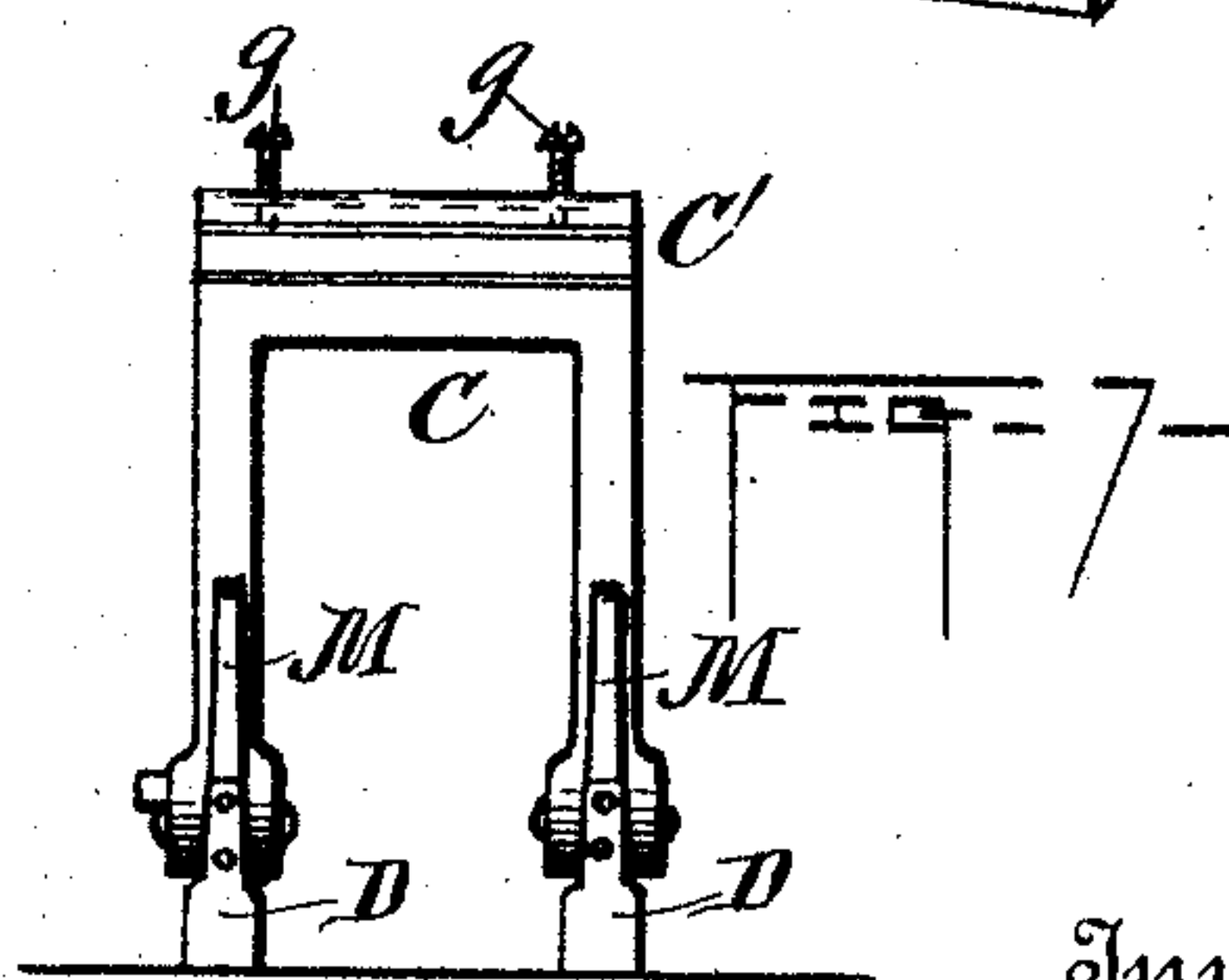
