H. F. KRANTZ.

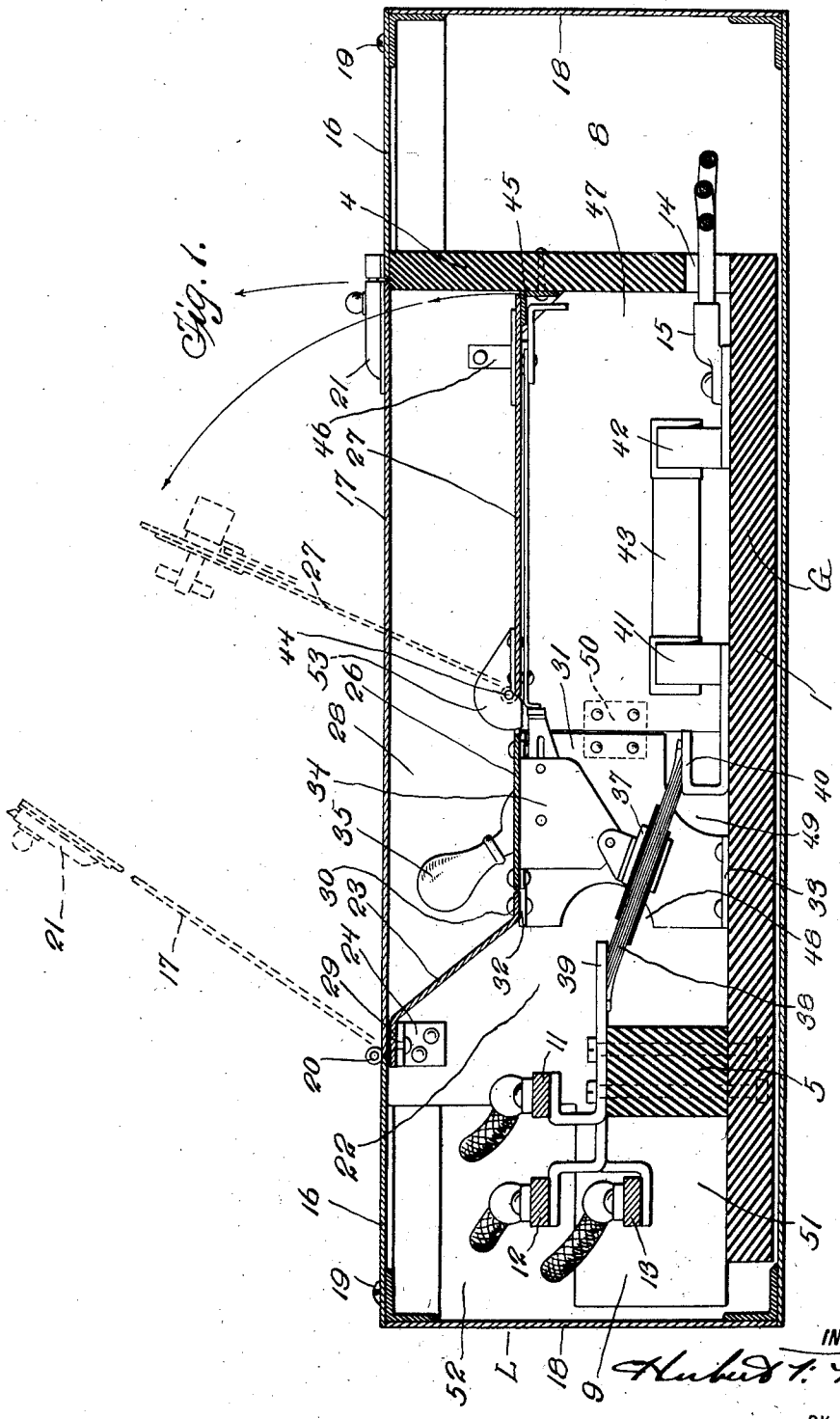
SAFETY PANEL BOX.

APPLICATION FILED JULY 19, 1917.

1,342,545. **Patented June 8, 1920.**

5 SHEETS—SHEET 1.

Fig. 1.



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5 SHEETS—SHEET 2.

