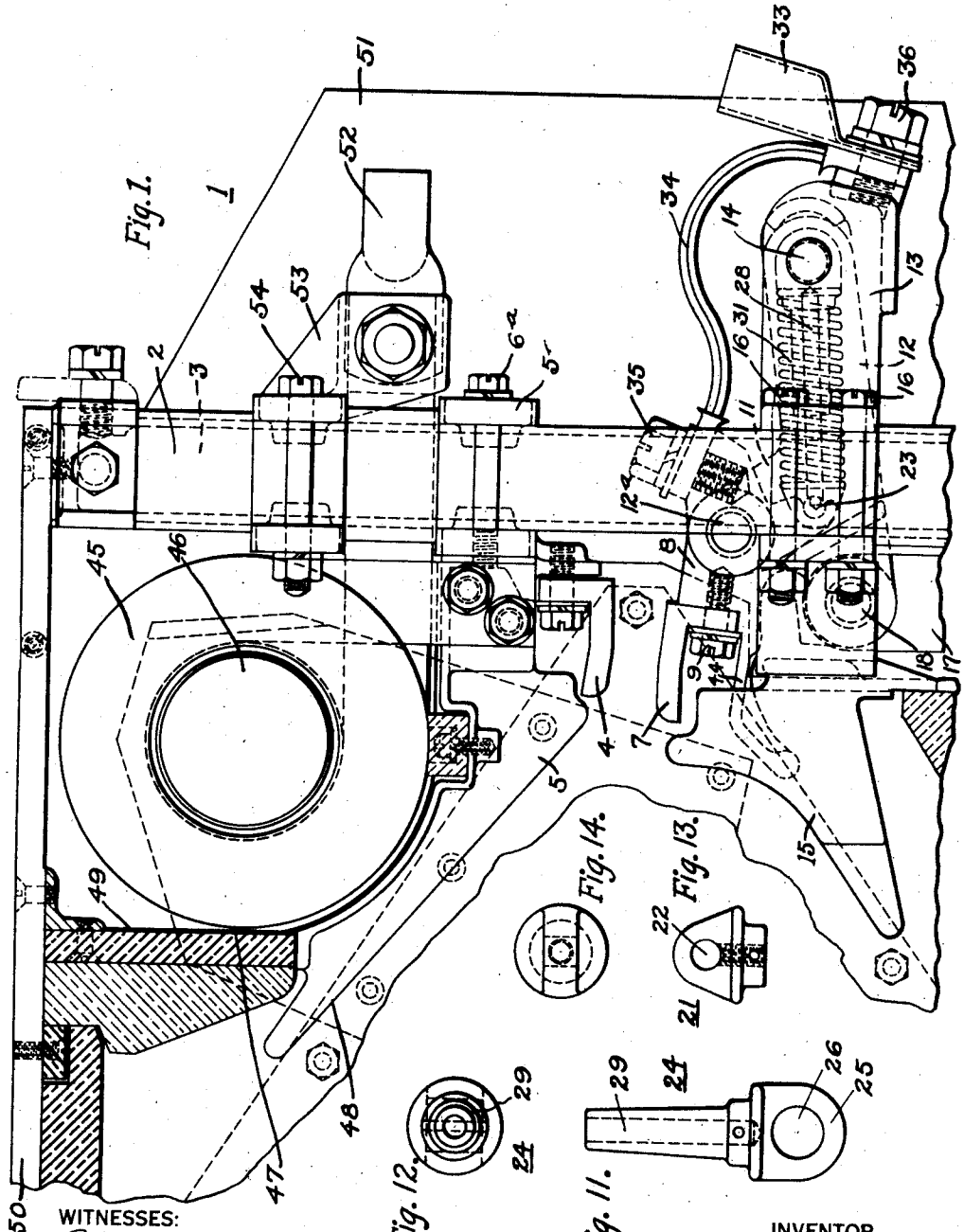
Jan. 11, 1927. **1,614,176**

B. O. AUSTIN

SWITCH

Filed Oct. 7, 1921 2 Sheets-Sheet 1



WITNESSES:

