

994,853.

Patented June 13, 1911.

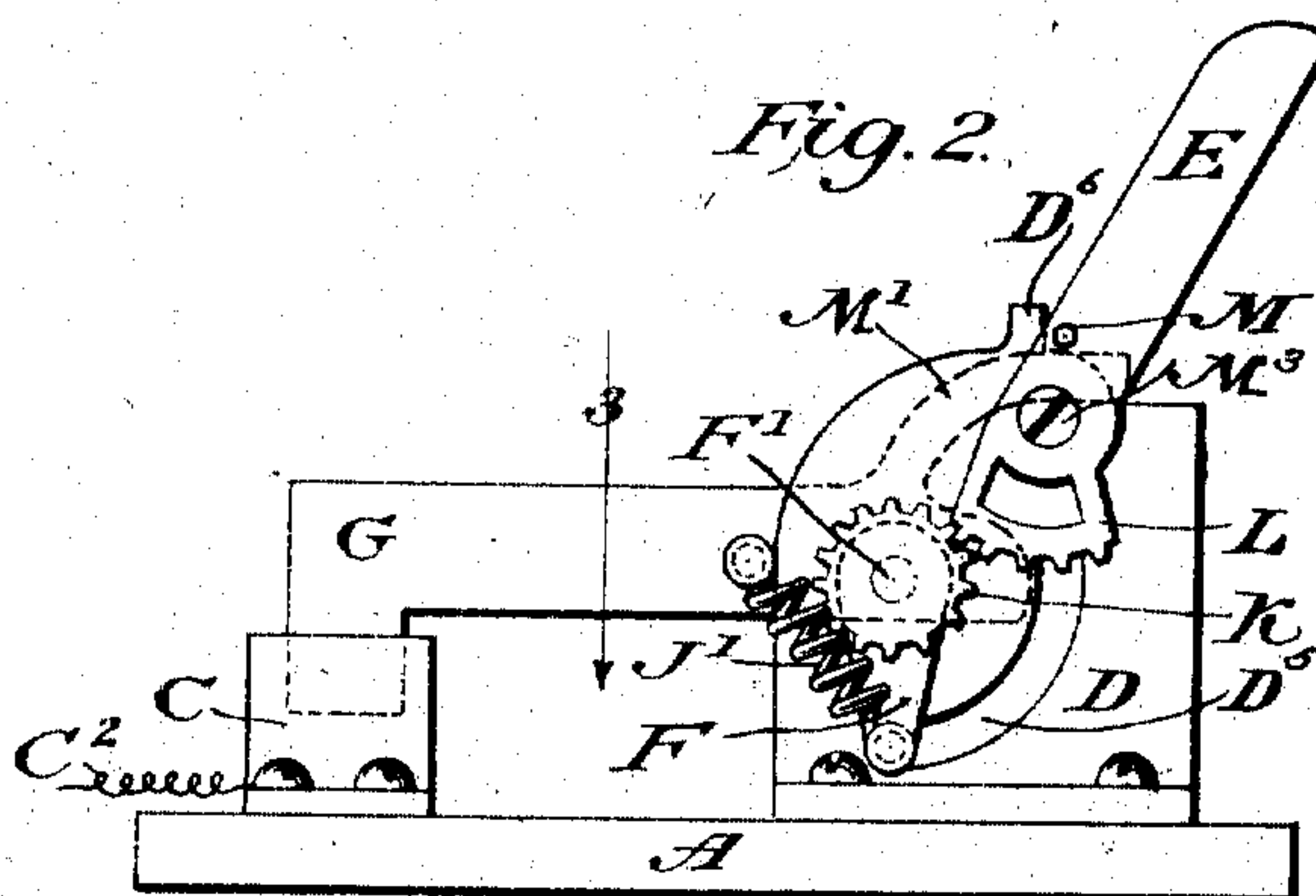
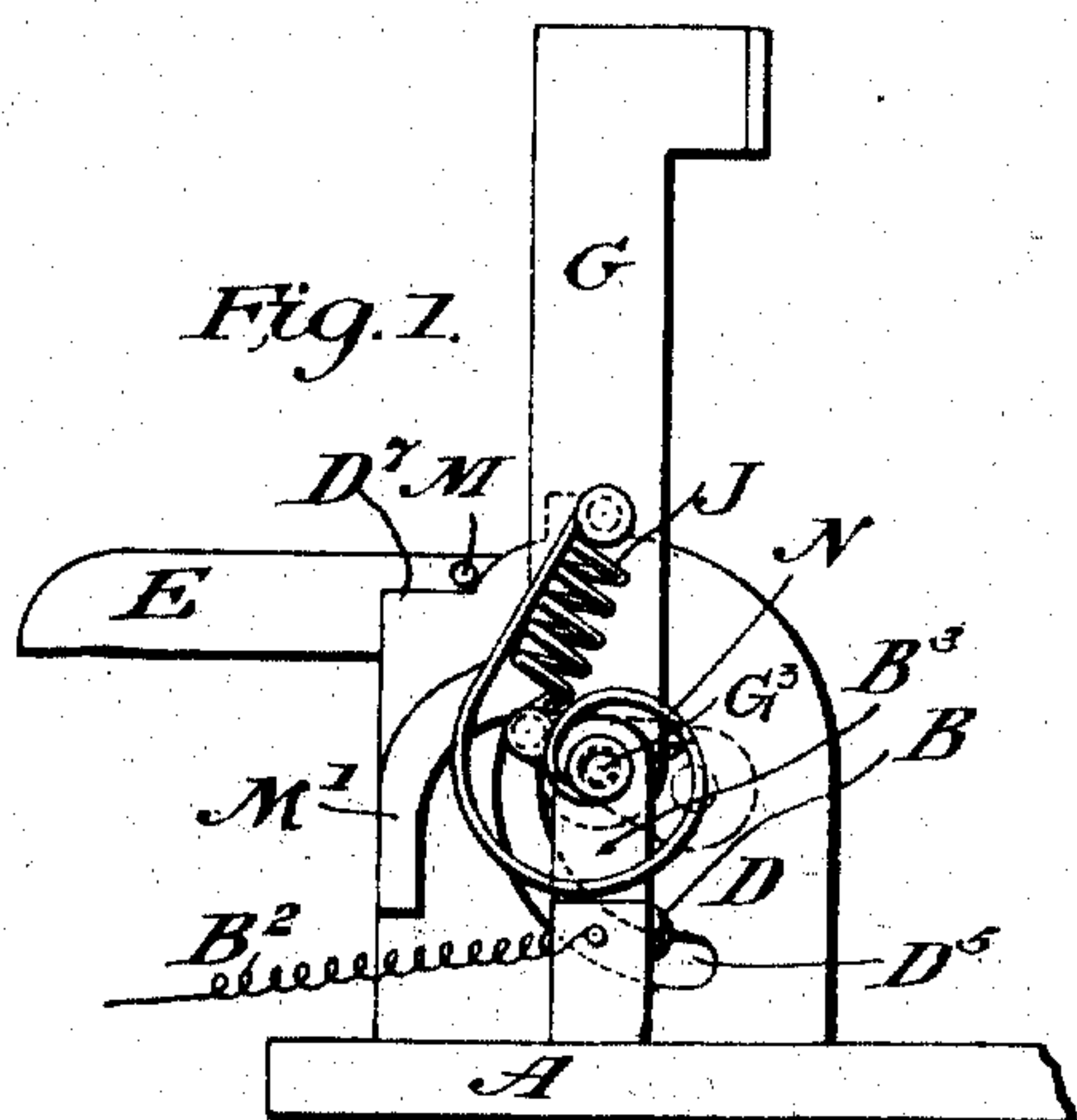
