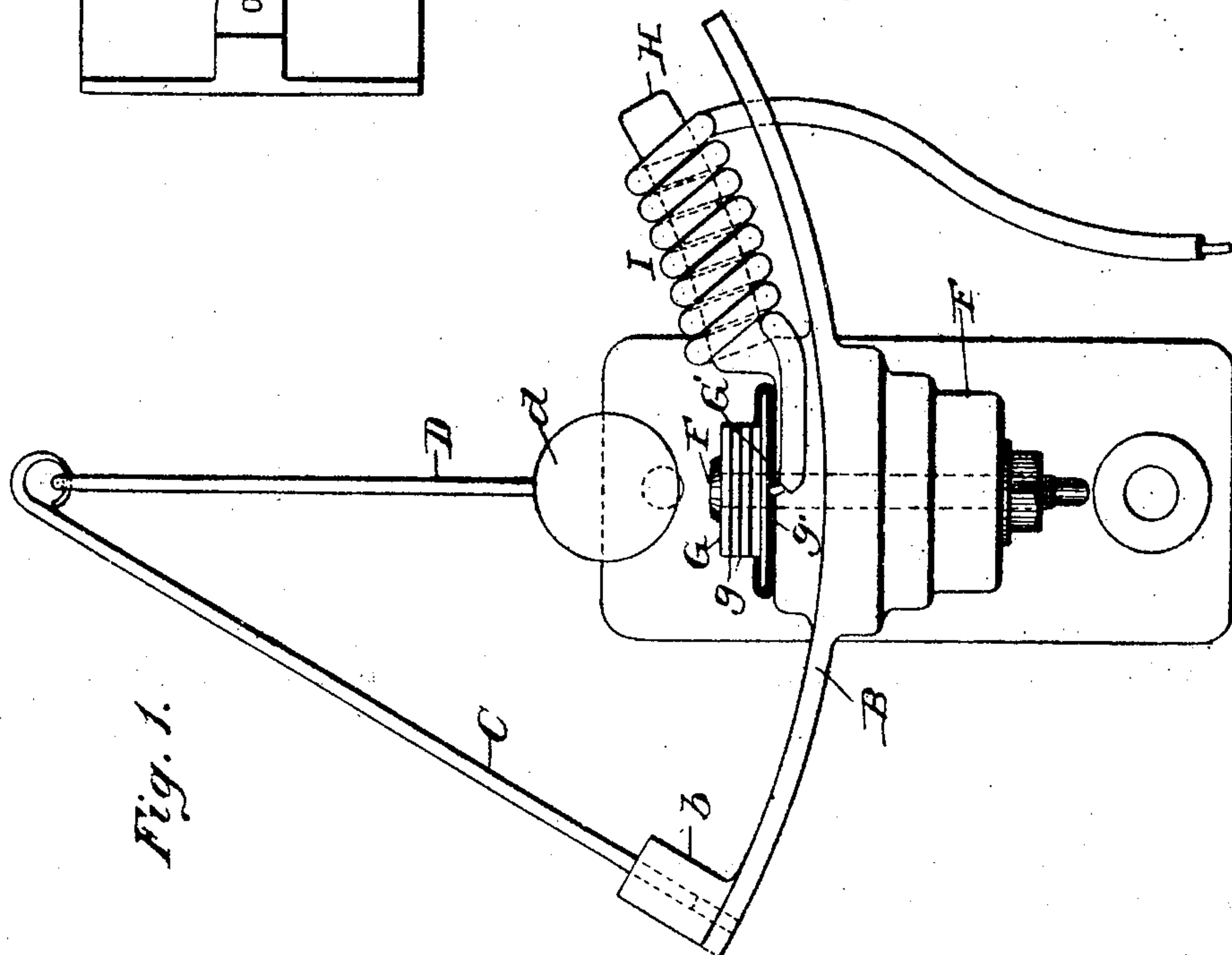
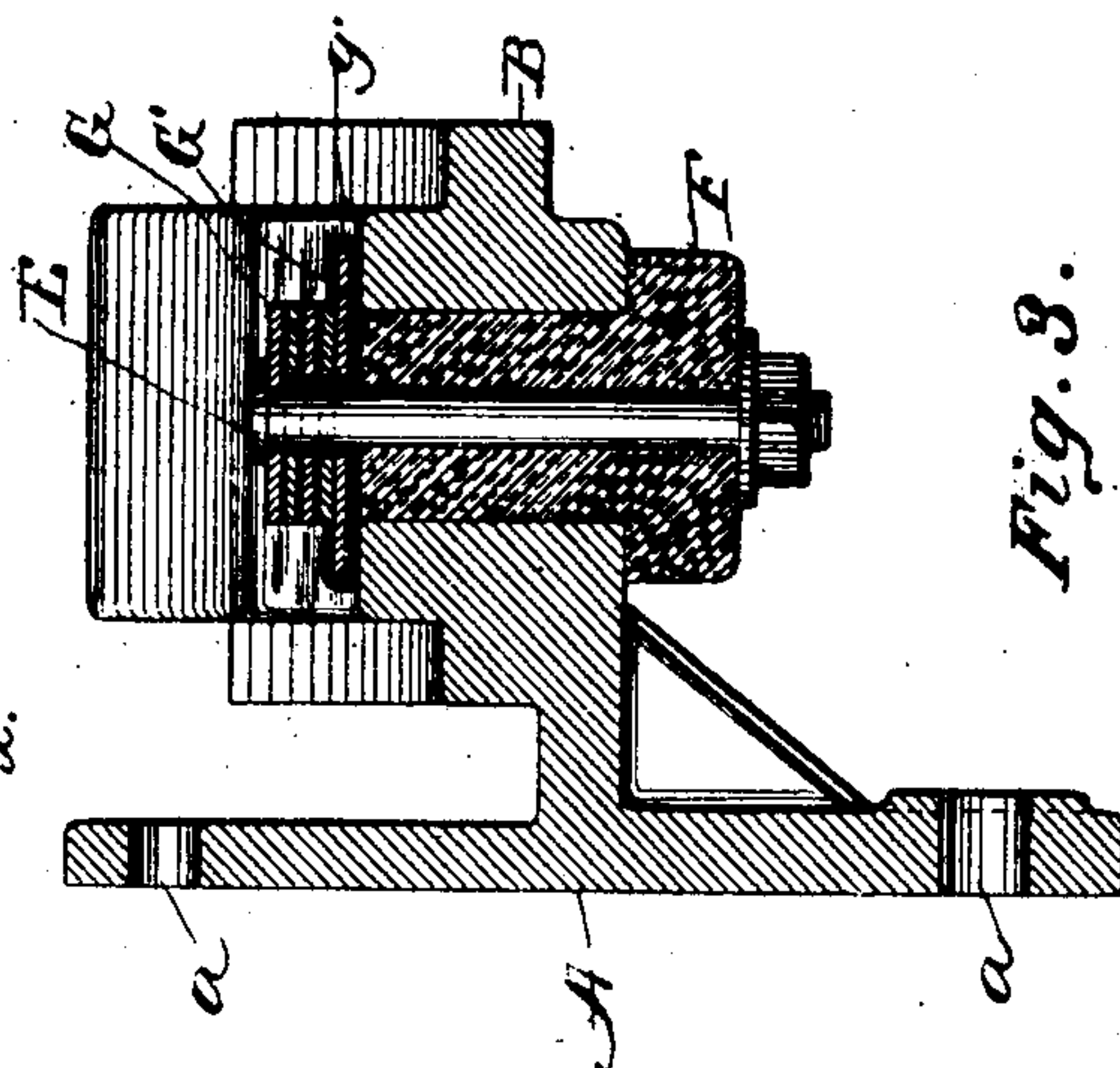
