Jan. 31, 1939. J. F. MERKEL 2,145,797

CABINET TYPE HOUSING FOR ELECTRICAL APPARATUS

Filed May 18, 1935

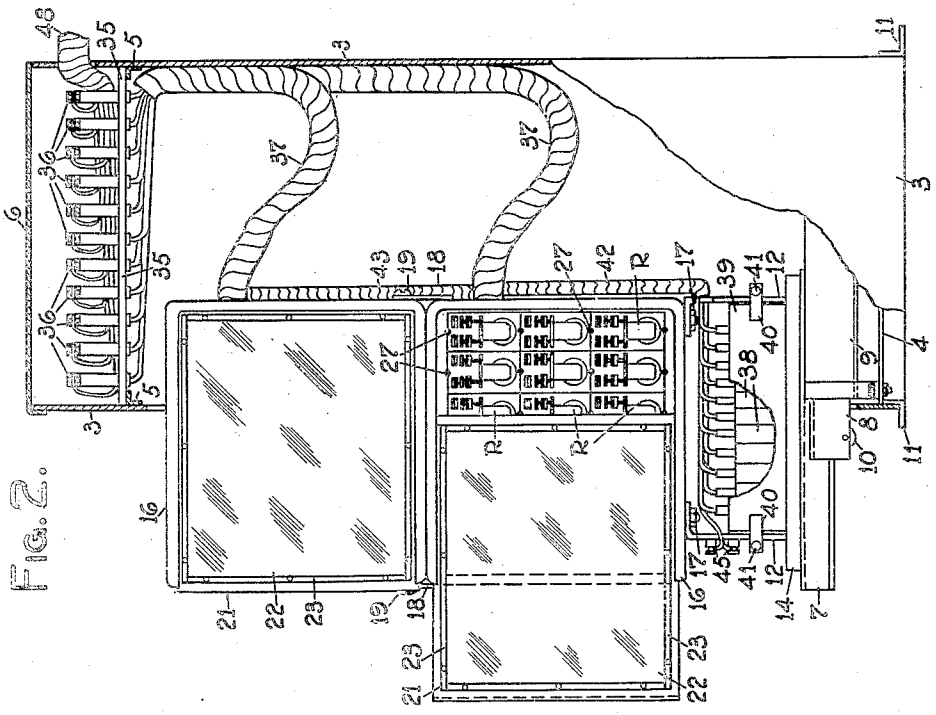


FIG. 2.

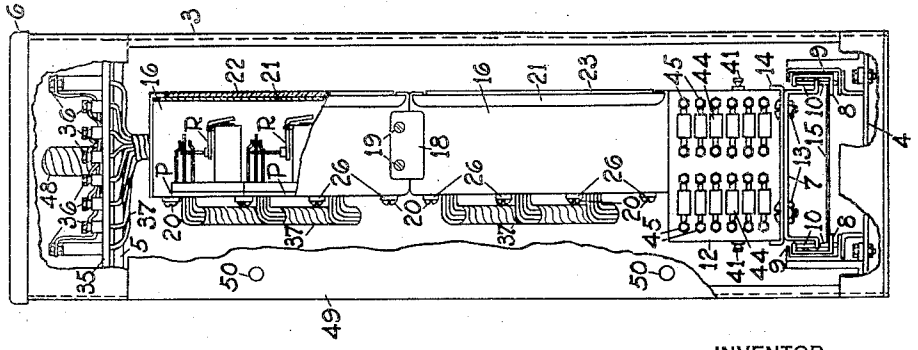


FIG. 1.

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Patented Jan. 31, 1939

2,145,797

UNITED STATES PATENT OFFICE

2,145,797

CABINET TYPE HOUSING FOR ELECTRICAL APPARATUS

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Application May 18, 1935, Serial No. 22,227

12 Claims. (Cl. 247—10)

This invention relates to housings for electrical devices, and more particularly to a means for mounting a large number of relays and associated devices such as are used in a railway centralized traffic controlling system.

In railway traffic controlling systems and particularly in the coded type of such systems, a large number of relays is required at the central control office and at various field stations along the railway system. The present practice in mounting these relays is to provide permanently mounted vertical insulating panels having wire terminals on one side and plug connecting means on the other side co-acting with associated connecting means on each relay whereby the relay may be conveniently installed and removed for tests or replacement purposes without disturbing the wire connections to the terminals on the other side of the panels. In housing the relays thus mounted, it is of course necessary to permit access to the rear of the vertical insulating panels for making and repairing the wire connections and also to permit access to the front of the panels for inspecting or replacing the relays. Consequently it is found in a centralized traffic controlling system that the large number of relays and allied electrical devices necessitates a housing floor space which is not practical to provide at the various locations along the railway system.

