July 8, 1924.

1,500,211

H. F. STARRETT

PANEL BOARD AND PANEL BOX CONSTRUCTION

Filed June 27, 1919

3 Sheets-Sheet 1

Fig. 1.

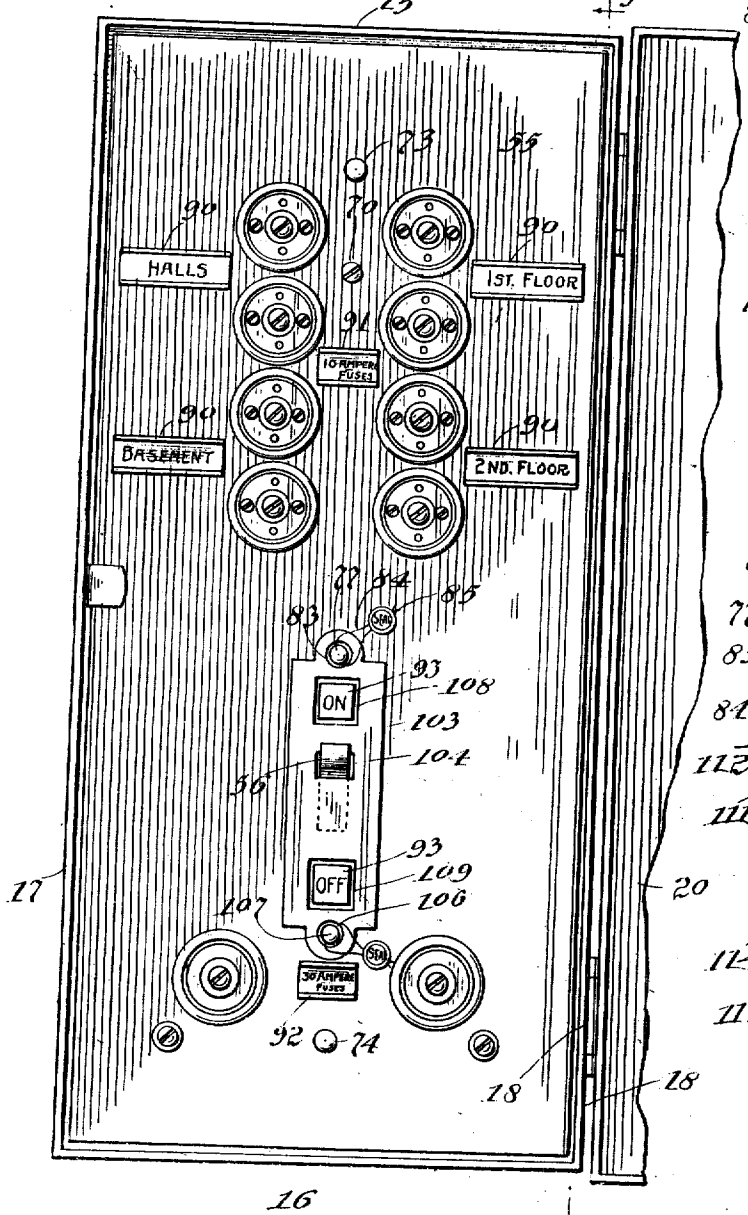


Fig. 3.

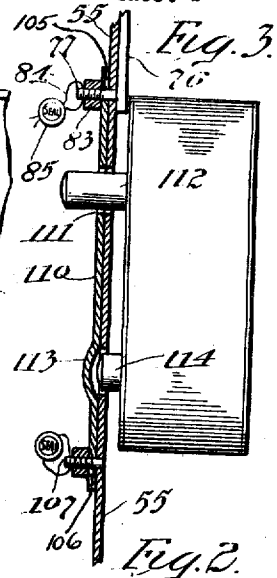
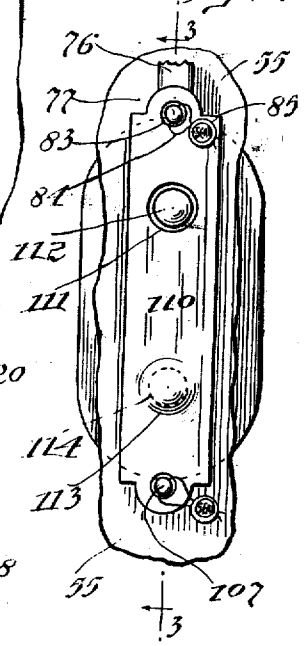


Fig. 2.



