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PATENTED DEC. 8. 1903.

C. A. BOREIN & L. P. DESIMONE.

AUTOMATIC CUT-OUT.

APPLICATION FILED MAY 11, 1901.

NO MODEL.

2 SHEETS—SHEET 1.

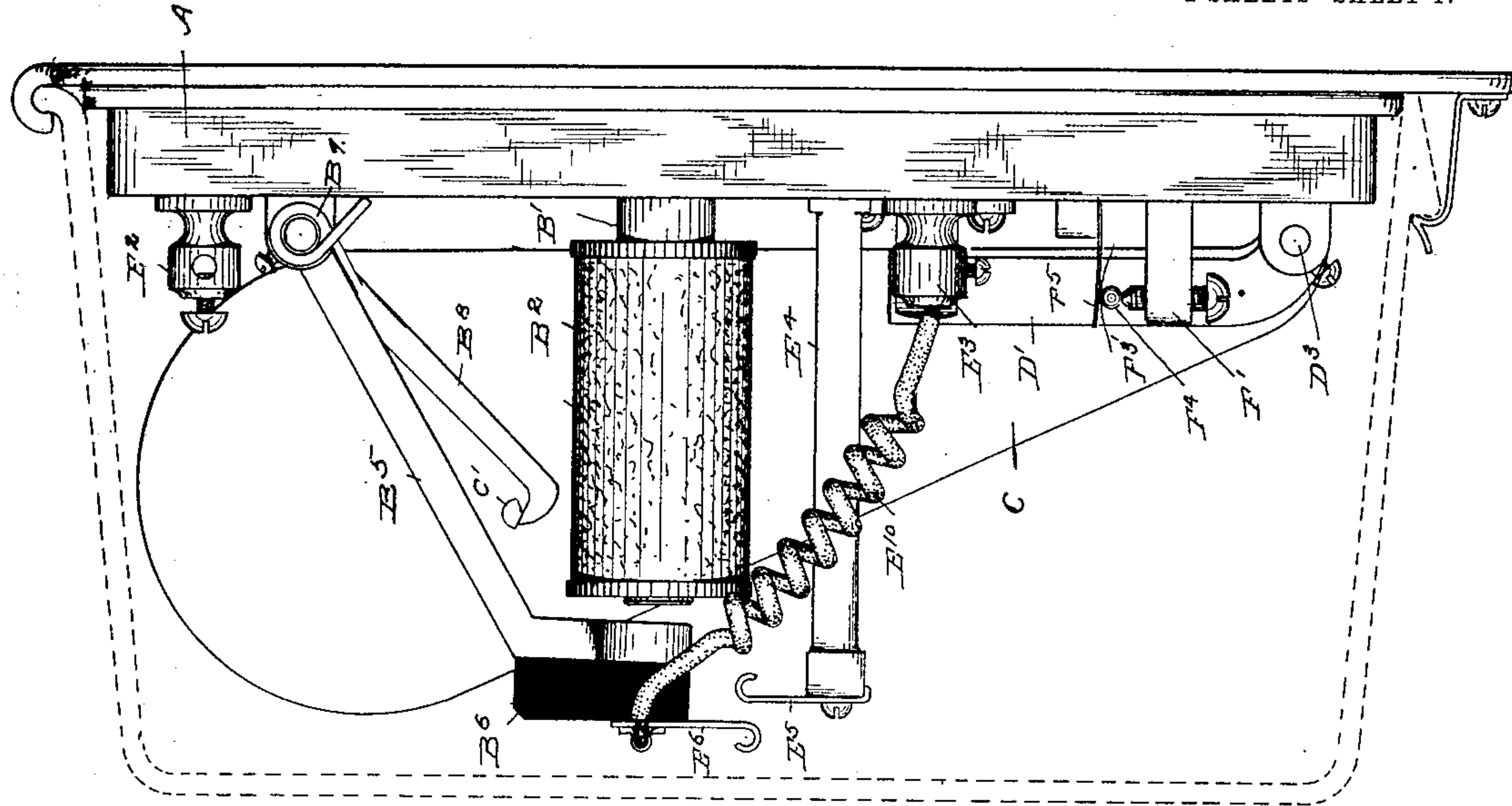


Fig. 2.