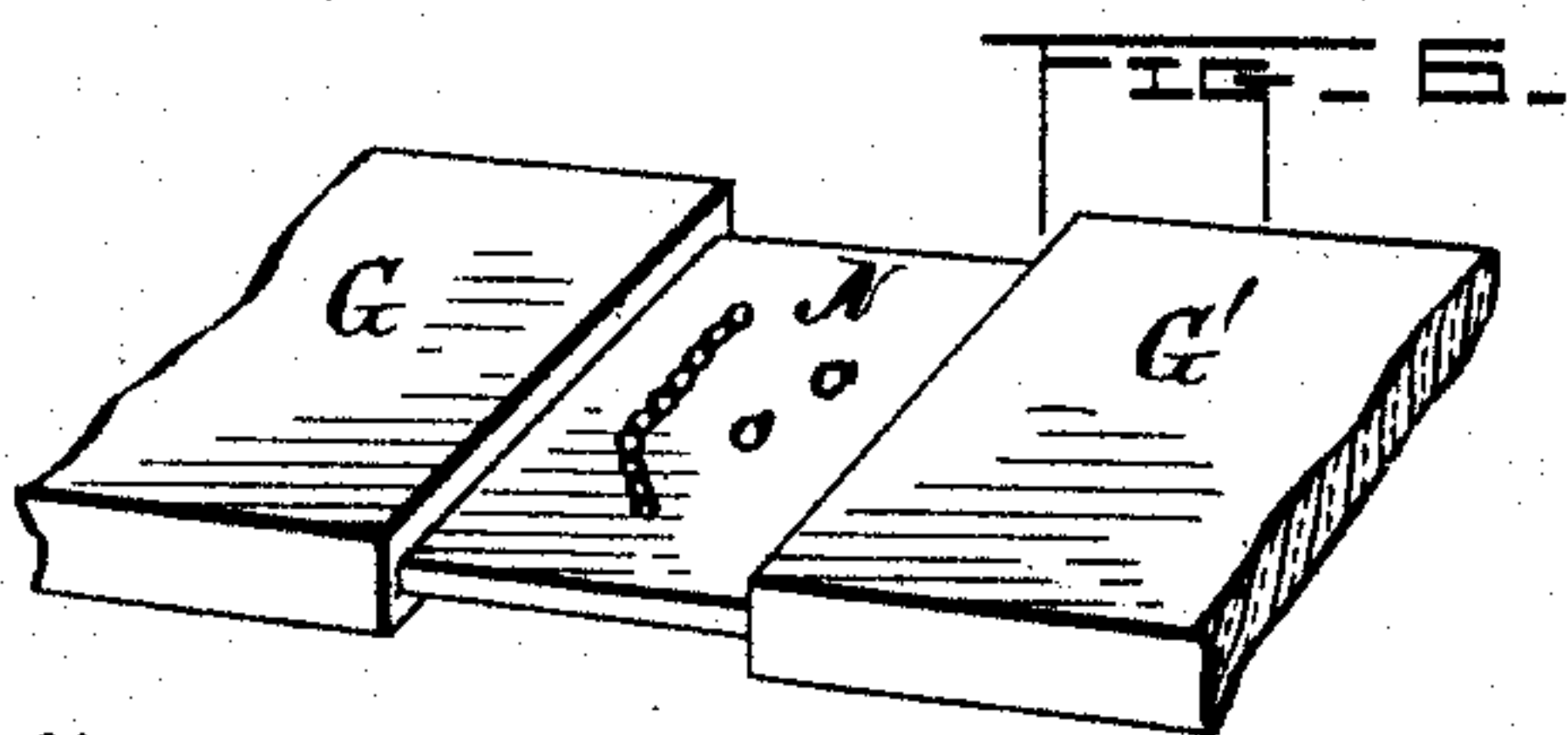