Inventor:
Henry F. Starrett

By
Jones, Addington, Ames & Seibold Attys.

July 8, 1924. 1,500,211

H. F. STARRETT

PANEL BOARD AND PANEL BOX CONSTRUCTION

Filed June 27, 1919 3 Sheets-Sheet 2

Fig. 4.

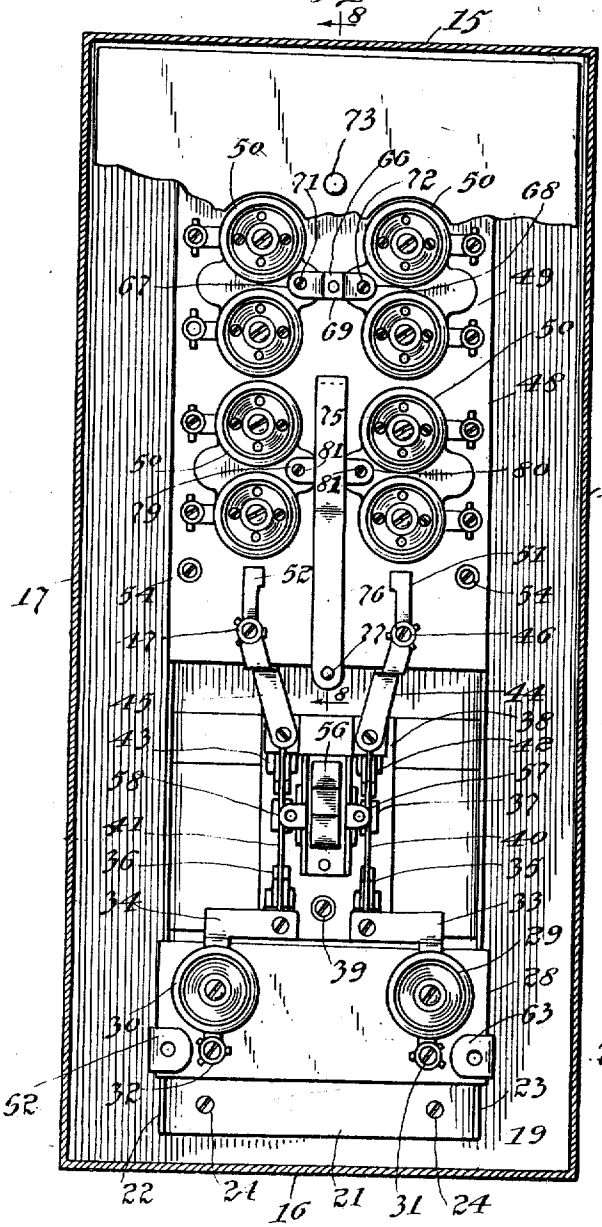
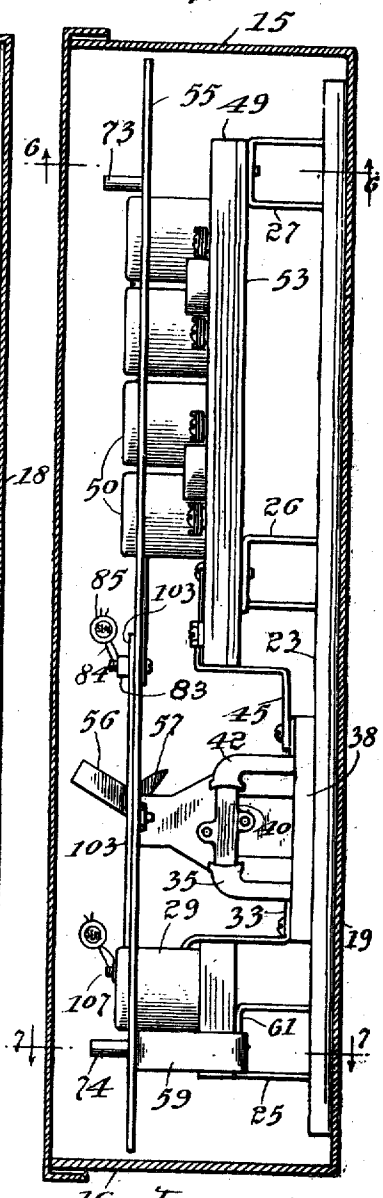


Fig. 5.



Inventor:
Henry F. Starrett

By
Jones, Addington, Ames & Seibold, Attys.

