

(No Model.)

F. W. HOEFER.
DOOR SPRING.

No. 409,587.

Patented Aug. 20, 1889.

Fig.1.

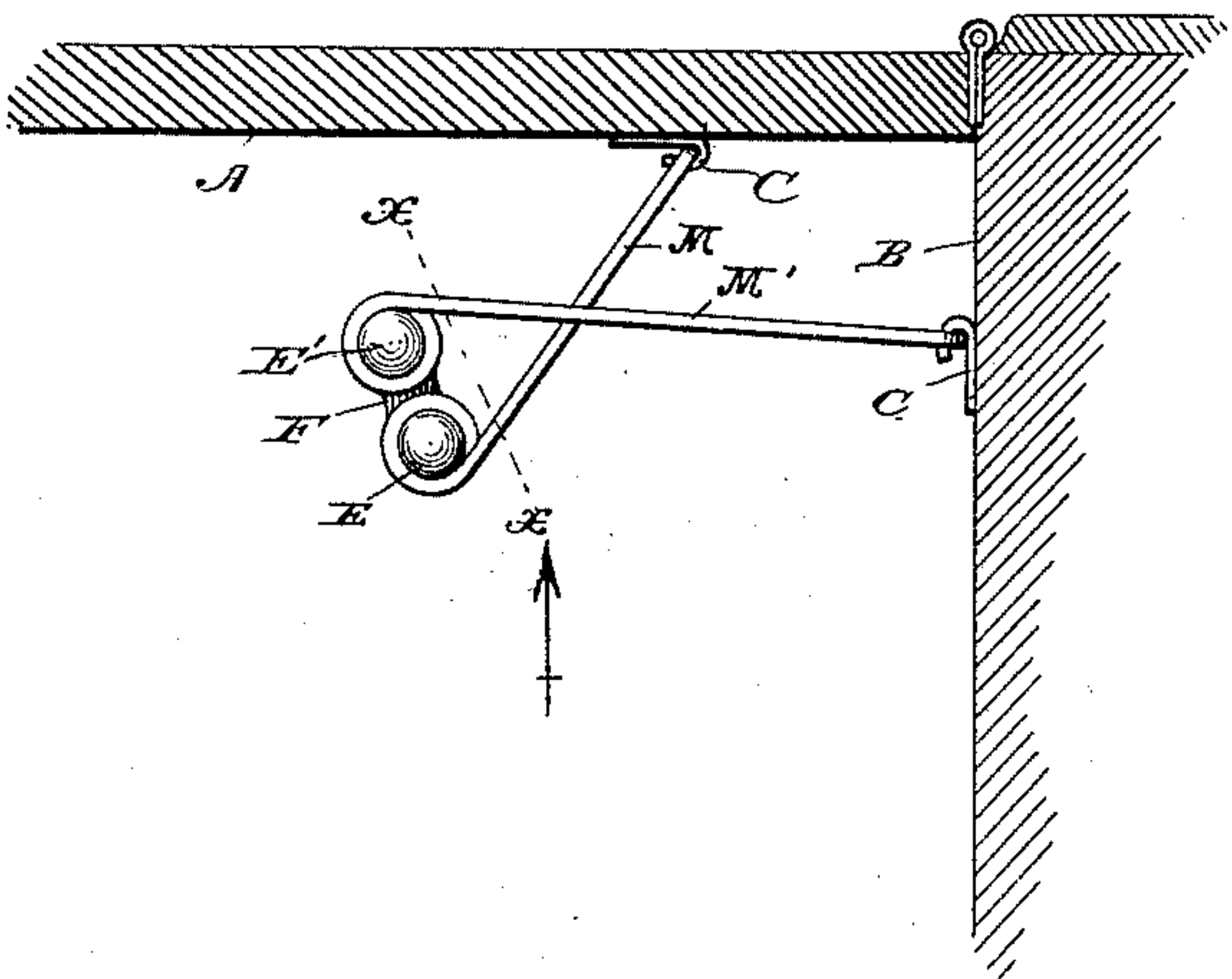


Fig. 2.

