May 11, 1926. 1,584,623

W. E. McCOY

SWITCHBOARD

Filed April 23, 1920 2 Sheets-Sheet 1

Fig. 2.

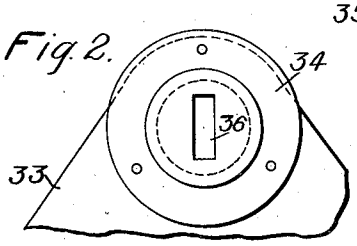
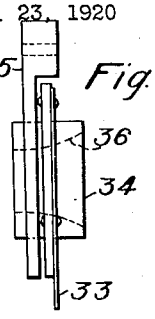


Fig. 3.



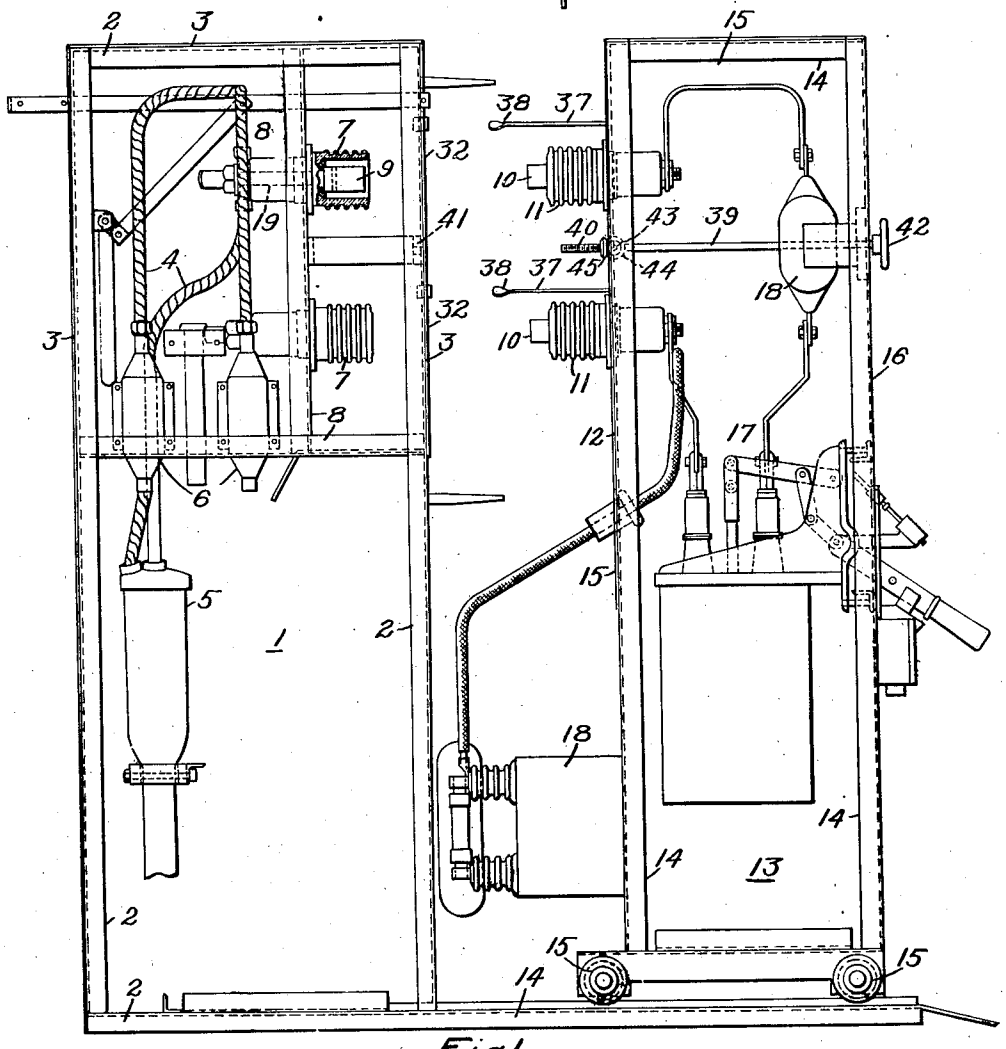


Fig. 1.

