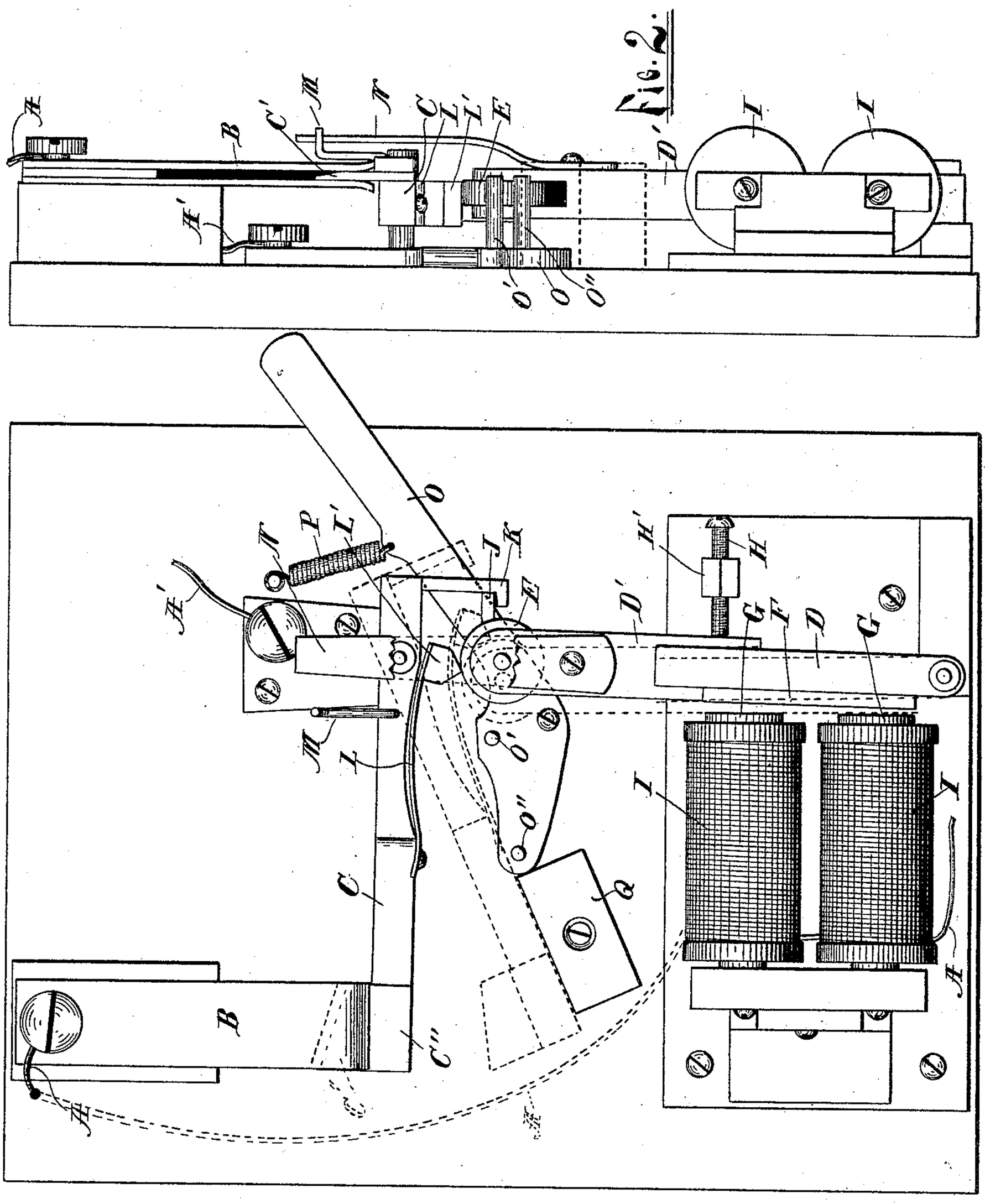
(No Model.)

D. F. SWEET.

AUTOMATIC ELECTRIC CUT-OUT.

No. 529,212. Patented Nov. 13, 1894.



WITNESSES:

Joseph Kennedy
Lewis E. Flanders

INVENTOR

Daniel F. Sweet
BY
Luther V. Moulton
ATTORNEY.

UNITED STATES PATENT OFFICE.

DANIEL F. SWEET, OF GRAND RAPIDS, MICHIGAN.

AUTOMATIC ELECTRIC CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 529,212, dated November 13, 1894.

Application filed April 23, 1894. Serial No. 508,574. (No model.)

To all whom it may concern:

Be it known that I, DANIEL F. SWEET, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Automatic Electric Cut-Outs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved automatic electric cut out, to prevent burning out of electrical apparatus, and other damage by excessive electric currents, and its object is to provide the same with certain new and useful features, hereinafter more fully described, and particularly pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of a device embodying my invention, and Fig. 2 a side elevation of the same, and it consists essentially of the following described parts, suitably insulated and arranged with relation to each other; and they may also be inclosed in a suitable case if desirable.

A, A, are portions of the wire, or conductor of the current forming the circuit, in which circuit is formed one or more coils I, I, surrounding cores G, G, which cores are rendered magnetic by the current in said coils.

