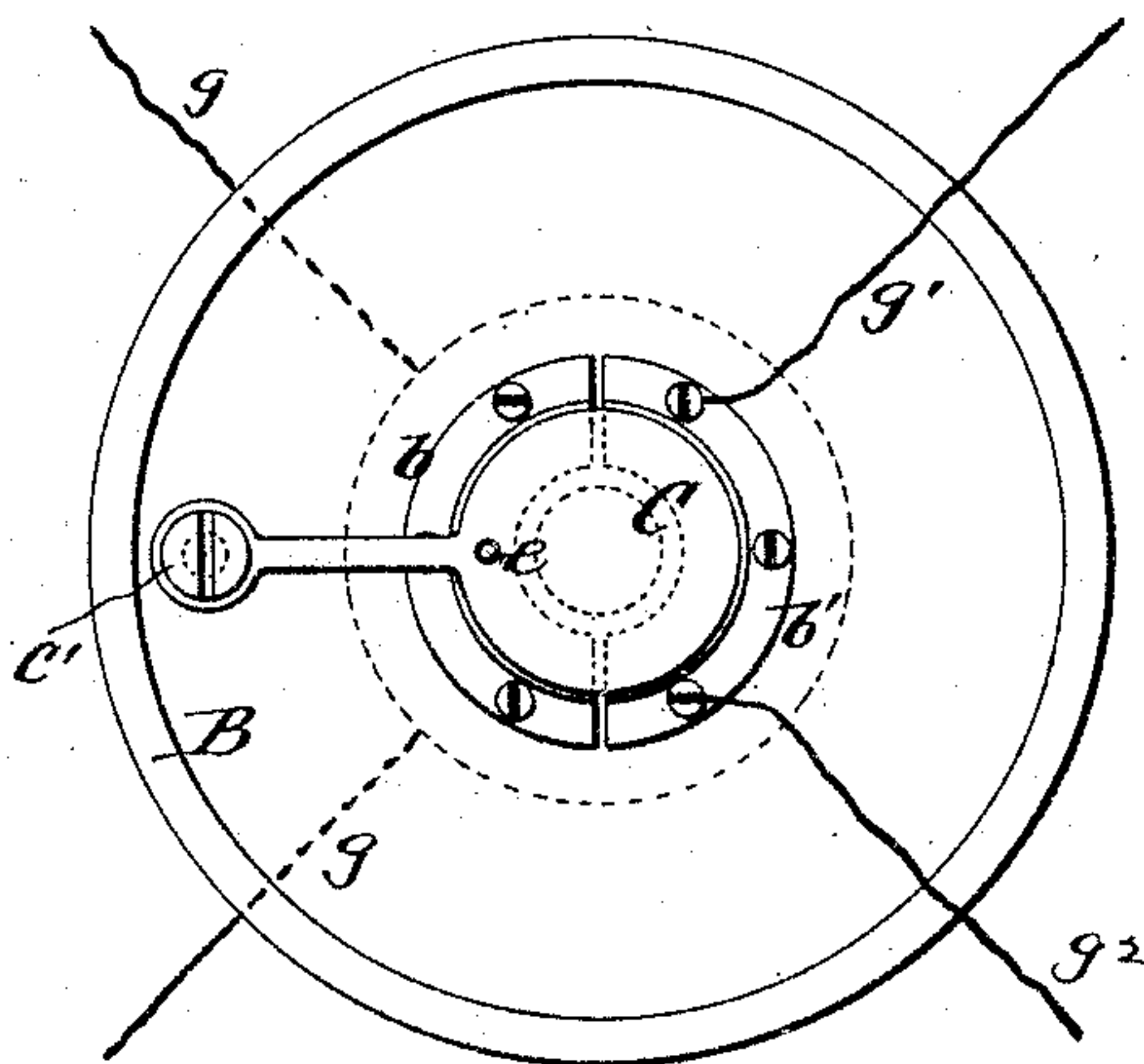
