

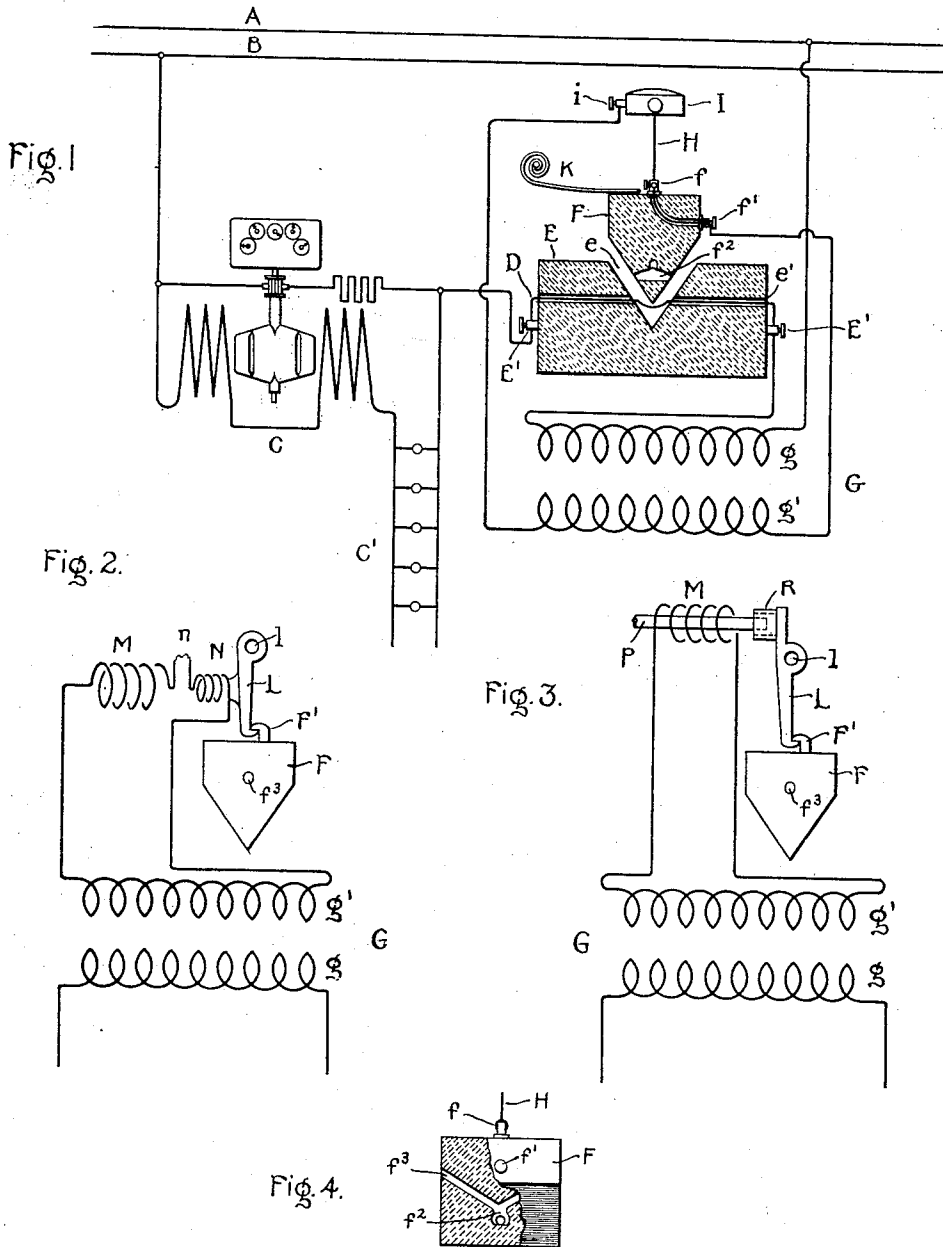
No. 710,056.

Patented Sept. 30, 1902.

C. D. HASKINS.  
AUTOMATIC CIRCUIT BREAKER.

(Application filed Dec. 14, 1900.)

(No Model.)



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## AUTOMATIC CIRCUIT-BREAKER.

SPECIFICATION forming part of Letters Patent No. 710,056, dated September 30, 1902.

Application filed December 14, 1900. Serial No. 39,835. (No model.)

To all whom it may concern:

Be it known that I, CARYL D. HASKINS, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Automatic Circuit-Breakers, (Case No. 1,596,) of which the following is a specification.

My invention relates to devices for protecting electrical apparatus from the destructive effects of an accidental crossing of its leads by wires carrying currents of higher potential than that for which the apparatus is designed. In the modern systems of transmission of power by means of alternating currents of excessively high voltage there is constant danger that a line conductor carrying such a current may become crossed with a conductor supplying current of comparatively low voltage to small apparatus, such as recording-meters, in which case the apparatus will be burned out or badly damaged.

My invention aims to protect all such apparatus by means of an automatic circuit-breaker so constructed and arranged that when an abnormal alternating current is thrown upon the circuit of the apparatus it energizes the primary coil of a transformer in said circuit, the secondary of said transformer being in circuit with a device for tripping a circuit-breaking device controlling the circuit of the apparatus.

For the purpose of illustration I shall describe the invention as applied to the protection of a recording-wattmeter; but it is to be understood that it can be used with a great variety of apparatus.

In the drawings, Figure 1 is a diagrammatic representation of my invention. Figs. 2 and 3 show modified devices for tripping the circuit-breaker. Fig. 4 is a side view, partly in section, of the wedge block.

