

No. 644,315.

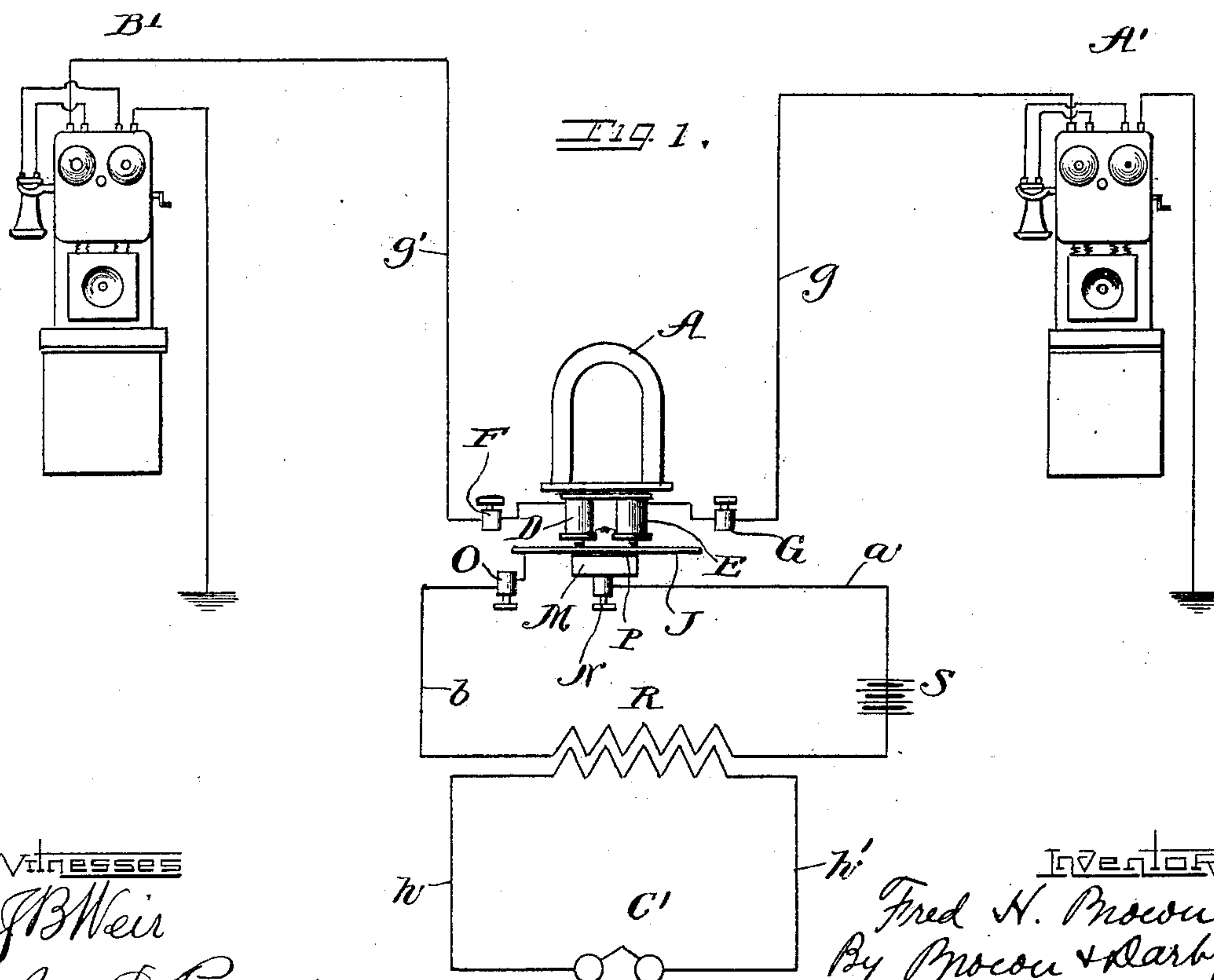