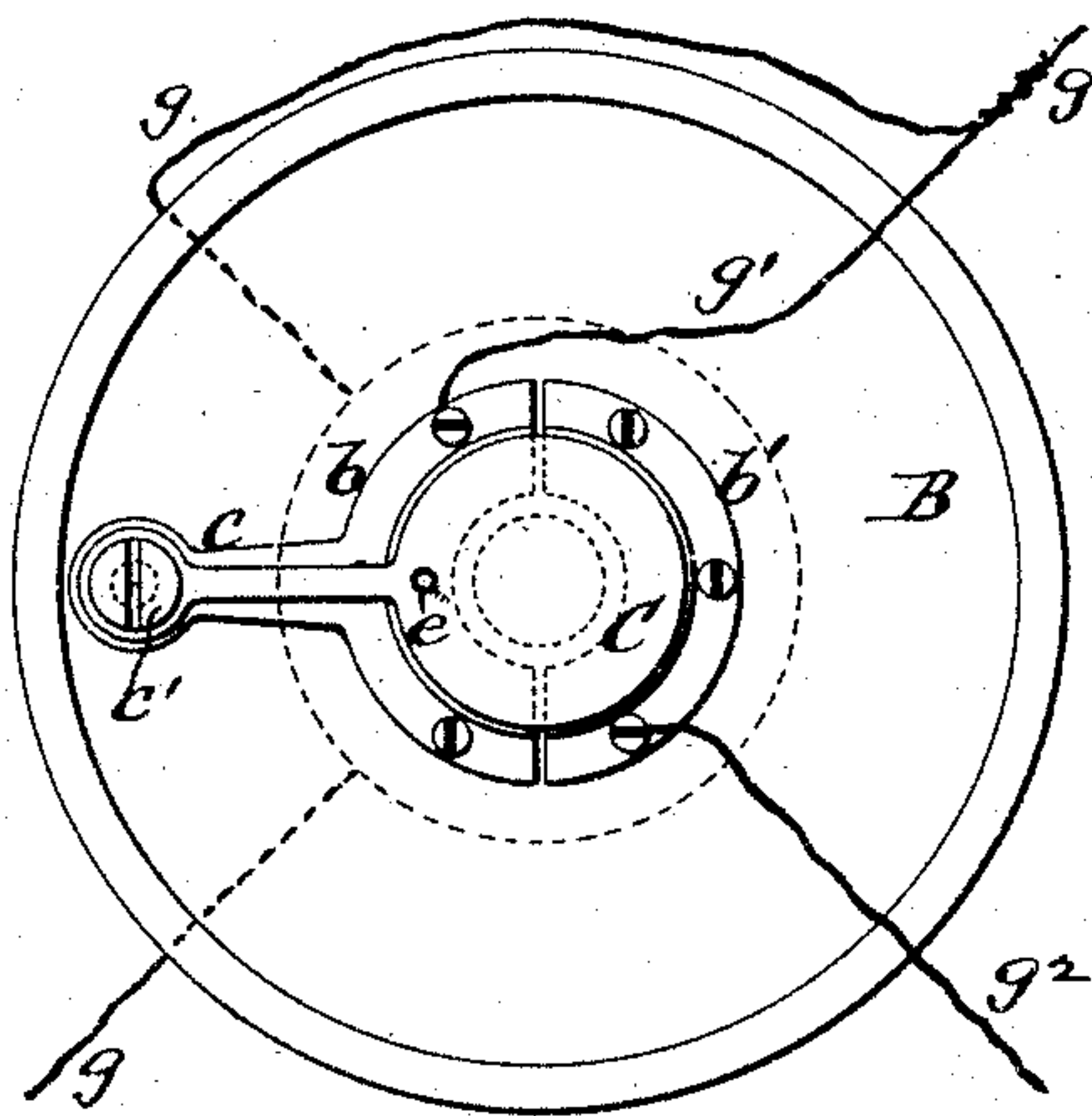
