Dec. 21, 1937. W. H. FRANK ET AL 2,103,069

PANEL BOARD AND PARTS THEREOF

Filed Dec. 26, 1935 4 Sheets-Sheet 1

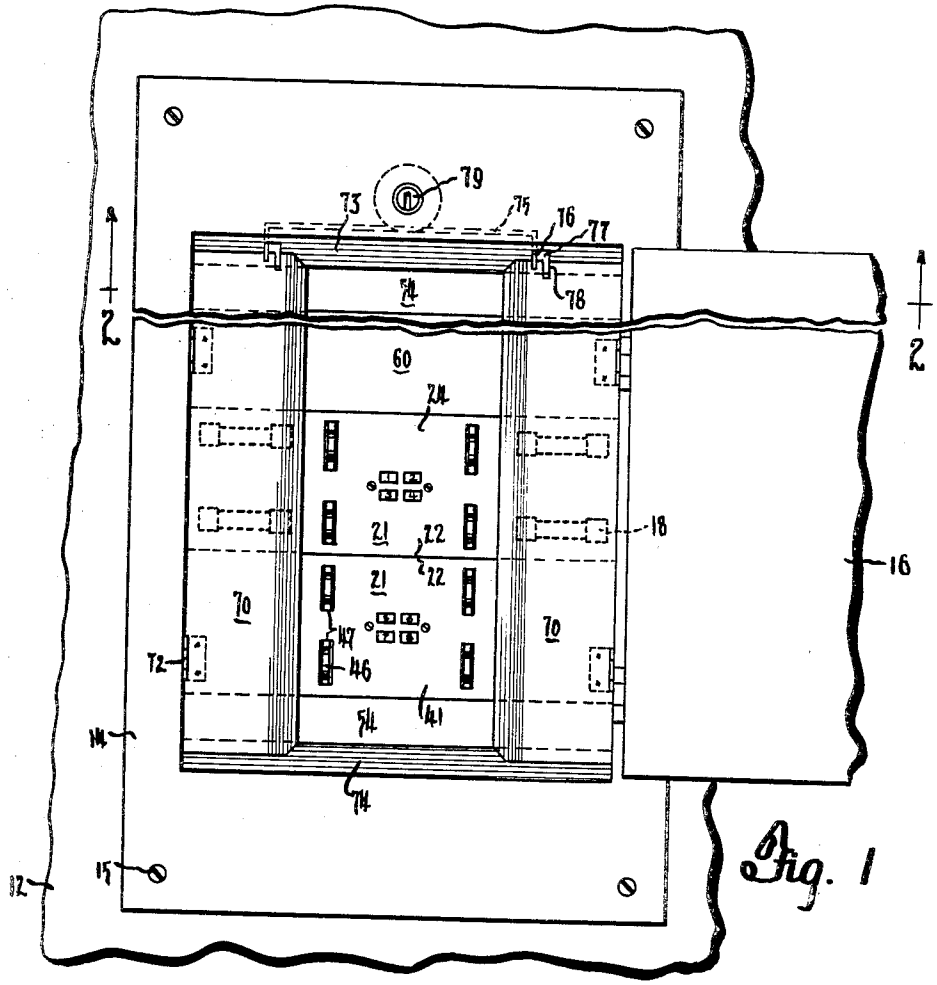


Fig. 1

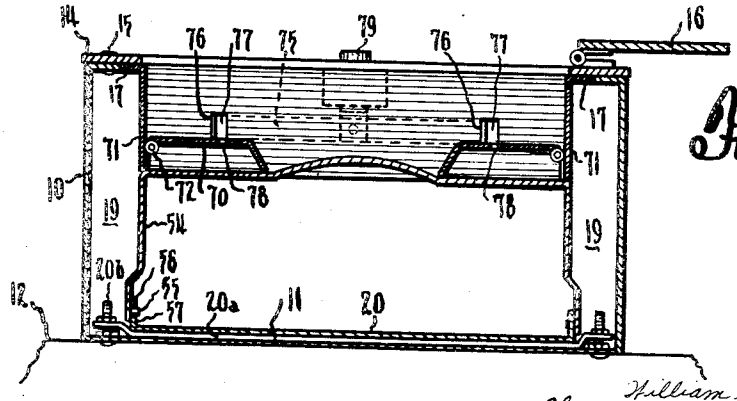


Fig. 2

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PANEL BOARD AND PARTS THEREOF