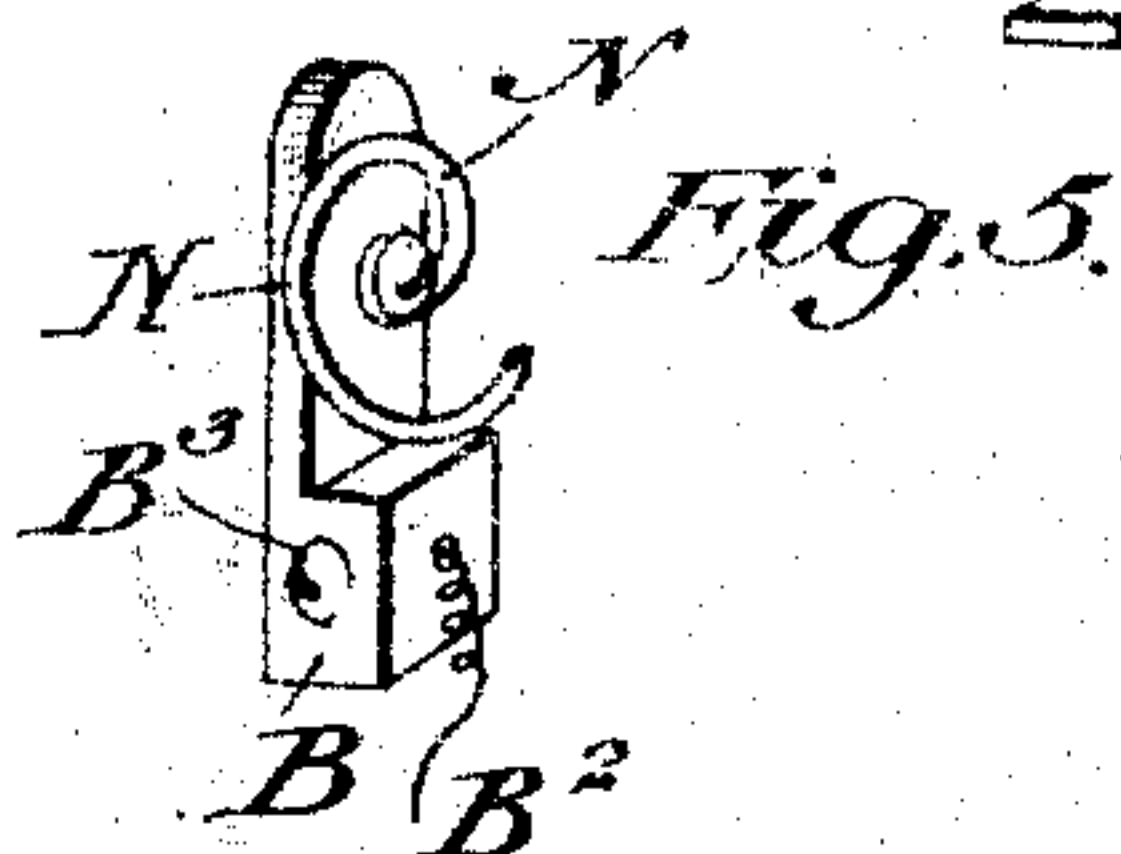
