

No. 660,018.

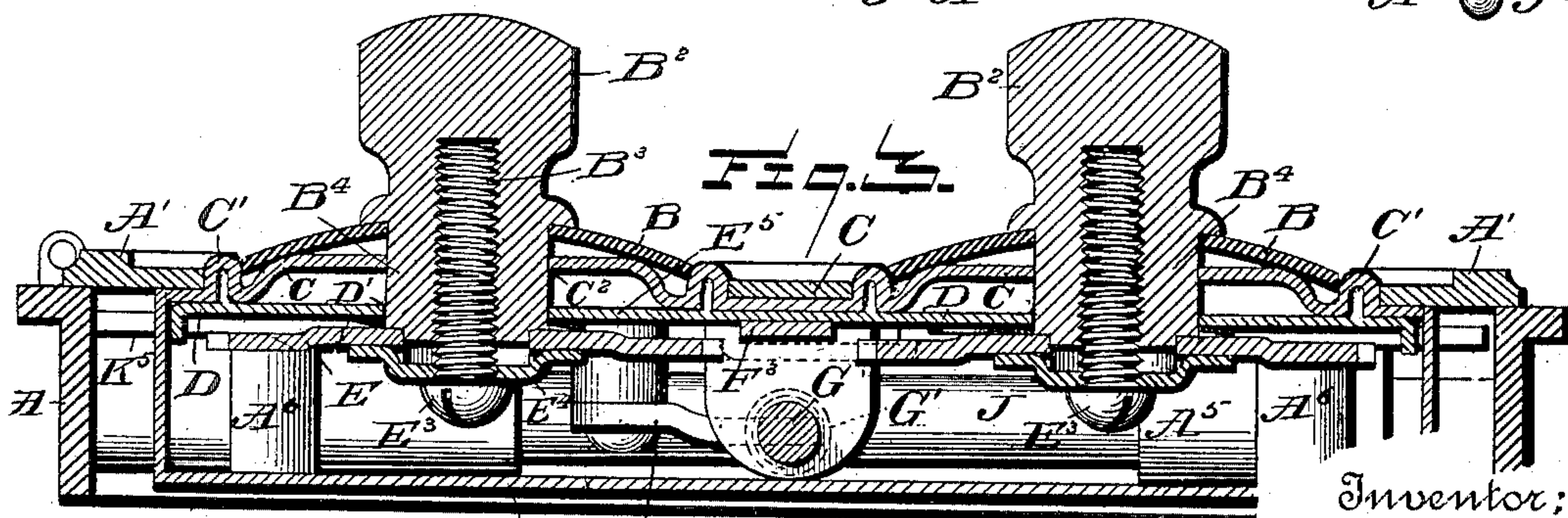