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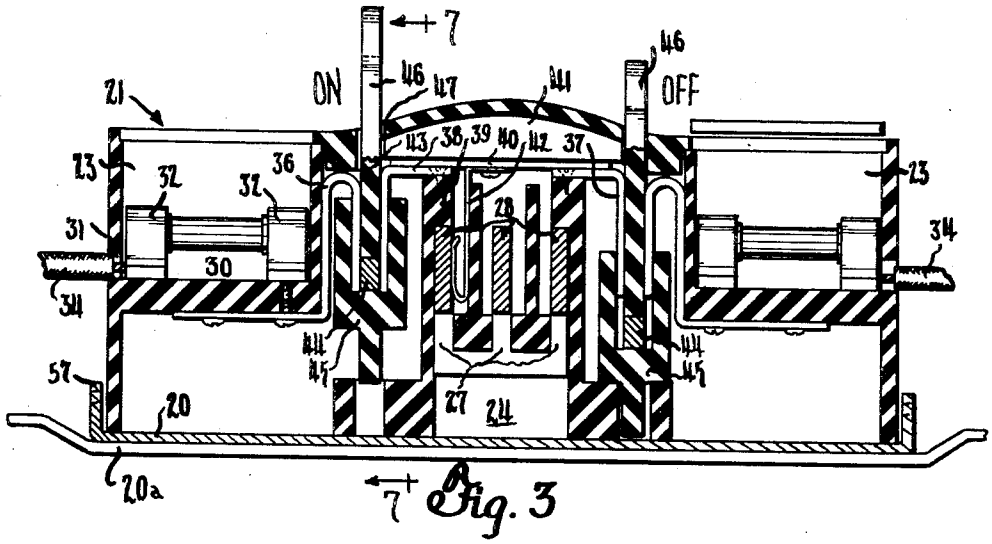


Fig. 3

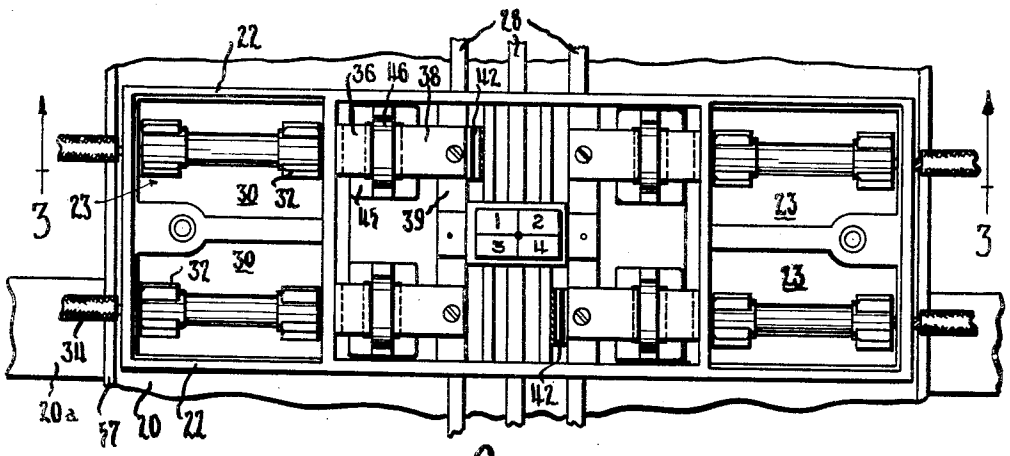


Fig. 4

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PANEL BOARD AND PARTS THEREOF