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Fig. 4.

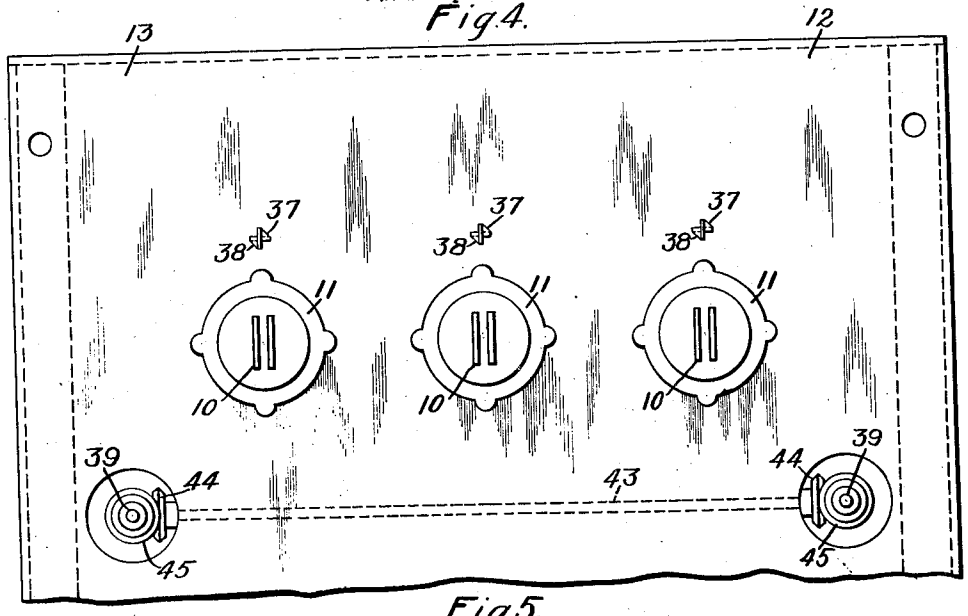


Fig. 5.

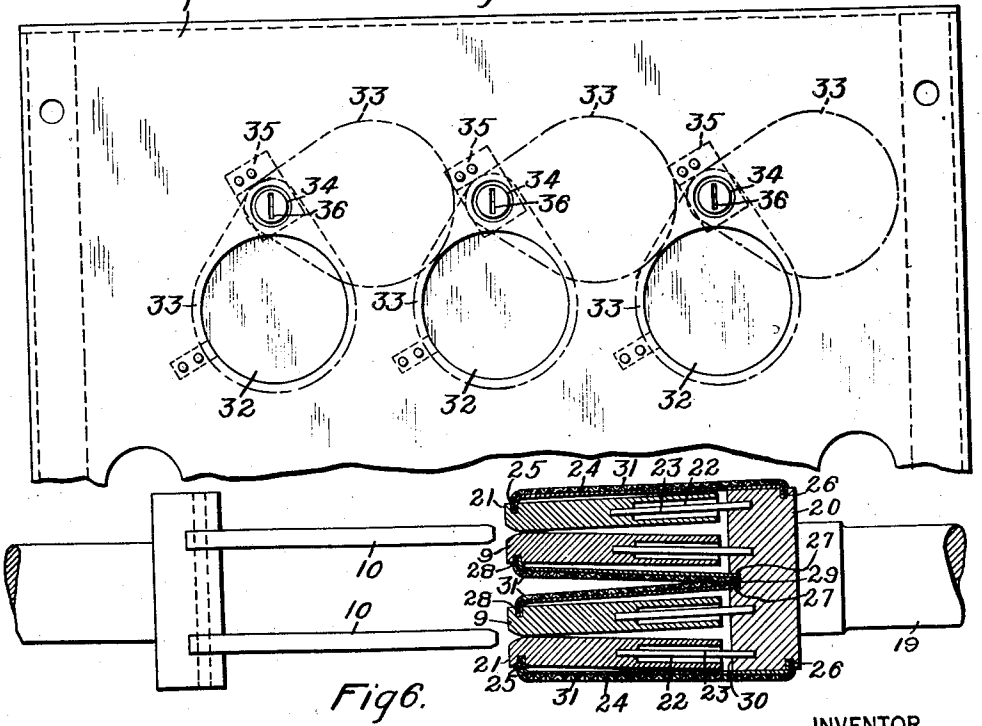


Fig 6.