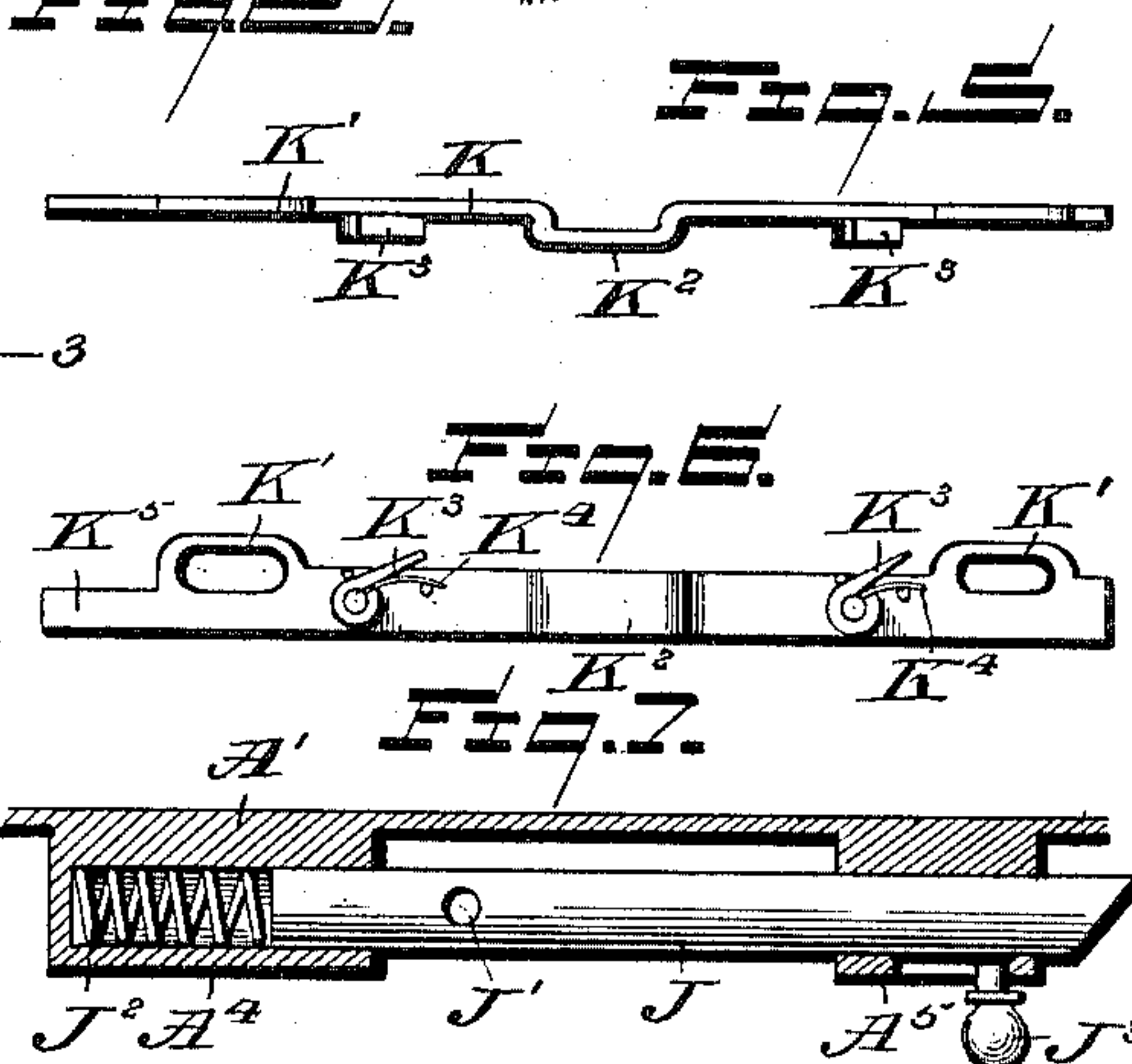
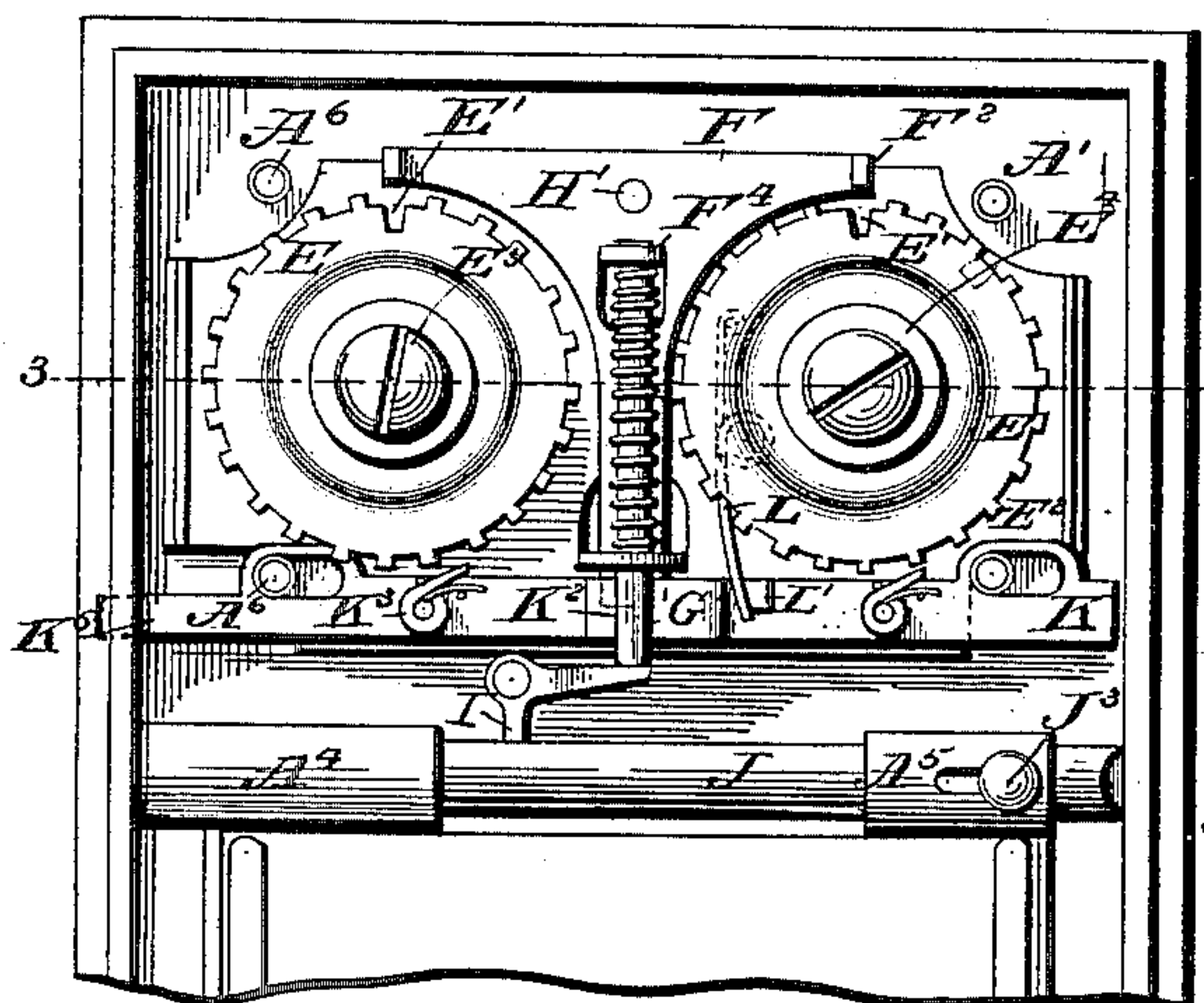
