

[54] MODULAR TERMINAL BLOCK WITH MOUNTING FOOT

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[63] Continuation of Ser. No. 774,721, Nov. 12, 1968, which is a continuation-in-part of Ser. No. 638,802, May 16, 1967, Pat. No. 3,437,983.

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[51] Int. Cl.....**H01r 9/22**

[56]

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[57]

ABSTRACT

A modular terminal block has two legs extending away from the block joined at their free ends by an arcuate flexible strap to form a foot for mounting the block on a rail. The strap deforms on engagement with the bottom of the rail to urge the legs apart so that detents on the legs firmly engage the sidewalls of the rail. One leg is inclined with respect to the block so that on removing the block from the rail the detent on that leg is more readily disengaged.

3 Claims, 2 Drawing Figures

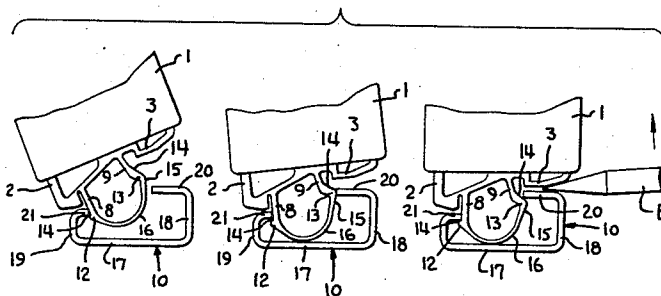


FIG. 1.

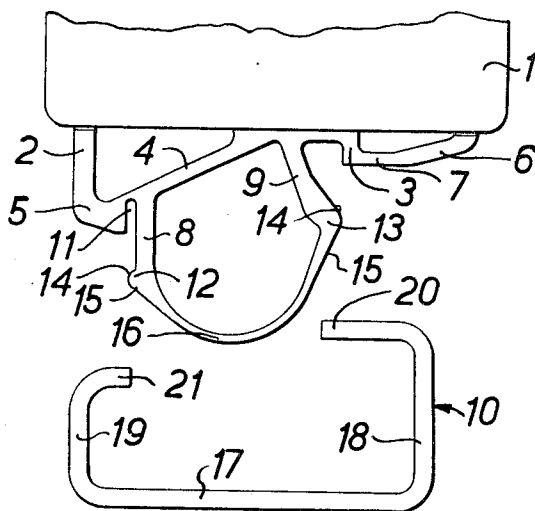
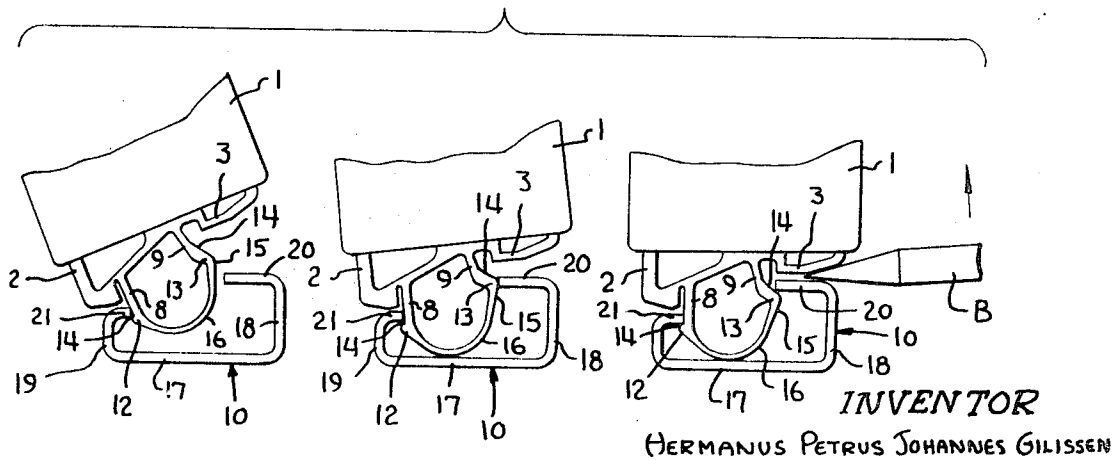


FIG. 2.



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CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation of application Ser. No. 774,721, filed Nov. 12, 1968, which in turn is a continuation-in-part application of Ser. No. 638,802, filed May 16, 1967, now U. S. Pat. No. 3,437,983, granted Apr. 8, 1969.

This invention relates to electrical terminal blocks and is particularly concerned with means for releasably mounting the blocks in a support rail.

