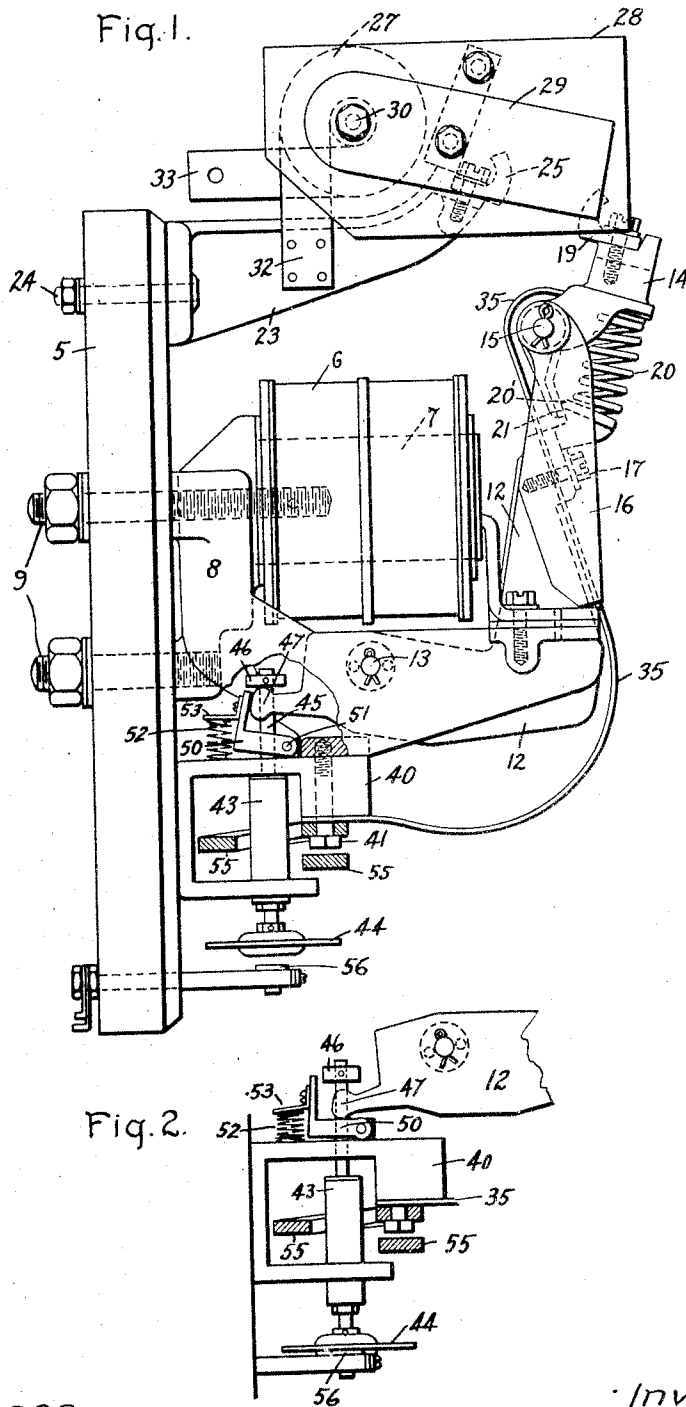


C. B. LARZELERE.
ELECTROMAGNETICALLY OPERATED SWITCH.
APPLICATION FILED AUG. 2, 1910.

982,146.

Patented Jan. 17, 1911.



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES B. LARZELERE, OF SENECA FALLS, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTROMAGNETICALLY-OPERATED SWITCH.

982,146.

Specification of Letters Patent.

Patented Jan. 17, 1911.

Application filed August 2, 1910. Serial No. 575,096.

To all whom it may concern:

Be it known that I, CHARLES B. LARZELERE, a citizen of the United States, residing at Seneca Falls, county of Seneca, State of New York, have invented certain new and useful Improvements in Electromagnetically-Operated Switches, of which the following is a specification.

My invention relates to electromagnetically operated switches, and particularly to a switch or contactor provided with a relay attachment and adapted for use in connection with systems of motor control of the general type covered by an application filed by Harold E. White and Eugene R. Carichoff, Serial No. 480,483, filed February 27, 1909, and assigned to the same assignee as this application.

