

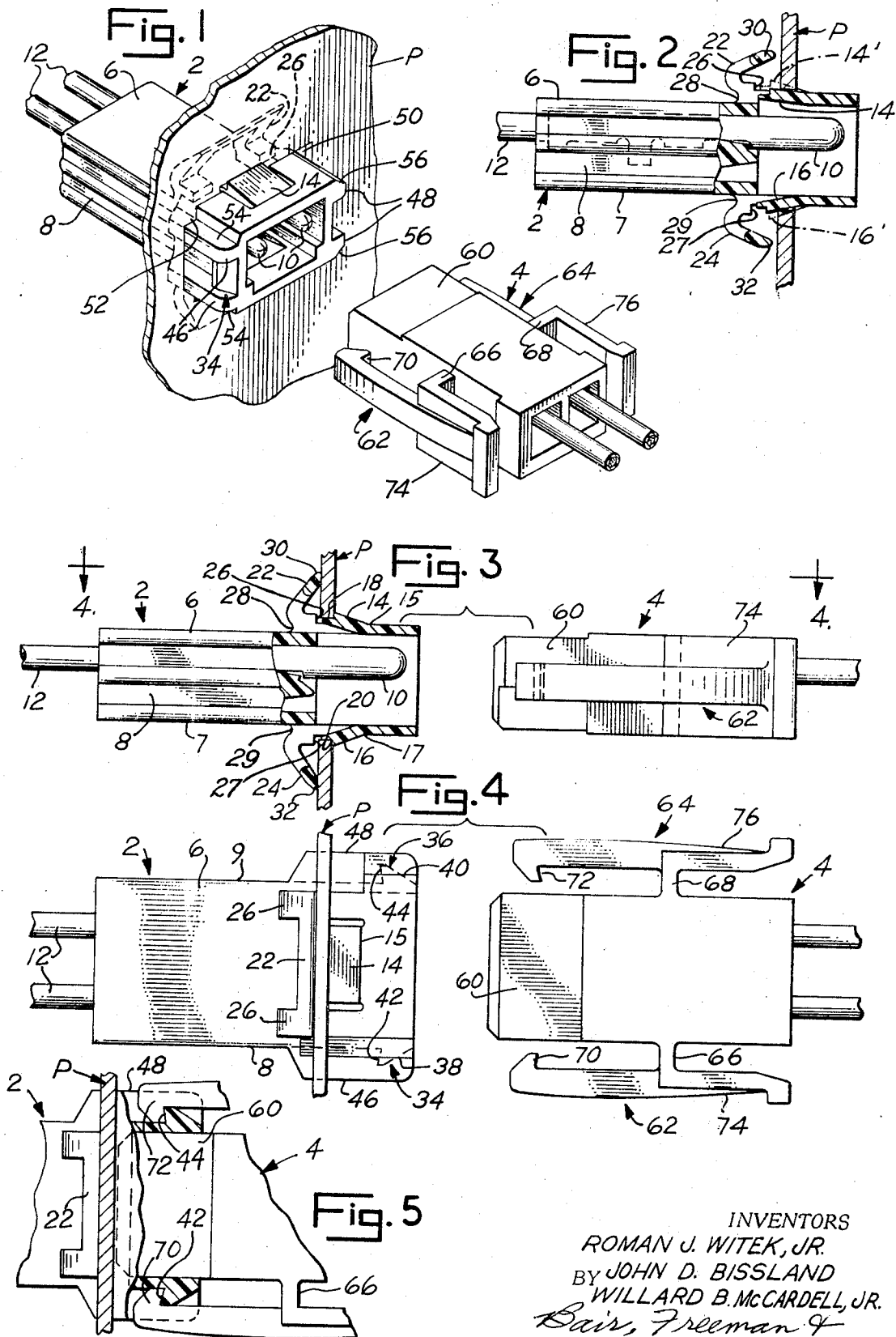
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PANEL LOCKING TERMINAL CONNECTOR BLOCK

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PANEL LOCKING TERMINAL CONNECTOR BLOCK

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8 Claims

ABSTRACT OF THE DISCLOSURE

A new and improved panel locking terminal connector block. A housing containing electrical terminals includes a pair of notched edge resilient inclined tabs and a pair of resilient backup members associated with each other and located on external faces of the housing. The housing is routed through a panel aperture and the notched tabs engage one side of the panel and the periphery of the aperture while the backup members remain on and bear against the other side of the panel to firmly lock the housing into the panel aperture. Shoulders are provided to prevent overrouting. A second housing, containing terminals, is inserted into the panel locked housing and means is included on both housings to firmly hold the housings together. The first housing includes ribs to protect said means while routing and also polarizing means are provided both to prevent routing of the first housing and insertion of the second housing in all but one position.