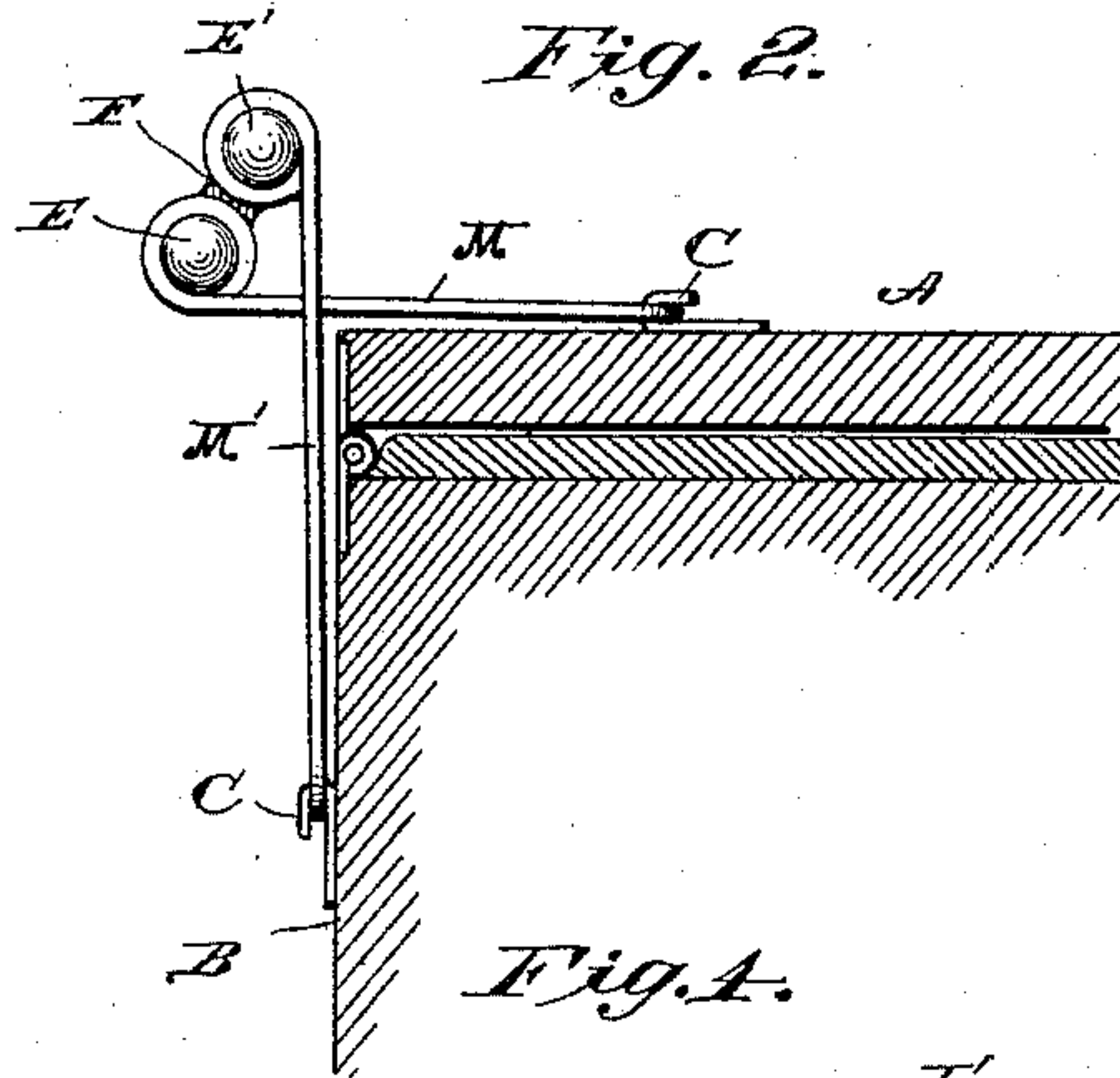


Fig. 3.