July 8, 1924. 1,500,211

H. F. STARRETT

PANEL BOARD AND PANEL BOX CONSTRUCTION

Filed June 27, 1919 3 Sheets-Sheet 3

Fig. 6.

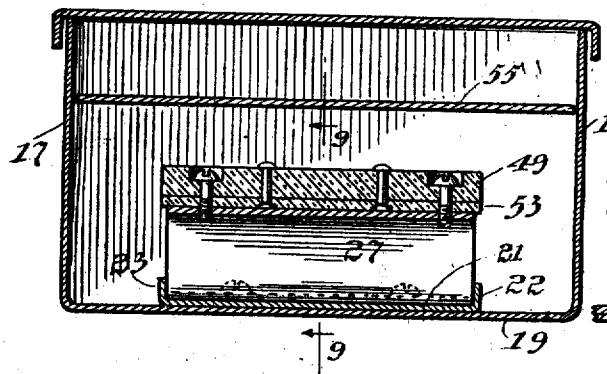


Fig. 9.

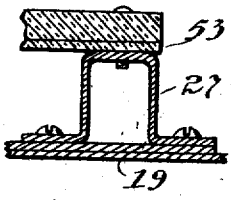


Fig. 7.

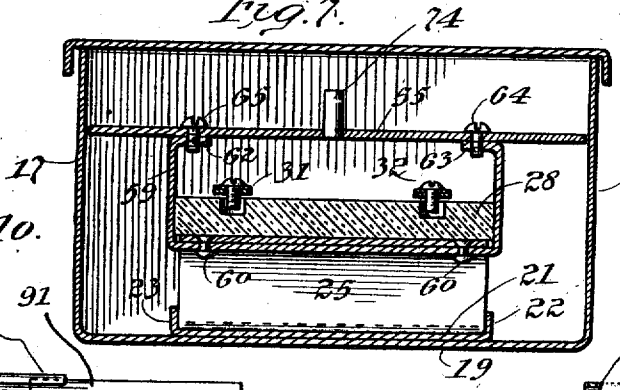


Fig. 10.

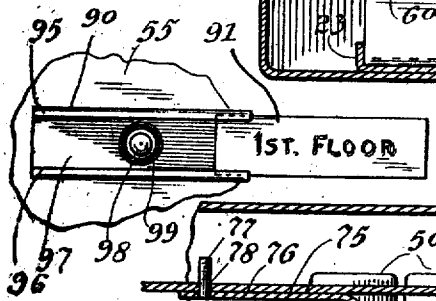


Fig. 11.

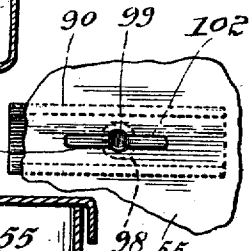
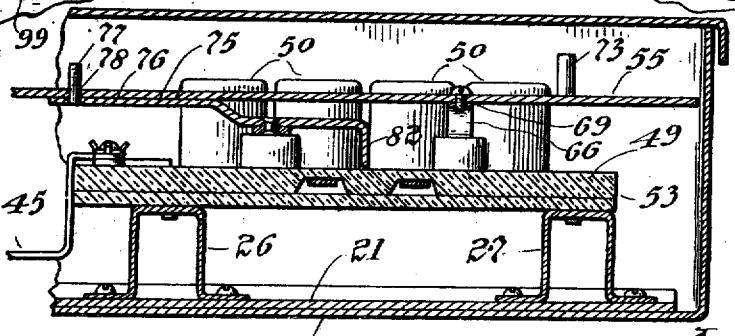


Fig. 8.



Henry F. Starrett Inventor

By Jones, Addington, Ames & Seibold Attys.

Patented July 8, 1924. 1,500,211

UNITED STATES PATENT OFFICE.

HENRY F. STARRETT, OF CHICAGO, ILLINOIS, ASSIGNOR TO STARRETT MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PANEL BOARD AND PANEL-BOX CONSTRUCTION.

Application filed June 27, 1919. Serial No. 307,189.

To all whom it may concern:

Be it known that I, HENRY F. STARRETT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Panel Boards and Panel-Box Construction, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

This invention relates to improvements in panel-boards and panel-box construction, and more particularly to that type of panel-board which is equipped with a dead front, that is, a panel-board of the type in which the current and potential carrying conductors are enclosed so as to prevent accidental contact therewith and consequent electrical shock.