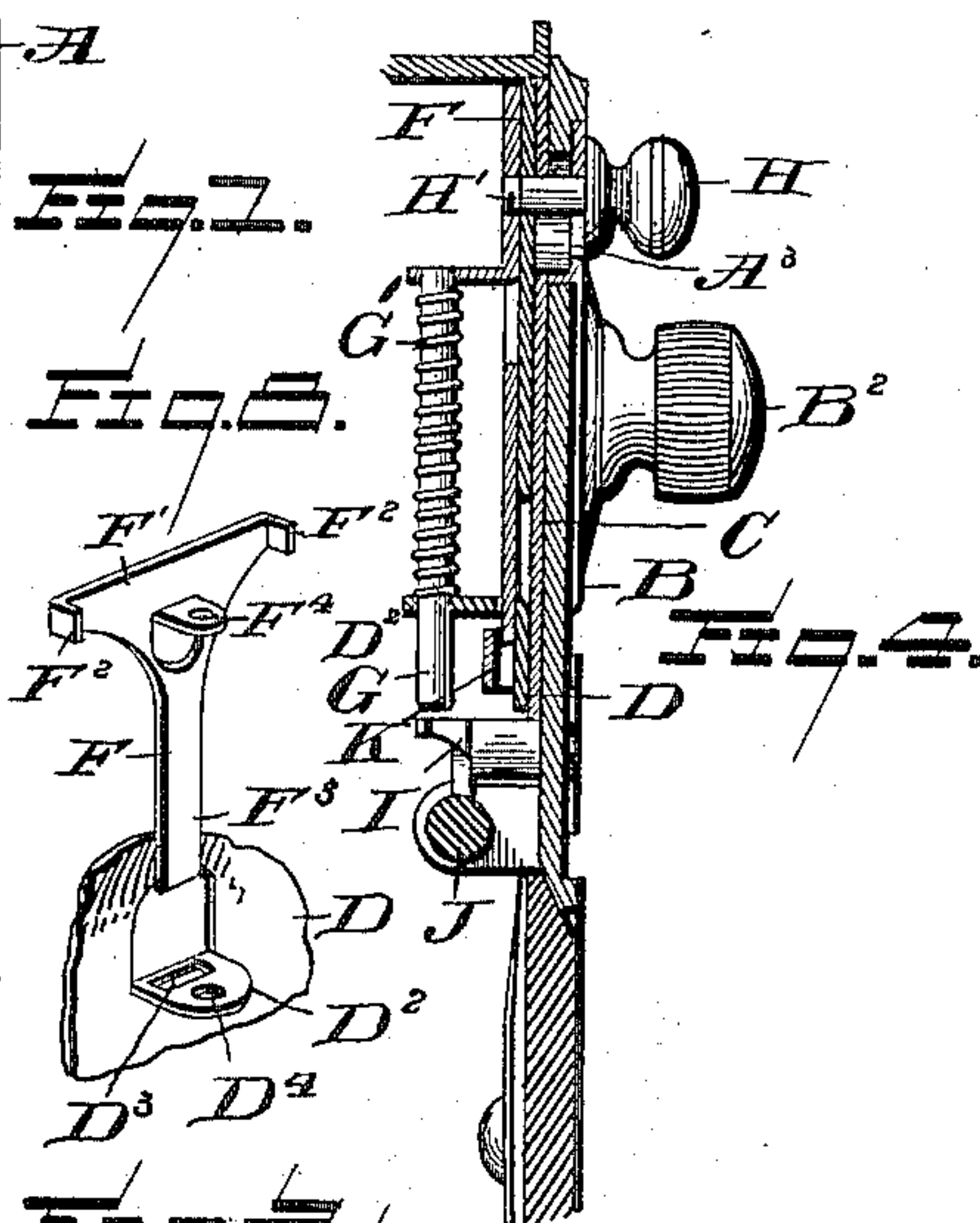
