M. M. SAMUELS AND F. N. BECHOFF.

DISCONNECTING SWITCH.

APPLICATION FILED JUNE 13, 1919.

1,381,344.

Patented June 14, 1921

2 SHEETS—SHEET 1.

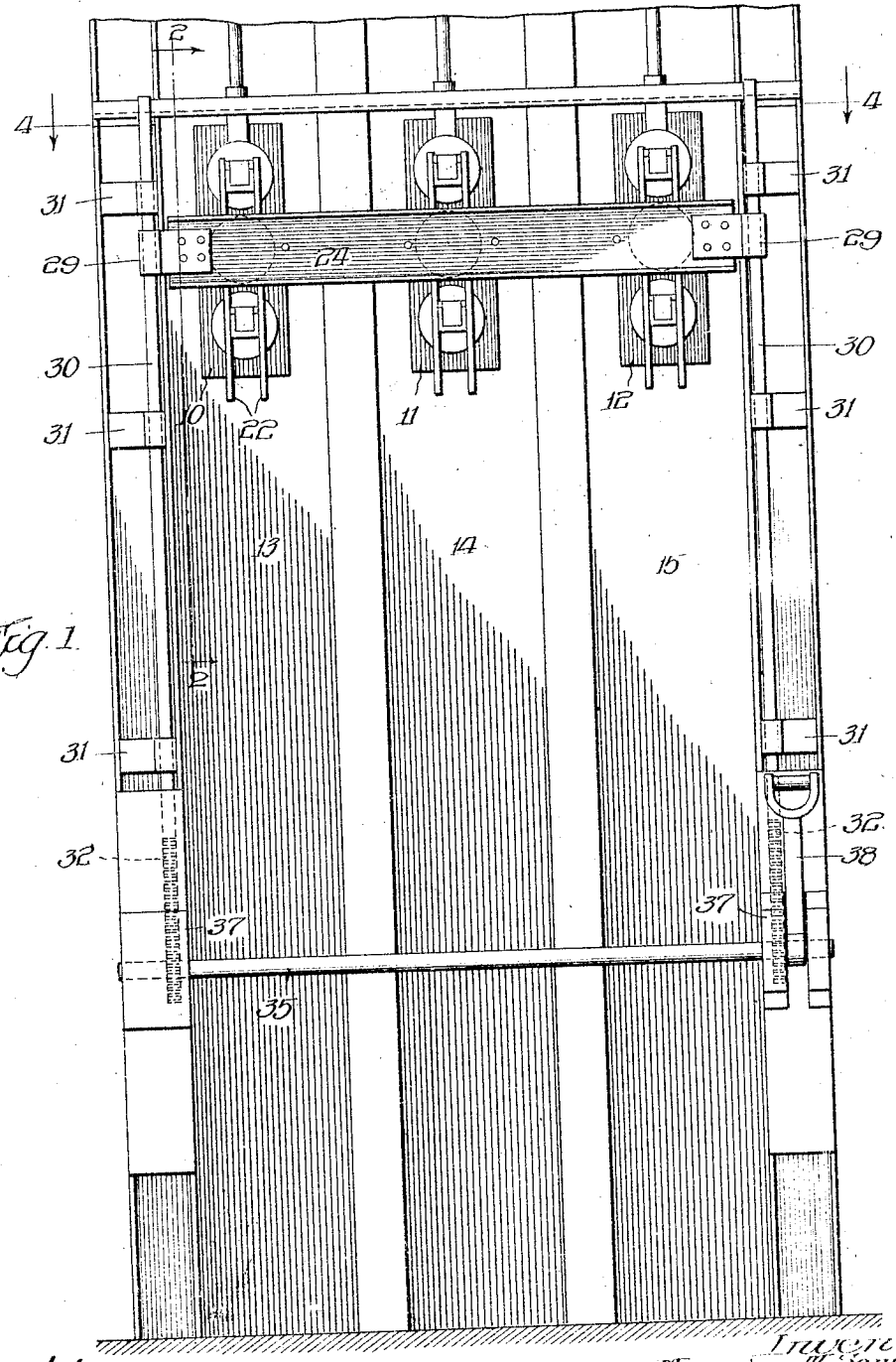


Fig. 1.