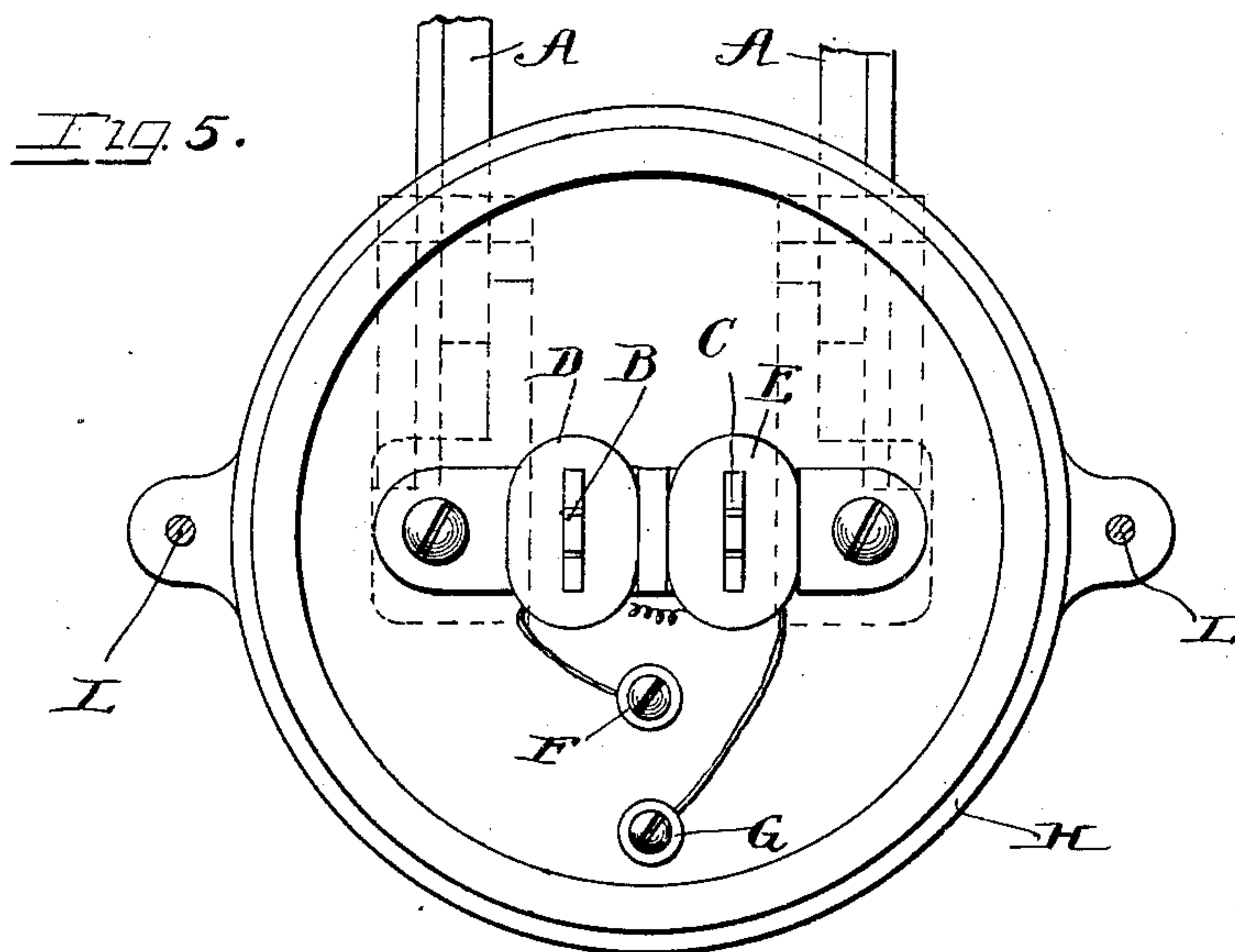
Patented Feb. 27, 1900.