In systems of control of the type covered by the application above referred to, in the case of both those contactors which initially complete the motor circuit and those contactors which cut out section by section the resistance interposed in the motor circuit in starting, the magnetizing coil of the cooperating auxiliary switch attachment generally receives its increased current only after the contactor has actually closed. It may happen, therefore, in some arrangements unless means is provided for preventing it, that a contactor during the first part of its closing movement will allow the auxiliary switch to move in a closing direction to a certain extent before the increase of current due to the closing of the contactor has become effective in the electromagnet of the auxiliary switch attachment. Under some conditions this may render the control of the auxiliary switches by their electromagnets somewhat uncertain, and for the purpose of overcoming this possible defect certain arrangements have been provided which are covered in applications filed by Harold E. White, Serial No. 480,481, filed February 27, 1909, and Serial No. 480,482, filed February 27, 1909, both of which are assigned to the same assignee as the present application.

It is an object of the present invention to provide, in connection with a contactor having an auxiliary switch attachment, another new and improved arrangement for preventing the auxiliary switch from closing before the current in its cooperating electromagnet has received the increase of current due to the closing of the contactor.

To the above end, my invention consists, generally speaking, in providing a contactor and auxiliary switch attachment with a latch mechanism arranged to hold the auxiliary switch in its open position, the mechanical connection between the contactor and the auxiliary switch attachment being such that the latch mechanism is tripped during the last part of the closing movement of the contactor.

My invention will best be understood from the following description, taken in connection with the accompanying drawing, in which—

Figure 1 is a side elevation, partly in section with certain parts broken away, of a contactor and auxiliary switch attachment provided with my invention; and Fig. 2 is a fragmentary side elevation of a portion of the mechanism shown in Fig. 1 showing the relative position of certain parts after the contactor has closed and tripped the latch mechanism and the auxiliary switch has moved to its closed position.

Referring to the drawing, the various parts of the contactor and auxiliary switch or relay attachment are shown as mounted upon a back 5 of slate or other insulating material. The actuating coil of the contactor is shown at 6 mounted upon a core 7 of magnetic material which is part of the field frame 8 of the contactor which is secured to the back 5 by bolts 9, or in any other suitable manner.

The movable contact member of the contactor comprises an L-shaped armature 12, pivoted at 13 in the field frame and carrying the movable contact element. This contact element comprises a finger 14 pivoted at 15 on a casting 16 secured to the armature 12 by bolts 17 or in any other suitable manner. The finger 14, which carries a removable tip 19, is biased in a counter-clockwise direction by a spring 20, this movement being limited by the heel 20' which engages with shoulder 21, all arranged as shown.

The fixed contact member of the contactor comprises a bracket 23 secured to the back 5 by bolts 24, said bracket being provided with a removable tip 25 so arranged as to cooperate with the tip 19 of the movable contact member.

The contactor is shown as provided with a blow-out device which comprises a blow-out coil 27 located within an arc chute 28

of any well-known form having pole pieces 29 embedded in the sides thereof and held by a bolt 30 passing through the blow-out coil 27. One terminal 32 of the blow-out coil is electrically connected to the bracket 23 and the other terminal is shown at 33.

The finger 14 of the contactor is connected by a flexible lead 35 to any suitable point on the contactor frame or a bus-bar. The path of current through the contactor when the same is closed is, therefore, through the lead 35, finger 14, tip 19, tip 25, bracket 23 and blow-out coil 27.

The auxiliary switch attachment or relay, which will now be described, is in many respects similar to the arrangements shown in the applications above referred to. The magnet frame of the auxiliary switch attachment is shown at 40 secured to the frame 8 of the contactor by a bolt 41.

The movable contact member of the auxiliary switch attachment comprises a core 43 of magnetic material carrying a contact disk 44. The core 43 is arranged for sliding movement through a hole in the lower part of the magnet frame 40, and said core at its upper end is provided with a rod 45 which slides in a hole in the upper part of the frame 40. This rod 45 has a disk 46 secured to its upper end and with this disk the heel 47, extending from the armature 12, engages.