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INVENTOR

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Jan. 11, 1927. 1,614,176

B. O. AUSTIN

SWITCH

Filed Oct. 7, 1921 2 Sheets-Sheet 2

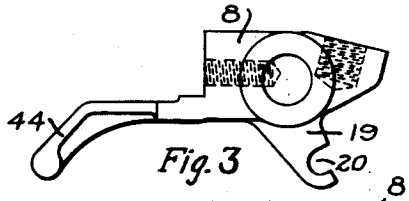


Fig. 3

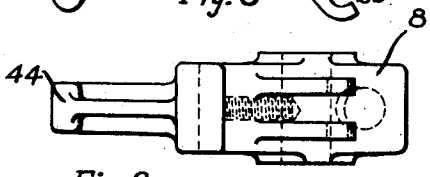


Fig. 2.

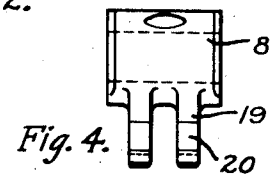


Fig. 4.

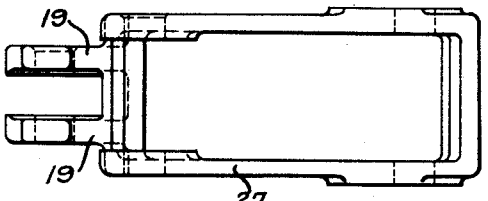


Fig. 5.

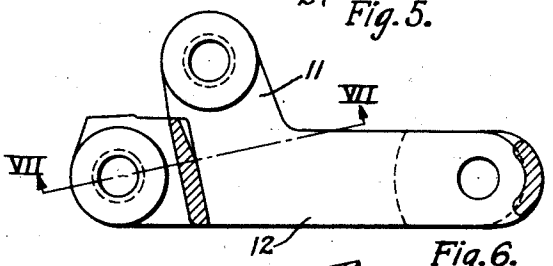
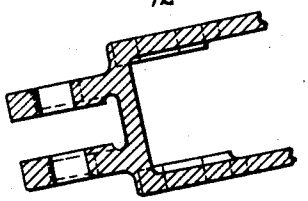


Fig. 6.


Fig. 7.

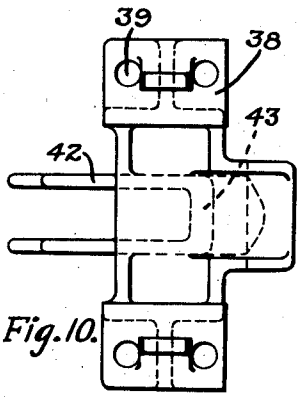


Fig. 10.

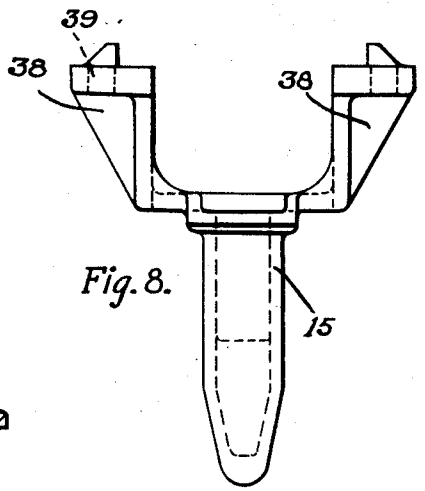


Fig. 8.

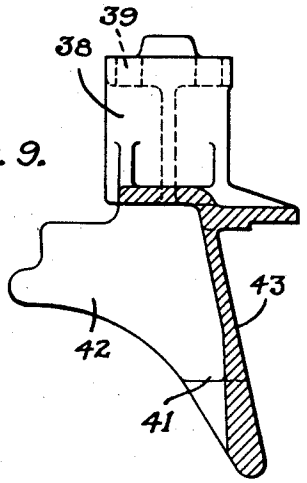


Fig. 9.

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Patented Jan. 11, 1927. 1,614,176

UNITED STATES PATENT OFFICE.

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SWITCH.

Application filed October 7, 1921. Serial No. 505,974.

My invention relates to switches and it has particular relation to switches for interrupting circuits that are traversed by relatively large currents.

