

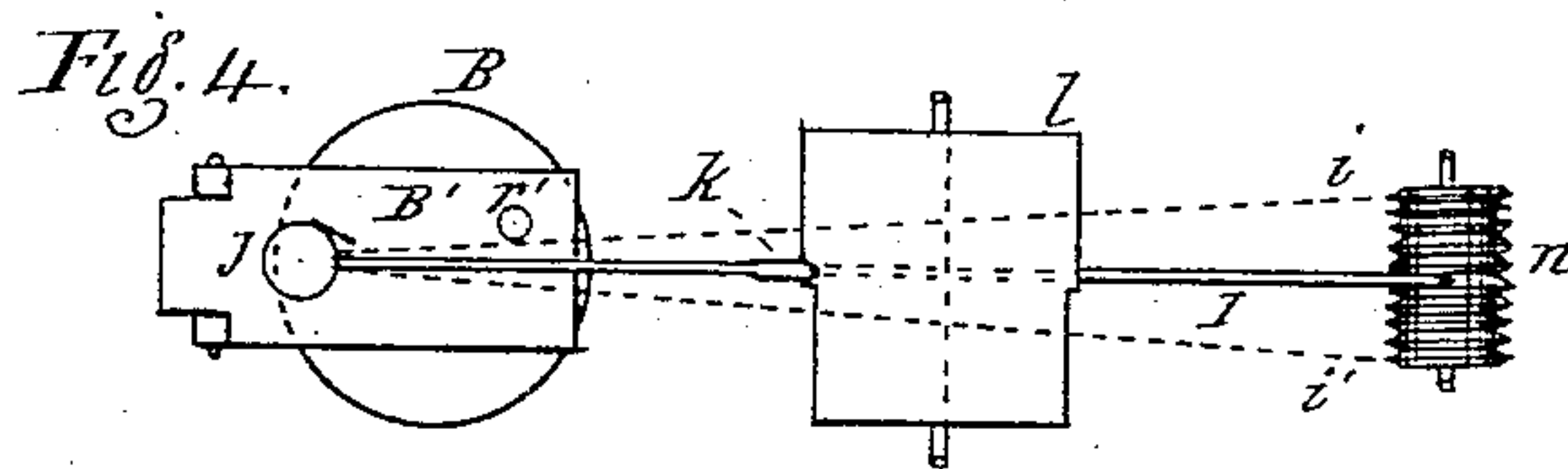