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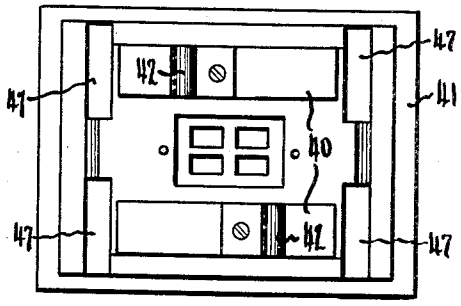


Fig. 5

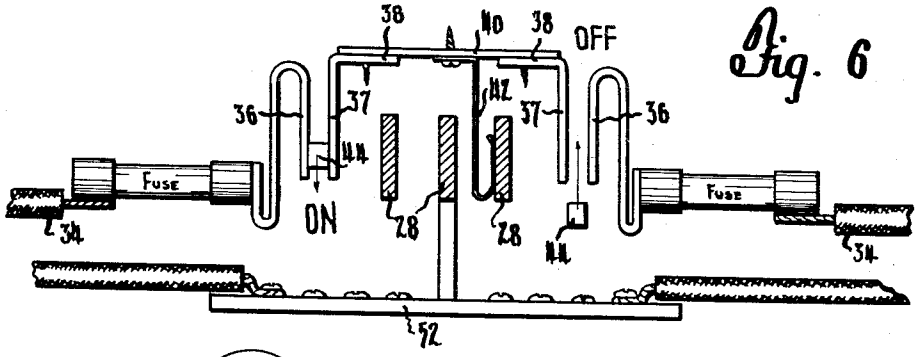


Fig. 6

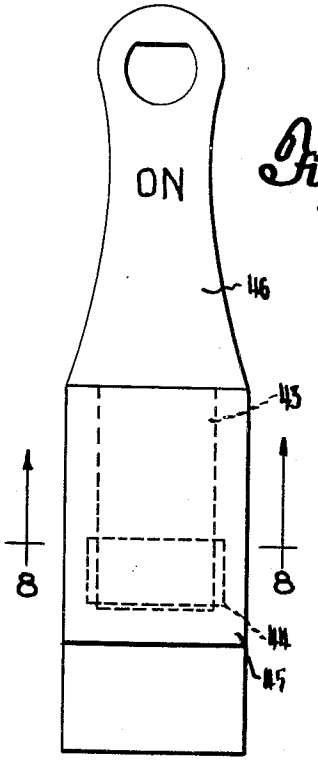


Fig. 7

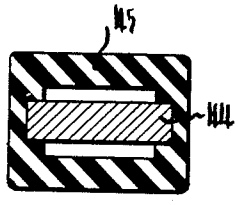


Fig. 8

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PANEL BOARD AND PARTS THEREOF

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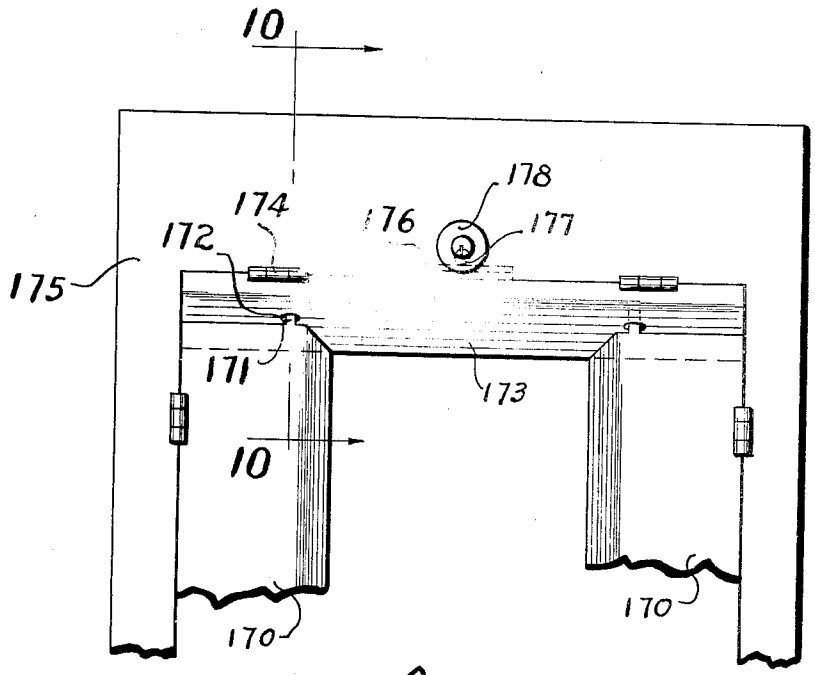


