April 22, 1952 M. J. BROWN ET AL 2,593,975

SWITCHBOARD CONSTRUCTION

Filed April 7, 1950 3 Sheets-Sheet 1

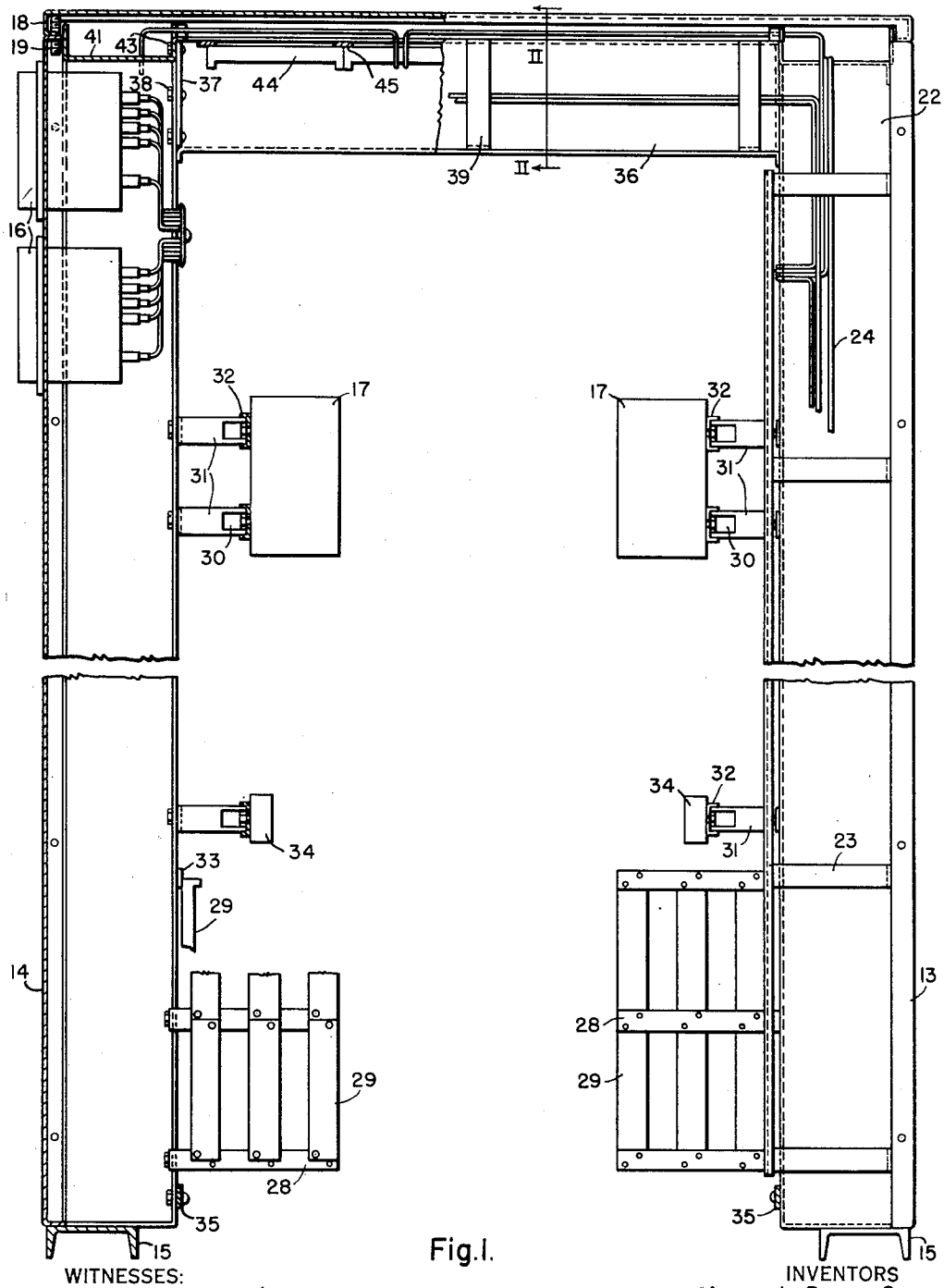


Fig.1.