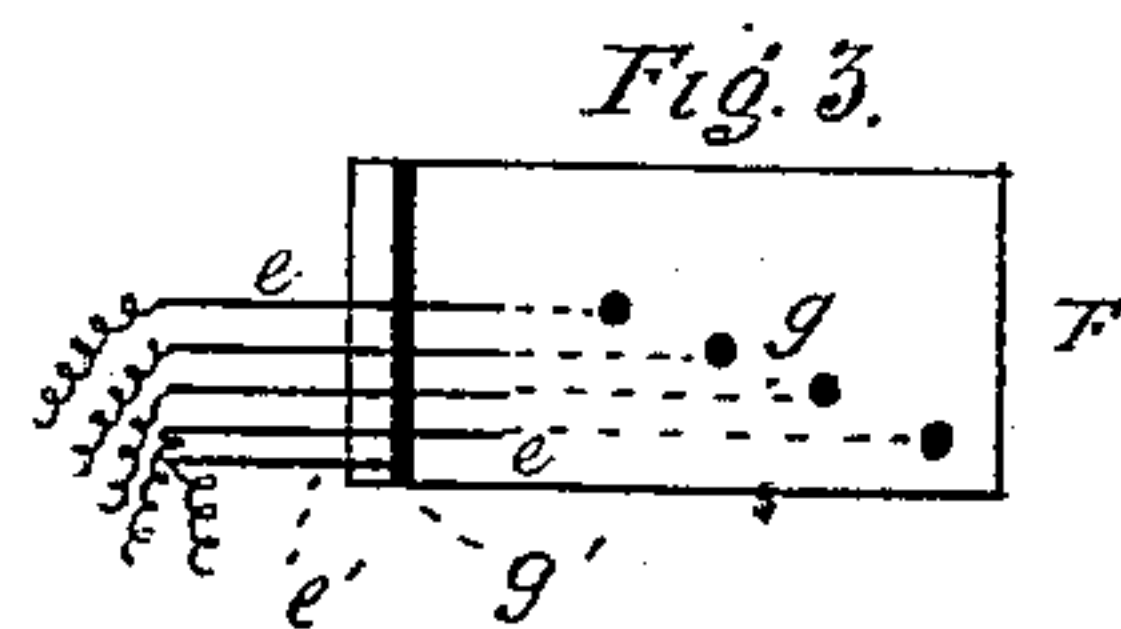
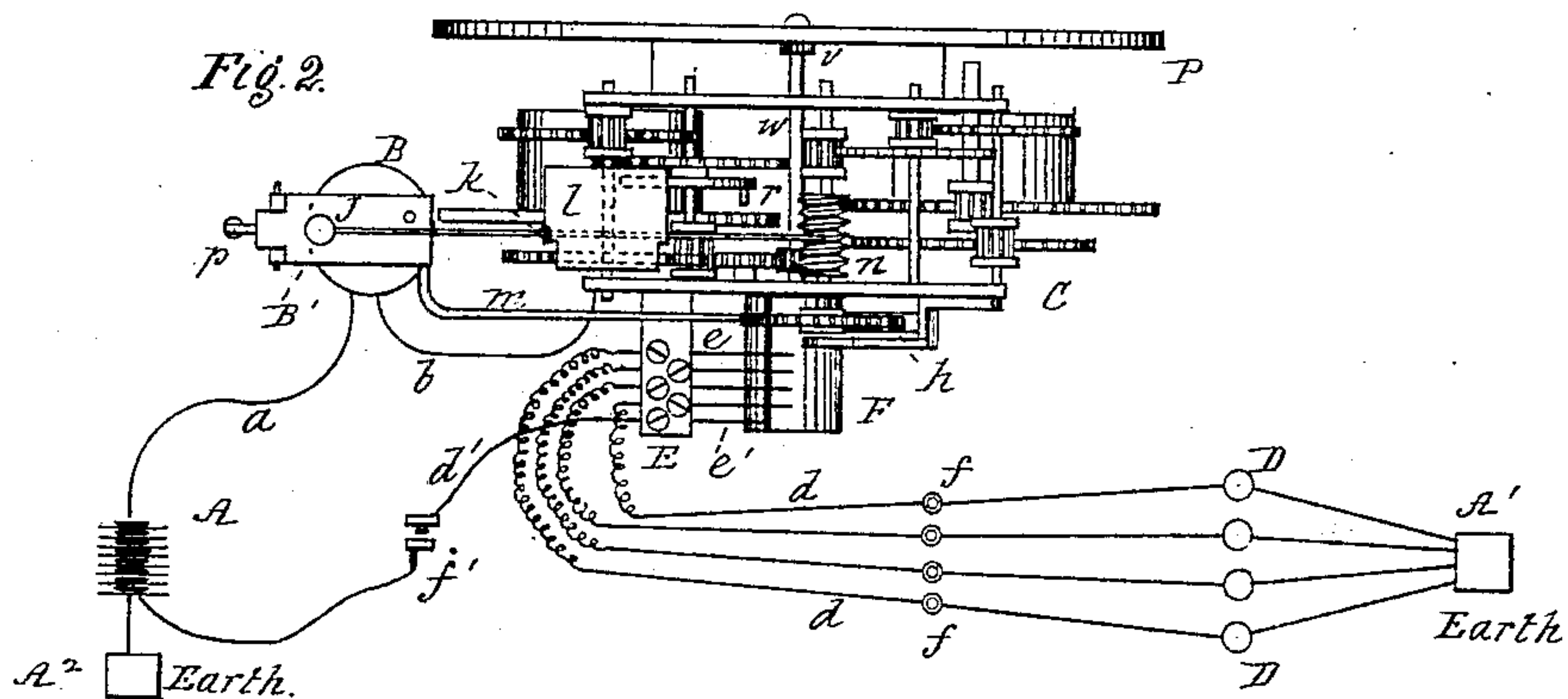
