(No Model.) 2 Sheets—Sheet 1.

E. PRUCKNER & G. SCHINDLER.

AUTOMATIC ELECTRIC CIRCUIT BREAKER AND CLOSER.

No. 592,443. Patented Oct. 26, 1897.

Fig. 1.

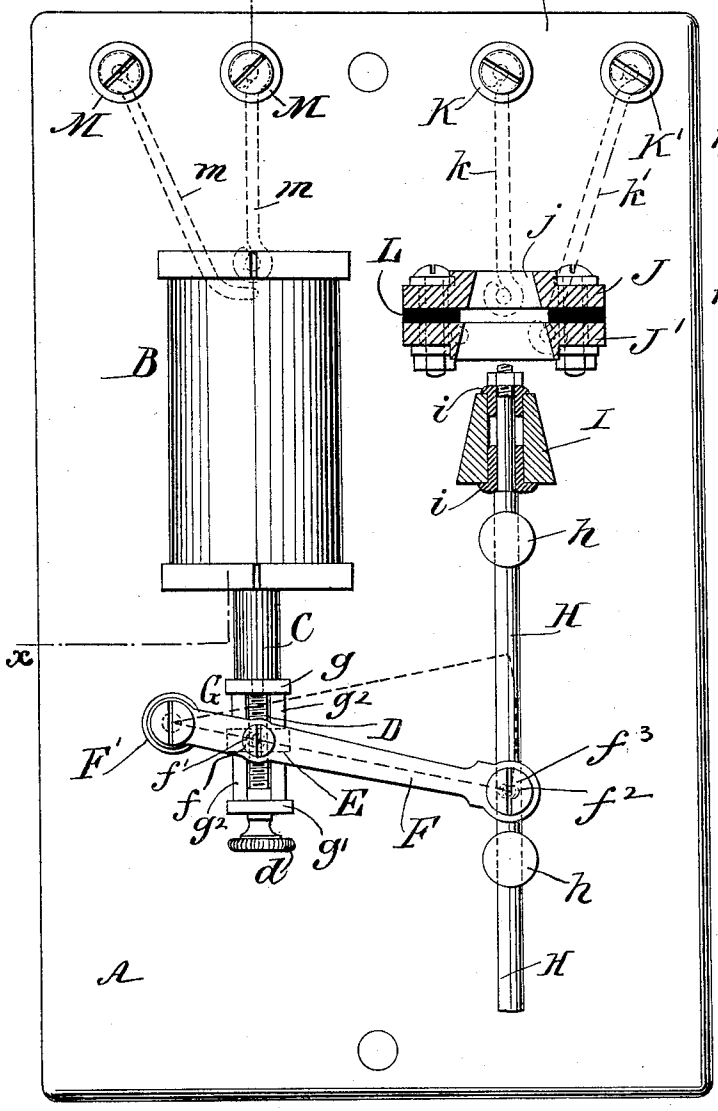
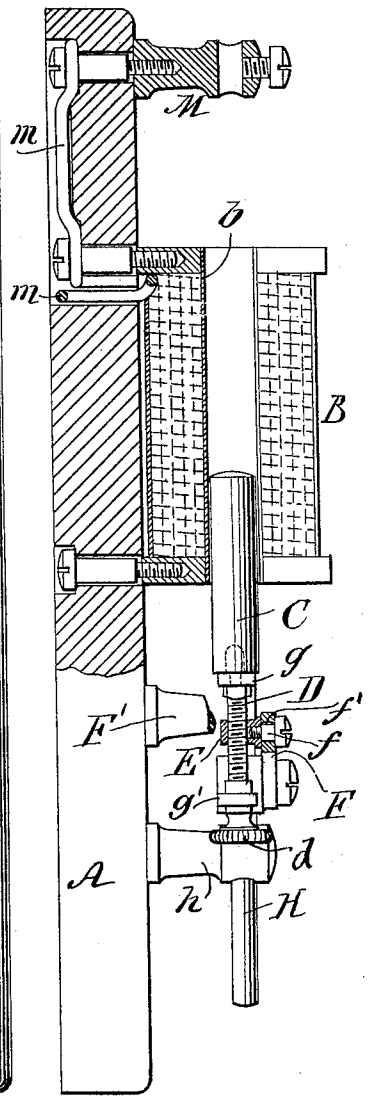


Fig. 2.



WITNESSES:
O. C. Minge.
B. McComb.

