March 2, 1965 H. I. STANBACK 3,171,888

ELECTRICAL CONNECTOR FOR BUS BARS

Filed June 21, 1961 2 Sheets-Sheet 1

Fig. 1.

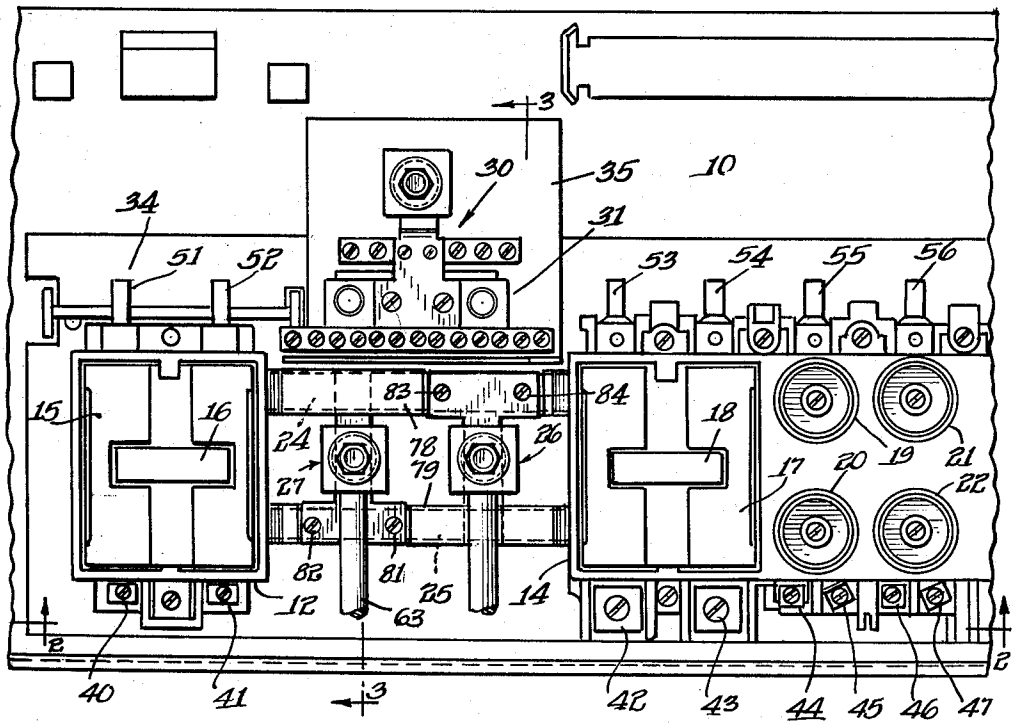
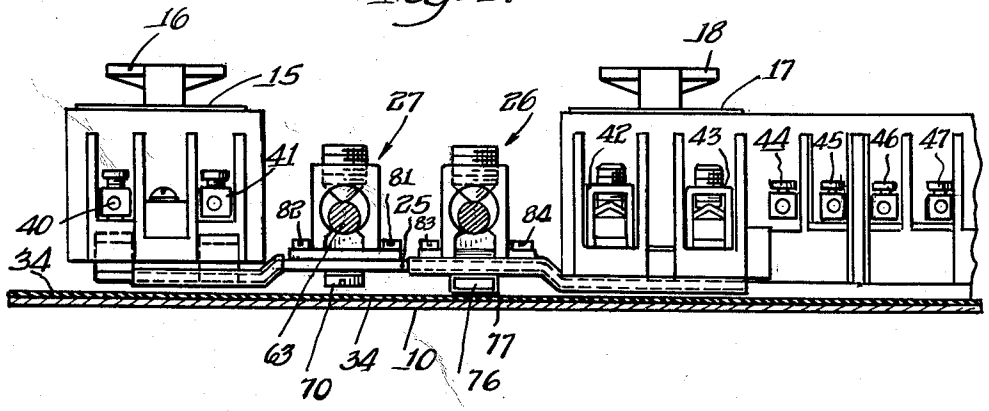


Fig. 2.



INVENTOR.
Harris I. Stanback
BY
Paul J. Rose Jr.
Atty.