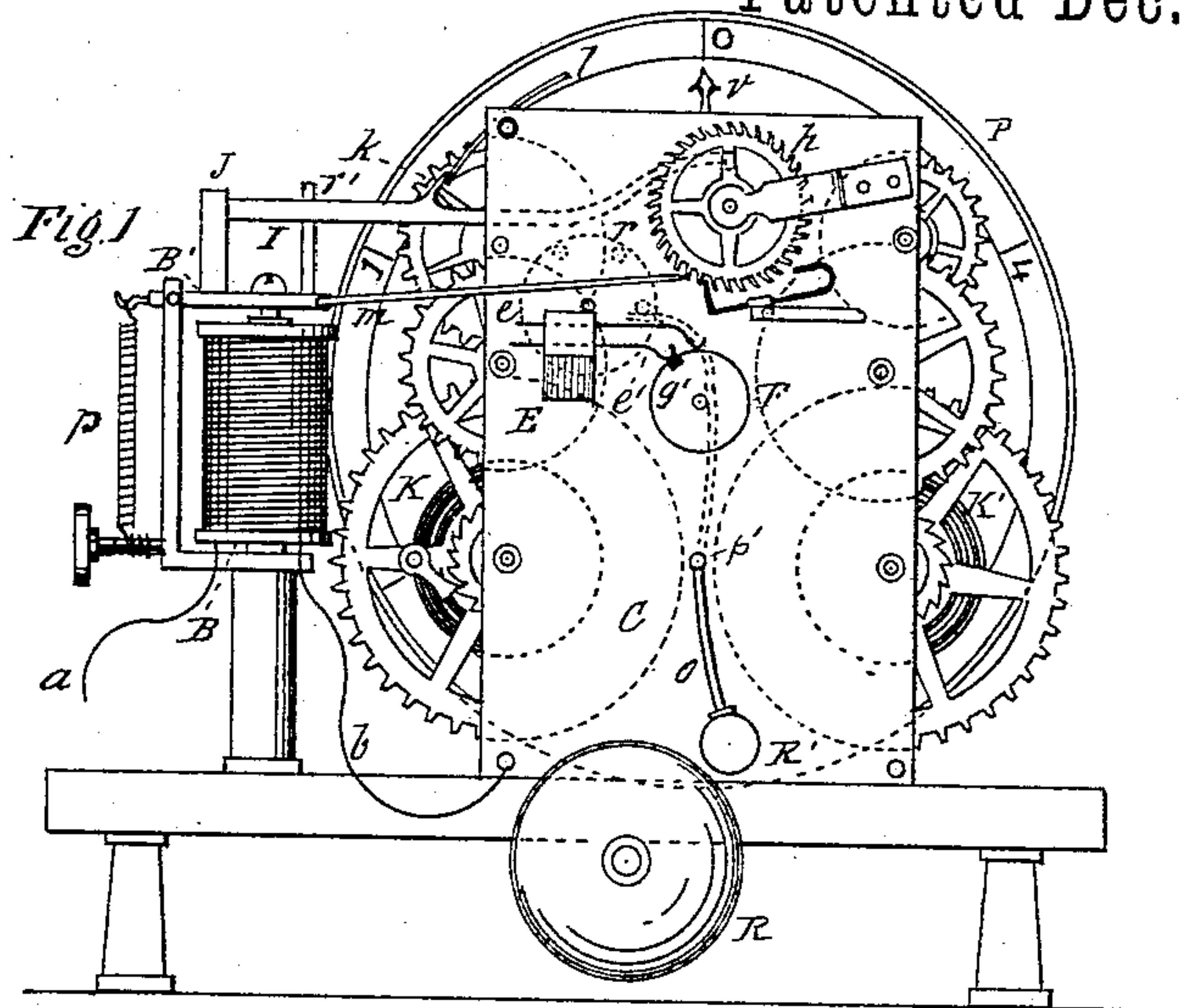
(No Model.)