A′ is another wire also forming a portion of the circuit and said wires A and A′ are connected by a cut out, consisting of a spring clamp B, to which the wire A is electrically connected and a pivoted bar C having a wedge C′ and stop block C″ engaging said clamp B to close the circuit, and to which bar the wire A′ is electrically connected. A lever D is pivoted to vibrate near the ends of the cores G, G, and has the armature F attached opposite said cores. A portion of said lever D′ is made of insulating material, and in its upper and movable end is journaled a roll E, which roll engages an oppositely inclined block L′ attached to a spring L, secured to the bar C. The lever D when withdrawn from the cores G brings the roll E in contact with the side of the block L′ that is inclined from the cores G and thus the pressure of the spring L tends to hold said lever away from said cores and in contact with an adjusting screw H in the post H′, and also to sustain the bar C in position to keep the circuit closed.

An arm M projects upward and outward from the bar C and an arm N projects from the lever D and engages the arm M, as the lever D moves toward the cores G as hereinafter described. To further secure the bar C in position for closing the circuit a projection J is provided on the lever D, which engages a hook K attached to the bar C at the end opposite the wedge C′. As the circuit increases in the coils I the attraction between the cores G and armature D increases, until sufficient to overcome the resistance due to the inclined face of the spring pressed block L′, when the lever D moves toward the cores G, and as the roll E passes under the angle of the block L′, the opposite incline of the latter comes into action, which now tends to pull the bar C down and also accelerates the movement of the lever D, which is also actuated with rapidly increasing force by the armature F as it approaches the cores G, and is thus acted on more strongly by their attraction. In the meantime the projection J has moved away from the hook K, and released the same. Finally as the armature F is about to contact the cores G, and is at its highest tension the arm N strikes the arm M with considerable force and effectually and suddenly removes the wedge C′ from the clamp B, thus promptly and surely opening the circuit and bringing the bar C to rest on the stop block Q, as shown by dotted lines in Fig. 1. This sudden and prompt action also prevents arcing. To still further increase air resistance the bar C may be oppositely extended and provided with break mechanism as described at both ends, whereby two simultaneous breaks will occur in the circuit, one at each end of said bar. By adjusting the armature F at the proper distance from the cores G, this breaking of the circuit may be adjusted to occur when the circuit shall have reached a predetermined intensity, and thus prevent any, and all damage of whatever nature due to excessive electric current in the circuit from whatever cause. To restore the parts to place and close the circuit again a lever O is provided, which is made of some suitable insulating material and provided with a pin, or

projection O′, suitably located to engage and move the lever D to place, and a like projection O″ to engage and lift the bar C to place. A spring P holds the outer end of the lever elevated when out of use.

It will be observed that before the poles of the magnet can draw the armature to them the attractive force must overcome the resistance caused by the knife edge of block L′ pressing upon the periphery of the roller to the left of the center of its journal. It is therefore obvious that the point at which the instrument is set to operate may be varied by simply adjusting the armature and roller-carrying arm so as to bring the bearing edge of the block nearer to or farther from a vertical line drawn centrally through the pivots of the armature and the journal of the roller, it being evident that the farther the knife edge be adjusted from said line the greater will be the resistance offered and the stronger the current required to attract the armature and break the circuit. In this manner an exceedingly delicate and variable adjustment is obtained, whereby the instrument may be set to accurately and quickly respond to any predetermined abnormal current, from the weakest to the strongest. The instant the bearing edge passes over the center of the roller the arm N strikes part M with considerable force and throws down the switch lever C.

What I claim is—

1. In an automatic electric cut-out, the combination of an electro magnet in the circuit, an armature carrying an arm, a roller journaled in said arm, a spring-pressed bearing-edge normally bearing on the periphery of said roller, means for adjusting said roller so as to cause said bearing edge to bear on the roller nearer to or farther from a line through the pivotal centers of the roller and armature, a bar carrying one of the contacts, a latch holding the contacts in engagement and means for disengaging said latch by the movement of the armature, substantially as described.

2. In an automatic electric cut-out, the combination of an electro magnet in the circuit, contact plates, a swinging bar carrying one of the contact plates, a spring pressed bearing block carried by said swinging bar a latch holding said bar in its closed position, an armature carrying a roller upon whose periphery said bearing-block normally presses, means for adjusting the armature and roller, substantially as described.

3. In an automatic electric cut-out, the combination of an electro magnet and an armature therefor, a roller journaled in an arm carried by the armature, means for adjusting said arm and roller, a swinging bar carrying one of the contact plates, a spring pressed bearing block adapted to bear upon the roller, a latch engaging the swinging bar and holding it closed, and means for disengaging the latch and striking the swinging bar the instant the bearing edge passes over the center of the roller, substantially as described.

4. In combination with an electric circuit, spring clamps in said circuit, a pivoted bar having at one end a wedge and stop engaging said clamps, and a hook at the other end, a pivoted lever actuated by magnets excited by coils in said circuit, a projection on said lever engaging said hook, an arm on said bar, and an arm on said lever engaging the same, a roll on said lever, and a spring on said bar having inclined faces engaging said roll, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

DANIEL F. SWEET.

Witnesses:
LUTHER V. MOULTON,
LEWIS E. FLANDERS.