BACKGROUND OF THE INVENTION

This invention relates to a new and improved panel locking terminal connector block and more particularly to a new and improved panel locking construction carried on an electrical terminal connector block itself.

It is frequently desirable to connect one or more electrical terminal connector blocks to a panel to provide ready access to the blocks and to concentrate various electrical circuit couplings at one or a few locations thereby facilitating maintenance and repair of the circuits.

In previous panel locking terminal connector blocks, the blocks after insertion in the panel, remained somewhat loose and movable and were thereby subjected to possible damage from rattling and vibration. Since these blocks were unsteady, it was also difficult to connect other necessary portions of the assembly to them. Moreover, in some previous installations, a second portion of the block which carried the mating terminals was required to be assembled with the first portion of the block in order to hold any one of the portions of the assembly on the panel. Thus, once a portion of the block was removed, the entire assembly fell away from the panel. Moreover, in some previous installations, coupling means carried on the block for connecting the block assembly together, as well as the panel locking arrangement itself, were frequently damaged due to the routing of the block through the panel. Also, previous blocks could be routed through the panel in a plurality of orientations unless routing was carefully supervised by the person installing the block in the panel. Moreover, even if the routed block was properly oriented, the block carrying the mating terminals was not constructed to be polarized with respect to the routed block. Thus, the final connection of the mating terminals was rendered more difficult since the orientation of each of the panel mounted terminals, as well as the terminals to be mated therewith, had to be observed to prevent crossed circuits before attempting to mate the remainder of the terminal assembly with it.

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It is accordingly a principal object of the present invention to provide a new and improved panel locking terminal connector block which may be easily yet securely and firmly mounted on a panel.

It is also an object of the present invention to provide a new and improved panel locking terminal connector block assembly wherein portions of the block assembly may be disassembled and removed without disengaging all portions of the block from the panel.

Another object of the invention is to provide a new and improved panel locking terminal connector block which may be routed through a panel without damage to its structure.

Also an object of the invention is to provide a new and improved panel locking terminal connector block which may be easily oriented both prior to and during the final assembly of the block.

These and other objects, features and advantages of the present invention may be more clearly understood through a consideration of the following detailed description.

BRIEF DESCRIPTION OF THE DRAWING

In the course of this description, reference will frequently be made to the attached drawing in which;

FIG. 1 is an exploded view of the preferred embodiment of the invention including the panel locking terminal connector block with a portion affixed to the panel;

FIG. 2 is a partially cut away elevation view of a portion of the block of the preferred embodiment of the invention;

FIG. 3 is a partially cut away elevation view of the panel locking terminal connector block shown in FIG. 1;

FIG. 4 is a plan view of block taken along line 4—4 of FIG. 3; and

FIG. 5 is a partially cut away plan view of a fully assembled panel locking terminal connector block of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, the panel locking terminal connector block of the preferred embodiment of the invention generally includes a pair of housings 2 and 4, having mating electrical terminals therein. Preferably each of the housings and their associated appendages are of one piece molded construction, preferably of nylon or other suitable polymer. Housing 2 is firmly locked in an apertured panel, P. The second housing 4 is then coupled to the housing member 2 to complete an assembly.

As shown in FIGS. 1—5, housing 2 includes a plurality of external faces 6, 7, 8 and 9. Inserted within the housing 2, are one or more electrical terminals 10 connected to electrical leads 12. The specific construction of the terminals and the housing interior for holding the terminals is not considered to be part of the present invention and therefore, will not be further described in detail. Carried on opposite external faces 6 and 7 of the housing 2 is structure for firmly locking the housing in a panel. This structure includes resilient inclined tabs 14 and 16 carried on each of the opposite external faces 6 and 7, respectively, of the housing. The tabs 14 and 16 are attached at one of their edges 15 and 17, respectively, to each of their associated housing faces. The opposite edge of each of the tabs is raised above its housing face and includes a notched step 18 and 20. Each of the opposite external housing faces 6 and 7 also carries a resilient backup member 22 and 24. Each backup member extends upwardly from backup shoulders 26 and 27, respectively, and each is attached along one of its edges 28 and 29, respectively, to associated backup shoulders 26 and 27. Each of the backup shoulders 26 and 27 is integrally molded to its

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respective external housing face. The backup shoulders 26 and 27 are adjacent to, but terminate slightly short of the notched edges of their associated tabs to provide for a subsequent disposition of a panel therebetween as will later be described. The raised edges 30 and 32, which are opposite the attached edges 28 and 29, respectively, are raised above the raised notched edges 18 and 20 of their associated inclined tabs.