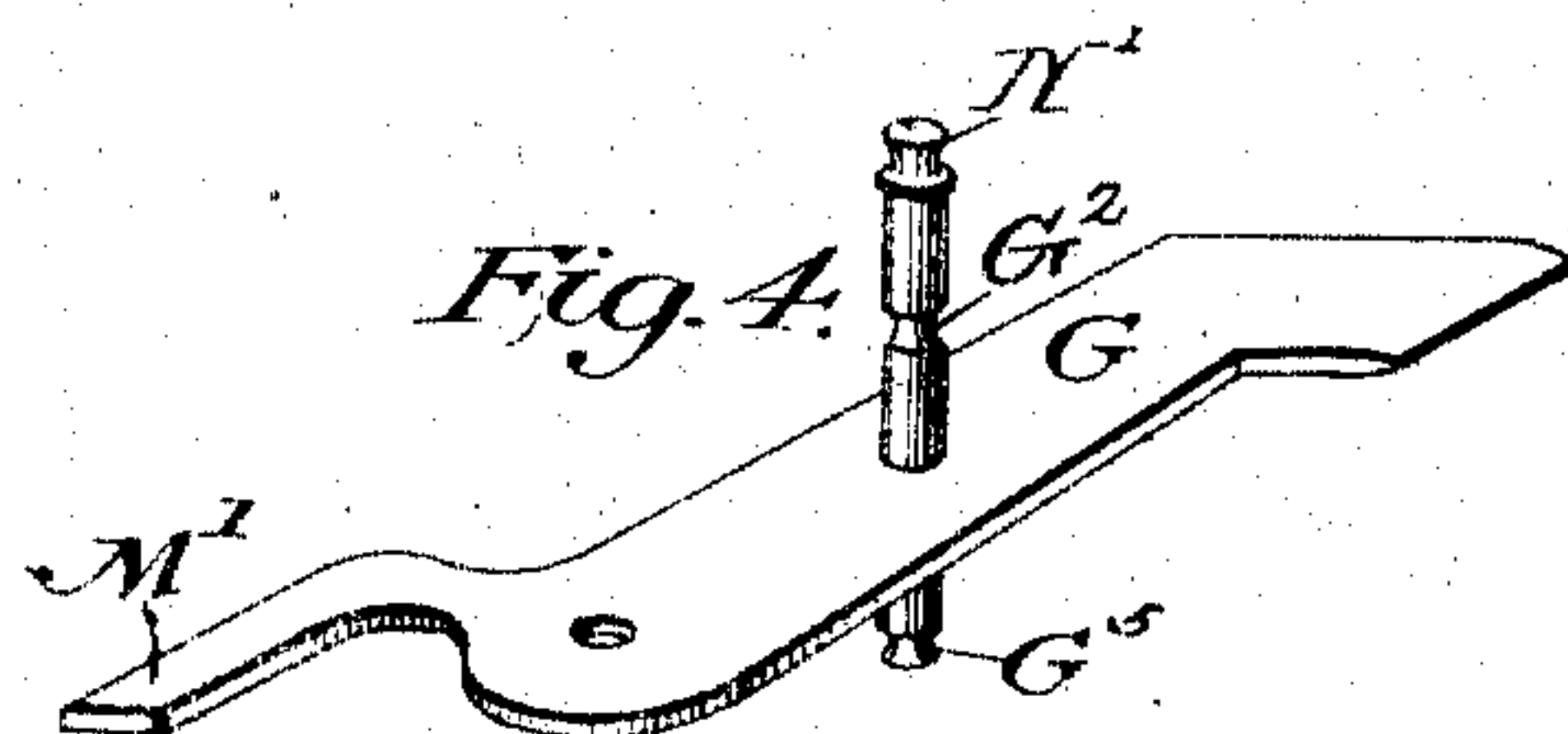
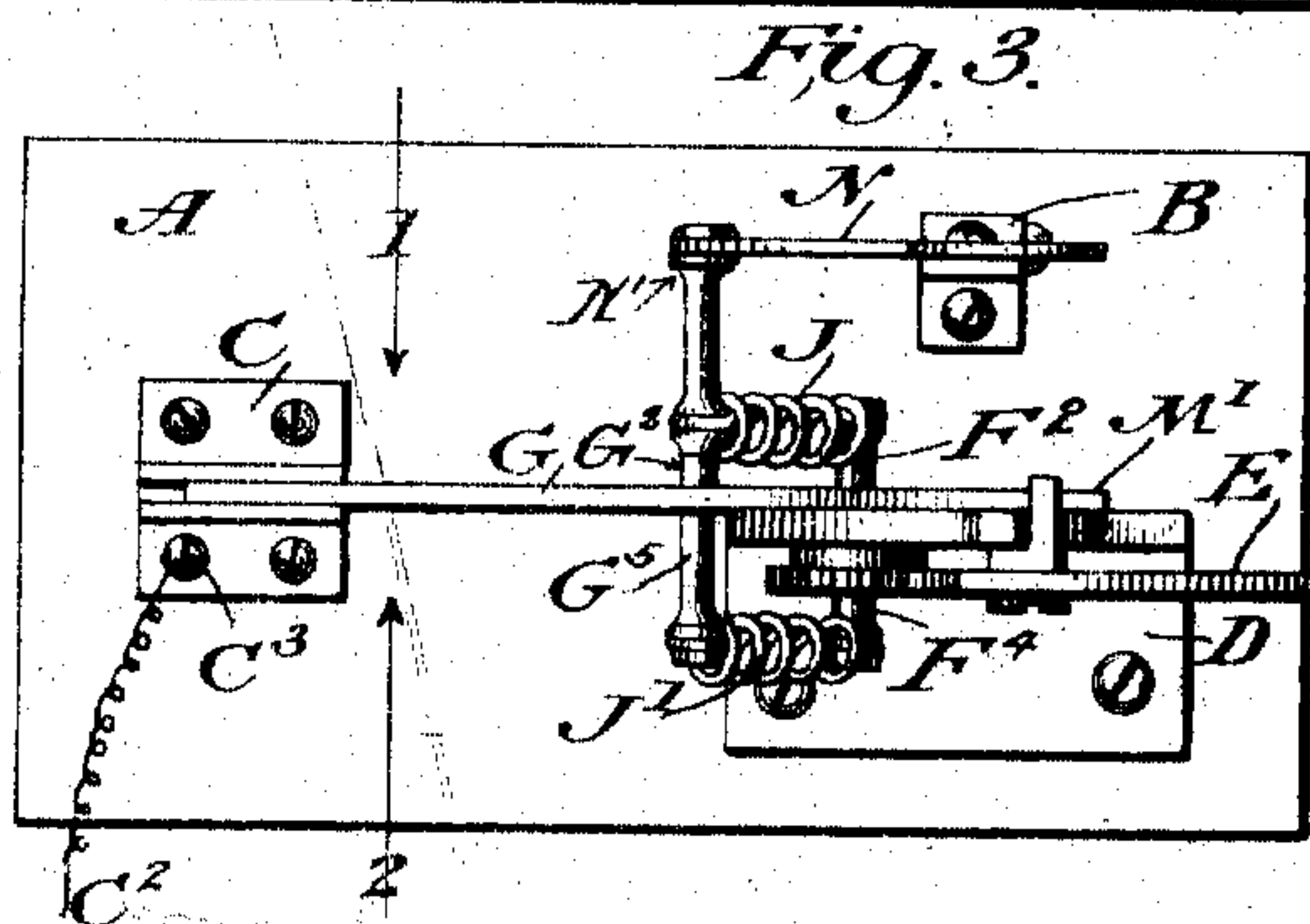