It is conventional for terminal blocks to be mountable in a support rail which defines a channel-section rail having one side limb longer than the other and with ends of the limbs folded over to narrow the open side of the channel in stepped manner.

Other forms of channel-section rail are used having limbs of even length. In some applications, terminal blocks are provided with a projection which is a sliding fit within the rail section, but this requires blocks to be mountable in a support rail which defines a channel-section rail having one side limb longer than the other and with ends of the limbs folded over to narrow the open side of the channel in stepped manner.

Other forms of channel-section rail are used having limbs of even length. In some applications, terminal blocks are provided with a projection which is a sliding fit within the rail section, but this requires blocks to be mounted from an end of the rail. In another application, blocks are formed with spaced resilient feet which can be clipped resiliently into the rail, releasably to hold the block. Difficulty is experienced in retaining these blocks in the rail without the provision of additional retaining means.

In copending patent application, Ser. No. 638,802, mentioned hereinabove, an insulating block is described and claimed having a pair of resilient legs formed with detents, the legs extending beyond the detents and being joined at their ends remote from the block by a strut.

This block can readily be mounted in a channel-shaped rail and, once mounted, is securely retained in the rail. It has been found that the mounting is so secure that there is some risk of one or other of the legs being torn from the block on removing the block from the rail.

According to an object of the present invention, a block for mounting in a support rail has a pair of resilient legs formed with detents, the legs extending beyond the detents and being joined at their ends remote from the block by a resilient, arcuate bar member.

Preferably, as another object of the invention, each detent has cam surfaces which extend in opposite directions along the leg and which blend smoothly into the surface of the leg.

A further object is to provide an arcuate bar member connecting the pair of resilient legs which permits accommodating various rail sizes.

An additional object is the provision of inclined cam surface means on one of the resilient legs so that rail mouths need not be of the same width.

Still a further object is to provide inclined resilient legs relative to the connector block from which they depend to facilitate disposition within a rail, to facilitate retention of the connector block within the rail and to facilitate removal of the connector block from the rail.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there is shown and described an illustrative embodiment of the invention; it is to be understood, however, that this embodiment is not intended to be exhaustive nor limiting of the invention but is given for purposes of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

An embodiment of the present invention is now described by way of example, reference being made to the accompanying drawing, in which:

FIG. 1 is an end view of a terminal block according to the invention which is about to be mounted in a support rail; and

FIG. 2 comprises similar views at successive positions of insertion of the block into the rail.

The terminal block 1 is generally rectangular and is formed of a resilient, insulating material, such as nylon. Recesses (not shown) to receive electrical connectors (not shown) generally extend across a face of the block 1 between a pair of opposite sides or stacked recesses can be in only one side.

A projection 2 on one of the other pair of opposite sides (the lower side as shown in the drawing) has a surface 4 which inclines from an end 5 towards the lower side. Another projection 3 on the lower side of the block also has a surface 6 inclined from an end 7 towards the lower side. A pair of legs 8,9 extend from the projection 2 and are spaced apart by a distance substantially equal to the width of the mouth of a channel-shaped rail 10 in which the block 1 is to be mounted. The leg 8 extends from the projection 2 adjacent the end 5 substantially normal to the lower side of the block 1. A slot 11 formed in the projection 2 between the end 5 and the leg 8 increases the effective length of the leg 8. The leg 9 extends from the projection 2 substantially normal to the inclined surface 4 so that the leg 9 is inclined with respect to the lower side of the block and away from the other leg 8.

Detents 12, 13 are provided on the remote sides of the legs 8 and 9 respectively. Each detent 12, 13 has cam surfaces 14,15 which extend in opposite directions along the leg and which blend smoothly into the surface of the leg. The slope of the cam surface 14 is considerably more pronounced than that of the cam surface 15. The ends of the legs 8,9 remote from the block 1 are integrally joined by an arcuate resiliently-flexible bar member 16.

The channel-shaped rail 10 has a base 17 and depending wide and narrow sidewalls 18,19 respectively, the free ends 20,21 of which are turned inwardly to project over the base 17.