In view of the above and other considerations, it is proposed in accordance with the present invention to provide a means for mounting electrical apparatus in a railway centralized traffic controlling system or the like wherein a large number of relays and allied devices can be arranged in a small housing space and yet permit convenient access to both the front and rear of the relays thus mounted. It is also proposed to provide an economical means for excluding dust, dirt and other injurious substances which may be present within the housing from the relays thus mounted, yet permitting inspection and convenient replacement of the relays.

Other objects, purposes and characteristic features of the present invention will be apparent as the description thereof progresses, during which reference will be made to the accompanying drawing, in which:—

Fig. 1 is a front elevational view of one section of a mounting means for electrical apparatus arranged in accordance with the present invention and having certain parts broken away to more clearly show the construction thereof.

Fig. 2 is a side elevational view of the arrangement shown in Fig. 1 also having certain parts broken away.

The single section of the relay mounting means illustrated in the drawing comprises a four-sided vertical cabinet formed from sheet metal pieces 3 so that the back and both sides form a complete inclosure while the center portion of the front is left open as shown in Fig. 1. A bottom for the cabinet thus formed is provided by a sheet metal piece 4 having the side portions thereof bent downwardly and suitably attached to the vertical sheet metal pieces 3, while a removable top is formed by a sheet metal piece 6 having its edges bent downwardly to fit over the sides of the pieces 3. Two pieces of angle iron 11, one at the front and one at the rear, are suitably attached to the bottom of the vertical cabinet such as by bolts passing through the angle iron pieces 11, through the sheet metal sides 3 and through the bottom member 4, which angle iron pieces 11 form a convenient means of attaching the vertical cabinet to the floor of the inclosure.

A channel shaped base member 7 having its lower edges bent outwardly is slidably mounted in the bottom of the cabinet thus formed, whereby the base 7 is arranged to slide longitudinally in and out of the cabinet by a telescoping guide arrangement provided by two intermediate channel members 8 connected by a cross member 15 and two fixed channels 9. The specific arrangement of this telescoping slide arrangement may be of the well known type such as used to mount the drawers in filing cabinets, or as may be seen in Fig. 2, the intermediate channel members 8 are arranged on rollers 10 to move longitudinally relative to both the base 7 and the fixed guides 9. In this manner, when the base 7 is fully withdrawn from the cabinet, the intermediate channel members 8 are withdrawn one half this distance from the cabinet so that the base 7 is rigidly supported when withdrawn from a housing of substantially equal length.

The base 7 carries front and rear end brackets 12 attached thereto by bolts 13 with upturned retaining strips 14 clamped therebetween for a purpose to be later described. Two substantially square sheet metal frames 16 are placed one above the other on the vertical brackets 12, the lower frame 16 being attached to the brackets 12 by bolts 17, while the upper frame 16 is attached by bolts 19 to holding strips 18 suitably attached to the lower frame 16 by spot welding or the like.

The upper, lower and rear edges of the frames 16 are bent inwardly at right angles thereto and

a metal window frame 21 is retained by these edges with a means for urging the frames 21 outwardly against these edges, such as a spring metal strip (not shown). The frames 21 are covered with a pane of glass 22 or other transparent material which is retained by strips 23 held around the edges thereof by rivets or the like. The window frame 21 of the lower frame member 16 is illustrated in a partly opened position, and it is obvious that these windows may be entirely withdrawn from the frame member 16 and when closed, a front inwardly extending edge of the window frames 21 overlaps the front edge of the frame 16 to provide a substantially air-tight inclosure for one side thereof.

The other side of the frame members 16, the left side, carries spaced horizontal bars 26 attached thereto by screws 20, and these bars 26 carry small rectangular insulated panels P by screws 27 threaded into the cross bars 26 so that enlarged heads thereof hold the upper end of one panel P and the lower end of an upper adjacent panel P. These panels P are a part of a quick detachable relay arrangement such as shown in the prior application of J. F. Merkel, Ser. No. 608,037 filed April 28, 1932, that is, the panels P are permanently mounted on the cross bars 26 and are provided with wire terminals which are plug connected to associated relays R which may be conveniently removed therefrom.

