Nov. 17, 1964 L. E. LANCZI 3,157,453

ELECTRIC TERMINAL BLOCK WITH MOUNTING RAIL

Filed June 19, 1961 2 Sheets-Sheet 1

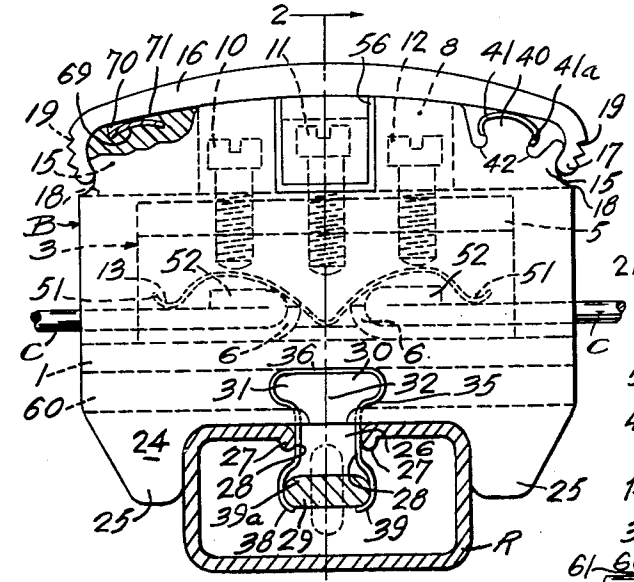


Fig. 1

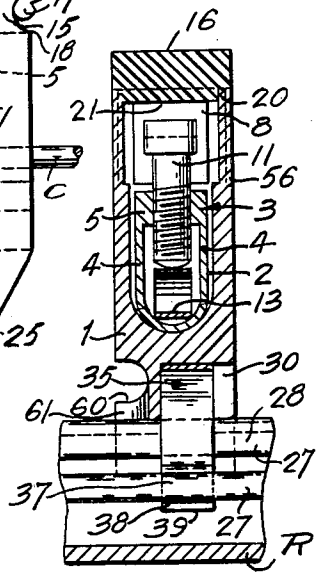


Fig. 2

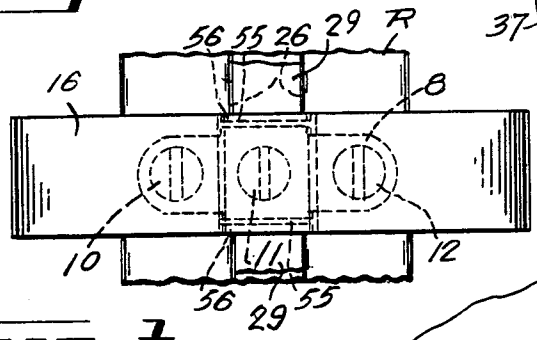


Fig. 3

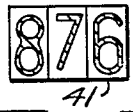


Fig. 4



Fig. 5

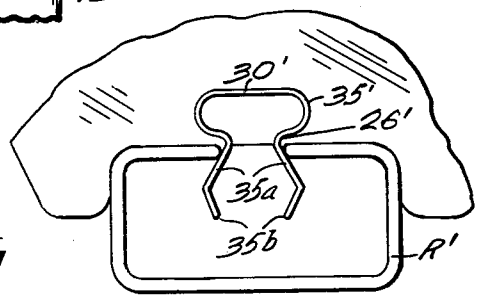


Fig. 6

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ELECTRIC TERMINAL BLOCK WITH MOUNTING RAIL

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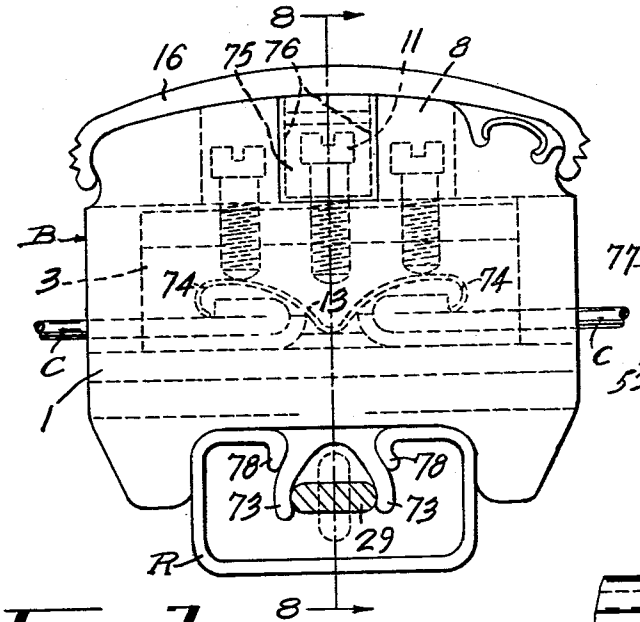


