

(No Model.)

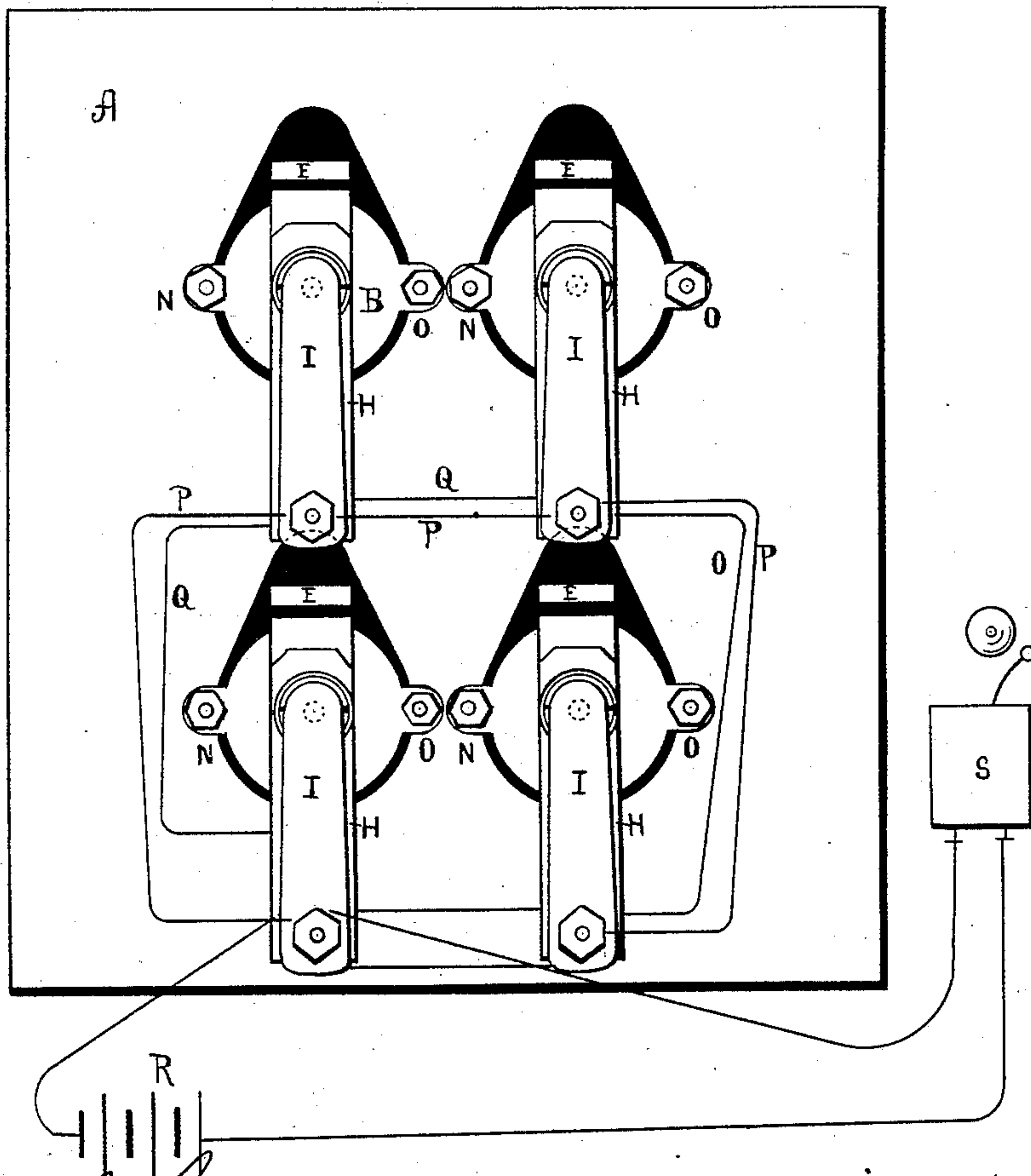
