Sept. 22, 1970 J. R. STAUDER ET AL 3,530,427

MULTIPOLE PULL-APART TERMINAL BLOCK OR CONNECTOR

Filed Aug. 19, 1968 2 Sheets-Sheet 1

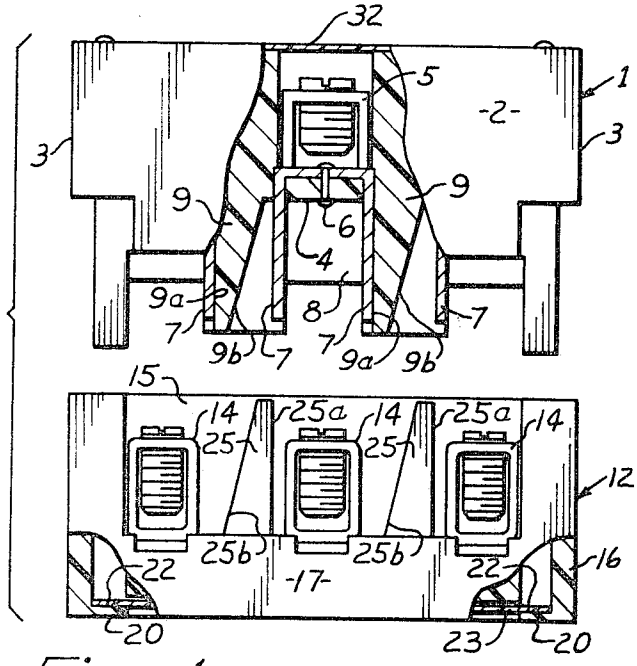


Fig. 1.

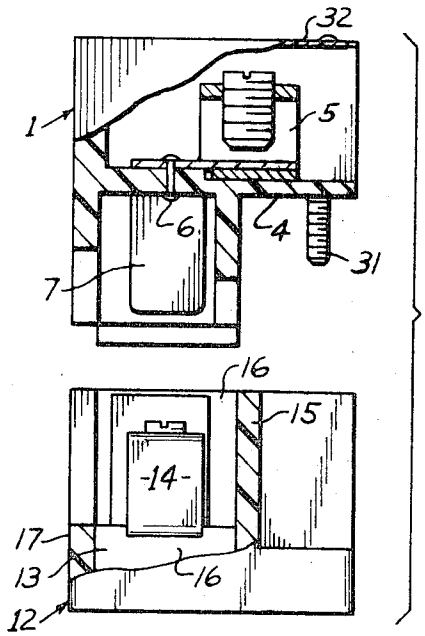


Fig. 2.

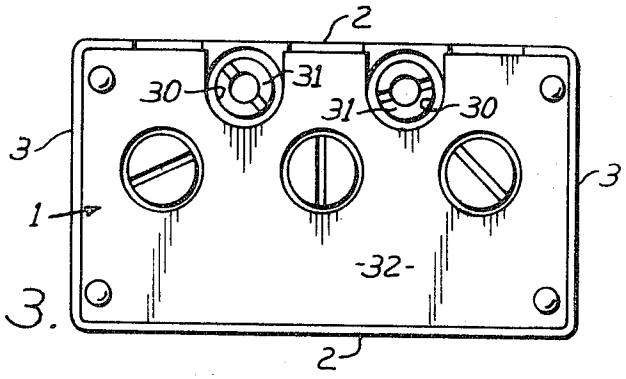


Fig. 3.

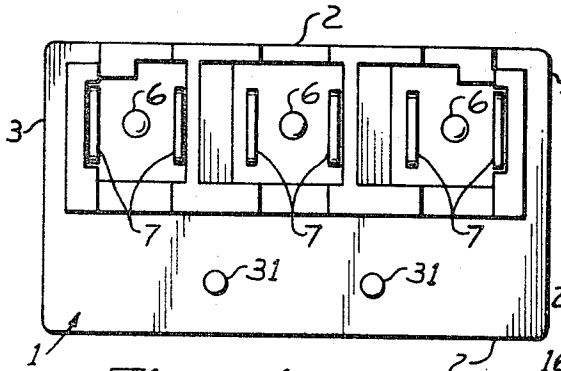


Fig. 4.