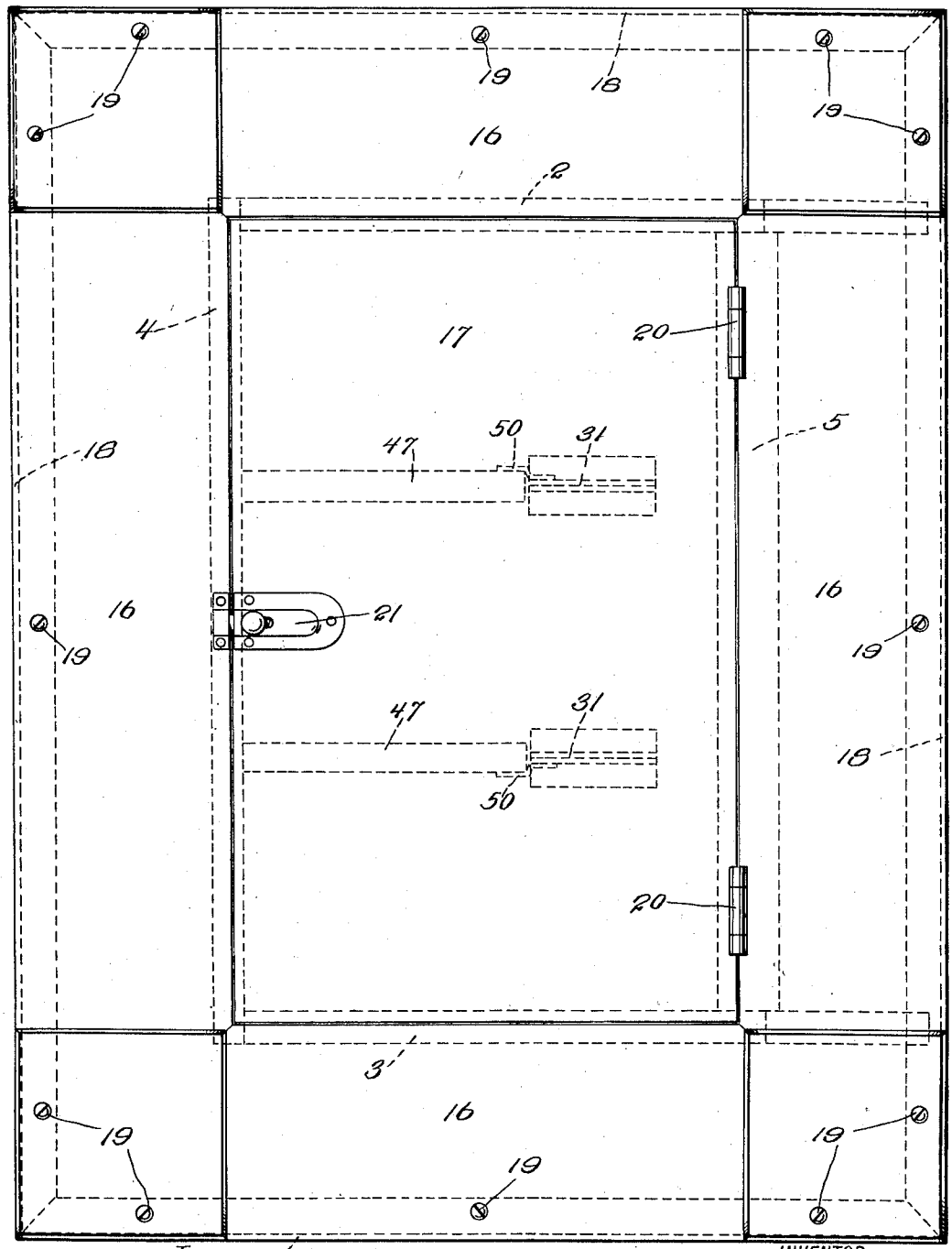


Fig. 2.

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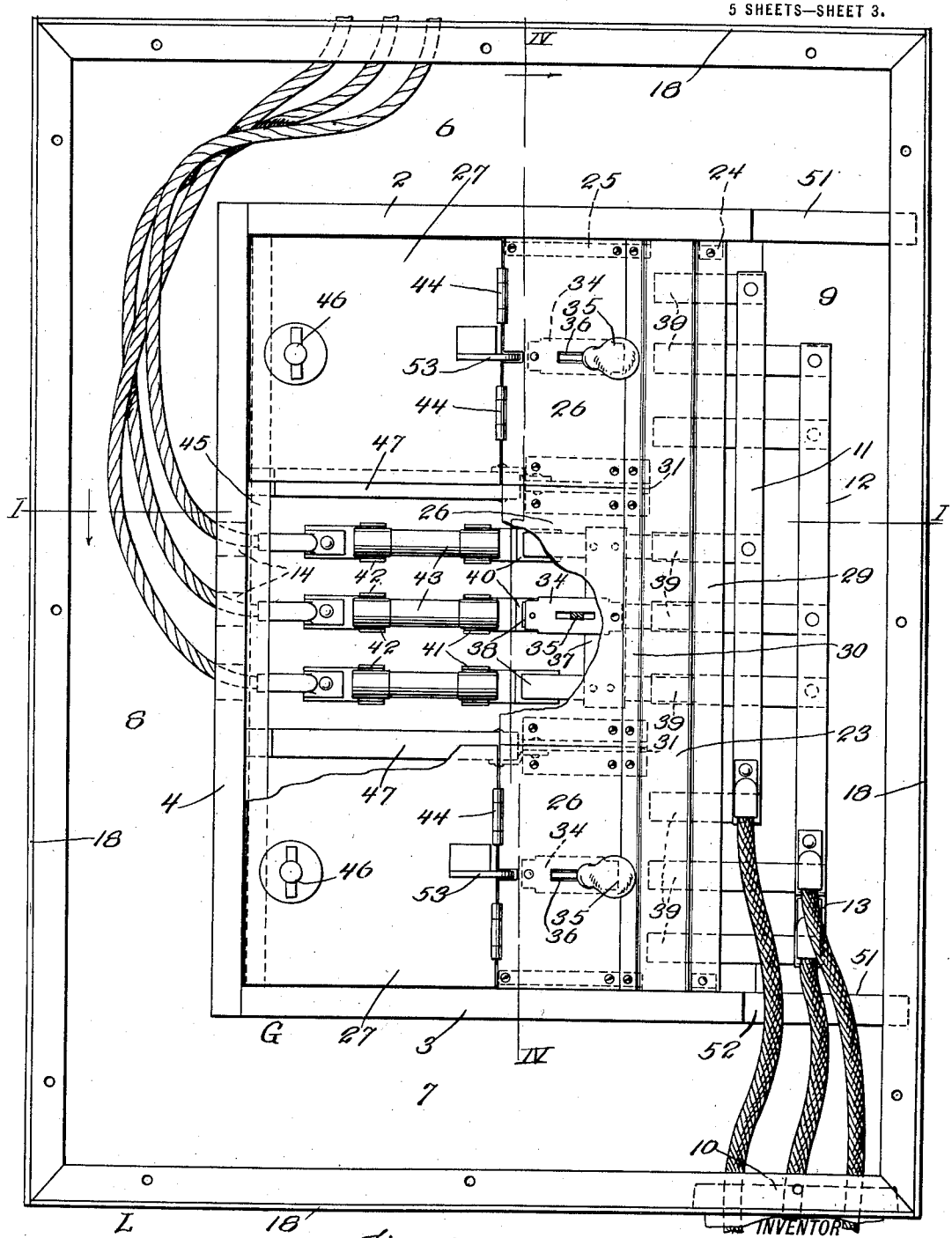


Fig. 3.

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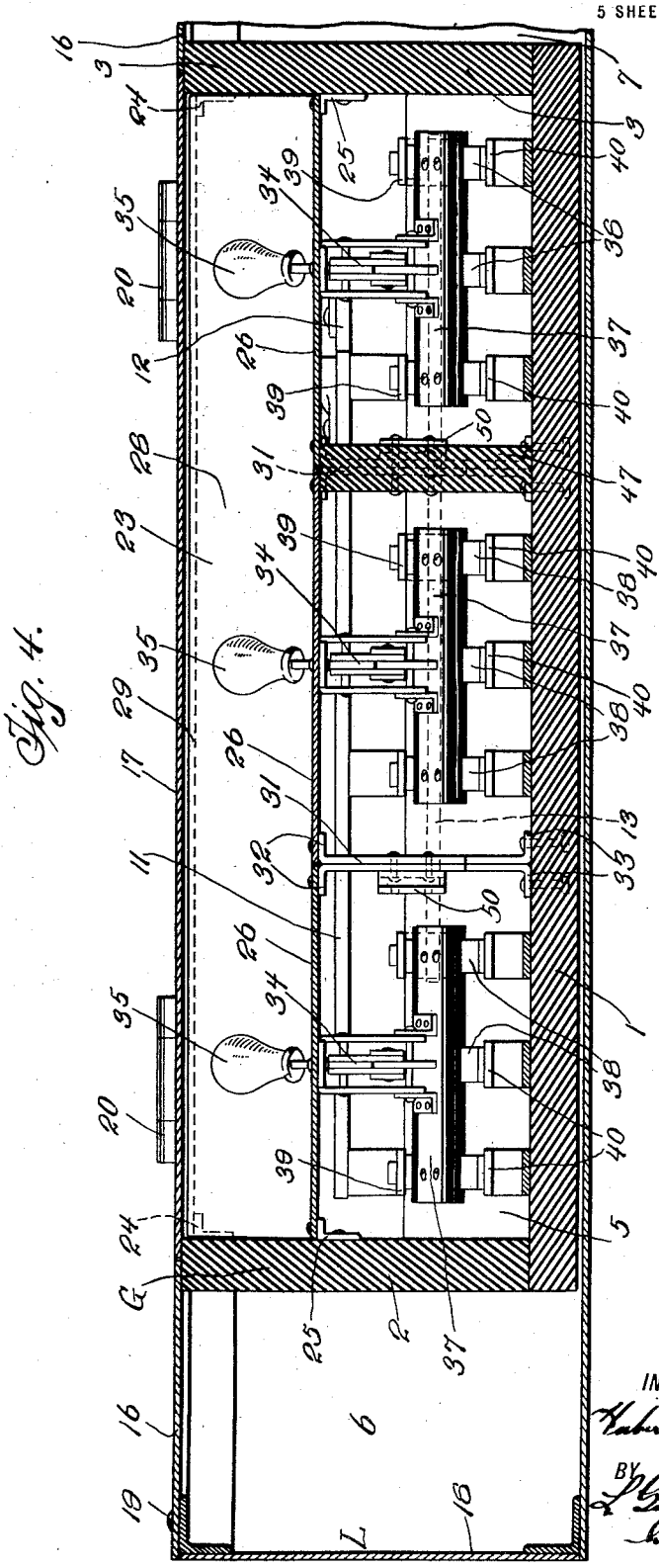


