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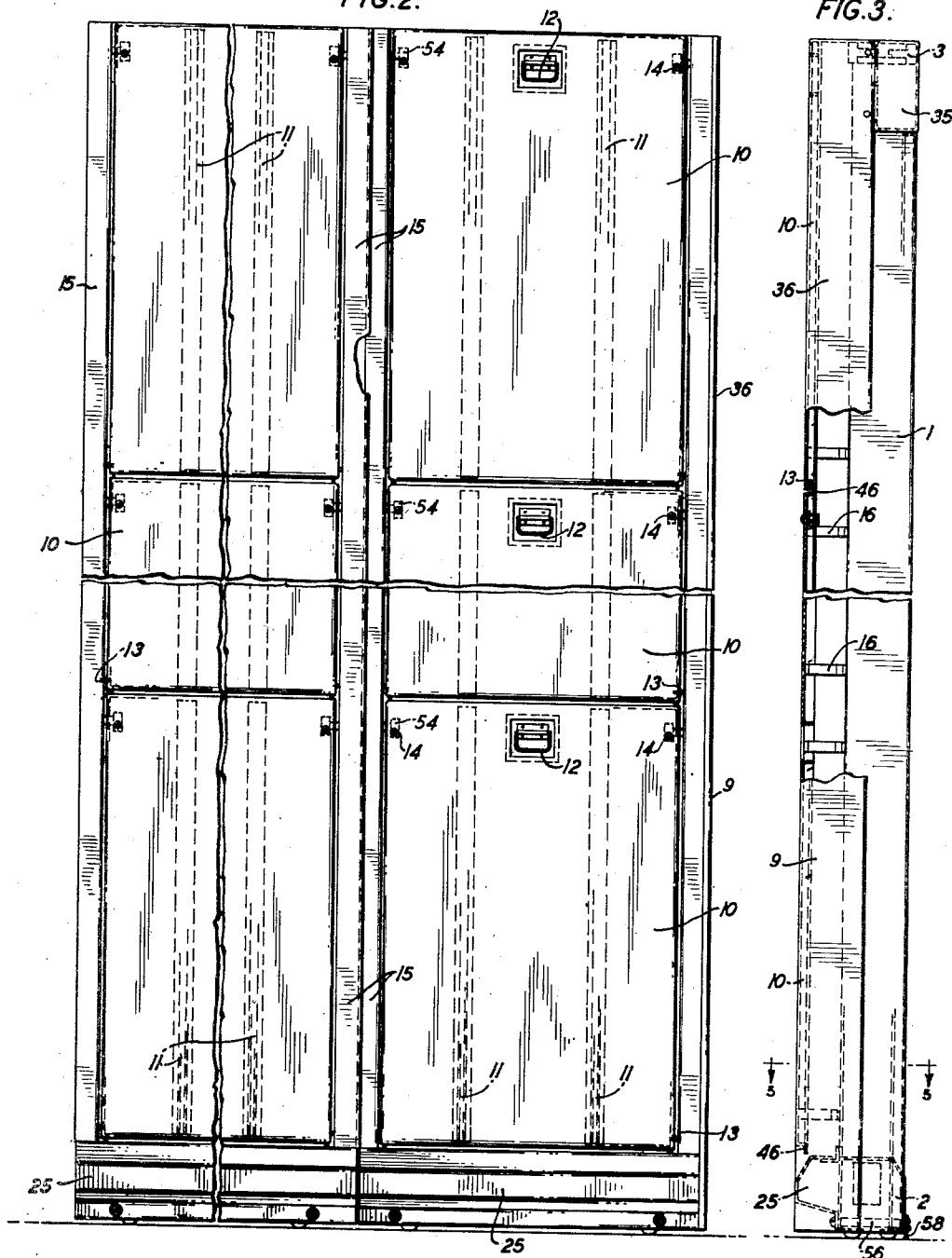
7 Sheets-Sheet 1

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Filed Nov. 14, 1947

FIG. 2.

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SWITCHBOARD

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FIG. 4.

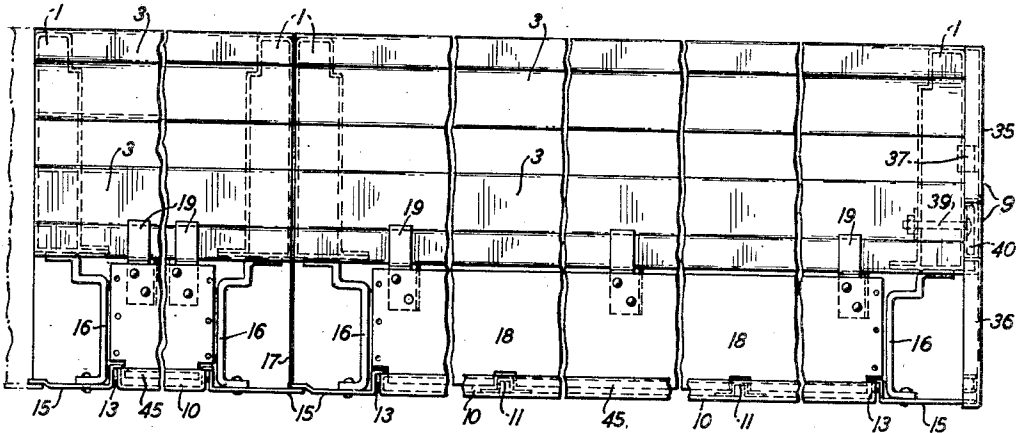


FIG. 5.

