

(No Model.)

J. M. STEARNS, Jr.
VARIABLE ELECTRIC RESISTANCE.

No. 362,859.

Patented May 10, 1887.

FIG. 1.

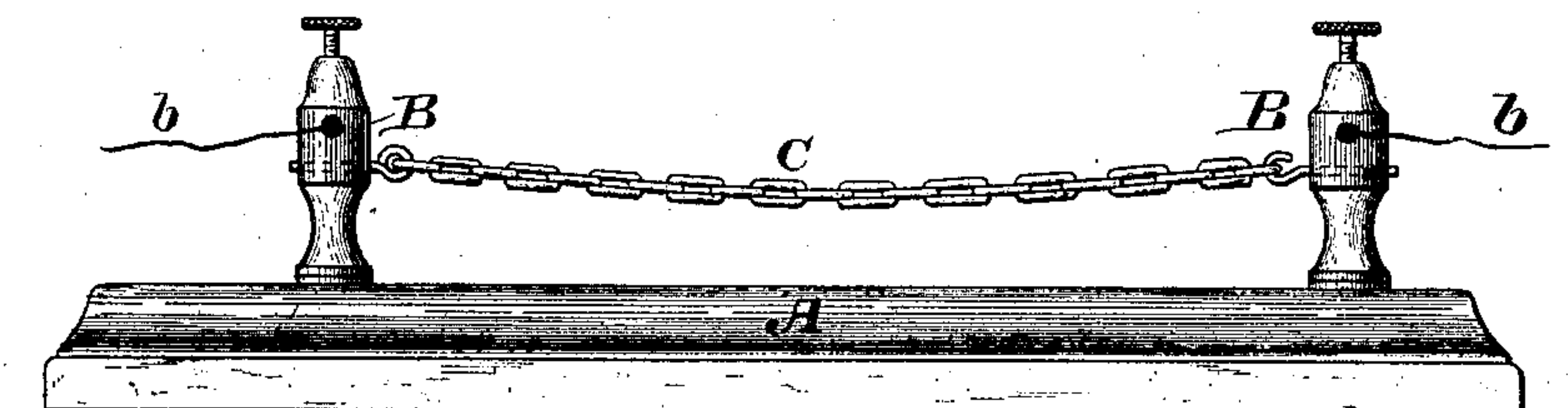


FIG. 2.

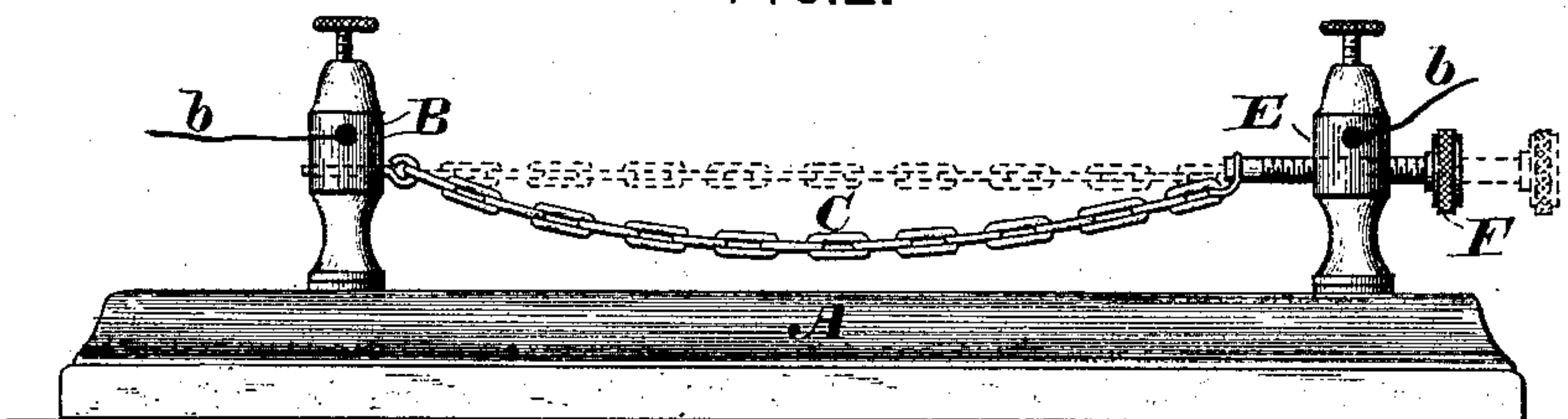
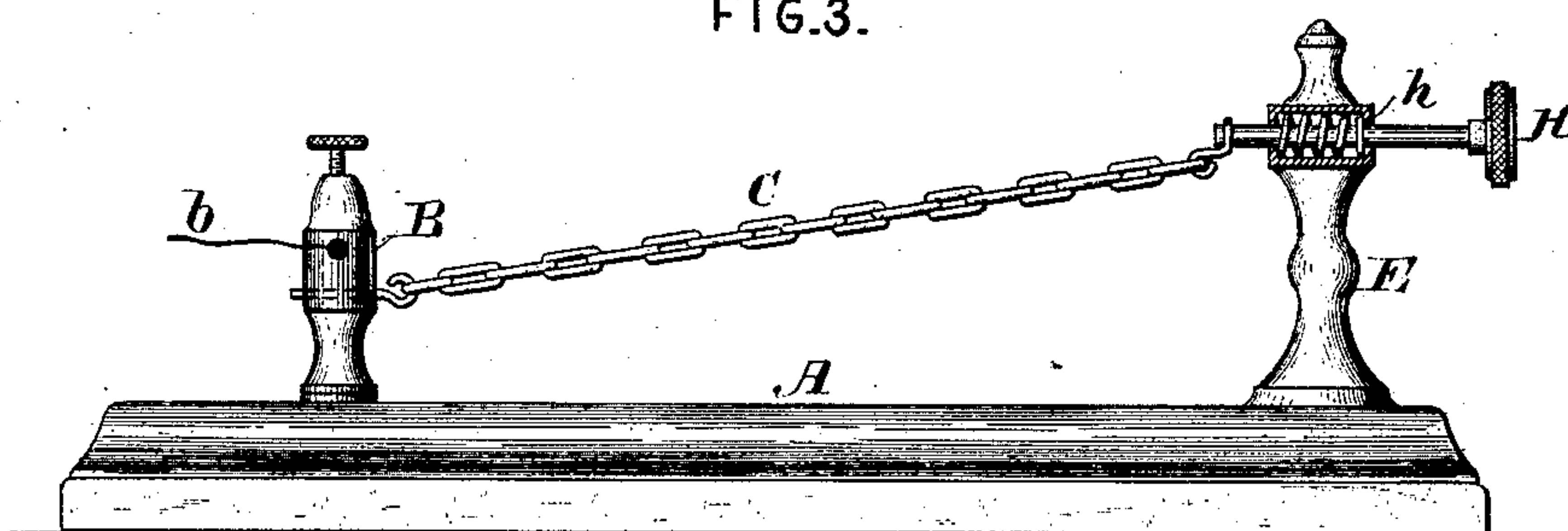