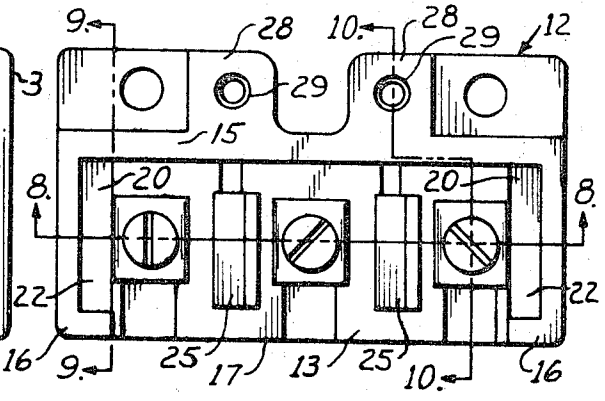


Fig. 5.

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MULTIPOLE PULL-APART TERMINAL BLOCK OR CONNECTOR

Filed Aug. 19, 1968 2 Sheets-Sheet 2

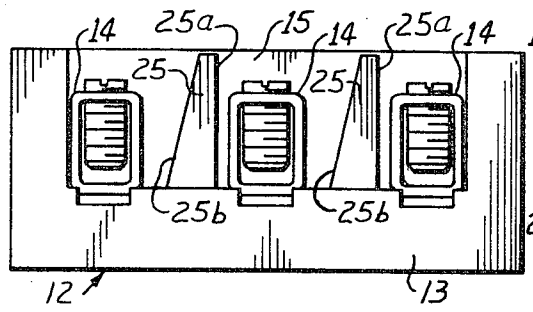


Fig. 6.

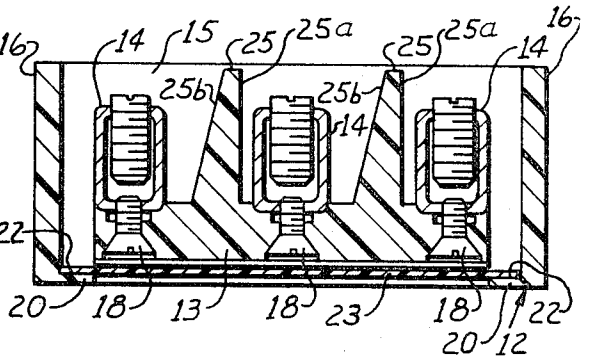


Fig. 8.

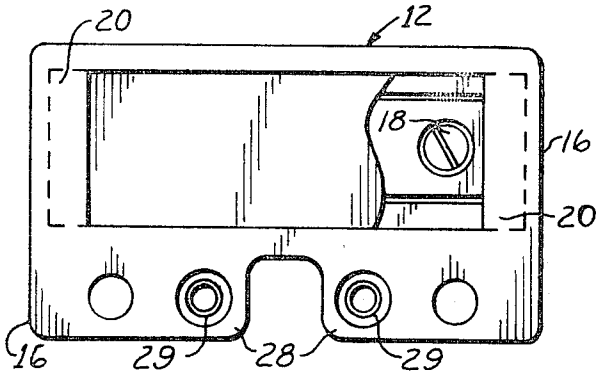


Fig. 7.

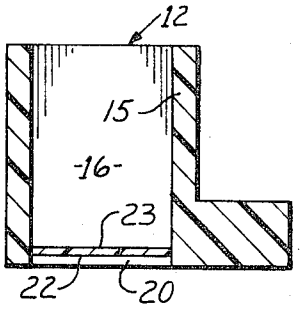


Fig. 9.

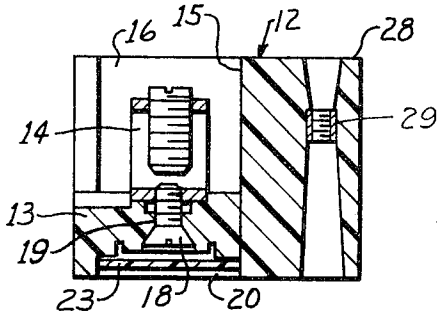


Fig. 10.

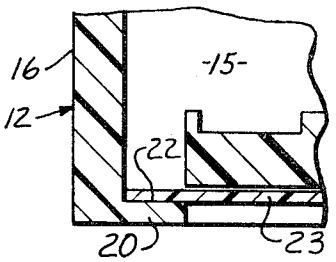


Fig. 11.

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United States Patent Office 3,530,427
Patented Sept. 22, 1970

3,530,427

MULTIPOLE PULL-APART TERMINAL BLOCK OR CONNECTOR

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Filed Aug. 19, 1968, Ser. No. 753,576
Int. Cl. H01r 9/00, 13/64, 25/06
U.S. Cl. 339—198 7 Claims

ABSTRACT OF THE DISCLOSURE

The multipole terminal block comprises a top and base carrying sets of complementary contacts with complementary wedging barriers between the sets. The barriers are so arranged that they guide the top and base into proper initial alignment and exert a wedging action so as to wedge them into precise final alignment. In the assembled block, associated barriers reinforce each other and buttress their associated complementary contacts in tight contact relation.