In the specific embodiment of my invention herein illustrated and described I have preferred to show a form of panel-board more especially adapted to be used in the wiring of houses or residences, but obviously the construction shown is also useful and can be readily incorporated in any and all panel-board structures.

One of the objects of this invention consists in the production of a simplified and improved panel-board and panel-box construction adapted for combined service and load-circuit protection.

Another object of this invention consists in the production of an improved and simplified means for producing a panel-board and panel-box construction of this kind, in which with a very simple construction a proper covering is provided to protect the conductors and conductor-wires leading into the cabinet, which constitutes the main feed-wires and the branch-circuit consumption wires.

A further object resides in the production of improved means whereby the assembled panel-board consists of a unitary structure which can be readily, quickly and easily removed from the panel-box and reassembled therein in any of a plurality of positions to adapt panel-board and box to the particular peculiarities of any wiring installation.

An additional object resides in an improved panel-board and cover-plate mounting, the cost of construction of which is very low, and which can be very speedily and efficiently assembled with and removed from panel-board positioned in the panel-box.

Another object consists in the production of improved and simplified means for locking switches on panel-boards in either the "on" or "off" positions.

Other objects and features of this invention will become apparent from the following description, the accompanying illustrations and the appended claims:

For the purpose of disclosing my invention, I have illustrated one embodiment thereof in the accompanying drawing, in which:

Fig. 1 is a plan view of the combined panel-board and panel-box with the cover thrown back;

Fig. 2 illustrates the plate utilized for locking and sealing the switch of the push-button type in either the "on" or "off" position;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a plan view of the combined panel-box and panel-board with the major portion of the dead front shield broken away;

Fig. 5 is a section of the combined panel-board and panel-box taken on the plane indicated by the line 5—5 of Fig. 1 looking in the direction of the arrows;

Fig. 6 is a transverse section taken on the plane indicated by the line 6—6 of Fig. 5 looking in the direction of the arrows:

Fig. 7 is a transverse section taken on the plane indicated by the line 7—7 of Fig. 5 looking in the direction of the arrows;

Fig. 8 is a vertical section of the upper portion of the combined panel-board and panel-box taken on the plane indicated by the line 8—8 of Fig. 4 looking in the direction of the arrows;

Fig. 9 illustrates the detailed construction of the bracket utilized to mount the panel-board in the panel-box; and

Figs. 10 and 11 are detailed views illustrating the method utilized for rotatably mounting the designation strips on the dead front shield.

As illustrated in Fig. 1, the panel-box en-

closure consists of the end walls 15 and 16, the side walls 17 and 18, the base 19 and a cover 20 hingedly secured to the said wall 18. Mounted on the base 19 of the panel-box enclosure is a flat plate 21 equipped with the lateral flanges 22 and 23, said plate constituting an apparatus mounting sub-base. This sub-base 21 is removably secured to the base 19 in any suitable manner, preferably by screws such as 24. Secured to the sub-base 21, either by electrowelding, screws or any other suitable manner, are the U shaped brackets 25, 26 and 27. These U shaped brackets serve as the interconnecting means for mounting the panel-board proper on the apparatus mounting sub-base 21. Mounted on the bracket 25 is an insulating base 28 which carries the main line fuse receptacles 29 and 30 which are connected respectively to the main line terminals 31 and 32 which receive the main line conductors. The other contacts of the fuse receptacles 29 and 30 which are conthe conducting straps 33 and 34 respectively, which in turn are connected respectively to the stationary contacts 35 and 36 of a toggle joint switch 37.

The switch 37 is mounted on an insulating base 38 which is secured in any suitable manner, preferably by screws such as 39, to the sub-base 21. The switch 27 constitutes the main switch of the panel through which all the current which is fed to the fuse receptacles mounted on the panel-board must flow. Obviously, any type of switch may be used for this purpose and instead of the toggle joint switch 37, shown in the illustration, a push button switch of any of the commercial forms could be utilized.

A detailed description of the toggle joint switch 37 is considered unnecessary as switches of this kind are well known in the art, consisting essentially of the operating blades such as 40 and 41 which are utilized to interconnect the live stationary switch contacts 35 and 36, which are connected to the main fuses 29 and 30 respectively, with the stationary switch contacts 42 and 43 respectively, connected to conducting straps 44 and 45 respectively, which are in turn connected to the main terminals 46 and 47 of the branch circuit panel-board 48.

