

May 3, 1927.

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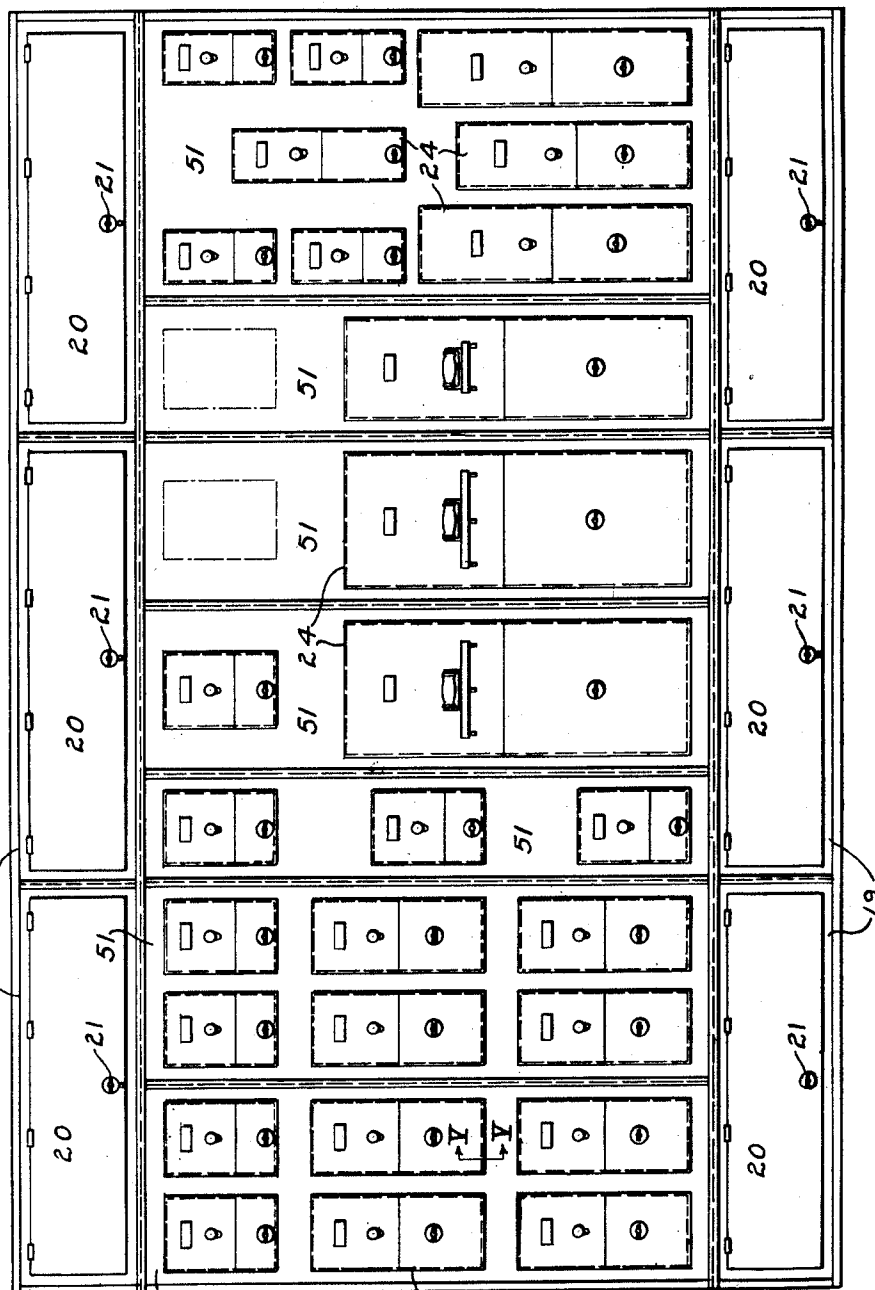
W. G. BALPH

SWITCHBOARD

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4 Sheets-Sheet 1

Fig. 1.



