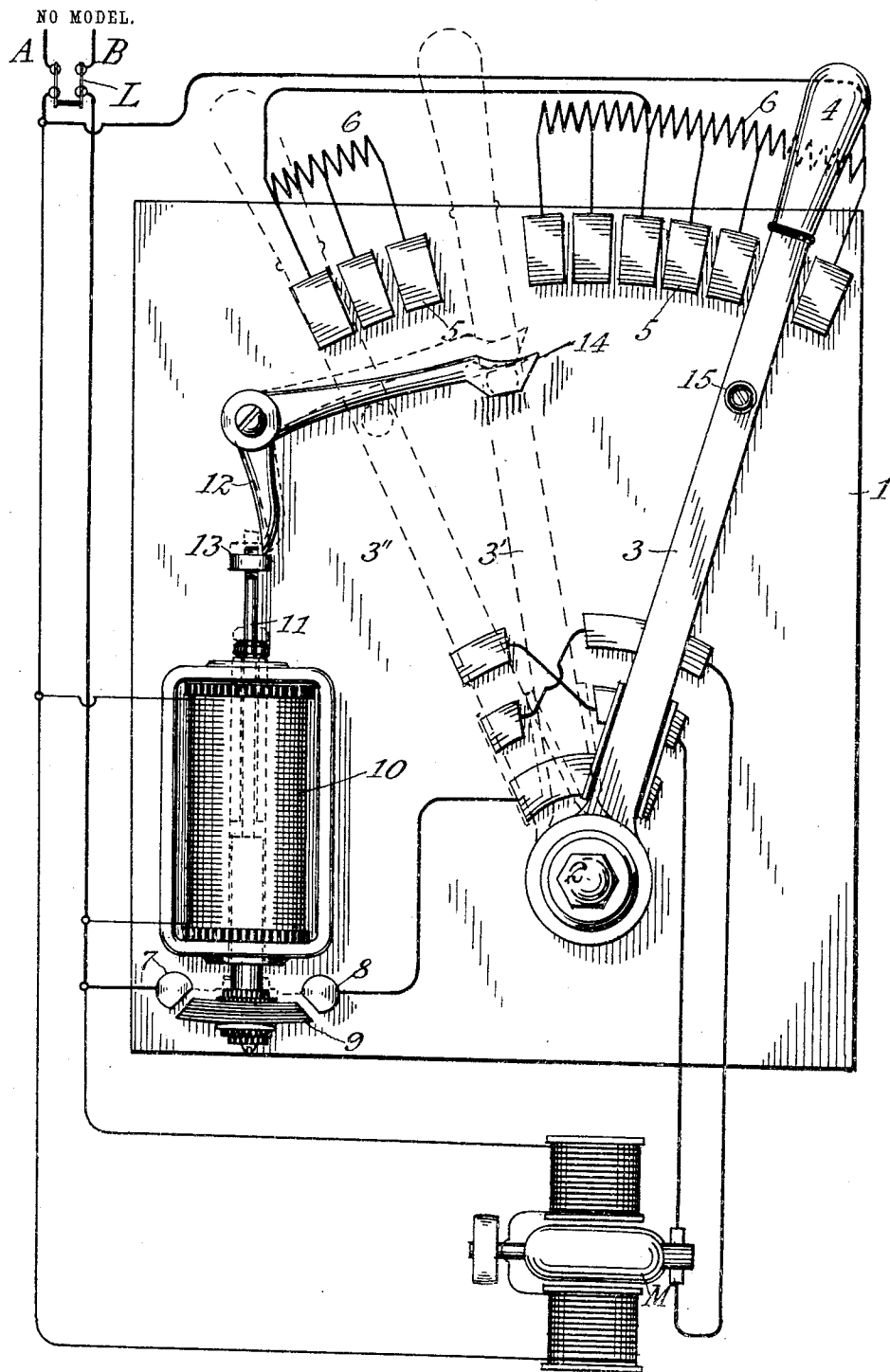


No. 768,227.

PATENTED AUG. 23, 1904.

A. J. HORTON.
ELECTRIC SWITCH AND CIRCUIT BREAKER.

APPLICATION FILED JAN. 16, 1904.



Witnesses:

Edward J. Murphy
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UNITED STATES PATENT OFFICE.

ALBERT J. HORTON, OF WHITEPLAINS, NEW YORK, ASSIGNOR TO THE CUTLER-HAMMER MFG. CO., OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

ELECTRIC SWITCH AND CIRCUIT-BREAKER.