March 2, 1965 H. I. STANBACK 3,171,888

ELECTRICAL CONNECTOR FOR BUS BARS

Filed June 21, 1961 2 Sheets-Sheet 2

Fig. 3.

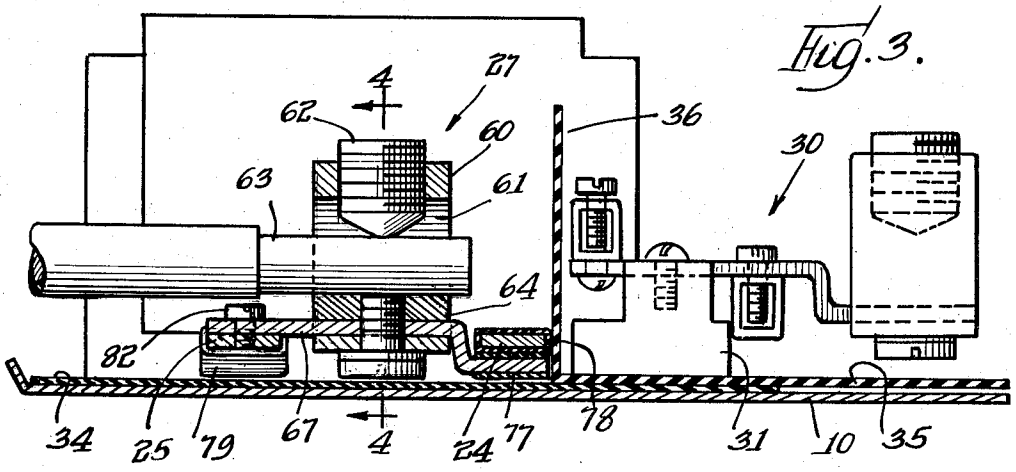


Fig. 4.

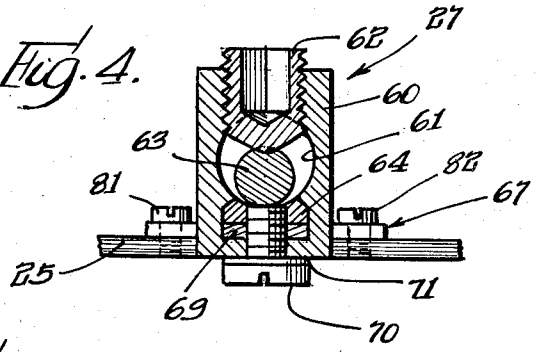


Fig. 5.

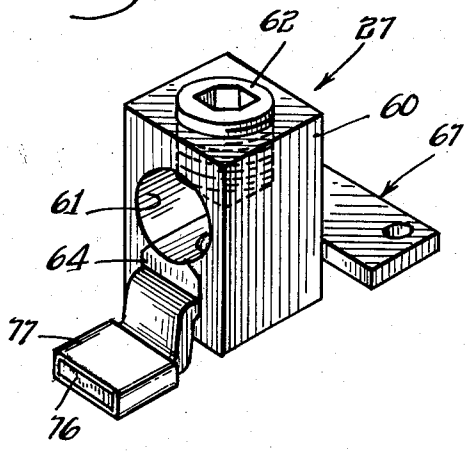
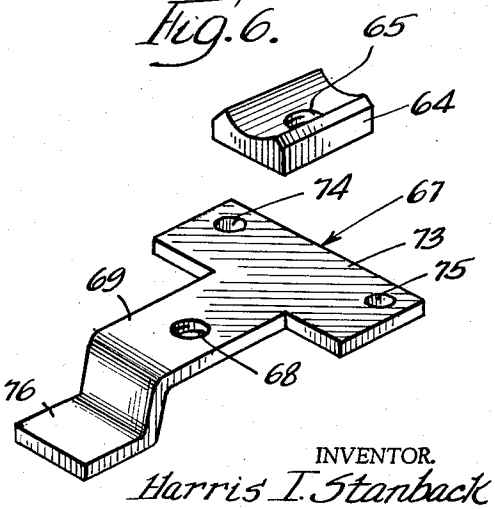


Fig. 6.



INVENTOR.
Harris I. Stanback
BY
Paul J. Rose Jr
atty.