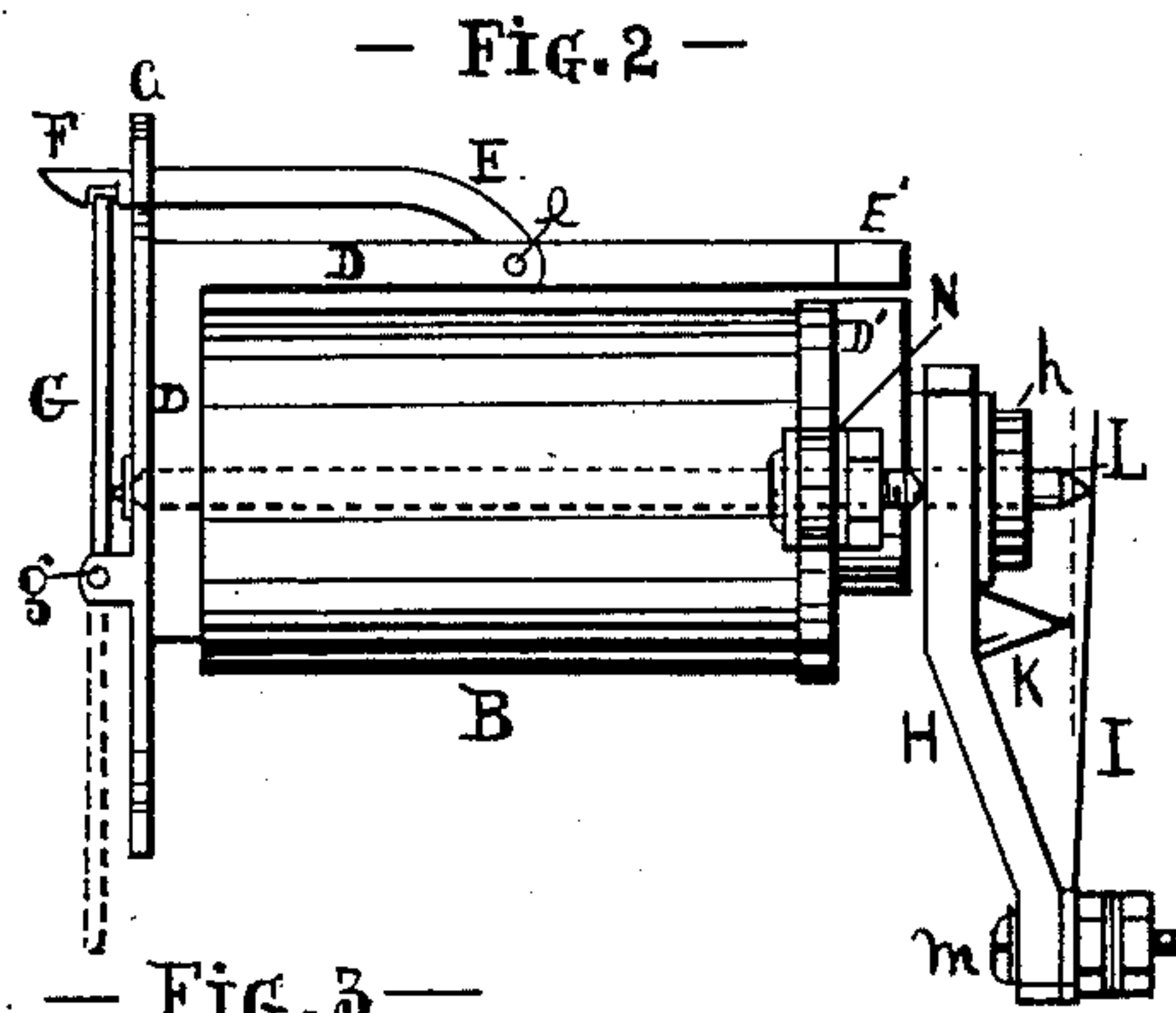
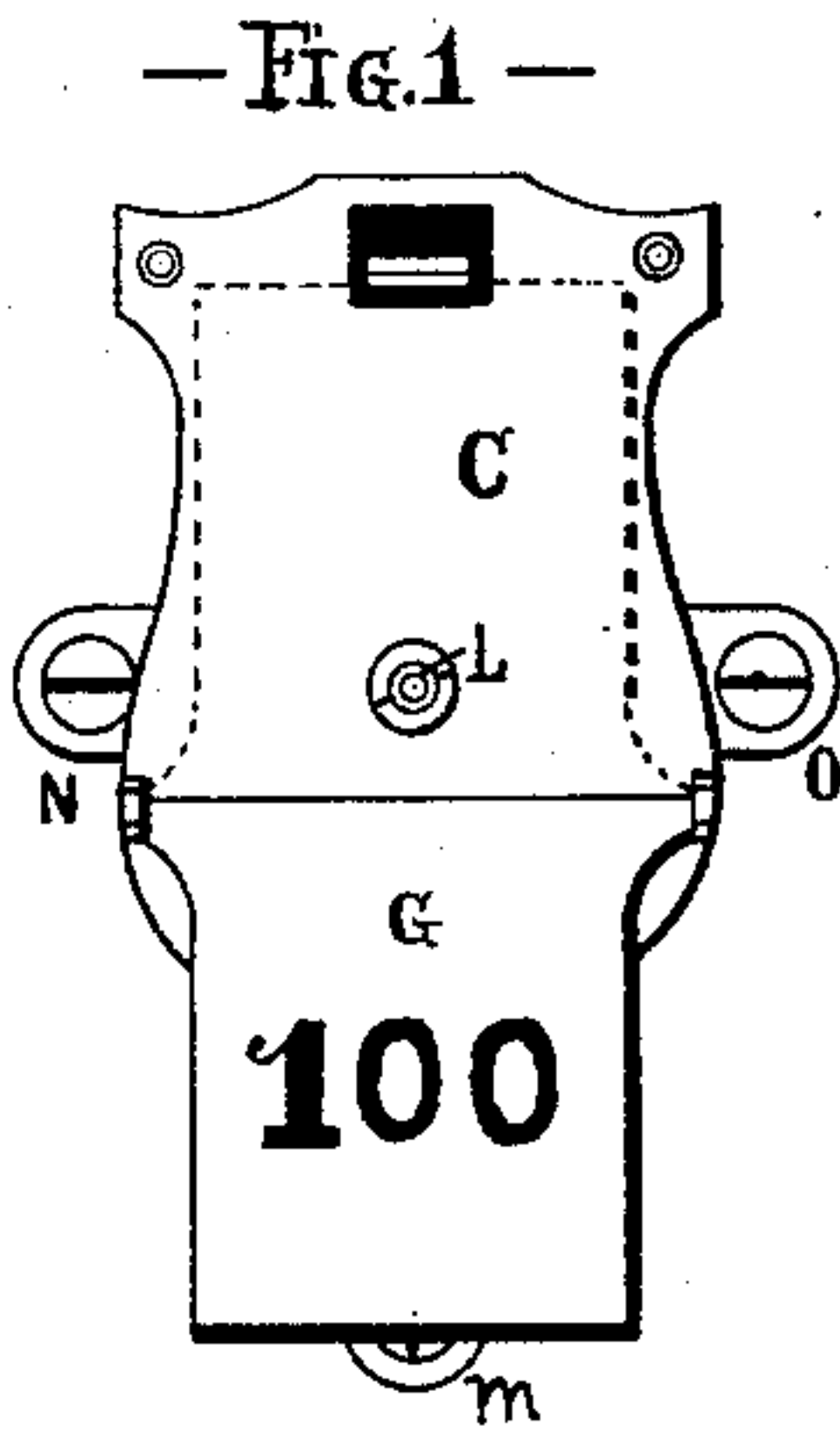
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F. E. FISHER.