Locking shoulders 34 and 36 are carried on opposed external faces 8 and 9 of housing 2 to adapt the housing for connection thereto of another housing. Each of the locking shoulders includes an incline 38 and 40 culminating in a steep abutment 42 and 44, respectively. Also carried on the opposed faces 8 and 9 of housing 2, are a pair of raised ribs 46 and 48 straddling each of the locking shoulders 34 and 36. These raised ribs are provided to protect the locking shoulders during the routing of housing 2 in panel P.

The panel P, as shown in FIG. 1, is provided with an aperture 50 which is adapted to receive the housing 2. The aperture 50 is generally shaped to conform with the shape of housing 2. To facilitate the uniform insertion or routing of housing 2 through the aperture, one or more of the corners of the aperture are shaped to include small raised projections 52. One of the pairs of the aforementioned raised ribs 46 is displaced slightly from the plane of the external opposed housing faces 6 and 7, thus forming a pair of housing steps 54. The other pair of raised ribs 48 are also preferably displaced similar to ribs 46, but are associated with opposed faces 6 and 7 by smooth inclines 56 or other suitably shaped surface. Since the steps 54 and the smooth inclines 56 present dissimilar end surfaces to the panel aperture, the housing 2 is thereby polarized and can be oriented in only one position when being routed through the panel P; raised aperture projections 52 will only allow the steps 54 to pass and will block passage of the housing side carrying the smooth inclines 56.

A second housing 4 is also provided and is adapted to carry one or more terminals for mating with terminals 10. Housing 4 includes a housing extension 58 at one end which is insertable into housing 2. The housing extension 58 includes notches 59 on one or more of its sides which are adapted to mate with corresponding stepped portions 60 in housing 2. The notches and stepped portions coact to polarize housing 4 with respect to housing 2 when the former is being inserted in the latter. Housing 4 also carries, on two of its external faces, resilient locking fingers 62 and 64. The locking fingers are integrally attached to housing 4 by fulcrum members 66 and 68 respectively. Each of the locking fingers includes a barb 70 and 72 disposed at one end of the respective locking fingers. Extending in the opposite direction from each of the fulcrums, are lever extensions 74 and 76.

MANNER OF ASSEMBLY

The manner of assembling and the locking of the terminal connector block and its associated panel will now be described.

As viewed in FIGS. 1-5, housing 2, with its associated terminal 10, is routed or inserted from the left of panel P through aperture 50 in the panel. As the resilient inclined tabs 14 and 16 pass through the aperture, they are depressed from their raised dotted line position 14', as shown in FIG. 2. As the housing 2 continues to move to the right, the notched edges 18 and 20 of the tabs are finally disposed in the panel aperture 50. Since the tabs 14 and 16 are resilient, they now tend to return to their undeformed original raised disposition. Thus, the generally horizontal portions of the notched edges 18 and 20 are now disposed between the inner periphery of the panel aperture 50 and the routed housing 2 and they firmly engage the inner periphery. The generally vertical portions of the notched edges engage the right

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flat face of panel P, as shown in FIG. 3, adjacent the periphery of the aperture. As housing 2 was moved to the right, the raised edges 30 and 32 of resilient backup members 22 and 24, respectively, contact the left face of panel P. Overstressing and possible damage to the relatively weak backup members 22 and 24 from over-routing, is prevented by the relatively strong backup shoulders 26 and 27. Their leading terminal ends will engage the left face of panel P as positive stops and prevent excessive continued movement of the housing 2 to the right. Thus, routing of housing 2 through the panel aperture 50 is now completed, and housing 2 is firmly locked into the panel aperture as shown in FIG. 3 with a measure of rigidity that prevents subsequent damage caused by rattling or vibration. The last described disposition of resilient tabs 14 and 16 and their respective notched edges 18 and 20, prevents movement of the housing to the left. The last described disposition of the raised edges 30 and 32 of the resilient backup members 22 and 24, respectively, prevents further movement of the housing 2 to the right.

It will be evident, when considering the above detailed description, that the insertion of the housing 2 in the panel requires only a minimum of effort, since the only opposing force that need be overcome is the frictional force between the inclined tabs 14 and 16 and the inner periphery of the panel aperture 50. However, a substantially increased force is required to remove the housing from the panel P without depressing tabs 14 and 16.