Fig. 1

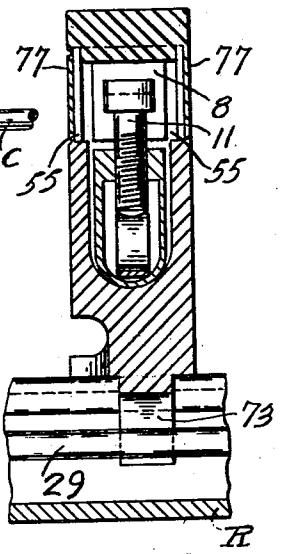


Fig. 8

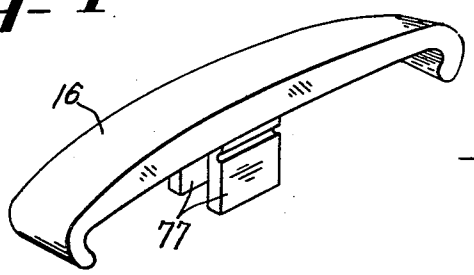


Fig. 9

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ELECTRIC TERMINAL BLOCK WITH MOUNTING RAIL

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9 Claims. (Cl. 339—198)

This invention relates to electric terminal blocks which are employed for facilitating the making of connections in electrical wiring, for example in locations where a number of meters or other instruments are grouped on a panel or distribution board and electrical connections have to be made between the instrument leads and other conductors. Such terminal blocks comprise a body of insulating material having mounted therein two or more cable-clamping terminals which are themselves electrically interconnected within the block. Normally, they are mounted in the position of use by means of screws or other fixings requiring the aid of tools both for mounting and dismounting the blocks.

The main object of the present invention is the provision of an improved terminal block which can be on and removed from suitable mounting means without the aid of tools.

The invention provides an electric terminal block formed at its base with two spaced projections adapted to embrace and fit closely against the sides of a mounting rail having an undercut slot extending longitudinally of its outer face, said block having on its base between the projections a spring clip capable of being compressed to pass into the slot in the mounting rail and then of expanding into the undercut portion of the slot to hold the terminal block firmly but detachably in engagement with the rail. The invention includes the terminal block in combination with the rail.

One form of terminal block embodying the invention and a few modifications thereof is illustrated in the accompanying drawings, wherein:

FIGURE 1 is an end elevation of the block shown engaged with a mounting rail;

FIGURE 2 is a longitudinal sectional view taken on the longitudinal central plane designated by the line 2—2 in FIGURE 1, certain details being omitted for clarity;

FIGURE 3 is a plan view of the block and rail;

FIGURES 4 and 5 are respectively front and side views of identification elements for use with the block of FIGURES 1 to 3;

FIGURE 6 is a partial side elevation of a modified form of terminal block;

FIGURE 7 is an end elevation of a modified form of the terminal block relating to the cable holding leaf-spring clip;

FIGURE 8 is a longitudinal central plan designated by the line 8—8 in FIGURE 7, and

FIGURE 9 is a perspective view of the modified cover plate.

Referring to FIGURES 1 to 3 of the drawing, the block designated generally B comprises a body 1 of insulating material providing a central passage 2 extending from side to side and containing a loosely-fitting metal body 3. The body 3 has the form, as seen from the side, of a U with its arms 4 joined at their ends by an integral bar 5; the body is of uniform section (FIGURE 2) apart from a pair of lugs 6 bent inwardly from the bight of the U adjacent the longitudinal central plane.