United States Patent Office 3,171,888
Patented Mar. 2, 1965

3,171,888

ELECTRICAL CONNECTOR FOR BUS BARS

Harris I. Stanback, Lexington, Ky., assignor to Square D Company, Park Ridge, Ill., a corporation of Michigan

Filed June 21, 1961, Ser. No. 118,688
11 Claims. (Cl. 174—72)

This invention relates generally to electrical panelboards or load centers having a pair of parallel spaced bus bars and a pair of terminals or connectors to facilitate the electrical connection of power supply conductors thereto, respectively, and more particularly to an improved means for mechanically and electrically connecting a terminal to a bus bar.

An object of the invention is to provide a simple means for mechanically and electrically connecting a terminal to one of a pair of parallel spaced bus bars in such a manner that the terminal is supported solely by the bus bars as distinct from being partially supported by a surrounding insulative casing.

Another object is to provide a simple method of increasing the electrical capacity of a panelboard.

A further object is to provide a novel method of mounting an electrical connector with respect to a pair of parallel spaced bus bars, wherein a bracket of the connector is secured over and electrically connected to one of the bus bars and extends under and engages the other bus bar in insulated relationship thereto.

Other objects of the invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

FIGURE 1 is a fragmentary plan view of a mounting pan assembly of an electrical panelboard constructed in accordance with the invention, a sheet metal box for enclosing the mounting pan assembly being omitted;

FIGURE 2 is an elevational view taken substantially along the line 2—2 of FIGURE 1;

FIGURE 3 is an enlarged elevational sectional view taken substantially along the line 3—3 of FIGURE 2;

FIGURE 4 is an elevational sectional view through a terminal taken substantially along the line 4—4 of FIGURE 3;

FIGURE 5 is a perspective view of a terminal assembly constructed in accordance with the invention; and

FIGURE 6 is a perspective view showing a connecting bracket or tang of a terminal constructed in accordance with the invention and also showing a clamping shoe of the terminal.

In FIGURE 1, a mounting pan is indicated by the numeral 10. In the embodiment of the invention shown by way of example, two molded insulative casings 12 and 14 are secured to the pan 10, the casing 12 being shown as adapted to receive a fuse holder 15 for a pair of cartridge fuses (not shown) and the casing 14 being shown as adapted to receive a similar fuse holder 17. The fuse holder 15 has a handle 16 and the fuse holder 17 has a handle 18. The casing 14 is shown as adapted to also receive screw-in type plug fuses in sockets such as sockets 19, 20, 21, and 22. The sockets 19–22 each have a peripheral ring member threaded to receive a screw-in type plug fuse and a central bottom contact insulated from the ring member, as is well understood in the art. It will also be understood that applicant's invention is equally applicable when molded case circuit breakers instead of fuses are used.

Extending between the casings 12 and 14 is a pair of bus bars 24 and 25 having a pair of electrical connectors or main terminals generally indicated by numerals 26 and 27 mechanically and electrically connected respectively thereto. The main terminals 26 and 27 will be hereinafter more fully described.

A neutral bar assembly generally indicated by the numeral 30 is shown in FIGURES 1 and 3 and is supported by an insulative base 31 secured to the mounting pan 10. A sheet of insulation 34 is provided between the mounting pan 10 and the casings 12 and 14, and a sheet of insulation 35 is provided between the mounting pan 10 and the neutral bar assembly 30, the sheet 35 having an upwardly bent portion 36 extending between the bus bar 24 and the neutral bar assembly as shown in FIGURE 3.

FIGURES 1 and 2 show terminals 40 and 41 associated with the casing 12 and terminals 42, 43, 44, 45, 46, and 47 associated with the casing 14. FIGURE 1 also shows branch circuit terminal studs 51, 52, 53, 54, 55, and 56 adapted to receive and make electrical connection to additional cartridge fuse casing units or screw-in type plug fuse casing units.

The electrical connections within the casings 12 and 14 are not shown. However, it will be understood that the fuse holders 15 and 17 each have two pairs of fuse clips (not shown) for holding two cartridge fuses, and that portions of the fuse clips are adapted to plug into jaws (not shown) provided in the casings 12 and 14. It will be further understood that proper electrical connections are provided between these jaws (not shown), the terminals 40–47, the terminal studs 51–56, the ring members of sockets 19–22, the bottom contacts of sockets 19–22, and the bus bars 24 and 25.