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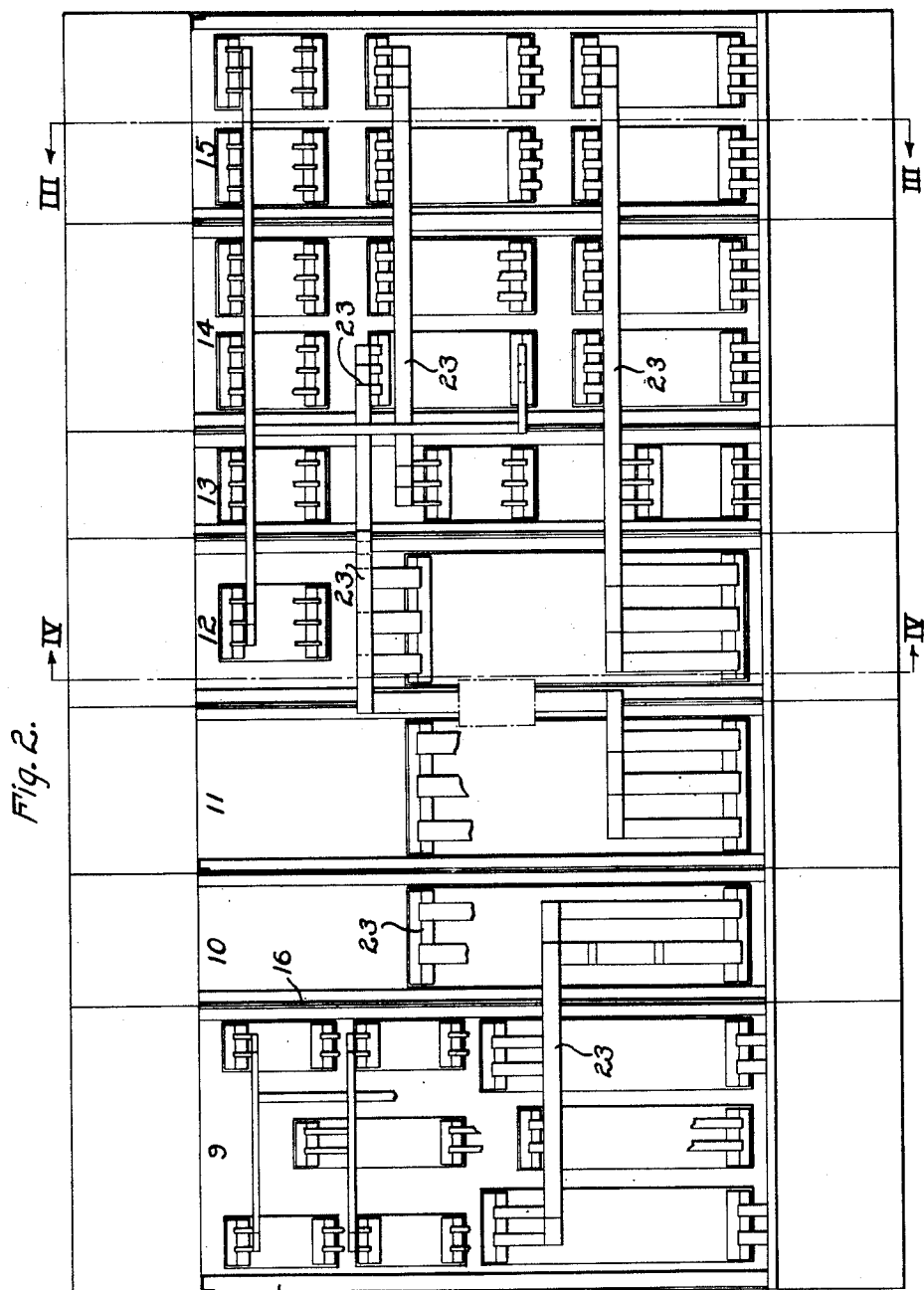
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Fig. 3.

