

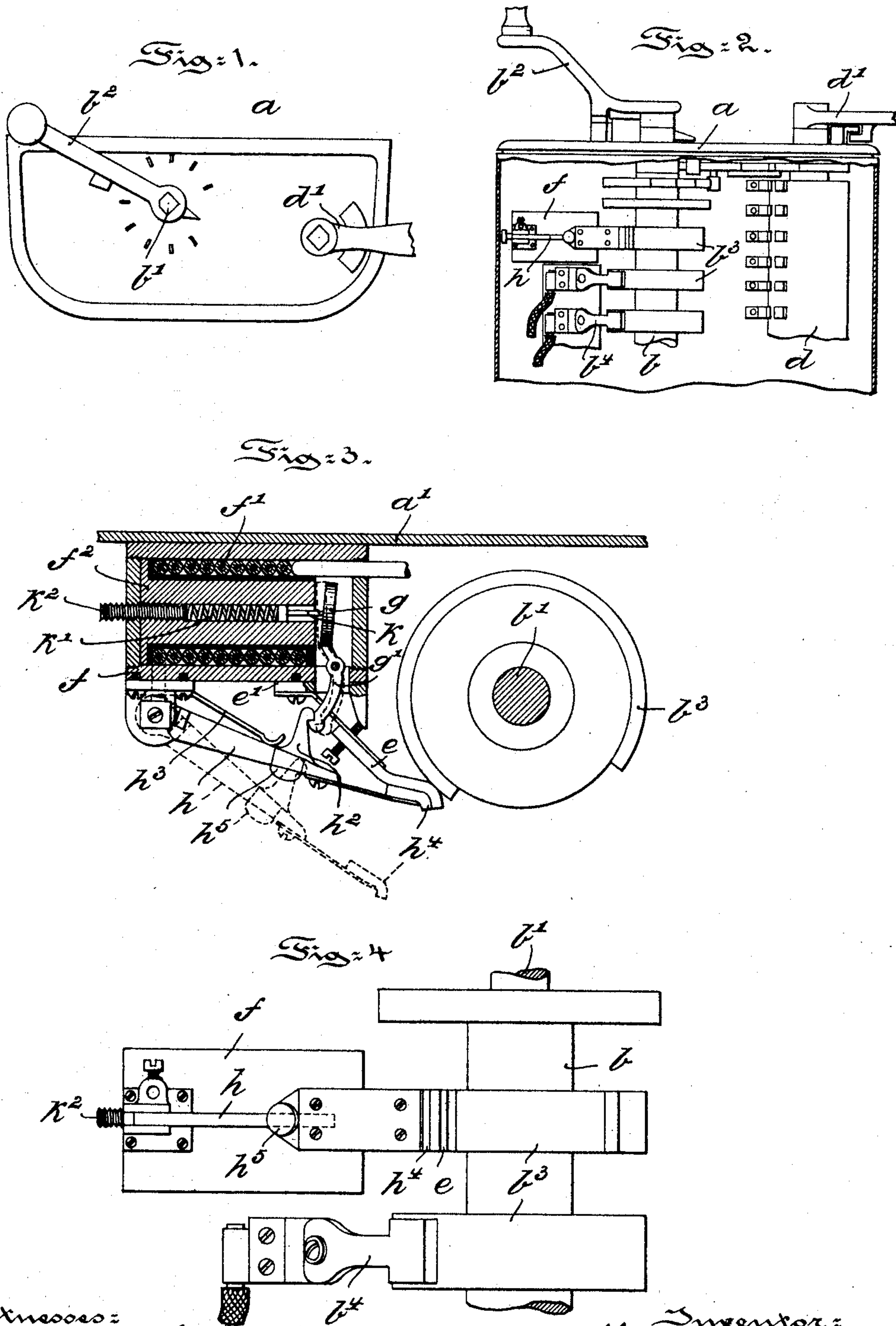
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Patented Sept. 5, 1899.

W. H. CONRAD.
CIRCUIT BREAKER FOR CONTROLLERS.

(Application filed May 17, 1899.)

(No Model.)



Witnesses:
Thomas M. Smith.
Richard C. Hapwell.

Inventor:
William H. Conrad,
By J. Walter Douglass,
Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM H. CONRAD, OF PHILADELPHIA, PENNSYLVANIA.

CIRCUIT-BREAKER FOR CONTROLLERS.

SPECIFICATION forming part of Letters Patent No. 632,516, dated September 5, 1899.

Application filed May 17, 1899. Serial No. 717,136. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. CONRAD, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Circuit-Breakers for Controllers, of which the following is a specification.