INVENTORS
Edmund Pruckner
and
George Schindler
BY
Carr Deemer & Co
ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

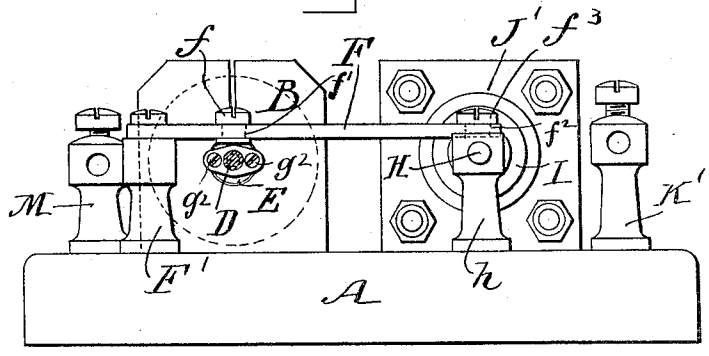
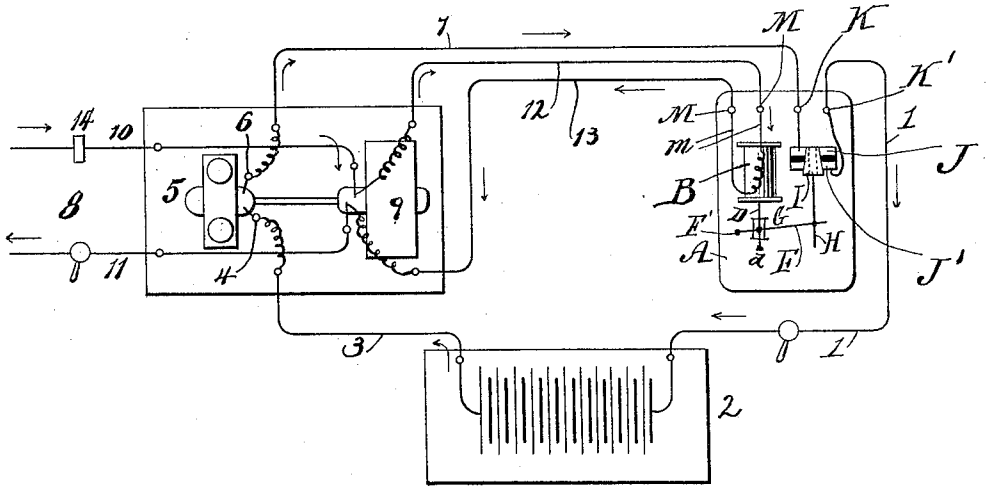


Fig. 4.



WITNESSES:
O. C. Hinge.
B. McComb.

INVENTORS
Edmund Pruckner
and
George Schindler
BY
Church Howson & Co
ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDMUND PRUCKNER AND GEORGE SCHINDLER, OF NEWARK, NEW JERSEY.

AUTOMATIC ELECTRIC-CIRCUIT BREAKER AND CLOSER.

SPECIFICATION forming part of Letters Patent No. 592,443, dated October 26, 1897.

Application filed February 4, 1897. Serial No. 622,029. (No model.)

To all whom it may concern:

Be it known that we, EDMUND PRUCKNER and GEORGE SCHINDLER, citizens of the United States, and residents of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Automatic Electric-Circuit Breakers and Closers, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof, in which similar letters and numerals of reference indicate corresponding parts.

This invention relates to improvements in automatic electric-circuit breakers and closers adapted for use in electric-lighting or other electrical systems, the object thereof being to provide means for instantaneously opening the circuit and cutting off connection between the secondary battery and the generator when any accident occurs to the outside line, whereby the danger of burning out armatures is obviated, a further object being to automatically close the circuit as soon as the motor is started.

The invention will be hereinafter fully described, and specifically set forth in the annexed claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a front elevation of our improved device, showing portions thereof in vertical sectional elevation. Fig. 2 is a vertical sectional elevation on the line $x\,x$ of Fig. 1. Fig. 3 is an inverted plan view; and Fig. 4 is a diagram illustrating our circuit-breaker in electrical connection with a motor, generator, and a secondary battery.

In the practice of our invention the apparatus is mounted upon a plate or base A, of non-conducting material—such as marble, slate, &c. This plate is fixed in an upright position at any suitable location in the motor-room, preferably upon one of the walls thereof.

Mounted upon the base A, at one side thereof, is an electromagnetic coil B, wound to any suitable amperage, depending upon the requirements of the work to be done.

Located vertically within the cylindrical inside portion b of the coil is a core C, preferably composed of wrought-iron. This said core is vertically adjustable for the purpose of bringing a larger or smaller surface thereof under the effect of the spool or coil, depending upon the requirements of the case.

As a means for adjusting the core the lower end thereof is pivotally connected to a screw D, which is threaded through a sleeve E, which sleeve is connected to the lever F by means of a screw f. This said lever is fulcrumed upon a stud F', extended laterally from the face of the base-plate A.

To add rigidity to the structure and prevent rotation of the core C and the sleeve E, a framework G is connected to the lower end of the core. This said framework comprises upper and lower plates g and g' and vertical rods g^2, adapted for guiding the sleeve E.