Fig. 4.

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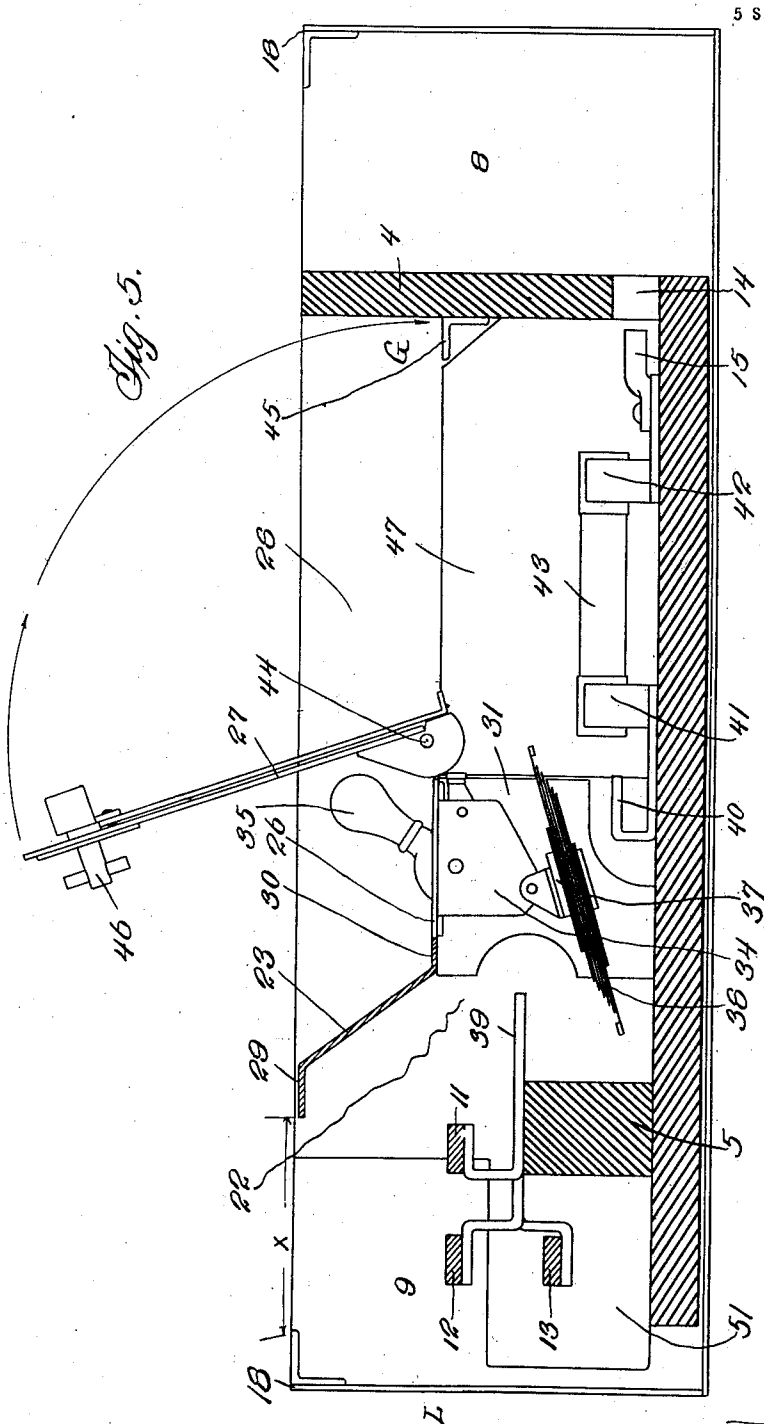
SAFETY PANEL BOX.

APPLICATION FILED JULY 19, 1917.

1,342,545. Patented June 8, 1920.

5 SHEETS—SHEET 5.

Fig. 5.



INVENTOR

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UNITED STATES PATENT OFFICE.

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SAFETY PANEL-BOX.

1,342,545. Specification of Letters Patent. Patented June 8, 1920.

Application filed July 19, 1917. Serial No. 181,466.

To all whom it may concern:

Be it known that I, HUBERT F. KRANTZ, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Safety Panel-Boxes, of which the following is a specification.

This invention relates to a safety panel box which is an improvement over that shown and described in Patent No. 1,292,808, Jan. 28, 1919.

An object of the present improvement is to provide a compact and efficient structure by means of which several switch units may be combined for service in connection with suitable bus bars, and in which the box is maintained of a symmetrical and attractive appearance.

A further object is to provide a spacious and well ventilated compartment for containing the bus bars and other elements.

A further object is to provide a structure in which the several switch elements and their contacts are arranged in a position between the bus bar compartment and the fuse compartments and to so arrange the parts of the structure that the several switch mechanisms and their contacts may be readily inspected either through the fuse compartment or from the bus bar compartment.

A further object is to so arrange the parts that the main line wires may lead into the box, for connection with the bus bars, from a plurality of sides, and through well appointed spaces, and also that the branch line wires shall have spacious channels and may lead into the box from various sides.

A further object is to provide efficient means for supporting the several switch elements and their associated parts.

A further object is to provide a box made up of an inner housing and an outer housing, the outer housing being sufficiently larger than the inner housing so as to provide spacious channels for the main and branch line wires and having a common cover for both housings, to provide the inner housing with an auxiliary cover which is spaced from the main cover to form a compartment of a size to receive the switch control elements, all other elements of the device being hid by said auxiliary cover, the auxiliary cover having an inspection door therein through which one side of the switch mechanism may be inspected, and to make the main cover detachable to give access to the main and branch line wire channels and to provide for inspection of the switch mechanisms from the opposite side.

