

[54] ELECTRICAL CONNECTOR

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[58] Field of Search 339/17, 75, 174, 119, 125, 339/128, 94, 60, 61, 176, 126, 91

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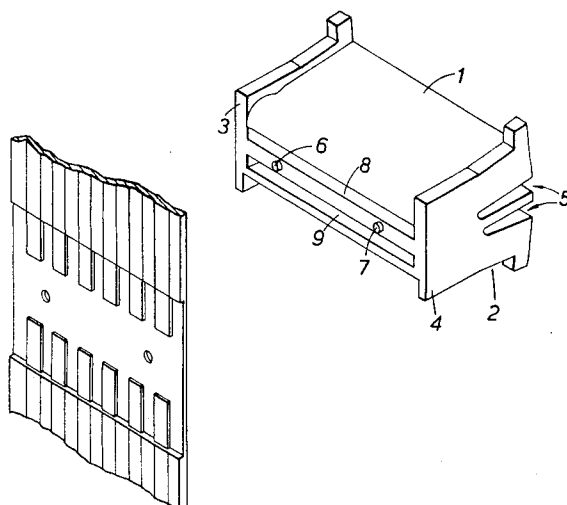
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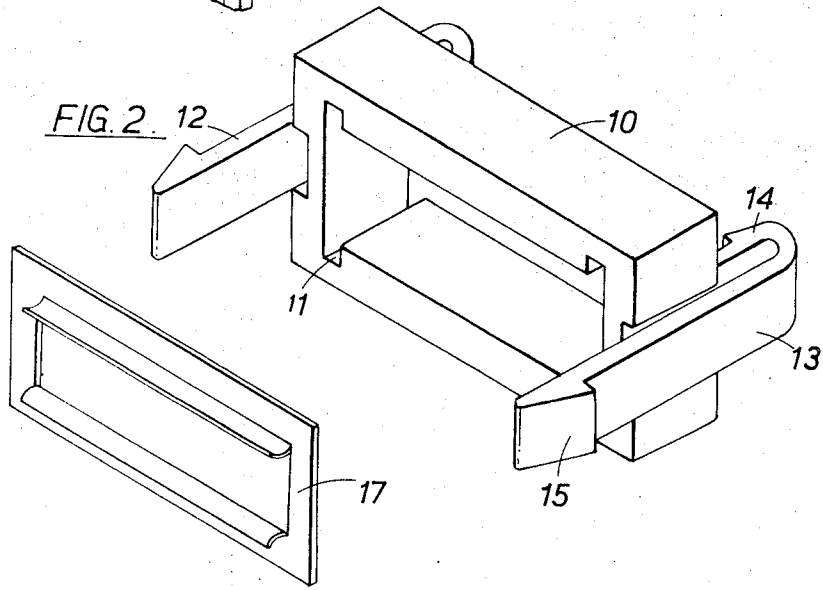
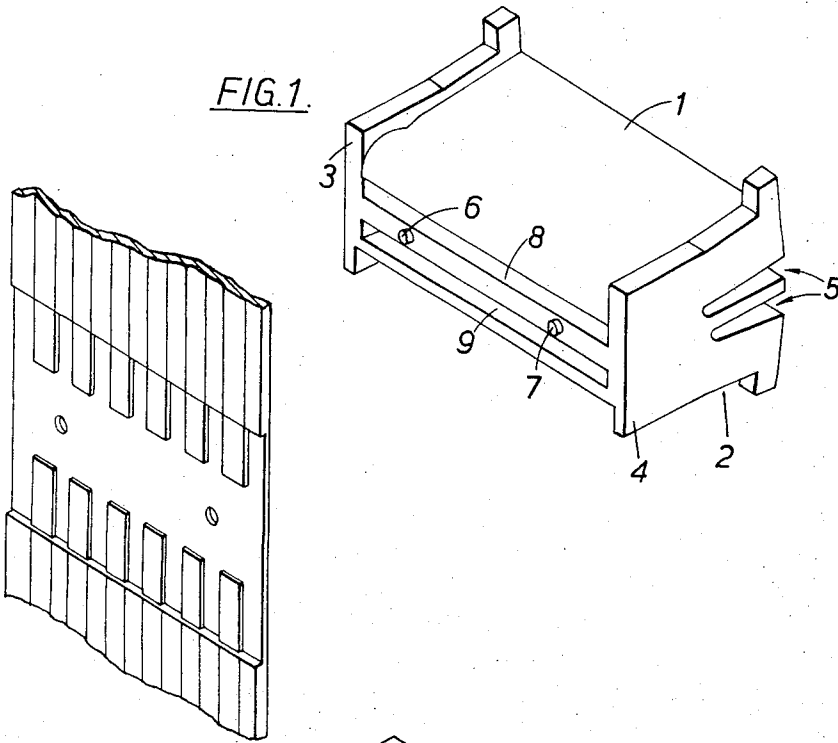
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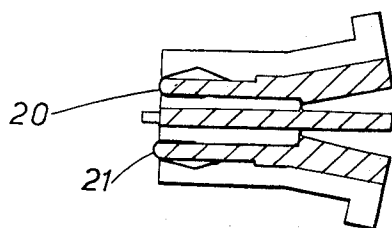
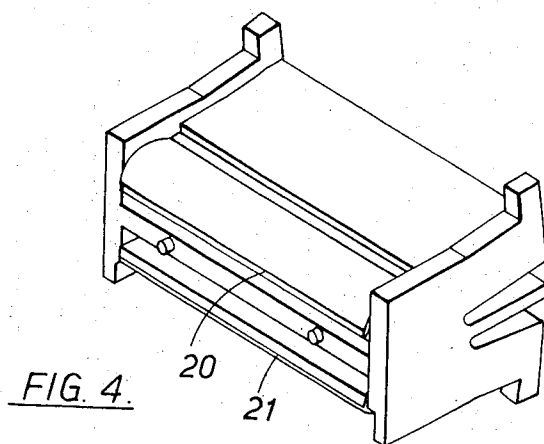
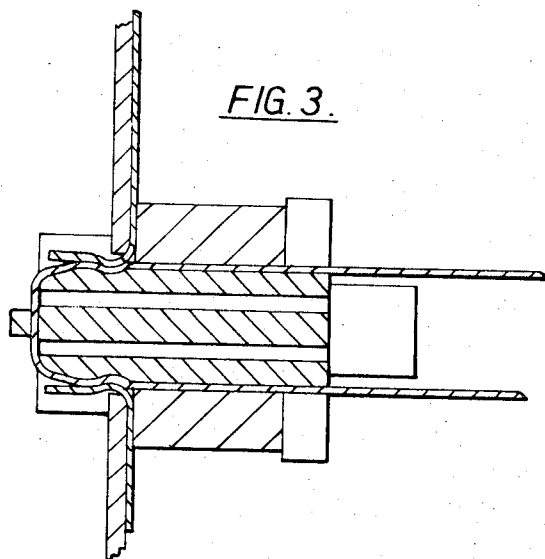
[57] ABSTRACT