Obviously any type of panel-board could be used in this construction but preferably a panel-board of the type illustrated and described in my Patent No. 1,294,185, issued February 11th, 1919, is used. This panel-board, as there described, consists of a plate 49 on which the branch fuse receptacles such as 50 are mounted and in which are carried the circuit conducting bus bars 51 and 52 which feed the current to the fuse receptacles 50. The bus-bars in the plate 49 are completely covered, insulated and hidden from view by a cover plate 53. The branch circuit panel-board is mounted on the sub-base 21 by means of the brackets 26 and 27, the base being secured to these brackets in any suitable manner, preferably by screws such as 54.

Mounted above the electrical equipment which is secured to the sub-mounting base 21 is a cover plate or dead front shield 55. This dead front shield is apertured to permit the projection therethrough of the top ends of the branch line fuse receptacles 50 and the operating handle 56 of the main switch, as well as the top ends of the main line fuse receptacles 29 and 30. The mounting base 38 of the switch 37 is so proportioned that the brackets 57 and 58, ordinarily employed to receive the top plate for the switch, will be positioned in a horizontal plane, so that the top portion of said brackets will act as a support for the shield 55. The lower end of the shield 55 is supported by a bracket 59 which is secured in any suitable manner, preferably by screws or rivets such as 60 to the under side of the upper plate 61 of the bracket 25. The bracket 59 is equipped with the inwardly extending lugs 62 and 63, which serve as supporting means for the lower end of the dead front shield 55. The dead front shield 55 is secured to these lugs 62 and 63 by means of screws such as 64 and 65. The upper end of the shield is held in position by means of the supporting bracket 66, which bracket is fitted with laterally extending ears 67 and 68, and a top face 69 containing a screw threaded aperture which receives the screw 70 for holding the top end of the dead front shield 55 in position.

The bracket 66 is held in position on the panel-board by means of screws such as 71 and 72 which serve the dual function of securing the two upper fuse receptacles 50 in position, as well as holding the mounting bracket 66 in position on the board. The upper faces of the ears 62 and 63 of the mounting bracket 59, the top face 69 of the brackets 66, and the top faces of the mounting brackets or ears 57 and 58 of the switch 37 are all positioned so as to be in the same horizontal plane, whereby they constitute suitable supporting means for the dead front shield 55.

The dead front shield 55 is equipped with handles 73 and 74 whereby the shield may be readily placed in position in the panel-box enclosure and removed from the panel-box enclosure when it is desired to inspect the apparatus beneath said shield. As clearly illustrated in Fig. 1, the dead front shield 55 completely covers all of the apparatus mounted in the panel-box enclosure and on the panel-board with the exception of the circuit-controlling portions of the said apparatus which project through the apertures cut in the shield 55.

Mounted on the panel-board 48 is a shield or cover plate sealing or locking bar 75. This bar comprises the upwardly extending arm 76, the upper face of which lies in the same plane as the upper faces of the mounting brackets which support the shield 55, the said arm being equipped at its forward end with a projecting pin 77 which protrudes through an aperture 78 cut in the shield 55. The bar is secured on the panel-board by means of laterally extending ears or lugs 79 and 80 which are apertured to receive the screws 81, said screws serving to secure the sealing bar 75 in position on the panel-board. The end of the sealing bar 75 opposite to the one carrying the pin 77, is equipped with a downwardly extending arm 82, which contacts with the top surface of the panel-board 48 and serves to give to the sealing bar 75 the required rigidity.

The pin 77 which projects through the shield 55 serves as a means for positively locking or sealing the shield 55 in position above the apparatus mounted in the panel-box enclosure and thereby prevents the molestation and tampering of this apparatus by individuals not authorized to have access thereto. The sealing or locking of this shield in position, by means of this projecting rod 77 may be accomplished in any desirable manner. This is preferably accomplished as shown in the illustration, by placing on the upwardly extending threaded end of said rod 77 a securing nut 83, the rod 77 being fitted with a transverse slot directly above the upper face of the nut 83 when it is screwed down in position, through which is inserted a wire 84 on which is placed a seal 85, the said wire and seal serving to lock the nut 83 in position, since the nut obviously cannot be removed without breaking the seal and removing the wire.

It follows, from the description just preceding of the cover plate or shield sealing bar 75, that the said bar may be readily placed in position either at the time that the apparatus is being constructed or at any time after the apparatus has been installed since the means for securing this bar in position are standard screws which can be secured in place at any time. Consequently the sealing bar 75 is a removable piece of apparatus which can be readily furnished at any time and installed to lock the cover plate in position against those unauthorized to have access to the equipment mounted on the panel-board.