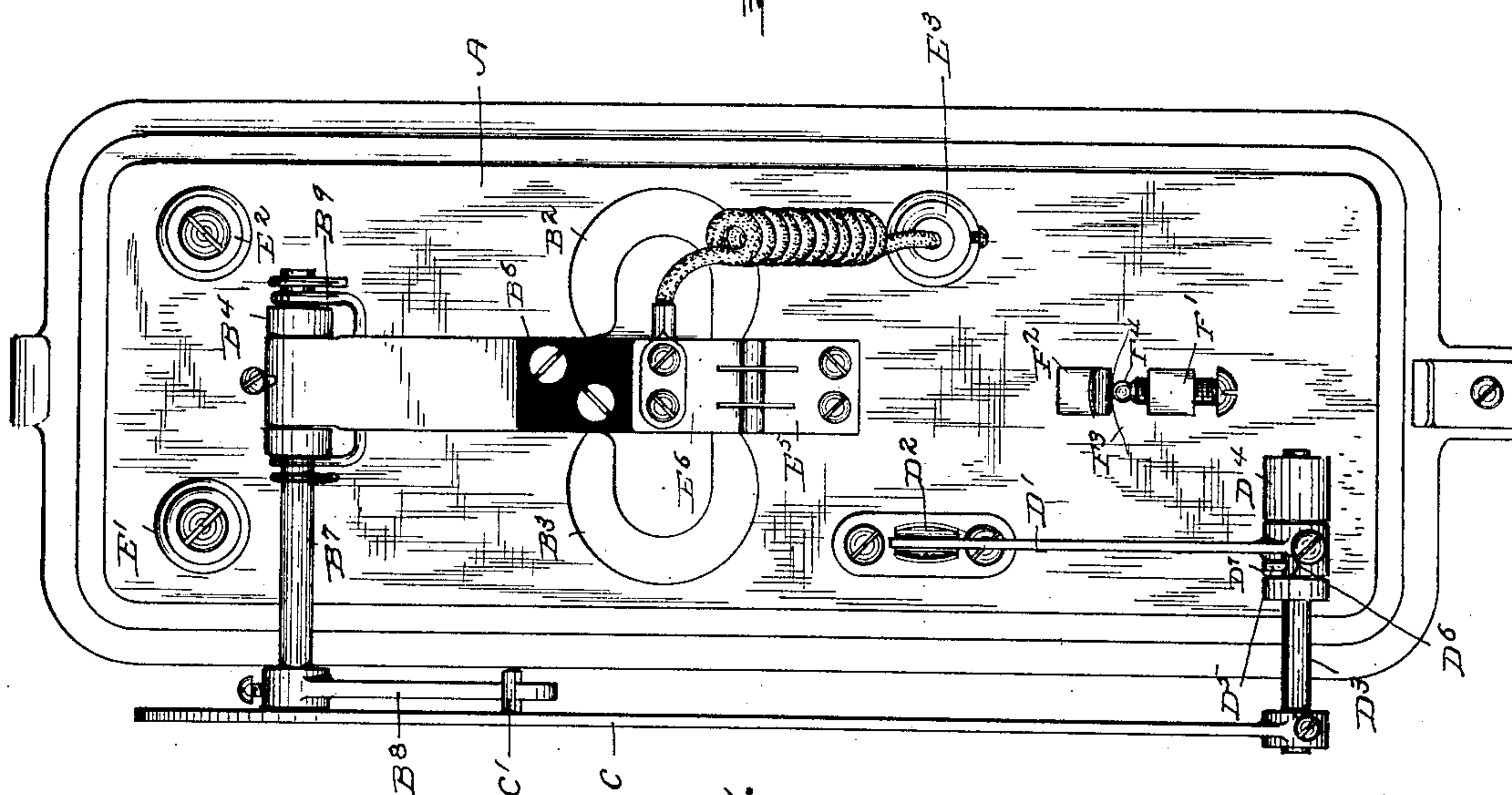


Fig. 1.