F. H. BROWN.
TELEPHONIC RELAY.

(Application filed Nov. 27, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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Fig. 2.

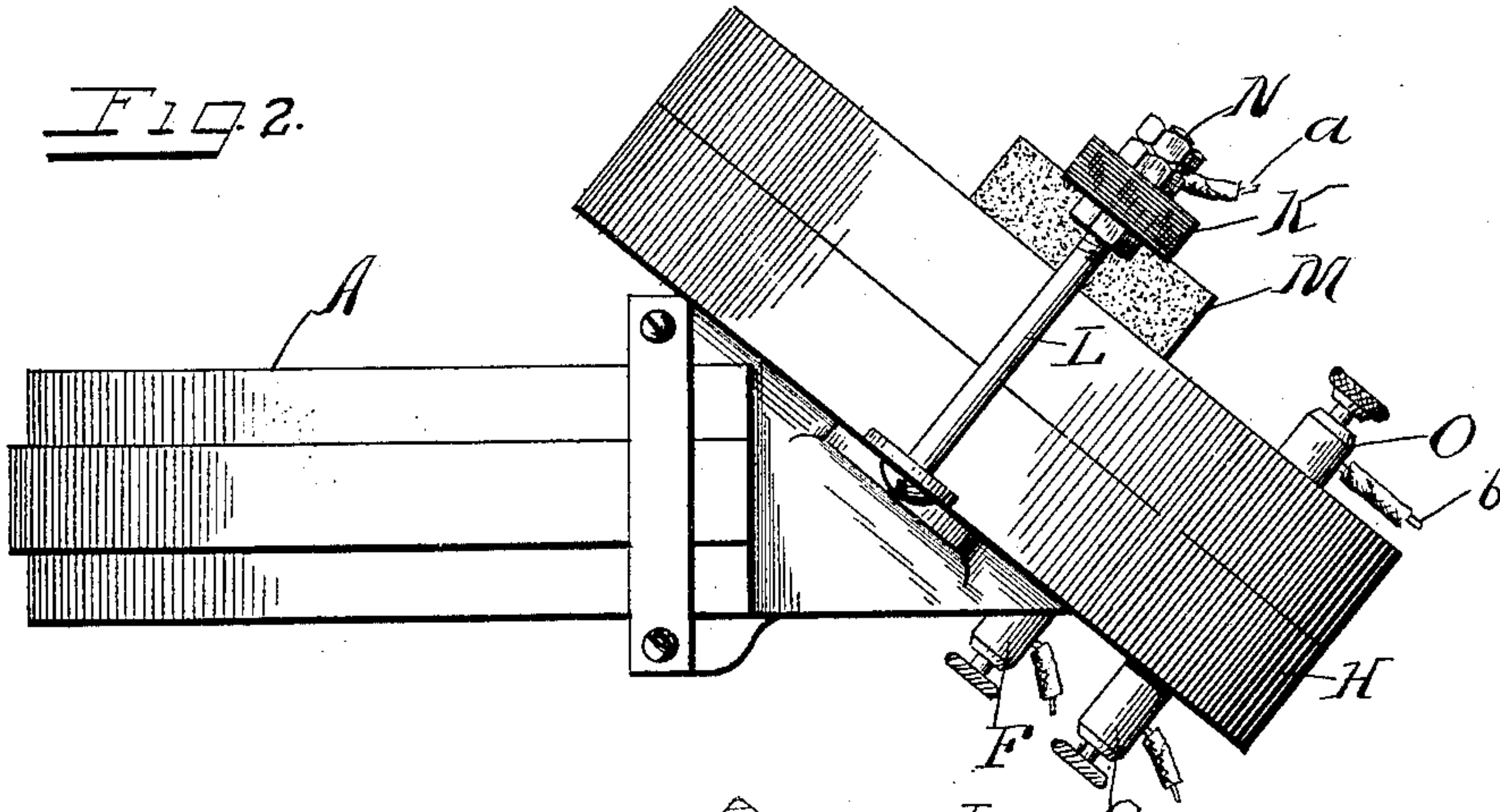


Fig. 3.