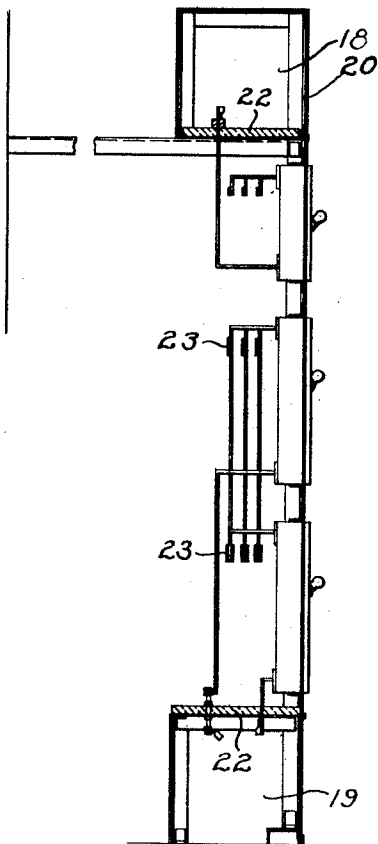


Fig. 4.

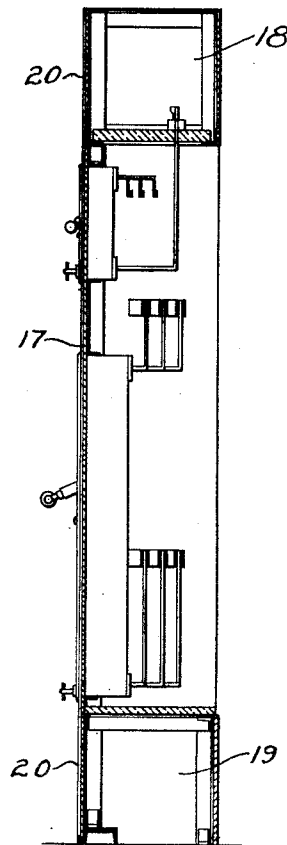
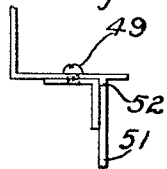


Fig. 5.