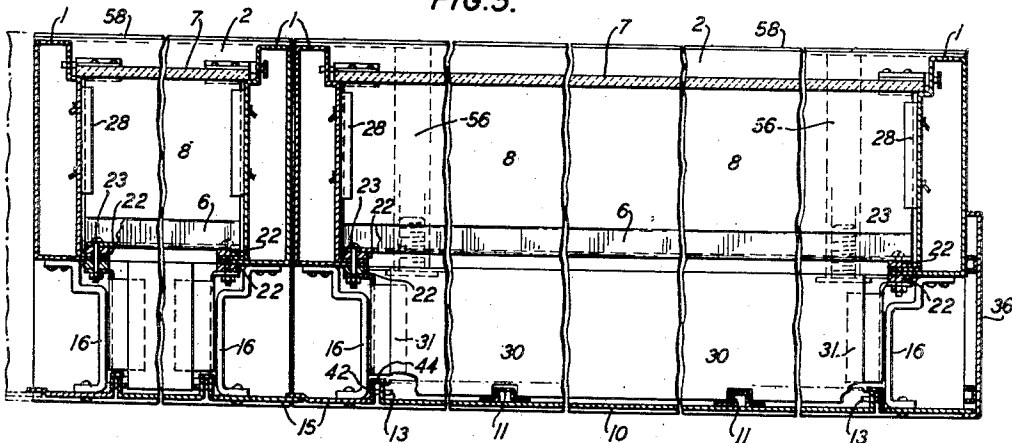


FIG. 6.

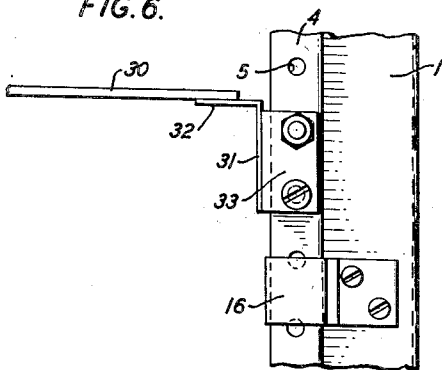
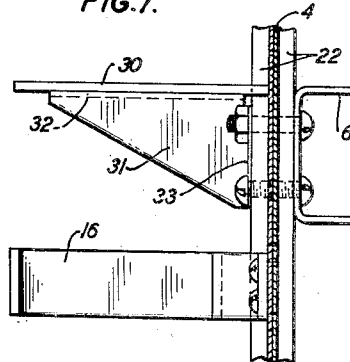


FIG. 7.



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FIG. 8.

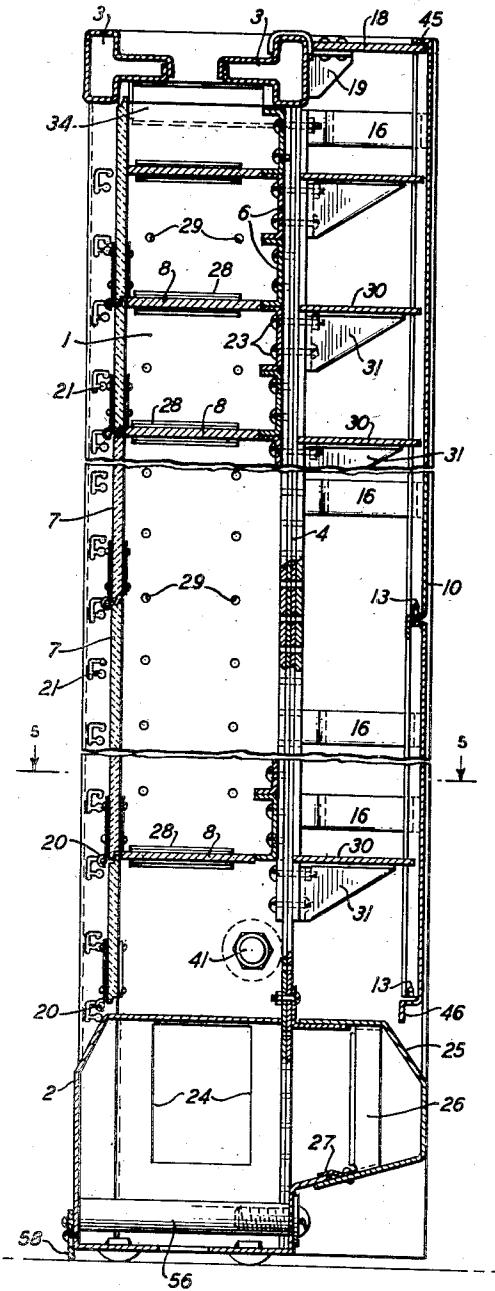


FIG. 9.

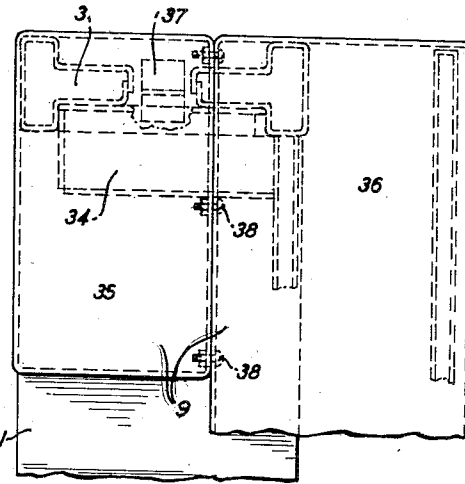


FIG. 11.