The contacts of the base are secured to a contact supporting bottom wall thereof by suitable screws of which the heads are exposed at the underside of the wall. A peripheral wall portion of the base is arranged with respect to the contact supporting wall so that an insulating liner can be installed, by snap-fastening it into place, in covering and concealing relation to the heads of the screws.

This invention relates to a multipole pull-apart terminal block or connector.

Prior pull-apart terminal blocks in general comprise a base having stationary contacts therein and a top having complementary stationary contacts therein arranged so that when the top is assembled on the base in the properly aligned position, each contact on the base engages a complementary contact on the top. Quite generally one contact on the base or top is in the form of a pair of spaced arms between which a rigid male contact on the other part of the block is received and resiliently gripped at its sides by the spaced arms. Generally the male contacts are mounted on an upwardly facing supporting wall of the base by means of screws of which the heads are accessible at the underface of the supporting wall for purposes of attaching the male contacts to the wall.

In the present invention, the contacts on the top are permanently secured thereto, and those on the base are secured by screws as above described, and a detachable liner is installed in the base so as to overlie and conceal the heads of the screws and to provide an external insulating barrier therefor.

Another feature resides in the provision of barriers on the top and base which are so arranged that, during assembly of the top on the base, they engage and prevent moving the top and base into contact making position if the top and base are misaligned either transversely or endwise, or by relative rotation out of proper position about a common axis extending normal to the plane of the base. The barriers also are so arranged that if the top and base are in approximate alignment at the initiation of assembly, they engage and shift the top and base into precise final alignment as the top and base are moved into final assembled relation. They also provide a wedging relation endwise of the top and base which assures not only proper alignment endwise but also extremely firm and tight engagement between the complementary contacts of the top and base.

Various other objects and advantages will become apparent from the following description wherein reference is made to the drawings in which:

FIG. 1 is an exploded front elevation showing the top and base of a terminal block of the present invention in position for assembly, part thereof being broken away for clearness in illustration;

FIG. 2 is an exploded side elevation of the block illustrated in FIG. 1, part thereof being broken away for clearness in illustration;

FIG. 3 is a top plan view of the top of the assembled block;

FIG. 4 is a bottom plan view of the top of the block;

FIG. 5 is a top plan view of the base of the block;

FIG. 6 is a front elevation of the base;

FIG. 7 is a bottom plan view of the base;

FIG. 8 is a vertical longitudinal sectional view taken on the line 8—8 of FIG. 5;

FIG. 9 is a vertical cross-sectional view taken on the line 9—9 of FIG. 5;

FIG. 10 is a vertical cross-sectional view taken on the line 10—10 of FIG. 5, and

FIG. 11 is an enlarged left end portion of the structure illustrated in FIG. 8.

Referring to the drawings, the top 1 of the block comprises a body of insulating material having front and rear walls 2, end walls 3, and a contact supporting wall 4. Mounted on the upper face of the wall 4 are terminal connectors 5 secured by rivets 6 to spaced-arm contacts 7 supported on the underside of the wall 4. The spaced-arm contacts 7 are housed in a lower peripheral wall 8 depending from the wall 4, and barriers 9 are disposed between one arm of each contact 7 and the adjacent arm of the next adjacent contact 7. The barriers 9 have faces 9*a* and 9*b*, as hereinafter described.

The base 12 of the block has a supporting wall 13 on the upper face of which are supported male terminal connectors 14 each of which is positioned to lie between the two arms of a complementary aligned contact 7 of the top 1 when the top 1 and base 12 are assembled. The base is provided with the back wall 15, end walls 16 and front wall 17, each of which extends upwardly from the bottom of the base 12. The front wall 17 terminates at its upper edge substantially to the top surface of the wall 13. The connectors 14 are connected to the wall 13 by means of screws 18 which extend through suitable passages 19 in the wall 13 and of which the heads are exposed at the underface of the wall 13 for access by a screw driver or suitable tool. The front, rear, and end walls of the base thus extend downwardly below the level of the underface of the wall 13 so that they and the wall 13 define a concavity opening downwardly through the bottom of the base. This concavity preferably has linear parallel front and rear walls extending endwise of the base. The end walls have in-turned flange portions or margins 20 which extend inwardly endwise of the base from the inner face of the end walls 16. The wall 13 terminates at its ends in spaced relation to the side walls 16, and preferably substantially at the innermost edges of the flanges 20. The upper faces of the flanges 20, as indicated at 22, are spaced at or slightly below the underface of the bottom wall 13.