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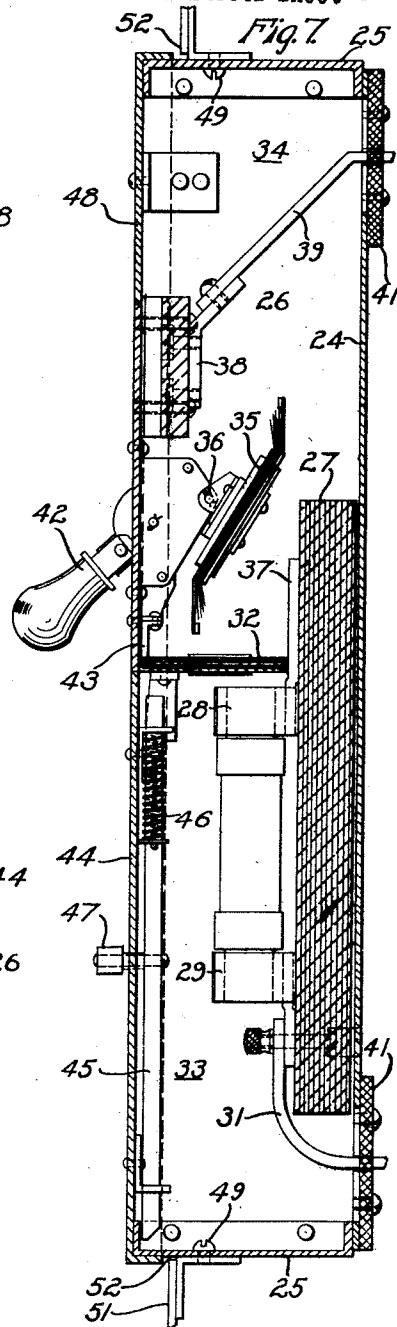
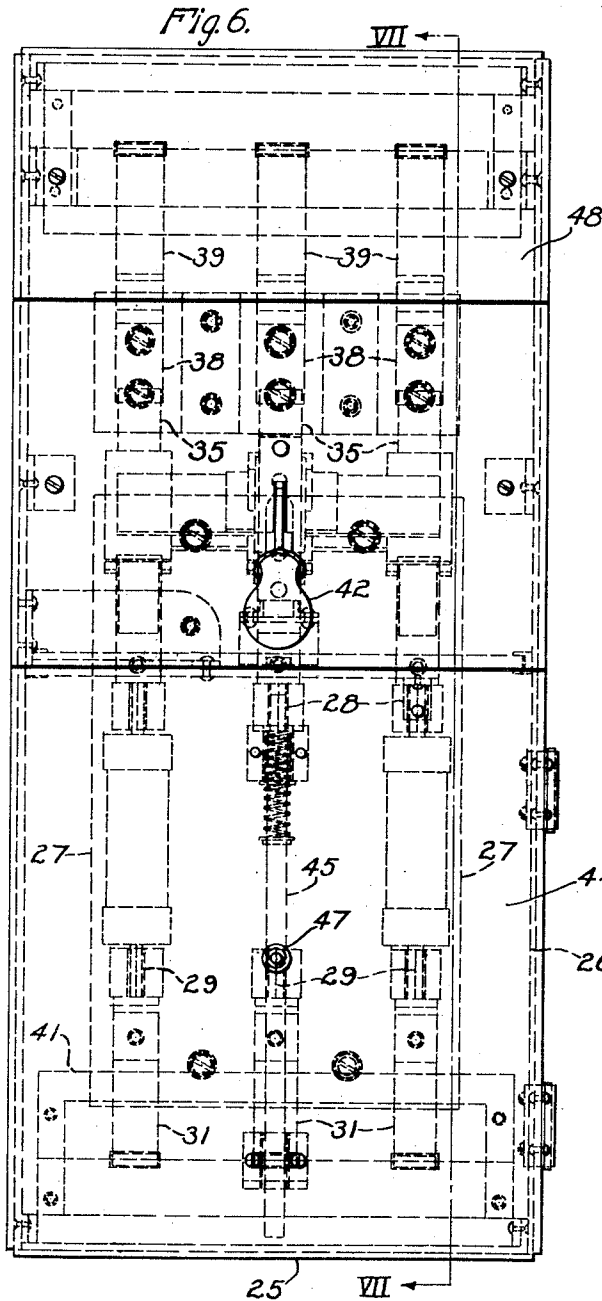
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SWITCHBOARD

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

WILMER G. RALPH, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO WESTINGHOUSE
ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

SWITCHBOARD.

Application filed February 26, 1921. Serial No. 448,106.

My invention relates to switch boards and particularly to dead-front switch boards.

One object of my invention is to provide a dead-front switch board wherein a plurality of completely enclosed safety switch boxes or units are assembled upon a supporting structure in convenient positions and wherein the space between the boxes is closed by a front plate for precluding access to the rear of the board from the front thereof.

Another object of my invention is to provide a dead-front switch board, wherein the supporting structure is built up of standard commercial shapes that are assembled into panels of various sizes for the purpose of accommodating a variety of combinations of switch-box units. Any number of panels may be arranged side by side and secured together to constitute a switch board for supporting any desired number of switch units.

Another object of my invention is to provide a dead-front switch board, having the above characteristics, wherein front plates are provided for each panel section and having insert openings within which various combinations of switch units may be inserted in such a manner as to substantially close the insert openings.

Another object of my invention is to provide a switch board, wherein the pull boxes are mounted at the top and bottom of the supporting structure and wherein the bus bars are disposed at the rear of the supporting structure and between the pull boxes in such positions that the terminals of the switch units may be readily attached thereto or disconnected therefrom.

Another object of my invention is to provide switch units with flat conductors that extend through the enclosing boxes and which may be attached in an orderly arrangement to their respective bus bars by means of screws.

Another object of my invention is to provide a dead-front switch board, wherein complete safety switch boxes of standard, commercial construction, having fuse compartments closed by doors that are interlocked with the switch, may readily be mounted upon the supporting structure to

thereby constitute a dead-front switch board wherein the fuses are accessible only when their respective switches are in open position.

