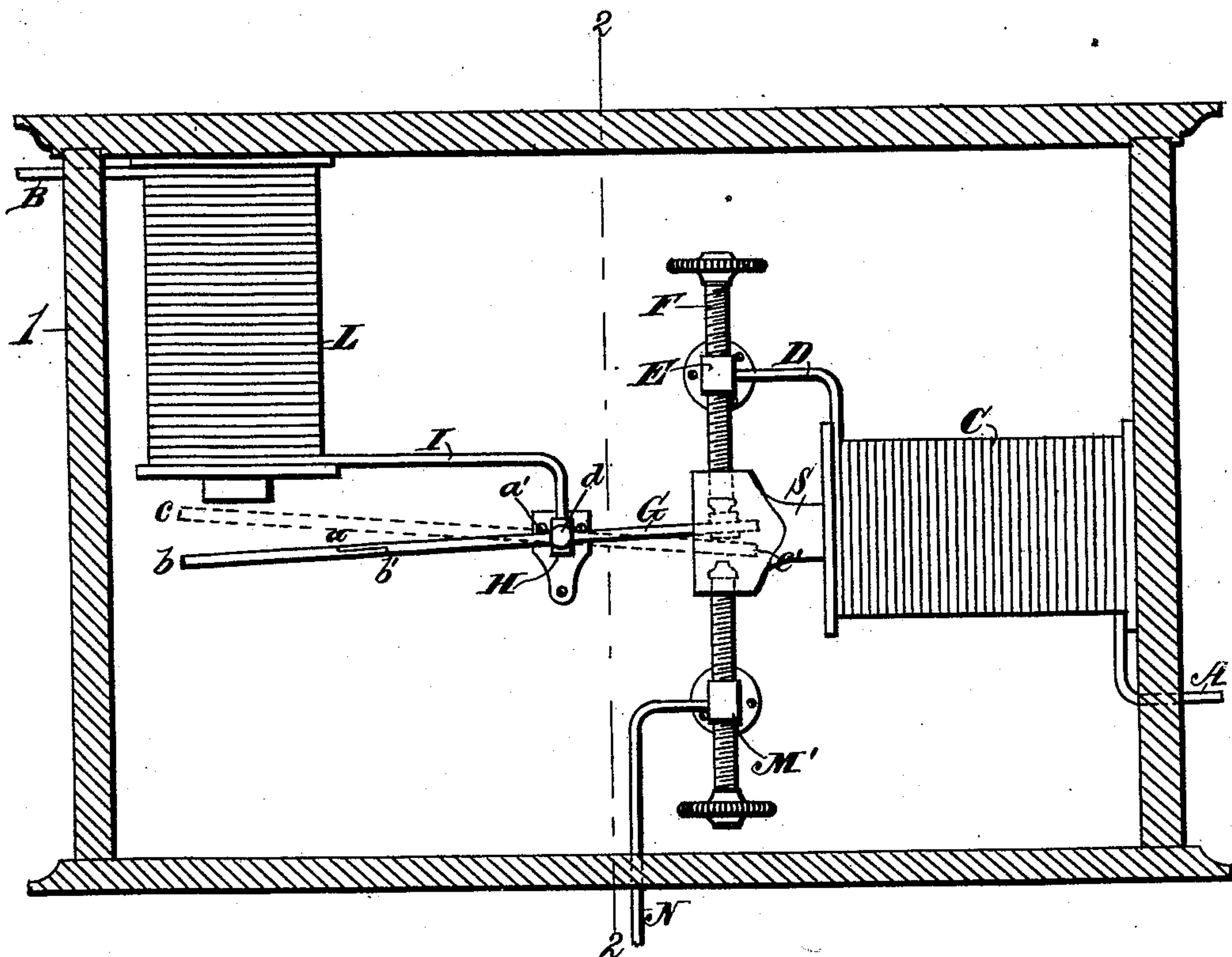


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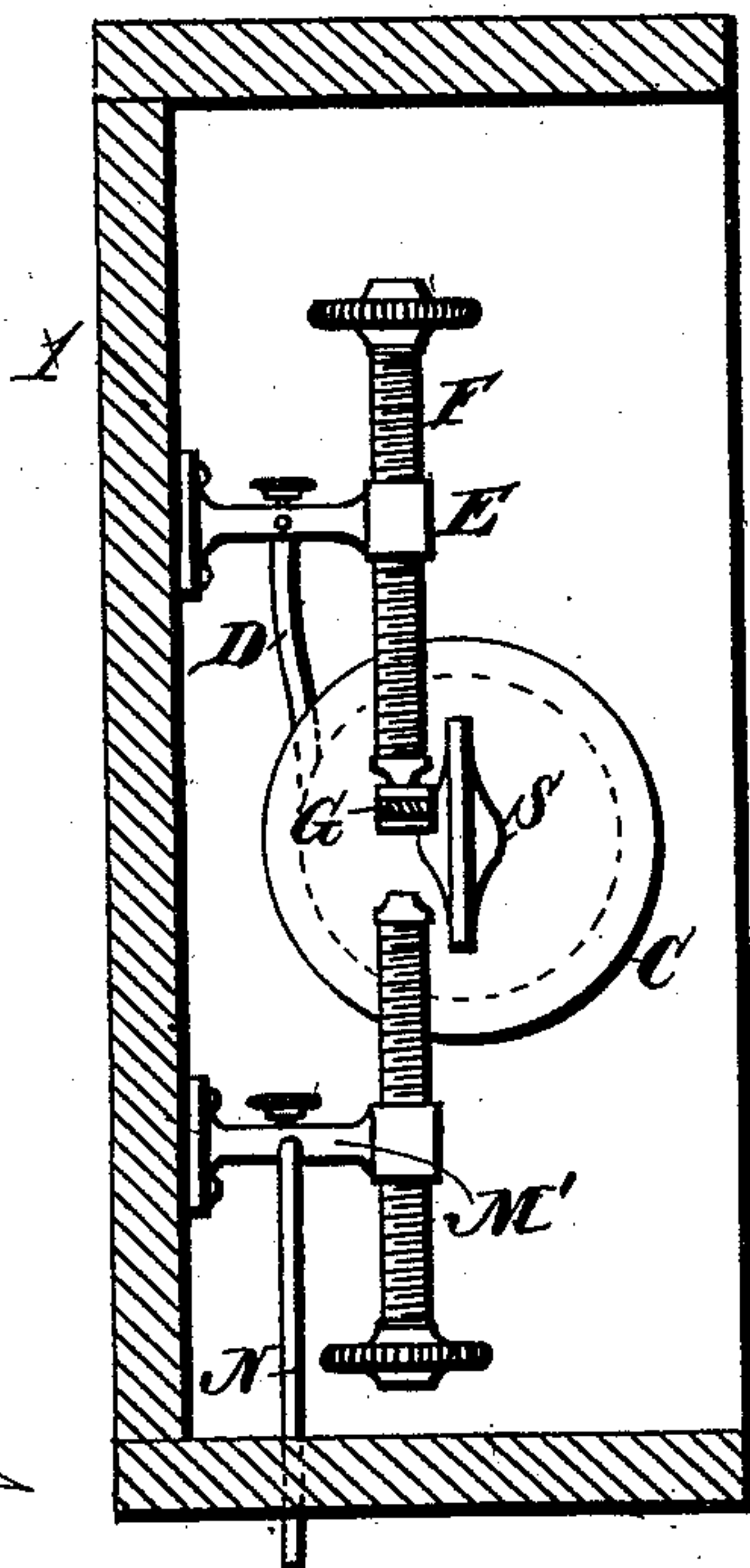
No. 467,023.

Patented Jan. 12, 1892.

*Fig.1.*



*Fig. 2.*



Witnesses,  
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J. A. Rutherford

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By James L. Norris  
Atty.

(No Model.)