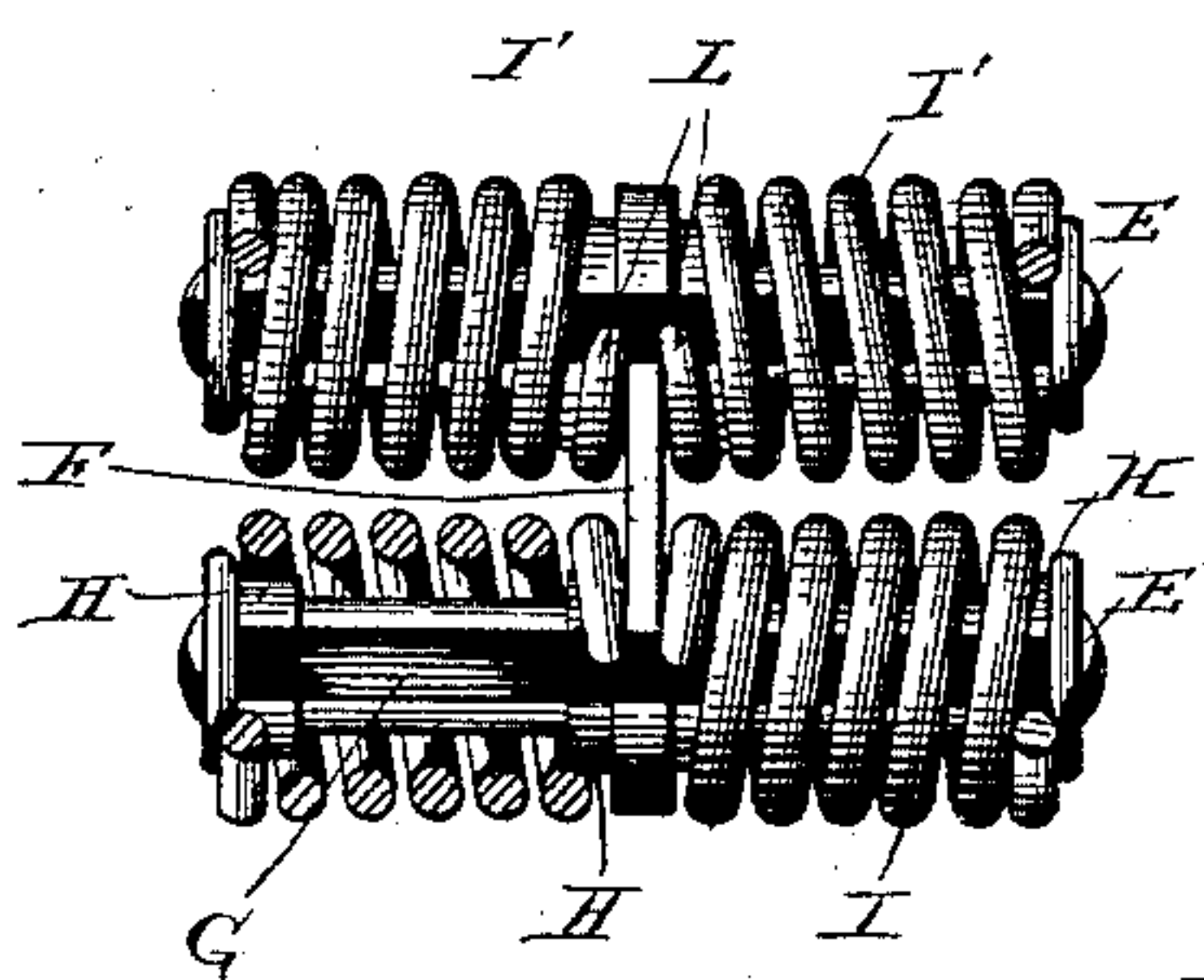


Fig. 5.