Other objects and aims of the invention, more or less specific than those referred to above, will be in part obvious and in part pointed out in the course of the following description of the elements, combinations, arrangements of parts and applications of principles, constituting the invention; and the scope of protection contemplated will be indicated in the appended claims.

In the accompanying drawings which are to be taken as a part of this specification, and in which I have shown merely a preferred form of embodiment of the invention:

Figure 1 is a longitudinal vertical sectional view through a panel box constructed in accordance with this invention, the view being taken substantially upon the plane of line I—I of Fig. 3, and the switch mechanism being shown in the "on" position.

Fig. 2 is a top plan view of the complete panel box.

Fig. 3 is a top plan view of the panel box with the main cover removed, and a portion of the inner or auxiliary cover being broken away.

Fig. 4 is a transverse vertical sectional view taken substantially upon the plane of line IV of Fig. 3, and

Fig. 5 is a diagrammatic view showing the parts of Fig. 1 with the switch mechanism in the "off" position, with the inspection door open, and with the main cover removed.

Referring to the drawings for describing in detail the structure which is illustrated therein, the reference charcater L indicates the main or outer housing. This may be made up of any suitable material, either sheet metal or otherwise, according to preference. In the drawings it is shown as being made from sheet metal.

The reference character G indicates the inner housing. This also may be made of any suitable material, but preferably is made of an insulating material such as slate or the like. It is formed with a bottom wall 1,

opposite side walls 2 and 3, a front wall 4, and a back wall 5. The front and back and side walls define a rectangle which is somewhat smaller than the main housing so as to provide side channels 6 and 7, a front channel 8 and a rear channel 9, all for the main and branch line wires. The main line wires may enter the outer housing at any desired point, as at 10, and extend into the channel 9 where they are connected with the bus bars 11, 12 and 13. The branch line wires likewise may enter the main housing at any desired point and lead thence through suitable openings 14, formed in the front wall of the inner housing, into connection with the branch line terminals 15 which are within the inner housing, all as clearly seen in Fig. 3.

The main cover consists of a rigid, substantially integral, rectangular frame 16 and a central door 17. The frame 16 is detachably connected to the side and front and back walls 18 of the main housing by means of screws or the like 19. The door 17 is hinged as at 20 to one of the side members of the frame 16. A spring latch 21 engages between the door and the opposite side member 16 to normally retain the door closed. The door is thus carried by and movable with the frame 16 at all times.

The front wall 4 and the side walls 2 and 3 of the inner housing are of such depth as to extend substantially to the inner surface of the adjacent members of the frame 16 and the side and end members of said frame are of a width to close the channels 6, 7, 8 and 9 regardless of whether the door 17 be opened or closed. The rear wall 5 of the inner housing, however, is of considerably less depth than the remaining walls so as to leave a wide open space 22 between its upper edge and the adjacent inner surface of the frame 16.

The auxiliary cover is formed entirely within the inner housing and is made up of a rear section 23, which extends continuously between the side walls 2 and 3 of said inner housing, being fixed to said side walls by brackets 24 and 25. A series of switch unit sections 26, and a like series of inspection doors 27 complete this cover and define a compartment, 28, within which the switch control elements are located.

The rear section 23 is arranged obliquely, its upper rear edge as 29 being close beneath the under surface of the main cover substantially in a plane directly above the wall 5 so as, in effect, to constitute a spaced extension of said wall 5. The lower forward edge, as 30, of the section 23 is spaced somewhat below the inner surface of the main cover and substantially a similiar distance in front of the front face of the wall 5, thus allowing for the wide open space 22 above referred to.

The intermediate portions of the lower edge 30 are fixed to supporting partitions 31. These partitions are arranged in the space beneath the auxiliary cover and may take any desired form. Preferably, however, they are shaped from sheet metal to provide flanges 32 and 33 at their upper and lower edges by means of which they may be connected to the edge 30 and to the bottom wall 1 respectively.

The switch unit sections 26 are detachably fixed to the upper surfaces of the flanges 32 in front of the edge 30, the outer sections being supported by the brackets 25, and each section 26 carries an independently operable switch mechanism 34, the operating handle, as 35, of which projects through a suitable opening, as 36, into the compartment 28.

Any suitable type of switch mechanisms may be employed but preferably a switch mechanism is employed which is similar to that shown and described in my pending application Serial No. 85,852, filed March 22, 1916, one of these is carried by and movable with each of the cover sections 26, and each switch mechanism includes a pivoted blade carrier 37 upon which a suitable number of double ended blades 38, for instance three as shown, is mounted for simultaneous movement by the handle 35. The rear ends of the blades 38 move into and out of engagement with the under surfaces of suitable main line contacts 39 which project forwardly from the upper surface of the rear wall 5, and the forward ends of said switch blades move into and out of engagement with the upper surfaces of branch line contacts 40 which are fixed to the bottom wall 1. The branch line contacts 40 are fashioned to provide fuse clips, as 41, which coöperate with fuse clips 42 to provide mounting for the fuses 43 through which current passes to the terminals 15 in the usual manner.

The inspection doors 27 of the auxiliary cover are hinged to the forward edges of the switch unit sections 26, as at 44, and their forward edges rest upon an angle bracket 45 which is fixed to the inner surface of the front wall 4.

Any suitable character of safety appliance may be used in connection with the doors 27 for retaining them against being opened while current is flowing, and for other purposes, but preferably the safety appliance employed, is similar to that shown and described in my pending application first above referred to. This includes a latch 46, movable to interengage with the angle 45 and to simultaneously control the position of the switch mechanism, also a guard member 53 movable with the door to positively prevent operation of the switch mechanism while the door is open.

A series of insulating partitions 47 is provided, one for each of the supporting par-

titions 31 and these serve, with the partitions 31, to divide the space beneath the auxiliary cover into a plurality of compartments to which access may be independently afforded by the respective inspection doors 27.

One of the inspection doors may be opened and the necessary repairs or renewal made without in any way disturbing the free passage of current in the adjacent compartments. The opening of the one inspection door will not in any way influence the remaining inspection doors and none of the remaining inspection doors may be opened except when its adjacent switch mechanism be thrown into the "off" position. The mechanism of each compartment is independent in all respects of the mechanism of the adjacent compartment and yet all of the compartments are formed within a single housing, have common bus bars, a common inspection opening (the opening 22) and the partitions defining the compartments are rigidly held by a common supporting member (as the member 23.)

Any one of the switch mechanisms 34, with their switch blades, may be bodily lifted out by removal of its respective section 26 at any time without disturbing any of the other units. All of this is accomplished in a structure in which the inspection doors 27 provide ample openings for the usual superficial examinations to which devices of this character are regularly subjected and in which the inspection doors can not be opened except when the mechanism protected thereby is in the "off" position, and in which the switch mechanisms themselves provide ample barriers for protecting the live main line contacts during such inspection, and in which a more thorough and complete examination may be made by the simple removal of a part which is normally fixed, (the main cover.)