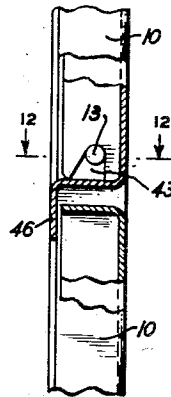


FIG. 10.

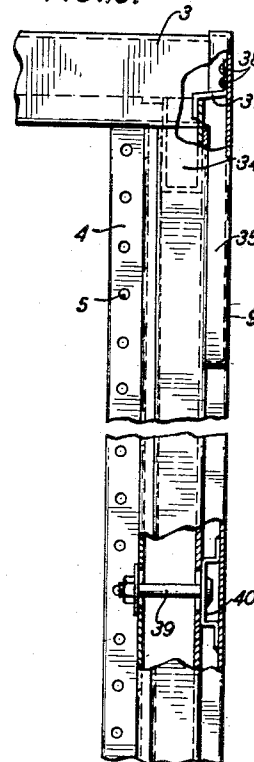
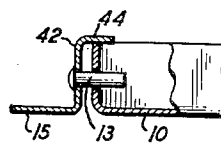


FIG. 12.



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FIG. 13.

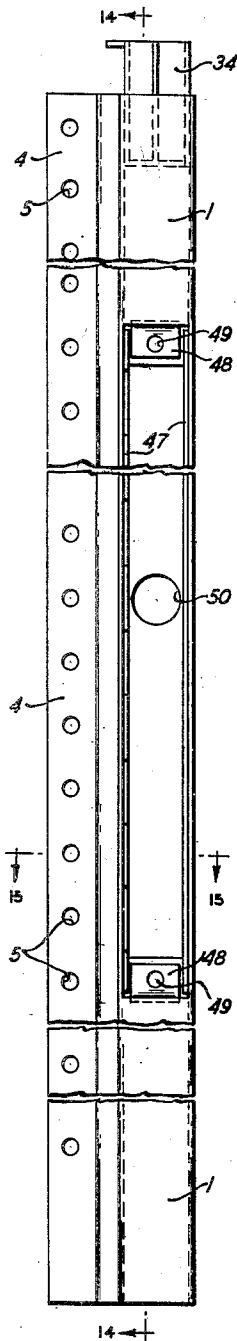


FIG. 14.

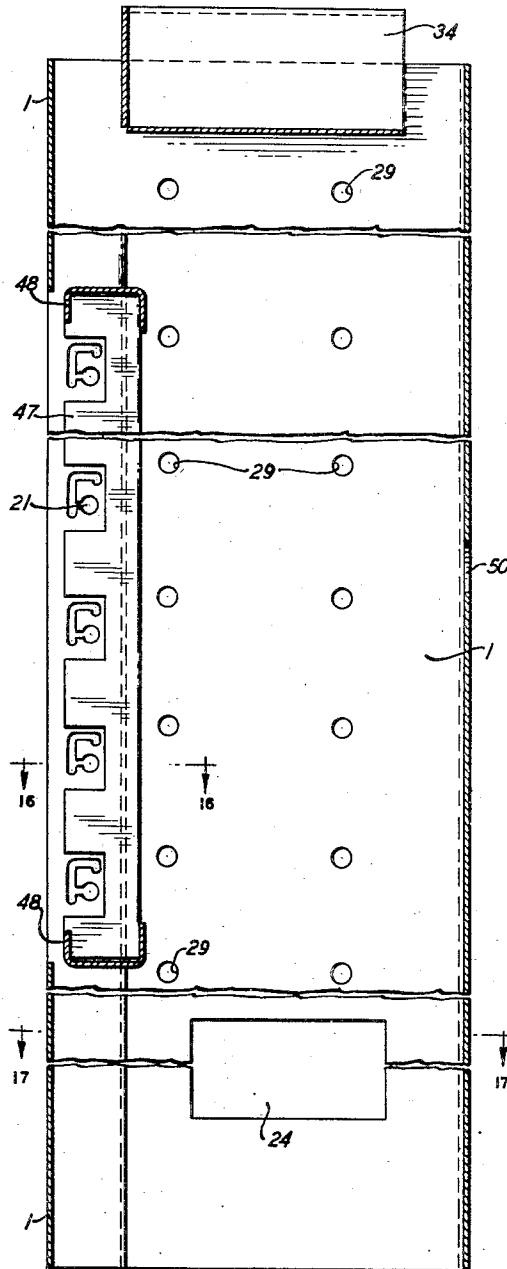


FIG. 15.

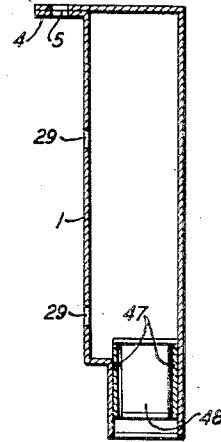


FIG. 16.

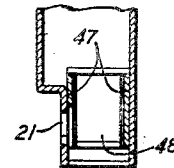
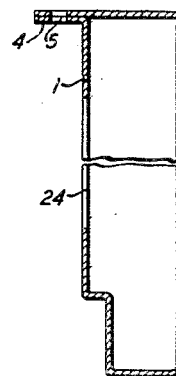


FIG. 17.



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FIG. 18.