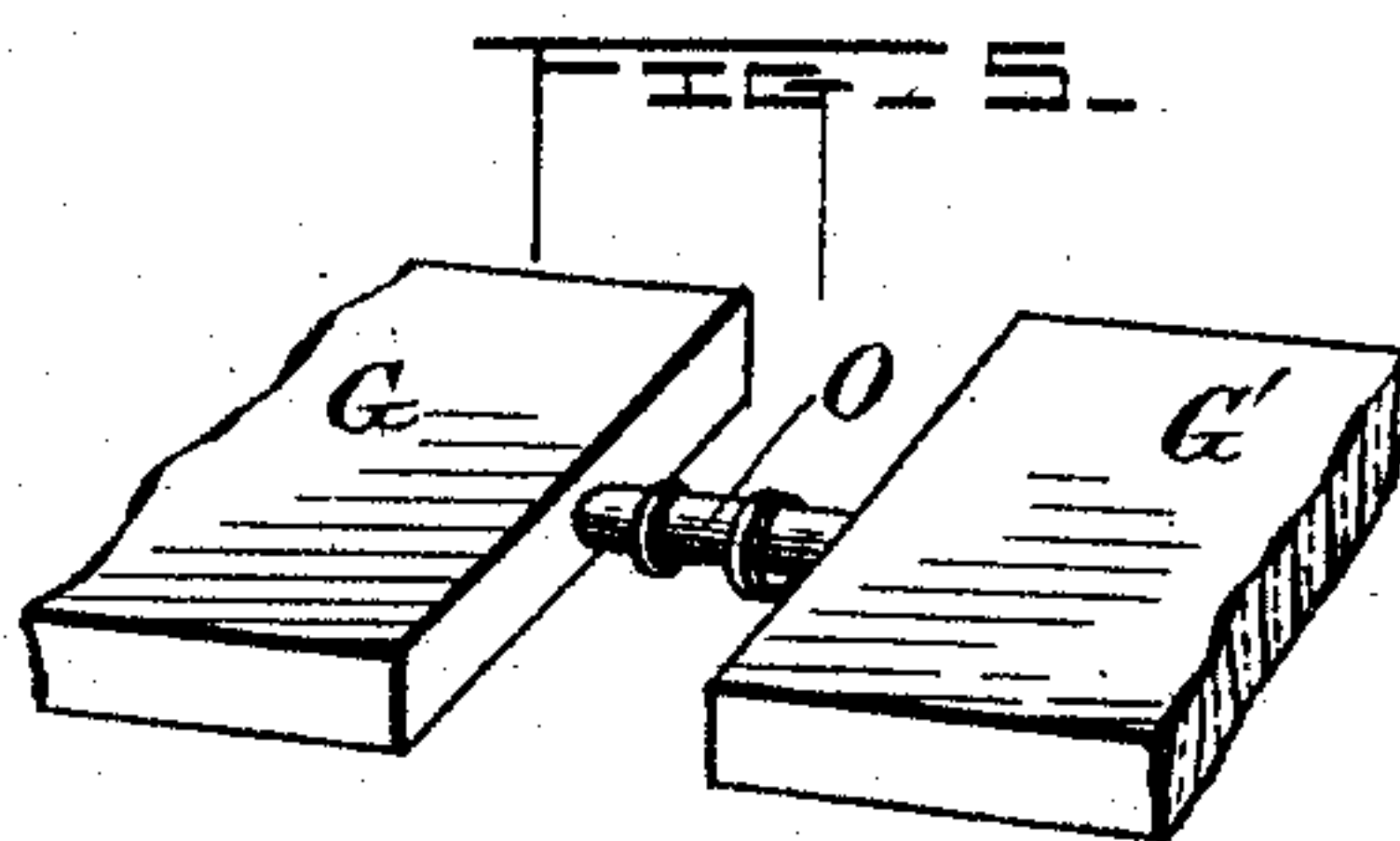
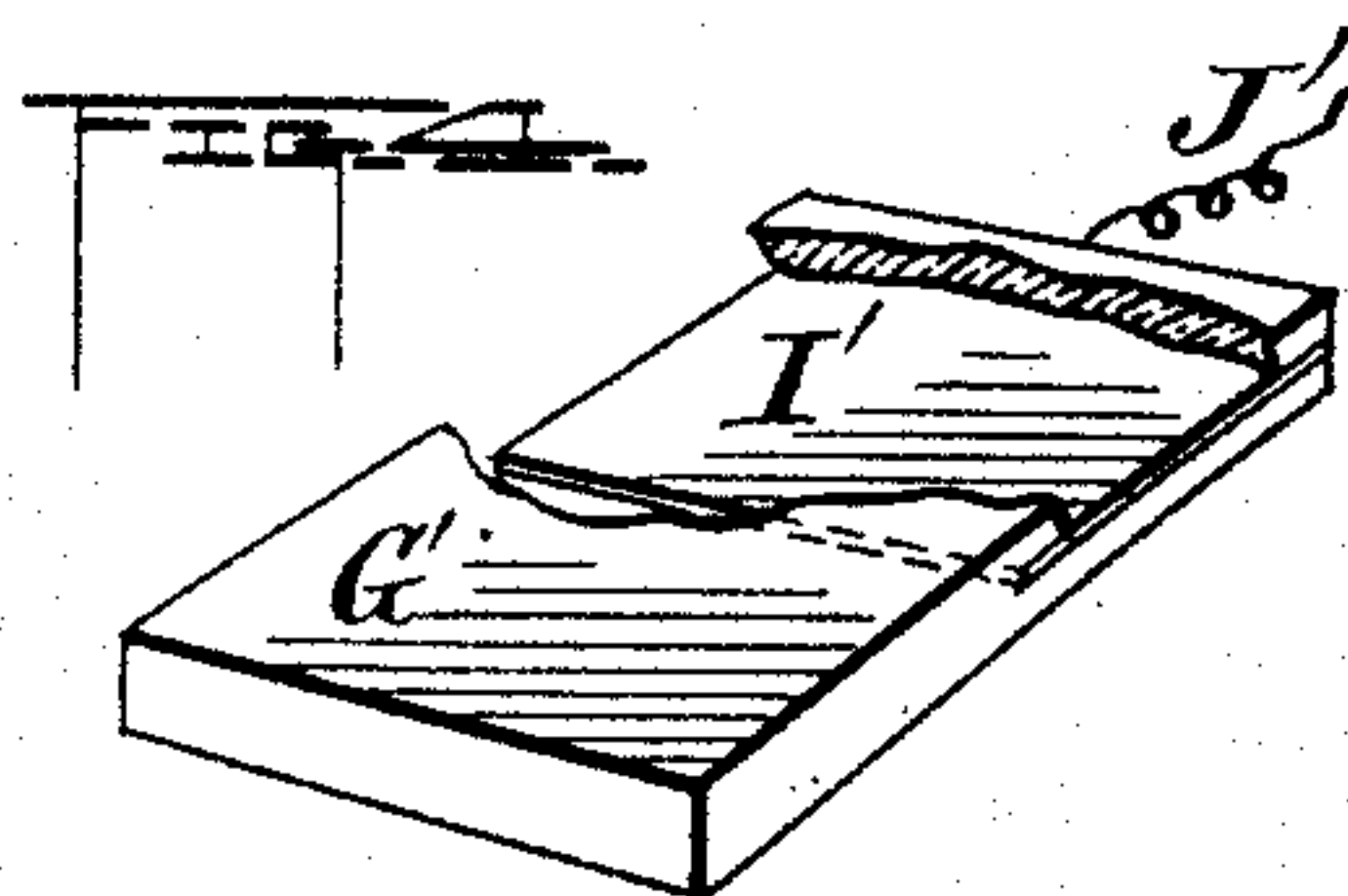