An electrical connector for connecting conductors mounted on a panel extending into a slot therethrough to those of a flat cable. The cable with one or more conductors bare is wrapped around an insulator. A rectangular block having a rectangular hole therethrough is pressed over the cable and insulator to stop projections on the latter. A portion of the insulator with the cable wrapper therearound which is exposed by the block on the side thereof opposite the side engaged by the projections is then press fit in the panel slot with the panel conductors in pressure and electrical contact with the cable conductors. Clips engageable with the panel can be snap fit over the plate to hold it and the cable in place in the slot.

8 Claims, 4 Drawing Figures







ELECTRICAL CONNECTOR

BACKGROUND OF THE INVENTION

This invention relates to the electrical connector art, and more particularly, to means for making connections to flat cable.

In the past it has been difficult to make electrical connections to flat cable because of its characteristic shape. Further, prior art connectors for flat cable have been complicated and expensive.

SUMMARY OF THE INVENTION

In accordance with the present invention, the above-described and other disadvantages of the prior art are overcome by providing a mounting plate around which a length of flat cable is wrapped. The mounting plate and the cable are then pushed through a snugly fitting panel slot, the panel having one or more conductors fixed relative thereto in positions to lie in pressure and electrical contact with corresponding one or more conductors in the cable.

The above-described and other advantages of the present invention will be better understood from the following detailed description when considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings which are to be regarded as merely illustrative:

FIG. 1 is an exploded perspective view of a length of flat cable and an insulator employed in one embodiment of the present invention;

FIG. 2 is an exploded perspective view of a panel slot frame, an assembly insulator block and retaining clips constructed in accordance with the present invention;

FIG. 3 is a vertical sectional view through an electrical connector constructed in accordance with the present invention; and

FIG. 4 includes perspective and sectional views of an alternative embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 1, an insulator or mounting plate is shown. This insulator may be of a molded configuration, if desired. This insulator includes rearwardly extending arm portions 1 and 2 and side plates 3 and 4. The latter are slotted as shown at 5 so that the two arms are in effect resiliently attached to the U-shaped portion of the insulator. At the nose of the insulator there are two symmetrically located studs 6 and 7 which are flanked by two slots 8 and 9. When the insulator is in use, a length of flat cable is prepared as shown at the left of FIG. 1, with a central portion from which the conductors have been removed. The conductors are bared on portions of the cable. The cable also has two holes therethrough. Such a cable is wrapped around the insulator with the studs 6 and 7 fitting into the cable holes.

Alternately, two flat cables can be applied to the member, each on one arm's outer face and tucked through one of the slots 8 and 9. The manner in which the insulator is used is the same in either case.

FIG. 2 shows a rectangular block 10 which may be made of an insulating material. Block 10 has a hole so dimensioned that the insulator shown in FIG. 1 fits

snugly inside the hole in block 10. The hole of block 10 has grooves 11 at the side thereof to receive the side plates 3 and 4 of the insulator. The block 10 also has double-bent arms 12 and 13 integral therewith, each having a pair of latches such as 14 and 15.

Also shown in FIG. 2 is a frame 17 for a panel metallic spring member slot, to be described, the frame 17 being made of a spring metal conductor and having leaf spring lips.