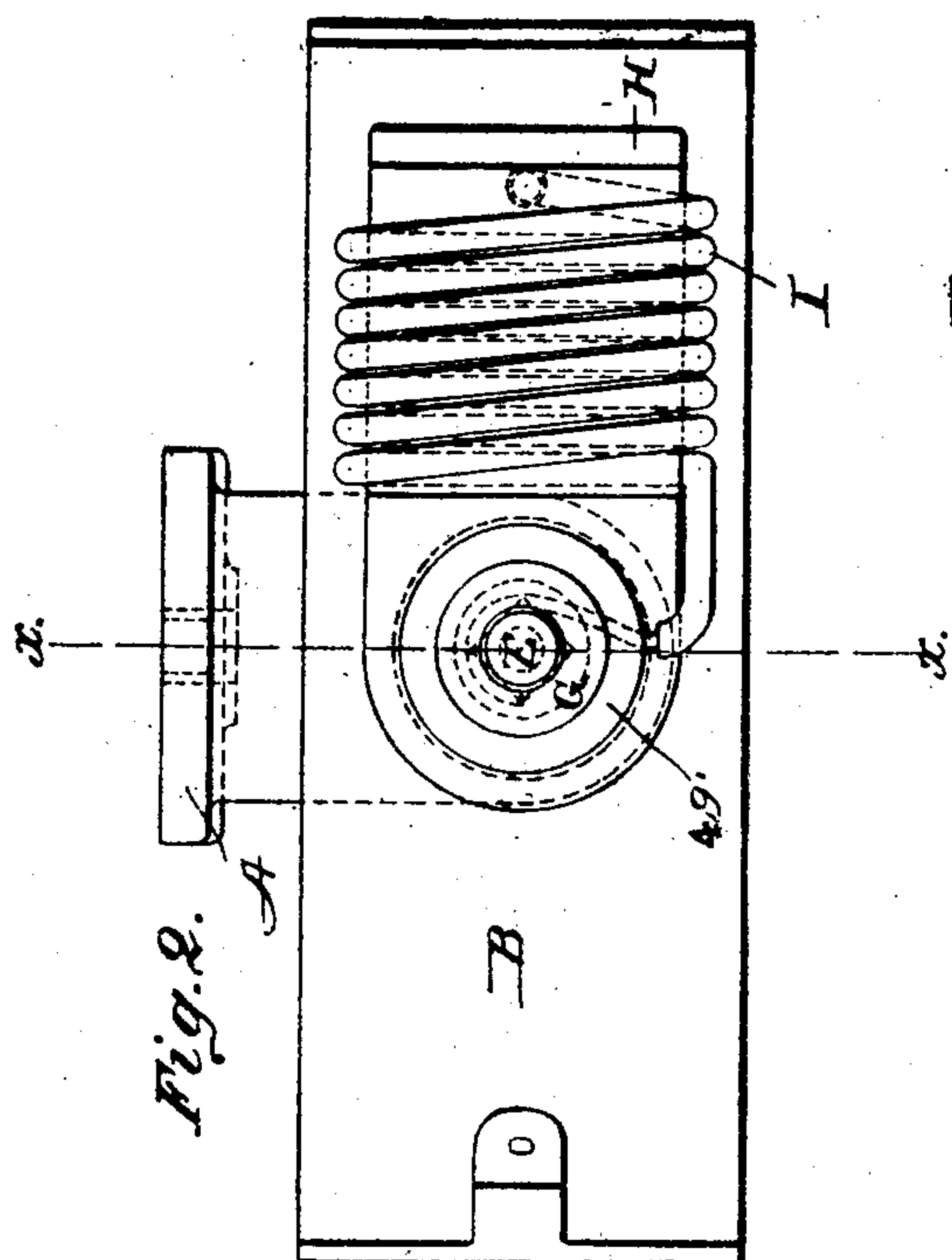