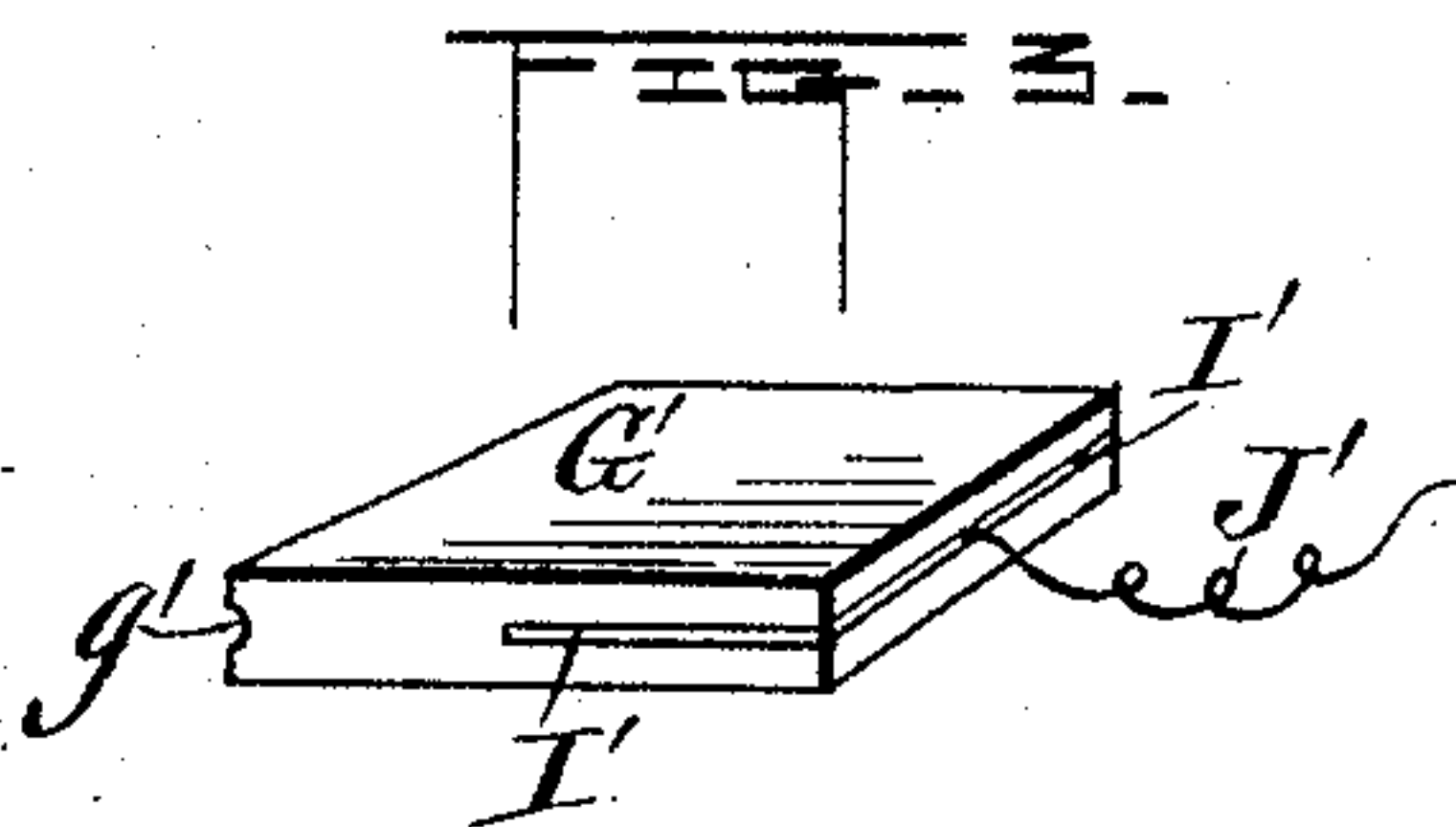