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SWITCHBOARD CONSTRUCTION

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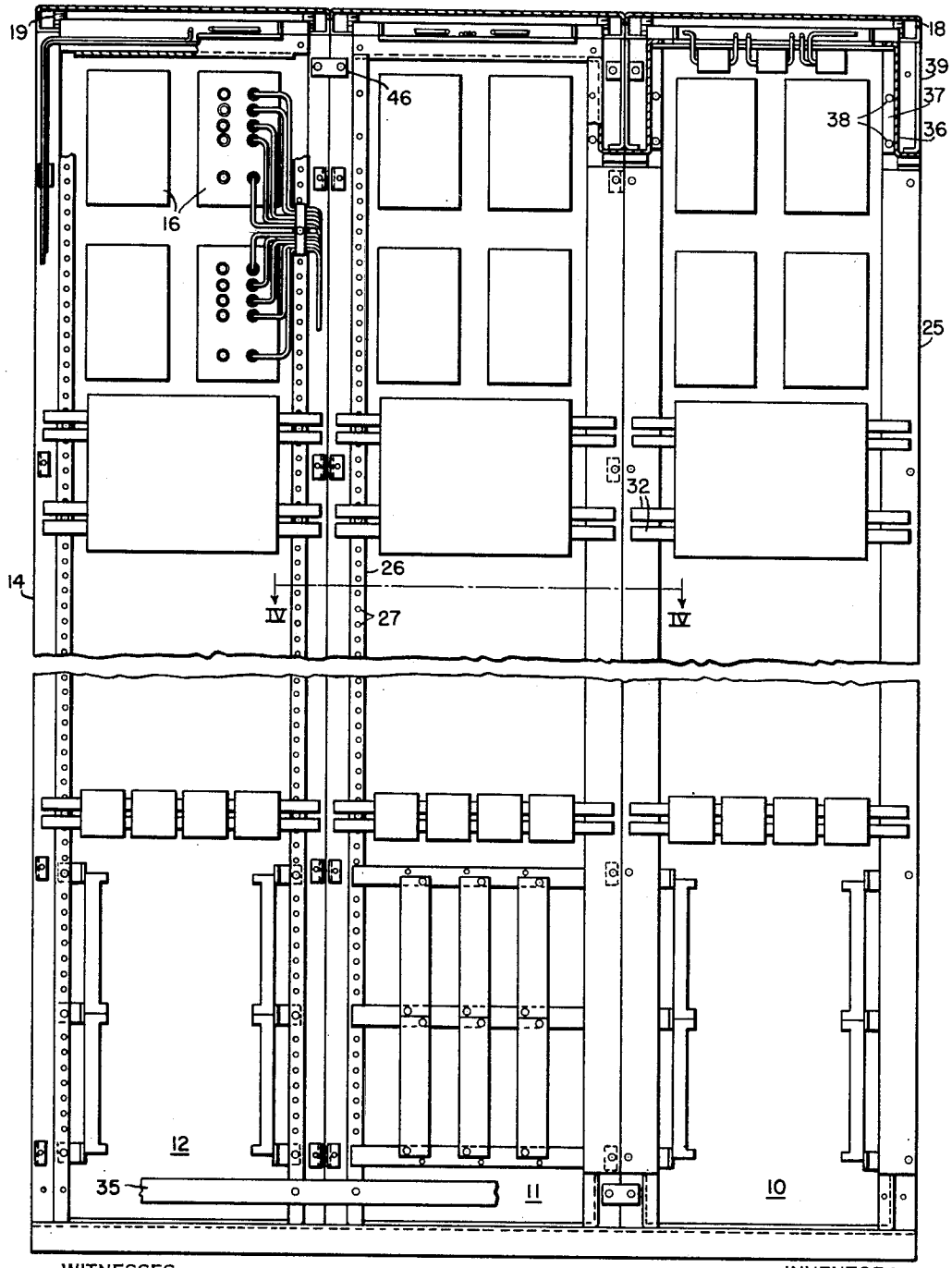


Fig. 2.