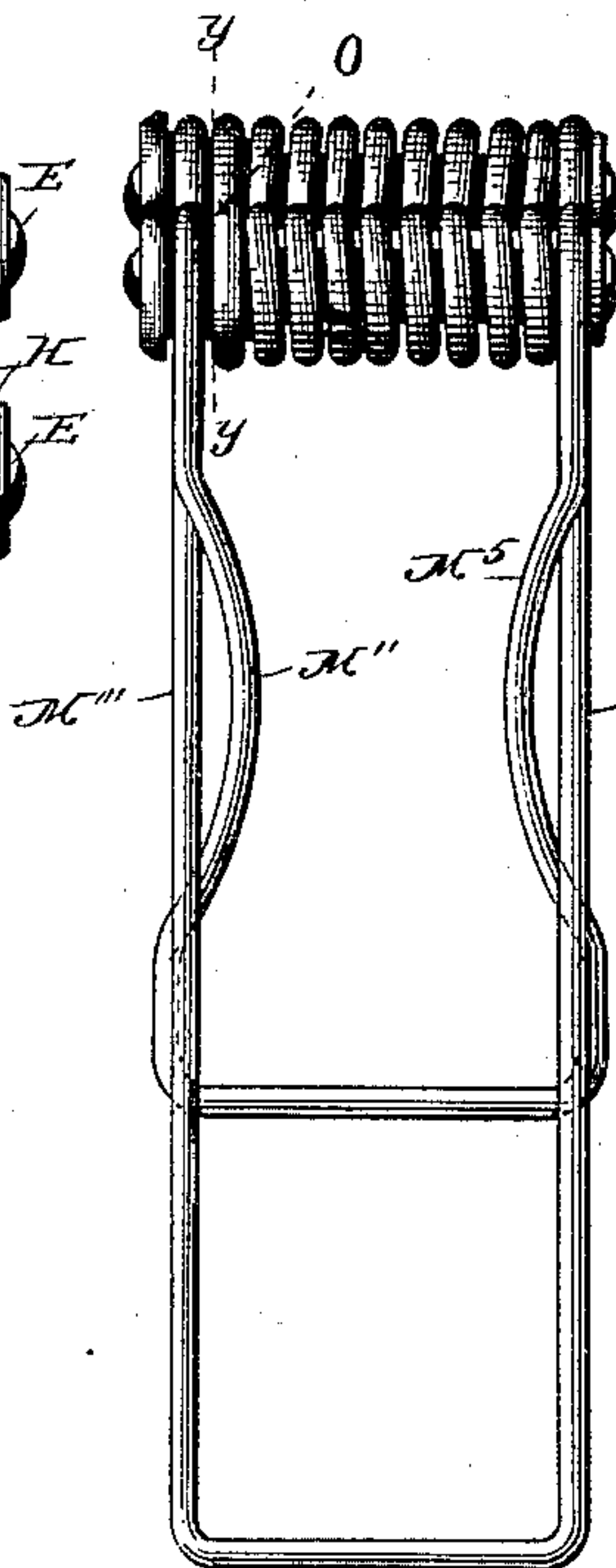


Fig. A.