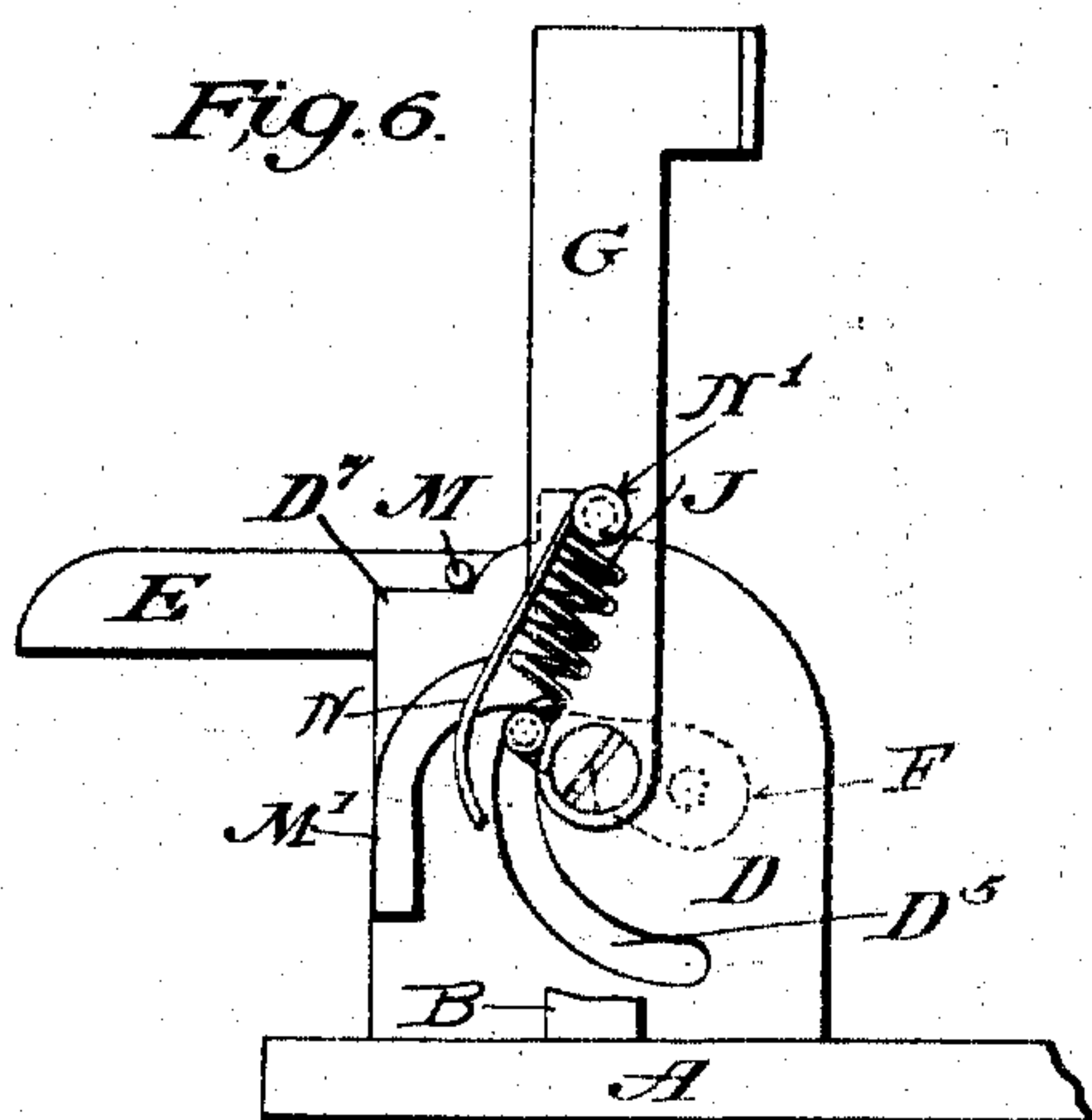