Further, the structure thus evolved provides a much enlarged and well ventilated space for the bus bars, together with a well ventilated locality for the switch contact elements. In this connection it is noted that the heat generated by the operation of the switch blades finds an easy path of discharge through the opening 22 for dissipation into the channels 9, 6, 7 and 8. All of the switch blades and contacts may thus be maintained normally cool and no one switch blade is likely to become heated to any excessive extent.

The supporting partitions 31 are preferably cut away as at 48 and 49 to prevent possible arcing from either of the contacts 39, or 40.

The insulating partitions 47 are preferably connected with the supporting partitions 31 by means of brackets 50 which are designed to hold said insulating partitions substantially in alinement with the partitions 31 and in position beneath the edges of adjoining inspection doors 27 so that the upper edges of the insulating partitions constitute common abutments for said doors, as is clearly seen in Fig. 3.

The manner of connecting the bus bars is of considerable importance and consists in providing rearward extensions of the contacts 39 bent to provide supporting means for the bus bars adapted to hold the bus bars properly spaced away from each other and in their most appropriate positions within the channel 9. For the bus bar 11 there is a plurality of contacts 39 one for each switch compartment, and these collectively support the bus bar 11. For the bus bar 12 there is a plurality of contacts 39 one for each switch compartment, and these collectively support the bus bar 12. For the bus bar 13 there is a plurality of contacts 39 one for each switch compartment, and these collectively support the bus bar 13. The contacts 39 for the bus bar 11 are formed from strips of material which are bent upwardly and thence forwardly at their rear ends so as to carry the bus bar 11 in a position spaced above the upper edge of the wall 5. The contacts for the bus bars 12 and 13 are formed of strips of material all of which are of substantially identical shape and size, each having an off-set portion to which the respective bus bars are connected the strips for the bus bar 12 being in reversed position as compared with the strips for the bus bar 13 and thus supporting said bus bars 12 and 13 in superposed relation, the bus bar 12 being substantially in a common plane with the bus 11 and the bus bar 13 being in a plane below the bus bar 12, all as clearly indicated in Figs. 1 and 5. The bus bars are all contained between the side walls 2 and 3 within the channel 9, and the main line wires lead into said channel and are connected thereto as above described.

Note that the side walls 2 and 3 are continued rearwardly beyond the wall 5 as at 51 thus, in effect, placing the bus bars within an inner compartment formed by the inner housing. Where the main line wires lead in through the side walls 18 of the main housing a portion of one or both of the side walls 2 and 3 may be cut away to form an opening as at 52 to provide passage of the main line wires to the bus bars as clearly seen in Figs. 1 and 3.

Fig. 5 of the drawings illustrates the manner in which full inspection is afforded for all of the mechanism within the device. This shows the main cover to be removed and the inspection door 27 to be open. With the parts in this condition it will be seen that the front side of the switch mechanism, together with the fuses and connected contacts, may be fully inspected through the door opening, and that the rear side of the

switch mechanism with the bus bars and its contacts may be fully inspected through the opening indicated at X.

It should be noted that when installing for use the device of this invention, the main cover is omitted preferably until after the device is entirely set and all of its connections properly made. At this time the authorized inspector is able to gain access for inspecting every part, and the main cover is usually not placed in position until after the inspection is completed. This materially simplifies the work of the inspector and renders possible a more complete installation before the time of the inspection.

It is also important to note that the inclined position of the wall section 23 admirably provides for the wide open inspection space 22 while at the same time enabling the maintenance of symmetry in the shape and proportion of the parts of the main cover so that a desirable appearance is presented from without.

While it is herein shown and described that the mechanism 34 are of such character that one side of each is adapted to be inspected through the opening 22, while the opposite side of the same switch mechanism is adapted to be inspected through one of the door openings 27, nevertheless, it will be apparent that the full spirit of this invention will be equally present in instances where the opening 22 may serve for inspection of one switch unit, while the door opening 27 may serve for inspection of a switch unit which may, or may not, be capable of being seen through the opening 22, the underlying principle, in this respect, being that the opening 22 and the door openings, taken together, provide for ample inspection, from different sides, of all of the switch units, or mechanisms, which may be arranged within the box. Hence, wherever in the claims hereto appended, the term "switch mechanism", or its equivalent, is employed, said term is intended to include either a single switch unit, or mechanism, or a plurality of units or mechanisms.

As many changes could be made in this construction without departing from the scope of the invention as defined in the following claims, it is intended that all matter contained in the above description or shown in the accompanying drawings, shall be interpreted as illustrative only and not in a limiting sense.

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

1. A panel box comprising a main cover, an auxiliary cover within the box spaced beneath the main cover to provide a compartment between itself and the main cover, a switch mechanism in the space beneath the auxiliary cover having an operating handle projecting into said compartment, a partition wall arranged within the box defining a channel separated from the switch mechanism by said partition wall, said auxiliary cover extending short of said partition wall to leave an open space above said partition wall for the inspection of a portion of the switch mechanism, and means whereby at least a portion of the main cover is removable adjacent said opening to facilitate such inspection.

2. A panel box comprising a main cover, an auxiliary cover within the box spaced beneath the main cover to provide a compartment between itself and the main cover, switch mechanism in the space beneath the auxiliary cover having an operating handle projecting into said compartment, a partition wall arranged within the box defining a channel separated from the switch mechanism by said partition wall, said auxiliary cover extending short of said partition wall to leave an open space above said partition wall for the inspection of a portion of the switch mechanism, a portion of said auxiliary cover adjacent said opening being arranged at an incline and terminating adjacent the main cover at a point above said partition wall, and means whereby at least a portion of the main cover is removable adjacent said opening to facilitate such inspection.

3. A panel box comprising an inner housing and an outer housing, each having confining side walls, the inner housing being smaller than the outer housing and being positioned to provide wire channels between said side walls entirely surrounding the inner housing, a common cover for both housings, said cover having parts normally fixed in position covering the channels between the two housings and having a door part readily movable to give access to the inner housing, a switch mechanism within the inner housing adapted to be inspected from one side when said door is open, a portion of one of the side walls of the inner housing being omitted to provide an opening adjacent the relatively opposite side of the switch mechanism, and means whereby the normally fixed portion of the cover adjacent said mentioned opening is removable to provide for inspection of said opposite side of the switch mechanism when desired.