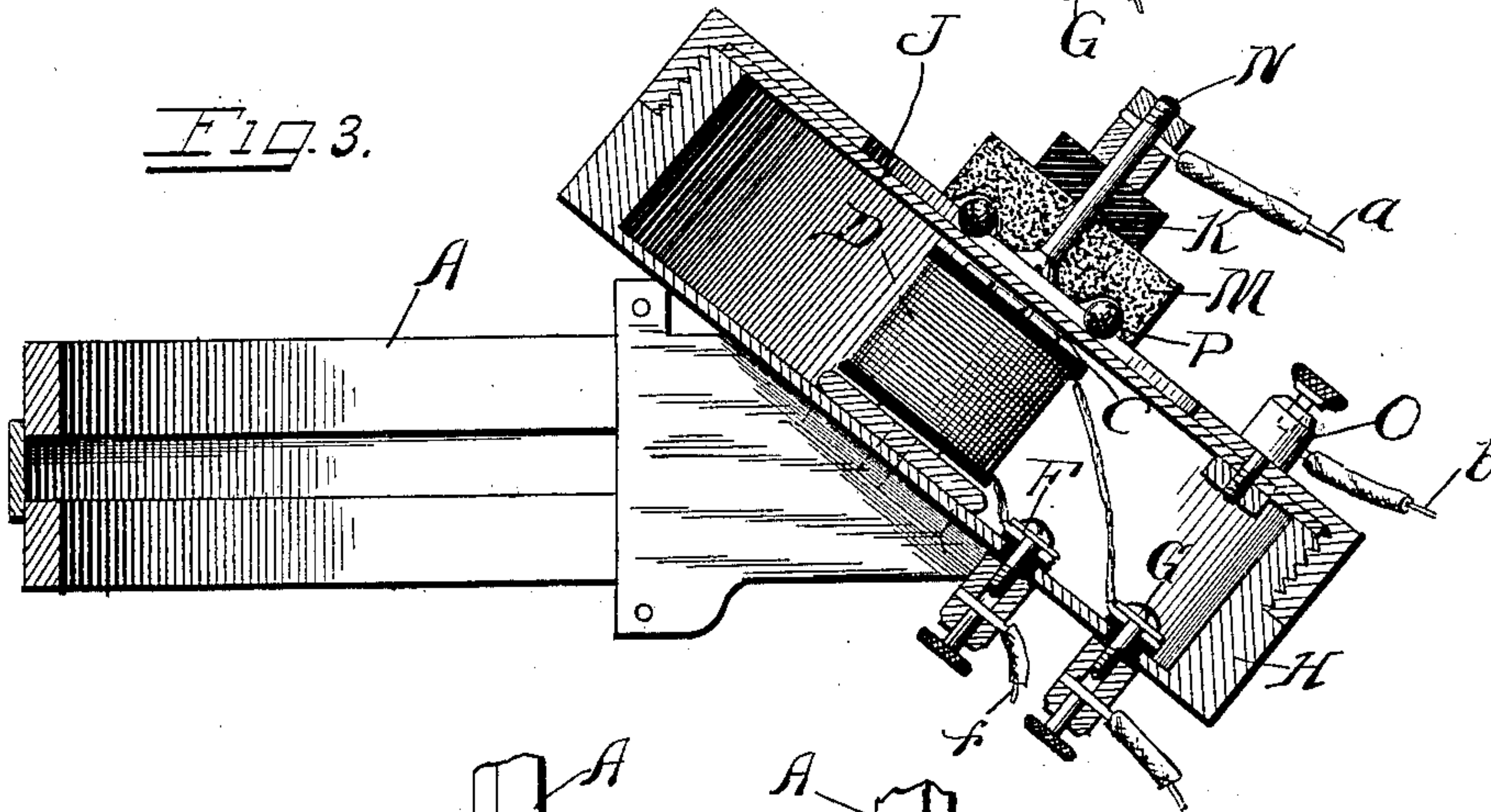