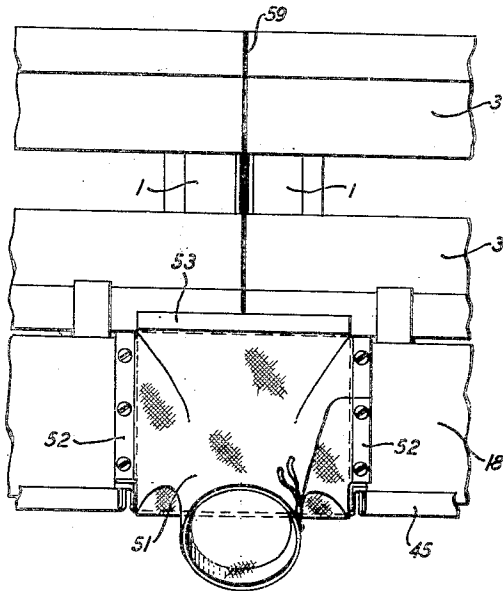


FIG. 19.

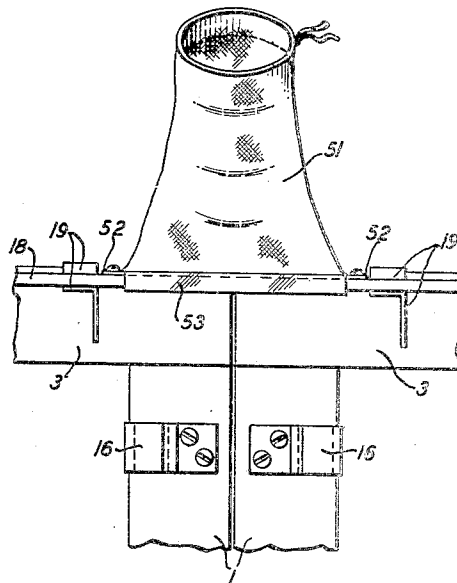
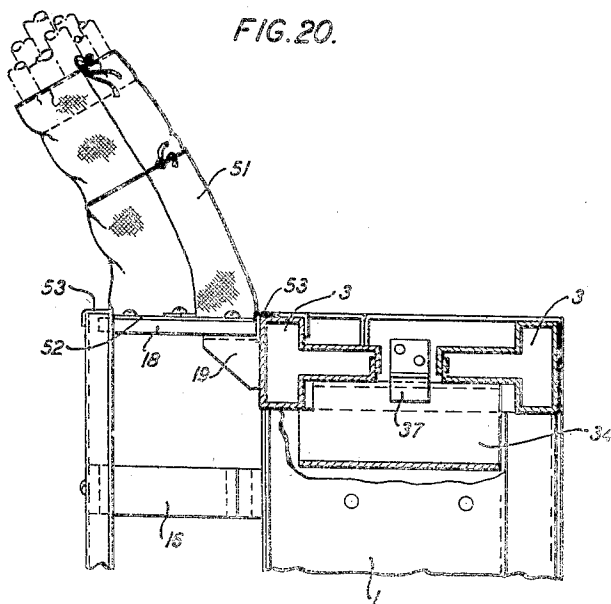


FIG. 20.



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FIG. 23.

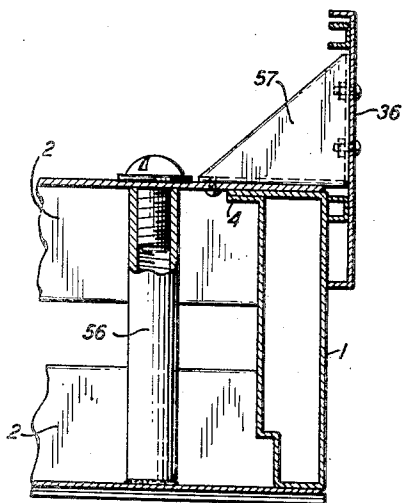


FIG. 21.

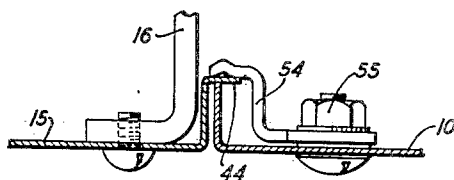


FIG. 22.

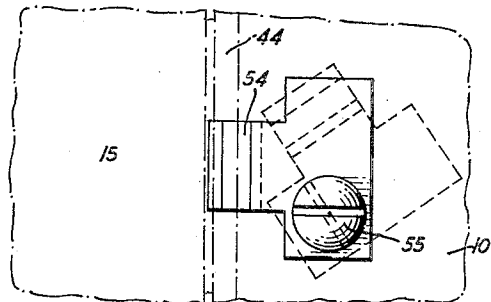


FIG. 24.

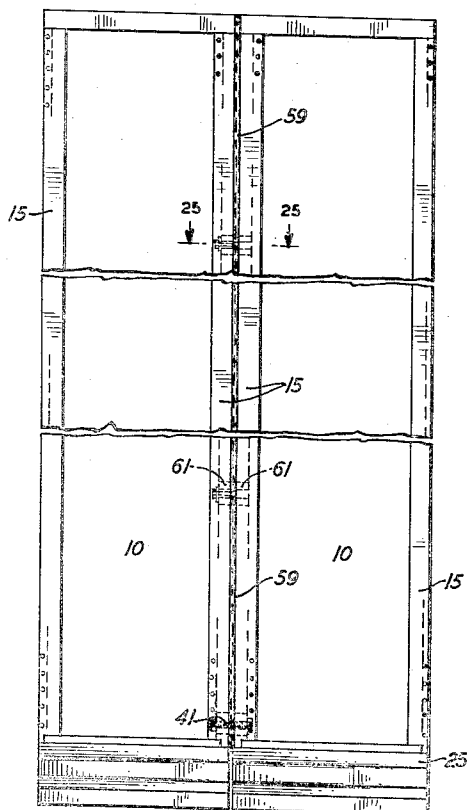
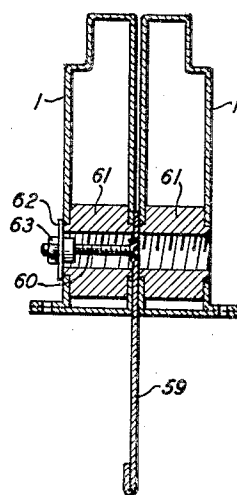


FIG. 25.