SPECIFICATION forming part of Letters Patent No. 768,227, dated August 23, 1904.

Application filed January 16, 1904. Serial No. 189,308. (No model.)

To all whom it may concern:

Be it known that I, ALBERT J. HORTON, a citizen of the United States of America, and a resident of Whiteplains, county of Westchester, and State of New York, have invented certain new and useful Improvements in Electric Switches and Circuit-Breakers, of which the following is a specification.

This invention relates to a circuit-breaker for electric current, and is designed especially for the emergency interruption of motor-armature circuits.

It is combined with a hand-operated motor starting and controlling switch by which the motor is started, controlled, and stopped in such manner that upon the operation of the circuit-breaker from any cause it cannot be closed until the starting-switch has been restored to its starting position.

The specific emergency device which is herein disclosed is an under-potential magnet arranged to open the circuit-breaker when the line potential falls materially or the supply of current ceases.

In the accompanying sheet of drawings, which forms a part of this specification, the figure is a front view of a slate with the circuit-breaker, starting-switch, and other apparatus mounted thereon, and combined with this is a diagram of the circuits therefor.

The apparatus illustrated comprises a motor M, which is supplied from two leads A B through a line-switch L, a motor starting and controlling switch and rheostat, and an independent circuit-breaker for opening the armature-circuit in an emergency such as arises upon the failure of current through the operation of an under-potential relay-magnet, which will be described in detail later. The motor has a shunt field which in this drawing is independent of the contacts of the rheostat and motor-starting switch and the circuit-breaker and is connected directly to the leads inside the line-switch, so that it will be open only when the line-switch is open.

A slate slab 1 carries a metal stud 2, on which a lever 3 is fulcrumed. The lever is provided with an operating-handle 4 and is

operated across a series of rheostat-contacts 5. Resistance-sections 6 are connected to these contacts. The slate also carries a circuit-breaker consisting of two contact-posts 7 8 and preferably a pile of strips of sheet-copper 9 for bridging between the posts. This bridging-piece is carried by the armature of a relay-magnet 10, also mounted on the slate. When the magnet is energized, the bridging-piece is drawn against the posts and electrical connection is established between the posts, through which current is admitted to the armature. The relay-magnet is in the form of a solenoid, and a stem 11, of non-magnetic material, is connected to the armature and moves with the armature and circuit-breaker. This stem projects through the upper end of the relay-magnet. Its use will be discussed later.

The relay-magnet is energized by a controlling-circuit between the supply-leads which is independent of the armature-circuit. As illustrated, it is connected directly between the leads, and hence the magnet is wound with a great number of turns of fine wire, so as to have a sufficiently-high resistance to withstand the voltage used. The magnet receives current directly from the supply-leads and is so adjusted that its armature will be released if there is any material fall in the potential between the supply-leads or cessation in the supply of current. The magnet therefore acts as an under-potential emergency device to disconnect the motor-armature from the line.

Whenever the circuit-breaker is operated by reason of the failure of current through the relay-magnet and the motor-starting lever is at a running position either toward the position 3 for forward operation of the motor or toward the position 3' for reverse operation of the motor, a latch 12 mechanically engages a collar 13 on the stem 11 and prevents the closure of the circuit-breaker until the motor-starting switch-lever has been brought toward or restored to the initial position 3' sufficiently to engage an arm 14 of the latch and withdraw the latch. This arm is engaged by

an insulated stud or roller 15 projecting from the lever. The circuit-breaker falls by gravity to its open position when released by the relay-magnet, and the latch falls by gravity
5 into locking engagement with the collar on the stem.

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

10 The combination of a hand-operated motor-starting switch, an electrically-operated circuit-breaker, a motor-armature circuit containing the motor-starting switch and circuit-breaker in series, a relay-magnet for closing and holding the circuit-breaker in closed po-

sition, a circuit for the magnet which is con- 15 nected to the same leads as the armature-circuit and is independent of the armature-circuit, an automatically-operated latch for engaging the circuit-breaker when open, and means for withdrawing the latch operated by 20 the restoration of the starting-switch to its initial position, substantially as described.

Signed by me at New York, N. Y., this 13th day of January, 1904.

ALBERT J. HORTON.

Witnesses:

SAMUEL W. BALCH,
C. E. CARPENTER.