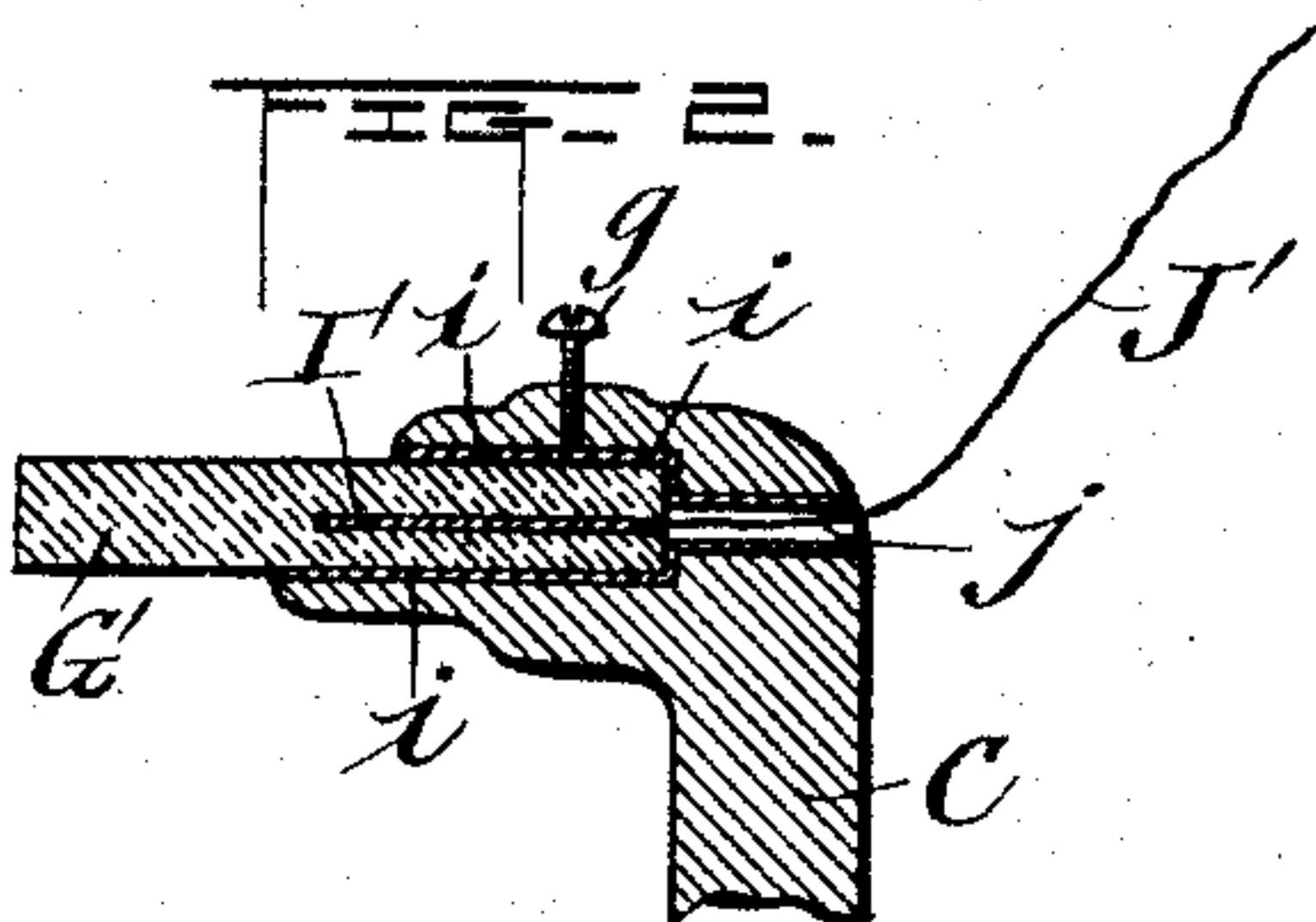