It will be noted that the terminals 42 and 43 are larger than the terminals 40, 41, and 44–47. The terminals 42 and 43 are not used when the main terminals 26 and 27 are provided as shown, but when the casing 14 is used without the casing 12 and the bus bars 24 and 25 in smaller load centers, the terminals 42 and 43 are then used as main terminals. It will be obvious that the bus bars 24 and 25 and the casing 12 may be added, because of growth in load demand, to an existing panelboard having only the casing 14, and that the main terminals 26 and 27 of this invention can then be used in place of the terminals 42 and 43 to accommodate larger power supply conductors than can be accommodated by the terminals 42 and 43.

The main terminals 26 and 27 are identical, and only the main terminal 27, best shown in FIGURES 3–6, will be described. The terminal 27 includes a body portion 60 substantially in the form of a rectangular parallelepiped. An aperture 61, somewhat in the shape of a keyhole, is provided in the body portion 60 to extend therethrough from one side thereof to another. A threaded hole communicating with the aperture 61 from the top of the body portion 60 is provided to receive a clamping screw 62 adapted to clamp an electrical conductor 63 against a clamping shoe 64 having a hole 65 (see FIGURE 6) therein. A T-shaped connecting bracket or tang 67 having a threaded hole 68 (see FIGURE 6) in a trunk portion 69 thereof is receivable by the body portion 60 in the aperture 61 below the clamping shoe 64. A screw 70 provided with a lock washer 71 is provided to extend through the bottom of the body portion 60 and thread into the hole 68 in the connecting bracket 67. The screw 70 projects into the hole 65 to retain the clamping shoe 64 against movement axially of the aperture 61, while the corresponding shapes of the aperture 61 and the clamping shoe 64 prevent movement of the clamping shoe 64 relative to the body portion 60 in other directions.

The head portion 73 of the connecting bracket 67 is provided with a pair of holes 74, 75, and the free end 76 of the trunk portion 69 is offset from the rest of the bracket and is provided with an insulating sheath 77. The bus bars 24 and 25 are also provided with insulating sheaths indicated by numerals 78 and 79, respectively, in FIGURES 1 and 3, but the sheaths 78 and 79 are cut

away where the head portions 73 of the connecting brackets 67 of the main terminals 26 and 27 are respectively attached to the bus bars.

The bus bars 24 and 25 are each provided with a pair of threaded holes spaced to correspond with the holes 74 and 75 in the head portions 73 of the connecting brackets 67 of the main terminals 26 and 27. To assemble the main terminal 27 to the bus bar 25, the free end 76 of the connecting bracket 67 is first placed beneath the bus bar 24 and then the head portion 73 of the bracket is screwed to the bus bars 25 by a pair of screws 81, 82 inserted through the holes 74 and 75. Similarly, the main terminal 26 is assembled to the bus bar 24 by securing the head portion 73 of the connecting bracket 67 thereof to the bus bar 24 with a pair of screws 83, 84, the free end 76 of the connecting bracket 67 of the main terminal 26 being beneath the bus bar 25.

It has been found that when the main terminals 26 and 27 are assembled to the bus bars 24 and 25 in the manner described, a rigid connection is formed and the body portions 60 cannot be moved with respect to the bus bars even when the bus bars 24 and 25 and the casings 12 and 14 associated therewith are removed as a unit from the mounting pan 10, this result occurring even though the main terminals 26 and 27 including their connecting brackets 67 are supported solely by the bus bars 24 and 25 without an insulative casing extending therearound.

It will also be seen that a very convenient way has been provided for enlarging the capacity of an existing panelboard having only a single protective unit therein, such as is represented by the casing 14. Bus bars such as the bus bars 24 and 25 and a protective unit such as is represented by the casing 12 may be added to the protective unit represented by casing 14, and the main terminals 26 and 27 may be added when the terminals 42 and 43 of the casing 14 are too small.

Various modifications may be made in the structure shown and described without departing from the spirit and scope of the invention.