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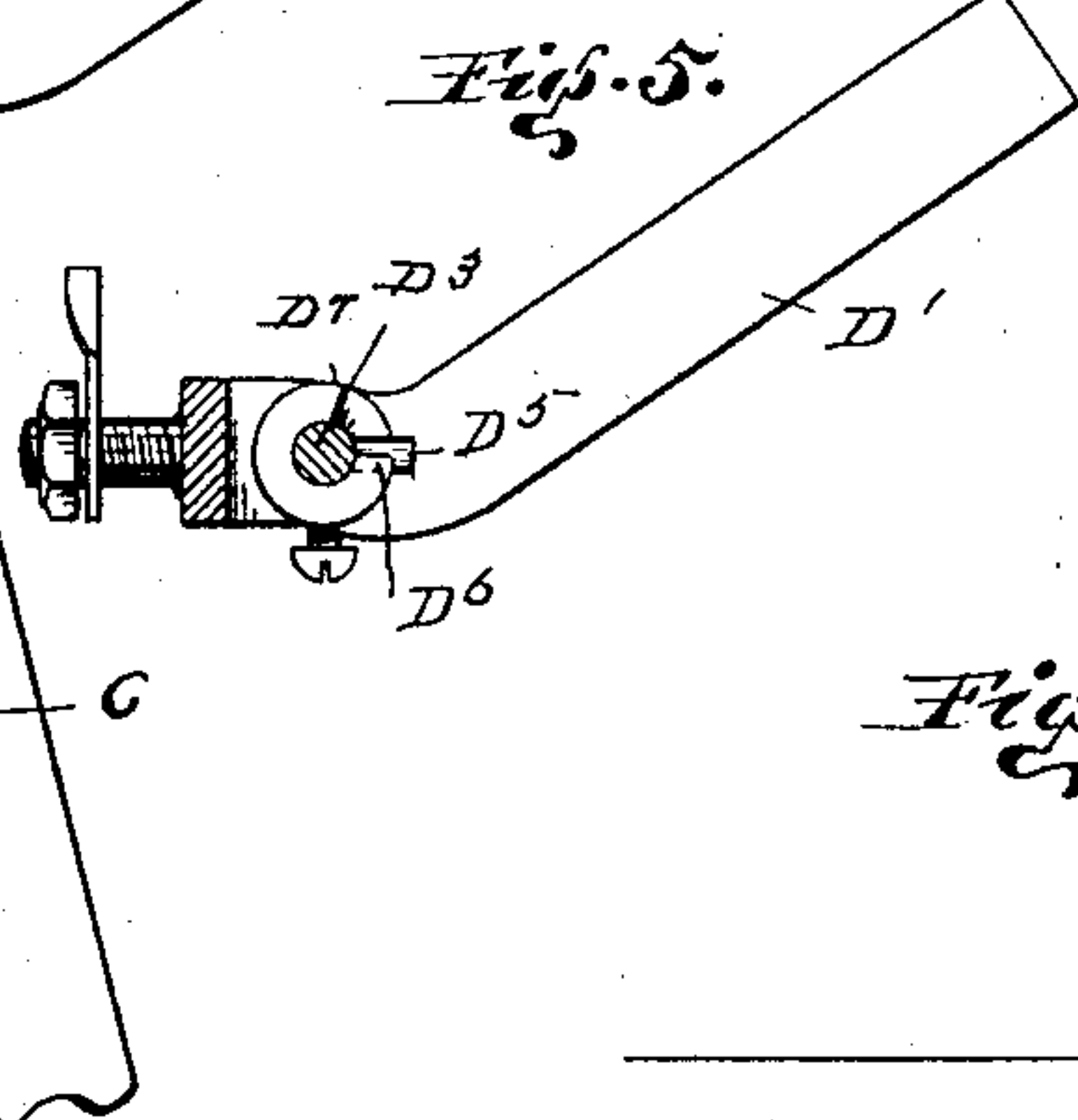