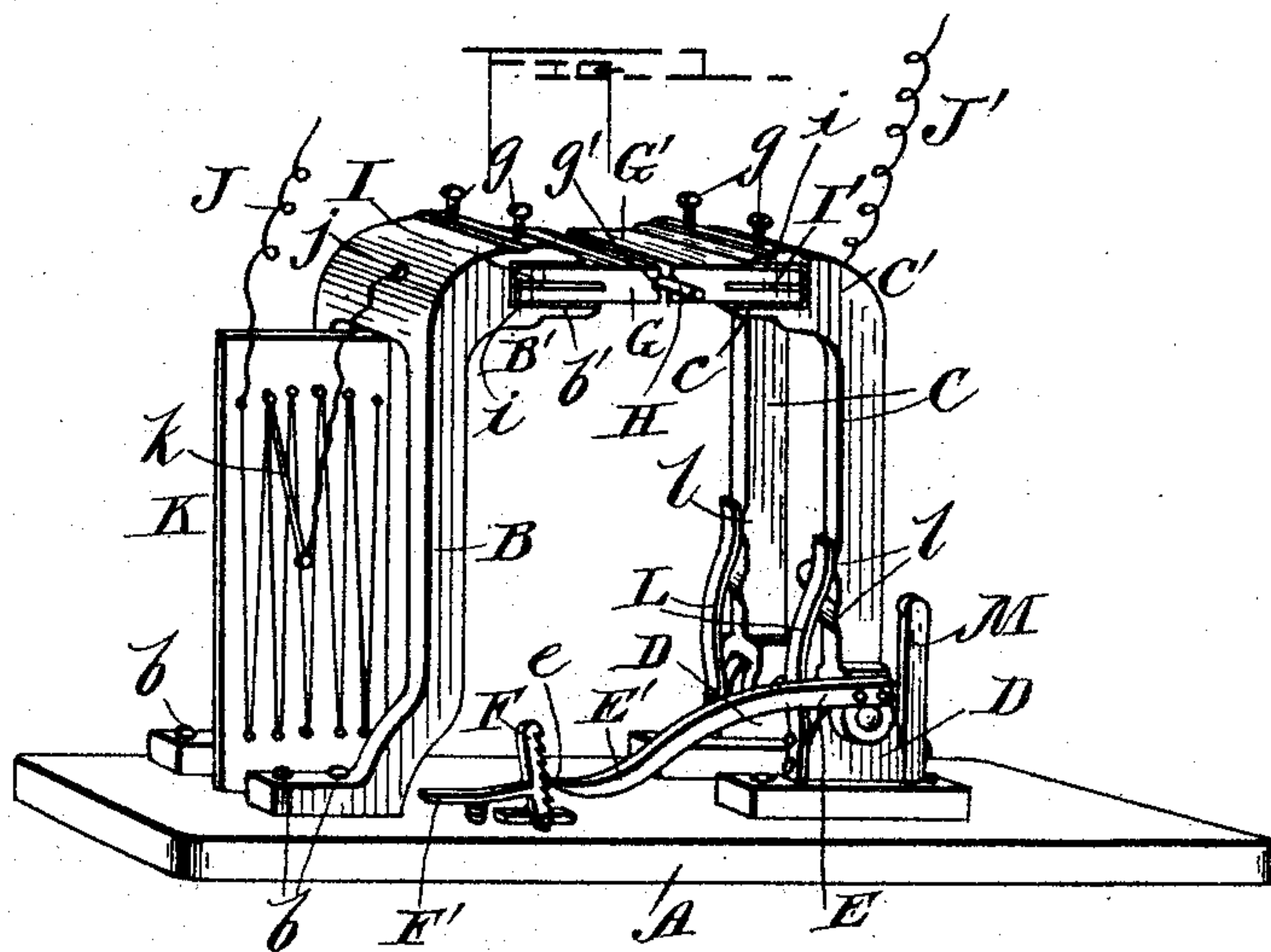