The terms "upper," "lower," "top," and "bottom" as used in the following claims are purely relative, it being obvious that the panelboard may be mounted in any position.

I claim:

1. An electrical panelboard comprising a pair of spaced molded casings adapted to receive circuit protective devices and provided with a plurality of pairs of terminals between which electrical circuits are respectively adapted to be completed by said circuit protective devices, a pair of special parallel bus bars extending between said casings and each adapted to be electrically connected respectively to one terminal of at least one pair of said pairs of terminals, and a pair of main terminals respectively electrically and mechanically connected to said bus bars, each of said main terminals including a body portion having an aperture extending therethrough from one side to another thereof and having a threaded hole extending through a top surface thereof and communicating with said aperture, a clamping screw threaded into said threaded hole, a connecting bracket extending through said aperture and having a threaded hole therein, and a screw extending through a bottom surface of said body portion and threaded into the threaded hole in said connecting bracket to secure said body portion thereto, one end of the connecting bracket of the first of said main terminals being mechanically and electrically connected to an upper surface of a first of said bus bars and other end of the connecting bracket of said first main terminal mechanically engaging a lower surface of a second of said bus bars in electrically insulated relationship thereto, and one end of the connecting bracket of a second of said main terminals being mechanically and electrically connected to an upper surface of said second bus bar and the other end of the connecting bracket of said second main terminal mechanically engaging a lower surface of said first bus bar in electrically insulated relationship thereto.

2. In an electrical panelboard having a pair of spaced parallel bus bars, a pair of electrical connectors respectively electrically and mechanically connected to said bus bars and adapted to receive electrical conductors for supplying electrical energy thereto, each of said electrical connectors including a body portion having an aperture extending therethrough from one side to another thereof and having a threaded hole extending through a top surface thereof and communicating with said aperture, a clamping screw threaded into said threaded hole, a connecting bracket extending through said aperture and having a threaded hole therein, and a screw extending through a bottom surface of said body portion and threaded into the threaded hole in said connecting bracket to secure said body portion thereto, one end of the connecting bracket of a first of said electrical connectors being mechanically and electrically connected to an upper surface of a first of said bus bars and the other end of the connecting bracket of said first electrical connector mechanically engaging a lower surface of a second of said bus bars in electrically insulated relationship thereto, and one end of the connecting bracket of a second of said electrical connectors being mechanically and electrically connected to an upper surface of said second bus bar and the other end of the connecting bracket of said second electrical connector mechanically engaging a lower surface of said first bus bar in electrically insulated relationship thereto.

3. In an electrical panelboard having a pair of spaced parallel bus bars, a pair of electrical connectors respectively electrically and mechanically connected to said bus bars and adapted to receive electrical conductors for supplying electrical energy thereto, each of said electrical connectors including a body portion having an aperture extending therethrough from one side to another thereof and having a threaded hole extending through a top surface thereof and communicating with said aperture, a clamping screw threaded into said threaded hole, and a connecting bracket secured to said body portion, one end of the connecting bracket of a first of said electrical connectors being mechanically and electrically connected to an upper surface of a first of said bus bars and the other end of the connecting bracket of said first electrical connector mechanically engaging a lower surface of a second of said bus bars in electrically insulated relationship thereto, and one end of the connecting bracket of a second of said electrical connectors being mechanically and electrically connected to an upper surface of said second bus bar and the other end of the connecting bracket of said second electrical connector mechanically engaging a lower surface of said first bus bar in electrically insulated relationship thereto.

4. An electrical panelboard as claimed in claim 1, wherein each of said main terminals includes a clamping shoe in the aperture of the body portion thereof between said clamping screw and connecting bracket, said clamping shoe having a hole therein for receiving the inner end of said screw threaded into said connecting bracket through said bottom surface of said body portion whereby said clamping shoe is retained in said body portion against movement relatively thereto axially of said aperture.

5. An electrical panelboard as claimed in claim 1, wherein said connecting bracket of each of said main terminals is T-shaped and has said body portion of the respective main terminal mounted on the trunk portion of the T, the head portion of the T being secured over and electrically connected to one of said bus bars and the free end of the trunk portion of the T extending under and engaging the other of said bus bars in electrically insulated relationship thereto.