The passage 2 in the insulating body 1 communicates with a recess 8 open to the top of body which recess locates the heads of three screws 10, 11, 12 extendnig vertically through holes in the bar 5 to the interior of

the body 3. A leaf spring 13 in the form of a V with the ends 51 of the arms bent down and then curled up again as illustrated in FIGURE 1, is located within the body 3, so that under pressure from the screws 10, 12 the ends 51 can be forced down to secure cable ends C, as later described. At each side of the body 1 are rounded shoulders 15 of a transparent plastic material; the cover is sufficiently elastic for its side edges 17 to snap into the grooves 18 under the shoulders and can be removed by finger pressure on serrations 19 formed in its exterior adjacent the edges. The end edges of the cover 16 in the region of the recess 8 are stepped as shown at 20 to receive one side walls 21 defining the recess in order to prevent endwise movement of the cover. The base 24 of the body 1 is formed with laterally spaced depending cheeks or projections 25 whose inwardly facing surfaces in combination with the bottom of the base 24 closely embrace the upper part of a mounting rail R of rounded generally rectangular hollow section. The rail R has a central longitudinal slot 26 in its upper face and an integral interior longitudinal bead or flange 27 at either side of the slot, the flanges providing opposed longitudinal vertical faces 28.

A locking bar 29, which is flat with rounded edges is mounted within the rail R for rotation about its axis, which is coincident with that of the rail; the bar 29 is shown in locking position in FIGURE 1 but for the sake of clarity is omitted from FIGURE 2. The body 1 defines a recess 30 adjacent its base 24 which recess is open to one end only of the body and consists of an inner wider portion 31 and a neck portion 32. A stout spring clip designated generally 35 is received in the recess 30 in the body and extends into rail R. The clip 35 is generally U-shaped, with an enlarged bight portion 36, a narrower straight-sided neck portion 37 and a wider outer portion 38, the tips 39 of the arms of the U being turned in. The bight portion 36 and adjacent part of the neck portion 37 snugly and resiliently engage the walls of the inner and neck portions 31, 32 respectively of the recess 30 in the body. The rest of the neck portion 37 bears against the faces 28 on either side of the slot 26 in the rail and the shoulders 39*a* at the junction between the neck and wider portion 37, 38 engage under the flanges 27 of the rail R. When the bar 29 is in the locking position shown it holds the tips 39 of the arms of the clip 35 apart, slightly increasing the stresses in the arms; the wider portion 38 of the clip is thus prevented from collapsing and the terminal block therefore cannot be withdrawn from the rail R. Rotation of the bar 29 by 90° to the position shown dotted withdraws it from contact with the tips 39 of the clip: the clip 35 still grips the rail R, its neck portion remaining in resilient contact with the flanges 27 and the shoulders 39*a* remaining in engagement under the flanges 27. However the wider part 38 is able to flex inwardly so that the block B can be withdrawn from the rail R. With the bar 29 in the dotted position the clip 35 can be assembled with or removed from the rail in the manner of a snap fastener, the co-operating surfaces or rail and clip being suitably rounded so that vertical forces on the contact block cause the desired camming action between rail and clip.

One of the shoulders 15 at the top of the body is formed as shown in FIGURE 1 to provide an undercut locating projection 40 spaced from the cover 15 sufficiently to accommodate a series of clip-on identification elements 41 (see FIGURES 4 and 5) arranged side by side. Each element 41 bears a number and has curled-over edges 41*a* to engage resiliently in the grooves 42 at either side of the projection. Elements 41 bearing the desired identification are assembled on the projection 40 before the cover 15 is attached to the body 1, and when this cover

is attached it protects the elements from being accidentally dislodged.

The terminal block as so far described operates as follows: with the screws 10, 12 unscrewed sufficiently, a pair of cable ends C, bared and return-bent as shown, are inserted into the metal body 3 from either side until their bights 50 abut the lugs 6. The screws 10, 12 are then tightened to apply pressure to the spring 13, the spring in turn applying pressure, through its end-portion 51, to the cable ends C. The return-bent end 52 of each cable end C then lies inwardly of the adjacent pressure-applying end 51 of the spring 13, and engages therewith to prevent the cable end from being pulled out of the block. The firm pressure between the cable ends C and spring 13 provides good contact between the cable ends, the spring and the body 2, and current passes between the cable ends via the latter members.