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SWITCHBOARD CONSTRUCTION

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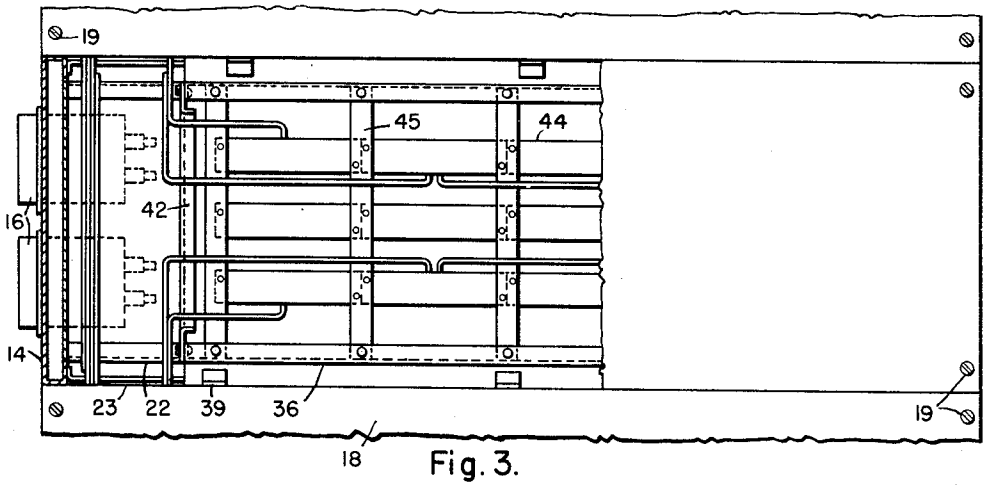


Fig. 3.

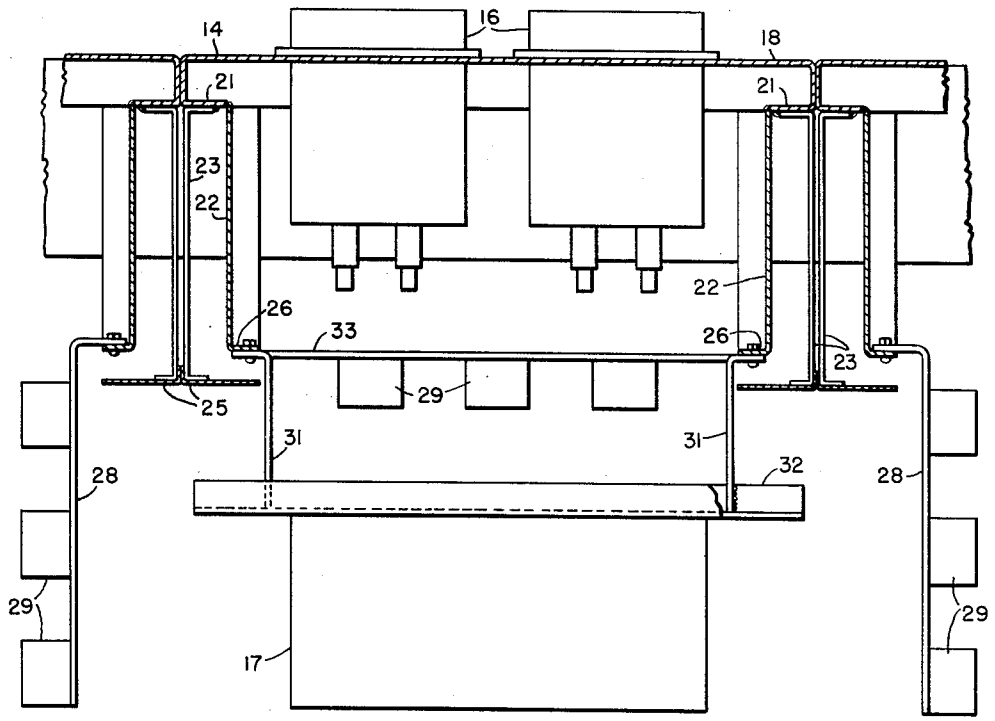


Fig. 4.