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UNITED STATES PATENT OFFICE.

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SWITCHBOARD.

Application filed April 23, 1920. Serial No. 375,964.

My invention relates to switchboards and particularly to switchboard structures of the kind known as the truck type.

One object of my invention is to provide a device of the above indicated character in which the removable structure shall be permitted of effective locking to the stationary structure and in which the locking means shall be conveniently operable at the front of the switchboard from any of a plurality of positions to, not only, lock the structures together but to effect a final binding action to engage the co-operating contact members thereof in effective conducting relation.

Another object of my invention is to provide a truck-type switchbard or similar structure embodying an enclosing casing or safety partition that shall have openings or doors through which the engagement of co-operating contact members on the respective structures is effected and means responsive to the separation and engagement of the structures for closing and opening the said doors.

Another object of my invention is to provide a knife-blade or similar switch structure in which the jaw or co-operating receiving members shall be so universally movable and resiliently mounted with respect to the base portion of the jaw structure as to be readily adapted for effective engagement with the knife-blade or other co-operating member, irrespective of certain irregularities in the form and position of the latter.

Switchboard structures of the truck type usually comprise a stationary or fixed structure divided into sections or compartments in which the ends of the power lines or other live conducting parts are disposed. Movable casings or structures, carrying circuit interrupters, meters and other usual and well-known switchboard apparatus, are adapted to be fitted into the above mentioned sections or compartments to complete a structure that, in front view, somewhat resembles an ordinary switchboard. This construction provides the advantages that, for cleaning or inspection purposes and in the event of damage to any of the apparatus of the movable structure, the latter may be removed and a similar structure immediately substituted, thus permitting the inspection and repair work to be effected at the convenience of the operator and in safety and causing a minimum of interruption to the switchboard service.

In structures of this kind, certain features of construction and operation must be given special consideration to assure an effective, reliable device. For instance, inasmuch as the structures are relatively large and are constructed somwhat roughly, as compared with more delicate, electrical devices, there is much greater likelihood by reason of expansion, wear and slight dislocation of the parts, for the co-operating contact members to move out of alignment.

It is desirable, also, when one of the removable structures has been taken from its operative position and before a substitute structure therefor has been placed, that there be no exposed live parts on the stationary structure.

In practicing my invention, I provide means, responsive to the movements of placing and removing the substitute structures, for operating shutters or doors which cover the contact members on the stationary structures, means whereby the co-operating contact members on the respective structures may be automatically aligned and fitted, irrespective of discrepancies in the relation with which they approach each other and means, operable from any one of a plurality of conveniently-located positions at the front of the movable structure, for effecting a final binding thrust between the structures to ensure good conducting relation between the co-operating contact members and to lock the structures together.

Figure 1 of the accompanying drawings is a side view, partially in elevation and partially in section, of a truck-type switchboard structure embodying my invention; Figs. 2 and 3 are enlarged detailed views of a safety shutter therefor; Fig. 4 is a rear elevational view of a portion of the movable structure thereof; Fig. 5 is a front elevational view of a portion of the stationary structure, and Fig. 6 is a detail view, partially in section, and partially in elevation, of co-operating self-aligning contact mem-

bers mounted, respectively, on the stationary and the movable structure embodying my invention.

A stationary structure 1, shown in end or transverse view in Fig. 1, and which may extend longitudinally for a relatively-great distance similar to a usual switchboard structure, comprises, in general, structural frame or angle members 2, plates 3 that are secured to the members 2 and serve to render the structure of enclosed box-like character, enclosed conductors 4, electrical devices, such as a pot head 5, insulators 6 and insulators 7 supported by members 8 in spaced relation to the front plate 3.

