

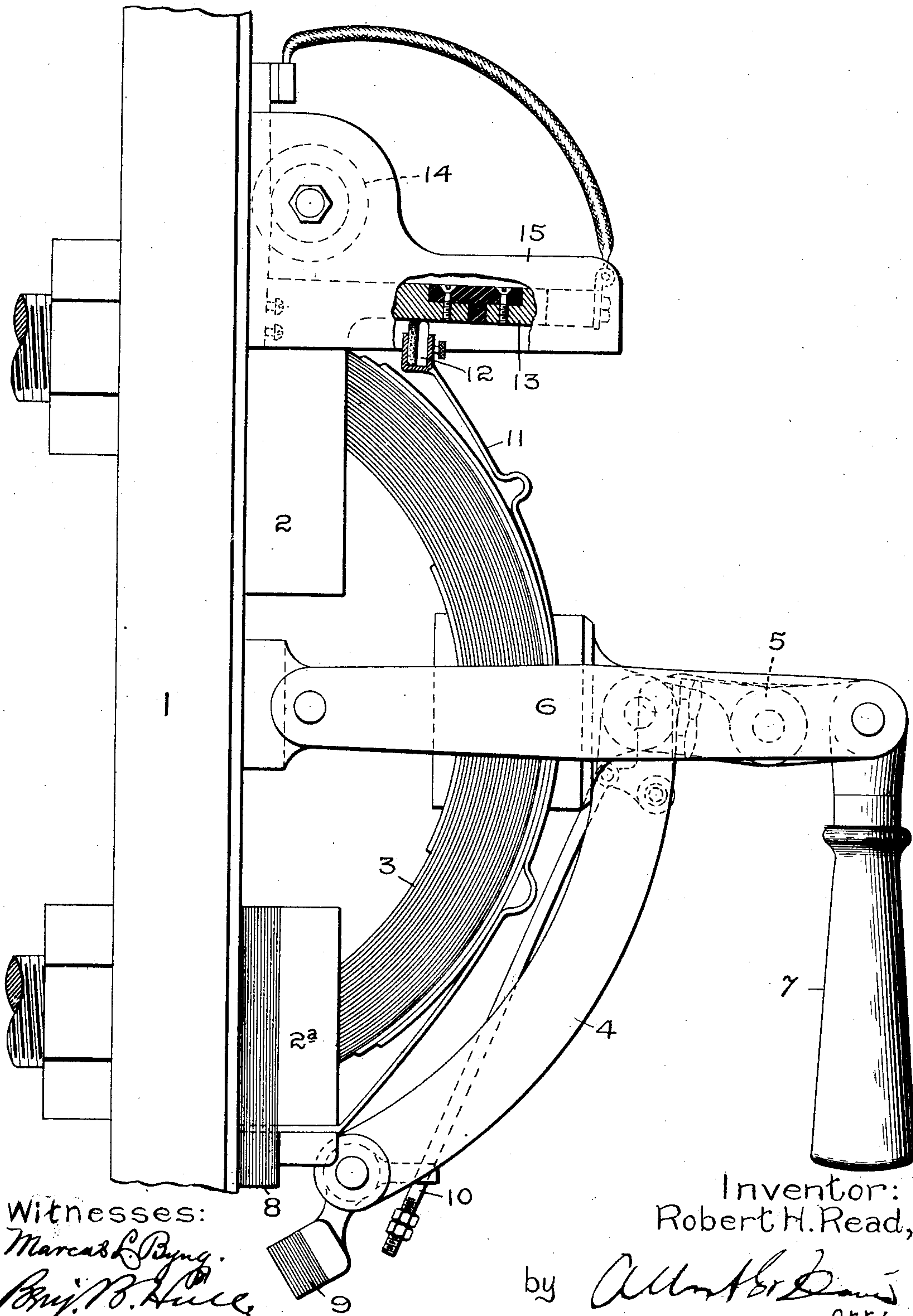
No. 687,065.

Patented Nov. 19, 1901.

R. H. READ.
CIRCUIT BREAKER.

(Application filed July 18, 1901.)

(No Model.)



UNITED STATES PATENT OFFICE.

ROBERT H. READ, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

CIRCUIT-BREAKER.

SPECIFICATION forming part of Letters Patent No. 687,065, dated November 19, 1901.

Application filed July 18, 1901. Serial No. 68,719. (No model.)

To all whom it may concern:

Be it known that I, ROBERT H. READ, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Circuit-Breakers, (Case No. 2,192,) of which the following is a specification.

In the operation of modern circuit-breakers, and particularly those of the magnetic blow-out type, in which bridging and shunt contacts are employed, a pitting of the main or bridging contact results from the considerable difference of potential in the two branches due to the impedance of the blow-out magnet when the bridging contact opens the main path of current. It is the object of my invention to prevent or reduce this pitting by furnishing the shunt-contact with a path of low impedance at the time the main or bridging contact opens.