One object of my invention is to provide a switch having relatively light movable parts for the amount of current traversing the switch.

Another object of my invention is to provide a switching device that is relatively simple, compact and economical in construction and positive and reliable in operation.

Briefly speaking, my invention consists in providing a switching device having a plurality of stationary arc horns, one of which is provided with a recessed portion, and a movable contact member having a projecting portion that is relatively movable in the recess of the arc horn.

For a better understanding of my invention, reference may be made to the accompanying drawings,

Figure 1 of which is a view, partly in side elevation and partly in section, of a portion of a switching device designed in accordance with my invention;

Figs. 2, 3 and 4 are detail views in plan, side and end elevation, respectively, of a contact-supporting member employed in the switching device illustrated in Fig. 1 of the drawing;

Figs. 5 and 6 are views, in plan and side elevation, respectively, of a lever arm illustrated in Fig. 1 of the drawing;

Fig. 7 is a sectional view, taken along the line VII—VII of Fig. 6;

Figs. 8, 9 and 10 are views, in plan, side and end elevation, respectively, of one of the arcing horns illustrated in Fig. 1 of the drawings;

Figs. 11 and 12 are views, in side and end elevation, respectively, of one of the detail parts illustrated in Fig. 1 of the drawings; and

Figs. 13 and 14 are views, in side and end elevation, respectively, of one of the members illustrated in Fig. 1 of the drawing.

Referring particularly to Fig. 1 of the drawings, a switching device 1 comprises two vertical supporting members 2 and 3 which are disposed in side-by-side relation, a stationary upper contact member 4 which is secured to a stationary arcing horn 5 by means of bolts 6 and a movable lower contact member 7 which is secured to a contact supporting member 8 by means of a tap bolt 9. The upper arc horn 5 is securely mounted upon the vertical supporting members 2 and 3 by means of a clamping member 5*a* and a plurality of bolts 6*a*. The contact-supporting member 8, which is best illustrated by Figs. 2 to 4, inclusive, of the drawings, is pivotally mounted upon a plurality of projecting arms 11, constituting portions of a lever arm 12, by means of a pin 12*a*.

The lever arm 12, which is best illustrated in Figs. 5 to 7, inclusive, is pivotally mounted upon a supporting bracket 13 by means of a pin 14. A stationary arc horn 15, which is provided for the lower contact member 7, and the supporting bracket 13 are securely clamped upon the vertical supporting members 2 and 3 by means of a plurality of bolts 16. The shape of the lower arc horn 15, which is illustrated in Figs. 8 to 10 of the drawings, will be hereinafter more fully described.

The lever arm 12 may be actuated by a vertical rod or member 17, to which it is pivotally connected by means of a pin 18. The contact-supporting member 8 is provided with a plurality of projections 19 having arcuate slots 20 therein, as is best illustrated by Figs. 2 to 4, inclusive, of the drawings. A spring seat 21, which is best illustrated in Figs. 13 and 14 of the drawings, is provided with a hole 22 for mounting it upon a pin 23. The pin 23 serves to position the spring seat 22 in the grooves 20 of the contact-supporting member 8.

A spring seat 24, which is best illustrated in Figs. 11 and 12 of the drawings, is provided with a flat portion 25 in which is located a hole 26 for mounting the spring seat 24 upon the pin 14, between the sides 27 of the lever arm 12.

A bolt 28, which is best illustrated in Fig. 1 of the drawings, is secured to the spring seat 21 by means of a threaded connection and is slidably mounted in a cavity 29 of the spring seat 24 (see Figs. 11 and 12). A resilient member or spring 31 is mounted upon the rod 28 and tends to actuate the contact-supporting member 8 in a clockwise direction about the pin 12*a*. When the vertical member 17 is actuated upwardly, the lever

arm 12 is moved in a clockwise direction about the pin 14, until the lower contact member 7 firmly engages the upper contact member 4.