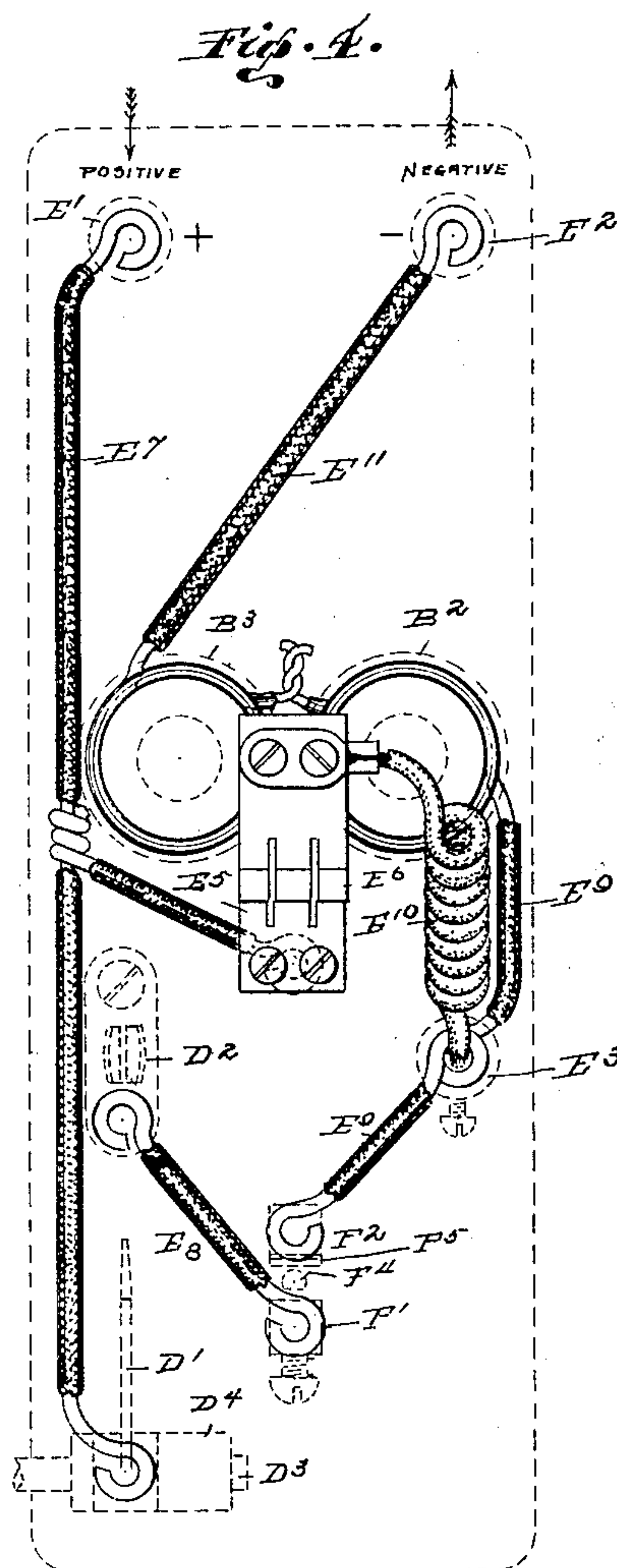
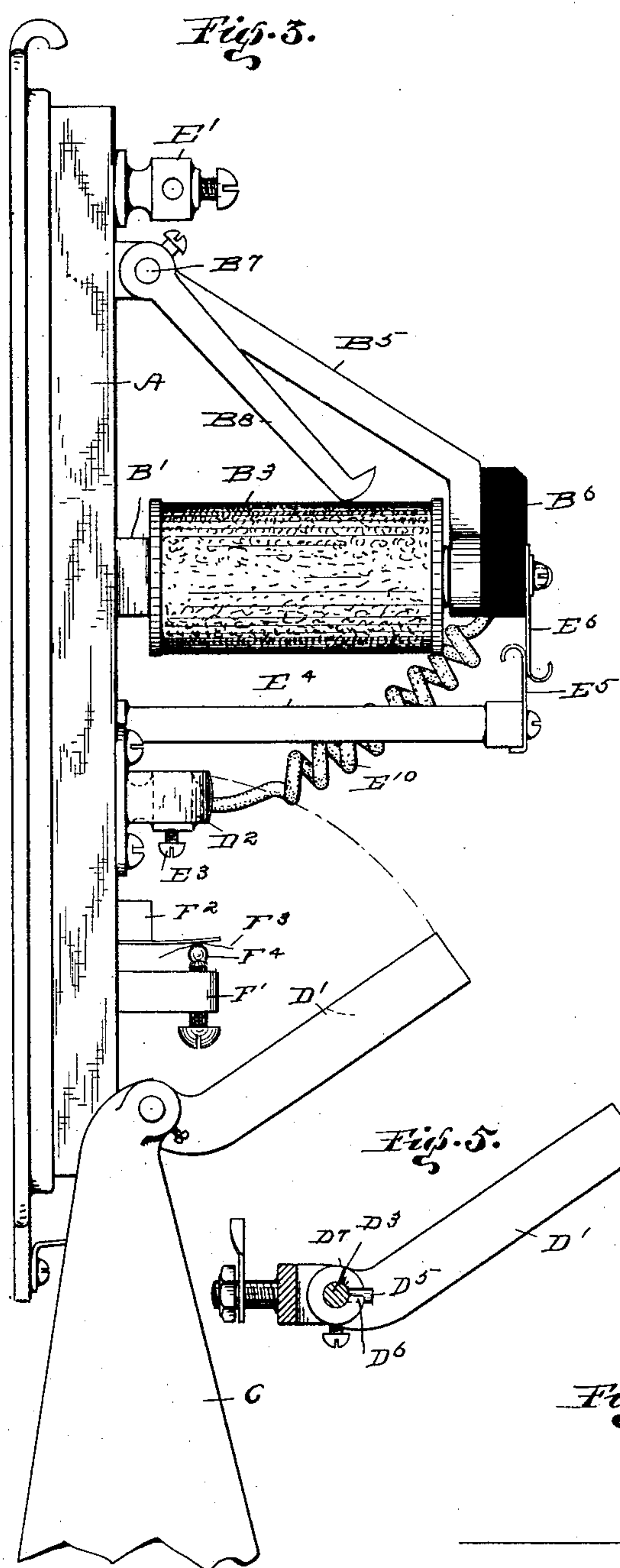