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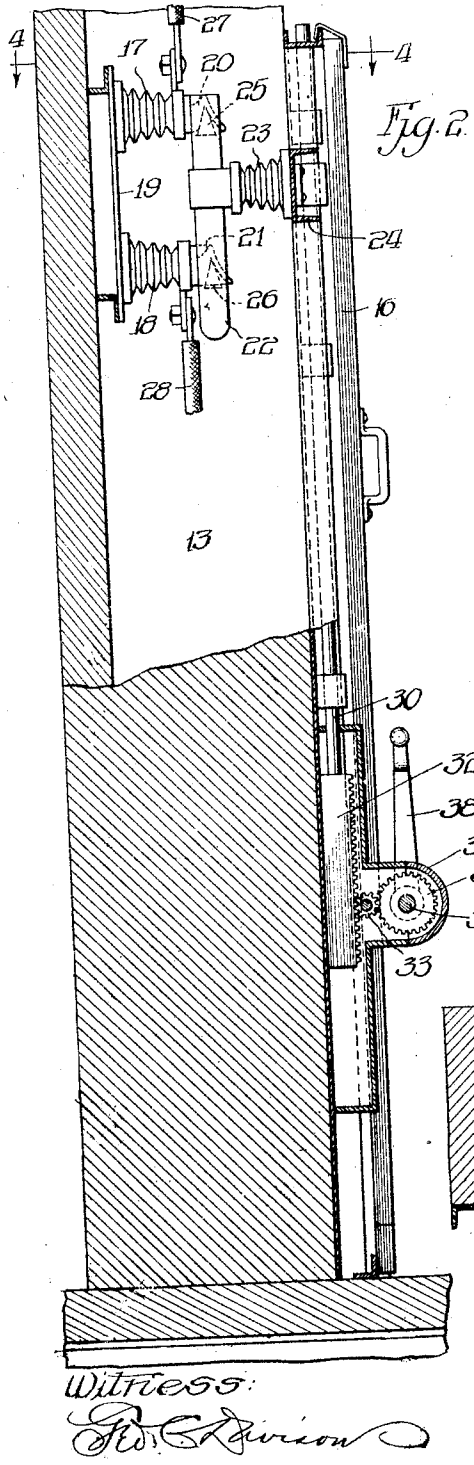


Fig. 2.

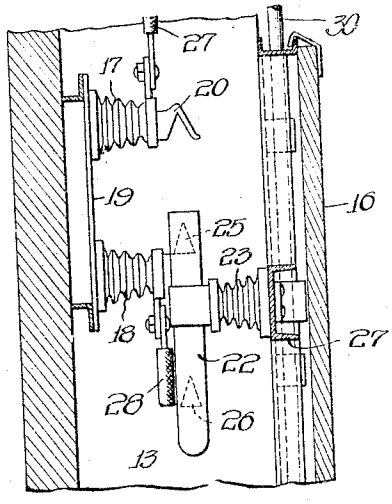
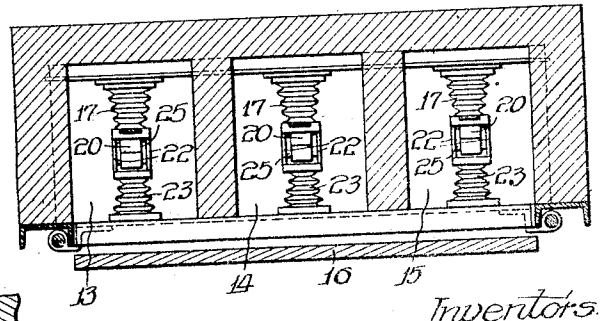


Fig. 3

Fig. 4



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UNITED STATES PATENT OFFICE.

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DISCONNECTING-SWITCH.

1,381,344. Specification of Letters Patent. Patented June 14, 1921.

Application filed June 13, 1919. Serial No. 304,027.