6. In an electrical panelboard having a pair of spaced

parallel bus bars, a pair of electrical connectors as claimed in claim 2, wherein each of said electrical connectors includes a clamping shoe in the aperture of the body portion thereof between said clamping screw and connecting bracket, said clamping shoe having a hole therein for receiving the inner end of said screw threaded into said connecting bracket through said bottom surface of said body portion whereby said clamping shoe is retained in said body portion against movement relatively thereto axially of said aperture.

7. In an electrical panelboard having a pair of spaced parallel bus bars, a pair of electrical connectors as claimed in claim 2, wherein said connecting bracket of each of said electrical connectors is T-shaped and has said body portion of the respective electrical connector mounted on the trunk portion of the T adjacent the head portion thereof, the head portion of the T being secured over and electrically connected to one of said bus bars and the free end of the trunk portion of the T projecting beyond said body portion and extending under and engaging the other of said bus bars in electrically insulated relationship thereto.

8. In an electrical panelboard having a pair of spaced parallel bus bars, a pair of electrical connectors as claimed in claim 3, wherein said connecting bracket of each of said electrical connectors is T-shaped and has said body portion of the respective electrical connector mounted on the trunk portion of the T adjacent the head portion thereof, the head portion of the T being secured over and electrically connected to one of said bus bars and the free end of the trunk portion of the T projecting beyond said body portion and extending under and engaging the other of said bus bars in electrically insulated relationship thereto.

9. An electrical panelboard comprising a pair of spaced parallel bus bars and an electrical connector electrically connected to one of said bus bars and braced by the other of said bus bars, said connector comprising a T-shaped bracket, and a body portion mounted on the trunk portion of said T-shaped bracket said body portion having means for electrically and mechanically securing an electrical conductor thereto, the head portion of said T-shaped bracket being secured over and electrically connected to one of said bus bars, and the free end of the trunk portion of said T-shaped bracket extending under and engaging the other of said bus bars in electrically insulated relationship thereto, whereby said other of said bus bars braces said bracket to provide a substantially rigid mounting for said body portion of said connector.

10. An electrical panelboard comprising a pair of spaced parallel bus bars and an electrical connector electrically connected to one of said bus bars and braced by the other of said bus bars, each of said bus bars having opposite first and second sides correspondingly positioned with respect to the first and second sides of the other bus bar, said electrical connector comprising a body portion having means for electrically and mechanically securing an electrical conductor thereto, and a bracket secured to said body portion, one end of said bracket being electrically and mechanically connected to one of said first and second sides of said one of said bus bars, and the other end of said bracket being mechanically engaged with the other of said first and second sides of said other of said bus bars in electrically insulated relationship thereto.

11. An electrical panelboard comprising a pair of spaced parallel bus bars and a pair of electrical connectors, one of said electrical connectors being electrically connected to one of said bus bars and braced by the other of said bus bars, and the other of said electrical connectors being electrically connected to said other of said bus bars and braced by said one of said bus bars, each of said bus bars having opposite first and second sides correspondingly positioned with respect to the first and second sides of the other bus bar, each of said electrical connectors comprising a bracket and a body portion secured to said bracket and having means for electrically and mechanically securing an electrical conductor thereto, one end of the bracket of said one of said electrical connectors being electrically and mechanically connected to one of said first and second sides of said one of said bus bars, the other end of said bracket of said one of said electrical connectors being mechanically engaged with the other of said first and second sides of said other of said bus bars in electrically insulated relationship thereto, one end of the bracket of said other of said electrical connectors being electrically and mechanically connected to one of said first and second sides of said other of said bus bars, and the other end of said bracket of said other of said electrical connectors being mechanically engaged with the other of said first and second sides of said one of said bus bars in electrically insulated relationship thereto.

References Cited in the file of this patent

UNITED STATES PATENTS

2,732,535	Hammerly	Jan. 24, 1956
2,738,446	Fleming	Mar. 13, 1956
2,786,162	Ballou	Mar. 19, 1957
2,823,339	Locher	Feb. 11, 1958
2,972,656	Fisher	Feb. 21, 1961
2,984,818	Logan	May 16, 1961