MECHANISM FOR OPERATING TELEPHONE NIGHT BELLS.

No. 314,817.

Patented Mar. 31, 1885.



WITNESSES
Geo. N. Lothrop
Sumner Collins

INVENTOR
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atty

(No Model.)

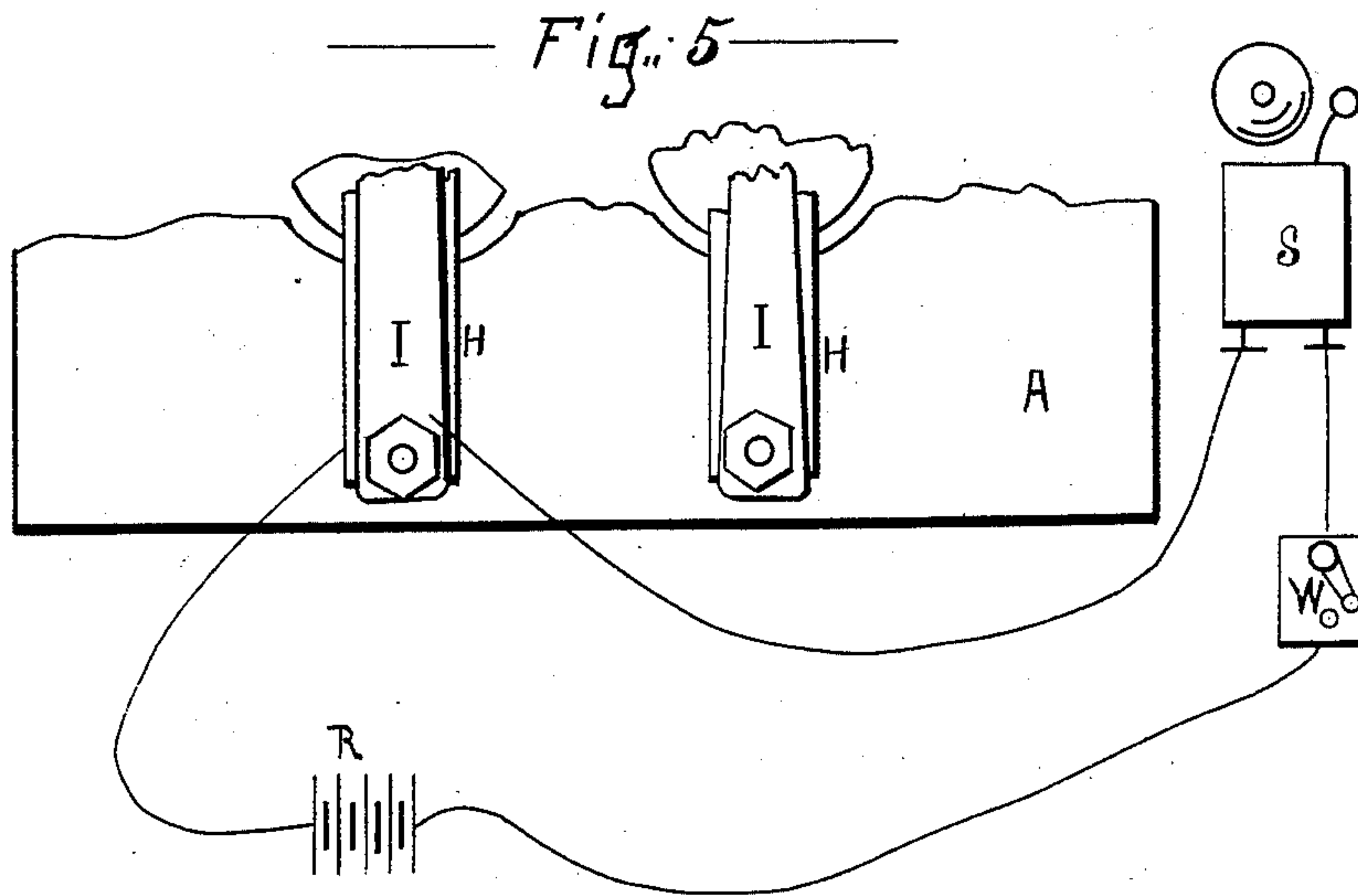