Cooperating with the movable contact member of the auxiliary switch attachment is a latch mechanism which comprises an L-shaped latch member 50 pivoted at 51 in lugs on the top of the magnet frame 40. This latch member 50 is biased to the position shown in Fig. 1 by a spring 52 located between the top of the magnet frame 40 and a bracket 53 secured to the latch member. This latch member 50 is so arranged that the heel 47 of the armature 12 of the contactor will engage said latch during the last part of the closing movement of the movable member of the contactor so as to trip the latch member 50 from the position shown in Fig. 1, in which it engages the disk 46, to the position shown in Fig. 2 in which the latch member is out of the path of said disk.

The magnet coil of the auxiliary switch attachment may be of any suitable form and in the arrangement shown consists of a single turn of heavy conductor or bus-bar 55, to which the end of the flexible lead 35 is connected by being bolted between said bus-bar and the frame 40 by the bolt 41, as shown in the drawing. The contact disk 44 bridges fixed contacts 56 in a manner clear from the drawing.

The mode of operation of the contactor and auxiliary switch attachment will be obvious from the foregoing description. When the contactor opens the heel 47 of the armature 12 engages with the disk 46 and the

core of the relay attachment is lifted to the position shown in Fig. 1, in which the contact disk 44 is out of engagement with the fixed contact members 56. As long as the contactor is in its open position, the heel 47 will be in the position shown in Fig. 1, and the upper end of the latch member 50 will be in the path of and below the disk 46. When the magnet 6 of the contactor is energized and the contactor closes its contacts, the initial downward movement of the heel 47 will not influence the latch member 50 which will engage with the disk 46 and will hold the longitudinally movable member of the relay attachment in its raised position. When, however, the armature 12 of the contactor has moved to such a position that the contact tips 19 and 25 are brought into engagement and the wiping action of one upon the other commences, the heel 47 engages with the latch member 50 and in its final movement forces said latch member against the tension of the spring 52 to the position shown in Fig. 2, thereby rendering the relay attachment operatively independent of the contactor and subject only to the magnetizing effect of the coil 55 upon the core 43. With this arrangement it is clear that the movable member of the relay is positively held in its raised position until the circuit controlled by the contactor has been completed and any increase of current in the coil 55, due to the closing of said contactor, has become effective.

It is, of course, to be understood that my invention may be applied to many styles of contactor and auxiliary switch attachments, and that the particular form of latch mechanism which I have shown is merely illustrative. In the following claims I intend to cover all modifications which come within the scope of my invention.

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

1. In combination a contactor, a relay, a mechanical connection between said contactor and said relay whereby said contactor in opening opens the relay contacts, and a latch mechanism for holding said relay open tripped by said contactor in closing.

2. In combination a contactor having a movable member, a relay having a movable member, a mechanical connection between the movable member of the contactor and the movable member of the relay whereby said contactor in opening opens the relay contacts, and a latch mechanism for holding the movable member of the relay in its open position tripped by said movable member of the contactor in moving to its closed position.

3. In combination a contactor, a relay, a latch mechanism for holding said relay open, and a mechanical connection which connects said contactor and said relay and said latch

mechanism whereby said contactor in opening opens the relay contacts and in closing trips the latch mechanism.

4. In combination a contactor having a 5 pivoted member, a relay having a longitudinally movable member, a latch mechanism for holding the longitudinally movable member in the position in which the relay 10 contacts are open, and a mechanical connection between said pivoted member and said longitudinally movable member and said latch mechanism whereby said contactor in 15 closing moves the longitudinally movable member of the relay to its open position and in closing trips the latch mechanism and renders said relay operatively independent.

5. In combination a contactor having a 20 fixed contact member, a movable contact member, and an actuating coil for moving said movable contact member into engagement with said fixed contact member, of an

auxiliary switch attachment comprising a fixed contact member, a movable contact member, a magnet coil cooperating with the last mentioned movable contact member, a 25 latch mechanism for holding said last mentioned movable contact member in its open position, and a mechanical connection between the movable contact member of said contactor and the movable contact member and 30 latch mechanism of said auxiliary switch attachment whereby said contactor in opening opens the contacts of said auxiliary switch attachment and in closing trips said latch 35 mechanism.

In witness whereof, I have hereunto set my hand this 22nd day of July, 1910.

CHARLES B. LARZELERE.

Witnesses:

ERNEST E. LEE,
EDW. SCHILDHAUER.