Fig. 9

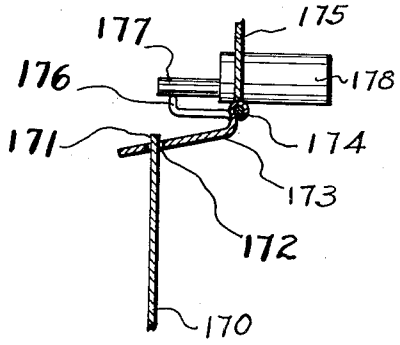


Fig. 10

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UNITED STATES PATENT OFFICE

2,103,069

PANEL BOARD AND PARTS THEREOF

William H. Frank, Clarence T. Hollingsworth, and Lawrence E. Fisher, Detroit, Mich.

Application December 26, 1935, Serial No. 56,227

4 Claims. (Cl. 247—10)

This application relates to distribution panels.

It is common practice in the art of panelboard construction to make the panel of units so that the panelboards are of the sectional type, and the panelboard here shown follows this practice. The panelboard here shown, however, differs from sectional panelboards heretofore known in features of construction of the units per se, in features of construction of the switches which form part of the units, in features of mountings for shielding plates and blank filler plates, in features of locking arrangements for the fuses of the units, and in other features of construction.

One feature of design is a novel construction for the units per se and particularly for the switches of the same. The units have on their backs slots receiving bus bars disposed edgewise therein and the units are provided with novel switching arrangements for connecting branch circuits to these bus bars. The switches of the units include stationary contacts and movable contacts carried by slides forming parts of housings terminating in handles projecting forwardly from the units and mere reciprocation of these housings manually accomplishes the desired switching operations.

Another feature of design is the novel arrangement for mounting shielding plates and blank filler plates. These plates, as here shown, are substantially U-shaped and the ends of the U are formed with tongues which cooperate with holes in upturned flanges of a mounting plate to hold these plates in place.

Still another feature of design is a novel fuse locking arrangement provided by fuse locking covers or inner doors hingedly mounted on a trim plate of the panel to cover the fuses thereof and adapted to be locked shut to debar access to the fuses or to be unlocked to expose the fuses, as desired.

Still further objects of the invention will readily occur to those skilled in the art upon reference to the following description and the accompanying drawings, in which,

Fig. 1 is a front elevation of a panelboard;

Fig. 2 is a section on line 2—2 of Fig. 1;

Fig. 3 is an enlarged section of a unit on line 3—3 of Fig. 4;

Fig. 4 is a front elevation of a unit, with the covers thereof removed;

Fig. 5 is a bottom plan view of a unit switch section cover;

Fig. 6 is a connection and switching diagram;

Fig. 7 is a section on line 7—7 of Fig. 3, showing a movable switching element;

Fig. 8 is a section on line 8—8 of Fig. 7;

Figs. 9 and 10 show a modified arrangement of fuse locking covers, in elevation, and in section on line 10—10, Fig. 9, respectively.