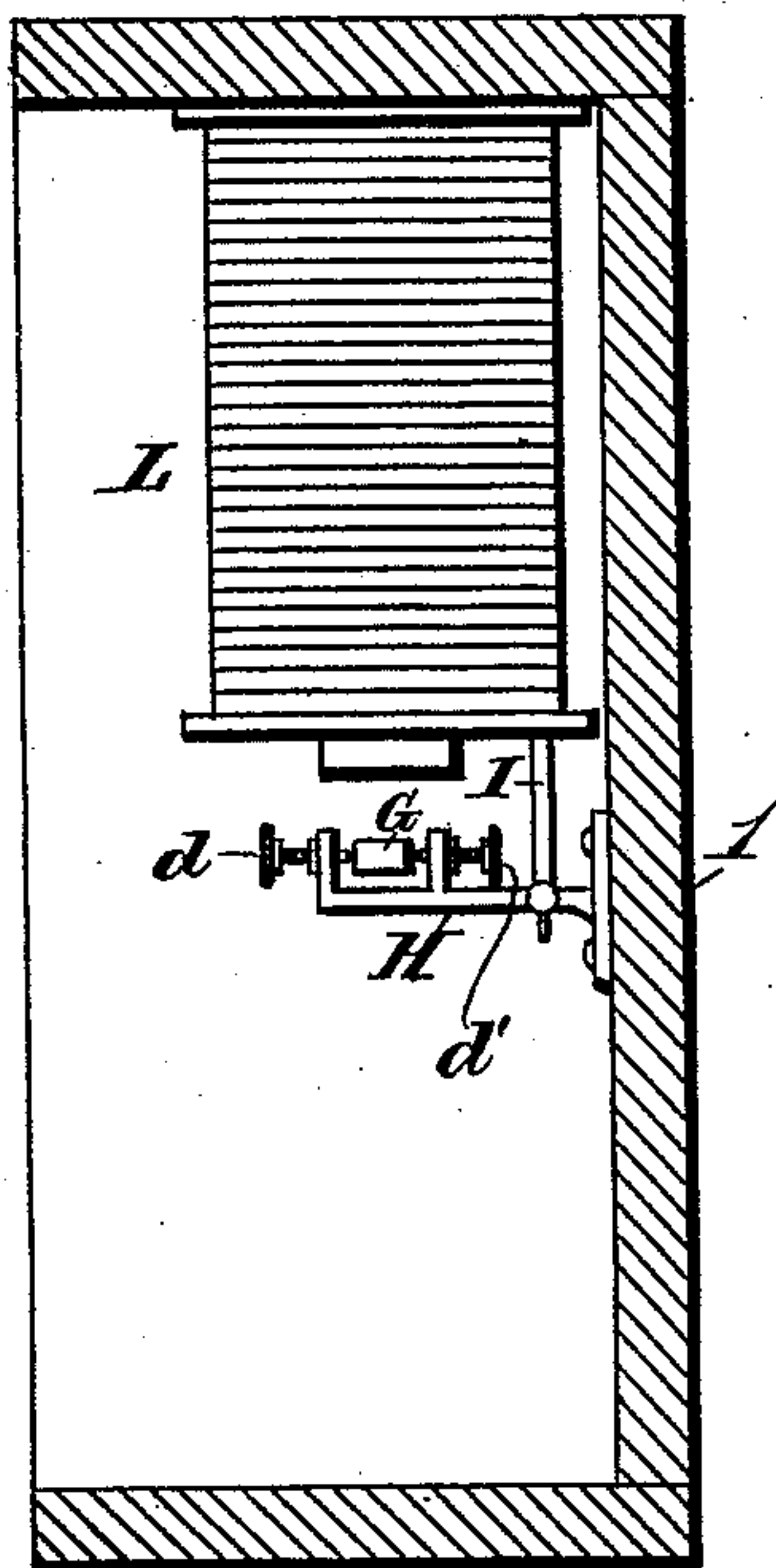
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G. W. SPITTLE.  
LIGHTNING ARRESTER.