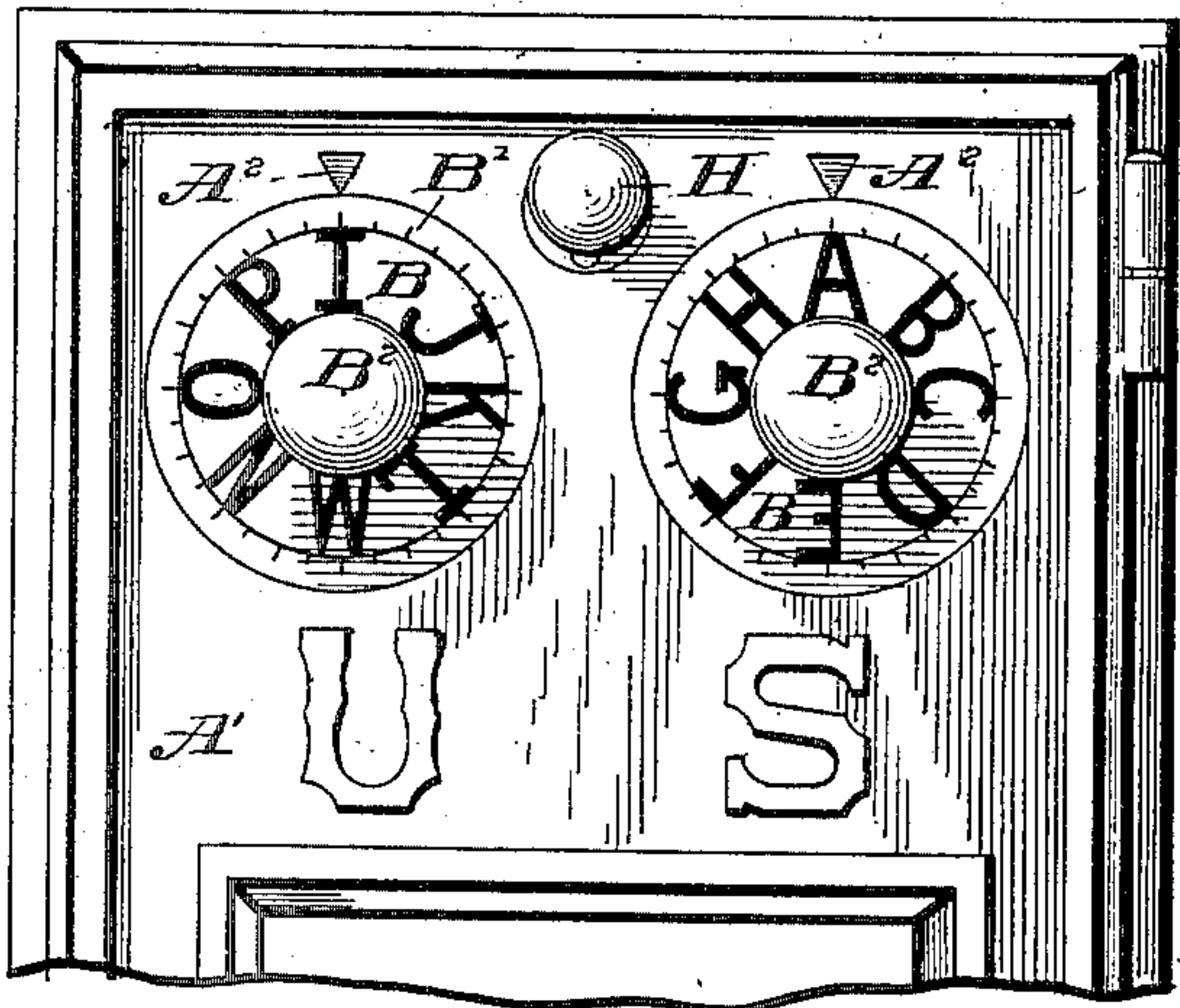
Patented Oct. 16, 1900.