Fig. 6.



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UNITED STATES PATENT OFFICE.

JULIUS K. LUX, OF ST. LOUIS, MISSOURI.

ELECTRIC SWITCH.

994,853.

Specification of Letters Patent. Patented June 13, 1911.

Application filed May 26, 1900. Serial No. 18,049.

To all whom it may concern:

Be it known that I, JULIUS K. LUX, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Electric Switches, of which the following, in connection with the accompanying drawings, is a full and clear description.

My invention relates particularly to that type of circuit controller known as a snap opening and closing knife switch, and the invention has for its objects; firstly, to provide a free and easy action of the rocking contact by eliminating all tendency of such contact to bind in its journal, such binding being heretofore due to the unevenly distributed strain or effort of the actuating means on this contact; secondly, to provide a mount or bearing for the rocking contact such that the latter may be guided by and maintained at all times against an outbearing or surface, whereby its true alinement is always assured; thirdly, to provide a mount or bearing for the movable and actuating parts such that these parts balance each other on either side of a common bearing plate and for this reason, and because of the use of the opposite faces of such plate as reversely disposed flat side bearings to maintain free action in the journals and true alinement of the parts when in action.

Other objects of my invention will appear hereinafter.

The first object of my invention I accomplish by discarding the single piece yielding actuator commonly in use, and in its stead substituting a compound or multiplex actuator, part of which I dispose on either side of the bearing plate in which the working contact is journaled. In this manner the effort or strain on each end of the contact journal may be balanced or equalized, and binding tendency in the journal thus eliminated.