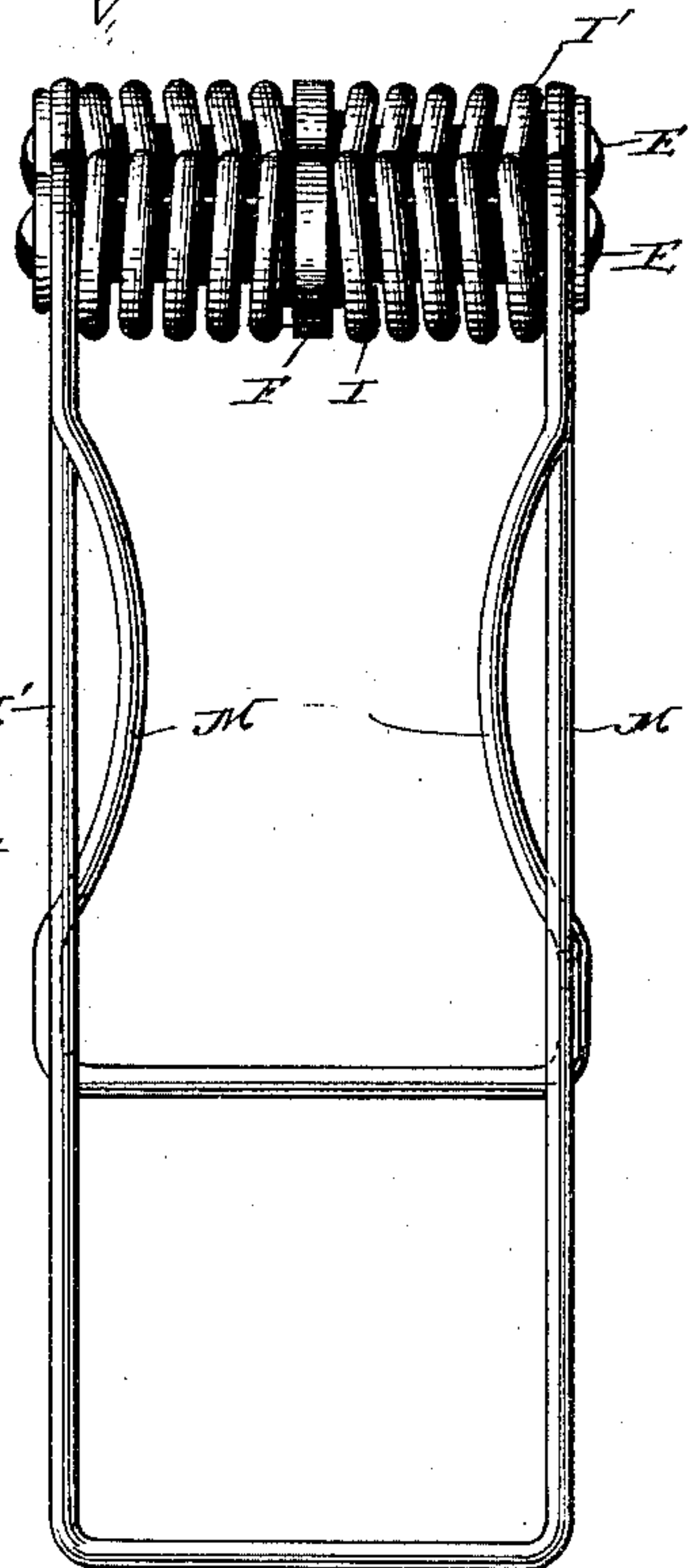
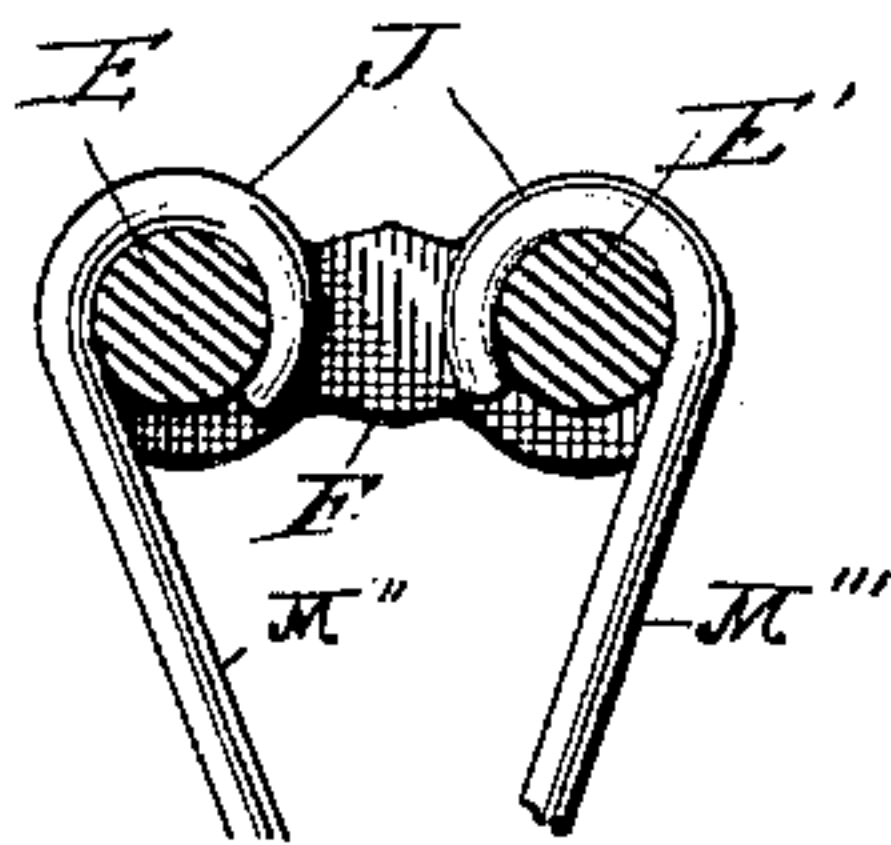


Fig. 6.



Witnesses

Witnesses:
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By his Attorneys

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UNITED STATES PATENT OFFICE.

FREDERICK W. HOEFER, OF FREEPORT, ILLINOIS, ASSIGNOR TO THE WARNER MANUFACTURING COMPANY, OF SAME PLACE.

DOOR-SPRING.

SPECIFICATION forming part of Letters Patent No. 409,587, dated August 20, 1889.

Application filed May 7, 1889. Serial No. 309,876. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. HOEFER, a resident of Freeport, in the county of Stephenson and State of Illinois, have invented certain new and useful Improvements in Door-Springs; 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 pertains to make and use the same.

My invention relates to improvements in door-springs of the class in which the action is reversed as the door, in its opening, passes a certain point, so that when the door is forced open beyond a certain point it is held open by the same spring that normally tends to close it.

In the accompanying drawings, Figure 1 shows the spring from above in operative position upon a closed door. Fig. 2 is a similar view, the door being opened one hundred and eighty degrees. Fig. 3 is a section on the line $x x$, looking toward the spring-coils. Fig. 4 shows the spring seen in the direction of the arrow of Fig. 1. Fig. 5 is a like view of a modified form. Fig. 6 is a section on the line $y y$, Fig. 5, looking to the left.