It will also follow from the foregoing description that since the panel-board 48, the switch 37, and the main fuses 29 and 30, together with their mounting base 28, are all secured to the sub mounting base 21, that this sub mounting base and all the apparatus can be removed from the panel-box enclosure as a single entity. The mounting of all the apparatus enclosed within the panel-box on a sub-base is an important feature, inasmuch that it permits the shifting of this apparatus end to end in the panel-box enclosure by merely removing the sub-base mounting screws 24. The shifting of the relative position of the apparatus in the panel-box enclosure becomes of importance when the equipment is being installed.

In the wiring of buildings the branch circuit leads and the main circuit leads are brought to a common wiring point and the panel-board must be mounted at this point in the building to fit the wiring as it has been installed. Depending upon conditions it is frequently necessary to mount the panel-box enclosure and panel-board in a vertical position and at other times it is necessary to mount the panel-board in a horizontal position. When the panel-board and panel-box is mounted in a horizontal position, it is always necessary, because of the underwriters' requirements, to keep the cover of the box at the top so that said cover will be restored to the closed position by gravity. It will consequently be evident that the ends of the panel-box enclosure in which the main fuse receptacles 29 and 30 should be mounted will depend upon what side of the box the main line conductors are wired. With the construction here shown in which all the apparatus is mounted on the mounting sub-base 21 the wiring of the panel-board to the branch line conductors and main feed wires will not be at all affected by the side of the panel-box to which the main feed wires are carried since the apparatus can be rapidly and speedily shifted to fit any condition by transposing the position of the sub-base 21 and consequently the apparatus which it carries on the base 19 of the panel-box enclosure.

The shield 55 is fitted with, a plurality of designation plates such as 90 which serve as circuit indications for the branch line fuses, with a designation strip such as 91 which serves to give the capacity of the branch line fuses, with a designation strip such as 92 which serve to give the capacity of the main line fuses and with the designation strips such as 93 which indicate the position in which the main switch 37 is operated.

Obviously since the panel-box enclosure and panel-board is adapted for vertical mounting, as well as horizontal mounting, means must be provided for changing the position of all of these designation strips to accommodate the particular position in which the panel-board is ultimately installed. For this purpose each designation strip is rotatably mounted on the shield 55. Since the means utilized for rotating all of these shields is identical, a description of the

method of mounting the designation strip 90 only will be outlined in the following:

The designation plate 90 comprises overhanging lateral flanges 95 and 96 and a base 97. The base 97 is fitted with a depression 98 which serves to receive the head of a rivet 99, the depression 98 being sufficiently great so that the head of rivet 99 will be substantially flush with the top surface of the base 97. The rivet 99 extends through a suitable aperture in the shield 55, and the rear end of said rivet is secured to the shield 55 in any suitable manner so that the designation strips will be rotatably mounted on the shield. Preferably, these rivets are secured to the rear face of the shield 55 forcing back against the surface of the shield the split tongues 101 and 102 of the rivet.

As illustrated in Figs. 1, 2, 3 and 5 means are provided for locking the main switch of the panel-board, such as 37, in either its "off" or "on" position. The means utilized for locking this main switch in the "on" or "off" position consists of a plate which is removably mounted on the front face of the shield 55. When a switch of the toggle joint type, such as 37, is used in which the operating handle projects through the shield and is oscillated to and fro for actuating the switch mechanism to either its "off" or "on" position, a switch locking plate such as 103 is used. This plate is provided with an aperture 104, the size of which is just great enough to conveniently accommodate the operating handle 56 of the switch. The plate 103 is provided at either end with an aperture 105 and 106 respectively. In mounting the plate on the shield 55, the pin 77 is slipped through the aperture 105 and a pin or rod 107 secured to the front face of the shield 55 is threaded through the aperture 106. When the plate is thus placed on the pins or rods 77 and 107, this plate will rest on the top surface of the shield 55, and the designation plates 93, which are mounted on the shield 55, and associated with the switch for indicating the "on" and "off" position will project through apertures 108 and 109 cut in the plate 103. When the plate 103 has been thus positioned on the shield the handle 56 can be locked in either the "on" or "off" position by sealing the plate in position by means of the nut 83, wire 84, and seal 85 utilized in connection with the pin 77 and a similar nut, wire and seal for the rod 107. The rod 77, together with its cooperating nut 83, wire 84 and seal 85, serve the double purpose of sealing the shield 55 in position and one end of the switch locking plate 103. The switch locking plate 103 could obviously be secured to the shield 55 in any other way. Thus for example if it were desired to lock the switch in one position only, one end of said plate could be secured to the shield by means of a hinge in place to the pin or rod 107 and aperture 106.