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2,577,101

SWITCHBOARD

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Application November 14, 1947, Serial No. 786,102

10 Claims. (Cl. 312—107)

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This invention relates to a frame for supporting electrical apparatus and more particularly to a switchboard frame.

In order to meet the requirements for a relatively light, compact, convenient and dustproof frame for supporting electrical apparatus employed in telephone switching systems, a frame in accordance with the present invention has been devised in which the major elements are light sheet metal members and in which covers are utilized to completely enclose the apparatus contained within the frame. The employment of formed sheet metal columns and girders in place of the solid channels most commonly used, has resulted in increased strength, markedly reduced weight, and an appreciable reduction in space requirements. Improved appearance and greater convenience are also attained by this construction inasmuch as cabling and apparatus auxiliary to the functioning of the switches may be placed within the hollow members. The removable dustproof covers completely enclose the front and rear of the frames, and the front covers incorporate a novel hinging means which is more completely disclosed in the copending application to E. T. Ball, Serial No. 786,103, filed November 14, 1947.

An object of this invention is to provide a strong, light frame for supporting electrical apparatus.

Another object is to completely enclose a frame to provide substantially dustproof protection for apparatus mounted therein.

Another object is to protect apparatus mounted in a frame from damage by fire.

A further object is to improve the appearance of the switching central by completely enclosing all switches and associated apparatus within frames.

Further objects and advantages of the invention will become apparent by reference to the drawings accompanying this specification in which:

Fig. 1 is an elevational view of a switchboard frame constructed in accordance with the invention;

Figs. 2 and 3 are rear and side views, respectively, of a frame showing the rear cover;

Fig. 4 is a top view of the frame;

Fig. 5 is a plan sectional view through 5—5 of Figs. 3 and 8;

Figs. 6 and 7 are front and side views, respectively, of the bracket support for the rear baffles;

Fig. 8 is a side view in section of the frame shown in Fig. 1;

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Fig. 9 is a partial side view of a frame with the end plates in place;

Fig. 10 is a partial elevation of one corner of the frame;

Fig. 11 is an enlarged section of the joint between adjacent rear covers;

Fig. 12 is an elevational view of a section through 12—12 of Fig. 11;

Fig. 13 is a front view of one of the upright members;

Fig. 14 is a side view in partial section of one of the upright members through 14—14 of Fig. 13;

Fig. 15 is a top sectional view through 15—15 of Fig. 13;

Fig. 16 is a top sectional view through 16—16 of Fig. 14;

Fig. 17 is a top sectional view through 17—17 of Fig. 14;

Figs. 18, 19 and 20 are top, rear and end views, respectively, of the cable boot assembly;

Figs. 21 and 22 are elevational and plan views, respectively, of the latches for securing the rear covers to the frame;

Fig. 23 is a sectional plan view showing the details of the hoisting tube construction;

Fig. 24 is a front view showing a means for interconnecting two frames and for supporting a vertical baffle; and

Fig. 25 is a sectional plan view through 25—25 of Fig. 24.

Referring now particularly to Figs. 1, 2, 3, 4, 6 and 8 showing the general construction of the embodiment of the invention disclosed herein, the frame comprises essentially a pair of tubular uprights 1, a base member 2, and a top member 3, all of which are formed of sheet steel, sheet aluminum, or other suitable metal into tubular shape. The base member 2 is welded or otherwise affixed to the lower ends of the uprights 1, and the top member 3 is similarly attached across the upper ends of the uprights 1. Each upright 1 is of a substantially rectangular cross-section and has a flange 4 formed integrally therewith as shall be hereinafter described. These flanges 4 have a plurality of apertures 5 throughout their length by means of which light channels 6 (Fig. 1) or other members may be attached to the uprights 1 to act as mounting panels for the apparatus contained within the frame. A front cover is provided comprising a plurality of panels 7 rotatably mounted about hinges 23 which are arranged to engage apertures in the uprights 1. As may be seen in the cut-away portion of Fig. 1 a plurality of dust- and fire-baffles 8 are suitably

mounted between the uprights 1. Constructed of treated wood, metal, metal-covered wood, or other suitable fire-resistance material, they serve to divide the frame into small compartments so that the opening of a single panel 7 will not expose all of the apparatus mounted within the frame to dust and so that a fire starting in a given compartment will be prevented from spreading to other compartments. At the left of Fig. 1 may be seen a finish plate 9 which covers the end of the final frame in a series. A slotted trim strip 58 along the bottom of the front edge of the frame is adjustable to conceal floor irregularities.