To all whom it may concern:

Be it known that we, MAURICE M. SAMUELS and FERDINAND N. BECHOFF, both citizens of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Disconnecting-Switches, of which the following is a specification.

Our invention relates to an improved form of disconnecting switch for use in connection with oil switches employed on high tension alternating current circuits, by which the live leads of a circuit may be disconnected from the oil switch when it is necessary for any reason to inspect or repair the oil switch.

We are aware that disconnecting switches of different kinds have heretofore been employed for this purpose, and our invention has to do particularly with disconnecting switches adapted to be installed in locations where a limited amount of room is available for the housing and operating of said switches and particularly where the available room is restricted to a vertical direction, or the direction of the line wires and compartments provided to receive the line wires and lead them to the oil switch which direction it will be understood is usually vertical in practice, a separate compartment being provided in high tension work for each wire and the switching mechanism provided for the same. By our invention we provide that the compartment for receiving each line wire and its switch mechanism may be of the minimum depth and width required to house the switch mechanism itself, without allowing additional space in either direction for the operation of the switch mechanism, since by our construction the motion of the switch devices is wholly in the longitudinal direction of the inclosing compartment, as a result of which the compartments containing the switch mechanism may remain closed and be of minimum depth and width, and the disconnecting switch operated from outside of the compartment with entire safety.

Our invention will best be understood by reference to the accompanying drawings showing a preferred embodiment thereof in which—

Figure 1 shows the disconnecting switch mounted in place in front elevation and employed in connection with a three wire circuit.

Fig. 2 is a side elevation of the disconnecting switch shown in Fig. 1, this view being partly in vertical section to more clearly show the relation of the parts.

Fig. 3 shows in a view similar to Fig. 2 one of the disconnecting switches in its open position, and

Fig. 4 is a horizontal sectional view of the parts shown in Figs. 1 and 2 taken along the line 4—4.

Similar numerals refer to similar parts throughout the several views.

As shown in the drawings, the disconnecting switches 10, 11 and 12 are mounted in parallel vertical compartments 13, 14 and 15, which may be closed by a protecting sliding door 16 to prevent accidental injury from contact with the disconnecting switches and the apparatus in the lower portion of the said compartments, which apparatus is not shown as it constitutes no part of the present invention. The disconnecting switches are of the same construction and it is therefore necessary to describe but one of them as, for example, switch 10.

As shown in Fig. 2 the disconnecting switch consists of a pair of insulators 17 and 18, mounted on a base plate 19, supported on the rear wall of the compartment 13, and these insulators have mounted on their outer ends contact clips 20 and 21. A pair of switch blades 22 are mounted on an insulator 23, in vertical alinement with and upon either side of the contact clips 20 and 21, so that they may be moved freely in a vertical direction, relatively to and without engaging said contact clips. The insulator 23 is supported upon a horizontally disposed channel beam 24 which is mounted in a manner to be described, to move the blades 22 vertically. The blades 22 are connected by contact blocks 25 and 26, disposed at such a distance apart that when the blades are in their upper position, said blocks make electrical contact with the contact clips 20 and 21, thereby electrically connecting said clips through the switch blades. When the blades 22 are moved to their lower position shown in Fig. 3 in a manner to be described, the contact blocks are moved from engagement with the contact clips until the upper contact block 25 is adjacent to contact clip 21, thus separating the contact block 25

from the contact clip 20 by an air gap nearly equal to the distance between the contact clips, which gap may be given any desired extent depending upon the voltage of the circuit with which the disconnecting switch is used. In this manner the circuit is positively opened between the line wire 27 connected with the contact clip 20 and the wire 28 extending from the contact clip 21 to the apparatus in the compartment 13 to be protected by the operation of the disconnecting switch.

The channel beam 24 extends across the front to all of the compartments 13, 14 and 15 and supports the switch blades of all of the disconnecting switches employed to control a particular circuit in the manner described above for the switch blades 22, and this beam is secured at its ends by brackets 29 to vertical rods 30 mounted for vertical movement in brackets 31 supported on the front wall of the said compartments.