It is now obvious that the relays R associated with these permanently mounted insulating panels P may be conveniently installed or removed from the right hand side of the frame members 16 when the windows are opened, and when the windows are closed, the relays are inclosed in a dust proof protecting inclosure. In cases wherein the total available space within the frame members 16 is not required to mount the number of relays in use, the blank spaces are to be covered by blank panels so that the left hand side as well as the right hand side of the frame members 16 is completely inclosed.

The space beneath the lower frame member 16 is utilized to house condenser units 38 ordinarily employed in connection with relays for arc suppression and the like, and these condenser units 38 are retained by metal side members 39 having their lower edges retained by the upstanding ends of the plate 14, and extending brackets 40 attached to the side members 39 are retained against the upright brackets 12 by screws 41. The front bracket 12 holds resistor units 44 attached thereto by insulating bolts 45 which are used for a division of voltages, arc suppression, and the like.

The upper portion of the cabinet plates 3 is braced by a frame of angle iron 5 which also serves to support a terminal board 35 holding rows of terminal bolts 36. The lower ends of the terminal bolts 36 extend through the insulating panel 35, and wires 37 attached thereto are formed into cables which extend downwardly in a substantial U-shape with the ends thereof connected to the terminals on the left hand side of the various permanently mounted panels P which hold the relays R within the frame members 16. The wires extending from the condensers 38 and resistors 44 are also formed into suitable cables 42 and extend along the rear vertical side of the frame members 16 to the panels P of the relays with which they are associated. The various electrical conductors 43 connecting the apparatus within the present cabinet with external apparatus and the like are connected to the upper ends of the terminal bolts 36 and may be formed into a cable as shown which extends through an opening in the rear vertical side piece 3.

It may now be seen that the relays R and other associated apparatus may be withdrawn as a unit from the cabinet enclosure on the telescoping slide means thereby permitting convenient inspection or replacement of the relays R from righthand side and likewise convenience access to the wiring on the left hand side. It is contemplated that in many cases, several of the cabinets thus arranged will be placed side-by-side against a wall for example, so that when all the relay carrying units are in their normal position within their respective cabinets, the space directly in front of these cabinets may be used for other purposes, such as an aisle or passageway.

A means for housing various groups of relays and allied apparatus has thus been provided wherein the floor space required therefor is substantially equal to the actual dimensions of the groups of relays, but wherein any one of the various groups may be withdrawn from its cabinet to a position permitting access to each side thereof. A sheet metal panel 49 may be provided to cover the opening in the front of the cabinets when the relay mounting units are inserted therein. This panel 49 may be detachably held in place by suitable screw clamping means 50 or may be permanently attached to the front of the frame members 16 so as to close the front of the cabinet when the relay carrying unit is fully inserted therein.

The above rather specific description of one form of the present invention is given solely by the way of example, and is not intended, in any manner whatsoever, in a limiting sense. It is also to be understood that various modifications, adaptations and alterations may be applied to meet the requirements of practice, without in any manner departing from the spirit or scope of the present invention, except as limited by the appended claims.

What I claim is:—

1. In a housing for electrical apparatus, a cabinet, a rectangular base slidably mounted to permit longitudinal movement thereof into and out of the cabinet, a plurality of insulating panels mounted longitudinally on the base, means for removably mounting relays on one side of the panels, terminal posts on the other side of the panels, a fixed terminal board in the cabinet and flexible cables connecting the terminal posts of the panels with the fixed terminal board.

2. In a housing for electrical apparatus, a vertical cabinet, rectangular frame members arranged one above the other in the cabinet, telescoping roller means permitting complete endwise removal of the frame members from the cabinet, slidable windows for enclosing one side of the frame members, panel members covering the other side of the frame members, relays detachably mounted on the inner side of the panels, a stationary panel within the cabinet, and flexible electrical cables extending from the stationary panel to the panels on the frame members.

3. In a housing for electrical apparatus, a vertical cabinet, rectangular frame members arranged one above the other in the cabinet, telescoping roller means permitting complete endwise removal of the frame members from the cabinet, slidable windows for enclosing one side of the frame members, panel members covering the other side of the frame members, relays detachably mounted on the inner side of the panels, a

stationary panel mounted horizontally at the top of the cabinet, a removable top on the cabinet permitting access to the stationary panel, and flexible electrical cables extending from the stationary panel to the panels on the frame members.