The block B is mounted on the rail R by first rotating the locking bar 29 to the position shown dotted in FIGURE 1, then inserting the projecting part of the clip 35 through the slot 26 in the rail, and finally rotating the bar 29 to the locking position shown in full lines. The consequent locking of the clip 35 holds the base 24 of the body 1 in firm engagement with the top of the rail, while the cheeks 25 steady the block and prevent any twisting thereof relatively to the rail.

Normally the rail will carry a series of generally similar terminal blocks: by means of the locking bar they can be locked or released together and when locked, no block can be removed or added.

The blocks when released will remain firmly on the rail until they are removed by hand. Each block can be identified as required by suitable combinations of the elements 47.

It is sometimes required to interconnect adjacent terminal blocks of a series, and the screw 11 is provided for this purpose. The walls 55 of the recess 8 opposite the screw 11 form panels of reduced thickness: an exterior groove 56 is formed about each panel so that it can easily be broken away if required. To connect a block on one side only one panel need be removed: to connect it on both sides both panels are removed. Connection can be effected by wires or metal strips apertured to take screws 11 said wires or metal strips being adapted to have one end attached to screw 11 of one block, the other end of said wires or metal strips being attached to screw 11 of an adjacent block, thereby to provide metallic connection between such two adjacent blocks.

The terminal block shown in FIGURES 1 to 3 has a groove 60 formed in the body 1 adjacent the base 24: the groove 60 connects with a vertical central groove 61. If desired the cables can be led into the grooves 60 and 61 and thence into rail R, through the slot 26, thus affording a compact and elegant disposition of the cables. Rail R must in this case be made large enough to accommodate the required quantity of cables and bar 29 must be omitted, spring tension in clip 28 maintaining block B on rail R.

FIGURE 1 shows at the left hand side a method of identifying the terminal block which provides an alternative to that above described. The shoulder 15 at the left hand of the block is formed with a wide and shallow groove with a convex bottom 69 and undercut side edge 70. A series of normally flat rectangular and somewhat resilient identification elements 71 bearing numbers and letters, say, on their upper side are snapped under the side edges 70 and held thereby in upwardly bowed condition upon the bottom 69 of the groove. The elements 71 are, like the elements 41, put in position before the cover is attached to the body 1, and once it is attached it protects the elements 71 from being disturbed. Though FIGURE 1 shows two methods of identifying the terminal block, this is done for purposes of convenient illustration only: normally one method of identifying the block will suffice.

FIGURE 6 shows a modification of the FIGURE 1 terminal block for use with a simpler form of rail than is shown in that figure. In FIGURE 6 the clip 35 of FIGURE 1 is replaced by a generally U-shaped clip 35′ which as before, fits within a recess (here designated 30′) in the body 1.

The parts of the arms of the clip 35′ which extend from the body 1 are bent first outwardly to provide entry portions 35*b*. In operation the retainer portion 35*a* bear resiliently behind the edges of a plain slot 26′ in the rail R′: the clip 35′ is assembled with and removed from the rail in the manner of a snap fastener.

The cable ends C will tend to reach the bottom of the U in the body under pressure from the spring 13, but if desired the bight of the U can be modified to provide a central locating depression.

It will be appreciated that the metal body 3 need not be as shown (when it is preferably a drawn section) but can instead be made of sheet metal (when the U and bar are preferably different pieces secured together by interlocking and bending tabs, or by e.g. brazing): if desired the U can be of sheet metal and the bar 5 of bar stock.

FIGURES 7–9 show an alternative solution for the elastic fixing of the body 1 on the rail R. In this case the springlike clip 73 is an integral part of the body 1 at the bottom. This clip-like extension with two arms is suitably rounded and by applying a vertical force on the terminal block body, will effect the desired camming action between rail and clip. An extension of the rail R is rounded down inwardly for the holding of the terminal block in the fixed position on the rail R.

An alternative form of the leaf-spring 13, characterized with the ends 74, which are bent down and curved inside in a form of a half circle. This spring is located within the body 3 so, that under pressure from the screws 10, 12 the ends 74 can be forced down, to secure the cable end C. In this case the cable end can not be pulled out without unlocking of the screws 10, 12.