My invention has relation to a circuit-breaker for a car-controller, and in such connection it relates particularly to the construction and arrangement of the circuit-breaker for said purpose.

The principal object of my invention is to provide, in conjunction with a controller for electric-motor cars, a circuit-breaking device adapted to automatically break the circuit through the controller when the amperage becomes too great, whereby the use of fuses and the burning or blowing out of the same and the consequent damage to the controller and its parts are avoided.

My invention, stated in general terms, consists of a circuit-breaker for a controller constructed and arranged in substantially the manner hereinafter described and claimed.

The nature and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a top or plan view of a controller for electric-motor cars. Fig. 2 is a vertical sectional view of the upper portion of the controller, the circuit-breaker embodying main features of my invention being illustrated in side elevation. Fig. 3 is a horizontal sectional view, enlarged, of the controlling-cylinder and the circuit-breaker applied thereto; and Fig. 4 is a front elevational view of Fig. 3.

Referring to the drawings, *a* represents the cap for the top of the controller, and *a'* the frame or casing. Within the frame *a'* is arranged the controlling-cylinder *b*, the shaft *b'* of which projects above the cap *a* and is adapted to be turned by the controller-handle *b²*. The reversing-cylinder *d* and its accessories, including the handle *d'*, are of the usual well-known construction. The controlling-cylinder *b* is made up of a series of contact-disks *b³*, carried by the shaft *b'* in the

ordinary manner, and revolves against a series of contact-fingers *b⁴*, forming the terminals for one pole of the circuit. Against the uppermost disk *b³* in the series instead of the usual finger *b⁴* is adapted to press the free end of a contact-spring *e*, the other end of which is secured, as at *e'*, to a box *f*, located within the casing or frame *a'* and preferably below the cap *a*. Within the box *f* a conductor *f'* of one pole of the circuit is coiled about an iron core *f²*, which when energized sufficiently is adapted to attract an armature *g*, carried at one end of a latch *g'*, pivoted to the box. Outside the box *f* is also pivoted an arm *h*, forming a continuation for the coil *f'* and having a projection *h²*, adapted to engage the latch *g'* and to be locked by the latch against the tension of a flat spring *h³*, normally tending to throw the arm *h* outward away from the box *f*, as indicated in dotted lines in Fig. 3. The free end *h⁴* of the arm *h* when the said arm is engaged by the latch *g'* is adapted to press on the free end of the contact-spring *e*, which normally rests on the contact-disk *b³* to complete the circuit. The armature end *g* of the latch *g'* is normally kept from the core *f²* by means of a pin *k*, held under the tension of a spring *k'*, preferably coiled within the center of the core *f*. The tension of the spring *k'* may be regulated by the adjusting-screw *k²*, so that the armature *g* cannot be attracted by the core *f²* until the amperage of the current passing through the coil of the core becomes abnormal. When the magnetic core *f²* actuates the armature *g*, the latch *g'* will be withdrawn from the projection *h²* of the arm *h*, and the said arm will then be thrown outward and its free end *h⁴* will be released from the free end of the contact-spring *e* and the circuit broken. The arm *h* is provided with an insulated knob or projection *h⁵*, by means of which the arm *h* may be pushed inward to cause its projection *h²* to again engage the latch *g'* and to complete the circuit when its free end *h⁴* rests against the spring-contact *e*.

Having thus described the nature and object of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An automatic circuit-breaking device for a controller, comprising a spring-contact normally resting on a disk of the controller-cylinder, an arm forming a continuation of one

terminal of the circuit, a latch normally adapted to lock the arm to the spring-contact, and a magnet located in the circuit of the controller and adapted to operate the latch to release said arm from said contact, substantially as and for the purposes described.

2. In a device of the character described, a controlling-cylinder and its disks, a spring-contact resting against one of said disks, an arm adapted to press against said contact to complete the circuit, a magnet included in the circuit of the controlling-cylinder, a latch adapted to be operated by said magnet, a projection on said arm adapted to engage the latch to lock the arm upon the spring-contact, and a spring normally tending to release the arm from said spring-contact, substantially as and for the purposes described.

3. In a device of the character described, a controlling-cylinder and its disks, a spring-contact resting against one of said disks, an

arm resting on said contact to complete the circuit, and means included in the circuit of the controlling-cylinder for releasing said arm from said spring-contact when the current becomes abnormal, substantially as and for the purposes described.

4. In a device of the character described, a controlling-cylinder and its disks, in combination with an arm adapted to complete the circuit through one of said disks and means located within the circuit for automatically operating said arm to break said circuit, substantially as and for the purposes described.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

WILLIAM H. CONRAD.

Witnesses:

J. WALTER DOUGLASS,
THOMAS M. SMITH.