As shown in Figs. 2, 3 and 4, the rear of the frame is enclosed by a plurality of rear covers 10 each comprising a sheet metal pan with reinforcing elements 11. Handles 12 may be provided. The rear covers 10 are retained in position on the frame by means of pins 13 and latches 14 as will be hereinafter described. As may best be seen in Fig. 4, the rear covers 10 are supported by sheet metal cable-run covers 15 which are arranged so as to overlap one another at the joint with the adjacent frame. The covers 15 are, in turn, bolted to or otherwise supported by a series of brackets 16 which are substantially C-shaped and are mounted upon the uprights 1 so that when two frames are mounted adjacent, a channel 17 is provided through which electrical cable may be run. By this construction it may be seen that an enclosed space is provided at the rear of the frame into which the terminals of apparatus mounted within the frame may extend. As may be seen in Figs. 4 and 8 this area is enclosed at the top by a plate 18 supported by a series of brackets 19 mounted on an element of the top member 3.

Referring now to Fig. 8 in which certain of the above-mentioned members may be seen more clearly, the panels 7 of the front cover are supported by hinge pins 20 engaging apertures 21 in the uprights 1 and may be placed in any mating pair of apertures to position the panels in relation to the apparatus mounted within the frame. Since the panels 7 are rabbeted so as to be interlocking, the apertures 21 are suitably shaped so that the panels may be freed of the interlocking engagement and then opened or removed, as is more completely disclosed in the above-identified copending application. The top member 3 is shown as comprising two substantially T-shaped tubes welded or otherwise affixed to the uprights 1. A U-shaped bracket 34 is welded across the tubes of top member 3 and extends downwardly a short distance into uprights 1 to provide additional rigidity. As shown in Figs. 5 and 15, each upright 1 has a flange 4 thereon formed by bending one side wall outwardly at right angles and welding or otherwise affixing it to an extension of the rear wall. Additional plates 22 may be placed on either side of flange 4 to strengthen the structure. Apertures 5 in flange 4 are provided for mounting the channel apparatus panels 6 by means of bolts 23. Adjacent uprights 1 in adjacent switchboard frames are interconnected by means of a bolt 41 (Fig. 8).

Base member 2 (Fig. 8) is adapted to contain auxiliary equipment such as fuse panels, frame filters, convenience outlets, power distribution arrangements, and indicating lamps. A base rear cover 25 having a stiffener 26 therein is arranged with a lip joint 27 so as to be readily removable for access to the apparatus in the base member 2.

The front baffles 8, as shown in Figs. 5 and 8, slidably engage light channel members 28 which are retained in apertures 29 by clamps, screws, or other means. The front baffles 8 are shaped so as to extend laterally from upright 1 to upright 1 and from the apparatus supporting channel 6 to the panel 7 of the front cover and are mountable in any of the mating sets of apertures 29 to position the baffles in relation to the front cover panels 7. To perform a function similar to that of the front baffles, a plurality of rear baffles 30 are placed so as to extend from the upright 1 rearwardly to the rear covers 10, and from cable bracket 16 to cable bracket 16. Suitable notches are cut at the rear of each baffle 30 into which the reinforcing elements 11 on the rear covers 10 may fit. Each end of a rear baffle 30 is supported as may be seen in Figs. 6, 7 and 8 by brackets 31 formed of sheet metal so as to have a horizontal portion 32 upon which the baffle 30 may rest and a portion 33 attachable to the flange 4 of upright 1.

The end frame of a row of frames is provided with a finish end plate 9 as may be seen in top view in Fig. 4, in side elevation in Fig. 9, and in end elevation in Fig. 10. The above-mentioned U-shaped bracket 34 serves as a stiffener for the top members 3 and also serves to support the finish plate 9. The finish plates 9 comprise two sections: a small pan-shaped sheet metal portion 35 towards the front of the frame and a long pan-shaped sheet metal portion 36 towards the rear of the frame. The forward portion 35 is affixed to the bracket 34 by means of an overhanging clip 37, shown in Fig. 10, and is attached to the rearward portion 36 by means of bolts 38. The rearward portion 36 is further affixed to uprights 1 by means of a bolt 39 (Figs. 4 and 10) passing through apertures in the upright 1 and to a bracket 40 secured to the end plate portion 36. Also evident in Fig. 23 is a base bracket 57 to secure the finish end plate 36 to the frame.

The method of attaching the rear covers 10 to the frame is depicted in side view in Fig. 8 and in top view in Fig. 4, with Figs. 11 and 12 being enlarged views of the joint between two adjacent rear covers 10. The overlapping cable-run covers 15 are bolted or otherwise attached to the cable bracket 16 as previously indicated. These overlapping covers 15 have pins 13 welded to a flange 42 bent at right angles to the major portion of the cover 15. Slots 43 are cut at the bottom of the inwardly extending flanges of each rear cover 10 and are arranged to be engageable with pins 13. To provide a dust-tight joint, the overlapped covers 15 have a further flanged portion 44 bent so as to be parallel to the major portion of said cover and thereby provide a tight metal fitting between the flange 44 and the flange of rear cover 10. As may be seen in Fig. 8, the top rear cover 10 has a flange 45 which is engageable with the metal top cover 18. A dust-tight fitting between adjacent covers is obtained by means of a downwardly extending flange 46 at the bottom of each cover, as is best disclosed in Fig. 11.

Figs. 21 and 22 are enlarged views of the latches 14 which hold the rear covers 10 in place on the frame. As was earlier indicated the edge flanges of the covers 10 fit tightly against the flanges 44 of the overlapped rear cover 15. Each latch 14 comprises a substantially T-shaped metallic element 54 eccentrically mounted about bolts 55 to cover 10. The base portion of the T-shaped element 54 is bent with two angles

therein so that it is adapted to engage the flange 44 of overlapped cover 15. It may be seen that since the eccentrically mounted element 54 is tightly held by bolt 55, each cover may be attached to the frame by inserting it in its proper position upon its pins 13 and then turning the bolts 55 until the flanges of elements 54 are engaged with their respective flanges 44.