Let A B be direct-current mains with which is connected a recording-wattmeter C of any desired construction in circuit with a lighting-circuit C'. A portion of the meter-circuit is composed of a small and weak fuse-wire D, which spans a deep notch *e* in the block E of insulation, preferably porcelain. The wire is led through small passages *e'*, running from

the sides of the block to a point a little above the bottom of the notch, as clearly shown in Fig. 1. The wire D is firmly held at its ends by two binding-posts E', mounted on the block near the outer ends of the passages *e'*. 55

Above the notch *e* is suspended a block F, of porcelain or the like, so shaped as to fit into the notch. The notch is preferably V-shaped, and the block F is wedge-shaped, as shown. The sharp edge of the wedge block lies normally just above that portion of the wire D which spans the lower part of the notch. It is evident that if the wedge block is permitted to drop it will not only sever the fragile wire D and open the meter-circuit, but it will also fill the notch and tend to extinguish any arc that may form between the ends of the wire. 60 65

In order to instantly release the wedge block in case the mains are crossed by a conductor carrying a high-potential alternating current, I arrange a transformer G with its primary coil *g* in circuit with the meter and its secondary coil *g'* in circuit with a device which will release the wedge block F when a secondary current is induced. In Fig. 1 this device consists of a fusible wire H, attached at one end to a stationary support I, carrying a binding-post *i* for one terminal of the secondary coil. The other end of the fusible wire is attached to the wedge block F by means of a binding-post *f*, which is connected with the other terminals of the secondary coil *g'*. To avoid an arc when the wire H ruptures, it may be led through a passage in the wedge block F from the binding-post *f* to a second binding-post *f'* on the side of the wedge block, the terminal of the secondary being brought to the second post, as shown in Fig. 1. 70 75 80 85 90

A heavy alternating current in the primary coil *g* will induce a secondary current in the coil *g'* sufficient to melt the wire H, or at least to weaken it, so that it will break and let the wedge block F fall. A spring K may bear upon the block F to assist in rupturing the fusible wire H and forcing the wedge-block snugly into the notch *e*. 95

The wedge block may be provided with a transverse hole *f<sup>2</sup>* and lateral passages *f<sup>3</sup>*, 100

running therefrom to its ends to lead off the flame of any arc that may possibly form when the wire D is severed.

The wedge block may be suspended by a hook L and catch F' instead of by a fusible wire. In such case the circuit of the secondary coil remains permanently closed through a coil M, arranged to swing the hook and release the catch when the coil is energized. Thus in Fig. 2 the coil will attract an armature or coil N on the hook connected with the coil M by a flexible conductor *n*, or the coil M may magnetize a laminated core P, which acts to repel a short-circuited secondary R of low resistance, secured upon an extension of the hook above its pivot *l* and inclosing the end of the core. This short-circuited secondary may be a ring of copper.

Other modifications of the idea may occur to one skilled in the art falling within the scope of my invention, and I do not limit myself to what I have specifically shown and described.

It will be understood that so long as the direct current flows through the primary coil *g* no current is induced in the secondary *g'*; but the instant an alternating current of dangerously high potential passes through the primary it induces in the secondary a current of considerable value, but of low potential. This induced current operates the releasing device in the manner above set forth and permits the wedge block to sever the fuse-wire D, thereby opening the meter-circuit.

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

1. The combination of an electric circuit, automatic means for mechanically cutting a conductive part thereof upon determinate circuit conditions, and means for explosively extinguishing the arc formed at the cut part.

2. The combination with direct-current electrical apparatus, of a circuit-breaker therefor, and a separate controlling-circuit for said circuit-breaker supplied with energy through said apparatus and energized by a high-potential alternating current in the circuit of the apparatus.

3. The combination with direct-current electrical apparatus, of a circuit-breaker therefor, and a transformer in series with the apparatus and energized by a high-potential alternating current in the circuit of said apparatus and controlling the circuit-breaker.

4. An automatic circuit-breaker for electrical apparatus, comprising a transformer having its primary coil in circuit with the apparatus, a fragile conductor in said cir-

cuit, and means responsive to a current in the secondary coil for rupturing said fragile conductor.

5. An automatic circuit-breaker for electrical apparatus, comprising a transformer having its primary coil in circuit with the apparatus, a fragile conductor in said circuit, a device for mechanically severing said conductor, and means responsive to a current in the secondary coil for causing said device to operate.

6. An automatic circuit-breaker for electrical apparatus, comprising a transformer having its primary coil in circuit with the apparatus, a fragile conductor in said circuit, a block suspended above said conductor and adapted when released to sever said conductor, and means responsive to a current in the secondary coil for releasing said block.

7. An automatic circuit-breaker for electrical apparatus, comprising a transformer having its primary coil in circuit with the apparatus, a block having a notch, a fragile wire forming part of the circuit and spanning said notch, a wedge block to fit the notch, means for suspending the wedge block above the notch, and means responsive to a current in the secondary coil for releasing the wedge block.

8. The combination with a block of insulating material having a small passage intersected by a deep notch, of a fragile wire led through said passage and spanning said notch, and a wedge block adapted to fit said notch.

9. The combination with a block of insulating material having a deep notch and an intersecting small passage, of binding-posts near the ends of said passage, a fragile wire led through said passage across the notch and held in the binding-posts, and a block of insulating material adapted to fit the notch, and containing passages near its lower end.

10. The combination with direct-current electrical apparatus, of a transformer having its primary coil in the circuit thereof, a fragile conductor forming part of said circuit, a block adapted, when dropped, to sever said conductor, and a fusible wire suspending said block, and in circuit with the secondary coil of said transformer.

In witness whereof I have hereunto set my hand this 12th day of December, 1900.

CARYL D. HASKINS.

Witnesses:

BENJAMIN B. HULL,  
MARGARET E. WOOLLEY.