The panelboard

The panelboard here shown includes a sheet metal cabinet or tub 10 having its back wall 11 mounted against a surface 12 which supports the panelboard. The front of the cabinet is open but may be closed by a front cover or trim plate 14 secured thereto by screws 15 passing through corner lugs of the cabinet and the cover 14 supports a hingedly-mounted door 16 and a masking flange 17 cooperating with the panel 18 in the cabinet to conceal the wiring gutters 19 and the top and bottom and spaces between the panel and the walls of the cabinet. On the back of the cabinet is a mounting plate 20 supported by straps 20*a* and screws 20*b*, and against this plate and disposed one above the other are the units 21 which form the panel 18 of the panelboard.

The unit

Each unit 21 comprises a body composed of molded insulation or the like formed to provide top and bottom walls 22, end sections 23, and a central switch containing section 24 in whose back wall are rearwardly opening slots 27 extending from top to bottom of the unit; the slots 27 of adjacent units align to form continuous channels which run from the top to the bottom of the panel and in which are disposed edgewise the main bus bars 28.

The end blocks are formed with cavities 30 open to the front of the unit and these cavities are provided with entrance holes 31 opening to the adjacent end walls of the unit. In the cavities are fuse receivers 32 which may be in the form of socket shells or in the form of fuse clips, and the fuse receivers are equipped with wire connection screws by means of which branch circuit wires 34, disposed in the wiring gutters 19 and introduced into the cavities 30 through the entrance holes 31 thereof, may have their terminals physically and electrically connected to the fuse receivers.

The switches

For the fuse receivers there are stationary contacts 36 in the switch sections of the unit, and aligned with these contacts are other stationary contacts 37 terminating in lugs 38 in front of ledges 39 of the switch section of the unit. Aligned lugs 38 are bridged by bridging straps

40 formed on the cover 41 of the switch section, which bridge straps are equipped with resilient contact prongs 42 adapted to engage predetermined ones of the three bus bars 28 of the panel, with the result that proper ones of the contacts 37 are electrically connected to proper ones of the bus bars 28 when the switch section cover 41 is in place.

For electrically switching contacts 36 to contacts 37 and thus to connect the branch conductors to the supply bus bars, there are disposed between the pairs of contacts 36—37 insulation slides 43 having slugs 44 of conducting material. The slides are formed as parts of housings 45 which closely surround the contacts 36—37, with each of these contacts received in a cell between a slide 43 and its housing. When the housings are pulled towards the front of the unit, the slugs 44 thereof bridge the adjacent contacts 36—37 for establishing connections between the bus bars and the branch circuit conductors. On the other hand, when the housings are pushed rearwardly, by means of the handle portions 46 thereof which project through slots 47 of the switch section cover 41, the slugs are out of engagement with contacts 36—37 and the circuits controlled by such housings are open.

It will be observed that the mere act of placing the switch section cover 41 on the front of the unit electrically connects the switches to the bus bars and that mere removal of such cover, providing access to these switches, automatically disconnects these switches from the bus bars.

It will also be observed that the proper positioning of the contact prongs 42 on the cover 41 determines the selection of the bus bars 28 to be connected to the bridging straps of the cover 41 and to the branch circuit conductors controlled by such bridging straps and the switches connected to such straps.

Plate mounting

At the ends of the panel are live parts (not shown) and these are shielded, in accordance with good electrical practice, by means of U-shaped shields 54 in front of these live parts and held thereon by means of tongues 55 struck inwardly from the ends of such shields cooperating with notches 56 cut in the upturned and flanged margins 57 of the mounting plate 20 which is disposed between the units and the back of the cabinet, and which is secured to such back.

The arrangement herein described for mounting the shields 54 is also utilized for mounting blank filler plates 60 which are used to absorb spaces left for reserve units.

The blank filler plates and the shields are similar in contour not only to one another but also to the units which together with such shields and plates form the panel.

Fuse locks

If desired, means may be provided to conceal the fuses and debar access thereto so that they may not be removed or tampered with except by persons in authority, and the provision of such means is optional with the purchaser of the panelboard. The means herein shown comprises a pair of inner doors or plates 70 hingedly mounted at their edges on the flanges 71 of the masking plate 17, as by hinges 72, and these doors or plates extend from the top flange 73 to the bottom flange 74 of the masking plate and overlie the fuses of the units to debar access thereto.