2 Sheets—Sheet 1.

A. L. BOGART.
ELECTRIC CIRCUIT CUT-OFF.

No. 290,732.

Patented Dec. 25, 1883.



Witnesses:
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Ambrey & Wilson

Inventor:
A. Livingston Bogart.
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Attorney

(No Model.)

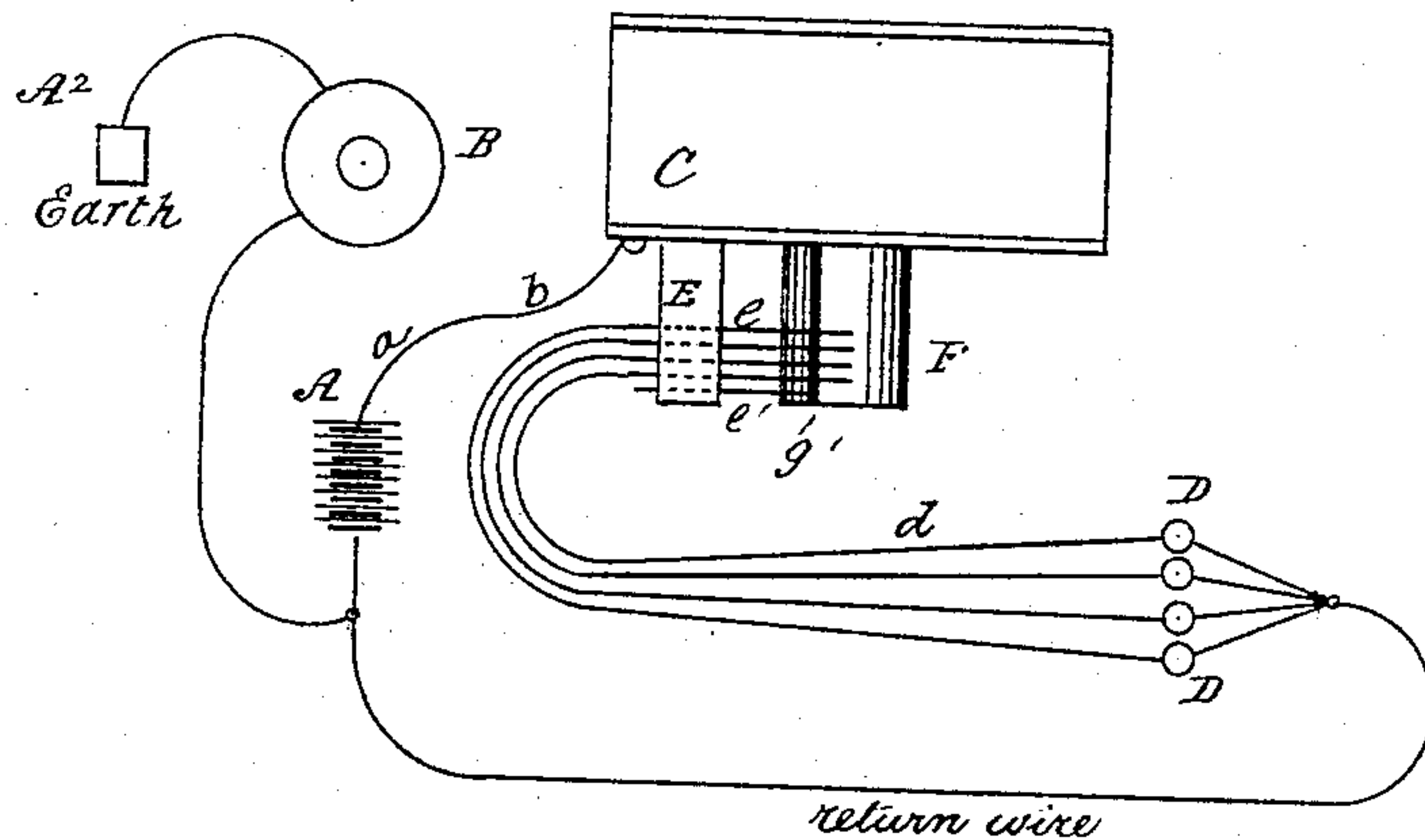
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Fig. 5



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UNITED STATES PATENT OFFICE.