J. H. LIVINGSTONE.

PERMUTATION LOCK.

(Application filed Aug. 15, 1900.)

(No Model.)



Witnesses:

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# UNITED STATES PATENT OFFICE.

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## PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 660,018, dated October 16, 1900.

Application filed August 15, 1900. Serial No. 26,927. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH HOLT LIVINGSTONE, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Permutation-Locks, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to permutation-locks, and particularly to a lock of that character embodying rotating tumblers and an automatically-operated throw-off device for placing the tumblers out of combination as and when the door to which the lock is applied is closed.

The invention has for one object to simplify, improve, and economize the construction of locks of this character, and especially the throw-off mechanism for automatically actuating the tumblers and throwing the same out of combination.

A further object of the invention is to improve the construction and arrangement of the supporting-plates for the operating mechanism and also the throw-off slide which engages the tumblers.

Other objects and advantages of the invention will hereinafter appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is an elevation of the face of the lock applied to the door. Fig. 2 is a similar view from the rear with the protecting-casing removed. Fig. 3 is an enlarged horizontal section through Fig. 1. Fig. 4 is a vertical section. Fig. 5 is a top view of the throw-off slide. Fig. 6 is a side elevation of the same. Fig. 7 is a horizontal section of the locking-bolt and its casing, and Fig. 8 is a detail perspective of the tumbler fence-plate and guiding means therefor.

Like letters of reference indicate like parts throughout the several figures of the drawings.

In the drawings the letter A designates a framework of any suitable construction or configuration, within which a pivoted door A' is mounted.

