

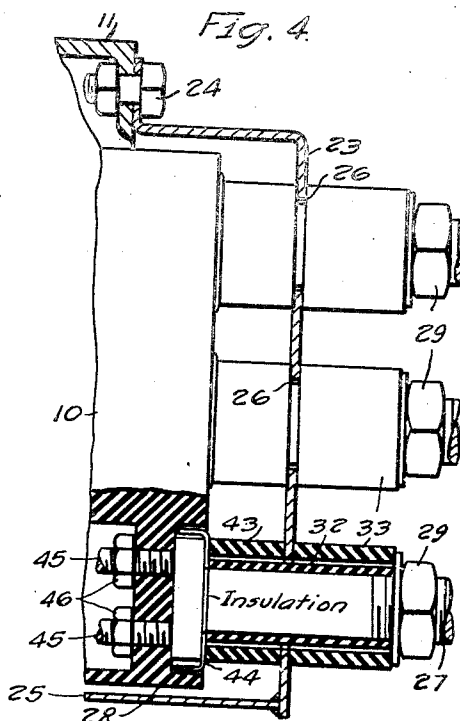
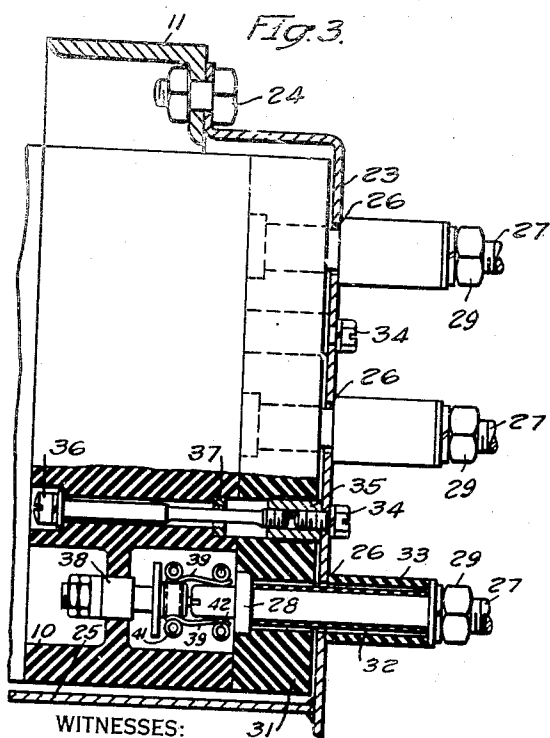
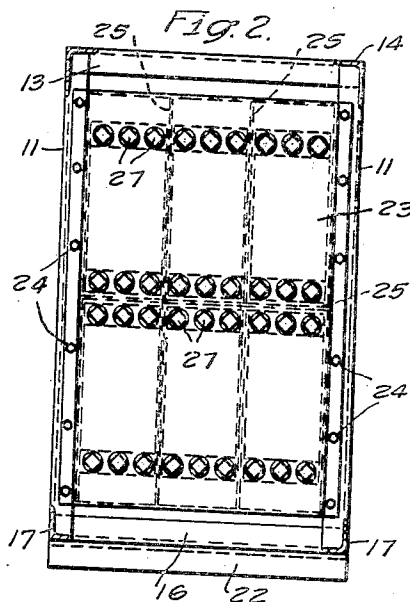
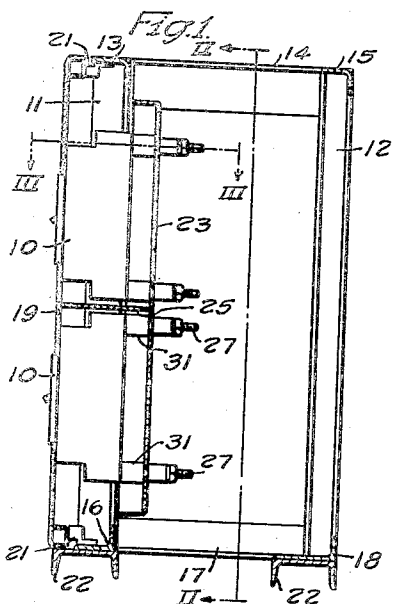
March 16, 1948.

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2,438,025

SWITCHBOARD

Filed Feb. 10, 1944



WITNESSES:

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2,438,025

SWITCHBOARD

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Application February 10, 1944, Serial No. 521,809

5 Claims. (Cl. 175—307)

1

My invention relates, generally, to switchboards and, more particularly, to switchboard structures for supporting automatic circuit breakers and similar switching apparatus.

In the construction of switchboards for use on ships, particularly Navy vessels, it is necessary to so mount the apparatus on the switchboards that it can withstand severe shocks. Heretofore, it has been customary to mount circuit breakers of certain types on heavy slabs of an impregnated fabric material reinforced by steel angles. This construction is heavy in order to resist shock from explosion and is expensive. It also requires a large amount of the impregnated material which at the present time is scarce and difficult to secure. Furthermore, it is inflammable and, therefore, constitutes a fire hazard.