4. A panel box comprising an inner housing and an outer housing each having confining side walls, the inner housing being smaller than the outer housing and being positioned to provide wire channels between said side walls entirely surrounding the inner housing, a main cover common to both housings, said cover comprising a rectangular frame and a door movable to control the central opening thereof, the side members of the frame bridging between adjacent side

walls of the respective housings to close the wire channels, an auxiliary cover within the inner housing spaced beneath the door of the main cover to provide a compartment between itself and said door, a switch mechanism arranged within the inner housing in the space beneath the auxiliary cover and having an operating handle extending into said compartment, one side of the inner compartment having an opening provided therethrough adjacent the switch mechanism affording access to said switch mechanism from the adjacent wire channel, and the portion of the auxiliary cover between said switch mechanism and said opening being disposed at an incline substantially for the purpose set forth.

5. A panel box comprising a housing, a plurality of switch mechanisms arranged therein each having a movable switch blade, a plurality of contacts one for each switch blade, a partition wall arranged within the box defining a channel separated from said switch blades by said partition wall, said contacts comprising strips of suitable material mounted upon the upper edge of said partition wall extending transversely thereof having one end adapted to be engaged by the switch blade and having its other end projecting into said channel, and bus bars arranged within the channel being fixed to and supported by said second mentioned ends.

6. A panel box comprising an inner housing and an outer housing, the inner housing having opposite side walls and front and back walls all spaced from corresponding walls of the outer housing to provide channels therebetween, a plurality of switch mechanisms arranged within the inner housing, each having a movable blade, the back wall of the inner housing being of less height than the remaining walls and providing an opening between the adjacent channel and the interior of the inner housing, a plurality of contact members one for each switch blade mounted upon the upper edge of said back wall transversely thereof each having its forward end disposed for cooperation with the adjacent switch blade and having its rear end projecting into the adjacent channel, and a plurality of bus bars arranged within said last mentioned channel being fixed to and supported by the rear ends of said contact members.

7. A panel box, a cover therefor, a plurality of switch mechanisms arranged within the panel box beneath said cover having operating handles projecting through said cover, a series of supporting partitions arranged in the space beneath the cover dividing said space into a plurality of compartments one for each switch mechanism, said partitions comprising supporting means for said cover, a plurality of fuse devices at least one associated with each of said switch mechanisms inspection doors comprised in said cover one for the fuse device of each switch mechanism, and insulating partitions one arranged in continuation of each of said supporting partitions for insulating the respective fuse devices from each other.

8. A panel box comprising an inner housing and an outer housing arranged to provide wire channels between them, a cover for the inner housing, a plurality of partitions arranged in the space beneath said cover spaced apart across the width of the inner compartment dividing said space into a series of compartments, one wall of the inner cover having an opening provided therethrough communicating between the adjacent channel and all of the compartments formed by said partitions, a switch mechanism arranged within each of said compartments, said cover including a member which extends continuously across the inner housing being fixed to all of said partitions to properly space and support said partitions, and said mentioned member of the cover being arranged obliquely whereby to increase the size of said opening.

9. In a switch board, the combination with a switch mechanism, and a plurality of bus bars, of supporting members for said bus bars, which supporting members each comprise a strip of suitable material supported intermediate its length having one of its ends serving as a contact for the switch mechanism and having its other end serving as a support for a bus bar, said supporting members being of substantially similar shape and each having an off-set portion to which the bus bars are connected respectively and one of said supporting members being reversed with respect to the other to dispose its off-set portion for supporting its bus bar in a position spaced from the bus bar which is supported by the off-set portion of the other supporting member.

10. A panel box comprising an inner housing and an outer housing having their side walls arranged to provide wire channels between them, a partition wall arranged within the inner housing dividing the space within the inner housing into a plurality of compartments, switch mechanisms arranged one within each of said compartments, said partition wall traversing less than the full width of the inner housing and terminating short of one wall of the inner housing, and said mentioned wall of the inner housing being formed with an opening therethrough adjacent the end of said partition wall, all whereby said compartments are in communication with each other and with the wire channels.

11. A panel box made up of an inner housing and an outer housing, said housings

being of a size to provide an open space between them, a main cover common to both said housings, an auxiliary cover spaced beneath the main cover, switch mechanism beneath said auxiliary cover, means whereby the main cover is removable, the parts of said housings being disposed so as to expose for inspection both said mentioned open space and a portion of the switch mechanism when the main cover is removed, and a separately formed door part comprised in said auxiliary cover movable relative to the remainder of said auxiliary cover for exposing more of said switch mechanism.

12. A panel box made up of an inner housing and an outer housing, said housings being of a size to provide an open space between them, a main cover common to both said housings, an auxiliary cover spaced beneath the main cover, said auxiliary cover comprising a relatively stationary part and a relatively movable part, switch mechanism disposed beneath and protected by the relatively stationary part, the relatively movable part of said auxiliary cover being of a character to be removed for exposing to inspection a portion of the switch mechanism, and means whereby the main cover is removable, the parts of said housings being disposed so as to expose for inspection both said mentioned open space and more of said switch mechanism when the main cover is removed.

13. A panel box made up of an inner housing and an outer housing, said housings being of a size to provide an open space between them, a main cover common to both said housings, an auxiliary cover spaced beneath the main cover to provide a compartment between itself and the main cover, the main cover comprising a door removable to give access to said compartment, a switch mechanism arranged beneath said auxiliary cover and having an operating handle extending through the auxiliary cover into said compartment, the auxiliary cover comprising a separately formed inspection door disposed at one side of the switch mechanism adapted to be opened to provide for inspection of the adjacent side of the switch mechanism, and means whereby the main cover is removable, the parts of said housings being arranged so as to expose for inspection both said open space and the opposite side of said switch mechanism when the main cover is removed.

14. In a panel box made up of an inner housing and an outer housing, a main cover common to both said housings, an auxiliary cover spaced beneath the main cover, switch mechanism beneath said auxiliary cover, the auxiliary cover comprising a part removable for affording inspection of one portion of the switch mechanism, and means to prevent removal of said removable part of the auxiliary cover while the switch mechanism is "on," the combination therewith of means whereby the main cover is removable, and the parts of said housings being arranged so as to expose for inspection another portion of the switch mechanism when said main cover is removed.

15. A panel box comprising a housing, switch mechanism therein, the housing comprising two protecting walls spaced apart above the switch mechanism, means whereby one of said walls is bodily removable, each of said walls comprising a relatively stationary part and a relatively movable door part, and all of said parts being disposed so as to require opening of both of said mentioned movable door parts to provide for inspection of a portion of the switch mechanism, and so as to require bodily removal of said removable wall to provide for inspection of another portion of the switch mechanism.

16. A panel box comprising an inner housing and an outer housing, a switch mechanism within the inner housing, operating means for the switch mechanism, fuse retaining parts also within the inner housing associated with the switch mechanism, the outer housing comprising a movable door part movable to give access into a portion of the inner housing, the inner housing comprising a movable door part movable for giving access to said fuse retaining parts and for exposing for inspection a portion of the switch mechanism when said first mentioned door part is in open position, said outer housing comprising a detachable wall part, and all of said parts being arranged so as to expose for inspection another portion of the switch mechanism when said detachable wall part is detached.