It will be understood that the lock is capable of application to any structure to be

locked; but for the purpose of illustration it has been shown as cooperating with a locking-bolt for the door of a post-office box. The door A' is provided upon its face with suitable apertures for the insertion of the dials B, and the body of the plate about these dials is provided with suitable indicating-points A<sup>2</sup> for use in connection with the indications B' upon the dial B. This dial is provided with any desired arrangement or number of letters or numerals, preferably of a clearly-defined character, so that the locks may be arranged in a variety of combinations. The dial is provided with a suitable knob B<sup>2</sup> for rotating the same. This knob is interiorly threaded, as at B<sup>3</sup>, and provided with an extended shank B<sup>4</sup>, adapted to form a bearing for the same in its rotation.

A suitable front plate C is provided and has a bead C' fitting the aperture in the front plate A'. This plate is also provided with an aperture C<sup>2</sup>, through which the shank B<sup>4</sup> of the operating-knob passes, and the walls of this aperture provide a bearing for the shank spaced from the bearing-aperture D' of the inner plate D. The inner end of the shank B<sup>4</sup> of the operating-knob carries a suitable tumbler E, having a gating E', corresponding in position with the letter upon the dial making the proper combination. This tumbler is also provided with a toothed periphery E<sup>2</sup>, by which it cooperates with a throw-off mechanism to be hereinafter described. The tumbler is clamped in position by means of a bolt E<sup>3</sup> entering the threaded aperture B<sup>3</sup> of the knob B<sup>2</sup>, and a clamping-washer E<sup>4</sup> is interposed between the head of said screw and the tumbler. A spring friction-washer E<sup>4</sup> is also interposed between the tumbler E and the back plate D of the lock, thus offering a slight frictional resistance to the rotation of the tumblers.

For the purpose of cooperating with the notches E' in the tumblers E, I have provided a fence-plate F of a very simple and efficient construction. This plate is provided at its upper portion with a cross-head F' and fences F<sup>2</sup>, adapted to sit in the gatings E', while the shank F<sup>3</sup> thereof passes through a guide-lug D<sup>2</sup>, bent from the back plate D. This lug has an aperture D<sup>3</sup> for the passage of the shank F<sup>3</sup> and an additional aperture D<sup>4</sup> for



the passage of the operating-rod G, carried by the lug F<sup>4</sup>, which is bent outward from the plate F' or otherwise attached thereto. A suitable coiled spring G' surrounds the rod G and rests upon the plate D<sup>2</sup>, so as to be compressed thereon when the fence-plate is forced downward by means of the finger-piece H, located upon the face of the plate A' and connected to the fence-plate F by means of the pin H', operating in a slotted way A<sup>3</sup> in the face-plate. It will be seen that the spring G' will restore the fence-plate to an elevated position when pressure is removed from the finger-piece H. The lower end of the rod G bears upon one arm of a crank-lever I, the other arm being in engagement with a slot J', formed in the locking-bolt J. This bolt is mounted at its inner end in a suitable casing A<sup>4</sup>, carried by the plate A', and is projected by means of a spring J<sup>2</sup>, located in the casing A<sup>4</sup> behind the bolt J. The outer end of the bolt is guided in a slotted case A<sup>5</sup> and may be retracted by means of a pin J<sup>3</sup>, carried by the bolt.

By means of the foregoing structure the combination of the locking-tumblers may be operated to permit the depression of the rod G and the operation of the locking-bolt J to open the door; but when the door is closed the combination is still in position to permit its being opened again if the operator neglects to turn the knobs B<sup>2</sup> and throw off the combination. For the purpose of automatically performing this throw-off operation an improved construction of slide K has been provided, which is formed with slotted projections K', adapted to slide over the posts A<sup>6</sup>, extending inward from the face-plate A'. These posts support the throw-off slide K and guide its reciprocations. The slide is also provided with a central offset K<sup>2</sup>, adapted to pass around the lower end of the fence-plate F and permit the free operation of the shank of the same. The slide K is further provided with pivoted pawls or dogs K<sup>3</sup>, held in an elevated position by any suitable form of spring—such, for instance, as shown at K<sup>4</sup>—so as to normally engage one of the teeth E<sup>2</sup> upon the periphery of the tumbler. When the door is opened, one end of the throw-off slide next the hinge side of the door is normally projected beyond the edge of the casing and adapted to engage the door-casing by means of any suitable spring—such, for instance, as shown at L—one end of which is secured to the casing and the opposite end L' adapted to engage one side of the offset K<sup>2</sup>, and thus move the throw-off slide into operative position after the same has been pushed inward by the closing of the door. The closing of the door causes the end K<sup>5</sup> of the slide to engage the jamb of the casing, thus moving the slide and rotating each of the tumblers E by means of the dogs K<sup>3</sup> to such an extent as to move the gatings or recesses E' from beneath the fences F<sup>2</sup>, which throws off the combination and leaves the parts in the position shown in Fig. 2, where the door is in