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Patented Apr. 22, 1952

2,593,975

UNITED STATES PATENT OFFICE

2,593,975

SWITCHBOARD CONSTRUCTION

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Application April 7, 1950, Serial No. 154,664

8 Claims. (Cl. 175—298)

1

Our invention relates, generally, to switchboards and, more particularly, to switchboards commonly known as duplex switchboards of the unit type.

Each unit of a duplex switchboard usually comprises two vertical panels which are disposed back-to-back and spaced apart sufficiently for workmen to enter the space between the front and the rear panels. Control switches, meters, relays and the like are usually mounted on the faces of the switchboard panels to be accessible from the front and the rear of the switchboard. Auxiliary apparatus, such as resistors, reactors, fuses, etc., is usually mounted at the rear of the panels to be accessible only by entering the space between the front and the rear panels. Such an arrangement necessarily requires a relatively large amount of wiring connections, as well as facilities for mounting the auxiliary apparatus.

An object of our invention, generally stated, is to provide a duplex switchboard which shall be simple and efficient in operation and which may be economically manufactured and installed.

A more specific object of our invention is to provide wiring troughs for the cross-panel and inter-panel wiring connections of a duplex switchboard.

Another object of our invention is to provide for readily attaching mounting brackets for auxiliary apparatus to switchboard panels.

A further object of our invention is to provide for readily separating a duplex switchboard into sections for shipping purposes.

Other objects of our invention will be explained fully hereinafter or will be apparent to those skilled in the art.

In accordance with our invention, each unit of a multi-unit duplex switchboard is provided with vertically disposed troughs for the vertical wiring on each panel, horizontally disposed troughs for inter-panel wiring between the front and the rear panels of each unit, and additional horizontally disposed troughs for cross-panel wiring between units. Terminal blocks are mounted on the roof of each section for segregating sections into shipping units. All terminal blocks are accessible from inside the switchboard structure.

For a better understanding of the nature and objects of the invention, reference may be had to the following detailed description, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a view, partly in end elevation and partly in section, of a switchboard structure embodying the principal features of the invention;

Fig. 2 is a view, partly in rear elevation and partly in section of a portion of the switchboard structure, the section being taken along the line II—II of Fig. 1, portions being broken away for clearness;

Fig. 3 is a view, in plan, of Fig. 1, portions being broken away for clearance, and

2

Fig. 4 is an enlarged view, in section, taken along the line IV—IV of Fig. 2.

Referring to the drawings, and particularly to Fig. 2, the structure shown therein comprises three switchboard units 10, 11 and 12 which are of the duplex type. As shown more clearly in Fig. 1, each unit comprises two vertical panels 13 and 14 which are disposed back-to-back in spaced relation. The panels 13 and 14 are preferably composed of sheet steel and they may be supported on channel-shaped bases 15.

Switchboard apparatus of the usual type, such as meters or relays 16, may be mounted on the panels. Also, control switches and other control apparatus (not shown) may be mounted on the panels. It is the usual practice in the construction of duplex switchboards to mount apparatus of certain types on the front panels where it is most readily accessible and other apparatus on the rear panels of the duplex units.