In order to provide an electrical barrier for concealing and protecting the ends of the screws 18 from contact with any extraneous object, a liner 23 is disposed in the concavity in the base in underlying relation to, and preferably juxtaposed face to face relation to, the underface of the wall 13. The liner 23 preferably is in the form of a rectangular strip of relatively stiff, but resilient, insulating material of which is received between those portions of the back wall 15 and front wall 17 which depend below the underface of the wall 13 and which when so received fits snugly therebetween.

The position of the upper faces 22 of the flanges 20

relative to the plane of the underface of the wall **13** and to the thickness of the liner **23** is such that the ends of the liner **23** can be passed between the underface of the wall **13** and the upper faces **22** of the flanges, which thereby provide sockets for holding the liner **23** in place. The liner can be installed readily by slightly flexing it flatwise and then pushing its opposite ends upwardly over the upper faces **22** of the flanges **20** and then pressing the liner firmly against the underface of the bottom wall or permitting it to self-restore, so that the ends of the liner project in overlying relation to the flanges **22**. The base **12** is provided with barriers **25** arranged one barrier between each pair of male terminal connectors **14**.

As will be noted from the drawings, face *9a* of each barrier **9** of the top **1** is juxtaposed against the face of one arm of an associated contact **7**, and the opposite face *9b* is spaced from the adjacent arm of the next adjacent contact **7** at the same side of the barrier **9** as the face *9b*. Each face *9b*, beginning at the bottom of the top **1** slopes upwardly and away from the arm against which the face *9a* of the barrier lies, in a direction toward the next adjacent arm of the next adjacent contact **7**.

Correspondingly, in the base, each barrier **25** has an upright face *25a* which is spaced from the adjacent face of a male contact terminal at a distance sufficient to provide a space into which one of the arms of an aligned contact **7** can pass and fit snugly. The opposite face *25b* of each barrier **25** slopes downwardly from its upper end and toward the next adjacent male terminal connectors **14**. The slopes of the faces *9b* and *25b* provide complementary wedge surfaces.

In this connection, it is to be noted that the lower ends of the barriers **9** of the top and the upper ends of the barriers **25** of the base are offset endwise from each other when the top **1** and base **12** are in proper alignment for assembly, but have not yet been moved downwardly a substantial distance toward assembled position. Thus they act as guides to assure that the top and base are in approximate alignment before they are moved to assembled position, and they guide them into proper position as they are moved to the proper assembled position. Thus, if the top or base are relatively offset somewhat endwise, the wedge surfaces move them relatively endwise into proper alignment. Furthermore, when the wedge surfaces engage and are moved to final position they buttress the barriers **9** of the top so that they, in turn, firmly buttress the arms of the contacts **7** against which they are juxtaposed, and hold them in tight fitting engagement with the side faces of the male connectors **14**. Further, in final position, the barriers **25** on the base **12** are positioned so that their upright faces *25a* are wedged against the arms of the contacts **7** opposite from those engaged by the barriers **9**. Thus, barriers **9** and **25** clamp the arms of contacts **7** against opposite sides of the associated terminal connectors **14**. They are so positioned and shaped that if the top **1** and base **12** are rotated 180° about their common upright axis, the barriers and other portions of the base and top engage each other and prevent moving the top and base into a position sufficient to make contact. Consequently, the top and base can be moved into contact making position only when they are in proper alignment.

The base is provided with suitable portions **28** in which are embedded interiorly threaded sleeves **29**. The top is provided with bores **30** through which screws or bolts **31** are received and engaged with the sleeves **29** for drawing the top **1** and base **12** firmly into assembled relation with respect to each other.

It will be noticed that when the top and base are in this assembled relation, terminal connectors **5** in the top are exposed at the rear of the connector block for reception of conductors and the male terminals, connectors, which also act as contacts in the base **12**, are exposed at the front. The open top of the top of the block is covered by a suitable shield **32** having desired indicia thereon.

While the terminal block has been illustrated as a three pole terminal block, obviously the same principle applies to other terminal blocks regardless of the number of sets of contacts incorporated therein.

In the description and in the claims, the structure has been described in reference to a position in which it is arranged upright so that the base **12** is actually at the bottom and the top **1** is superimposed thereon. This positional reference is merely for briefness and clarity in the description of the relative position of the parts, and is not to be taken as an absolute as obviously the blocks may be used in other than upright position.