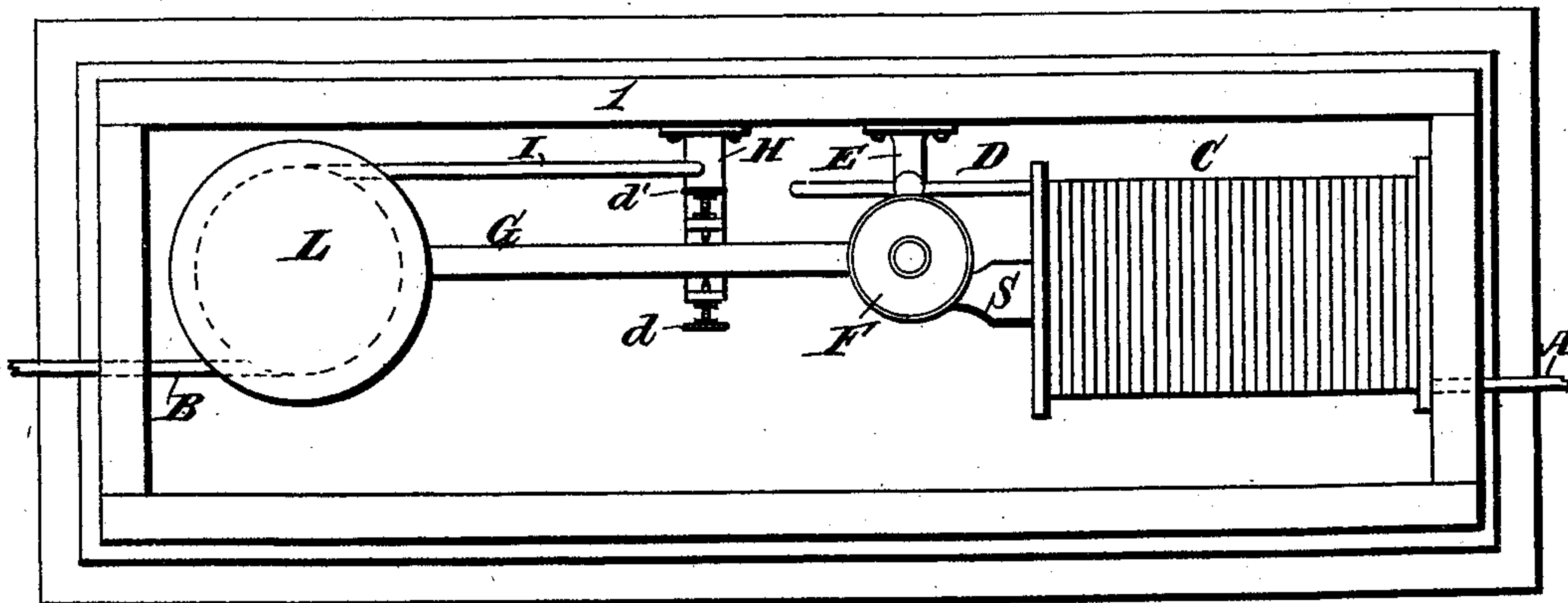
No. 467,023.

Patented Jan. 12, 1892.

*Fig. 3.*



*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

GEORGE WILLIAM SPITTLE, OF CAMPOS, BRAZIL.

## LIGHTNING-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 467,023, dated January 12, 1892.

Application filed September 3, 1891. Serial No. 404,800. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE WILLIAM SPITTLE, a subject of the Queen of Great Britain, and a resident of Campos, in the Province of Rio de Janeiro, Republic of Brazil, have invented certain new and useful Improvements in Lightning-Arresters, of which the following is a specification.

It is the purpose of my invention to provide a simple automatic lightning-arrester for the protection of telephonic, telegraphic, and electric-lighting apparatus, as well as to guard those who are employed upon such apparatus, or in the immediate neighborhood, upon the occurrence of storms, when the wires are liable to receive discharges of atmospheric electricity.

To enable others to clearly understand my said invention and to make, construct, and use the same, I will proceed to describe in detail an apparatus organized in accordance with my views, reference being had for such purpose to the accompanying drawings, in which—

Figure 1 is a sectional elevation of the apparatus arranged within a wood casing to protect it from dust. Fig. 2 is a sectional view of the same, the section plane being in the line 2 2, Fig. 1. Fig. 3 is a similar section taken upon the same plane looking in the opposite direction. Fig. 4 is a plan view of the parts shown in Fig. 1, the top of the casing being removed.

In the said drawings the reference-numeral 1 indicates the casing inclosing the apparatus. This casing is entered by two wires A and B, the first communicating with the apparatus to be protected and the other with the line-wire. The circuit of the generating-battery is by way of the coil of the electro-magnet C, wire D, support E, regulating-screw F, armature G, support H, wire I, electro-magnet L, and out of the apparatus by the wire B.

