F. E. CASE.

SWITCH STRUCTURE.

APPLICATION FILED DEC. 14, 1917.

1,275,846.

Patented Aug. 13, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

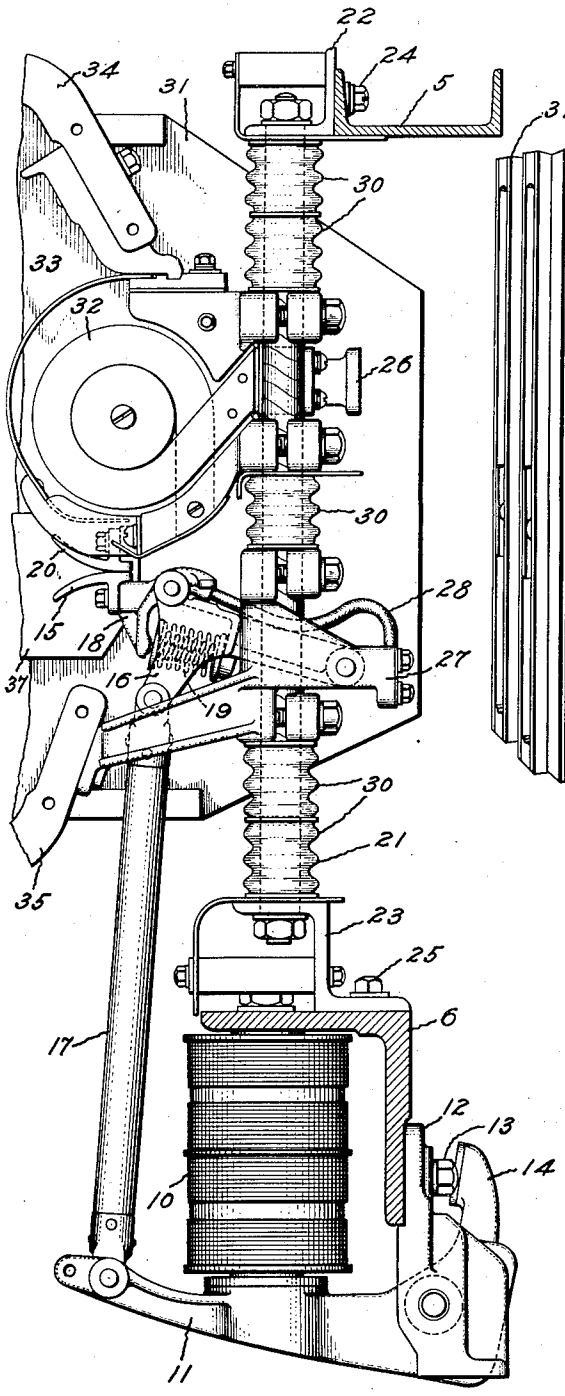
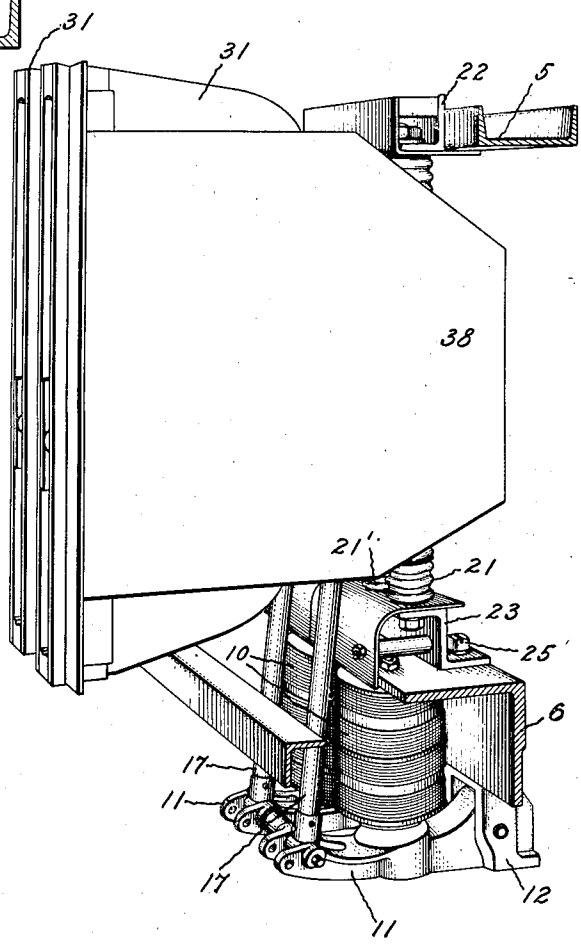