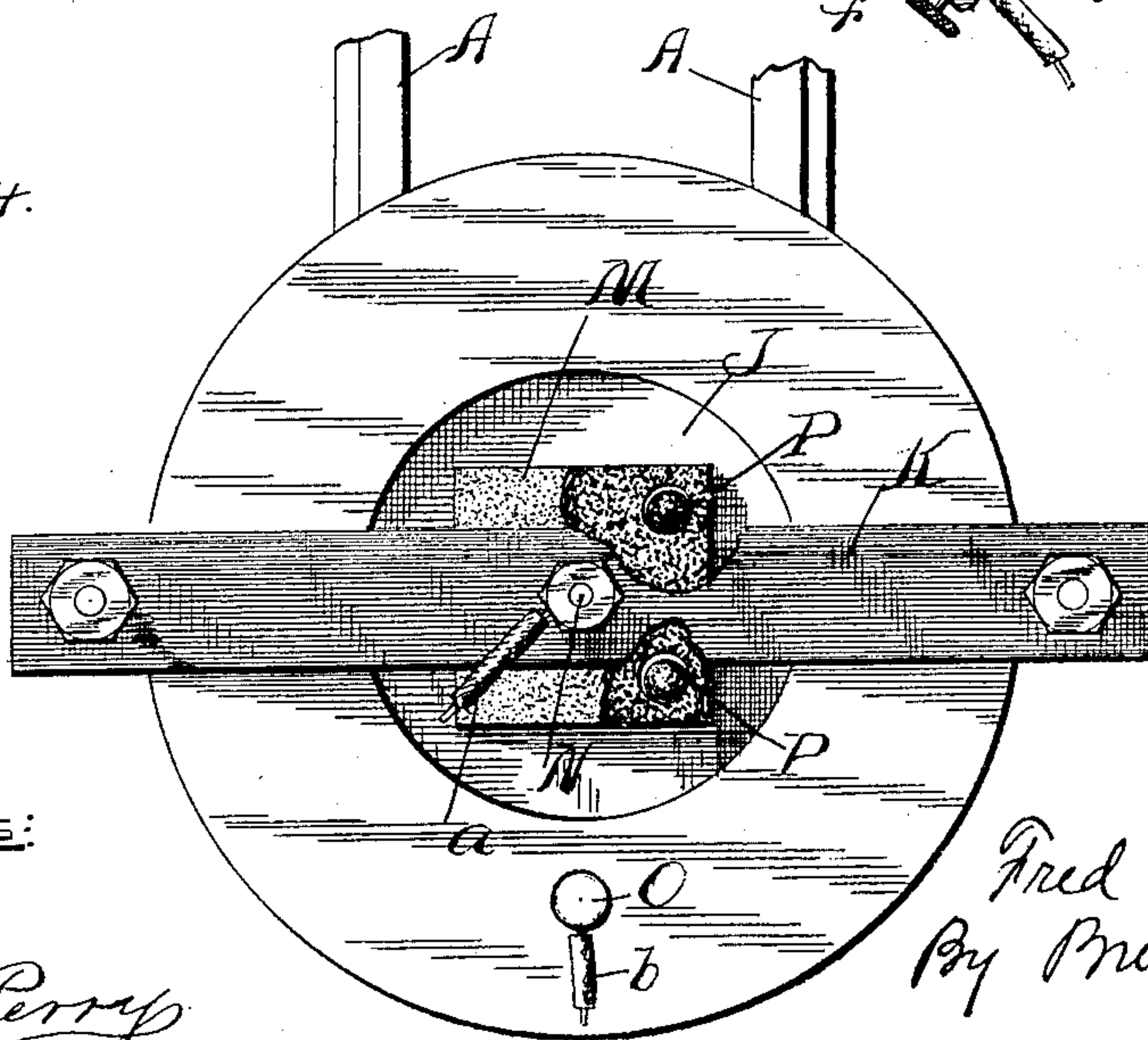