In the support E is mounted the regulating-screw F, by which the distance of the armature G from the electro-magnet L is adjusted. The armature G is formed of suitable metal from *a* to *a'*, but from *b* to *b'* it is formed of soft iron. The space between said armature G and the electro-magnet L is adjusted in accordance with the condition that

the electro-magnet shall be able to attract the said armature and draw it upward only when there is an excess of electric current in said electro-magnet. The armature in such case takes the position shown in dotted lines *c c'*.

The screw M, engaged with a screw-socket in a support M', located beneath the short arm of the armature G, communicates with the ground-wire N and is regulated so that its point shall be at the distance of one-half to one millimeter from the armature G. The screws F and M are both shown in Fig. 2, with their communications with the wire D and with the earth through the wire N. The points of these screws are tipped with platinum, and that part of the armature G which comes in contact with either screw is plated or provided with a platinum button to prevent the fusion of the metal of the screws and of the armature in the event of the formation of a voltaic arc by the displacement of the armature due to the passage of a discharge of electricity.

From the wall of the casing projects a bracket H, having opposite screws *d d'*, provided with conical points, as shown in Figs. 3 and 4, to engage with and support the armature G. From the wall of the casing springs the supporting-bracket 2, also upon which the electro-magnet L is arranged, the latter being connected by the wire I with the bracket H. By reason of this arrangement, as soon as a discharge takes place upon the line wire the electro-magnet attracts the armature G and throws it instantaneously in contact with the screw M, to which the ground-wire N is attached. The armature is then in the position shown by dotted lines, and the apparatus is entirely isolated and protected. At the moment of discharge the current passes by way of the electro-magnet L, wire I, bracket H, armature G, and screw M, and passes out by the ground-wire N. As soon as the discharge has passed the attraction of the electro-magnet becomes null and the armature resumes its original position, owing to the fact that its center of gravity lies between the point of its pivotal support and the electro-magnet L and re-establishes the line-circuit with the apparatus ready for another discharge.

The core of the electro-magnet C is formed



of a bar of soft iron, the end S projecting beyond or outside of the coil. Its point is plated or protected centrally upon the side next the armature G, as shown in Fig. 2, and the magnetic field established by this part, which  
 5 constitutes the pole of the electro-magnet, prevents the formation of the voltaic arc.

When the lightning-arrester is used to protect telephonic and telegraphic apparatus, the  
 10 electro-magnet C may be omitted and the wire I connected directly to the apparatus to be protected.

The dimensions of the automatic arrester will be varied according to the apparatus to  
 15 be protected, and the wires also may be of different size, these details being controlled by the judgment of those skilled in the art.

The arrangement of parts in my invention is extremely simple, and their functions are  
 20 easily performed. Moreover, in its application to apparatus of any kind there is no necessity for setting or adjusting the parts after each discharge or for changing any one of said parts. It is at all times ready for action  
 25 and requires no attention.

What I claim is—

1. In an automatic lightning-arrester for the protection of telephonic and other electrical apparatus, the combination, with an  
 30 electro-magnet in circuit with the line-wire and with a bracket-support, of an armature pivotally mounted on said bracket-support out of its center of gravity and having its long arm arranged to be attracted by the  
 35 electro-magnet, a screw-support arranged above the short arm of the armature, a screw

engaging the screw-support and having one extremity located above one side of the short arm of the armature, a screw-support arranged  
 40 beneath the short arm of the armature, an adjustable screw engaging the latter support and having one extremity arranged beneath the short arm of the armature, a ground-wire connected with one screw, and a leading-wire connected to the other screw, substantially as  
 45 described.

2. In a lightning-arrester, the combination of a screw-support, an electro-magnet connected with the support and with a line-wire, a second electro-magnet having one terminal  
 50 connected with a leading-wire, an armature-support interposed between the two magnets and connected with the other terminal of the magnet for the leading-wire, an armature pivoted at one side of its center of gravity to  
 55 provide a long and a short arm, the long arm being arranged in proper relation to the magnet for the leading-wire, an adjustable screw engaging the said screw-support and having its lower extremity arranged above the short arm  
 60 of the armature, and a secondary adjustable screw having its upper extremity arranged beneath the short arm of the armature, substantially as described.

In testimony that I claim the foregoing as  
 65 my invention I have signed my name, in presence of two witnesses, this 13th day of July, 1891.

GEORGE WILLIAM SPITTLE.

Witnesses:

JULES GERAUD,  
 CARLOS JORGE BAILLY.