As housing 2 was routed through panel 50, each pair of raised ribs 46 and 48 protected their respective straddled locking shoulders 34 and 36 from damage due to contact with the sharp periphery of the aperture. Also routing the housing 2, in other than a desired orientation, was prevented by the polarizing coaction of housing steps 54 and/or inclines 56 with raised aperture projections 52. The final assembly of the terminal connector blocks by affixing the second housing thereto, may now be completed or deferred until a later time as desired.

To carry out the final assembly, housing 4 is moved to the left as viewed in FIGS. 1, 3 and 4. Upon moving to the left, housing extension 58 is inserted within the open end presented by housing 2. The housing extension 58 may be inserted in only one orientation, since the notches 59 must mate with their associated stepped portions 60 in housing 2. Thus, disorientation of housings 2 and 4 is prevented and the possibility of crossed circuits is eliminated. As housing 4 moves to the left, barbs 70 and 72 ride up the inclines 38 and 40 of locking shoulders 34 and 36, respectively. Finally, when movement of housing 4 to the left is completed, the barbs 70 and 72 snap over the steep abutments 42 and 44, respectively, of the locking shoulders thereby preventing the removal of housing 4, as shown in FIG. 5. If it is desired to remove housing 4, the lever extensions 74 and 76 of the resilient locking fingers 62 and 64, respectively, are easily depressed, thus causing barbs 70 and 72 to move outwardly away from the steep abutments 42 and 44 thereby unlocking the fingers from their associated locking shoulders. The housing 4 is then simply pulled to right as shown in FIGS. 1, 3 and 4.

It is to be understood that the embodiment of the invention which has been described hereinabove, is merely illustrative of one application of the principles of the invention. Numerous modifications may be made by those skilled in the art without departing from the true spirit and scope of the invention.

What is claimed is:

1. A panel locking terminal connector block, comprising:
 - a housing member having a plurality of external faces and adapted to hold at least one electrical terminal;
 - at least a pair of inclined resilient tabs, each of said tabs, being disposed on opposite external faces of said housing member, each of said tabs being inte-

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grally attached to said housing at one edge of the tabs, and the other opposite edge of each of said tabs being raised above its associated housing member face;

at least a pair of backup shoulders also being disposed on said opposite external faces of said housing and each being associated with one of said tabs, each of said shoulders being integrally attached to said housing member, and being adjacent to, but spaced slightly from the raised edge of said tab associated therewith;

at least a pair of resilient backup members on said opposite external faces of said housing adjacent said backup shoulders, each of said backup members having an edge extending above its associated backup shoulder and above the raised edge of its associated tab, each of said tabs extending from said one edge of said tabs toward said backup members;

whereby when said housing member is routed through a panel aperture, said inclined resilient tabs first deform upon passing said panel and then resiliently return toward their original raised disposition to engage one side of the panel while said backup members resiliently engage the other side of the panel to firmly lock the housing in the panel aperture.

2. The panel locking block of claim 1, wherein the raised edge of each of said inclined resilient tabs is notched to engage both the one side of the panel and the inner periphery of the panel aperture.

3. The panel locking block of claim 1, further including means adjacent one of said external faces for polarizing said housing member to prevent routing of said housing member in the panel aperture in all but one orientation.

4. The panel locking block of claim 1, wherein the raised edge of each of said inclined resilient tabs is notched and further including;

a second housing member adapted to hold another electrical terminal for mating with the first mentioned terminal;

said second housing member being inserted within the first mentioned housing member;

the first mentioned housing member including a pair of locking shoulder means, each shoulder means being disposed on second opposite faces of the first mentioned housing member;

means on said second housing member for firmly affix-

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ing said second housing member to said locking shoulder means; and

a pair of raised ribs disposed on opposite sides of each of said locking shoulder means and extending above said locking shoulder means to protect said locking shoulder means while routing the first mentioned housing member through the panel aperture.

5. The panel locking block of claim 1, further including;

a second housing member adapted to hold another electrical terminal for mating with the first mentioned terminal;

said second housing member being inserted within and firmly affixed to the first mentioned housing member.

6. The panel locking block of claim 5, wherein said housing members include means to orient said second housing member with said first mentioned housing member when inserting the former in the latter.

7. The panel locking block of claim 1, further including;

a pair of locking shoulder means, each shoulder means being disposed on second opposite faces of said housing member for affixing a second housing member to the first mentioned housing member; and

a pair of ribs disposed on opposite sides of each of said locking shoulder means and extending above said locking shoulder means to protect said locking shoulder means while routing the housing member through the panel aperture.

8. The panel locking block of claim 7, wherein the block is of molded one piece construction.

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