A. LIVINGSTON BOGART, OF JAMAICA, NEW YORK.

ELECTRIC-CIRCUIT CUT-OFF.

SPECIFICATION forming part of Letters Patent No. 290,732, dated December 25, 1883.

Application filed July 7, 1882. (No model.)

To all whom it may concern:

Be it known that I, A. LIVINGSTON BOGART, a citizen of the United States, residing at Jamaica, in the county of Queens and State of New York, have invented an Improved Electric-Circuit Cut-Off; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form a part of this specification.

The object of this invention is to provide an improved electric-circuit cut-off, annunciator, and alarm for use where a number of circuits are operated by one and the same open-circuit battery, and where the circuits are intended to be closed for use during short intervals of time only—as, for instance, in telegraphing and operating electric bells, burglar-alarms, railroad-signals, gas-lighting apparatus, and the like.

In the employment of an open-circuit battery for working several circuits, it frequently happens that a circuit becomes permanently closed by accident—as, for instance, by the striking of keys and press-buttons—and while one of the circuits is thus closed or grounded none of the other circuits can be operated, and thereby much inconvenience is occasioned and much expense incurred through the polarization and consequent destruction of the battery. This invention is for the purpose of obviating these difficulties, and my improved apparatus is constructed in such manner that it will cut off the battery from the closed or grounded circuit after a predetermined space of time without interfering with the operation of any of the other circuits connected with and worked by the same battery, and at the same time will give an alarm and indicate which one of the several circuits it is that is closed or grounded.

I do not broadly claim as my invention an electric-circuit cut-off composed of a clock-work mechanism placed in an electric circuit and provided with a cut-off escapement that is automatically set in motion to cut off the circuit from the battery after it has been closed or grounded during a predetermined space of time, as that has been in public use for several years; but I confine my claims of invention to the improved constructions and combinations of mechanism hereinafter described.

This invention is also applicable for use in connection with closed circuits, as will be hereinafter explained.

The invention consists in certain novel constructions and combinations of mechanisms and devices, as hereinafter particularly set forth, whereby the said objects may be attained.

In the accompanying drawings, Figure 1 represents a side elevation of the mechanism constituting my improved cut-off, together with the alarm and the indicator. Fig. 2 is a plan view of the same; and Figs. 3, 4, and 5 are details hereinafter referred to and explained.

Similar letters of reference indicate the same parts in all the several figures.

The mechanism which I employ in carrying out my invention embraces devices for determining the length of time during which the circuits may remain closed, and devices for operating the cut-off at the expiration of such period of time, and in the drawings an ordinary clock-movement is shown adapted to these purposes.

A may represent a battery for operating two or more circuits, which is connected by a battery-wire, *a*, with a magnet, B, a wire, *b*, connecting said magnet with the mechanism of the instrument C.

d d are a series of line-wires, each forming a separate circuit, and connecting with one of the instruments, D, (which may be gas-lighting apparatus, alarms, &c.,) to be operated thereby. These several wires are grounded, as at A', and may each be provided with a press-button or key, *f*, between the cut-off C and said instrument D. These wires *d* are attached to springs *e*, which are secured in an arm, E, of non-conducting material, attached to the frame of the instrument C, with their outer ends resting upon a metal drum, F. This drum is rotated by means of the train of wheels at the left of Fig. 1, driven by the spring K, and on its periphery is provided with a series of points, *g*, of non-conducting material, inserted therein flush with its surface, which, when the drum revolves, successively pass under their corresponding springs, *e*, for the purpose of breaking the circuits. The said drum is also provided with a longitudinal bar, *g'*, of non-conducting material, let into the same and flush with its surface, upon which said bar the ends

of the springs rest simultaneously once at each revolution of the drum. Fig. 3 represents a projection of the surface of this drum, showing the relative positions of the points g and g' .

