

S. B. CONDIT, JR.
MAGNETICALLY CONTROLLED SWITCHING APPARATUS.
APPLICATION FILED JAN. 5, 1911.

1,014,455.

Patented Jan. 9, 1912.

Fig. 1.

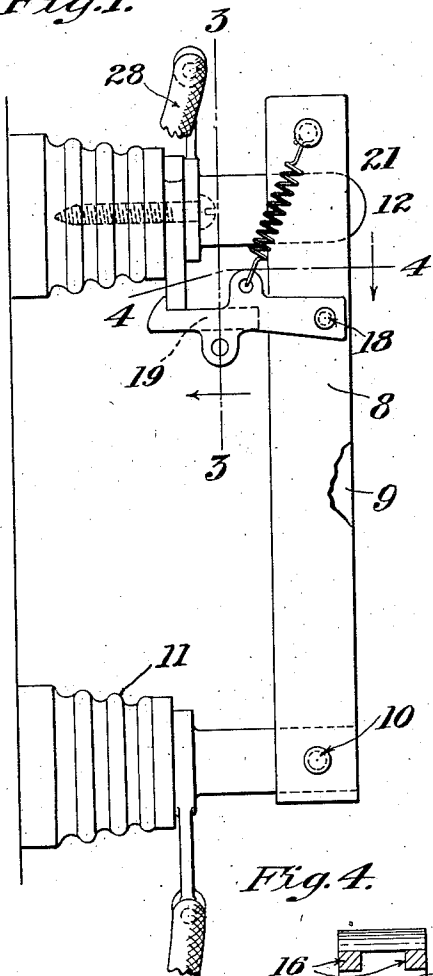


Fig. 2.

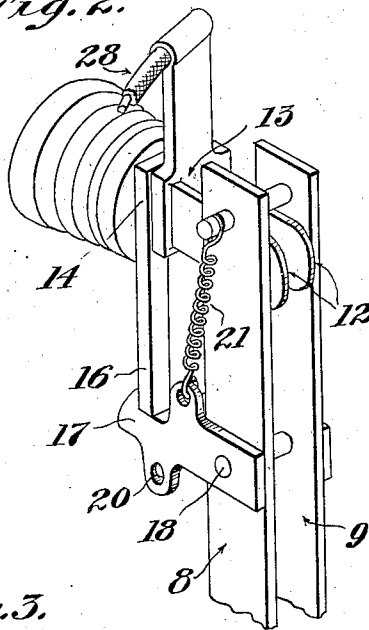


Fig. 3.

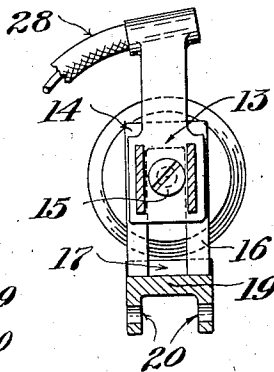


Fig. 4.

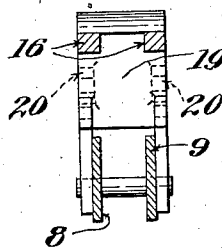
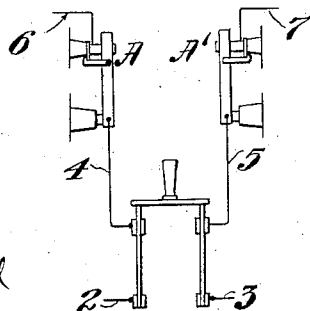


Fig. 5.



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MAGNETICALLY-CONTROLLED SWITCHING APPARATUS.

1,014,455.

Specification of Letters Patent.

Patented Jan. 9, 1912.

Application filed January 5, 1911. Serial No. 601,027.

To all whom it may concern:

Be it known that I, SEARS B. CONDIT, Jr., a citizen of the United States, and resident of Brookline, in the county of Norfolk and State of Massachusetts, have invented an Improvement in Magnetically-Controlled Switching Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present application is a division of my copending application Serial No. 483,781, filed March 16, 1909, and relates to a switch having a magnetic locking device actuated by the passage of current in the main line.

My invention is particularly applicable as a disconnecting switch between the main line terminals and a main switch, whereby the disconnecting switch is maintained in operative relation during and by all passage of current, so that it results in leading the operator always to open the main switch first before he disconnects it from the main line by operating the disconnecting switch.

In the accompanying drawings, in which I have shown a preferred embodiment of my invention, Figure 1 is a view in side elevation of the disconnecting switch; Fig. 2 is a fragmentary perspective view thereof; Fig. 3 is a sectional view on the line 3—3, Fig. 1; Fig. 4 is a horizontal sectional view showing the armature latch in plan; and Fig. 5 is a diagrammatic view illustrating the complete connections.

My invention may best be described in connection with one of the chief uses for which it is adapted, as shown in Fig. 5, in which a main switch 1 in the main lines 2, 3 is connected by conductors 4, 5 to the line terminals 6, 7 by my magnetically controlled disconnecting switches, one thereof being shown in each line connection at A and A' respectively. As herein shown, these disconnecting switches are preferably of the knife-switch type, each switch having two blades 8, 9 pivoted at their lower ends at 10 on any suitable insulated support as a post 11, the blades or disconnecting members 8, 9 being adapted to be sprung or forced over the projecting ends 12 of a terminal clip 13 from which extends the line terminal 6 or 7, as the case may be. To render it impossible for a disconnecting switch A or A' to be opened on the occurrence of a sudden overload, for instance, thereby producing