A further object of my invention is to provide a switch-board structure wherein the switch boxes are secured to the frame by means of screws or other attaching means that are accessible from the front of the board when the box covers are removed.

These and other objects, that will be made apparent throughout the further description of the invention, are attained by means of the switch-board structure hereinafter described and illustrated in the accompanying drawings, wherein:

Figure 1 is a front view of the dead-front switch board;

Fig. 2 is a rear view of the switch board shown in Fig. 1;

Figs. 3 and 4 are vertical sections through the switch board taken on the line III—III and IV—IV, respectively, of Fig. 2;

Fig. 5 is a section of a detail of the construction taken on the line V—V of Fig. 1;

Fig. 6 is a plan view of a typical enclosed safety-switch unit used in the switch board; and

Fig. 7 is a longitudinal section through the typical switch unit, taken on the line VII—VII of Fig. 6.

Referring to the drawings, the switch board includes a supporting structure 8 which comprises a plurality of rectangular panels 9, 10, 11, 12, 13, 14 and 15, each panel consisting of vertical standards 16 made of angle iron and connected, at their ends and at intermediate points, by means of horizontal bars 17 that are also made of angle iron. In Fig. 2, which is a rear view of the switch-board structure, the angle irons 17 are omitted for the purpose of avoiding confusion.

Each panel is so constructed as to accommodate boxes of predetermined design, and the horizontal bars 17 are, therefore, so spaced that the switch-box unit, to be hereinafter described, may be inserted between them and be supported thereby.

Pull boxes 18 and 19 are disposed respectively at the top and bottom of the supporting structure. As shown, these boxes are built in sections and extend along two or

more panel sections. These boxes are for the purpose of receiving the various branch-line terminals which may enter the boxes at the rear thereof. Each pull box is provided with an open front which is closed by means of doors 20 that are hinged at their upper horizontal edges and which are provided with latch handles 21.

The adjacent sides 22 of the pull boxes are made of slate or other insulating material and serve to support the bus-bar terminals and connections to which the line terminals are connected.

Horizontal bus bars 23 are arranged in parallel relation at the rear of the supporting structure and are disposed in the space between the pull boxes. These bars may be supported upon the frame structure in any suitable manner.

As shown in Fig. 1, a variety of switch-box units, having various capacities, are mounted upon the frame structure, a variety of combination of boxes being mounted on different panels. A typical form of switch box is illustrated in Figs. 6 and 7. The switch box and enclosed mechanism is fully described in a copending application Serial No. 567,322, filed June 10, 1922, by Hubert K. Krantz, now Patent No. 1,551,315 and assigned to the Westinghouse Electric & Manufacturing Company, and are of standard commercial design.

As illustrated in Figs. 6 and 7, each box includes a housing 24, end walls 25 and side walls 26. A fuse panel 27, that is made of insulating material, is secured to the bottom of the housing and supports the fuse-clip terminals 28 and 29, the latter of which is connected to a branch-line terminal 31 which consists of a flat metal bar which extends through the bottom of the housing and which may be connected to its respective branch-line bus bar at the rear of the switch board.

A baffle wall or barrier 32 divides the housing into a fuse compartment 33 and a switch compartment 34. The switch mechanism consists of three switch members 35 of the brush type which are so pivoted upon a shaft 36 that they may swing into and out of engagement with contacts 37, which are connected to the fuse clip 28, and the main-line contacts 38 that are mounted upon the housing adjacent the outer face thereof. The contacts 38 are connected to their respective bus bars by means of flat conductor strips 39 that extend through the bottom of the housing. The conductor strips 31 and 39 are insulated from the housing by means of perforated insulating plates 41 that are attached to the exterior of the bottom 24.

The switch blades 35 are actuated by means of an operating handle 42, by means of mechanism illustrated in the above-mentioned copending application. The plunger

43 is connected to the handle 42, and, when the switch is moved to closed position, the plunger 43 is advanced into the fuse compartment to constitute a switch interlock with the fuse-door latch to be hereinafter described.