The second and third objects of my invention I effect in conjunction with the first by so shaping the bearing plate and disposing the movable contact on one side of the bearing piece and its operating parts on another side thereof and against it, that the plate forms side bearings for the movable parts, and the latter by reason of the disposition and the balanced effort of the yielding actuator maintain free and easy action along such side bearings.

Having set forth the objects and nature of my invention I will now describe the same in connection with the drawings, in which—

Figure 1, is a side elevation of a switch embodying my invention as seen looking in the direction of the arrow 1 in Fig. 3, parts being broken away to economize space. Fig. 2, is a side elevation looking in the direction indicated by the arrow 2, in Fig. 3. Fig. 3, is a top plan view as seen looking in the direction of the arrow 3, in Fig. 2. Fig. 4, is a view of the movable contact G. Fig. 5, is a view of the terminal B. Fig. 6, is a view analogous to Fig. 1, parts being broken away to show more clearly the arrangement of the axes.

Referring to the drawings in detail, A is a support or base of any suitable material at one point of which a fixed contact C, is mounted and at another point of which is attached the bearing plate D. It will be noted that the plate D consists in part of an upright portion, one face of which is in alinement with the fixed contact C. Pivotally journaled on the bearing plate D at an inner point thereof and on the face thereof in alinement with contact C, is the rocking contact G. The plate D by reason of the fact that the contact G is maintained against the same, and is pivoted at an inner point thereof serves as a flat side bearing or guiding surface for the contact G, whereby the latter is always maintained in true alinement with its cooperating fixed contact.

In the present embodiment of my invention I have shown mounted on the journal F' in loose relation thereto the contact G, but on the reverse side of the bearing plate D in fixed relation to the journal, the lever F, which is part of the contact-operating means and may be termed the energizer, through the operation of which the yielding contact actuator is placed under tension or caused to store its actuating energy. This energizer F, is likewise positioned against the bearing plate D, and the face of the latter when the parts are in motion serves as a flat side bearing for the energizer. The energizer and rocking contact being mounted at reverse sides of the bearing plate D, and in contact therewith, the moving parts naturally tend to maintain true alinement, whereby tendency of the axis or journal to bind in the plate is obviated and a true and free movement secured.

Mounted on the energizer F, I have indi-

cated in the present embodiment of my invention spur gear K, in turn meshing with a segmental gear L, carried by the operating handle E. By pivoting the handle E on the plate D, as at N³, and by the use of the gears aforesaid, a movement is obtained by which the handle and rocking contact always have the same direction of rotation, the movement of the handle being limited to about a quarter turn by limiting stops or shoulders —D⁶— and —D⁷— on the plate —D—. There are other advantages to such an arrangement but such need not herein be enumerated as they have no necessary relation to the invention herein claimed.

The contact actuator or yielding means by which the snap opening and closing movements are obtained, are the springs J, J'. These are shown secured on the one hand to the energizer F, by attachment to the pins F⁴ of the latter, which journals are shown as connected and as extending or disposed on either side of the bearing plate. On the other hand the actuating means J, J' are shown connected respectively to the pins G², G⁵ which journals are likewise shown as connected and extended or disposed on either side of the plate D. J, J' together form a compound or multiplex actuator, so disposed as to have its efforts or strain balanced or equalized on either side of the bearing of the rocking contact on the plate D. Such balanced effect prevents the journal of the rocking contact from being tipped and thereby caused to bind in its bearing. And this feature in connection with the reversely disposed flat bearings for the movable parts provides a movement in which true alignment and easy action are assured.

In operation, assuming the switch to be in position indicated in Fig. 2, to open the same, the handle E, is moved clockwise. The rack L, of the latter engaging the gear K, on the energizer F, causes the latter to move in the slot D⁵, in the opposite direction, to that in which the handle moves, thereby putting the actuating springs J, J' under tension. As the movement of the free end of F, carries the springs near the dead center the supplementary actuator M, engages an extension M' on the movable contact G, urges the pins G²—G⁵ past the dead center and positively disengages the cooperative contacts irrespective of the power of the springs. The outer end of F, having moved through a requisite distance or until the effort of the spring is past its dead center, the contact G, is snapped open. The closing operation is the reverse, the actuator M engaging the rocking contact positively urges the latter by the dead center of the movement, whereupon the yielding actuator means J, J' being in the meantime placed under tension act to snap the switch closed.