In the drawings, A and B are respectively a part of a door and of a jamb or casing to which it is hinged. Upon each of these is fixed a hook C, to be engaged by the arms of the spring, which is compound and consists of four coils I I', mounted upon the four free ends of two cores E E', which are united at the middle by an integrally-formed web F. Each of the four coils is wound oppositely to the coils either laterally or vertically adjacent, and each pair of coils upon the same core is formed from the ends of single wire, the uncoiled middle portion of which is bent into a loop, whose end engages one of the hooks C, and whose sides or branches M M' are the spring-arms. Each end spiral of each coil is supported by an enlargement H upon the core, and the free ends of all the coils are bent inward into engagement with lateral slots G in the cores. The four coils are first formed and then slipped over the ends of the cores, their inwardly-bent ends passing along the grooves G until they reach the position shown in the drawings. The two arms, at

first diverging at a considerable angle, are then crossed, winding all the coils and creating a sufficient torsional strain to hold a door closed with some firmness. The end of one arm-loop is a little broader than that of the other, and in crossing the arms this end is passed between the two parts of the opposite arm, the parts being slightly sprung apart for the purpose, and the middle parts M of the branches of this wider loop are bent somewhat sharply inward, as shown, so that in the working of the spring the arms may not interfere. At the same time the shoulders formed by the bending prevent the uncrossing of the arms by the action of the spring alone, so that the spring does not require tying for shipment, but is at all times in position for attachment to the hooks C by a slight further crossing to bring the arms into the position shown in Fig. 1. The length of the arms and the distances of the hooks from the hinge-axis are so proportioned that when the door is opened one hundred and eighty degrees the arms may be, as shown in Fig. 2, nearly parallel, respectively, to the door and the jamb. In passing to this position the ends of the loops turn in the hooks C and the coils swing bodily through an angle somewhat less than that passed through by the door, and the line of strain, which is a straight line between the hooks, crosses the line of the hinge-axis, and the spring thereafter tends to open instead of to close the door. So far as the action of this spring upon the door is concerned it presents little novelty; but the use of two sets of coils halves the torsional strain upon each; the upper branches and the lower branches of the arms being respectively in the same plane, they may be made to automatically retain their crossed position; the ends of the arms being closed loops, they cannot slip out of the fastening upon the door and jamb; no mistake can be made in putting the spring upon the door, and shorter pieces of wire being required the whole can be made from the waste wire accumulating in the manufacture of the other similar springs having but one core.

As shown in Figs. 5 and 6, the lower parts of the two cores may be omitted, the lower coils being replaced by hooks J, which engage the

cores between the web F and the lower ends of the upper coils. In this case the force of the springs is exerted entirely through the upper branches of the arms; but in other respects the action of the spring is the same.

Instead of the lower ends of the coils being bent into the grooves G of the cores, the coils may be formed integrally, as shown, the lower turn of each spiral being continuous at O, which causes the reaction of the springs against each other without the transmission of the strain through the web, and, indeed, when the coils are thus connected, the spring is operative even if the cores be removed.

What I claim is—

1. In a door-spring, the combination, with two rigidly-connected parallel spring-cores lying side by side, of oppositely-coiled springs mounted thereon and provided with opposing arms adapted to engage, respectively, suitable fastenings upon a door and its jamb, substantially as set forth.

2. In a door-spring, the combination, with two parallel spring-cores rigidly united at the middle, of oppositely-coiled springs mounted thereon, each with one end in engagement with its core and each having its opposite end carried outward to form an arm and returned upon itself and engaged with one of said

cores, substantially as and for the purpose set forth.

3. The combination, with the cores E E', united by a web F, of springs I I', mounted thereon, the looped spring-arm M', carried by the springs I', and the looped spring-arm M, carried by the springs I, and having the inwardly-bent branches passing between the branches of the arm M', substantially as set forth.

4. The combination, with the laterally-slotted cores rigidly connected by the web F, of the oppositely-wound springs I I', mounted upon the core E, with their adjacent ends in engagement with said core and with their outer ends extended to form a single arm-loop, the similar springs I', mounted in like manner upon the core E', and having their outer ends extended to form a second opposing arm-loop M', substantially as and for the purpose set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FREDERICK W. HOEFER.

Witnesses:

J. H. STEARNS,
JACOB W. GIEB.