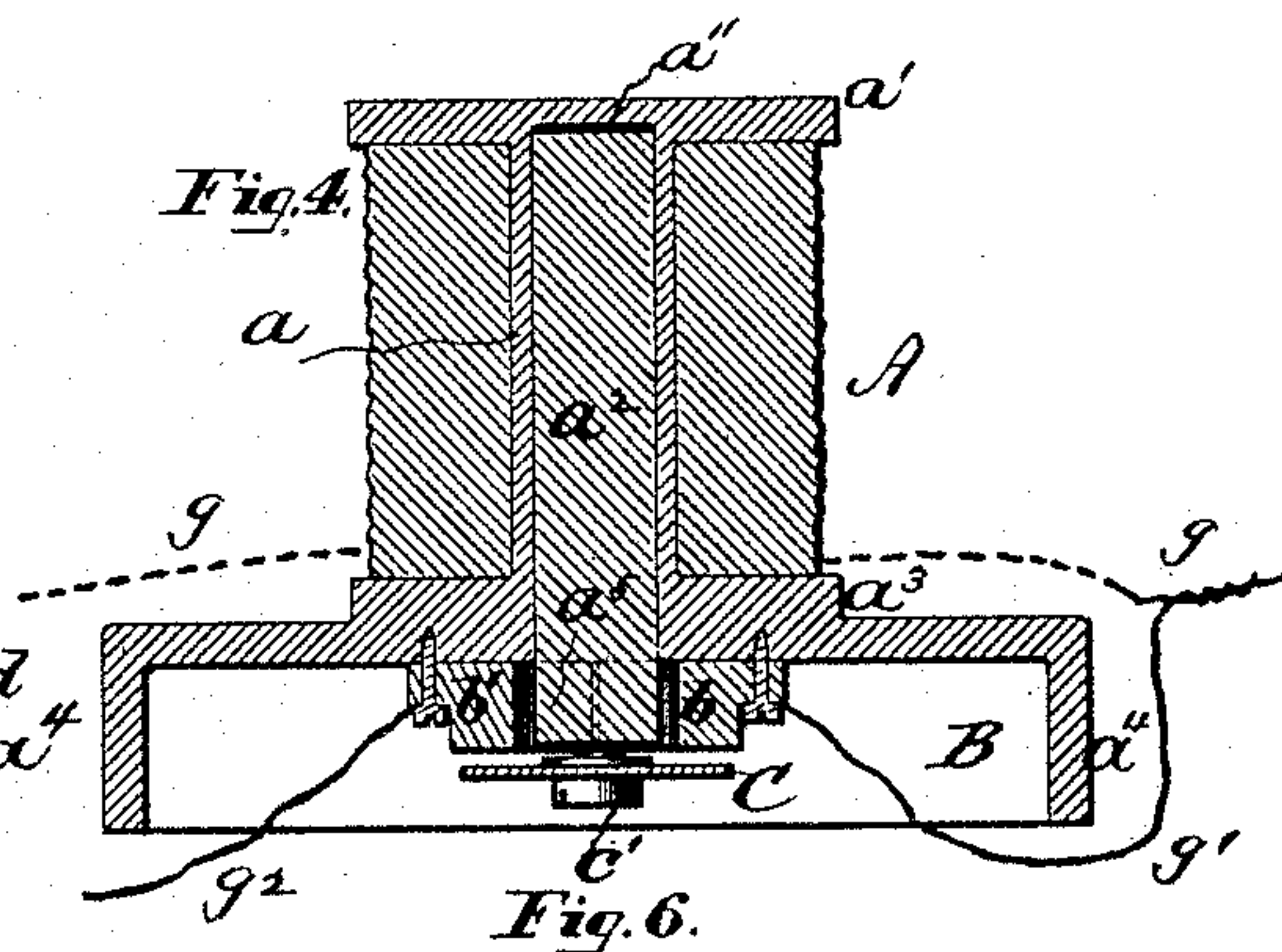
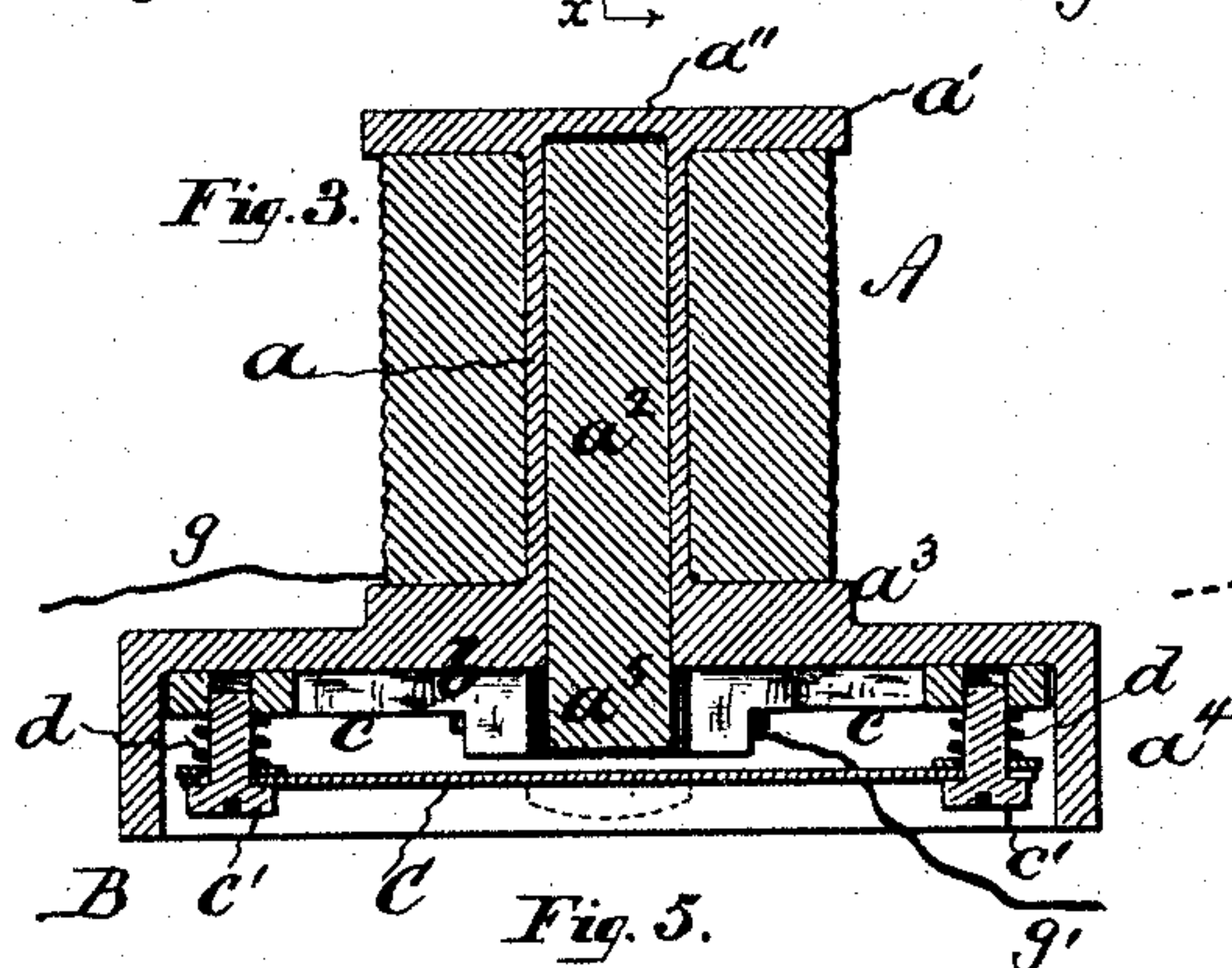