The aperture 104 in the plate 103 is so positioned that the handle 56 will project therethrough when the switch is in the "on" position, and the plate is positioned as illustrated in Fig. 1, thereby locking the switch in the "on" position, and when it is desired to lock the switch in the "off" position, the aperture 104 will fit over the handle 56 when it is operated to its "off" position, if the position of the plate 103 is reversed, —that is, turned to 180 degrees. It will thus be evident that a plate such as 103 serves to lock the switches in either the "on" or "off" position.

Figs. 2 and 3 show a similar plate 110 used to lock a switch of the push button type in either the "on" or "off" position. This plate is provided with an aperture 111 to accommodate one of the push buttons, such as 112 of the switch and with an embossing 113 which is adapted to ride over the projecting portion of the push buttons 113 which in the drawing is shown in its depressed position. The plate 110 is fitted with suitable apertures at either end to receive the pins or rods 77 and 107 for mounting the plate on the shield 55. Likewise the plate is sealed in position in a manner identical to that described for the plate 103. When the plate is thus sealed in position on the shield 55 with one of the operating push buttons, as for example the push button 112, as illustrated in Fig. 3, projecting through the aperture 111, the switch cannot be operated since the push button cannot be depressed Actuation of the push button 112 is prevented since the push buttons 112 and 114 are interconnected and depression of one of said buttons can only be accomplished by a corresponding rise of the other button. Therefore, since the push button 114 is in substantial contact with the embossed portion 113 of the plate 110, movement of either of the buttons 112 or 114 will be prevented. In the case of the plate 110, the locking of the switch in the opposite condition is accomplished the same as with the plate 103,—that is, the plate is merely rotated through an arc of 180 degrees in which position the aperture 111 will be positioned over the opposite push button, in the illustrations Figs. 2 and 3, over push button 114.

From the foregoing description it now follows that in a panel-board and panel-box constructed in accordance with the teachings of this invention the electrical equipment is so mounted in the panel-board enclosure that the said enclosure can be readily installed in any position and the position of the apparatus with respect to the enclosure can be speedily and rapidly changed so as to fit the apparatus to any particular form of wiring installation. Likewise, the equip-

ment comprises a dead front panel-board in which the dead front shield can be conveniently sealed in position if so desired, and, further, if for any reasons it becomes necessary to lock the main switch in either of the "on" or "off" position, this can be readily accomplished by the mere addition over the shield of the switch locking plates.

Obviously the invention is not limited to specific embodiment thereof herein illustrated and described, but is capable of other applications and many variations within the spirit and scope of the invention as set forth in the following claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a device of the character described, a panel-box enclosure, a panel-board carrying circuit-controlling apparatus mounted in said enclosure, a dead front shield removably mounted in said enclosure over said panel-board, said shield being apertured to permit the projection of the circuit-controlling portions of said apparatus thereto, and designation means for said apparatus rotatably mounted on said shield.

2. In a device of the character described in combination, a panel-box enclosure, a panel-board carrying circuit-controlling apparatus, a mounting sub-base, to which said panel-board is removably secured, said sub-base being removably secured to the bottom of said panel-box enclosure, a dead front shield removably mounted in said enclosure over said panel-board, said shield being apertured to permit the projection of the circuit-controlling portions of said apparatus therethrough, and designation means for said apparatus rotatably mounted on said shield, whereby said panel-box may be mounted either in the vertical or horizontal position and the designation means rotated in the proper position for the particular mounting of the panel-box enclosure.

3. In a device of the character described, a panel-box enclosure, a flat plate mounting sub-base secured to the bottom of said enclosure, apparatus mounting brackets permanently secured to said sub-base, circuit-controlling equipment mounted on suitable bases removably secured to said brackets, the said sub-base and the said circuit-controlling equipment mounted thereon comprising a unitary structure, means for mounting said unitary structure in said panel-box enclosure whereby said structure may be readily removed as a unit from said panel-box enclosure and positioned therein in any one of a plurality of positions, a dead front shield removably mounted in said enclosure over said circuit-controlling apparatus, said shield being apertured to permit the projection therethrough of the circuit-controlling portions of said circuit-controlling apparatus, and designation means for said apparatus rotatably mounted on said shield.