As shown, the meters or relays 16 are of the semi-flush mounted type having the cases or housings of the instruments extending a considerable distance to the rear of the switchboard panel. As shown in Fig. 1, the panels 13 and 14 are spaced a sufficient distance apart to permit a workman to enter the space between the panels, thereby having access to the rear terminals of the apparatus mounted on the fronts of the panels as well as to the auxiliary apparatus 17 mounted at the rear of the panels. A cover member 18 is provided for each unit and is attached to the tops of the panels by screws 19.

As explained hereinbefore, switchboards of the duplex type require a relatively large amount of wiring connections, some of which must extend between the apparatus mounted on the front and the rear panels of each unit and some of which extend between apparatus mounted on different units. Also, part of the apparatus must be connected to other apparatus which is located remotely from the switchboard structure.

In order to make these wiring connections in a satisfactory manner and to provide a structure which has a neat appearance when the wiring is completed, it is desirable to provide wiring troughs or gutters for the wiring connections. Such wiring troughs have been provided in the past, but in previous structures the troughs have been of such a design and they have been so located that it is difficult to make the wiring connections when the switchboard is originally built, and it is even more difficult to make any changes or additions to the wiring connections after the switchboard has been installed.

With a view to overcoming these difficulties we have provided wiring troughs of the type shown in the present structure. As shown most clearly in Fig. 4, the vertical edges of each panel 13 or 14 have rearwardly extending and inturned flanges 21. As described in the copending application of P. S. Graham and H. Kennedy,

Serial No. 154,648, filed April 7, 1950, vertical wiring troughs for the panel may be provided by securing a flanged member 22 to the flange 21 of the switchboard panel. Channel-shaped brackets 23 may be attached to the flanges 21 at spaced intervals as shown most clearly in Fig. 1. The brackets 23 are spaced from the members 22 to provide a vertically extending trough or gutter for vertically disposed wires 24 as shown in Fig. 1. Cover plates 25 may be attached to the brackets 23 and spaced from an inwardly turned flange 26 on the member 22, thereby providing space for the wires to be brought out of the wiring trough.

As shown most clearly in Fig. 2, the flange 26 of each trough member 22 is provided with a plurality of relatively closely spaced holes 27. These holes may be utilized for attaching brackets 28 which support terminal blocks 29 to which the wires in the vertical troughs may be connected in order to permit these wires to be electrically connected to apparatus mounted remotely from the switchboard structure. The holes 27 may also be utilized for attaching brackets 31 to which spaced angle bars 32 may be attached for supporting the auxiliary apparatus such as reactors or resistors 17. The ends of the bars 32 may extend beyond the brackets 31, thereby providing additional space on the bars for mounting apparatus. As shown in Fig. 1, a notch 30 may be provided in each bracket 31 to permit the heads of the bolts which attach the apparatus units to the bars 32 to slide past the brackets 31.

If desired, straps or bars 33 may extend from the flange 26 on the wiring trough at one edge of each of the panels to the flange 26 at the other edge of the panel and may be utilized to support additional terminal blocks 29. Also, as shown in Figs. 1 and 2, fuse blocks 34 may be mounted on angle bars 32, which are attached to brackets 31 which, in turn, are bolted to the flanges 26 of the vertical wiring troughs. Thus, the vertical troughs provide space for the vertical wires and also support terminal blocks and auxiliary apparatus. As shown in Figs. 1 and 2, a ground bus 35 may also be attached to the flanges 26 near the bottom of the panels.

As shown most clearly in Figs. 1 and 2, a horizontally disposed wiring trough 36 is provided at each edge of each vertical panel. The trough 36 is of a Z-shaped cross-section, and is provided with a flange 37 at each end which may be attached to the flange 26 on the vertical wiring gutter by bolts 38, thereby supporting the horizontal trough. L-shaped brackets 39 may be attached to the trough 36 at spaced intervals to retain the wires in the horizontal trough.

As shown most clearly in Figs. 1 and 3, the members 22 and 36 of the vertical and the horizontal troughs, respectively, are disposed in the same vertical plane, thereby permitting the wires 24 to enter the horizontal trough from the vertical trough by merely bending the wires at right angles. Thus, inter-panel connections between the front and the rear panels of each unit may be readily made.

