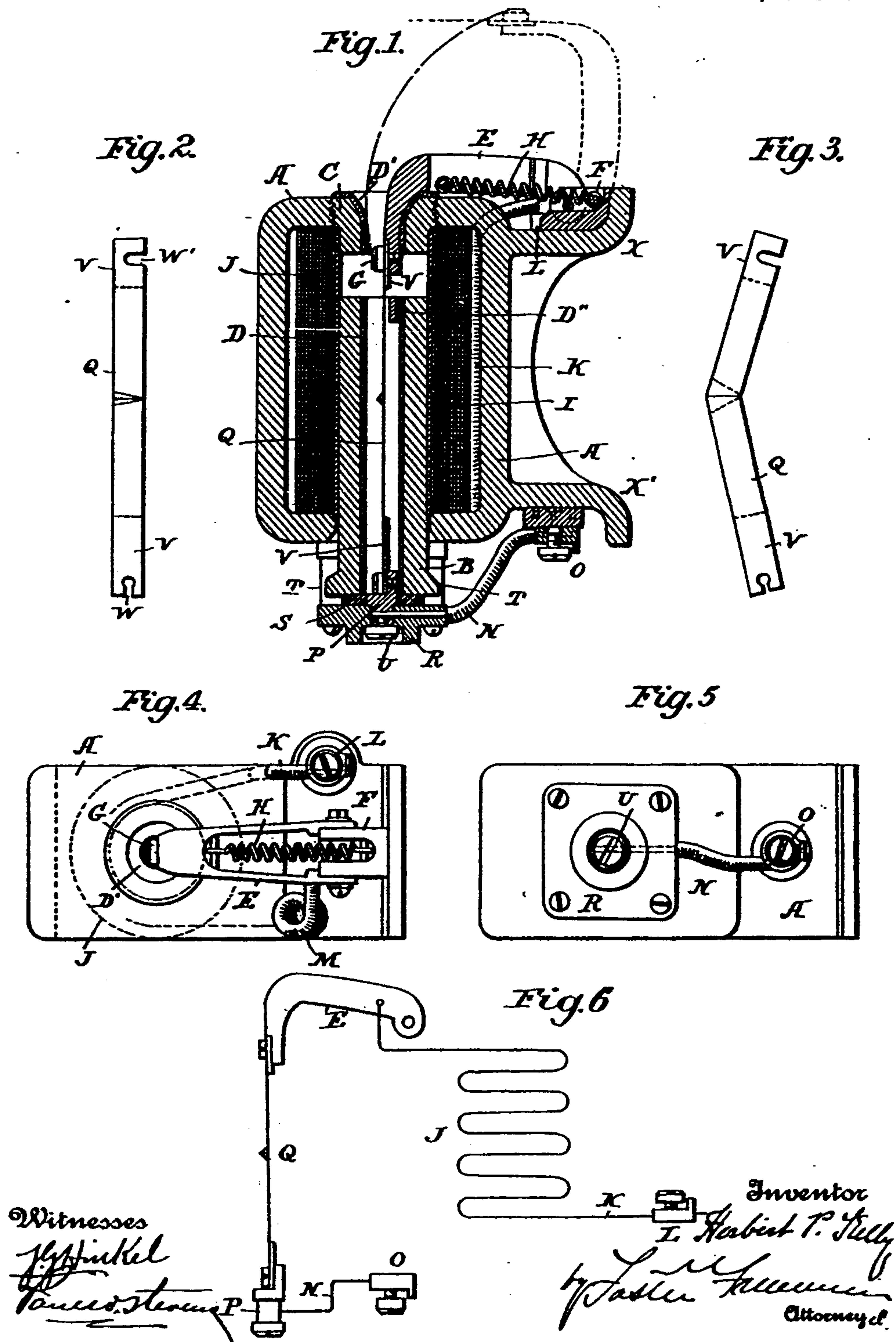


(No Model.)

H. P. KELLY.
CIRCUIT BREAKER.

No. 578,750.

Patented Mar. 16, 1897.



UNITED STATES PATENT OFFICE.

HERBERT P. KELLY, OF PHILADELPHIA, PENNSYLVANIA.

CIRCUIT-BREAKER.

SPECIFICATION forming part of Letters Patent No. 578,750, dated March 16, 1897.

Application filed April 7, 1893. Serial No. 586,511. (No model.)

To all whom it may concern:

Be it known that I, HERBERT PAINE KELLY, of the city and county of Philadelphia, Pennsylvania, have invented a new and Improved Magnetic Circuit-Breaker; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists in the provision of a strip of metal or other suitable conducting material in combination with a magnetic movable core arranged to operate as a hammer to break the said strip of metal, constructed and operated in the manner hereinafter described.

The object of the invention is to break electric currents to prevent destructive effect at any predetermined strength of current, all operating in the manner and for the purpose hereinafter described.

In order to enable others to use and practice my invention, I will proceed to describe its construction and operation.

On reference to the accompanying drawings, which form part of this specification, Figure 1 is a vertical section through center of apparatus. Figs. 2 and 3 are side views of breakable metal strips. Fig. 4 is a top view. Fig. 5, a bottom view; and Fig. 6 is a diagram of the circuits.