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

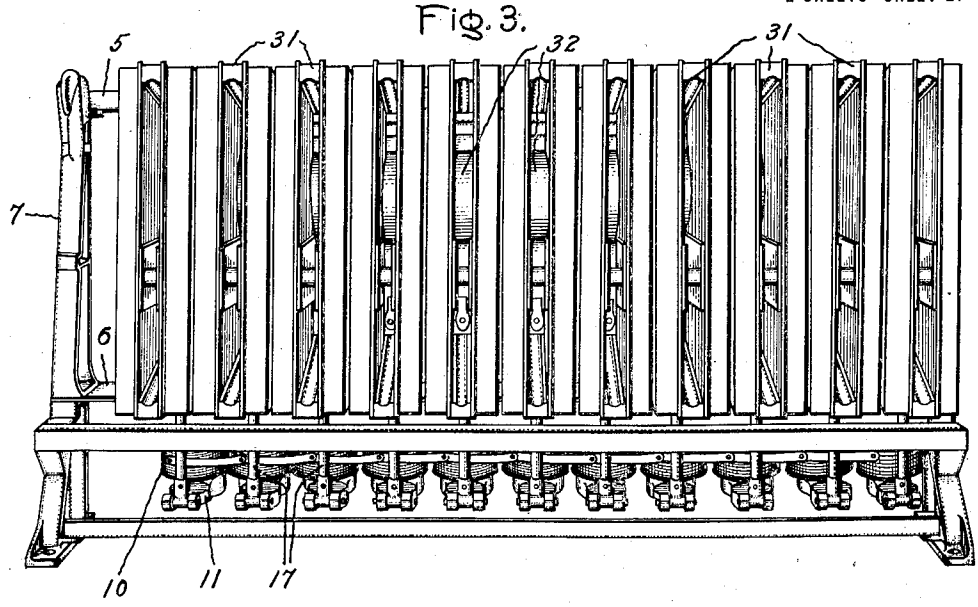
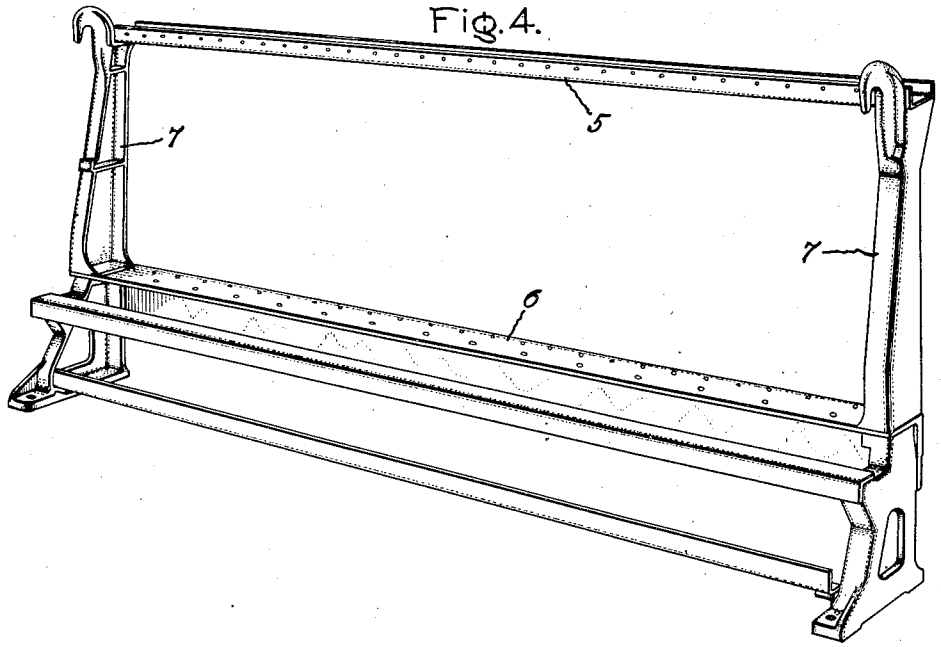


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANK E. CASE, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

SWITCH STRUCTURE.