The improved arrangement of the parts

F and J—J' which produces the herein described different powers, is made possible in this device by causing the said parts to move about axes which are independent of the axis of the operating handle and actuator. By this new arrangement my combined improvements are applied to this form of device so as to produce the new and improved results described. Less angular movement of the operating handle than of the operative connections of the yielding actuating means is obtained. The specific arrangement of the axis of the energizing means F, together with the balanced arrangement of the yielding actuating means; the like direction of movement of the handle, actuator, and movable contact, which in a knife-switch is essential to efficiency; the direction of movement of the energizing means F relatively to that of the operating handle and actuator; the loose connection between the latter parts and the movable contact; the positive action of the actuator together with the snap action of the movable contact unretarded by the handle; are obtained in combination by means of the said separate arrangements of the axes.

N, indicates a yielding conductor, having one end connected with the terminal B, and the other end connected with the movable contact. The said yielding means N is coiled so as to form a volute spiral; the outer end is connected with the movable contact in any suitable manner, as with the pins G². The inner end of the said coiled spring is secured to the terminal B in any suitable manner. The said terminal B is provided with a binding screw B³ to hold a conductor B² in position. The contact G travels to and fro through the arc of a one quarter circle more or less, and if the yielding means N be free from stress at the middle of the said arc, the resistance offered by the said means to the free movement of the movable contact will then equal the stress developed by about a one-eighth revolution of the said connection. That portion of the yielding means N which is connected with the movable contact is more yielding than is that portion which is connected with the terminal B. This tends to reduce the retarding or hindering influence of the part N to the minimum. The yielding means N serves the purpose of a fixed contact without opposing or hindering the circuit closing power of the yielding actuating means in the same measure as would equivalent fixed contacts of the forms heretofore usual in snap closing circuit controlling devices.

The circuit connections are through the conductor B² to the terminal plate B, thence through the conductor N, to the contact G, and when the circuit is closed, out through the stationary contact C, and a conductor C², attached thereto by a binding screw C³.

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

1. In an electric knife switch, a bearing
5 plate, a rocking contact and a rock arm
coaxial therewith, said contact and rock arm
having independent rotary sliding engage-
ment with opposite faces of the bearing
plate, springs connecting the rock arm and
10 contact at opposite sides of said bearing
plate, and means for rocking said arm to
shift the springs across and to opposite sides
of the axis of the contact to open and close
the contact with a quick snap action.
- 15 2. In an electric knife switch, a bearing
plate, a rocking contact and a rock arm co-
axial therewith, said contact and rock arm
having independent rotary sliding engage-
ment with opposite faces of the bearing
20 plate, springs connecting the rock arm and
contact at opposite sides of said bearing
plate, means for rocking said arm to shift
the springs across and to opposite sides of
the axis of the contact to open and close the
25 contact with a quick snap action, said means

including a lever fulcrumed at one side of
the axis of the contact, having a supplemen-
tary actuating device engaging the contact to
positively move it from its extreme positions.

3. In an electric knife switch, a bearing 30
plate, a rocking contact and a rock arm co-
axial therewith, said contact and rock arm
having independent rotary sliding engage-
ment with opposite faces of the bearing
plate, springs connecting the rock arm and 35
contact at opposite sides of said bearing
plate, a rocking operating lever and means
actuated thereby for moving the rock arm
in a reverse direction from the lever, springs
connecting the rock arm and contact and 40
actuated across the axis of the contact by
said rock arm to open and close the contact
with a quick snap action, and supplementary
means on the lever for engaging and starting 45
the contact from its extreme positions in the
same direction as the movement of the lever.

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Witnesses:

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