For locking these doors in place there is provided at the upper end of the panel a locking bar 75 having downwardly bent terminals 76 projecting through slots 77 in the upper flange 73 of the masking plate. When the locking bar 75 is in such a position that its terminals register with notches 78 of the fuse locking doors 70, these latter may be swung forwardly to expose the fuses; on the other hand, when the locking bar 75 is so positioned that its terminals are out of registry with the notches 78 of the doors 70, these doors are held against being swung open and are maintained in fuse concealing position.

The locking bar 75 is operatively connected to a key operated lock 79 mounted in the front or trim plate 14 in a conventional manner so that rotation of the key, when the latter is in its lock, will move the locking bar into and out of its fuse cover locking position.

In the event the fuse covers are not to be used, not only will the fuse covers be omitted but also there would be omitted the slots 77 of the flange 73 of the masking plate 17, the locking bar 75, and the key controlled lock 79.

Another fuse locking cover arrangement is shown in Figs. 9 and 10. In this arrangement, the inner doors 170 have lugs 171 adapted to seat in notches 172 of a masking plate flange 173 which is hingedly mounted at 174 on a masking plate 175 and which is provided with a lug 176 adapted to be engaged by a pin 177 eccentrically disposed on a rotary lock barrel 178.

When the lock is released, the barrel 178 is rotated so that its pin 177 clears lug 176 to permit flange 173 to be moved away from the ends of the doors 170 and release them. Otherwise, the parts are held locked to debar access to the fuses.

We claim:

1. A panelboard comprising a panel having switches in a central stripe thereof and circuit protective means in side stripes thereof, a masking plate having a large opening exposing the panel with the edges of the opening adjacent edges of the panel, and means for covering the circuit protective stripes only comprising side cover plates within the masking plate opening and proportioned to extend over the circuit protective stripes only and movably mounted on side edges thereof, and a lock controlling said side cover plates only and accessible from in front of said masking plate.

2. A panelboard comprising a panel having switches in a central stripe thereof and circuit protective means in side stripes thereof, a masking plate having a large opening exposing the panel with the edges of the opening adjacent edges of the panel, and means for covering the circuit protective stripes only comprising side cover plates within the masking plate opening and proportioned to extend over the circuit protective stripes only, and movably mounted on side edges thereof, and a lock controlling said side cover plates only and accessible from in front of said masking plate through an opening thereof, and positioned behind the masking plate and above the upper edge of the masking plate opening and operating on the cover plates through means above and adjacent the upper edge of the panel.

3. A panelboard comprising a panel having switches in a central stripe thereof and circuit protective means in side stripes thereof, a masking plate having a large opening exposing the panel with the edges of the opening adjacent edges of the panel, and means for covering the circuit protective stripes only comprising side

cover plates within the masking plate opening and proportioned to extend over the circuit protective stripes only and movably mounted on side edges thereof, and a lock controlling said side cover plates only and accessible from in front of said masking plate through an opening thereof, and positioned behind the masking plate and above the upper edge of the masking plate opening and operating on the cover plates through means above and adjacent the upper edge of the panel, the last mentioned means including a sliding locking bar whose ends project downwardly through a flange of the masking plate at the upper edge of the opening thereof to overlie the upper ends of the side cover plates.

4. A panelboard comprising a panel having switches in a central stripe thereof and circuit protective means in side stripes thereof, a masking plate having a large opening exposing the panel with the edges of the opening adjacent edges of the panel, and means for covering the circuit protective stripes only comprising side cover plates within the masking plate opening and proportioned to extend over the circuit protective stripes only and movably mounted on side edges thereof, and a lock controlling said side cover plates only and accessible from in front of said masking plate through an opening thereof, and positioned behind the masking plate and above the upper edge of the masking plate opening and operating on the cover plates through means above and adjacent the upper edge of the panel, the last mentioned means including a movably mounted flange of the masking plate at the upper edge of the opening thereof.

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