To mount the block 1 in the rail 10, the block 1 is turned slightly anticlockwise (as viewed in FIG. 1) and the leg 8 passed through the mouth of the rail 10 until the cam surface 14 of the detent 12 is engaged under the projecting end 21 of the rail sidewall 19. The block 1 is now rotated clockwise. As the block 1 rotates, the cam surface 15 of the detent 13 on the leg 9 rides along the projecting end 20 of the rail sidewall 18 causing the legs 8,9 to be flexed towards each other and the bar member 16 to bow further. Continued rotation of the block 1 brings a part of the outer surface of the bar member 16 into contact with the base 17 of the rail 10 and the bar member 16 consequently tends to flatten or unbow. At substantially this point in the insertion of the block 1, the peak of the detent 13 passes the projecting end 20 and the cam surface 14 of the detent 13 rides along the end 20, thus permitting the legs 8,9 to flex away from each other towards their original positions. The return of the legs 8,9 to their original positions is assisted by the bar member 16 which is being flattened by engagement with the base 17 of the rail 10.

The block 1 is held firmly in the rail 10 with the lower surface of the block 1 and its projections 2,3 maintained spaced from the rail 10. Retention of the block 1 is obtained by engagement of the cam surfaces 14 of the detents 12,13 with projecting ends 20,21 is maintained by the tendency of the legs 8,9 to move away from each other because of their natural resiliency and by the flattened or stressed condition of bar member 16 urging the legs 8,9 apart and upwardly away from the base 17 of the rail 10.

To remove the block 1 from the rail 10, a lever such as a screwdriver blade B, is inserted between the projection 3 and the projecting end 20 of the sidewall 18 and rotated away from the rail 10 towards the block 1. This causes the cam surface 14 of the detent 13 to ride over the projecting end 20, deflecting the legs 8,9 towards each other, until the detent 13 is clear of the projecting end.

An advantage of the present insulating block is that it can be used with rails 10 of various depths, the depth being the distance between the base 17 and the projecting ends 20, 21 of the sidewalls 18, 19 and with rails of cross-sectional shapes different from the generally rectangular shape described. It is only essential that the mouth of the rail should be of substantially the same width as the distance between the outer surfaces of the legs and that the depth of the rail be such that when the detents on the legs are engaged with sidewall projections, the bar member should be flattened to some degree from its normally bowed shape by engagement with the base of the rail. The inclined disposition of cam surface 14 on leg 9 permits use on rails having different mouth widths so that tolerances of the mouth widths of rails and those of cam surfaces 14 do not have to be so strict.

Some terminal blocks have been proposed having mounting legs which, when the block is mounted in a rail, extend substantially normal to the projecting ends of the rail. It has been found that on turning such blocks to release them from the rail, it sometimes occurs that the leg adjacent which the levering force is applied is torn away from the block. This is because the leg is being pulled normally to the projecting end of the adjacent rail side wall and thus the detent on the leg does not ride readily over the projecting end, particularly if the projecting end has a rough surface. With the present block, the leg 9 is inclined with respect to the block 1 so that when the block 1 is mounted in a rail, the leg 9 extends at an angle to the projecting end 20 of the rail sidewall 18, as can be seen to the right of FIG. 2. The inclination of the leg 9 and the cam surface 14 of the detent 13 with respect to the projecting end 20 is in the direction the block 1 has to be turned to release it from the rail 10 and thus the detent rides readily over the projecting end 20 as the block 1 is levered away from the rail.

It will, therefore, be appreciated that the aforementioned and other desirable objects have been achieved; however, it

should be emphasized that the particular embodiment of the invention, which is shown and described herein, is intended as merely illustrative and not as restrictive of the invention.

The invention is claimed in accordance with the following:

1. An assembly comprising an insulating block and a channel-shaped support rail, the block having a pair of resilient legs provided with detents and the support rail having a pair of projecting members extending from side walls and overhanging a base, said legs of said block extending beyond the detents, a resilient, arcuate bar member joining said legs remote from said block, the block and the support rail being relatively dimensioned so that the legs can be inserted into the support rail so that each detent engages a respective one of the sidewall projecting members to lock the block to the support rail, and when the block is locked to the support rail, the bar member is deformed by engagement with the base of the support rail and urges the legs outwardly against the sidewall projecting members.

2. A connector assembly comprising a terminal block and a mounting member; said terminal block having spaced stiffly-flexible leg members extending outwardly from one side, arcuate-shaped bar means connecting said leg members together, detent means on each of said leg members and spaced from said one side, camming-surface means provided by said detent means; said mounting member having a base, sides and inwardly-directed ends, said inwardly-directed ends being disposed in engagement with respective ones of said camming-surface means on said detent means via flexure of said stiffly-flexible leg members with said bar means being disposed in engagement with said base thereby biasing said leg members toward said inwardly-directed ends whereby said block is maintained in said mounting member.

3. A connector assembly according to claim 2 wherein said leg members are inclined relative to said one side and in a direction away from each other.

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