(No Model.)

W. K. FREEMAN.
LIGHTNING ARRESTER.

No. 578,981.

Patented Mar. 16, 1897.



Witnesses:
J. M. Fowler Jr.
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UNITED STATES PATENT OFFICE.

WALTER K. FREEMAN, OF FORT WAYNE, INDIANA.

LIGHTNING-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 578,981, dated March 16, 1897.

Application filed July 5, 1895. Serial No. 555,051. (No model.)

To all whom it may concern:

Be it known that I, WALTER K. FREEMAN, of Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Lightning-Arresters; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention relates to improvements in lightning-arresters, and more particularly such as are designed for use in connection with lines adapted to carry or carrying heavy currents or currents of high voltage, the objects being to afford a ready avenue of slight resistance for the escape of the abnormal static discharge incident to lightning and at the same time to provide a means for breaking or extinguishing any arc which might be established by the passage of the current before the appliances can be injured or burned and before the working current can ground to any appreciable extent.

Referring to the accompanying drawings, Figure 1 is a front elevation of a device embodying my invention. Fig. 2 is a top plan view of the same with the pendant and its support removed. Fig. 3 is a detail section on the line, *x x*, Fig. 2.

Like letters of reference in the several figures indicate the same parts.

In carrying this invention into practice it has been one of my chief ends to provide an apparatus which while embodying the qualities heretofore mentioned will at the same time be entirely automatic and certain in its action, requiring absolutely no attention after having been properly connected; and with this object in view I prefer to employ a pendulous electrode through which the current incident to lightning is discharged and by the deflection of which the arc which would otherwise be established by the passage of the current is broken or extinguished, the passage of the current itself, through mechanism to be presently described, causing the pendulous electrode to be deflected after the initial discharge, preventing the formation of the arc and allowing the electrode to assume its nor-

mal position and restore the conditions previously existing.

