July 11, 1939. M. H. ALBERS 2,165,203

PANEL BOARD

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Fig. 1

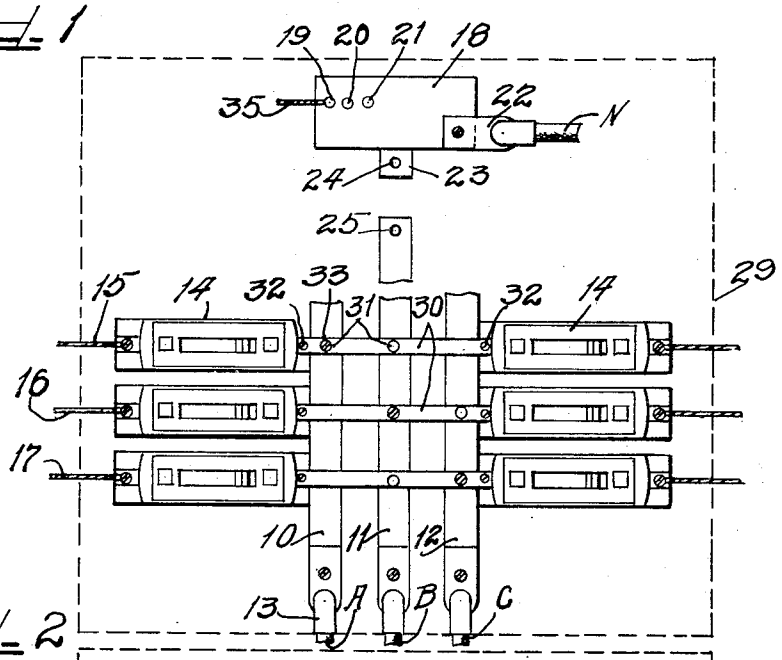


Fig. 2

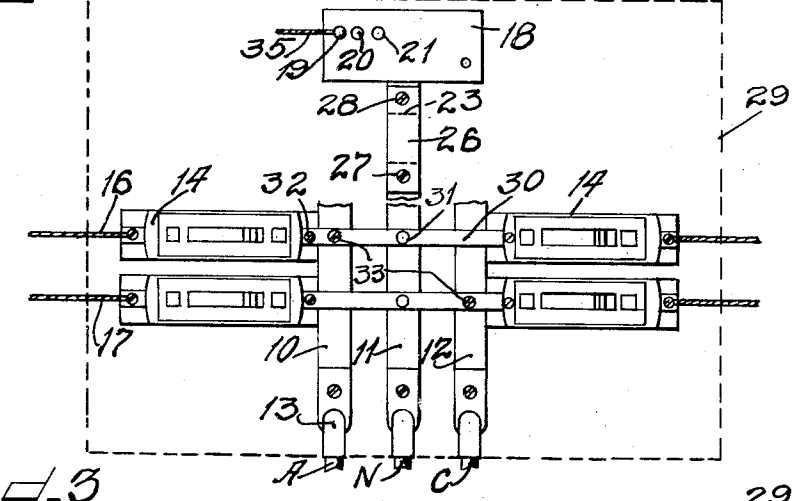
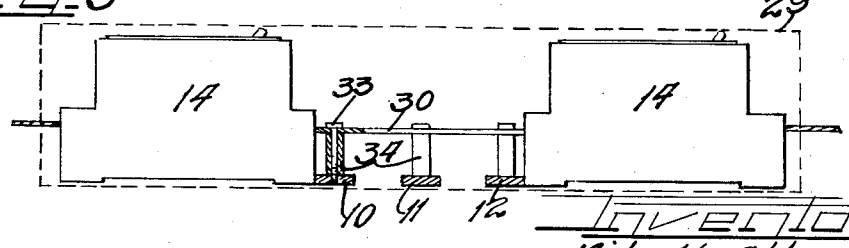


Fig. 3



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PANEL BOARD

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5 Claims. (Cl. 175—369)

The present invention is primarily concerned with panel boards for electrical distribution to the power and lighting circuits of buildings and the like.

For such purpose, the general practice in most cities is to supply power and lighting circuits from an automatically controlled low voltage network system, and the supply circuit may in different localities be either three-phase four-wire, or single-phase three wire, depending upon the system being used in the particular locality.

Due to the difficulty of obtaining suitable four-wire distribution panel boards from the manufacturers of such apparatus, three-wire panel boards have in some cases been used for four-wire distribution service, but this makeshift has proven unsatisfactory due to the inherent construction of the three-wire panel boards which makes it difficult to obtain a proper balancing of the loads.