FIG. 3.



ATTEST.

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VARIABLE ELECTRIC RESISTANCE.

SPECIFICATION forming part of Letters Patent No. 362,859, dated May 10, 1887.

Application filed November 27, 1885. Serial No: 184,122. (No model.)

To all whom it may concern:

Be it known that I, J. MILTON STEARNS, Jr., a citizen of the United States, residing in Brooklyn, county of Kings, State of New York, have invented certain new and useful Improvements in Applied Electric Resistance, applicable to all descriptions of machinery and apparatus operated by electricity, including instruments for measuring or governing and controlling electric currents and the electric light; and I do hereby declare that the following is a full, clear, and exact description, which will enable others skilled in the art to make and use the same.

Heretofore applied electric resistance has been used in various forms in instruments for electrical measurements in telegraph and telephone instruments and in electric lighting, to render uniform the movements of the mechanism of the lamps or regulators and to make the current steady.

The applied resistances used in the various devices have been continuous conductors—such as coils of wire or compressed cushions of wire, resisting in one case according to the length of the coil and in the other according to the length of the free portion, surface contact-plates, liquids, powdered semi-conductors, or the air interposed between contact-points.

In order to afford a clear understanding of this invention, it is proper to note that the materials or devices employed as resistance in electrical apparatus in most cases offer less resistance when compressed. Especially is this true when such materials or devices are elastic either in their nature or their form. As an example I will cite conducting material in powdered form and wire cushions. In another class, above referred to as contact-points of telegraphic relays, the apparatus is operated by suddenly increasing the resistance to electric conduction by the interposition of a non-conductor between the points—in this case atmospheric air.

The object of my invention is to provide a substitute for these various heretofore-employed resistances in the various instruments before mentioned.

My improved applied electrical resistance consists of a chain of conducting material formed in connecting-links in the usual manner. Conducting material thus arranged in chain form has the peculiarity of presenting a very high electric resistance when slack and a very low electric resistance when taut or stretched, and also presents a specific resistance according to the tension applied to stretch it. A chain further presents the additional advantage of passing from a state of very high resistance to the conduction of an electric current to a very low resistance by very minute or small changes in its tension.

To give effect to this invention, some device must be used to increase or diminish the tension of the chain, and this may be done in any convenient manner. The means used will vary according to the application which is made of it as resistance. This change may be effected by a screw attached to one end, a spring, or automatically by the instrument in which it is used and without human intervention. In the drawings I have shown two methods of adjusting the tension of the chain, and it is obvious that numerous other methods can be readily devised.

In the drawings, Figure 1 is a view of my improved resistance, a simple chain attached to two binding-posts, to which electric conducting-wires can be attached. Fig. 2 shows a view of the chain with a screw to tighten it, the dotted line indicating its most tense position or condition of greatest conductivity. Fig. 3 is a view of a device whereby the chain is always in a condition of good conduction, being kept under tension by a spiral spring, *h*.

In this case greater resistance can be thrown into the circuit by pressing against the thumb-piece *H*. When the hand is removed, the chain will again become a good conductor and offer its least resistance to the electric current.

A is the ordinary instrument-base; *B*, binding-posts; *C*, the chain, which forms the subject of this invention; *b b*, conducting-wires; *E*, binding-posts, provided with holes for adjusting devices; *F*, ordinary thumb-

screw; H, spring-adjusting rod controlled by spring h.

Having now fully described my invention, what I claim, and desire to secure by Letters
5 Patent, is—

As a variable-electrical-resistance device, a chain in combination with an adjusting-screw

or similar device for increasing or diminishing its tension, and consequently its electric conductivity, substantially as set forth.

J. MILTON STEARNS, JR.

Witnesses:

WILLIAM H. CLEVELAND,
WM. H. BRYAN.