4. In a device of the character described, a panel-box, a panel-board mounted therein carrying circuit-controlling apparatus, an apertured shield mounted above said panel-board covering said apparatus and permitting the circuit-controlling portions of said apparatus to project through said apertures, a bar, a downwardly extending arm, said arm contacting with the face of said panel-board, an upwardly extending arm on said bar serving as a support for said shield, and means positioned on said upwardly extending bar adapted to receive a seal for locking said shield in position.

5. In a device of the character described, a panel-box, a panel-board mounted therein carrying circuit-controlling apparatus, an apertured shield mounted above said panel-board covering said apparatus and permitting the circuit-controlling portions of said apparatus to project through said apertures, a bar, a bracket secured to said panel-board for removably securing said bar to said board, a downwardly extending arm on said bar contacting with the face of said panel-board, an upwardly extending arm on said bar serving as a support for said shield, and a threaded bolt positioned on said upwardly extending arm adapted to receive a seal for locking said shield in position.

6. In a device of the character described, a panel-box, a panel-board mounted therein carrying circuit-controlling apparatus, an apertured shield mounted above said panel-board covering said apparatus and permitting the circuit-controlling portion of said apparatus to project through said apertures, a bar, a bracket secured to said bar, means adapted to secure circuit-controlling apparatus to said panel-board, means to removably secure said bracket to said panel-board, a downwardly extending arm on said bar contacting with the face of said panel-board, an upwardly extending arm on said bar serving as a support for said shield, and means positioned on said upwardly extending arms adapted to receive a seal for locking said shield in position.

7. In a panel-board construction, an apparatus mounting base, a switch mounted on said base, a cover-plate for said switch, apertured to permit the projection therethrough of the operating element of said switch, a second apertured plate adapted to be positioned over said cover-plate, said plate acting to lock the operating element of said switch in the "on" position and adapted to lock the operating element of said switch in the "off" position when placed on said cover-plate in the reverse position, and means to seal the said locking plate in position on said cover-plate.

8. In a panel-board and panel-box con-

struction, a panel-box, an apparatus mounting base positioned in said box, circuit-controlling apparatus including a switch mounted in said box, an apertured shield adapted to be mounted in said box to cover said apparatus and the interconnecting conductors the circuit-control operating portions of said apparatus projecting through said apertures in said shield, an apertured plate adapted to be positioned over the circuit-controlling portion of said switch on the outer face of said shield to lock it in its "off" position, and a common means for sealing the said shield and the said plate in their respective positions.

9. In a panel-box and panel-board construction, a panel-board, an apparatus mounting base positioned in said box, circuit-controlling apparatus including a switch mounted on said base, an apertured shield adapted to be mounted in said box to cover said apparatus and the interconnecting conductors, the circuit-controlling operating portions of said apparatus projecting through said apertures in said shield, means to seal said shield in position, a plate apertured to fit over the circuit-controlling portion of said switch to lock the switch in the "off" position, designation means mounted on said shield to indicate whether the switch is operated in its "on" or "off" position, apertures in the switch locking plate adapted to receive the switch designation plates, and means for sealing the said plate in position.

10. In a panel-board and panel-box construction, a panel-box, an apparatus mounting base positioned in said box, circuit-controlling apparatus including the switch mounted in said box, an apertured shield adapted to be mounted in said box to cover said apparatus and the interconnecting conductors, the circuit-controlling operating portions of said apparatus projecting through said apertures in said shield, an apertured plate adapted to be positioned over the circuit-controlling portion of said switch on the outer face of said shield to lock it in its "off" position, a common means for sealing the said shield and the said plate in their respective positions, designation means adapted to indicate the position in which the switch is operated, and apertures in said plate adapted to receive the switch designation means.

11. In a device of the character described in combination, a panel-box, a panel-board mounted therein, a panel-board shield positioned above said panel-board, designation plates, and means to rotatably mount said plates on said shield whereby the said plates may be turned into any position to conform with the particular mounting of the panel-box and associated shield.

12. In a device of the character described in combination, a panel-box, a panel-board mounted therein, a panel-board shield positioned above said panel-board, designation plates, a depression positioned substantially in the middle of said designation plates, rivets for rotatably mounting said plates on said shield, the heads of said rivets being positioned in the said depressions to maintain a substantially flush surface for the face of said plate, whereby the said plates may be turned into any position to conform with the particular mounting of the panel-box and associated shield.

In witness whereof, I have hereunto subscribed my name.

HENRY F. STARRETT.