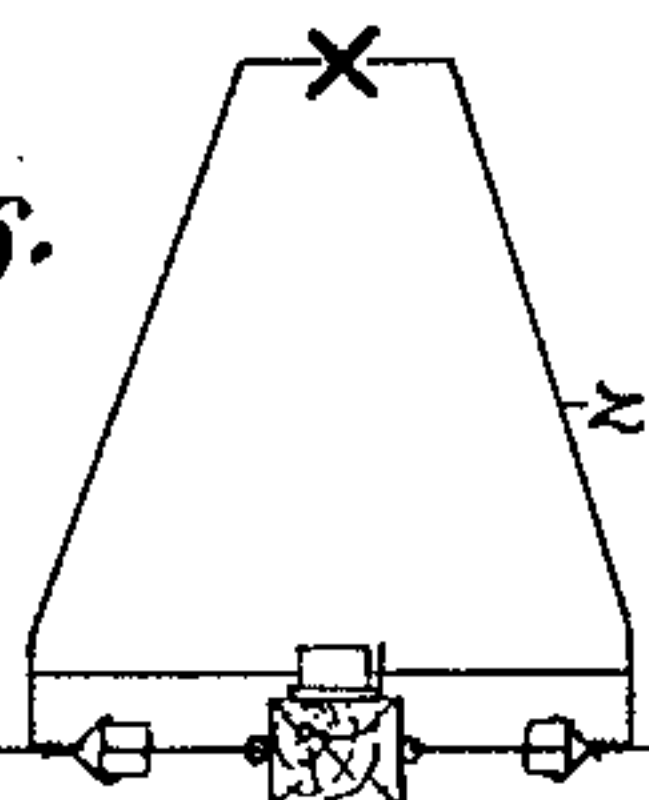
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2 SHEETS—SHEET 2.