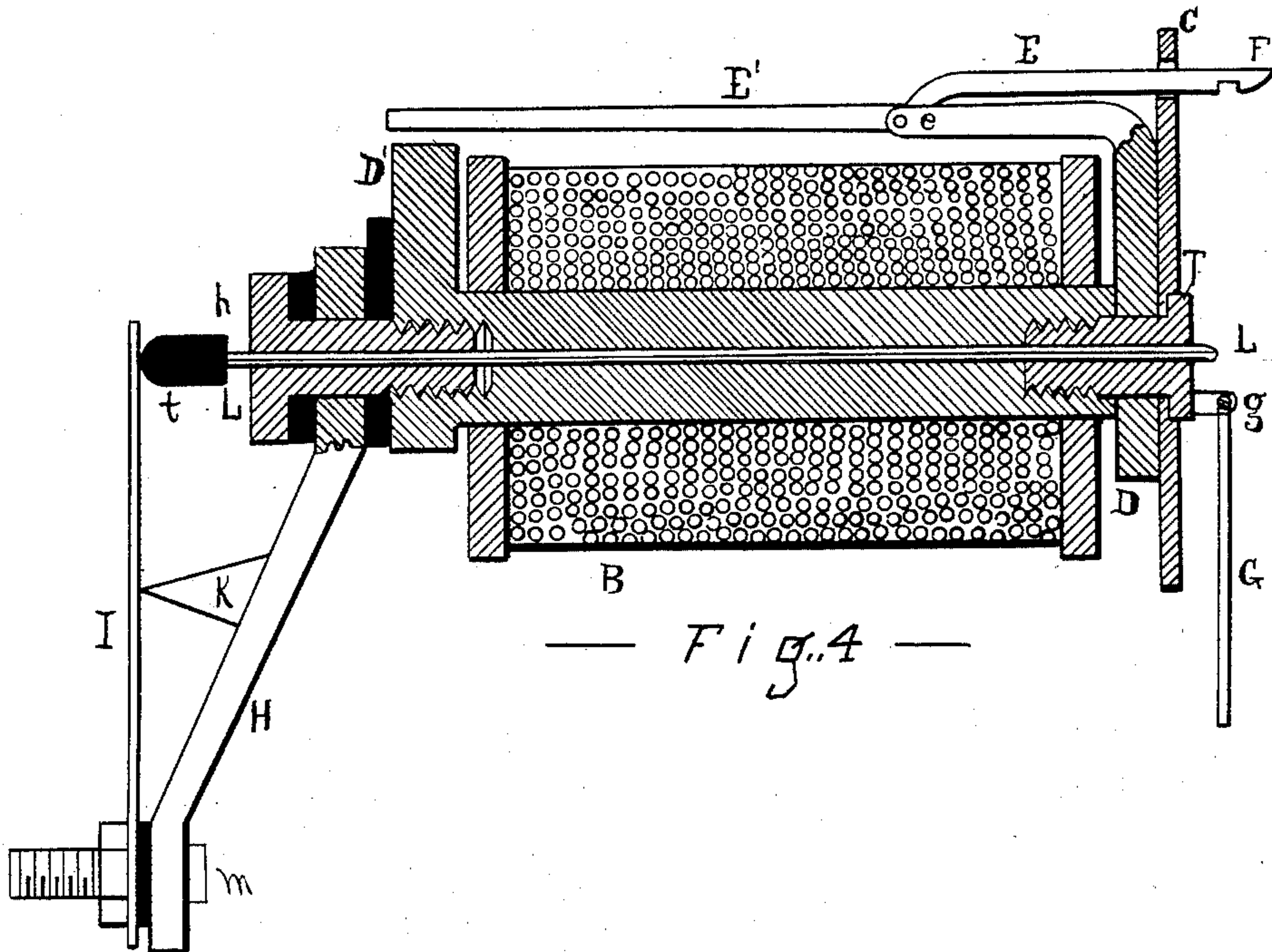
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Witnesses:

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Inventor:

Frank E. Fisher
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UNITED STATES PATENT OFFICE.