As a means for operating the screw D the lower end thereof has a thumb-knob d connected thereto.

To allow for easy movement of the lever F a slot f' is formed therethrough at the point where the screw f passes through the lever. The outer end of the lever is also supplied with a slot f^2, through which a screw f^3 passes to engage with a vertically-movable rod H, which said rod is journaled through studs h, extended laterally from the face of the base-plate A.

Mounted upon the upper end of the rod H is a metallic cone I, said cone being insulated from the rod by any suitable insulating material i. This said cone is adapted to be seated within a conical recess j, formed by the conjunction of two plates J and J', which said plates are connected, respectively, to binding-posts K and K' by means of conductors k and k'. These two said plates are insulated from each other by means of a ring L, composed of any suitable insulating material, or they may be simply separated from each other by air-space between them. The respective poles of the electromagnetic coil B are also connected to binding-posts M by means of conductors m.

We do not confine ourselves to the specific construction of the plates J and J' nor to the specific construction of the cone I, as it is obvious that under the scope of our invention we are entitled to variations of mere mechanical detail. For instance, the plates J and J' may be arranged opposite to each other

upon a horizontal plane and having a vertical space between them.

In the operation of the device a conductor 1 is lead from the binding-post K′ to one pole of the secondary battery 2. From the opposite pole of the battery a conductor 3 is lead to the brush 4 of the generator 5, the opposite brush 6 of the said generator being in electrical connection with a conductor 7, which is connected to the binding-post K. This said post is in electrical connection with the plate J′, whereby when the cone is not seated within the recess *j* the circuit between the secondary battery and the generator is broken.

The outside line 8 is in electrical connection with the motor 9 by means of conductors 10 and 11, and this said motor is also in electrical connection with the magnetic coil B by means of conductors 12 and 13, whereby when the motor is in operation the coil is energized and its core C raised by the magnetic attraction of the coil B. The raising of the core also obviously lifts the lever F and brings the cone I into contact with the plates J and J′, whereby an electrical connection is made between the generator and the secondary battery, and this connection is maintained during the whole time the motor is running or while the line is in perfect working condition.

Should an accident occur to the main line by breaking of one of the conductors, or should the circuit be broken by means of the fuse 10, the magnetic coil B will immediately lose its force and allow the core C to drop by gravity, the downward movement thereof carrying the cone I out of contact with the plates J and J′, whereby the circuit leading through the secondary battery to the generator is broken and danger of burning out the armature of the generator is obviated.

When the line has been repaired and the motor again started, it is obvious that the circuit is automatically closed again by the magnetic attraction of the electromagnetic coil B for the core C, and we therefore style our invention as an "automatic electrical circuit breaker and closer."

It will be noted that in our apparatus the swinging armature common to most circuit-breaking devices is not used in conjunction with the core. Therefore action of the core is not retarded by a remnant of magnetic attraction between the core and armature which frequently causes the core to stick to the armature and nullify the protective effect of the device by preventing instantaneous action of the instrument. In our arrangement the core with all its connected parts is kept in balance and position only by a surplus of induced magnetism, which can be adjusted to a minimum amount. Therefore the moment the magnetic coil has lost its current nothing but the weight of core and its mechanically-connected parts is required to throw the cone out of connection with the circuit-making plates, whereby the action is instantaneous and positive.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a circuit breaker and closer, the combination of a magnetic coil and a vertically movable and adjustable core, said core being mounted upon a rod which is connected to a lever, and a vertically-movable rod having a plug connected thereto and insulated therefrom, and two plates insulated from each other adapted for engagement with the said plug, whereby they may be brought into electrical connection with each other; and a base-plate of insulating material for mounting the said parts, substantially as shown and described.

2. In an automatic circuit breaker and closer, the combination of a magnetic coil and a vertically-adjustable core, said core being mounted upon a screw-rod which engages with a sleeve connected to a swinging lever, said lever also having a rod connected thereto which carries at its upper end a conical plug, which plug is insulated from the rod, and two adjacent plates electrically separated from each other by means of insulating material, said plates, in conjunction, having a conical recess formed therein for engagement with the said conical plug; with an electrical system, substantially as shown and described.

3. In an automatic circuit breaker and closer, the combination of a magnetic coil and a vertically-adjustable core, said core being mounted upon a screw-rod which engages with a sleeve connected to a swinging lever, said lever also having a rod connected thereto which carries at its upper end a conical plug, which plug is insulated from the rod, and two adjacent plates electrically separated from each other, said plates, in conjunction, having a conical recess formed therein for engagement with the said conical plug; with a motor, a secondary battery and a generator arranged in circuit, substantially as shown and described.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 2d day of February, 1897.

EDMUND PRUCKNER.
GEORGE SCHINDLER.

Witnesses:
C. SEDGWICK,
B. MCCOMB.