NO MODEL.

*Fig. 6.*

WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLEY ASHLEY BOREIN AND LOUIS PAUL DESIMONE, OF OAKLAND,
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AUTOMATIC CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 746,273, dated December 8, 1903.

Application filed May 11, 1901. Serial No. 59,875. (No model.)

To all whom it may concern:

Be it known that we, CHARLEY ASHLEY BOREIN, residing at 180 Seventh street, and LOUIS PAUL DESIMONE, residing at 969 Jefferson street, in the city of Oakland, county of Alameda, and State of California, citizens of the United States, have invented certain new and useful Improvements in Automatic Cut-Outs; and we do hereby declare the following to be a full, clear, and exact description of said invention, such as will enable others skilled in the art to which it most nearly appertains to make, use, and practice the same.

This invention relates to improvements in electrical instruments, and has particular relation to automatic cut-outs for series circuits.

The invention will be described with reference to its adaptation to use in series arc-light circuits.

Arc-light circuits as at present wired are subject to the disadvantages if one lamp in the circuit fails to properly "cut out" it renders the rest of the series inoperative or where they are arranged to be raised or lowered to facilitate trimming the constant bending of the wires in raising and lowering often breaks the wire inside the insulation or at the binding-posts. In the event of such a mishap the whole loop of lamps comprising that particular circuit are rendered inoperative.

The object of this invention is to place an automatic cut-out at each lamp or loop of lamps, so that in the event of a broken wire or other mishap the cut-out will operate and pass the current around the open circuit.

In the drawings, Figure 1 is a front elevation of an automatic cut-out constructed in accordance with this invention, the parts in normal position. Fig. 2 is a side elevation of the same, the box-cover being shown in dotted lines. Fig. 3 is a side elevation from the side opposite to that shown in Fig. 2 and in operative position. Fig. 4 is a diagrammatic plan of the wiring of the cut-out, parts above the base-block, except wires and contacts, being in dotted lines. Fig. 5 is a side elevation detail of the blade of the knife-switch and the mounting therefor, showing method of operation. Fig. 6 is a diagram-

matic view of the wiring for an arc-light in connection with this invention.

Referring to the mechanisms shown in the drawings, the base-block is given the distinguishing reference-letter A, the electromagnets the letter B, the telltale the letter C, the knife-switch the letter D, and the wiring the letter E. The secondary mechanisms of the above main groups are designated by the common letter with the addition of a numeral.

The base A is preferably of porcelain embossed and channeled to receive the various mechanisms mounted thereon, which consist of the positive binding-post E¹, the negative binding-post E², the mounting for the blade D¹ of the knife-switch, the contact D² of the knife-switch, the circuit-breaker posts F¹ and F², the binding-post E³, the bar B¹, connecting the cores of the two electromagnetic coils B² B³, the bearings B⁴ for the armature B⁵ of the electromagnet, and the post E⁴, carrying the brush E⁵, which makes connection with brush E⁶, mounted upon insulation-block B⁶ on armature B⁵, when the same is attracted to the magnets.

The armature B⁵ is rigidly mounted upon the shaft B⁷, which is journaled in the bearings B⁴, the spring B⁹ normally maintaining the armature in the position shown in Fig. 2 when the magnets are not energized. The latch B⁸ is also rigidly mounted upon shaft B⁷ and describes an arc from the same center as that described in the movement of the armature. This throws the latch B⁸ into and out of engagement with the pin C¹ on the telltale C. Thus when the shaft B⁷ is rotated by the drawing down of the armature the latch disengages from the pin and permits the telltale to drop.

The telltale C is mounted rigidly upon the shaft D³, which is journaled in D⁴. As the telltale drops the shaft D³ rotates and butts the pin D⁵ against the shoulder D⁶ on the blade D¹, which is loose on shaft D³, forcing it out of engagement with contact D². This action takes place after the telltale has received some momentum in falling, so that contact is broken suddenly, thus reducing liability to arc if the circuit between E⁵ and E⁶ is not closed before the switch operates. The rotation of shaft D³ in the opposite di-

rection in returning telltale to normal position butts pin D^4 against the shoulder D^7 and returns D^7 to normal position.