(No. Model.)

W. MITCHELL.  
ELECTRIC METAL HEATING DEVICE.

No. 491,437.

Patented Feb. 7, 1893.



Witnesses  
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Inventor  
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# UNITED STATES PATENT OFFICE.

WILLIS MITCHELL, OF MALDEN, ASSIGNOR TO THE AMERICAN ELECTRIC HEATING COMPANY, OF BOSTON, MASSACHUSETTS.

## ELECTRIC METAL-HEATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 491,437, dated February 7, 1893.

Application filed June 16, 1892. Serial No. 436,972. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIS MITCHELL, a citizen of the United States, residing at Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Electric Metal-Working Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to electric metal-working devices in which a heating current of electricity passes between two jaws carrying electrodes or terminals one of the said jaws being movable toward and from the other.

The said invention consists in the construction and combination of parts hereinafter more particularly set forth and claimed.

In the accompanying drawings Figure 1 represents a perspective view of a machine embodying my invention; Fig. 2 represents a vertical section on an enlarged scale of a part of one of the vertical jaws or supports and its carbon plate or block; Fig. 3 a detail perspective view of one of the carbon plates; Fig. 4 a perspective view of the same partly broken away to expose the copper plate within; Figs. 5 and 6 represent detail views of modifications and Fig. 7 represents a rear elevation of the movable jaw.

A designates the base-plate of the machine B a fixed rigid preferably metallic support fastened thereon by bolts *b*, and C a similarly formed movable support consisting of a frame pivoted at its lower ends to brackets D which are bolted on the said base-plate. Springs L fastened to the said brackets bear against swells *l* on the front or inner face of the said movable support and resist its tendency to close, also serving to return it to a more outward position when the said support is released. Braces M, also attached to the said brackets and arranged behind or outside of the said movable support, prevent the latter from turning outward too far on its pivot. An arm E attached to the lower part of the said support C extends forward or inward and is bent downward and then hori-

zontally to form a foot-rest E' at convenient height. The end of this foot-rest forms a tooth *e* which engages any one of the teeth of an upwardly inclined ratchet-bar F, which is arranged to lock the said movable support in any one of divers degrees of inward inclination. This ratchet bar is pivoted to the bed, plate and has a tail or small foot-rest F' rigid therewith and approximately horizontal that receives the upward pressure of a spring *f* to hold the said tooth and rack in such engagement.

The upper ends of the supports B and C are bent inward toward each other to form broad jaws B' and C', which are constructed with broad flat recesses *b'* and *c'*, to receive correspondingly shaped plates or blocks G G' of carbon, one to each jaw. These are held in place by set screws *g*, working down through the top of the said jaws; and protrude from the inner faces of the latter to hold between them the rod H or other article to be operated on. The proximate faces or ends of these carbon plates are correspondingly grooved at *g'*, to receive the said rod or other article. In each of these plates or blocks at the outer part of the same a copper plate I or I' is embedded to which a wire J or J' is attached forming part of an electric circuit. The force of the current is regulated by a rheostat or variable resistance K conventionally indicated rather than fully shown behind support B. This has a switch arm *k* by shifting which on its pivot the resistance of the circuit is increased or lessened at will. In the present instance this resistance is introduced into the wire J, but any other part of the circuit would do instead. These carbon plates may receive between them a rod O of plumbago or ordinary electric-lamp carbon or other suitable material arranged endwise as shown in Fig. 5 on which rings have previously been hung for jeweler's work or any other ring-soldering welding or burnishing in which heat may be employed. Or a flat plate N as in Fig. 6 may thus be employed holding articles which are to be brazed welded or melted. These devices are substituted for the metal rod H before mentioned, and will be found especially