FRANK E. FISHER, OF DETROIT, MICHIGAN, ASSIGNOR TO THE DETROIT ELECTRICAL WORKS, OF SAME PLACE.

MECHANISM FOR OPERATING TELEPHONE NIGHT-BELLS.

SPECIFICATION forming part of Letters Patent No. 314,817, dated March 31, 1885.

Application filed October 1, 1884. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. FISHER, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Mechanism for Operating Telephone Night-Bells, of which the following is a specification.

My invention consists in a novel arrangement of mechanism for operating the night-bells of a telephone-exchange, and is hereinafter fully pointed out in the claims.

Figure 1 is a front elevation, and Fig. 2 a side elevation, of an annunciator; and Fig. 3 is a rear elevation of a section of the annunciator-board, showing four annunciators and a night-bell, with the connections. Fig. 4 is a longitudinal central section through Fig. 2; and Fig. 5 is an elevation of the circuit which contains the night-bell, showing a switch breaking and closing said circuit.

In telephone-exchanges it is customary during the night, when a reduced force of operators is in attendance, to use a call-bell with each annunciator-board to notify the operators of a call, and this bell is disconnected during the day, when there is an operator in attendance at each switch-board.

A represents a section of the board which carries the annunciators. B represents an electro-magnet. C represents a brass plate screwed to the front of board A, to which the electro-magnet B is fastened by a hollow screw, T; and G represents the drop pivoted to lugs on plate C at *g*.

The core of the electro-magnet B is hollow, and to it at one end is secured by a hollow diamagnetic screw, *h*, a pole-piece, D', which extends to the circumference of the electro-magnet, and to the other end is secured by a diamagnetic hollow interiorly-threaded screw a pole-piece, D, which extends along the outside of the electro-magnet, and forms a support to which the armature E is pivoted.

E represents a swinging armature pivoted at *e* to pole-piece D, and so constructed that one end, E', is in close proximity to pole-piece D', and the other end, F, is directly over the drop when raised, and is hooked to engage with the drop. The end F must be heavier

than the end E', or must be held to the drop by a light spring. This mode of hanging the armature puts it in magnetic connection with one pole of the core of the magnet, so that E' D' really become the poles, and the magnetic attraction at that point is stronger than when the armature is hung in any other way.

L represents a light metal rod or needle, which passes through the hollow core of the electro-magnet B, and protrudes therefrom at both ends. One end of this needle at the right, Fig. 2, is tipped with insulating substance *t*, and the needle is prevented from touching the core by the diamagnetic hollow screws which fasten the pole-pieces D D' and through which the needle passes.

N O represent binding-posts secured to a cap of insulating material fastened to the end of the electro-magnet, and to them are fastened the ends of the helix composing said electro-magnet.

H represents an arm of diamagnetic metal, secured to one end of the core of the electro-magnet by the screw *h* and insulated from said core.

K represents a contact point formed on arm H, and extending out to or beyond the end of screw *h*.

I represents a metal spring fastened by screw *m* to arm H, but insulated therefrom, and extending far enough to press against the insulated end of needle L.

All of the arms H of the annunciators belonging to a switch-board are connected together by wires or strips of metal, Q, and all the springs I are similarly connected by wires or strips P.

R represents a battery, and S an electric bell, and one arm H is connected with one pole of the battery. The other pole is connected with one binding-post of the electric bell, and the other binding-post of the bell is connected with one of the springs I, as indicated in Fig. 3. So long as the arms H and springs I all remain insulated from each other, the circuit through the battery and bell will be open and the bell will not sound. If any of the springs I come in electrical contact with the arm H which carries it, the circuit will be

closed, because all the arms H are connected, and all the springs I also connected, and the bell S will ring until the circuit is broken.