5 I is a spring-rod, secured at one end to a post or stud, J, attached to the armature B' of the magnet, the outer and free end of which extends over the horizontal screw n , and is provided with a point, which works in the
10 threads of said screw. In its normal position—that is to say, when the armature is not attracted by its magnet—the free end of said rod is not in contact with said screw; but when-
15 ever the armature is attracted by the magnet the point of said rod is brought in contact and engages with the threads of the screw, and is thereby gradually brought into the position shown by the dotted line i' , Fig. 4. The screw
20 n is secured upon the shaft of the escapement-wheel h , which I call the “time-escapement,” as the number of its threads and its speed determine the length of time during which any one of the circuits may remain closed before it is again cut off. Upon the rod I is a spur or
25 projection, k , which acts as a stop to the fly l until the free end of said rod has traversed about one-half the length of the screw n , and then said fly is released from said spur k , a portion of the edges of the same being cut away,
30 as shown in Fig. 4, so that as it revolves it does not come in contact with the spur k during the remainder of the movement of said rod toward the end of the screw. This fly, with its adjuncts, I term the “cut-off escapement,” and
35 whenever said fly is released from the rod I the drum F is rotated by the train of wheels driven by the spring K. The time-escapement is driven by the spring K' and train of wheels connected therewith, and a rod, m , at-
40 tached to the armature of the magnet, retains it from running so long as the armature remains passive; but whenever said armature is attracted by its magnet said rod is thereby moved out of contact with the wheel h .

45 d' is a return-wire connected to a separate spring, e' , which latter is secured in the arm E, its end resting upon the drum F. The said wire d' is provided at any suitable point with a key or press-button, f' , for closing the circuit. These parts constitute the resetting de-
50 vice hereinafter mentioned.

The operation of the parts already described is as follows: The instrument being set as shown in Fig. 3—that is to say, with the springs
55 e each resting upon the metallic surface of the drum, and the spring e' resting upon the bar g' —when any one of the keys f is pressed, the circuit through the spring e with which such key is connected is closed, and consequently
60 the magnet B attracts its armature, releasing the rod m from the wheel h , and bringing the point on the rod I into contact with the threads of the screw n , and as the latter revolves it carries the end of the rod I toward i' . If the
65 circuit remains closed for a longer period than is necessary for the point on the rod I to reach the position in which the cut-off fly l is re-

leased from the spur k , said cut-off fly begins to revolve, and the drum F is rotated until the particular insulated point g answering to the
70 line closed comes under its respective spring e . This cuts off all battery-supply to such line, and, the current ceasing, the armature B' is retracted by the spring p , and stops the move-
75 ments of both the time and cut-off escape-ments. If the circuit does not remain closed for a sufficient length of time for the cut-off fly to be set in motion by the movement of the rod I, the latter simply resumes its normal
80 position without releasing the cut-off. It will be understood that the elasticity of the rod I causes it to fly back to the opposite end of the screw (or to dotted line i) as soon as it is re-
85 leased from the screw by the armature rising away from the magnet. A stop-pin, r' , determines the extent of its movement in that direction. (See Fig. 4.) Again, if two of the
90 circuits should be closed at the same instant and remain closed for a longer period than elapses before the cut-off is set in motion, in
95 such case the cut-off mechanism will rotate the drum F, as before described, and the current through each will be momentarily broken when its respective spring e is over its corre-
sponding point g ; but the movement of the drum will not be affected, as there will be a
100 current passing through the other wire at the same instant, which will keep the armature attracted, and consequently the drum will continue to revolve until the bar g' comes under
105 all the springs e , and thus cuts off all the circuits. From this it will be readily seen that if any two of the circuits are closed or grounded at the same time for a longer period of time than that for which the instrument is set all
the circuits will thereby be cut off.

The resetting device above mentioned is for the purpose of bringing the instrument into its normal condition for action after it has gone through the operations above described.

On referring to the drawings, it will be seen that when the springs e are resting upon the bar g' , or any one of them upon its insulating-
110 point g , the spring e' will rest upon the metallic portion of the drum F, and in order to re-set the instrument the key f' is pressed, which
115 closes its circuit, and the pressure is continued until the revolution of the drum brings the bar g' under the spring e' , thus cutting off the circuit, and leaving the instrument in the same
120 position as at first. The rod m may be dispensed with, if desired, and the wheel h allowed to revolve continuously, as the screw n is not engaged with the rod I unless the arma-
125 ture is attracted by the magnet. The main object of its employment is to stop the unwinding of the spring when the instrument is not in use, and hence, if desired, the screw may be attached to an ordinary clock and may
130 revolve continuously.