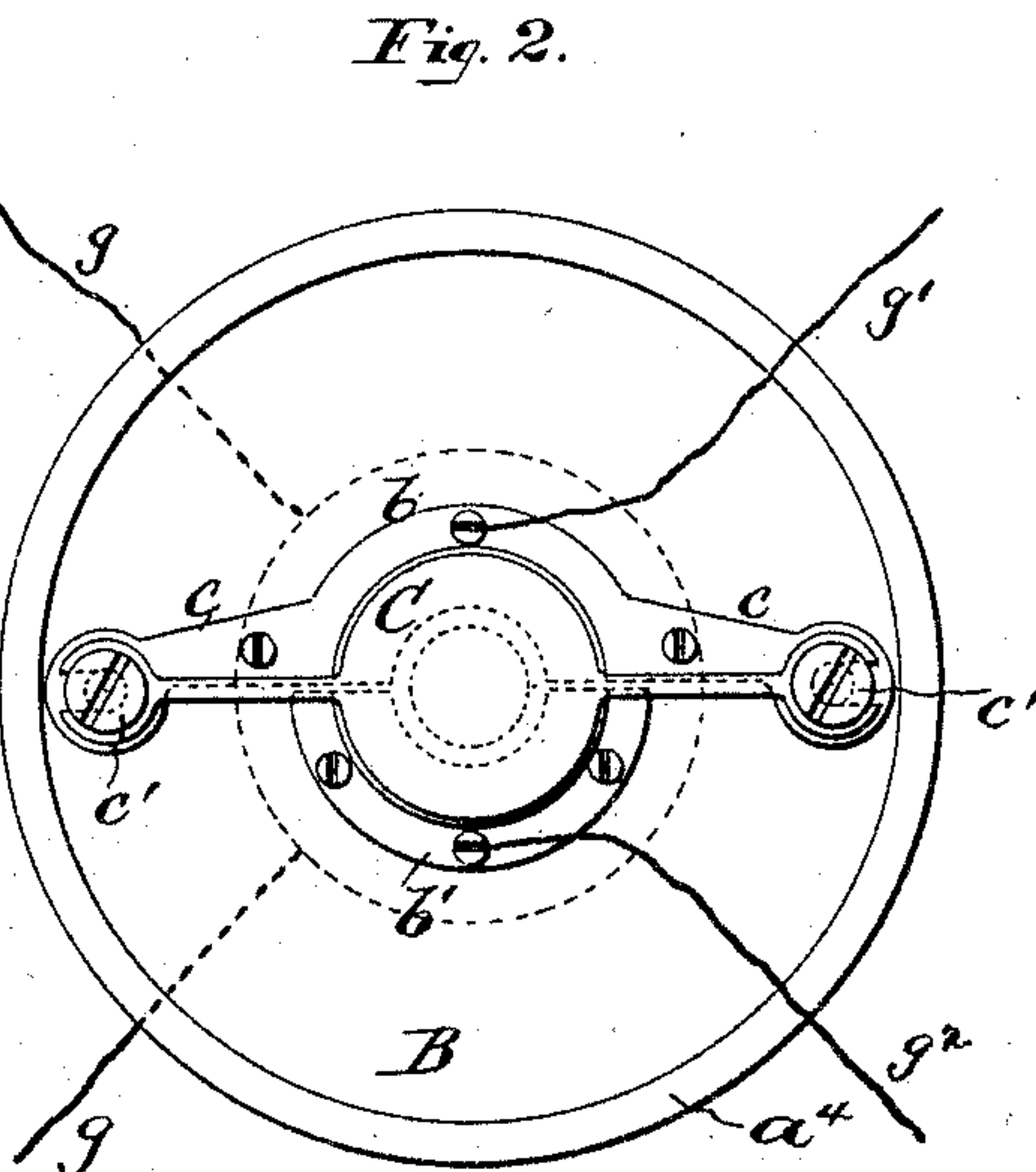