When the lower contact member 7 first engages the upper contact member 4, the lower contact member 7 is actuated slightly in a counter-clockwise direction thereby. The counter-clockwise movement of the lower contact member 7 is resisted by resilient member 31, thereby causing the contact member 7 to effect a rolling action upon the upper contact member 4. The movement of the lever arm 12 about the pin 14 causes a relatively slight horizontal movement of the contact surfaces of the contact segments 4 and 7, thereby ensuring a wiping action thereof. The contact-supporting member 8 is electrically connected to the stationary contact terminal 33 by a flexible conductor 34 and tap bolts 35 and 36, which are mounted in the contact-supporting member 8 and the supporting bracket 13.

The lower arc horn 15, which is illustrated in Figs. 8 to 10, inclusive, of the drawings, is provided with a plurality of supporting arms 38 having holes 39 therein for receiving the bolts 16. The arc horn 15 is provided with a hollow projecting portion 41 having side walls 42 and a bottom portion 43. The cavity formed by the side walls 42 is of sufficient width to permit a projecting portion 44 of the contact-supporting member 8 to move vertically therein.

The switch 1 is provided with a blow-out coil 45, which is mounted upon a core member 46, and with a plurality of pole pieces 47 which are secured to the sides of an arc box 48.

The coil 45 is protected from any arcing action at the tip or the upper arc horn 5 by an insulating barrier 49. A cover member 50 and a plurality of side members 51 are provided for the switching device 1. A stationary contact terminal 52, which is electrically connected directly to the blow-out coil 45, is secured to the vertical members 2 and 3 by means of a bracket 53 and a plurality of bolts 54.

When the switching device 1 occupies its closed position, a circuit is established from the lower contact terminal 33 through the flexible conductor 34, pin 12*a*, contact-supporting member 8, contact members 7 and 4, arc horn 5 and blow-out coil 45 to stationary contact terminal 52.

When the switch 1 is opened under load conditions, the contact member 7 is disengaged from the contact segment 4, thereby establishing an arc therebetween, which is forced outwardly by the flux that is set up by the magnetic circuit comprising the pole pieces 47 and core member 46. The current passes from the contact segment 7 through the projection 44 of the contact-supporting member 8, stationary arc horn 15 and thence, as an arc, across the air gap to the stationary arc horn 5. The arc will tend to move out along the arc horns 5 and 15 until it is extinguished.

The advantage of having the arc horn 15 stationary is that its weight does not have to be carried by the vertical member 17, thereby lessening the weight of the movable parts of the switch and thus eliminating or diminishing any chattering of the contact members 4 and 7 of the switch when actuated to closed position.

While I have shown my invention in the preferred form, it is apparent that minor modifications may be made in the shape and position of certain portions of the switch without departing from the spirit of my invention. I desire, therefore, to be limited only by the scope of the appended claims.

I claim as my invention:

1. In a switching device, in combination, a plurality of co-operative contact members, one of said contact members being movable, an arc horn for receiving arcs from the movable contact member, said arc horn having a recess therein into which the contact member may be moved to facilitate the delivery of an arc.

2. In a switching device, in combination, a plurality of co-operative contact members, one of said contact members being movable, an arc horn for receiving arcs from the movable contact member, said arc horn having a recess therein into which the contact member may be moved to facilitate the delivery of an arc, said contact member having a projection thereon shaped to fit into said recess and engage the arc horn to facilitate the delivery of an arc.

3. In a switching device, the combination with a plurality of contact members, one of said contact members being movably mounted, of an arc horn having a recess, and a projecting member actuated within said recess by said movable contact member.

4. In a switching device, the combination with a plurality of contact members, one of said contact members being movably mounted, of an arc horn having a recess and a projecting member actuated within said recess by said movable contact member to electrically connect said movable member and said horn.

5. A switching device comprising, in combination, a frame, a stationary contact member carried by the frame, a movable contact member, a switch-actuating member for operating the movable contact member, said movable contact member being mounted to move relative to the actuating member, means for retaining the movable contact member in a predetermined position when the switch is open and to permit movement of the contact member during the closure

of the switch, and an arc horn for receiving arcs from the contact member, said arc horn being shaped to receive the contact member to facilitate the delivery of an arc.