An object of my invention, generally stated, is to provide an improved means for mounting electrical apparatus, such as circuit breakers, on switchboard structures.

A more specific object of my invention is to reduce the weight and cost of a mounting structure for switchgear apparatus.

Another object of my invention is to provide a mounting structure of the character described which shall be capable of withstanding severe shocks.

A further object of my invention is to reduce the fire hazard of a mounting structure for switchgear apparatus.

Other objects of my invention will be explained fully hereinafter or will be apparent to those skilled in the art.

In accordance with one embodiment of my invention, a plurality of circuit breaker units are mounted on a steel pan which is secured to a switchboard frame. The breaker terminal studs extend through holes in the pan and are insulated therefrom by insulating blocks and tubes which surround the studs. If desired, barriers may be secured to the pan to isolate the breaker units.

For a fuller understanding of the nature and objects of my invention, reference may be had to the following detailed description, taken in conjunction with the accompanying drawing, in which:

Figure 1 is a view, partially in elevation and partially in section, of a switchboard structure embodying the principal features of my invention;

Fig. 2 is a vertical section, taken along the line II—II of Fig. 1;

Fig. 3 is an enlarged view, in section, taken along the line III—III of Fig. 1; and

Fig. 4 is a view, similar to Fig. 3, showing a modification of the mounting structure.

Referring to the drawing, and particularly to Figs. 1 and 2, the structure shown therein com-

2

prises a plurality of enclosed switch units 10, a switchboard frame which may be of the usual type having upright members 11 and 12 disposed at the front and the rear thereof, respectively, and horizontal members 13, 14, 15, 16, 17 and 18 for tying the upright members together, a front panel 19 which may be removably secured to the frame by brackets 21 and a pair of channel members 22 for supporting the frame. Since the framework may be of the usual construction, it is believed to be unnecessary to describe it further at the present time.

In order to support the switch units 10 in the switchboard frame, a metal pan 23 may be removably secured to the upright members 11 by a plurality of bolts 24. If desired, the pan 23 may be welded to the switchboard frame. As shown, horizontally and vertically disposed barriers 25 may be welded to the pan 23 between the switch units 10 to reinforce the pan and isolate each switch unit from the other units.

As shown more clearly in Fig. 3, the pan 23 is provided with openings 26 for receiving terminal studs 27 for the switch units. Each stud 27 is provided with a shoulder 28 near one end and a nut 29 which is threaded on to the other end of the stud. The usual electrical connections (not shown) for the switch units may be secured to the portions of the studs which extend beyond the nuts 29.

As shown in Figs. 1 and 3, a pair of spacing blocks 31, composed of insulating material, is provided for each switch unit. The blocks 31 are disposed between the shoulders 28 of the studs 27 and the pan 23. An insulating sleeve 32 surrounds each stud 27 and extends through the opening 26. Another insulating sleeve 33 surrounds the sleeve 32 on each stud and is disposed between the pan 23 and the nut 29. Thus, it will be seen that when the nut 29 is tightened against the sleeve 33, the stud is securely held in the pan 23 and is completely insulated from the pan.

Each block 31 is secured to the pan 23 by bolts 34 which extend through the pan 23 and are threaded into metal inserts 35 disposed in the block 31. The switch unit 10 is supported by bolts 36 which are threaded into the end of the metal inserts 35 opposite the bolts 34. If desired, threaded inserts 37 may be provided in the housing for the switch unit 10 to prevent the bolts 36 from falling out of the housing when the switch unit is removed from the switchboard structure. When the bolts 36 are first inserted into the housing 10, they may be threaded through the inserts 37 and into the inserts 35 in the spacing blocks 31.

As shown in Fig. 3, the switch unit 10 may be electrically connected to the studs 27 by contact members of the plug-in type. Each contact member comprises a stud 38, which is preferably

3

molded into the housing for the switch unit, and a plurality of contact fingers 39 which are retained on the stud 38 by a garter spring 41 and are disposed to engage the end of the stud 27 when the switch unit is mounted in position on the spacing block 31. A garter spring 42 biases the fingers 39 against the stud 27.

In this manner, the switch unit 10 is mechanically secured to the pan 23 by the bolts 36 and electrically connected to the studs 27 by the plug-in contact members. A switch unit may be removed from in front of the switchboard structure by removing the panel 19 and unscrewing the bolts 36 from the inserts 35 in the spacing blocks 31. It is not necessary to disturb the electrical connections on the rear ends of the studs 27 in order to remove a switch unit.