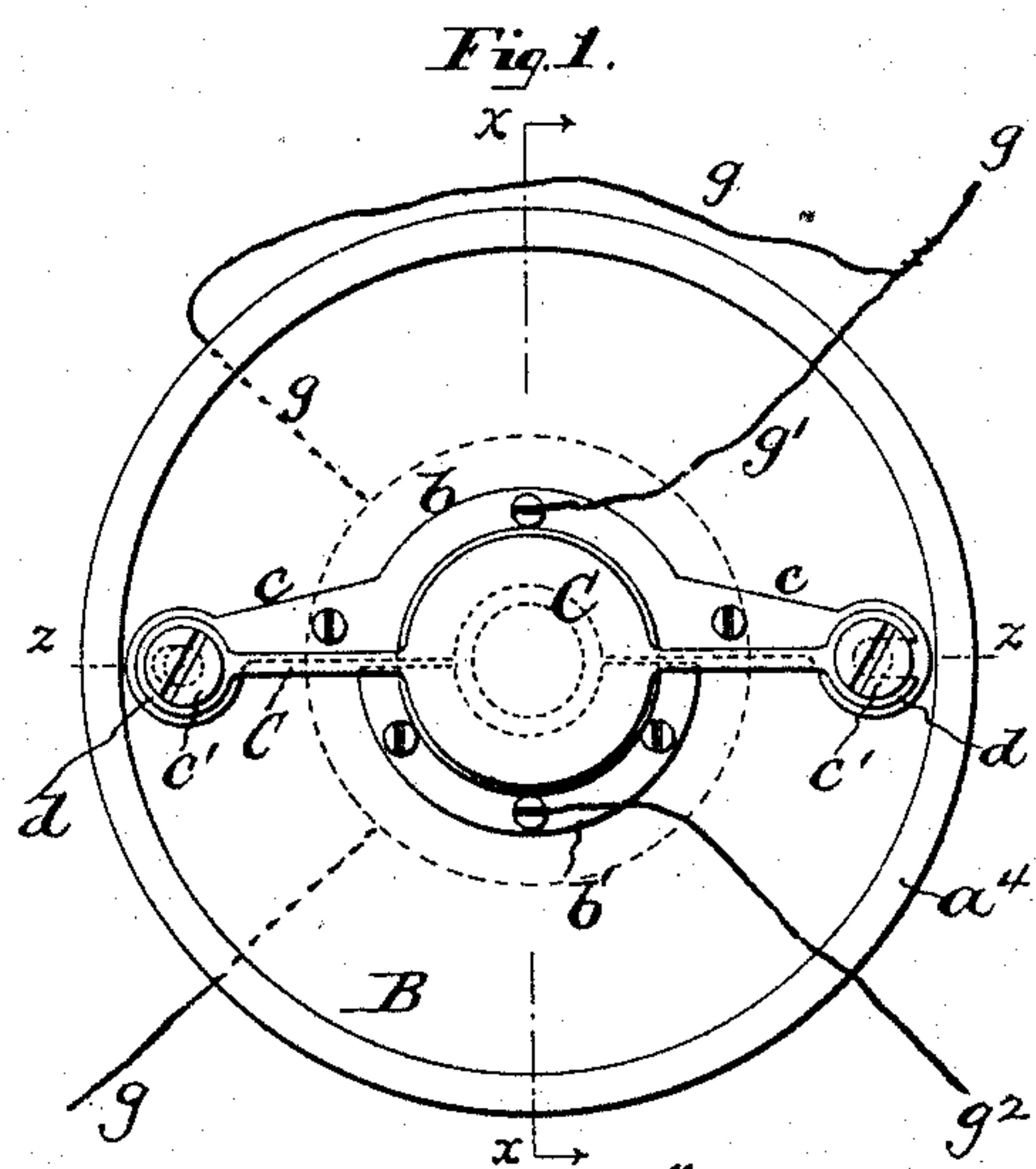