With the foregoing difficulties in mind, the present invention more specifically contemplates an improved panel board arrangement which is so constructed as to permit its being quickly and easily converted for use on a three or four-wire system as desired.

A further object of the invention is to provide in a panel board having a terminal block and a plurality of main busses, improved means whereby one of the busses may be connected and disconnected relative to the terminal blocks, as desired.

A further object of the invention is to provide improved means for selectively connecting the branch distribution conductors to the main busses of the panel board.

Another object is to provide a panel board utilizing phasing bars of novel construction, which may be interchangeably utilized to selectively connect the main busses and distribution conductors.

Still another object resides in the provision of novel connecting and supporting means between a phasing bar and a main bus.

Although the present invention has been disclosed and described in connection with panel boards having individual control switches for the various distribution circuits, it will be apparent to one skilled in the art that the invention may with equal facility be utilized with switch boxes, fuse boxes, etc.

Other objects and features of the invention will more fully appear from the following detailed description taken in connection with the accompanying drawing which illustrates a single embodiment thereof, and in which:

Figure 1 is a fragmentary plan view illustrating the cooperative relationship between the various elements of the panel board of the present invention, the parts being connected for operation on a four-wire system;

Figure 2 is a similar view showing the parts connected for operation on a single-phase three-wire system; and

Figure 3 is a transverse sectional view showing the details of the means for connecting the phasing bars to the bus bars.

As shown on the drawing:

Referring to the drawing, the panel board of the present invention comprises a plurality of main bus bars, in this instance three, as indicated at 10, 11 and 12. These bus bars are as is the usual practice disposed in spaced parallel relationship and lie substantially in the same plane. The lowermost ends of the bus bars are adapted to have supply conductors connected thereto as by suitable lugs 13.

The busses are connected to aligned circuit controlling devices disposed on either side of the busses. The circuit controlling devices may constitute fuses, switches, or the like as indicated at 14, which are provided with suitable terminal connections whereby connections may be made to branch distribution conductors, for example, as shown at 15, 16 and 17.

At the topmost portion of the panel is a terminal block 18 which is provided with a plurality of terminals such as 19, 20 and 21 which have a common connection adapted to be secured by an appropriate lug 22 to one of the supply conductors.

The terminal block 18 is provided with an additional lug connection 23 which is aligned with one of the main bus bars, in this instance being aligned with the central bus bar 11. The lug 23 and the uppermost end of bus bar 11 are disposed with their ends spaced apart and respectively provided with apertures 24 and 25, whereby a link member 26 may be secured at its ends by appropriate bolts 27 and 28 to electrically connect the lug 23 and the central bus bar 11. The purpose of this connection will be subsequently explained in detail.

The various elements composing the panel board such as switches, bus bars, etc., may be mounted, if desired, within a suitable housing 29 as diagrammatically illustrated in dotted lines.

For connecting the circuit devices, that is the switches 14 in this instance, to the bus bars, it is proposed to provide a plurality of interchangeable phasing bars 30 by means of which the

switches, and consequently the branch distribution conductors, may be selectively connected to the bus bars.

The phasing bar comprises a strip of conducting material such as copper, this strip being provided with a pair of spaced apertures 31, this spacing being such as to bring the openings over the center lines of adjacently disposed bus bars, when the phasing bar is being used.

Since in the particular instance there are three bus bars provided, the two openings in the phasing bar will be disposed, for example, when the phasing bar is in one position over busses 10 and 11, but if the phasing bar is turned end for end, the two openings will be disposed over busses 11 and 12. With this arrangement a phasing bar may be so disposed as to bring one of the openings over any particularly desired bus bar. The ends of the phasing bars are apertured to permit connection by suitable screws 32 to the innermost terminals of the switches or other distribution devices located on each side of the bus bars.

Connection is made from a phasing bar to a bus bar, as shown in Figure 3, by means of a connecting screw 33 which may be inserted in one of the apertures of the phasing bar, which is disposed over the bus to which it is desired to connect the bar. The threaded end of the screw 33 is arranged to be threaded into an appropriately threaded opening in the bus bar which is aligned with the aperture in the phasing bar. In order to support the phasing bar where it is connected to the bus, a sleeve 34 is provided through which the screw 33 extends, this sleeve having one end abutting the bus bar and its other end abutting the phasing bar.

The foregoing arrangement provides phasing bars which may be interchanged and which may be utilized for selectively connecting the branch distribution conductors and switches to any desired bus.