Referring to the accompanying drawings, wherein I have illustrated an exceedingly simple embodiment of the invention, the letter A indicates a metallic framing, usually an iron casting, adapted to be secured to a support, as by screws passing through the openings *a* or in any other ordinary well-known manner and having projecting from the front portion a transversely-curved bracket B, to one end of which there is attached, usually by being inserted in a socket *b*, an upwardly-projecting electrode-support C, to the upper end of which the electrode D, terminating in a ball *d* at the lower end, is suspended and adapted to hang in a vertical position, as shown clearly in Fig. 1.

Immediately beneath the ball *d* the bracket is provided with an insulated fixed electrode E, the air-gap between the said pendulous and fixed electrode being only of sufficient width to prevent the formation of an arc unless started by a statical discharge or a discharge of higher voltage than the line is normally intended to carry. This fixed electrode is preferably simply a bolt which passes down through an insulator F, held in the bracket, and in addition is preferably provided above the bracket with a series of washers G, insulated from the bolt and insulated one from the other by disks *g*, of mica or its equivalent, and the whole number of washers insulated from the bracket by a bottom washer G', preferably of somewhat larger diameter and covered with an insulating-covering *g'*.

The connection through which the discharge takes place is made with the bottom washer, and thus the statical discharge must first jump from washer to washer until it reaches the electrode, and must then jump across the air-gap to the pendulous electrode, which latter through any suitable connection made with the base or bracket forms the other terminal, being grounded, as usual.

In the preferred construction the connection with the line-wire is made to the washer just mentioned, and in order to cause the pendulous electrode to swing laterally away from the fixed electrode this line connection is formed into a coil having a suitable core and

constituting an electromagnet located in proximity to, but to one side of, the fixed electrode. With such an arrangement it will be seen that when there is no statical discharge taking place the magnet is not energized, and hence the pendulous electrode hangs in position in proximity to the fixed electrode, but the instant such a discharge takes place the magnet is energized and draws the pendulous electrode away from the fixed electrode, thereby increasing the air-gap and interrupting the circuit, and consequently the magnet is no longer energized, and the pendulous electrode returns to normal position ready to permit of another statical discharge.

I prefer to form on the bracket a finger-like projection or core H, extending in the arc of a circle just beyond the radius of the pendulous electrode and to one side of the fixed electrode, and this core H is adapted to have a few turns of the line connection wound about it, forming a coil I. The core may be and preferably is flat or widened, in order to present a large magnetic field, although this is not essential; nor is it essential to the operation of the device that the movable electrode should be returned to normal position by gravity, as other well-known and obvious equivalents may be employed.

The embodiment of the apparatus shown is exceedingly simple, there being no complicated or finely-adjusted parts to get out of order, and in practice it is found highly efficient for the purposes intended.

In connecting the device it is simply necessary to connect the line-wire with the line at any point desired and provide the movable electrode support or bracket with a good ground connection, as will be obvious to those skilled in the art.

Having thus described my invention, what I claim as new is—

1. In a lightning-arrester, the combination with the bracket or support, fixed electrode carried thereby and the movable electrode having a magnetic pendulous end normally standing in proximity to but out of contact with the fixed electrode, of the curved elec-

tromagnet located in proximity to and at one side of the fixed electrode but out of the path of movement of the pendulous end of the movable electrode, whereby said movable electrode is permitted to have a free movement, said electromagnet being connected in circuit through the air-gap between the electrodes; substantially as described.

2. In a lightning-arrester, the combination with a bracket or support carrying a fixed electrode, and a magnetic pendulous electrode having a magnetic end suspended to normally hang in proximity to but out of contact with the fixed electrode, of an electromagnet curved to conform to the arc described by the pendulous position of the movable electrode, located at one side of said electrodes in position to deflect the pendulous electrode away from the fixed electrode, said magnet being connected in circuit through the air-gap between the electrodes; substantially as described.

3. In a lightning-arrester, the combination with the bracket or support and the pendulous electrode, of the insulated electrode projecting in proximity to, but not in contact with the pendulous electrode, the curved core on the bracket projecting laterally from the fixed electrode, and the circuit connections passing about said core, to constitute a magnet, and connected with the fixed electrode; substantially as described.

4. In a lightning-arrester the combination with the bracket or support and the pendulous or movable electrode, of the fixed electrode, an insulator for said electrode mounted in the bracket, a series of washers with interposed disks of insulation surrounding the fixed electrode, a core carried by the bracket and projecting at one side of the fixed electrode, and a circuit connection coiled about the core and connected with the bottom washer; substantially as described.

WALTER K. FREEMAN.

Witnesses:

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