In the structure shown in Fig. 4, in which like parts are designated by the same reference characters as in Fig. 3, the switch unit 10 is supported by the terminal studs 27. An insulating sleeve 43 is provided for each stud 27 in place of the insulating block 31 which is provided for each group of three studs in the structure shown in Fig. 3. The sleeves 43 surround the sleeves 32 and are disposed between the shoulder 28 on each stud and the pan 23. An insulating washer 44 may be disposed between the end of the sleeve 43 and shoulder 28 for additional protection if desired. Thus, when the nut 29 is drawn against the sleeve 33, the stud 27 is secured in position in the pan 23 and is completely insulated from the pan.

The switch unit 10 is both electrically and mechanically connected to the stud 27 by means of a pair of stud bolts 45 which are threaded into the shoulder 28 of the terminal stud 27. A nut 46 may be utilized on each bolt 45 to draw the housing for the switch unit 10 against the shoulder 28, thereby securing the switch unto the terminal stud. The necessary electrical connections for the switch unit 10 may be made to the studs 45 inside of the housing in the usual manner.

From the foregoing description, it is apparent that I have provided for mounting a plurality of switch units in a switchboard structure in a manner which is capable of withstanding severe shocks and which requires a relatively small amount of insulating material for satisfactorily insulating the switch units from the metallic members of the structure. Furthermore, the housings for the switch units are separated from the bus bars at the rear of the structure by the steel mounting pan, thereby reducing the danger of the switch units being set on fire by arcs drawn between the power conductors at the rear of the structure. Each switch unit may be isolated in a cell formed by barriers in the mounting pan as a further protection against communication of fire. Both the weight and the cost of the mounting structure are reduced as compared with prior structures requiring large amounts of heavy insulating material.

Since numerous changes may be made in the above described construction and different embodiments of the invention may be made without departing from the spirit and scope thereof, it is intended that all matter contained in the foregoing description or shown in the accompanying drawing, shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. In a switchboard structure having a supporting framework, a front panel removably attached to the framework, and a metal pan secured to the framework and spaced from the panel for supporting a plurality of apparatus units, in combination,

horizontal and vertical metal barriers extending between the panel and the pan and secured to said pan and disposed between the apparatus units to isolate each unit from the other units and reinforce the pan, said pan having a plurality of openings therein, terminal studs for the apparatus units disposed in said openings, insulating means for spacing the studs and the apparatus units from said pan, means for securing the studs to the pan, and means for connecting the apparatus units to the studs.

2. In a switchboard structure having a supporting framework, a front panel removably attached to the framework, and a metal pan secured to the framework and spaced from the panel for supporting a plurality of apparatus units, in combination, horizontal and vertical metal barriers extending between the panel and the pan and secured to said pan and disposed between the apparatus units to isolate each unit from the other units and reinforce the pan, said pan having a plurality of openings therein, terminal studs for the apparatus units disposed in said openings, an insulating sleeve surrounding each stud, insulating means surrounding said sleeves for spacing the apparatus units from the pan, means for securing the studs to the pan, and means for connecting the apparatus units to the studs.

3. In a switchboard structure having a supporting framework, a front panel removably attached to the framework, and a metal pan secured to the framework and spaced from the panel for supporting a plurality of apparatus units, in combination, horizontal and vertical metal barriers extending between the panel and the pan and secured to said pan and disposed between the apparatus units to isolate each unit from the other units and reinforce the pan, said pan having a plurality of openings therein, terminal studs for the apparatus units disposed in said openings, each stud having a shoulder near one end and a removable nut near the other end, an insulating sleeve surrounding each stud, spacing means surrounding said sleeves and disposed between said shoulders and the pan, additional spacing means disposed on said sleeves between the pan and said nuts, and means for connecting the apparatus units to the studs.

4. In a switchboard structure having a supporting framework, a front panel removably attached to the framework, and a metal pan secured to the framework and spaced from the panel for supporting a plurality of apparatus units, in combination, horizontal and vertical metal barriers extending between the panel and the pan and secured to said pan and disposed between the apparatus units to isolate each unit from the other units and reinforce the pan, said pan having a plurality of openings therein, terminal studs for the apparatus units disposed in said openings, an insulating sleeve surrounding each stud, insulating means surrounding said sleeves for spacing the apparatus units from the pan, means for removably securing the units to the pan, means for securing the studs to the pan, and means disposed in said units for removably engaging the studs.

5. In a switchboard structure having a supporting framework, a front panel removably attached to the framework, and a metal pan secured to the framework and spaced from the panel for supporting a plurality of apparatus units, in combination, horizontal and vertical metal barriers extending between the panel and the pan and secured to said pan and disposed be-

tween the apparatus units to isolate each unit from the other units and reinforce the pan, said pan having a plurality of openings therein, terminal studs for the apparatus units disposed in said openings, an insulating sleeve surrounding each stud, insulating means surrounding said sleeves for spacing the apparatus units from the pan, means for securing the insulating means to the pan, means for securing the units on said insulating means, means for securing the studs to the pan, and means for electrically connecting said units to the studs.

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