of the connecting block 1 are, at intervals corresponding to the width and spacing of the conductive fingers 26 of the plug board 4, developed into apertures 28 which house internal connecting sockets (not shown) within the connecting block 1 forming the electrical connections between the conductive fingers 26 and the connector elements 9, 10 passing through the face 8.

FIG. 3 shows a modification of the construction described above in that only a single plug board 29 is accommodated in a connecting block 1 and is retained in position between a pair of clips 6, the support member

25, of course, being omitted. Further, the mounting flanges 20 may be turned inwardly parallel to the clamping lugs 15, 16, behind the connecting block 1.

It will be appreciated that the resilient clips 6 must be produced in left and right handed forms in which one form is suitable for one end of the connecting block 1 and a reverse form is suitable for the other end of the connecting block 1. The clip devices may be made of metal, for example steel or other material having comparable resilient property.

If desired the clamping lugs 16 engaging with the groove 17 in the face 19 of the connecting block 1 may be omitted. Further a combined left and right hand clip device may be produced in which the clamping lugs 15 are extended across the length of the recess 17 in the face 18, thus joining two clip devices 6 together.

The connecting block 1 may be a standard edge connector and may receive the fingers of a plug board in the apertures 28 or may be the type of edge connector block described in U.S. Pat. No. 3,399,372. In this specification a continuous edge of a board having individual elongate conductive portions rather than individual fingers is inserted into the slot in the face corresponding to the face 2 of the edge connector 1.

It will be apparent that by retracting the portion 13 of the clip 6 and inserting a plug board 4 or 29 into the slot 3 on the face 2 electrical connection is made between the conductors of the cable 27 shown schematically as a flat cable, via the fingers 26 of the plug board 4 or 29 and the connecting sockets (not shown within the connecting block 1, the connector elements 9, 10 and the conductive strips 11, 12 on the printed circuit board 5. The portion 13 is released after the plug board 4 or 29 is in position and the slot 14 then engages with the tongue 23 and the detent 21 locks into the recess shown on the plug board 29 of FIG. 3. Thus until the plug board 4 or 29 is correctly positioned the portion 13 of the clip 6 does not return to its original position, but having been correctly positioned the plug board is physically located and prevented from being moved accidentally.

While flat cables 27 have been shown in FIG. 1 for the purpose of illustrating only it will be appreciated that other type of cable may be connected to the plug boards 4 or 29. For example twisted pair, multi-core or coaxial cables may be connected in the same manner, each conductor of the cable to a different one of the conductive finger positions 26. If desired a cable clamp (not shown) may be attached to the plug board to secure the cables to the plug board in known manner.

Further, while connector elements 9, 10 have been shown for illustration as wires piercing the face 8 and these may be bent in any suitable configuration to align with the conductive strips 11, 12 on the printed circuit board 5 to which they are each to be soldered or welded, it will be appreciated that the internal connector sockets 9, 10 (not shown) may terminate external of the face 8 of the block 1 in any of the known form of solder tag or crimping post to which connecting links may be attached in known manner to form electrical connection with the conductive strips 11, 12.

I claim:

1. An electrical connector assembly including a first part for mounting on a support; a second part releasably connectable with the first part; and a clip device formed from sheet material including a body portion, means for attachment to the support, a pair of spaced apart tongues extending transversely of the body portion and arranged to grip opposed surfaces of the first part to retain the first part on the support, and an integral resilient extension of the body portion having a closed ended slot therein extending in a lengthwise direction of the extension; and wherein the second part has a lug the resilient extension latching the second part when connected with the first part by entry of said lug into the slot.

2. An electrical connector assembly as claimed in claim 1 including a pair of said clip devices respectively arranged to retain opposite ends of the first part on the support; and in which said second part has a pair of said lugs located one on each of two opposed edges, said lugs respectively entering in the slots of the resilient extensions to latch the second part when connected with the first part.

3. An electrical connector assembly as claimed in claim 1 in which the first part is arranged to accommodate two separate ones of said second parts, each of said second parts having a first edge with a lug thereon and a second edge opposed to said first edge; the assembly including an abutment on the first part engaging said second edge of each of said second parts and a pair of said clip devices respectively arranged to retain opposite ends of the first part on the support, the lug on one of said second parts entering in the slot of one of said resilient extensions and the lug on the other of said second parts entering in the slot of the other of said resilient extensions to latch both second parts when connected with the first part.

4. An electrical connector assembly including a first part for mounting on a support; a second part releasably connectable with the first part; and a clip device having means for attachment to the support, a pair of spaced apart tongues gripping opposed surfaces of the first part to retain the first part on the support, and a resilient extension extending in alignment with and engaging said second part when said second part is connected with said first part, the resilient extension having an aperture therein and said second part having a lug engageable in the aperture to retain the second part connected with the first part.

5. An electrical connector assembly as claimed in claim 4 including a pair of said clip devices respectively arranged to retain opposite ends of the first part on the support; and in which said second part has a pair of said lugs located one on each two opposed edges, said lugs respectively engaging in the apertures of the resilient extensions to retain the second part connected with the first part.

6. An electrical connector assembly as claimed in claim 4 in which the first part is arranged to accommodate two separate ones of said second parts, each of said second parts having a first edge with a lug thereon and a second edge opposed to said first edge; the assembly including an abutment on the first part engaging said second edge of each of said second parts, and a pair of said clip devices respectively arranged to retain opposite ends of the first part on the support, the lug on one of said second parts engaging in the slot of one of said resilient extensions and the lug on the other of said second parts engaging in the slot of the other of said resilient extensions to retain both second parts connected with the first part.

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