convenient when small articles are to be acted on which the said grooved carbon plates would not readily hold between them. The wires J J' reach the said copper plates I I' through openings or passages *j* in the said jaws. The said wires are insulated by coating or painting or otherwise and the carbon plates or blocks G G' are insulated by linings *i* which fit the walls of recesses *b c*. The copper plates I I' make a better electric communication between the wires and the carbon plates and leave the chief resistance of the carbon in the inner metal-holding parts of the said plates G G' where the heat is required.

To operate this machine the article to be acted on is placed in the groove *g'* of the carbon plate or block G of the fixed jaw B'. The foot-rest E' is then forced down to rock the support C and its jaw C' inward until the carbon plate or block G' held in the said jaw clamps the said article against the said fixed carbon plate, and the tooth *e* engages the ratchet bar F, locking the said parts in this position. The electric circuit being closed, the current passes from one carbon plate to the other, the resistance offered by the said plates evolving sufficient heat for the purposes designed. This heat of course will be regulated by the rheostat aforesaid. When the work is done the rack-bar F is tilted back out of engagement and against the resistance of its spring and the springs L throw the support C back against braces M, breaking the circuit by the separation of the carbon plate I' from the carbon plate I and the rod H or other interposed article or means of support. At the same time the said rod or article is removed.

Instead of carbon, other resisting material may be employed for the plates G G' and other metals beside copper may be used for the plates I I'. But these are best as described.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination with a fixed support and a resistance secured thereto a pivoted support a resistance secured to it, a spring or springs bearing against the said pivoted support to force it away from the fixed support, conductors completing the circuit through said resistances and a locking device for holding the said movable support in its nearest position to the said fixed support substantially as set forth.

2. In combination with a fixed support and a resistance attached thereto, a pivoted support, a resistance secured to it, a spring or springs being against the said movable support to force it away from the said fixed support, a brace or braces M raised behind the said pivoted support to limit its outward motion and support it when moved into contact

therewith and electrical connections completing the circuit through the said resistances substantially as set forth.

3. In combination with a fixed support and a resistance secured thereto, a pivoted support having swells *l* formed on its inner face a spring L bearing against the said swells, a resistance secured to the said pivoted support and electrical connections completing the circuit through the said resistances substantially as set forth.

4. In combination with a fixed support and a resistance secured thereto, a pivoted support a spring bearing against the latter to force it away from said fixed support, an arm attached to the said pivoted support, a rack engaging the said arm but movable away therefrom, a resistance carried by the said pivoted support, and electrical connections completing the circuit through the said resistances substantially as set forth.

5. In combination with a fixed support and a resistance block or plate secured thereto, a pivoted support, a resistance plate or block secured to the latter, an arm extending from the said pivoted support and having a footrest and tooth formed thereon, a ratchet bar arranged to engage the said tooth for locking the said resistance plates together, electric conductors making circuit through the said plates and means for permitting the disengagement of the said tooth and ratchet bar when the said plates are to be separated.

6. In combination with a fixed support and a resistance plate secured thereto, a pivoted support, a resistance plate secured to the latter, an arm extending from the said pivoted support and provided with a foot-rest and a tooth, a pivoted spring-pressed ratchet-bar arranged to engage the said tooth for locking the said pivoted support in position to clamp an article between the resistance plates and electric conductors making circuit through the said resistance plates, substantially as set forth.

7. In combination with a fixed support B having a jaw B' formed on it and provided with a recess *b*, a pivoted support C having a jaw C' formed therewith and provided with a recess *c*, electrically insulating linings for the said recesses, resistance plates or blocks fitted into the said recesses, electric conductors making circuit through the said resistance plates or blocks and means for locking the said plates or blocks together on an intervening article substantially as set forth.

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

WILLIS MITCHELL.

Witnesses:

A. F. SARGENT,

A. F. SARGENT, Jr.