17. A panel box comprising a housing, a switch mechanism within the housing, operating means for the switch mechanism, fuse retaining parts also within the housing associated with the switch mechanism, the housing comprising one removable wall part adapted to be removed for giving access to said fuse retaining parts and for exposing for inspection a portion of the switch mechanism, said housing comprising another removable wall part removable for exposing for inspection another portion of the switch mechanism, and said second mentioned wall part including a relatively movable door adapted to be opened for giving access to said first mentioned movable wall part while said second mentioned wall part is attached.

18. A panel box comprising a housing, a switch mechanism within the housing, operating means for the switch mechanism, the switch mechanism comprising a double-ended switch blade, a pair of contacts spaced apart adapted to be engaged by the opposite

ends of said switch blade, the housing comprising one removable wall part adapted to be removed for exposing for inspection one of said contacts, and the housing comprising another removable wall part removable for exposing for inspection the remaining contact.

19. In a panel box made up of an inner housing and an outer housing, a main cover common to both said housings, an auxiliary cover spaced beneath the main cover, switch mechanism beneath the auxiliary cover, the auxiliary cover having a door formed as one part thereof displaceable to give access to the switch mechanism, the main cover having a door formed as a part thereof displaceable to give access to the door of said auxiliary cover, and the main cover comprising another part which is displaceable to give access to the switch mechanism.

20. In a panel box made up of an inner housing and an outer housing, a main cover common to both said housings, an auxiliary cover spaced beneath the main cover, switch mechanism beneath the auxiliary cover, fuse retaining parts also beneath the auxiliary cover associated with said switch mechanism, the auxiliary cover having a door formed as one part thereof overlying said fuse retaining parts displaceable to give access to said fuse retaining parts and to expose for inspection a portion of the switch mechanism, and the main cover having a door formed as a part thereof displaceable to give access to the door of said auxiliary cover.

21. A panel box comprising a housing, a switch mechanism within the housing, operating means for the switch mechanism, the switch mechanism having two portions spaced apart and to each of which access is desirable, the housing comprising one removable wall part adapted to be removed for giving access to one of said parts of the switch mechanism and the housing comprising another removable wall part removable for giving access to the second part of the switch mechanism, said two parts of the switch mechanism being disposed so as not to be conveniently accessible at the same time by the removal of either one of said wall parts.

22. In a switch board, a base board, a plurality of bus bars, switch mechanism operatively associated with said bus bars, and means for supporting the bus bars from the base board comprising a plurality of supporting members, said supporting members being of substantially similar shape and each having an off-set portion to which the bus bars are connected respectively and one of said supporting members being reversed with respect to the other to dispose its off-set portion for supporting its bus bar in a position spaced from the bus bar which is supported by the off-set portion of the other supporting member, and said supporting members having parts connected with the base board.

23. A panel box comprising a housing, a switch mechanism within the housing, operating means for the switch mechanism, the switch mechanism having two portions spaced apart and to each of which access is desirable, the housing comprising one removable wall part adapted to be removed for giving access to one of said parts of the switch mechanism, the housing comprising another removable wall part removable for giving access to the second part of the switch mechanism, the housing providing a bus bar receiving space, and bus bars within said bus bar receiving space inaccessible upon removal of one of said removable wall parts but accessible upon removal of the other removable wall part.

24. A panel box comprising a housing, a switch mechanism within the housing, operating means for the switch mechanism, the switch mechanism having two portions spaced apart and to each of which access is desirable, the housing providing a bus bar receiving space and a fuse clip receiving space, bus bars and fuse clips in said spaces respectively, the bus bars being disposed so as to be accessible by removal of one of said wall parts, the fuse clips being disposed to be accessible by removal of the other wall part, and one portion of the switch mechanism being accessible by removal of one of said wall parts.

25. A panel box comprising a housing, a switch mechanism within the housing, operating means for the switch mechanism, the switch mechanism having two portions spaced apart and to each of which access is desirable, the housing providing a bus bar receiving space and a fuse clip receiving space, bus bars and fuse clips in said spaces respectively, the bus bars being disposed so as to be accessible by removal of one of said wall parts and the fuse slips being disposed to be accessible by removal of the other wall part, said bus bars and said fuse clips being disposed also so as not to be conveniently accessible both at the same time by removal of either one of said wall parts, and one portion of the switch mechanism being accessible by removal of one of said wall parts.

26. A panel box comprising a housing, a switch mechanism within the housing, operating means for the switch mechanism, the switch mechanism having two portions spaced apart and to each of which access is desirable, the housing having a relatively stationary part and two removable wall parts, and the switch mechanism being po-

sitioned beneath the relatively stationary part and the two mentioned portions thereof being adjacent the mentioned removable wall parts respectively so that said mentioned portions of the switch mechanism are independently accessible by removal of said removable wall parts.

27. A panel box comprising a housing, a switch blade within the housing, two conductor elements also within the housing with which the opposite ends of the switch blade connect, an operating handle connected with the switch blade, a member stationary with the housing by which said operating handle is supported, the housing having two removable wall parts one at each side of said stationary member, and said switch blade being positioned so that the opposite ends thereof and said conductor elements occupy positions accessible by removal of said removable wall parts respectively.

28. A panel box comprising a housing having a stationary wall part and having a removable wall part at one side of the stationary wall part, a switch mechanism within the housing beneath said stationary wall part, fuse clips within the housing at one side of said switch mechanism beneath said removable wall part, and the housing having a second removable wall part at the opposite side of said stationary wall part removable for giving access to a portion of the switch mechanism removed from said fuse clips.

29. A panel box comprising a housing having a stationary wall part and having a removable wall part, switch mechanism within the housing beneath said stationary wall part, fuse clips within the housing at one side of said switch mechanism beneath said removable wall part, interlock mechanism between said removable wall part and the switch mechanism for preventing removal of said removable wall part while the switch is "on," and the housing having a second removable wall part at the opposite side of said stationary wall part removable for giving access to a portion of the switch mechanism removed from said fuse clips.

30. A panel box comprising a housing having two removable wall parts the first of which may be removed independently of the second and both being removable for giving access into the housing, switch mechanism within the housing, interlock mechanism between the switch and the first removable wall part operable to prevent removal of said first removable wall part while the switch is "on," an operating handle for the switch mechanism, and a door movable into and out of position covering the operating handle and the first removable wall part.

31. A panel box comprising a main cover, an auxiliary cover spaced beneath the main cover to provide a compartment between itself and the main cover, a switch mechanism in the space beneath the auxiliary cover having an operating handle projecting into said compartment, and said main cover having a portion removable at a point for giving access to a portion of the switch mechanism.

32. A panel box, a plurality of partitions arranged within the box dividing the space within the box into a plurality of switch compartments, a plurality of switch mechanisms one within each of said compartments each having a supporting member connected with said partitions by which to support the respective switch mechanism, and said supporting members serving collectively to constitute in part a cover for the box.