As also shown most clearly in Figs. 1 and 3, a horizontally disposed trough member 41 extends between the two vertical troughs for each panel. The trough 41 is generally of a channel-shape having a portion of one leg bent outwardly to form a horizontal flange 42. The trough 41 may be supported by attaching one leg to the flange 37 of the horizontal trough 36 by bolts 43. If desired, the other leg of the trough 41 may be welded to the top of the vertical panel 14 or 13, as the case may be.

As shown most clearly in Fig. 1, the vertical trough member 22, the horizontal trough member 36 and the horizontal trough member 41 have a common intersection at the edge of the vertical panel, thereby making it possible for vertical wires 24 to enter either the horizontal trough 36 or the horizontal trough 41. The wires which enter the horizontal trough 41 may extend into the horizontal trough for the adjacent panel or they may be brought out of the horizontal trough 41 across the flange 42 and connected to terminal blocks 44 which are supported by bars 45 which are attached to the horizontal troughs 36.

The terminal blocks 44 may be utilized for so making the connections between units of the switchboard that it may be readily divided into sections suitable for shipping purposes. Thus, assuming that three units may be shipped as a section, the terminal blocks 44 may be utilized for making the connections between adjacent sections when the switchboard is installed after being shipped to the point of installation.

As shown, the terminal blocks 44 are disposed underneath the cover 18 to be accessible from the space between the vertical panels. In fact, all terminal blocks and wiring connections are accessible from the space between the vertical panels. As shown in Fig. 2, adjacent panels may be tied together by connecting bars 46. These may be readily removed where it is desired to separate the panels for shipping purposes.

From the foregoing description, it is apparent that we have provided a duplex switchboard structure which may be readily assembled and wired in a neat and orderly manner. The wiring troughs for the vertical and horizontal wires are so constructed that the wires may be easily installed in the troughs. Furthermore, the wires, as well as all of the terminal blocks to which the wires are connected, are readily accessible from the space between the vertical panels of the duplex units, thereby making it easy to inspect the wiring or to make changes or additions to the wiring. The switchboard is so constructed that it may be readily divided into sections containing any desired number of units for shipping purposes.

Since numerous changes may be made in the above described construction and different embodiments of the invention may be made without departing from the spirit and scope thereof, it is intended that all matter contained in the foregoing description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

We claim as our invention:

1. In a switchboard structure, in combination, a vertical panel having rearwardly extending flanges at its vertical edges, vertical wiring troughs secured to said flanges, in-turned flanges on said troughs, said in-turned flanges having a plurality of holes therein, oppositely disposed mounting brackets attached to said in-turned flanges at said holes, each mounting bracket having a notch in one end, pairs of spaced horizontally disposed bars secured to said mounting brackets, the ends of said bars extending beyond the mounting brackets, apparatus units supported by said bars, and bolts for attaching said units to said bars, the heads of said bolts being slid-

able along said bars through said notches in the mounting brackets.

2. In a duplex switchboard unit, in combination, two vertical panels disposed back-to-back in spaced relation, each panel having a rearwardly extending flange at each one of its vertical edges, a vertically disposed rearwardly extending wiring trough on each panel flange, horizontally disposed wiring troughs extending between oppositely disposed panels at the tops of the vertical troughs, the lower edge of a horizontal trough and the rear edges of oppositely disposed vertical troughs meeting and said vertical and horizontal troughs having sides in the same vertical plane providing a continuous passageway for wires running in said troughs between said panels, horizontally disposed bars extending between the tops of the horizontally disposed troughs, and terminal blocks attached to said bars, said terminal blocks being above the lower edges of the horizontal troughs and accessible from the space between the vertical panels.