Fig. 4.



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FRED H. BROWN, OF OAK PARK, ILLINOIS.

TELEPHONIC RELAY.

SPECIFICATION forming part of Letters Patent No. 644,315, dated February 27, 1900.

Application filed November 27, 1899. Serial No. 738,251. (No model.)

To all whom it may concern:

Be it known that I, FRED H. BROWN, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Telephonic Relays, of which the following is a specification.

This invention relates to telephony.

The object of the invention is to provide a relay for telephones.

Other objects of the invention will appear more fully hereinafter.

The invention consists, substantially, in the construction, combination, location, and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings and to the various views and reference-signs appearing thereon, Figure 1 is a view illustrating the application of the principles of my invention to a telephonic relay. Fig. 2 is a view in side elevation of an apparatus constructed in accordance with the principles of my invention. Fig. 3 is a central longitudinal section of the same. Fig. 4 is a broken view in plan, parts being broken out, of the apparatus shown in Figs. 2 and 3. Fig. 5 is a view similar to Fig. 4, showing the diaphragm and carbon block removed.

The same part is designated by the same reference-sign wherever it occurs throughout the several views.

I will first describe the construction of the apparatus employed and will subsequently explain the application and use of such construction for the various purposes above indicated.

In the drawings reference-sign A designates a strong laminated magnet of the horse-shoe type, having the pole-pieces B C, upon which are wound spools D E, wound in series with each other with very fine wire, the terminals of which are suitably and conveniently connected—as, for instance, to the binding-posts F G. If desired and as shown, the pole-pieces B C and spools D E may be enclosed in a suitable casing H. Arranged over the pole-pieces B C is a diaphragm J, preferably of a large diameter, said diaphragm being suitably supported at its peripheral edge

in a suitable or any convenient manner. At suitable points and on opposite sides of the casing H are supported the ends of a suitable strip or block K, of insulating material—as, for instance, by means of rods L—said strip of insulating material arranged to extend transversely across the face of the diaphragm J. Carried by said insulating-strip and in coöperative relation with respect to the diaphragm is a block of carbon M or other suitable conducting material arranged to make electrical contact under suitable conditions, as will be more fully explained hereinafter, with the diaphragm. In the practical form shown, to which, however, the invention is not limited, said block M is supported upon the insulating-strip K by means of a rod or bolt N, which may also serve as a binding-post to receive a circuit-terminal, as will be more fully explained hereinafter. Suitably mounted at a convenient point upon the casing is a binding-post O in electrical communication with the diaphragm J.

A convenient arrangement is shown for securing a variable contact between the block M and the diaphragm J and which comprises a series of balls P or other suitable conducting material which are arranged to be received in seats formed in the face of the block M and to rest upon or bear against the diaphragm J. While I have found this construction efficient for practical use, I desire it to be understood that my invention is not limited in this respect, as any other form of variable contact may be employed for this purpose. I have also shown an efficient arrangement, which in practice I have found to be efficient, for maintaining contact between the diaphragm and the block M, but to which I do not desire to be limited or restricted, and wherein the diaphragm is arranged at an angle to the horizontal or in a normally-inclined position and the points of contact of the balls P therewith being normal to the plane of said diaphragm. By this arrangement the balls will constantly contact both with the diaphragm and the block M, thus maintaining efficient electrical connections between said block and diaphragm.

Associated with the apparatus above described in the operation thereof is an induction-coil R, the primary circuit of which in-

cludes a battery, (indicated at S,) one terminal of said battery being connected through wire *a* and binding-post or screw N to block M. The other terminal of said battery is connected through the primary winding of the induction-coil R and wire *b* to binding-post O, which is in electrical contact with diaphragm J. By this arrangement the circuit, which includes the battery S and the primary winding of the induction-coil, is closed by means of the contact between the diaphragm and the block M. Therefore any vibration imparted to the diaphragm operating through the variable contact maintained between said diaphragm and block M varies the current flowing through the primary winding of the induction-coil, and hence varies the potential in the secondary circuit of said induction-coil. I make use of this current in the practical application of my invention as a relay in a telephonic apparatus, and I will now describe the application thereof to such purpose.

In Fig. 1 I have shown the principles of my invention applied in the operation of a telephonic relay, whereby at any convenient point in the telephone-circuit intermediate terminal stations an auxiliary line may be put in operation to transmit the message to some one or more other terminal stations. For instance, A' B' may represent terminal stations at a distance from each other, connected through line-wire *g g'* and return through ground or metallic circuit in the usual well-known manner. At such one or more points intermediate the terminal stations A' B' an apparatus constructed in accordance with the principles of my invention may be interposed in said line-circuit, the wire *g* being connected to binding-post G, thence extending through spools E and D to binding-post F and line-wire *g'* to the station B'. The diaphragm J is connected up in circuit with a battery S and the primary of induction-coil R in the same manner as that above described. The terminals of the secondary of said induction-coil may be sent to any other point or points and may be the circuit for receiving instruments, as indicated at C'. Suppose the stations A' and B' are respectively at New York and Omaha and the relay apparatus is imposed in the line-circuit connecting these stations at Chicago, for instance. Then the auxiliary circuit *h h'*, which includes the secondary of the induction-coil, may extend to Cincinnati, to St. Louis, or to any other convenient and suitable point, thus reproducing in the receiving instrument at such point or points and in synchronism with the initial transmitting instrument the vibrations due to the sound-waves of the voice acting upon the diaphragm in the transmitting instrument. It is obvious that a similar relay may be interposed at any one or more points in the circuit *h h'*, thus again transmitting the electrical impulses and reproducing the vibrations of the transmitting-diaphragm at any other point or points, as may be desired,

all the receiving instruments throughout the system operating to reproduce the vibrations of the diaphragm of the transmitting instrument.