I may also state that by attaching a pendulum to the pallet s the length of time during which the circuits remain closed may be in-
creased at pleasure.

Fixed upon the shaft *w*, which carries the drum *F*, is a pointer, *v*, which indicates upon a dial, *P*, (secured upon the frame of the instrument or upon the case in which it is inclosed,) the particular circuit which has been closed and is cut off. The said pointer revolves along with the drum, and the numerals or other characters are marked upon the dial in such order that when any one of the insulated points *g* is under its corresponding spring *e* the pointer will stand at the numeral or character upon said dial that stands for the particular line so closed.

R is an ordinary alarm-bell, and *R'* its hammer, which latter is fixed on the end of a rod, *o*, that is pivoted on a bar, *p'*, and is operated by a disk-wheel, *r*, having a series of pins on its face, which successively strike the upper end of said rod *o* whenever said wheel is set in motion. This wheel *r* is driven by the same train of wheels which operate the drum *F*, and consequently whenever the drum is rotated the alarm is sounded.

It will be seen that whenever any of the circuits through the line-wires *d* become closed or grounded the instrument is automatically set in operation, by reason of the spring *e* connected with such line-wire being in contact with the drum *F*, and that the said drum will be rotated until the point *g*, answering to such spring, comes under the same and cuts it from the battery, and that the pointer *v* will indicate which one of the circuits has thus been operated upon, the alarm meanwhile being sounded to call attention to the fact.

In Fig. 2 I have represented a ground-return; but this instrument is equally applicable, as a safety device, to prevent grounds occurring on metallic circuits—that is to say, on circuits having a wire return—as, for instance, in electric lighting. This is illustrated by Fig. 5. In such case no change is necessary in the construction of the cut-off; but the wires *a* and *b*, instead of passing through the magnet, are made one continuous wire, connecting the battery with the instrument directly, and the magnet *B* is interposed between the battery and the earth-connection *A*². In this case the magnet *B*, and consequently the cut-off, can only act when one of the line-circuits *d* becomes grounded.

As above mentioned, this invention is also applicable to closed circuits, and when the instrument is used as a preventive against grounds on closed circuits, which would diminish the resistance of one line and weaken the action of

magnets on the other lines, the tension of the retracting-spring *p* is adjusted so that when all the circuits are closed normally the magnet *B* will not be affected; but whenever a greater quantity of electricity flows through said magnet by reason of a decrease of resistance through the ground, it will be affected and will set the cut-off in motion. No change in the construction of the mechanism is necessary for this purpose; but the tension of the spring *p* is simply increased sufficiently to prevent the armature being attracted to the magnet until an increase of current through said magnet is occasioned by the grounding of one of the circuits.

What I claim as my invention is—

1. In combination with the time-escapement and cut-off escapement, both constructed substantially as described, the indicator *P v* and the alarm mechanism *R R' o r*, as and for the purposes set forth.

2. The combination of the magnet *B* and its armature, the rod *I*, provided with the spur *k*, the fly *l*, the rod *m*, and screw *n*, and escapement-wheel *h*, as described, for the purpose of determining the length of time a circuit may remain closed before being cut out by the instrument.

3. The drum *F*, constructed and operated as described, and provided with the points *g*, disposed in relation to each other as shown, in combination with the circuit-springs *e*, for the purpose of cutting off each circuit separately and again turning it on before any other of the circuits is cut off by the continued rotation of said drum.

4. In combination with the time-escapement and cut-off escapement, both constructed substantially as described, and the circuit-springs *e*, the drum *F*, provided with the insulating-bar *g'*, and constructed as described, to cut off all the circuits whenever two or more of said circuits become closed or grounded simultaneously and remain so for more than the predetermined length of time, as set forth.

5. The drum *F*, constructed and operated as described, and provided with the insulating-points *g* and insulating-bar *g'*, in combination with the separate circuit-spring *e'* and battery-connections, as shown and described, for the purpose of resetting the instrument.

A. LIVINGSTON BOGART.

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