3. In a duplex switchboard unit, in combination, two vertical panels disposed back-to-back in spaced relation, each panel having a rearwardly extending flange at each one of its vertical edges, a vertically disposed rearwardly extending flanged wiring trough on each panel flange, horizontally disposed wiring troughs extending between oppositely disposed panels at the tops of the vertical troughs and attached to the flanges on the vertical troughs, the lower edge of a horizontal trough and the rear edges of oppositely disposed vertical troughs meeting and said vertical and horizontal troughs having sides in the same vertical plane providing a continuous passageway for wires running in said troughs between said panels, horizontally disposed bars extending between the horizontally disposed troughs, and terminal blocks supported by said bars, said terminal blocks being accessible from the space between the vertical panels.

4. In a duplex switchboard unit, in combination, two vertical panels disposed back-to-back in spaced relation, each panel having a rearwardly extending flange at each one of its vertical edges, a vertically disposed rearwardly extending flanged wiring trough on each panel flange, horizontally disposed wiring troughs extending between oppositely disposed panels at the tops of the vertical troughs and attached to the flanges on the vertical troughs, the lower edge of a horizontal trough and the rear edges of oppositely disposed vertical troughs meeting and said vertical and horizontal troughs having sides in the same vetrical plane providing a continuous passageway for wires running in said troughs between said panels, horizontally disposed bars extending between the horizontally disposed troughs, terminal blocks attached to the bottom side of said bars, and additional terminal blocks supported by the vertical troughs, all of said terminal blocks being accessible from the space between the vertical panels.

5. In a duplex switchboard unit, in combination, two vertical panels disposed back-to-back in spaced relation, vertical wiring troughs disposed at the vertical edges of each panel and terminating in spaced relation from the top of the panel, a horizontal wiring trough extending between the tops of the vertical troughs on the same panel and terminating at the tops of the vertical troughs, and additional horizontal wiring troughs extending between oppositely disposed panels at the tops of the vertical troughs, the

vertical trough and the horizontal troughs at one side of each panel having a common meeting point at the top of the vertical trough providing continuous passageways through said troughs for wires.

6. In a duplex switchboard unit, in combination, two vertical panels disposed back-to-back in spaced relation, vertical wiring troughs disposed at the vertical edges of each panel and terminating below the top of the panel, a horizontal wiring trough extending between the tops of the vertical troughs on the same panel and terminating at the tops of the vertical troughs, additional horizontal wiring troughs extending between oppositely disposed panels at the tops of the vertical troughs, the vertical trough and the horizontal troughs at one side of each panel having a common meeting point at the top of the vertical trough providing continuous passageways through said troughs for wires, and terminal blocks supported by said wiring troughs, said terminal blocks being accessible from the space between the vertical panels.

7. In a duplex switchboard, in combination, a plurality of units each comprising two vertical panels disposed back-to-back in spaced relation, vertical wiring troughs secured to the panels at their vertical edges and terminating below the tops of the panels, horizontal wiring troughs extending between oppositely disposed panels at the tops of the vertical troughs and attached to said vertical troughs, said vertical and horizontal troughs having sides in the same vertical plane providing continuous passageways for wires running in said troughs between panels, and additional horizontal troughs extending between the tops of the vertical troughs on the same side of the switchboard providing a wire gutter between units, all of said troughs being accessible from the space between the vertical panels.

8. In a duplex switchboard, in combination, a plurality of units each comprising two vertical panels disposed back-to-back in spaced relation, vertical wiring troughs secured to the panels at their vertical edges and terminating below the tops of the panels, horizontal wiring troughs extending between oppositely disposed panels at the tops of the vertical troughs and attached to said vertical troughs, said vertical and horizontal troughs having sides in the same vertical plane providing continuous passageways for wires running in said troughs between panels, additional horizontal troughs extending between the tops of the vertical troughs on the same side of the switchboard providing a wire gutter between units, all of said troughs being accessible from the space between the vertical panels, and terminal blocks mounted at the top of the switchboard, said horizontal troughs having flanged edges over which wires run to said terminal blocks.

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