6. A switching device comprising, in combination, a frame, a stationary contact member carried by the frame, a movable contact member, a switch-actuating member for operating the movable contact member, said movable contact member being mounted to move relative to the actuating member and resilient means tending to retain the movable contact member in a predetermined position, thereby to provide for imparting to the contact member a rolling and wiping action when the switch is closed, and an arc horn for receiving arcs from the movable contact member, said arc horn having a recess formed therein for the reception of the movable contact member to facilitate the delivery of an arc.

7. In a switching device, the combination with a plurality of contact members, and means for pivotally mounting one of said contact members, of an arcing horn having a recess, and a conducting member actuated in said recess by said means.

8. A switching device comprising, in combination, a frame, stationary and movable switch members carried by the frame, contact members mounted on the switch members, one of said contact members being pivotally mounted on a corresponding switch member, means adapted to effect a movement of the pivotally mounted contact member relative to the corresponding switch member as the switch member is moved toward closed position, said contact member rotating means being resilient thereby to permit a rolling and wiping action when the contact members are brought into engagement, and arcing horns disposed to receive arcs from the contact members, said arcing horns being stationary.

9. A switching device comprising, in combination, a frame, stationary and movable switch members carried by the frame, contact members mounted on the switch members, one of said contact members being pivotally mounted on a corresponding switch member, means adapted to effect a movement of the pivotally mounted contact member relative to the corresponding switch member, as the switch member is moved toward closed position, said contact member rotating means being resilient thereby to permit a rolling and wiping action when the contact members are brought into engagement and stationary arcing horns provided with projections disposed adjacent the outer ends of the contact members.

10. A switching device comprising, in combination, a frame, stationary and movable switch members carried by the frame, contact members mounted on the switch members, one of said contact members being pivotally mounted on a corresponding switch member, means adapted to effect a movement of the pivotally mounted contact member relative to the corresponding switch member as the switch member is moved toward closed position, said contact member rotating means being resilient thereby to permit a rolling and wiping action when the contact members are brought into engagement, arcing horns disposed to receive arcs from said contact members, and means electrically connected to the movable contact member adapted to contact with one of the arcing horns when the movable switch member is moved to a predetermined position.

11. A switching device comprising, in combination, a frame, stationary and movable switch members carried by the frame, contact members mounted on the switch members, one of said contact members being pivotally mounted on a corresponding switch member, means adapted to effect a movement of the pivotally mounted contact member relative to the corresponding switch member as the switch member is moved toward closed position, said contact member rotating means being resilient thereby to permit a rolling and wiping action when the contact members are brought into engagement, arcing horns disposed to receive arcs from the contact members, and an arm electrically connected to the movable contact member disposed to contact with one of the arcing horns when the movable switch member is moved to a predetermined position.

12. A switching device comprising, in combination, a frame, stationary and movable switch members carried by the frame, contact members mounted on the switch members, one of said contact members being pivotally mounted on a corresponding switch member, means adapted to effect a movement of the pivotally mounted contact member relative to the corresponding switch member as the switch member is moved toward closed position, said contact member rotating means being resilient, thereby to permit a rolling and wiping action when the contact members are brought into engagement, arcing horns disposed to receive arcs from the contact members, an arm electrically connected to the movable contact member disposed to contact with one of the arcing horns when the movable switch member is moved to a predetermined position, and a plurality of walls formed on the arcing horn, said walls being spaced to permit movement of said arm therebetween.

13. A switching device comprising, in combination, a frame, stationary and movable switch members carried by the frame, contact members mounted on the switch members, one of said contact members being pivotally mounted on a corresponding

switch member, means adapted to effect a movement of the pivotally mounted contact member relative to the corresponding switch member as the switch member is moved toward closed position, said contact member rotating means being resilient thereby to permit a rolling and wiping action when the contact members are brought into engagement, stationary arcing horns disposed to receive arcs from the contact members, said arcing horns being provided with projections located adjacent the outer ends of the contact members, and means electrically connected to the movable contact member disposed to contact with one of the arcing horns when the movable switch member is moved to a predetermined position.

In testimony whereof, I have hereunto subscribed my name this 29th day of September 1921.

BASCUM O. AUSTIN.