(No Model.)

A. E. PAIGE.
ELECTRIC CUT-OUT.

No. 356,008.

Patented Jan. 11, 1887.



WITNESSES:

WITNESSES:
M. F. Halle M
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INVENTOR

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UNITED STATES PATENT OFFICE.

ARTHUR E. PAIGE, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 356,008, dated January 11, 1887.

Application filed September 17, 1886. Serial No. 213,801. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR E. PAIGE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Cut-Outs or Safety Devices for Electric Railways, of which the following is a specification, reference being had therein to the accompanying drawings.

10 My invention has relation to lightning-arresters, cut-outs, or safety devices for telephonic, telegraphic, or other electric circuits; and it has for its object to provide a simple, inexpensive, durable, and effective device
15 which is automatic in its action, and which may be used for a relay.

My invention consists in the combination, construction, and arrangement of parts, as hereinafter described and claimed, having reference particularly to a line or other circuit having an electro-magnet suitably located, a pair of separate electrodes or plates insulated from one another, and preferably surrounding one pole of the magnet, one of which has a
25 ground-connection and the other a shunt-connection with the line-circuit, or both may form part of a separate circuit, and an armature provided with retracting spring or springs and located below or adjacent to both electrodes, which armature is unattracted by the magnet when a normal current of electricity is passing through it or is upon the line, but is attracted when an abnormal current gains access to or is upon the line, and when attracted it contacts with or bridges both electrodes to complete circuit between them for
30 either discharging the abnormal current from the line or for relay purposes.

Referring to the accompanying drawings,
40 Figure 1 is an inverted plan of my invention when in use for a cut-out or safety device; Fig. 2, a like view for a relay; Fig. 3, a vertical section on line $z z$, Fig. 1; Fig. 4, a like section on line $x x$, Fig. 1. Fig. 5 is an
45 inverted plan of a modified form of construction of the cut-out or safety device, and Fig. 6 a like view of same for relay purposes.