The insulators 7 enclose and support contact jaw devices 9, shown more clearly in Fig. 6, for co-operation with contact blade members 10 that are exposed but similarly supported by insulators 11 on a rear wall 12 of a movable structure 13. A track or runway 14 on which the structure 13 is moved, by means of wheels 15, extends forwardly from the base of the stationary structure 1.

The movable structure 13, which may be one of several for side-by-side disposition and co-operation with one of the stationary structures 1, is, similarly to the structure 1, constructed of frame members 14, plates 15 and a front wall 16 corresponding to the front side of a usual switchboard. The usual switchboard devices, such as a circuit interrupter 17 and instrument transformers 18, are mounted on the movable structure 13.

As shown more clearly in Fig. 6, the contact jaw device 9 is disposed at one end of a conductor 19 that extends through the insulator 7 for connection to one of the conductors 4, as shown in Fig. 1, and comprises a base member 20, two pairs of contact jaw members 21 that are severally spaced from the base member 20 and have bores 22 at their inner ends, resilient members 23, such as piano wire, that are embedded and secured, at one end, in the base member 20 and, similarly attached to the jaw members 21 at their other ends at the bottoms of the bores 22 through which they extend, resilient members 24 that are disposed along the outer surfaces of the outer jaw members 21 and soldered or otherwise secured, at their outer ends, in slots 25, in, and adjacent to the outer ends of, the outer jaw members 21 and, at their inner ends, in slots 26 in, and adjacent to the inner end of, the base member 20. Resilient members 27, similar to the members 24, are similarly secured in slots 28 adjacent to the outer ends of the inner of the respective pairs of the contact jaw members 31 and are secured, at their inner ends, in a slot 29 in an outer or front face 30 of the base member 20.

Flexible conductors 31, preferably of braided copper, are disposed over each of the resilient members 24 and 27 and are secured, at their ends, in the slots 25, 26, 28 and 29, respectively.

The jaw members 21 of the respective pairs thereof are biased toward each other and, being yieldably suspended at their inner ends and at positions near their center portions by the resilient member 23, or, in other words, being pivoted at two points, are free for automatic substantially-universal adjustment to effect good contact engagement with the co-operating blade members 10. The bores 22 are of such diameter as to permit the rear ends of the members 21 to swing freely for a certain distance with respect to the resilient members 23.

The front plate 3 of the stationary structure 1, Figs. 1 and 5, is provided with a plurality of openings 32, opposite the contact jaw devices 10, over which shutters or plates 33, also shown in Figs. 2 and 3, are pivoted to bearing or sleeve members 34. The latter are supported, at one side by the front plate 3 of the structure 1 and, at the other side, by bracket or bearing arms 35 that are riveted or otherwise secured to the plate 3.

When the structures 1 and 13 are separated, the shutters 33 are moved to positions over the openings 32 to close the structure 1 and prevent the inadvertent or accidental engagement with the contact members 9.

The sleeves 34 are provided with centrally-disposed rectangular openings 36 that are tapered or enlarged at their outer ends for the ready reception of members 37 projecting from the rear wall 12 of the movable structure 13. The members 37, of slightly smaller rectangular cross section than, and similar to, the openings 36, are rounded or tapered at their outer ends to facilitate their entry to the openings 36 and, at a portion 38 somewhat removed from the outer ends, are twisted through an angle of substantially 90°. Thus, after the members 37 have entered the openings 36, the latter being on the axes of the sleeves 34, and, as the twisted portions 38 enter the openings, the shutters 33 will be given a right angular turn to the dotted-line positions, clear of the openings 32, as shown in Fig. 4, to permit the blade members 10 to engage the jaw members 9. When the structures 1 and 13 are separated, the reverse movement of the shutters 33 will occur, since the sleeves 34 will slide relative to the projections 37 and be positively actuated to their lower positions over the openings 32.