The FIGURE 9 shows an alternative form of the connection of blocks under each other. The walls 55 on both sides of the recess 8, opposite the screw 11 is a square cut-out 75, although a small border 76 is provided on three sides. The coverplate 16 has on both sides two square shaped extensions 77. These fit in the square cut 75 guided by the borders 76 of the body 1, connecting one block to the other. These extensions can be removed and connection can be effected by wires or by metal strips apertured to take screws 11.

What I claim is:

1. An electric terminal block adapted for use in combination with a terminal block-receiving rail, comprising a molded insulating body having a top portion and a base portion, a plurality of inwardly extending recesses in said body top and base portions, a metallic resilient cable-receiving member located centrally within and extending longitudinally of one of said body recesses, said resilient metallic cable-receiving member being of U-shaped formation in cross-section, and a leaf spring mounted in and extending longitudinally of said metallic member, adjustable securing means mounted on said body top portion, a resilient clip located within a further one of said body recesses located in said base portion, said securing means being adjustably engaged with said insulating body and adapted to engage said metallic member, said resilient clip being provided with a pair of outwardly extending legs adapted to resiliently engage said receiving rail, said body base portion also being provided with two outwardly extending projections adapted to engage said receiving rail at portions opposed to those contacted by said resilent clip outwardly extending legs.

2. Apparatus as claimed in claim 1 wherein said receiving rail is an extruded channel with the edges of the

sides of said channel projecting to form inwardly directed flanges, and means cooperating with said rail to lock said resilient clip to said rail.

3. Apparatus as claimed in claim 2, wherein said means cooperating with said rail to lock said resilient clip to said rail is a longitudinally extending member having an oval cross-section, said locking member being located between said resilient clip legs and centrally in said receiving rail, whereby, when said locking member is rotated about its longitudinal axis, it abuts against the inner side of said resilient clip legs with the major axis of said locking member cross-section in a horizontal plane relative to said rail, said resilient clip legs being adapted to be compressed when said locking member is rotated 90°, with the minor axis of said locking member in the said horizontal plane.

4. Apparatus as claimed in claim 1 wherein said metallice cable-receiving member has a substantially U-shaped cross-section, a transverse portion across the free end of the legs thereof, the bight of the said U-shaped section providing said cable end-receiving surfaces and said transverse portion being adapted to receive said adjustable securing means in threaded engagement.

5. Apparatus as claimed in claim 4 wherein said metallic cable-receiving member has abutments extending from the cable end-receiving surfaces of said bight of said U-shaped member for endwise location of the cable ends.

6. Apparatus as claimed in claim 1, whereby said securing means comprises at least three spaced-apart screws, the center screw being adapted to provide an external connection for said terminal block and being located in an upper one of said insulating body recesses, opposed walls of said recess being adapted to form panels which can be broken away by means of weak line

grooves defining said panel, the other of said screws being adapted to abut against said leaf spring, to increase said resilience of said leaf spring.

7. Apparatus as claimed in claim 6 wherein said recess provided for said securing means in said insulating block is covered by a transparent snap-on cover.

8. Apparatus as described in claim 6, whereby said panels formed by two projections which extend from said cover plate downwardly to opposite sides of said center screws covering said recess.

9. Apparatus as claimed in claim 1, wherein said base portion of said insulating body includes two connected perpendicular exterior grooves both semi-circular in cross-section and being adapted to allow cables to be led within said receiving rail.

References Cited in the file of this patent

UNITED STATES PATENTS

2,178,092	Werner	Oct. 31, 1939
2,654,872	Saul et al.	Oct. 6, 1953
2,699,533	Harnett	Jan. 11, 1955
2,739,292	Modrey et al.	Mar. 20, 1956
2,740,001	Vergilio et al.	Mar. 27, 1956
2,877,440	Dorjee	Mar. 10, 1959
2,983,897	Blanchet	May 9, 1961
3,002,177	Bundy	Sept. 26, 1961
3,021,501	Blanchet	Feb. 13, 1962

FOREIGN PATENTS

62,250	Austria	Nov. 25, 1913
174,094	Austria	Aug. 15, 1952
69,235	France	May 27, 1958
716,623	Germany	Jan. 24, 1942
272,078	Switzerland	Nov. 30, 1950