33. A panel box, a plurality of partitions arranged within the box dividing the space within the box into a plurality of switch compartments, a cover part extending between and being fixed to all of said partitions serving to retain said partitions in position, and a plurality of switch mechanisms one within each of said compartments each having a supporting member extending between and connected to two adjacent partitions serving collectively to provide a further cover part for the box.

34. A panel box, a plurality of partitions arranged within the box dividing the space within the box into a plurality of switch compartments, a plurality of switch mechanisms one within each of said compartments each having a supporting member connected with said partitions by which to support the respective switch mechanism, said supporting members serving collectively to constitute in part a cover for the box, switch handles comprised in said switch mechanisms projecting beyond the said mentioned cover part, means completing the cover for the box, and a second cover spaced beyond the first cover and providing a compartment between the covers within which said switch handles are contained.

35. A panel box comprising a housing, a plurality of bus bars arranged within the housing, a switch mechanism also within the housing coöperative with said bus bars, fuse clips also within the housing, the housing having one removable wall part giving access to the fuse clips and to a portion of the switch mechanism, and the housing having a second removable wall part giving access to the bus bars and to another portion of the switch mechanism.

36. A panel box comprising a housing, a plurality of bus bars arranged within the housing, a plurality of switch mechanisms also within the housing arranged side by side longitudinally of the bus bars and being coöperative with the bus bars, the box having a plurality of removable cover parts

one for each switch mechanism removable independently of each other for giving access to the respective switch mechanisms, and the box having a further independently removable cover part removable for giving access to the bus bars and to all of said switch mechanisms.

37. A safety panel box made up of a housing having a removable main cover part, wall members defining an inclosure within the housing for the reception of switch mechanism and for forming channels within the housing outside the inclosure for the reception of elements associated with the switch mechanism, switch mechanism within the inclosure, a cover member for the switch mechanism within the inclosure spaced beneath the main cover so as to provide a compartment between itself and said main cover, operating means for the switch mechanism extending into said compartment, and certain of the wall members of said inclosure being arranged to provide for inspection of the switch mechanism upon removal of the main cover.

38. A safety panel box made up of a housing having a removable main cover part, wall members defining an inclosure within the housing for the reception of switch mechanism and for forming channels within the housing outside the inclosure for the reception of elements associated with the switch mechanism, switch mechanism within the inclosure, a cover member for the switch mechanism within the inclosure spaced beneath the main cover so as to provide a compartment between itself and said main cover, operating means for the switch mechanism extending into said compartment, said last mentioned cover having a door comprised therein for giving access to a portion of the switch mechanism, and certain of the wall members of said inclosure being arranged to provide for inspection of another portion of the switch mechanism upon removal of the main cover.

39. A panel box made up of a housing having a removable main cover, switch mechanism within said housing, a cover member for the switch mechanism also within the housing spaced beneath said main cover, operating means for said switch mechanism projecting through said second cover into the space between said second cover and said main cover, the second cover having a door for giving access to a portion of the switch mechanism, the main cover having a door for giving access to the door of the second cover, and the parts being arranged to provide for inspection of another portion of the switch mechanism upon removal of the main cover.

40. A panel box made up of a housing having a main cover, switch mechanism within the housing, an auxiliary cover for the switch mechanism beneath the main cover, the auxiliary cover having a part removable to give access to the switch mechanism, and said main cover being constructed to provide access to the mentioned part of the auxiliary cover and being removable independently of the auxiliary cover also for giving access to said switch mechanism.

41. A panel box made up of a housing having a main cover, switch mechanism within the housing, an auxiliary cover for the switch mechanism beneath the main cover, a door comprised in the auxiliary cover for giving access to a portion of the switch mechanism, a door comprised in the main cover for giving access to the door of the auxiliary cover, and the main cover being removable for giving access to another portion of the switch mechanism.

42. In a switch panel, a base board, a bus bar extending therealong, a plurality of independently operable switch mechanisms spaced apart along the length of the bus bar adapted for making electrical connection with the bus bar, means providing independent compartments for said switch mechanisms each of said compartments having a separate door giving access thereto, and a removable guard member for said doors collectively.

43. In a panel box made up of a housing having a main cover, an auxiliary cover spaced beneath the main cover, switch mechanism beneath the auxiliary cover, fuse retaining parts also beneath the auxiliary cover associated with said switch mechanism, the auxiliary cover having a door formed as a part thereof displaceable to give access to said fuse retaining parts and the main cover having a door formed as a part thereof displaceable to give access to the door of the auxiliary cover.

44. In a panel box made up of a housing having a main cover, an auxiliary cover spaced beneath the main cover, switch mechanism supported by the auxiliary cover depending from the under surface thereof, the auxiliary cover having a door formed as one part thereof displaceable to give access to the space therebeneath, and the main cover having a door formed as a part thereof displaceable to give access to the door of the auxiliary cover.

45. In a panel box made up of a housing having a main cover, an auxiliary cover spaced beneath the main cover, switch mechanism supported by the auxiliary cover depending from the under surface thereof, operating means for said switch mechanism extending outwardly therefrom through said auxiliary cover into the space between said covers, and the main cover having a door formed as a part thereof displaceable to give access to said operating means.

46. In a panel box made up of a housing having a main cover, an auxiliary cover spaced beneath the main cover, switch mechanism supported by the auxiliary cover depending from the under surface thereof, operating means for said switch mechanism extending outwardly therefrom through said auxiliary cover into the space between said covers, fuse retaining parts associated with the switch mechanism, said auxiliary cover having a door formed as a part thereof displaceable to give access to said fuse retaining parts, and the main cover having a door formed as a part thereof displaceable to give access to said operating means and to the door of the auxiliary cover.

47. A panel box, a plurality of switch mechanisms arranged within the box, separate supporting members for said switch mechanisms serving collectively to constitute in part a cover for the box, switch handles comprised in the switch mechanisms projecting beyond said mentioned cover, fuse retaining parts associated with said switch mechanisms respectively, said cover including as another part thereof doors for giving independent access to the fuse retaining parts of the respective switches, and a second cover spaced beyond the first cover for providing a compartment between the covers within which said switch handles are contained.

48. A panel box, a bus bar arranged within said box, a plurality of switch mechanisms arranged within the box spaced side by side along the length of the bus bar, separate supporting members for said switch mechanisms serving collectively to constitute in part a cover for said box, switch handles comprised in the switch mechanisms projecting beyond said mentioned cover, fuse retaining parts associated with said switch mechanisms respectively, said cover including as another part thereof doors for giving independent access to the fuse retaining parts of the respective switches, and a second cover spaced beyond the first cover for providing a compartment between the covers within which said switch handles are contained.

In testimony whereof I affix my signature in the presence of two witnesses.

HUBERT F. KRANTZ.

Witnesses:
J. A. NEWTON,
S. L. WHITLOCK.