A subscriber's line on entering the exchange is connected with binding-post O, and binding-post N is connected with the switch which bears the number shown on the annunciator, where the line is grounded in the usual manner.

W represents an ordinary switch situated in the circuit which contains the call-bell, whereby said circuit can be broken or closed at pleasure.

The operation of my invention is as follows:

When the drop G is turned up and held by hooked end F of armature E, as shown in Fig. 2, the face of the drop presses against the end of needle L, and thus presses spring I away from contact-point K. When a subscriber sends a current over his line to call the exchange, it passes through the helix of the electro-magnet B and magnetizes the core thereof. Pole-piece D' attracts the end E' of armature and raises the hook F, so that drop G becomes freed therefrom, and, by its own weight, assisted by the pressure from spring I, transmitted through needle L, the drop falls, exposing subscriber's number. As drop G no longer presses against the end of needle L, this is free to move, and is moved by spring I until the spring touches contact-piece K, closing the circuit and ringing the bell S until the circuit is broken by raising drop G and causing needle L to press spring I away from contact-point K.

It is obvious that for springs I may be substituted swinging pieces of metal so pivoted that the force of gravitation will tend to cause them to make contact with contact-points K, except when held away therefrom by needles L, and that any such device is a simple mechanical equivalent for springs I.

This device entirely avoids the difficulties inherent in the mechanism now used for similar purposes, for there is no electrical connection between the night-bell mechanism and annunciator mechanism, and no corresponding liability to crosses or difficulty in locating crosses.

During the day-time the circuit can be broken by a switch at any convenient point in the battery and bell connections.

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

1. A night-bell mechanism for annunciator-boards in telephone-exchanges, consisting of a metallic arm attached to each annunciator but insulated therefrom, and all of said arms being electrically connected, a spring attached to but insulated from each of said arms in such a manner that its free end constantly tends to make electrical connection with said arm, and

all of said springs being electrically connected, mechanism, substantially such as is described, whereby the drop, when raised, forces the free end of the spring away from the arm, and a battery and electric bell in a circuit one end of which is electrically connected with one of said arms and the other with one of said springs, substantially as shown and described.

2. In mechanism for operating a night-bell attached to an annunciator, the following elements, viz: an electro-magnet having a hollow core, a pivoted armature adapted to hold or release a drop in the usual manner, a metallic arm attached to but insulated from the electro-magnet, a spring attached to but insulated from the metallic arm, a needle having an insulated end extending through the hollow core, and adapted to press against the drop when raised and the free end of said spring, and a battery and electric bell in a circuit whose ends are connected, one with said arm and the other with said spring, substantially as shown and described.

3. In mechanism for operating a night-bell in connection with an annunciator, a battery and electric bell in a circuit having its ends connected with two contact-pieces which are supported by but have no electrical connection with the annunciator mechanism, a connecting-rod having an insulated tip resting at one end against one of said contact-pieces and at the other end against the drop when raised, to hold said contact-pieces apart, and a swinging drop adapted, when raised, to hold said rod in position and release the same when it falls, substantially as shown and described.

4. The combination of the battery R and electric bell S, situated in a circuit formed in part by the fixed arm H and spring I, with the needle L, having the insulating-point t, and the pivoted drop G, substantially as and for the purposes described.

5. The combination, with an annunciator, of a battery and night-bell in a circuit entirely independent of the annunciator mechanism, and having therein two contact-pieces, one of which is fixed, while the other is a spring constantly tending to make contact with the fixed piece, and a rod having an insulated end bearing against said spring-contact piece, and extending, when said contact-pieces are in contact, beyond the plane of a drop on the annunciator when said drop is raised, whereby raising said drop separates said contact-pieces, and said spring-contact forces said drop to fall when released from the pawl which locks it, substantially as shown and described.

FRANK E. FISHER.

In presence of—

CYRUS E. LOTHROP,
SUMNER COLLINS.