1,275,846. Specification of Letters Patent. Patented Aug. 13, 1918.

Application filed December 14, 1917. Serial No. 207,022.

To all whom it may concern:

Be it known that I, FRANK E. CASE, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Switch Structures, of which the following is a specification.

This invention relates to switch structures and has for its object an improved construction and arrangement of parts whereby switches may be efficiently and economically assembled or repaired.

More particularly this invention relates to the structure of switches designed for operation in conjunction with other switches assembled in a bank.

In switches arranged for operation in conjunction with others as heretofore constructed it has been necessary to assemble the parts going to make up the switch bank at the place where they are designed to be used.

The appliances used for facilitating assembly in the shops are not infrequently unavailable at the place where the bank of switches is to be used which greatly add to the cost of installation.

Where space is a factor to be considered, the inconvenience and expense experienced in installing the switch bank becomes still greater.

With my invention these disadvantages are entirely overcome because I have devised an arrangement of parts whereby the mechanism comprising each switch may be entirely assembled in the shop and then fastened in the frame designed to support the bank of switches by applying simple securing devices such as bolts.

Such an arrangement as I have devised permits the complete assembly of the switch bank even to the securing of the busses before the bank is set up, thereby reducing the cost of assembly and expediting the work of repair when such becomes necessary.

For a more complete understanding of the nature and objects of this invention, reference should be had to the following detailed description when taken in connection with the accompanying drawing, in which Figure 1 is a side elevation of a switch mechanism embodying my invention; one side of the arc chute being removed in order to more clearly disclose the invention. Fig. 2 is a view in perspective of switches embodying my invention, portions of the supporting frame being cut away. Fig. 3 is a perspective view of a bank of switches embodying my invention installed in the supporting frame, while Fig. 4 is a perspective view of the supporting frame alone.

Referring now to the drawing, numerals 5 and 6 denote respectively the upper and lower rails of the supporting frame, which rails are secured to the castings 7, shown in Figs. 3 and 4.

These rails serve as convenient supports to which is readily secured the mechanism of each switch, which I will now describe.

To the lower rail 6 is secured an electromagnetic winding 10 arranged to actuate the armature 11 pivoted to the bracket 12; the bracket being secured to rail 6 by means of a bolt or screw, such as shown at 13. By this arrangement the rail 6 becomes a part of the magnetic circuit for each winding 10 or solenoid secured thereto.

The armature 11 has a heel 14 designed to abut against the bracket 12 for limiting its motion and is arranged to operate the movable contact member 15 carried by the pivoted bracket 16 through the instrumentality of the connecting rod 17.

The contact member 15 is not rigidly secured to bracket 16, but is carried by the intermediate member 18 which is pivoted to bracket 16 and is resiliently supported by spring 19 in order to afford a rolling contact between member 15 and stationary contact member 20 as they make and break the circuit.

In order to afford support for the bracket 16 and the contact member 20, I have provided transverse supports here shown as two uprights 21 and 21′ which are made fast to upper and lower base supports 22 and 23, the latter being constructed from portions of angle iron which are conveniently secured by bolts or screws 24 and 25 to the supporting rails 5 and 6 respectively. To these uprights I have clamped the upper terminal 26, but in insulating relation thereto, from which terminal the stationary contact member 20 is supported in conduction relation therewith.

In a similar manner I have clamped the lower terminal 27 to these uprights to which terminal the bracket 16 is pivoted; good conducting relation between the contact member 15 and this terminal being insured

by the use of the flexible conducting member 28 which is connected to each.

The proper position of the terminals 26 and 27 which are clamped to the uprights, is insured by the use of insulating spacing members 30 slipped over the uprights and covering the intervening portions thereof.

In order to quickly dissipate the arc drawn by the opening contact members 15 and 20, I have provided a magnetic blow-out, here shown as comprising the arc chute 31 and the coil 32 in series with the contact member 20.