The convertible features of the panel board will now be described. If the panel board is to be used for four wire distribution, the parts will be connected as shown in Figure 1. The three phase wires A—B—C will be respectively connected through lugs 13 to the busses 10, 11 and 12. The neutral wire will be connected through lug 22 to the terminal block 18. Under these conditions, the link 26 will be disconnected relative to the lug 23 and bus 11. The branch distribution conductors 15, 16 and 17, which are connected through switches 14, will be individually connected through phasing bars and connecting screws to the busses 10, 11 and 12. The neutral branch distribution conductor, as shown at 35 would be connected to terminal 19 on the terminal block 18. With this arrangement, it will be evident that four wire distribution may be obtained upon the panel board, the phase wires being connected to busses 10, 11 and 12, and the neutral distribution wire being connected to the neutral terminal block.

In order to utilize the panel board for three wire distribution it is only necessary to insert the link 26 so as to connect the terminal block with the main bus 11, as shown in Figure 2, the neutral supply conductor in this case being connected through a lug 13 to the lower end of bus 11. For such operation, the three wire single phase supply circuit A—N—C is connected respectively to busses 10, 11 and 12. By connecting two of the branch distribution circuits, for example, circuits 16 and 17 by means of the phasing bars to main busses 10 and 12, the distribution conductor 35 connected to the terminal block is still the neutral conductor.

With this arrangement it will be apparent that panel boards of the convertible type may be built up to take care of any number of circuits depending upon the number of switches used and the number of terminals provided on the terminal block 18.

From the foregoing description, it will be apparent that the present invention provides an improved panel which is so constructed as to permit of its being quickly and easily converted for use on a three or four wire system as desired; which embodies improved means whereby one of the busses may be connected and disconnected relative to the terminal block; which has improved means for selectively connecting the branch conductors to the main busses; which utilizes phasing bars of novel construction, these bars being interchangeable to selectively connect the main busses and distribution conductors; and which has novel connecting and supporting means between the phasing bars and the bus to which the phasing bar is connected.

The invention has been described herein more or less precisely as to details, yet it is to be understood that the invention is not to be limited thereby, as changes may be made in the arrangement and proportion of parts, and equivalents may be substituted, without departing from the spirit and scope of the invention.

I claim as my invention:

1. In a distribution panel, spaced apart rows of circuit controlling devices, a plurality of laterally spaced bus bars lying substantially in the same plane and disposed between said rows of devices, said devices having confronting terminal connections lying above the plane of said bus bars, means for selectively connecting the terminals of said devices to said busses, said means comprising a plurality of interchangeable flat phasing bars each adapted to extend transversely of and spaced above the bus bars and be secured at one end to the terminal of a device in one of said rows and at its other end to the terminal of a device in said other row, and a member for selectively connecting each phasing bar to any one of said busses.

2. A distribution panel comprising a neutral terminal block normally connectable to the neutral supply conductor of a three phase four wire supply circuit, a plurality of main bus members connectable to the phase conductors of said supply circuit, said busses and terminal block being arranged to have branch distribution conductors connected thereto for three phase four wire distribution, and means whereby one of said busses may be electrically connected to said terminal block to obtain three wire distribution utilizing the same neutral branch distribution conductors, when a single phase three wire supply circuit is connected to said busses with its neutral connected to said one of said busses.

3. In a distribution panel board containing main busses and a neutral terminal block for connection to the phase conductors and neutral conductor of a three phase four wire supply service, means for adapting said panel board for connection to a single phase three wire supply service, said means including a member for electrically connecting one of the busses to said terminal block, whereby the three wire service may be connected to the busses with its neutral conductor connected to said one of said busses.

4. In a distribution panel structure, a plurality of bus bars, a neutral terminal block adapted for connection to a plurality of neutral branch conductors, a main terminal connection at said block enabling direct connection thereto of the neutral supply conductor of a three phase four wire supply circuit, when the phase conductors are connected to said busses, and means for establishing a supply connection to said neutral block through one of said busses in lieu of said main terminal connection, when a single phase three wire supply circuit is connected to said busses, with its neutral supply conductor connected to the bus which is connected to said neutral block.

5. In a distribution panel arrangement including a plurality of busses and a neutral block having a plurality of branch distribution conductor connection terminals; a plurality of main supply terminals at said neutral block for respectively feeding the branch terminals, one of said main supply terminals being arranged for direct connection to a neutral supply conductor, and the other of said main supply terminals being arranged for connection to one of said busses for establishing a neutral supply circuit through said bus, when said bus is connected to a neutral supply conductor.

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