The fuse compartment 33 is closed by means of a door 44 that is hinged to the side of the housing. The door is normally held in closed position by means of a latch bar 45 that is normally held in latched position by a spring 46. The bar is actuated by means of a handle 47 that extends through a slot in the door.

When the switch is in closed position, the plunger 43 prevents unlatching movement of the bar 45, and, consequently, access to the fuse compartment is precluded so long as the switch is in closed position. When the switch is in open position, the plunger 43 is withdrawn to the position illustrated in Fig. 7 and, therefore, the latch bar 45 may be moved to releasing position. The switch chamber 34 is closed by means of a detachable cover 48 which may be removed for the purpose of inspecting the switch mechanism.

In assembling a switch unit upon the supporting structure, the box is inserted between the proper horizontal bars 17 and is secured thereto by means of screws 49 in the manner illustrated in Figs. 5 and 7. The screws 49 are accessible from the front of the switch board when the detachable cover is removed and the fuse-compartment door is in open position.

The space surrounding the switch boxes or units and between the pull boxes is closed by means of plates 51. Each panel section is preferably provided with a separate plate having suitable insert openings 52 into which the switch boxes may be inserted. The boxes substantially close the openings in the plate and, therefore, access cannot be had to the rear of the switch board from the front thereof.

The combination of front plates and enclosed switch boxes constitutes a dead-front panel board in which standard commercial switch boxes are employed. The construction is neat in appearance and is comparatively inexpensive to manufacture. By reason of the arrangement of panels herein illustrated and described, it will be apparent that switch boards of any desired size may readily be assembled and any combinations of switches may be installed. As illustrated, switches for controlling both light and power circuits of different capacities are mounted upon the switch board.

While I have described and illustrated but one embodiment of my invention, it will be apparent to those skilled in the art that various modifications, changes, substitutions, additions and omissions may be made in the

apparatus illustrated without departing from the spirit and scope of the invention, as set forth in the appended claims.

I claim as my invention:—

5 1. A switch board comprising a supporting structure, bus bars supported thereon and spaced therefrom, a plate covering the structure for precluding access to the bus bars from the front of the board and having
10 an insert opening therein, and a box for enclosing fixtures and inserted within, and substantially closing, the opening and having a bottom disposed between the bus bars and the said plate.

15 2. A switch board comprising a supporting structure, a plurality of separate front plates mounted thereon for precluding access to the rear of the board from the front thereof, each plate having an insert opening
20 therein, and boxes for enclosing electrical fixtures and inserted within and substantially closing the openings.

3. A switch board comprising a supporting structure, a pair of pull boxes mounted
25 in spaced relation upon the structure, a front plate closing the space between the boxes for precluding access to the back of the board from the front thereof and having an insert opening therein, and a box for enclosing electrical fixtures and inserted within,
30 and substantially closing, the opening.

4. A switch board comprising a supporting structure, a pair of pull boxes mounted in spaced relation upon the structure and

each having an opening in the front wall 35 thereof, a door for closing the opening in each pull box, a front plate for closing the space between the boxes to preclude access to the back of the board from the front thereof and having an insert opening therein, 40 and a box for enclosing electrical fixtures and inserted within, and substantially closing, the said opening.

5. A switch board comprising a supporting structure, a pair of pull boxes mounted 45 in spaced relation upon the structure, bus bars disposed between the adjacent walls of the pull boxes, a front plate for closing the space between the pull boxes to preclude access to the bus bars from the front of the 50 board and having an insert opening therein, and a box for enclosing electrical fixtures and inserted within, and substantially closing, the said opening.

6. A dead-front switch board comprising 55 a pair of oppositely disposed pull boxes having doors, the uppermost door being hinged at its upper horizontal edge, a front plate disposed between the pull boxes for precluding access to the rear of the board 60 from the front thereof, and a box for enclosing electrical fixtures and having a door hinged at one of the vertical edges of the box.

In testimony whereof, I have hereunto 65 subscribed my name, this first day of February, 1921.

WILMER G. BALPH.