The chute 31 is here shown as designed to encompass a high voltage arc, and consists of two similar slabs 33 of highly incombustible insulating material secured, one on each side, to the upper and lower bars of insulating material shown at 34 and 35, which are supported from the upper and lower terminals 26 and 27 respectively.

The slabs 33 are reinforced interiorly by the small slab 37 adjacent the point where the arc starts, and exteriorly by the slab 38 which protects the pole pieces of the coil 32.

The mode of assembly and operation of this switch is as follows:

The supporting frame shown in Fig. 4 would first be assembled at the place the switches are to be installed. The actuating mechanism, comprising the electromagnetic winding 10 and the bracket 12 supporting armature 11 would then be secured in place upon rail 6. The mechanism adapted to make and break the current, which is secured to uprights 21 and 21′, would now be inserted and secured to rails 5 and 6 by applying the bolts 24 and 25. The link 17 which constitutes the operating connection for the two mechanisms is preferably attached originally to bracket 16, so that when this mechanism on the uprights is secured in place, operative relations are established by merely slipping a pivot pin into the eyes in the adjacent ends of rod 17 and armature 11. When busses have been secured to the terminals 26 and 27 and the windings 10 connected to the control circuit, the switch is ready to be operated and closes and opens the contact members 15 and 20 when the winding 10 is energized and deënergized respectively.

Where the busses are to be located in the rear of a bank of switches, such as shown in Fig. 3, and in a comparatively confined space, the busses may, with advantage, be secured to the terminals 26 and 27 before the uprights and their mechanism are secured in place. In such an instance, after all the bus connections have been made for the bank, the assembled mechanism on the now united group of uprights would be secured on the supporting frame as a unit.

When repairs are required, or when, for any other reason, the removal of any particular switch is desired, this can be effected without disturbing any of the others by simply detaching its parts from the supporting frame.

While I have here shown an embodiment of my invention which is, at present, the best means known to me for carrying the same into effect, I would have it understood that this is merely illustrative, and that I do not mean to be limited thereby to the precise details here disclosed, since obvious alterations thereof will appear to those skilled in this art, nor in the choice of recognized equivalents, except as defined in my claims hereunto annexed.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In a circuit controlling mechanism, in combination a supporting upright frame including parallel longitudinal members, a plurality of electromagnets arranged along one of said members, contact mechanisms for said electromagnets arranged along a parallel member, and an operating mechanism connecting each magnet with its contact mechanism.

2. In a circuit controlling mechanism, in combination a supporting upright frame including parallel longitudinal members, a plurality of electromagnets arranged along one of said members in such wise that said member forms a part of the magnetic circuit for each electromagnet, contact mechanisms for each electromagnet supported along a parallel member, and an operating connection between each electromagnet and its contact mechanism.

3. In a circuit controlling mechanism, in combination a supporting upright frame including parallel longitudinal members, a plurality of electromagnets arranged along one of said members in such wise that said member forms a part of the magnetic circuit for each electromagnet, a plurality of transverse supports secured along a parallel member, a plurality of contact mechanism secured to said transverse supports, and an operating connection between each electromagnet and a corresponding contact mechanism.

4. In a switch bank, the combination with a frame comprising a plurality of supporting rails, of a plurality of circuit making and breaking mechanisms mounted on said rails, a plurality of actuating mechanisms therefor, each including an electromagnetic winding, and an operating connection between each circuit making and breaking mechanism and its actuating mechanism.

5. In a switch bank, the combination with a frame comprising a plurality of supporting rails, of a plurality of circuit making and breaking mechanisms mounted on said rails, a plurality of actuating mechanisms therefor, each comprising an electromag-

netic winding and its armature secured to one of said rails in such wise that the magnetic circuit of each winding is completed through said rail, and an operating connection between each circuit making and breaking mechanism and armature.

6. In a switch bank, the combination with a frame comprising a plurality of supporting rails, of a plurality of transverse supports secured thereto, a plurality of circuit making and breaking mechanisms mounted thereon, a plurality of actuating mechanisms therefor, each comprising an electromagnetic winding and its armature, all secured to one of said rails, and an operating rod connecting each armature to a circuit making and breaking mechanism.