Figs. 13 and 14 are enlarged front and sectional side views, respectively, of one of the uprights 1, and Figs. 15, 16 and 17 are sectional views therethrough. In order to obviate the necessity of opening the frame to connect leads to apparatus mounted within the frame for purposes of testing, a jack panel may be mounted in one of the uprights 1 in each frame. These jacks may be service-observing jacks, other test jacks, inter-bay telephone jacks, or for any other electrical connection desired. To provide means for placing such a jack panel flush with the frame, a portion is cut out of the front of one or both of the uprights 1, and a bracket is secured therein comprising two side members 47 one of which has notches cut therein so as not to interfere with the apertures 21. The ends of the members 47 are joined by U-shaped clips 48 having apertures 49 therein by means of which a jack panel may be affixed to the bracket. An aperture 50 is cut in the rear of upright 1 so that leads to the jack panel may pass therethrough. A rectangular aperture 24 (Figs. 14 and 17) is cut in the side of the uprights 1 near the base thereof so that leads may be entered therethrough and passed up the length of the uprights 1.

As previously mentioned, the cable brackets 16 are conformed so as to form a channel 17 therebetween through which wiring cables or power leads may be passed. In order to meet the requirements for a substantially dust-tight installation, a cable boot 51 may be provided as shown in Figs. 18, 19 and 20. The boot 51 in the embodiment herein presented comprises a canvas sleeve of substantially rectangular cross-section at its base and of substantially circular cross-section throughout the major portion of its length. The rectangular base of the boot 51 is placed over the channel 17 and is attached to plates 18 at the top of adjacent frames by means of strips 52. The lower front and rear edges of the boot may have short overhanging portions 53 to provide a seal at the front and rear of the boot. After cabling has been passed through the boot, drawstrings are employed to fit the boot tightly around the cables.

As may be seen in Figs. 8 and 23, means is provided for expediting the handling of the frame during transportation and installation comprising a hoisting tube 56 affixed within the base member 2 by welding at the front and bolting at the rear, though other means of attachment may be employed.

Since the switchboard frames disclosed herein are adapted to be placed side by side to form banks of frames, a fire-resistant vertical baffle may be extended rearwardly to separate the rear portions of adjacent frames as is shown in the rear view of the frame of Fig. 24 and in the enlarged sectional plan view of Fig. 25. The vertical baffle 59 is attached to one of the uprights 1 at a series of points throughout its length by means of bolts 60 having their heads countersunk in the baffle 59 and extending through a reinforcing spacer 61, through an aperture in the upright 1, and then fastened through the washer 62 by a nut 63. The spacers

61 are tapped as shown for the purpose of screwing two switchboard frames together as shown at 41, Figs. 8 and 24, and also serve as a means for hoisting the frame when an eye-bolt is screwed therein. The frames may be further interconnected by the attaching of a gusset plate across the top member 3 of a series of switchboard frames.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth, or shown in the accompanying drawings, is to be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a switchboard frame, two uprights each formed from sheet metal into a tubular shape and having a flange extending outwardly therefrom, said two uprights being assembled with their flanges in alignment and extending toward each other, a base member formed from sheet metal into a tubular shape and having the ends thereof secured to the lower ends of said uprights, and a top member formed from sheet metal into a tubular shape and having the ends thereof secured to the upper ends of said uprights, the flanges of said uprights serving as supports to which apparatus mounting panels may be secured, a plurality of C-shaped brackets connected to each of said uprights and extending rearwardly therefrom, a front cover supported by said uprights, and a rear cover supported by said brackets, each of said brackets having its open portion facing outwardly from the frame with which it is associated whereby the brackets on adjacent frames form a channel through which cable may be passed.

2. In a switchboard frame, two uprights each formed from sheet metal into a tubular shape and having a flange extending outwardly therefrom, said two uprights being assembled with their flanges in alignment and extending toward each other, a base member formed from sheet metal into a tubular shape and having the ends thereof secured to the lower ends of said uprights, a top member formed from sheet metal into a tubular shape and having the ends thereof secured to the upper ends of said uprights, the flanges of said uprights serving as supports to which apparatus mounting panels may be secured, a plurality of brackets connected to each of said uprights and extending rearwardly therefrom, a front cover comprising a plurality of panels each pivotally mounted on said uprights, and a rear cover comprising a plurality of panels supported by said brackets, each of said brackets having its open portion facing outwardly from the frame with which it is associated whereby the brackets on adjacent frames form a channel through which cable may be passed.

3. In a switchboard frame, two uprights each formed from sheet metal into a tube of substantially rectangular cross-section and having the vertical edge of one side wall bent outwardly at right angles and secured to an extension of the rear wall to form a flange, said uprights being assembled with their flanges in alignment and extending toward each other, a base member formed from sheet metal into a box shape having its ends secured to the lower ends of said uprights, a top member formed from sheet metal into two parallelly extending tubular portions having their ends secured to the upper ends of said uprights, the flanges of said uprights serving as supports

to which apparatus mounting panels may be secured, a plurality of brackets connected to each of said uprights and extending rearwardly therefrom, a front cover supported by said uprights, and a rear cover supported by said brackets, each of said brackets having its open portion facing outwardly from the frame with which it is associated whereby the brackets on adjacent frames form a channel through which cable may be passed.