Having thus described my invention, I claim:

1. A pull-apart terminal block or connector comprising a base of insulating material having a plurality of spaced contacts;

said base having a contact supporting bottom wall with screw passages therethrough;

screws in said passages securing the contacts to the bottom wall and having their heads exposed exteriorly of the underface of the bottom wall;

a top of insulating material having a plurality of spaced contacts complementary to the contacts on the base, respectively, for making contact therewith when the top and base are assembled;

said contact supporting bottom wall being inset from the bottom of the base toward the top of the base, whereby the base has a downwardly open concavity;

said base having ledge wall portions at the ends of said bottom wall, each ledge wall portion having an upper face spaced from the under-surface of the bottom wall; and

a relatively stiff insulating liner in and closing said concavity and having its opposite ends juxtaposed on the upper faces of the ledge wall portions, respectively, and retained thereby in said closing relation.

2. The structure according to claim **1** wherein the base has end walls, said supporting wall terminates endwise in spaced relation to the end walls, and said ledge wall portions are inturned flanges on the lower ends of the end walls.

3. The structure according to claim **2** wherein said liner is a relatively thin strip which is longer than said supporting wall, the underface of said supporting wall is generally planar, the distance between the plane of the supporting wall and upper faces of said flanges are so related to the thickness of the strip as to tightly engage the end margins of the strip while the intermediate portion of the strip is juxtaposed firmly against the underface of the bottom wall.

4. The structure according to claim **1** wherein spaced insulating barriers are provided on the base between the adjacent contacts thereon, respectively;

insulating barriers are provided on the top between adjacent contacts thereon, respectively, and

the barriers are shaped and positioned so that each bottom barrier between two contacts is complementary to, and receivable in face to face guiding relation to, one of the top barriers between the two complementary contacts, as the top and base are moved together.

5. A pull-apart terminal block or connector comprising a base of insulating material having a plurality of spaced contacts;

a top of insulating material having a plurality of spaced contacts complementary to the contacts on the base, respectively, for making contact therewith when the top and base are assembled by movement of the top downwardly relative to the base into assembled position on the base;

insulating barriers on the base between the adjacent contacts thereon, respectively;

complementary insulating barriers on the top between adjacent contacts thereon, respectively;

each of said barriers, from its base to its opposite end, extending toward its complementary barrier, and being shaped and positioned so that each bottom barrier between two contacts is complementary to, and has a lateral face receivable in face to face guiding relation to, a lateral face of one of the top barriers between the two complementary contacts, as the top and base are moved in a direction toward each other during assembly;

characterized in that —

each barrier tapers, at its said lateral face, from its base to its said opposite end, said opposite end of each barrier of each pair of complementary barriers is offset, in a direction transverse to said direction of movement, from said opposite end of its complementary barrier when the top and base of the block are initially brought into position for being assembled, but are out of final assembled relation, and said lateral faces of each pair are complementary wedge faces which are engageable, as the base and top are moved in said direction toward assembled position, to effect relative movement of the base and top into precise alignment in said transverse direction as the base and top are moved to final assembled relation.

6. The structure according to claim **5** wherein each contact on the top has two arms in face to face spaced relation in said transverse direction;

barriers are provided on the top between each two adjacent arms, each of which arms is on a different one of each of two adjacent contacts, respectively, and has one face which acts to buttress one of the arms against deflection in said transverse direction, and has a wedging face facing toward the other of said adjacent arms and spaced therefrom;

barriers are provided on the base between each two adjacent contacts, respectively, and each has a wedging face complementary to the wedging face on the complementary top barrier and another face spaced from that contact on the base which is opposite from the wedging face of said barrier so as to receive snugly in the resultant space therebetween the other of said arms of the associated top contact, and buttress it against deflection in said transverse direction, and said wedging surfaces being operative when the top and bottom are moved into final position to cause the barriers to clamp the arms of the associated top contact firmly against the opposite faces of the complementary contact of the base.

7. The structure according to claim **5** wherein each pair of complementary contacts have juxtaposed contact faces facing in said transverse direction; and

said barriers of the top and base are positioned relative to the complementary contacts so that said relative movement of the top and bottom in said transverse direction by said wedge surfaces forces said juxtaposed faces into tight contact with each other.

References Cited

UNITED STATES PATENTS

2,945,201	7/1960	Waninger.	
3,011,143	11/1961	Dean	339—49
3,154,364	10/1964	Gerg	339—65 X
3,350,677	10/1967	Daum	339—60 X

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U.S. Cl. X.R.

339—49, 65, 184