In carrying out my invention I provide the circuit-breaker with main and shunt contacts, both in direct connection with the circuit-terminals, and insure a determinate range of movement for the shunt-contact before the blow-out coil is connected in circuit, such connection being effected before final rupture, so that the circuit is ultimately opened in a magnetic field, which serves to extinguish the arc. My invention involves, therefore, essentially, a circuit-breaker provided with a magnetic blow-out, an auxiliary or shunt contact, and means for short-circuiting the blow-out during the early part of the opening movement of the circuit-breaker.

The several features of novelty will be more particularly hereinafter described, and will be definitely indicated in the claims appended to this specification.

In the accompanying drawing, which illustrates the invention as applied to a recent commercial form of circuit-breaker, 1 represents a supporting-panel, of fireproof insulating material—such, for example, as slate or marble—on which are mounted terminals 2 2^a, connected when the circuit is closed by a bridging contact 3, formed of a bundle of compactly-arranged laminæ of copper, phosphor-bronze, or other good conducting metal. This is pivotally supported on a link 4, piv-

oted near the lower terminal, and is connected by a toggle 5 with a frame 6, pivoted at a point between the terminals. To one member of the cramping-toggle is fixed a handle 7, by which the toggle may be cramped and the circuit-breaker closed with a hard pressure on its bridging contact. The type of breaker shown is provided with a trip device comprising a bundle of iron laminæ 8, including three sides of the lower terminal and adapted to be magnetized thereby and cooperating with an armature 9, connected with a trip-rod 10, for collapsing the toggle. These features form no essential part of my improvements and are described merely by way of illustration. The shunt-contact 11 may be connected with one terminal in any suitable manner by a permanent connection, and the breaking end rests when the circuit-breaker is closed on a metal face integral with or in good conductive relation to the terminal 2. The face is preferably part of a metallic extension of the terminal 2, as indicated in the drawing. The shunt-contact is provided with an arcing tip, composed jointly of metal and carbon, as indicated at 12, in which an opening movement of the circuit-breaker effects a sliding movement over the face of the terminal. The extent of this movement may be graduated according to the potential of the current to be broken, the design in all cases being such as to permit the main contact to leave a safe air-gap between its contact-faces and the terminals before the shunt-contact opens engagement with the terminal.

In the same plane with the extension for the shunt-contact is a metallic contact-piece 13, connected with one terminal of a blow-out coil 14, the other terminal of the blow-out coil being connected with the terminal 2. The contact 13 is insulated from the terminal. The distance between the adjoining faces of the contact 13 and the terminal extension is such that the shunt-contact will bridge the gap without opening the circuit. The shunt-contact is preferably compound in character, the trailing end being of carbon and the leading end of metal, as indicated in the drawing. The ends of the core of the blow-out coil are provided with extension pole-pieces, one of which is seen at 15, to

provide a magnetic field inclosing the rupturing-point of the shunt-contact. The terminal face of the contact 13 may also be of carbon. With this organization in opening
5 the circuit the main contact is first opened, while a non-inductive shunt of very small impedance permits current to readily pass and creates a very slight drop of potential across the gaps between the terminals and
10 the bridging contact, thus effectively eliminating arcing at this point. After a safe range of movement the blow-out coil is connected in circuit by the shunt-contact and the arc finally extinguished when the contact
15 between the extension-terminal 13 and the shunt arcing tip is broken, this arc being instantly extinguished by a magnetic field between the pole-pieces produced by the blow-out coil 14.

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

1. A circuit-breaker provided with main and shunt contacts, a path of low impedance for the shunt-contact when the main contacts
25 are separated, and a blow-out coil cut into circuit before final rupture.

2. A circuit-breaker provided with main

and shunt contacts, both having non-inductive paths when the circuit is closed, and an auxiliary branch including a blow-out coil
30 cut into the shunt-circuit after the main contact has moved through a definite air-gap.

3. A circuit-breaker provided with main and shunt contacts, both having non-inductive connections with the terminals, means
35 for prolonging the non-inductive connection of the shunt until the main contacts have opened a definite distance, and a blow-out coil cut into circuit before the shunt is opened.

4. A circuit-breaker provided with main
40 and shunt contacts, both in non-inductive relation to the circuit, means for maintaining the non-inductive shunt connection until the main contact has opened a determinate distance, a normally open branch including a
45 blow-out coil, and means for closing this branch before the circuit is broken.

In witness whereof I have hereunto set my hand this 15th day of July, 1901.

ROBERT H. READ.

Witnesses:

BENJAMIN B. HULL,
FRED RUSS.