4. In a switchboard frame, two uprights each formed from sheet metal into a tubular shape and having a flange extending outwardly therefrom, said two uprights being assembled with their flanges in alignment and extending toward each other, a base member formed from sheet metal into a tubular shape and having the ends thereof secured to the lower ends of said uprights, a top member formed from sheet metal into a tubular shape and having the ends thereof secured to the upper ends of said uprights, the flanges of said uprights serving as supports to which apparatus mounting panels may be secured, a first plurality of horizontal baffles extending between said uprights, means for attaching said first plurality of baffles to said uprights, a second plurality of horizontal baffles supported on said uprights and extending rearwardly therefrom, and means for attaching said second plurality of baffles to said uprights.

5. In a switchboard frame, two uprights each formed from sheet metal into a tubular shape and having a flange extending outwardly therefrom, said two uprights being assembled with their flanges in alignment and extending toward each other, a base member formed from sheet metal into a tubular shape and having the ends thereof secured to the lower ends of said uprights, a top member formed from sheet metal into a tubular shape and having the ends thereof secured to the upper ends of said uprights, the flanges of said uprights serving as supports to which apparatus mounting panels may be secured, a plurality of brackets associated with each of said uprights and extending rearwardly therefrom, a front cover supported by said uprights, a rear cover supported by said brackets, a first plurality of horizontal baffles extending between said uprights, means for attaching said first plurality of baffles to said uprights, a second plurality of horizontal baffles supported on said uprights and extending rearwardly therefrom so as to extend from said uprights to said rear covers, and means for attaching said second plurality of baffles to said uprights.

6. In a switchboard frame arranged for alignment side by side with other switchboard frames, two uprights each formed from sheet metal into a tubular shape and having a flange extending outwardly therefrom, said two uprights being assembled with their flanges in alignment and extending toward each other, a base member formed from sheet metal into a tubular shape and having the ends thereof secured to the lower ends of said uprights, a top member formed from sheet metal into a tubular shape and having the ends thereof secured to the upper ends of said uprights, the flanges of said uprights serving as supports to which apparatus mounting panels may be secured, a plurality of brackets supported by said uprights and extending rearwardly therefrom, and a cable-run cover supported on said brackets and arranged to overlap the cable-run cover of the adjacent frame so as to completely enclose the cable run.

7. In a switchboard frame, two uprights each formed from sheet metal into a tube of substantially rectangular cross-section and having the vertical edge of one side wall bent outwardly at right angles and welded to an extension of the rear wall to form a flange, said uprights being assembled with their flanges in alignment and extending toward each other, a base member formed from sheet metal into a tubular shape having its ends secured to the lower ends of said uprights, a top member formed from sheet metal into two parallelly extending tubular portions having their ends secured to the upper ends of said uprights, the flanges of said uprights serving as supports to which apparatus mounting panels may be secured, said uprights, top member and base member having cut-out portions therein wherein auxiliary switching equipment may be placed, a plurality of brackets supported by each of said uprights and extending rearwardly therefrom, a front cover comprising a plurality of transparent panels each pivotally mounted on said uprights, a rear cover comprising a plurality of panels supported by said brackets, a first plurality of horizontal baffles extending between said uprights, means for attaching said first plurality of baffles to said uprights, a second plurality of horizontal baffles supported by said uprights and extending rearwardly therefrom so as to extend from said uprights to said rear cover, and means for attaching said second plurality of baffles to said uprights.

8. In a switchboard frame, two uprights each formed from sheet metal into a tubular shape and having a flange extending outwardly therefrom, said two uprights being assembled with their flanges in alignment and extending toward each other, a base member formed from sheet metal into a tubular shape and having the ends thereof secured to the lower ends of said uprights, a top member formed from sheet metal into a tubular shape and having the ends thereof secured to the upper ends of said uprights, the flanges of said uprights serving as supports to which apparatus mounting panels may be secured, a plurality of brackets supported by each of said uprights and extending rearwardly therefrom, a cable-run cover supported by the brackets on each of said uprights, an inwardly-extending flange on each of said cable covers, and a rear cover comprising a plurality of panels supported by said cable-run covers and arranged to rest against the flange on each of said cable-run covers so as to form a substantially dust-tight joint.

9. In a switchboard frame, two uprights each formed from sheet metal into a tubular shape and having a flange extending outwardly therefrom, said two uprights being assembled with their flanges in alignment and extending toward each other, a base member formed from sheet metal into a tubular shape and having the ends thereof secured to the lower ends of said uprights, a top member formed from sheet metal into a tubular shape and having the ends thereof secured to the upper ends of said uprights, a front cover comprising a plurality of panels each having hinging means arranged to engage apertures in said uprights, and means for affixing a jack panel to the frame comprising a bracket secured within one of said uprights in alignment with a rectangular aperture in the upright, said bracket having notches cut therein in register with the first-mentioned apertures.

10. In a switchboard frame, two uprights each

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formed from sheet metal into a tubular shape and having a flange extending outwardly therefrom, said two uprights being assembled with their flanges in alignment and extending toward each other, a base member formed from sheet metal into a tubular shape and having the ends thereof secured to the lower ends of said uprights, a top member formed from sheet metal into a tubular shape and having the ends thereof secured to the upper ends of said uprights, the flanges of said uprights serving as supports to which apparatus mounting panels may be secured, a plurality of brackets supported by each of said uprights and extending rearwardly therefrom, a front cover supported on said uprights, a rear cover supported by said brackets, a stiffener secured within one of said uprights and extending upwardly therefrom, and a finish end plate comprising a first portion secured to said

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stiffener and a second portion supported by said first portion and by the upright, said finish end plate extending so as to entirely enclose the end of the frame.

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