disastrous arcing, I provide magnetic holding means for rendering it impossible to open said switch (called an air switch in the parent case) during the passage of heavy current, said means being shown as consisting of a turn of magnetic material about the clip 13 or projecting end terminal of the conductor 6, said turn of magnetic material being herein shown in the form of a horseshoe 14 held immovably in place at the base of the clip by any suitable means, as by the projecting edges or base of the clip 13 and a bolt 15. This electro-magnetic part extends downwardly at its lower end to constitute a catch 16, and cooperating therewith is a latch 17 pivoted at 18 to the adjacent disconnecting members 8, 9. At its forward end the latch has a cross bar 19 which acts as an armature with relation to the magnet 14, so that when heavy current is passing through the line and hence through said magnet, the latter becomes magnetized and forcibly attracts and positively holds the latch 17 in locked position as shown. At its lower side, the latch is provided with an opening 20 to receive a hook whereby said latch may be pulled downwardly slightly out of locking engagement with the catch 16 and, upon being pulled still farther, will serve as a means for disconnecting or separating the swinging switch members 8, 9 from the spring clips 12 and thereby open the disconnecting switch. A spring 21 normally holds the latch 17 in engaged position so that, irrespective of whether a heavy current is passing or not, the latch will normally interlock with the catch 16 and thereby aid in maintaining the current conductors in operative connection.

Not only do the disconnecting switches A, A' render it easy to kill the main switch 1 and whatever mechanism may be connected therewith so that this of itself cannot complete the circuit (with the attendant advantages explained in the parent case), but they make it impossible for the conductors 4, 6 and 5, 7 to become unintentionally disconnected when current is passing. The parts 14—17 constitute an electromagnetic locking device which guards against the opening of the air switches or disconnecting switches A, A' before the main switch or circuit breaker 1 is opened. This provision leads the operator always to open the main switch first before he attempts to render it inoperative for controlling the main line.

Preferably the magnet 14 is made of wrought iron to cooperate with the armature made of malleable iron, and the parts are so located, as shown, that they are directly magnetized by the flow of current through the relatively movable switch members 8, 9 and 12 between the conductors 4 and 6 or 5 and 7.

It will be understood that while the mechanism shown and described is preferred because of its simplicity and its convenience in connection with oil switches and the like, as explained in the parent application, the invention may obviously have a wide variety of mechanically different embodiments without departing from the spirit and scope thereof as hereinafter defined in the claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The combination with a main switch and its circuit, of a disconnecting switch in the latter, and mechanism, including magnetic locking means, for normally holding the disconnecting switch closed for the transmission of normal main line current when the main switch is closed and rendered inoperative when the main switch is opened.

2. The combination with a main switch and its circuit, of a disconnecting switch in the latter, and mechanism rendered active by the passage of normal main line current for holding the disconnecting switch closed for the transmission of said current when the main switch is closed, said mechanism being rendered inoperative when the main switch is opened.

3. The combination with a main switch and its circuit, of a disconnecting switch in the latter, and mechanism, including magnetic locking means, for normally holding the disconnecting switch closed for the transmission of full normal main line current when the main switch is closed and rendered inoperative when the main switch is opened, said magnetic locking means having a latching armature on one of the relatively separable current switching members of said disconnecting switch and a cooperating magnet on the other of said relatively separable current switching members.

4. The combination with a main switch, the main line terminals, and a disconnecting switch between the latter and the main switch, of means rendered automatically operative by the passage of current for maintaining said disconnecting switch closed and connected for the transmission of normal main line current during said passage of current.

5. The combination with a main switch, the main line terminals, and a disconnecting switch between the latter and the main

switch, of magnetic locking means actuated by the passage of current to the main switch to maintain said disconnecting switch positively locked in circuit-closing position and connected for the transmission of normal main line current.

6. The combination with a main switch, the main line terminals, and a disconnecting switch between the latter and the main switch, of a movable locking latch carried by one of said members and maintained operative during and by all passage of current to engage an adjacent stationary part for holding the disconnecting switch in circuit-closing position and connected for the transmission of normal main line current.

7. A switch, having its relatively separable current switching members provided respectively with an electro-magnet and an armature having cooperative locking portions for positively locking the switch closed during the energizing of the electro-magnet.

8. A switch, having its relatively separable current-switching members provided respectively with a magnet and an armature having cooperative latching portions and energized by the passage of current through said current-switching members.

9. A switch, comprising a stationary contact, and a movable contact, a magnet mounted on said stationary contact in position to be energized by the passage of current through said contact when the movable contact is moved to main circuit closing position, and a latching device mounted on the movable contact and provided with an armature in position to be controlled by said magnet when energized by the passage of current for maintaining the switch locked in circuit-closing position during the passage of current.

10. A switch, comprising a stationary contact, and a movable contact, a magnet mounted on said stationary contact in position to be energized by the passage of current through said contact when the movable contact is moved to main circuit closing position, a latching device mounted on the movable contact and provided with an armature in position to be controlled by said magnet when energized by the passage of current for maintaining the switch locked in circuit-closing position during the passage of current, and a spring normally tending to hold said latching device in said locked position.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

SEARS B. CONDIT, JR.

Witnesses:

G. A. BURNHAM,
ARTHUR F. DUGAN.

It is hereby certified that in Letters Patent No. 1,014,455, granted January 1912, upon the application of Sears B. Condit, Jr., of Brookline, Massachusetts, for an improvement in "Magnetically-Controlled Switching Apparatus," an error appears in the printed specification requiring correction as follows: Page 2, line 39, for the word "disconnceting" read *disconnecting*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 6th day of February, A. D., 1912.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.