7. In a switch bank, the combination with a frame having supporting rails, of a plurality of actuating mechanisms, each including an electromagnetic winding secured to one of said rails, transverse supporting means secured between two of said rails, a plurality of movable and stationary contact making members supported therefrom, and an operating connection between each of said actuating mechanisms and said movable contact making members.

8. In a switch bank, the combination with a frame having supporting rails, of a plurality of actuating mechanisms each including an electromagnetic winding secured to one of said rails, a plurality of transverse supporting members secured between two of said rails, a plurality of terminals for electrical connections clamped to each pair of members, movable and stationary contact making members supported in conducting relation with the respective terminals on each pair of said members, and operating rods connecting each of said actuating mechanism with one of said movable contact making members.

9. In a switch bank, the combination with a frame having supporting rails, of a plurality of actuating mechanisms each including an electromagnetic winding secured to one of said rails, of a plurality of transverse supports secured between two of said rails, terminals for electrical connections clamped to each pair of supports, movable and stationary contact making members supported in conducting relation with the respective terminals on each pair of supports, a magnetic blow-out secured to each pair of supports in operative relation to each coöperating pair of contact making members, and operating rods connecting each of said actuating mechanism with one of said movable contact making members.

10. In switch construction, the combination with a frame having supporting rails, of an electromagnetic winding and an armature therefor secured to one of said rails so that said rail forms a part of the magnetic circuit for said winding, a pair of uprights having supports secured to two of said rails, terminals clamped to said uprights but insulated therefrom, movable and stationary contact making members supported by said terminals, and an operating rod connected between said armature and said movable contact making member.

11. In switch construction, the combination with a frame having supporting rails, of an electromagnetic winding and an armature therefor secured to one of said rails so that said rail forms a part of the magnetic circuit for said winding, a pair of uprights having supports secured to two of said rails, terminals clamped to said uprights but insulated therefrom, a stationary contact member supported from one of said terminals, a movable contact member pivotally supported by another of said terminals, spacing members slipped over said uprights to insure the proper position of said terminals, and an operating rod connecting said armature to said movable contact member.

12. In switch construction, the combination with a frame having supporting rails, of an electromagnetic winding and an armature therefor secured to one of said rails so that said rail forms a part of the magnetic circuit for said winding, a pair of uprights having supports secured to two of said rails, terminals clamped to said uprights but insulated therefrom, a stationary contact member supported from one of said terminals, a movable contact member pivotally supported by another of said terminals, a magnetic blow-out including an arc chute supported from said terminals in operative relation to said contact members, spacing members slipped over the intervening portions of said uprights, and an operating rod connecting said armature to said movable contact member.

13. In a switch bank, the combination with a frame comprising a plurality of supporting rails, of a plurality of transverse supports secured thereto, a plurality of circuit making and breaking mechanisms mounted thereon, a plurality of actuating mechanisms therefor, each comprising a power operated device, all secured to one of said rails, and an operating rod connecting each power device to a circuit making and breaking mechanism.

14. In a switch bank, the combination with a frame having supporting rails, of a plurality of actuating mechanisms each comprising a power operated device all secured to one of said rails, a plurality of transverse supporting members secured between two of said rails, a plurality of terminals for electrical connections clamped to each pair of members, movable and station-

ary contact making members supported in conducting relation with the respective terminals on each pair of said members, and operating rods connecting each of said actuating mechanism with one of said movable contact making members.

15. In a switch bank, the combination with a frame having supporting rails, of a plurality of transverse supports secured between two of said rails, terminals for electrical connections clamped to each pair of supports, movable and stationary contact making members supported in conducting relation with the respective terminals on each pair of supports, a magnetic blow-out secured to each pair of supports in operative relation to each coöperating pair of contact making members, and operating connections for said movable contact making members.

16. In switch construction, the combination with a frame having supporting rails, of a pair of uprights having supports secured to two of said rails, terminals clamped to said uprights but insulated therefrom, a stationary contact member supported from one of said terminals, a movable contact member pivotally supported by another of said terminals, and spacing members slipped over said uprights to insure the proper position of said terminals.

In witness whereof, I have hereunto set my hand this 12th day of December, 1917.

FRANK E. CASE.