Each of the rods 30 has secured to its lower end as indicated in Fig. 2, a rack 32 meshing with the idler pinions 33, which in turn meshes with the gear 34 secured to a shaft 35 extending horizontally across the front of the compartments outside of the door 16. The shaft 35 is supported in suitable bearings from the front wall of the compartments which may form a part of the housings 37 employed to inclose the gears 34 and pinions 33. The shaft 35 has rigidly secured thereon at one end an operating handle 38 and the ratio of the gearing is preferably such that when the handle is in its upper position as shown in Figs. 1 and 2, the contact clips of the disconnecting switches are connected together by the means described, and when the handle is rotated outwardly and downwardly to its lowermost position or, in other words, is given substantially a one-half rotation, the blades of the disconnecting switches are moved to the position indicated in Fig. 3, opening said switches.

From the above it will appear that by our invention we provide a construction in which the only clearance required for operating the disconnecting switch is in a vertical direction, that is to say, in a direction of the length or height of the inclosing compartments, and that the compartments need be only of such a depth as to contain the contact clips 20 and 21 of the disconnecting switch, and maintain between them and the front and rear walls of the compartment proper minimum striking distances for the voltage employed in connection with any particular circuit, and that the same consideration is the only one controlling the width of each compartment, and furthermore that since the space available longitudinally of each compartment is usually ample for properly containing apparatus of this kind for use with the high voltage circuits employed in practice, our invention may readily be employed in any case where it is desired to use disconnecting switches. Furthermore, it will be observed that the operating mechanism described positively holds the moving parts of the disconnecting switches in either their closed or their open position, and thus prevents the accidental opening of the disconnecting switches due to the action of the excessive current which may under certain conditions momentarily flow through said switches.

While we have shown our invention in the particular embodiments herein described we do not, however, limit ourselves to this exact construction as we may employ any equivalent thereof known to the art at the time of the filing of this application without departing from the scope of the appended claims.

What we claim is:

1. In a disconnecting switch the combination of a pair of insulators, a contact clip supported by each insulator, a pair of switch blades located one upon either side of said contact clips, contact blocks extending between and secured to said blades for engaging said contact clips in the closed position of the switch, an insulator supporting said switch blades, a member supporting said last named insulator, rods secured to said member and located substantially parallel with said switch blades and mounted for longitudinal movement, and devices for moving said rods longitudinally to open or close said switch as desired.

2. In a disconnecting switch, the combination of a pair of insulators, a contact clip supported by each insulator, a pair of switch blades located one upon either side of said contact clips, contact blocks extending between and secured to said blades for engaging said contact clips in the closed position of the switch, an insulator supporting said switch blades, a member supporting said insulator, rods secured to said member and located substantially parallel with said switch blades and mounted for longitudinal movement, a rack secured to each of said rods, gearing meshing with each rack, a shaft connecting the gearing meshing with said racks, and an operating handle secured to said shaft to impart simultaneous movement in the same direction to said racks to open or close said switch as desired.

3. In combination, a plurality of disconnecting switches, each comprising a pair of insulators, a connecting clip carried by each insulator, a pair of switch blades located one upon either side of said contact clips, contact blocks between and secured to said switch blades to engage said contact clips in the closed position of the switch, and an insulator supporting said pair of contact

blades, a member supporting the last named insulator of each disconnecting switch, and devices for moving said member to impart simultaneous longitudinal movement to the switch blades of said disconnecting switches to open or close said switches as desired.

4. In combination, a plurality of disconnecting switches, each comprising a pair of insulators, a connecting clip carried by each insulator, a pair of switch blades located one upon either side of said contact clips, contact blocks between and secured to said switch blades to engage said contact clips in the closed position of the switch, an insulator supporting said pair of contact blades, a member supporting the last named insulator of each disconnecting switch, rods secured to said member and disposed substantially parallel with said switch blades and mounted for longitudinal movement, a rack secured to each of said rods, gearing meshing with said racks, a shaft connecting the gearing meshing with said racks, and an operating handle secured to said shaft to impart common movement to said racks.

In witness whereof, we hereunto subscribe our names this 16th day of December A, D., 1918.

MAURICE M. SAMUELS.
FERDINAND N. BECHOFF.