It is evident that one or more relays, as above explained, may all be employed in the same system, and as many as may be desired to effect the objects in view. It is also obvious that a telephone-apparatus receiver or transmitter, or both, may be interposed between the initial transmitting instrument and the relay or between such relay and the other distant terminal or in the auxiliary circuit or circuits, which include the secondary of the induction-coil.

Having now set forth the object and nature of my invention and an apparatus embodying the principles thereof and having described such construction, its function, and mode of operation and the application thereof to various purposes and results, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. In a telephonic apparatus, a main-line circuit connecting two distant stations, an independent or local circuit including a generator, means arranged in the main-line circuit for varying the resistance of said local circuit, an auxiliary circuit connected to a third station and means operated by the variations in the resistance of the local circuit for reproducing the impulses of the main line in said auxiliary circuit, as and for the purpose set forth.

2. In a telephonic apparatus, a main-line circuit connecting two distant stations, an independent or local circuit including a generator, a magnet, a coil encircling the pole-piece of said magnet, said coil included in circuit with the main line, a diaphragm arranged to vibrate under the influence of said magnet-coil, said diaphragm included in said local generator-circuit, means actuated by the vibrations of said diaphragm for varying the resistance of said local circuit, an auxiliary circuit connected to a third station and means operated by the variations in resistance of the local circuit for reproducing the impulses of the main line in said auxiliary circuit, as and for the purpose set forth.

3. In a telephonic apparatus, a main-line circuit connecting two distant stations, a horseshoe-magnet, coils arranged upon each at the poles of said magnet, said coils being in series with each other and with said line, an independent local circuit, including a generator, means arranged to be actuated by said magnet-poles for varying the resistance in said local circuit, an auxiliary circuit connecting a third station and means operated by the variations of the resistance in the local circuit for reproducing the impulses of the main line in said auxiliary circuit, as and for the purpose set forth.

4. In a telephonic apparatus, a main-line circuit connecting two distant stations, a horseshoe-magnet, coils for each of the poles

of said magnet said coils included in series with each other and with said line-circuit, an independent local circuit including a generator, a diaphragm and a variable contact actuated thereby, and arranged in said local circuit, said diaphragm supported over to be vibrated by said magnet-poles, whereby the resistance of the local circuit is varied synchronously with the impulses of the main line, an auxiliary circuit connecting a third station, and means actuated by the variations of resistance in the local circuit for reproducing the main-line impulses in said auxiliary circuit, as and for the purpose set forth.

5. In a telephonic apparatus, a main-line circuit connecting two distant stations, a magnet having a pole-piece, a coil for said pole-piece said coil included in circuit with the main line, a local circuit including a generator, a diaphragm included in said local circuit, said diaphragm arranged in inclined position relative to the horizontal, and to be vibrated by said magnet-pole, carbon balls resting upon said inclined diaphragm for completing the said local circuit, whereby when said diaphragm is vibrated the resistance of the local circuit is varied, an auxiliary circuit connecting a third station, and means actuated by the variations in resistance of the local circuit for reproducing the impulses of the main line in said auxiliary circuit, as and for the purpose set forth.

6. In a telephonic apparatus a main-line circuit connecting two distant stations, a telephone receiving instrument and a telephone transmitting instrument, a single diaphragm common to both instruments, said receiving instrument arranged in the main-line circuit, a local circuit including a generator, said transmitting instrument arranged in said local circuit, an induction-coil having its primary also arranged in said local circuit, and its secondary arranged to connect a third station whereby the impulses in said main-line circuit are reproduced in the circuit of said secondary, as and for the purpose set forth.

7. In a telephonic apparatus, a main-line circuit connecting two distant stations, a telephone-receiver and a telephone-transmitter, a diaphragm common to both receiver and transmitter, said diaphragm being arranged in inclined position relative to the horizontal, said receiver arranged in said main-line circuit, a local circuit including a generator, the variable contact of said transmitter resting upon said diaphragm and included in said local circuit, an induction-coil having its primary included in said local circuit and its secondary connecting a third receiving-station, as and for the purpose set forth.

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Witnesses:

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