Similar letters refer to similar parts, of which—

A is a magnetic yoke made of cast-iron provided with lugs X X', which furnish means of support of apparatus against switchboard, &c. Said yoke has flat sides, as shown by dotted lines, Fig. 4.

C is a bushing of magnetic metal screwed or otherwise secured into cast-iron yoke A and provided with a lining D' of a non-conducting and fire-resisting material.

B is a hollow core of magnetic metal free to move in a vertical direction. Said hollow core is lined with a non-conducting and fire-resisting tube D, the same material being used in the cross-bar D'', secured firmly in place to enable practical contact with lever E when operating in the manner and for the purpose hereinafter described.

The non-conducting support R is secured in position by four studs T, of non-magnetic metal, screwed into magnetic yoke-casting A,

said non-conducting support being secured to same by ordinary screws shown, and furnishes support to said hollow core when in normal position shown. O is one of the two terminal binding-clamps, into which are secured the main wires carrying the current. The other of said binding-clamps is shown at L. N is an insulated conductor connecting said binding-clamp O with clamp P, which makes direct connection with and secures in place the lower end of the breakable metal strip Q, said insulated conductor N being secured into hole in said clamp P by set-screw U, which also serves to fasten said clamp P in place. The said strip Q continues the electric circuit to metal lever E to insulated connection M, from thence to coil J, from bottom of coil J to insulated conductor K, to above-mentioned terminal binding-clamp L, all operating in the manner hereinafter described.

The end of lever E is pivoted in insulating-block F, and its free end is curved downward so as to enter top of bushing C, said curved end being provided with a screw G to hold upper end of said metal breaking strip Q firmly in place. Said lever E is provided with spiral spring H, secured in position shown in Fig. 1 by a metal pin at each end in a line closely parallel across the pivoted point of said lever E. The effect is to cause little or no strain to pull lever in upward direction from the normal condition, but exerts its full force as soon as lever is liberated and caused to rise out of its normal position, as hereinafter more fully explained.

The ends of breakable strips Q are reinforced by being made thicker than central part and are provided with slots W W', which slots are provided to enable a clamping hold with bottom screw in P and top screw G. The middle portions of said breakable strips are fashioned as shown in Fig. 3, being cut from sheet metal (or foil) at an angle. They are afterward made to have their edges conform to straight lines by being "wrinkled," as shown in Fig. 2, the effect of which when forced apart is a tearing action, the straight or unwrinkled edge taking the first strain, causing the metal first to separate at that point. In attaching, the strip is secured to lever E, which can be lifted clear of obstructions for

that purpose, the said strip being first inserted in hole in center of core. Next the said core is lifted partly upward, exposing screw-head at P, under which lower end of strip is secured by means of lower slot W and core is allowed to drop again into normal position.

Ordinary washers of non-conducting material of various thicknesses are placed at point S to enable adjustment of distance between magnetic core B and magnetic bushing C, for the purpose hereinafter explained.

The inner portion of coil J is provided with a metal tube-lining, in which the magnetic core B freely slides when operating, as hereinafter explained.

The operation of the circuit-breaker is in this wise: When in series circuit with an electric-current generator and motors, lamps, or other devices, constituting a load, and the electric current exceeds a predetermined value fixed by adjusting thickness of washers S, insuring the proper length of air-gap between magnetic core B and bushing C, the magnetic core B, which remains in position shown so long as current is normal, then rises by its induced magnetism and flies upward with sufficient force to operate as a hammer upon the lever E, causing the metal strip Q to break in the aforementioned middle portion, the two parts separating, the lower remaining fixed, while the upper flies out of the center of bushing C and assumes the position shown by dotted lines, thus removing the said parts beyond arcing distance, after which a similar strip Q can be inserted and the operation repeated whenever emergency requires the use of such safety appliance.

What I claim, and desire to secure by Letters Patent, is—

1. In a circuit-breaker, a breakable strip included in the circuit, and mechanical means controlled by the circuit for mechanically breaking the strip without previously fusing it, substantially as described.

2. In a circuit-breaker, the combination with an electromagnet, of a weakened conducting-strip included in the circuit of the magnet, a support for said strip, and electromagnetic means mechanically impinging on said support to break the strip, substantially as described.

3. In a circuit-breaker, the combination with an electromagnet, of a weakened conducting-strip included in the circuit of the magnet, a movable support for one end of the strip, and a core electromagnetically operated to mechanically impinge upon the support and break the strip, substantially as described.

4. In a circuit-breaker, the combination with an electromagnet, of a breakable conducting-strip included in the circuit of the magnet, a pivoted spring-controlled support for one end of the strip, and a core electromagnetically operated to impinge upon the support to break the strip, substantially as described.

5. In a circuit-breaker, the combination of the magnet, the hollow core, the incombustible lining, the breakable strip mounted within the core, and the spring-actuated support for said strip, substantially as described.

HERBERT P. KELLY.

Witnesses:

EMILE L. PUDRIAUX,
GEO. L. MASON.