Shafts 39, as shown in Figs. 1 and 4, having threaded inner ends 40 for cooperation with interiorly threaded members 41 on the structure 1, extend through the structure 13 and are provided at their front ends, with hand wheels 42. A transversely-extending shaft 43, at the rear of the structure 13, is

provided, at its ends, with miter gear wheels 44 that coact with similar gear wheels 45, on the shafts 39. By this arrangement, after the structure 13 has been transported from a distance to position on the tracks 14, in close relation to the structure 1, the structure 13 may, by operating either of the hand wheels 42, be moved to operative position in a manner ensuring effective and secure engagement between the contact members 9 and 10. This facilitates the work of the operator by permitting him to finally engage and lock the structures from whatever position at the front of the structure 13 he may happen to occupy.

If any of the devices on one of the structures 13 becomes inoperative or if it be desired to inspect any of the apparatus thereof, the one such structure 13 may, by releasing the shafts 39 from the members 41, be removed from the switchboard without interfering with the other of the structures 13. When it is withdrawn, the members 37 will automatically move the shutters 33 to close the openings 32.

When replacing the same or a similar one of the structures 13 to operative position, the shutters 33 are automatically removed from the path of the contact members 10 that, irrespective of discrepancies of position or form, will engage the universally and yieldably-mounted jaw members 9 in good contact relation.

While I have shown and described a particular form of my invention, changes may be effected therein without departing from the spirit and scope thereof, as set forth in the appended claims.

I claim as my invention:

1. In a truck-type switchboard, the combination with a stationary structure and a movable co-operating structure therefor, of means carried by the movable structure and operable at the front thereof for securing said structures together.

2. In a truck-type switchboard, the combination with a stationary structure and a movable co-operating structure therefor, of means for securing said structures together at a plurality of positions and a single means for operating said securing means.

3. In a truck-type switchboard, the combination with a stationary structure and a movable co-operating structure therefor, of a plurality of means for securing said structures together and a single means for operating a plurality of said securing means.

4. In a truck-type switchboard, the combination with a stationary structure and a movable co-operating structure therefor, of a plurality of means for securing said structures together and a plurality of selective means for severally operating a plurality of said securing means.

5. In a truck-type switchboard, the combination with a stationary structure and a movable co-operating structure therefor, of a plurality of means for securing said structures together and a plurality of selective means for severally operating all of said securing means simultaneously.

6. In a truck-type switchboard, the combination with a stationary structure and a movable co-operating structure therefor, of screw-threaded receiving means on the stationary structure, a shaft extending through the movable structure having a threaded inner end for co-operation with said receiving means, and an operating member disposed on the shaft at the front face of the movable structure.

7. In a truck-type switchboard, the combination with a stationary structure and a movable cooperating structure therefor, of screw-threaded receiving means on the stationary structure, a plurality of operatively-connected rods extending through the movable structure having threaded inner ends for co-operation with said receiving means and operating means disposed on said rods at the front face of the movable structure.

8. In a truck-type switchboard, the combination with a stationary structure and a movable co-operating structure therefor, of screw-threaded receiving means on the stationary structure, two shafts extending through the movable structure having threaded inner ends for co-operation with said receiving means, operating means for each of said shafts and a shaft operatively connected to said first shafts whereby the operation of one of said operating means effects operation of the other.

9. In a switchboard device, the combination with relatively movable cooperating casings and a contact member supported by each thereof for cooperation with the contact member of the other, one of said casings having an opening opposite said contact members, of a member rotatable about an axis parallel to the plane of movement of the casings and actuated by means carried by the other casing and moving in a direction parallel to the said axis for automatically covering and uncovering the said opening when said casings are separated and moved together respectively.

10. In a switchboard device, the combination with relatively movable contact members, of a partition structure disposed therebetween having an opening opposite the same, a member rotatable about an axis parallel to the plane of movement of the casings for covering and uncovering the said opening, and means associated with one of said contact members movable in a direction parallel to said axis and cooperating with said covering member for actuating the latter.

11. In a switchboard device, the combi-

nation with relatively-movable contact members, of a partition structure disposed therebetween having an opening opposite the same, a slotted pivoted structure for covering and uncovering the said opening, and a twisted projecting member associated with one of said contact members having substantially the same contour as said slot and cooperating therewith to automatically actuate said covering structure when said contact members are actuated.

In testimony whereof, I have hereunto subscribed my name this 10th day of April, 1920.

WALTER E. McCOY.