Operation: Presuming a break to have occurred at point marked "Z" on the wire, Fig. 6, the current unable to pass through the arc-light X would pass to positive post E^1 , thence through lead E^7 to the knife-switch, thence by E^8 to contact breaker-post F^1 , puncturing insulating-strip F^3 between point F^4 and brush F^5 on post F^2 , thence by E^9 to magnets B^2 B^3 , which attract the armature B^5 , releasing the telltale C and short-circuiting E^5 and E^6 before the telltale opens the knife-switch. The current now passes down flexible cord E^{10} through post E^3 direct to magnets by E^9 , keeping magnets energized by passing through the same, thence out by E^{11} to E^2 and on to next lamp, the circuit from E^1 to E^2 being closed until current is turned off, which releases armature B^5 , opening the circuit. The telltale C, being down, identifies the location of the trouble. When the usual magneto test is made at the central station after the run and the circuit is found open, the trimmer is instructed to look for telltale down. When found, he returns telltale to normal position and places new resistance (tissue-paper) between F^4 and F^5 , which places cut-out again in operative position. It has been found that a thin sheet of tissue-paper has a resistance slightly in excess of the resistance of the lamp, the current naturally taking the line of least resistance passes through the lamp; but an open circuit caused by, say, a broken wire, raises the potential at the point F^4 , causing an arc through the resistance F^3 .

It is obvious that this invention is applicable to any series circuit, whether direct or alternating, by merely such slight changes as increasing or diminishing the resistance F^3 and winding the magnets B to be operated by the form of current used.

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

1. In an automatic cut-out, the combination with a main-line circuit, a shunt about a portion of said main-line circuit, means within said shunt-circuit for normally holding it open, of a second shunt-circuit about a portion of said first shunt-circuit, means for normally holding said second shunt normally open, and means within said first shunt-circuit which operates to complete said second shunt-circuit upon the completion of said first-mentioned shunt-circuit.

2. In a device of the character specified, the combination of a main-line circuit, a shunt about a portion of the main circuit, an electromagnet in said shunt-circuit, an armature coöperating with said magnet, a switch in said shunt-circuit, a telltale, released by the armature, adapted to open the switch by its fall, a dielectric in said shunt-circuit, a shunt around the switch and dielectric, a circuit-

closer in said second shunt controlled by the armature, all so arranged that upon the occurrence of an abnormal resistance in the shunted main circuit, the dielectric breaks down, the switch opens, and the magnet keeps the shunt-circuit closed through itself and the circuit-closer, substantially as described.

3. In a device of the class described, the combination of a main-line circuit, a shunt about a portion of the main-line circuit, mounted on an insulation-base, of a knife-switch in said shunt-circuit, a telltale mounted on said base and adapted to actuate said knife-switch, a dielectric connected to said switch, an electromagnet connected to said dielectric, means operated by the electromagnet for releasing the telltale, and a circuit-closer mounted on the aforesaid means and adapted to form a second shunt-circuit.

4. In an automatic cut-out, the combination with a main-line circuit, a shunt about a portion of said main-line circuit, a second shunt-circuit about a portion of said first shunt-circuit, an electromagnet in said first shunt-circuit, an armature coöperating with said electromagnet, an arm connected to said armature, of a telltale supported by said arm, and means operated by the telltale for breaking said shunt-circuit and permitting the second shunt-circuit to be formed.

5. In an automatic cut-out, the combination with a main-line circuit, a shunt about a portion of said main-line circuit, of an electromagnet in said shunt-circuit, a second shunt-circuit about a portion of said first shunt-circuit, an armature coöperating with said electromagnet to close said second shunt-circuit, and a dielectric in said first shunt-circuit which on breaking down completes the first shunt-circuit and permits the current to have access to said second shunt-circuit to thereby complete the main-line circuit.

6. In an automatic cut-out, the combination with a main-line circuit, a shunt about a portion of said main-line circuit, a dielectric maintaining said shunt-circuit normally open but adapted to complete the circuit on access of a predetermined potential thereto, a second shunt-circuit about a portion of said first shunt-circuit, an electromagnet in said first shunt-circuit, an armature coöperating with said electromagnet, an arm connected to said armature and actuated thereby, of a telltale supported by said arm, and means operated by said telltale for breaking said first shunt-circuit and permitting the second shunt-circuit to be formed after the completion of the first shunt-circuit by the breaking down of the dielectric.

In testimony whereof we have hereunto set our hands this 1st day of April, 1901.

CHARLEY ASHLEY BOREIN.
LOUIS PAUL DESIMONE.

Witnesses:

BALDWIN VALE,
JNO. S. ROBBINS.