4. In a housing for electrical apparatus, a vertical cabinet, rectangular frame members arranged one above the other in the cabinet, a horizontal base carrying the frame members and mounted on telescoping roller means permitting endwise removal of the frame members from the front of the cabinet, electrical condenser and resistor units mounted between the frame members and the base, insulated terminal boards covering one side of the frame members, relays detachably mounted on the inside of the terminal boards, slidable windows covering the other side of the frame members, electrical conductors connecting the condensers and resistors to the terminal boards, a stationary terminal panel, and flexible electrical conductors extending loosely from the stationary terminal board to the terminal panels.

5. In a housing for electrical apparatus, in combination, a cabinet, a base slidably mounted to permit longitudinal movement thereof into and out of the cabinet, a plurality of insulating panels mounted on the base, means for removably mounting translating devices on one side of the panels, terminal posts on the other side of the panels, a fixed terminal board in the cabinet, and flexible cables interconnecting the terminal posts of the panels with the fixed terminal board.

6. In a cabinet for housing electrical apparatus, a rectangular base slidably mounted to permit longitudinal movement thereof into and out of the cabinet, electrical devices mounted on the base, a fixed terminal board within the cabinet, mounting terminals thereon and flexible cables connecting the devices on the base with respective terminals on the terminal board, the cables being of sufficient length to permit the said movement of the base.

7. In housing means for electrical apparatus, in combination, a cabinet, a rectangular receptacle slidably mounted to permit longitudinal movement thereof into and out of the cabinet, electrical devices mounted in the receptacle, a fixed terminal board within the cabinet, mounting terminals on the board, flexible cables connecting the devices in the receptacle with respective terminals on the board, the cables being of sufficient length to permit the said movement of the receptacle, the receptacle permitting ready inspection of, and access to the devices, through one side of the receptacle when the receptacle is moved out of the cabinet.

8. In housing means for electrical apparatus, in combination, a cabinet, a rectangular receptacle slidably mounted to permit longitudinal movement thereof into and out of the cabinet, electrical devices mounted in the receptacle, a fixed terminal board within the cabinet, mounting terminals on the board, flexible cables connecting the devices in the receptacle with respective terminals on the board, the cables being of sufficient length to permit the said movement of the receptacle, and a cover on the cabinet movable to expose the fixed terminal board for inspection and access.

9. In housing means for electrical apparatus, in combination, a cabinet, a rectangular receptacle slidably mounted to permit longitudinal movement thereof into and out of the cabinet, electrical devices mounted in the receptacle, a fixed terminal board within the cabinet, mounting terminals on the board, flexible cables connecting the devices in the receptacle with respective terminals on the board, the cables being of sufficient length to permit the said movement of the receptacle, the cabinet being deeper than the receptacle to leave space for the cables when the receptacle is fully in the cabinet.

10. In housing means for electrical apparatus, in combination, a cabinet, a rectangular receptacle slidably mounted to permit longitudinal movement thereof into and out of the cabinet, electrical devices mounted in the receptacle, a fixed terminal board within the cabinet, mounting terminals on the board, flexible cables connecting the devices in the receptacle with respective terminals on the board, the cables being of sufficient length to permit the said movement of the receptacle, the receptacle permitting ready inspection of, and access to, the devices, through one side of the receptacle when the receptacle is moved out of the cabinet, and a cover on the cabinet movable to expose the fixed terminal board for inspection and access, the cabinet being deeper than the receptacle to leave space for the cables when the receptacle is fully in the cabinet.

11. In housing means for electrical apparatus, in combination, a cabinet, a receptacle slidably mounted to permit longitudinal movement thereof into and out of the cabinet, electrical devices mounted in the receptacle, a fixed terminal board within the cabinet, mounting terminals on the board, flexible cables connecting the devices in the receptacle with respective terminals on the board, the cables being of sufficient length to permit the said movement of the receptacle, the cabinet providing a space adjacent the receptacle being of a construction for housing the cables when the receptacle is fully in the cabinet.

12. In housing means for electrical apparatus, in combination, a cabinet, a receptacle slidably mounted to permit longitudinal movement thereof into and out of the cabinet, electrical devices mounted in the receptacle, a fixed terminal board within the cabinet, mounting terminals on the board, flexible cables connecting the devices in the receptacle with respective terminals on the board, the cables being of sufficient length to permit the said movement of the receptacle, the receptacle permitting ready inspection of, and access to, the devices, through one side of the receptacle when the receptacle is moved out of the cabinet, and a cover on the cabinet movable to expose the fixed terminal board for inspection and access, the cabinet providing a space adjacent the receptacle for housing the cables when the receptacle is fully in the cabinet.

JOSEPH F. MERKEL.