When the electrical connector assembly of the present invention is in use, the insulator of FIG. 1 with one or two flexible cables installed, as described above, is forced into the hole in the block 10, in which case the front end thereof projects through. During this insertion, the arms 1 and 2 flex due to the slots in the rear. When insertion is complete, the latches 14 snap in behind the end plates 3 and 4 to lock the insulator and block 10 together.

The panel to which the assembly is to be mounted has flexible cables or circuits on it and portions thereof extend into a rectangular slot therethrough. See FIG. 3. Then the assembly is pushed into the panel hole until its latches 15 snap in behind the panel and the rim of the spring member 17. In this condition, the cables on the connector engage those on the panel. The use of frame 17 is optional and not shown in FIG. 3. However, the curved lips of the frame 17 may augment the contact pressure, if desired.

In some cases, contact pressures will be adequate without the use of the frame 17. In this case, the connector assembly, when mounted on a panel, will be as shown schematically in cross-section in FIG. 3.

Contact pressure may also be improved as shown in FIG. 4. In this construction, members 20 and 21 are fitted to the "plug" member of the connector assembly.

In FIG. 3, the insulation portions of the cable have been omitted for clarity. The cable conductor in FIG. 3 also extends completely around the left end of the insulator.

What is claimed is:

1. An electrical connector comprising: a mounting plate; a flat cable mounted over one end of said mounting plate, said mounting plate being substantially more rigid than said cable, said cable being substantially more flexible than said mounting plate; said one mounting plate end having a substantially uniform thickness; a block having a rectangular hole therethrough, said one mounting plate end and said cable being pushed through said hole to a position such that said block extends completely therearound, the width of said hole being substantially equal to the width of said mounting plate end plus that of said cable, said block fitting snugly around both said one mounting plate end and said cable, said mounting plate having stop means at the other end thereof to prevent it from being pushed all the way through said hole by engaging said block, said other end of said mounting plate embodying a pair of integral resilient arm sections having a thickness greater than that of said hole, said arm sections being surrounded by said block; a panel plate having a rectangular slot therethrough, said cable having a first conductor on the outer surface thereof, said one mounting plate end and said first conductor projecting through said slot from one side of said panel plate; and a second generally flat flexible conductor fixed relative to the face of said panel plate on said one side thereof,

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said second conductor extending through said slot in pressure and electrical contact with said first conductor.

2. The invention as defined in claim 1, wherein said block is dimensioned so as to fit snugly between said stop means and said panel plate when said assembly means is in place.

3. The invention as defined in claim 1 including a pair of longitudinally extending slots through said mounting plate for mounting a pair of said flat cables.

4. The invention as defined in claim 1 including at least one stud on said one mounting plate end engaged in an opening in said flat cable for holding said cable in a substantially fixed position relative to said mounting plate.

5. The invention as defined in claim 1 including latching means on said block for releasably attaching said block to said panel plate.

6. The invention as defined in claim 5 including additional latching means on said block for releasably retaining said mounting plate in said rectangular hole.

7. The invention as defined in claim 1 including assembly means on the other side of said panel plate engaging said one mounting plate end to lock said mounting plate in a substantially fixed position in said rectangular slot.

8. An electrical connector comprising: a mounting plate; a flat flexible cable mounted over one end of said mounting plate, said mounting plate being substantially more rigid than said cable, said cable being substantially more flexible than said mounting plate; said one mounting plate end having a substantially uniform thickness; a block having a rectangular hole therethrough, said one mounting plate end and said cable being pushed through said hole to a position such that said block extends completely therearound, the width of said hole being substantially equal to the width of said mounting plate, said hole having a thickness equal to that of said one mounting plate end plus that of said

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cable, said block fitting snugly around both said one mounting plate end and said cable, said mounting plate having stop means at the other end thereof to prevent it from being pushed all the way through said hole by engaging said block; a flat panel plate having a rectangular slot therethrough, said cable having a first conductor on the outer exposed surface thereof, said one mounting plate end and said first conductor projecting through said rectangular slot from one side of said panel plate; and a second generally flat flexible conductor fixed relative to the face of said panel plate on said one side thereof, said second conductor extending through said rectangular slot in pressure and electrical contact with said first conductor; latch means on said block for releasably attaching said block to said panel plate and for releasably retaining said mounting plate in said rectangular hole in said block, said latch means comprising generally U-shaped resilient elements adjacent two opposite sides of said block, each said element including a short leg and a long leg, each short leg being integral with the rear of said block and extending in a direction away from said one side of said panel plate, an integral inwardly extending latch element on each said short leg engaging behind the rear of said mounting plate, recesses formed in said opposite sides of said block, said long legs being located outside of said short legs and aligned with said recesses, said long legs extending forwardly through said rectangular slot in said panel plate to the other side of said plate, and an integral outwardly extending latch element on the end of each of said long legs engaging said other side of said panel plate, whereby biasing of said long legs toward each other moves said long legs into said recesses causing said latch elements on the ends of said long legs to disengage from said other side of said panel plate and said latch elements on said short legs to disengage from said rear of said mounting plate.

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