A represents an electro-magnet, the spool a of which is preferably made of one piece of
50 rubber, fiber, or other suitable material, hav-

ing a bore, a'' , which does not extend through the top spool-flange, a' , and in which is inserted the core a^2 . The bottom spool-flange, a^3 , is of a larger diameter than that of the upper flange or end, a' , and is provided with a downwardly-
55 projecting edge flange, a^4 , to form a box or case, B, at one end of the electro-magnet A, into which the end or pole a^5 of the core a^2 projects, as shown.

Surrounding the end a^5 of the core a^2 are 60 semicircular plates or electrodes $b b'$, which slightly project beyond the end a^5 of said core. They are insulated from one another and suitably secured to spool end a^3 . One of these plates or electrodes is provided with laterally-
65 extending arms c , having threaded openings for the reception of screws c' , which support an elastic plate, C, serving as an armature for magnet A.

The armature C is provided with spiral 70 spring-supports d , surrounding screws c' , and it is made wide enough to cover or be adjacent to both electrodes or plates $b b'$.

The elasticity of armature C or its spring-supports d , or both combined, normally keeps 75 the armature away from the electrodes or plates $b b'$.

The line or other circuit is represented at g , and includes the magnet A, and from circuit g a shunt or connection, g' , is made with plate 80 b , and the plate b' has a ground-connection, g'' , as shown in Fig. 1, when the instrument is used as a circuit cut-out or safety device for telephonic, telegraphic, or other lines, the operation of which is as follows: The electro-magnet A is 85 of a resistance or is so constructed that the normal current passing over line g and through the magnet does not cause the latter to attract its armature C; but when an abnormal current gains access to line g the magnet A attracts its
90 armature, which then contacts with both plates or electrodes $b b'$, to bridge or connect them for providing a ground-circuit for the escape of the abnormal current from the line, whereupon the magnet A ceases to be active
95 enough to attract its armature, and it is moved away from the magnet to break contact with the electrodes $b b'$ by the reaction of its spring or springs. When the instrument is used as a relay, the connection or circuit g' is separate 100

from and not in shunt with circuit *g*, as plainly illustrated in Fig. 2.

The action of the instrument is automatic, and all its parts are secured to the spool of the magnet, which in turn may be suitably located in the line-circuit, as desired.

The armature C may be made as shown in Figs. 5 and 6, or have only one supporting pin or screw, *c'*, in which case a guide or steady-
 10 ing stud, *e*, is used to prevent lateral motion or swaying of the same as it moves to and from the magnet, and the electrode *b* has but one arm, *c*, the circuit connections for the electrodes *b b'*, however, remaining the same for
 15 the cut-out or for the relay, as above described, and as indicated, respectively, in Figs. 5 and 6.

The screws *c'* for armature C make it adjustable to and from the pole or end *a* of magnet A.

20 What I claim as my invention is—

1. The combination, with magnet A, of a pair of separate electrodes or plates surrounding one pole of the magnet and projecting beyond the end of said pole, an armature having reaction spring or springs for contact with
 25 said electrodes, and circuit-connections, substantially as set forth.

2. A magnet included in an electric circuit, a pair of semicircular electrodes surrounding

a pole of the magnet, circuit-connections for said electrodes, and an armature with reaction spring or springs serving as a bridge for said electrodes, substantially as set forth.

3. The magnet A, having an enlarged spool end or chamber, B, into which projects one end or pole of the core of said magnet, a pair of electrodes insulated from one another surrounding said pole, an armature acting as a bridge for said electrodes, and circuit-connections for the magnet and electrodes, substantially as set forth.

4. A safety device or cut-out for electric circuits, comprising an electro-magnet included in a line-circuit, a pair of electrodes separate or insulated from one another and surrounding one pole of the magnet, a shunt-circuit from one electrode to the line-circuit, a ground-connection for the remaining electrode, and an armature for said magnet, which, when attracted by an abnormal current, bridges the electrodes to complete the shunt-circuit to ground, substantially as set forth.

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

ARTHUR E. PAIGE.

Witnesses:

S. J. VAN STAVOREN,
 CHAS. F. VAN HORN.