a locked condition and the tumblers have been reset to open the door.

From the foregoing description the operation of the several parts will be apparent to one skilled in the art, and the structure herewith presented is particularly adapted for economical manufacture and efficient operation, as the essential parts can be formed of sheet material and stamped or pressed into shape, while the apertures in and projections from such members as the fence-plate and back plate can be simultaneously cut and require only bending and adjustment when the lock is to be assembled for use. It will likewise be seen that the front plate C is capable of production at a single stamping operation and that all of the parts by reason of their simplicity in construction and operation are not liable to become disarranged in use or broken, whereby the efficiency of the lock is materially increased and the annoyance incident to the disarrangement of complicated structures entirely avoided. The operating parts of the lock are suitably inclosed by a rear casing A<sup>7</sup>, secured by any desired means to the posts A<sup>6</sup>, which project from the face-plate.

It will be obvious that changes may be made in the details of construction and configuration of this invention without departing from the spirit of this invention.

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

1. In a permutation-lock, the combination with a tumbler having peripheral teeth and bolt-operating mechanism coöperating with said tumbler, of a throw-off slide having one of its ends normally projecting beyond the lock-casing and adapted to engage the door-casing, a pawl carried by said slide and adapted to engage a tooth on said tumbler, and means for yieldingly projecting said slide in one direction; substantially as specified.

2. In a permutation-lock, the combination with a rotating tumbler provided with peripheral teeth, of bolt-operating mechanism coöperating with said tumbler, a throw-off slide mounted beneath said tumbler and normally projected at one end beyond the lock-casing and adapted to engage the door-casing, a pawl pivotally mounted upon said throw-off slide, and a spring for normally projecting said slide in one direction; substantially as specified.

3. In a permutation-lock, the combination with a face-plate provided with posts extending from its inner face, rotating tumblers supported by said plate and provided with peripheral teeth, bolt-operating mechanism carried by said plate and adapted to coöperate with said tumblers, a throw-off slide provided with slotted ways adapted to rest upon said posts, a pawl carried by said slide and adapted to engage a tooth in said tumblers, and a spring adapted to normally project said slide in one direction beyond the lock-casing where-



by the bolt may be engaged by the door-casing within which said face-plate is pivoted; substantially as specified.

4. In a permutation-lock, the combination with a front plate, of a back plate supported thereby and provided with a lug having a guide-aperture, rotatable tumblers carried by said front plate, a fence-plate having a single shank adapted to pass through the aperture in said lug and cooperating with said tumblers, a pin supported by a lug from said fence-plate and passed through an aperture in the lug upon the back plate, a spring surrounding said pin and resting upon said lugs, and a locking-bolt operatively connected with said pin; substantially as specified.

5. In a permutation-lock, the combination with a front plate, of a back plate supported thereby and provided with a lug having a guide-aperture, rotatable tumblers carried by said front plate, a fence-plate having a single shank adapted to pass through the aperture in said lug and cooperating with said tumblers, a pin supported by a lug from said fence-plate and passed through an aperture in the lug upon the back plate, a spring surrounding said pin and resting upon said lugs, a locking-bolt operatively connected with said pin, a throw-off slide provided with a central offset portion adapted to bridge the shank of said fence-plate, pawls carried by said throw-off slide and adapted to rotate said tumblers, and a yielding device for projecting one end of said slide beyond the casing thereof where-

by it is adapted to engage the door-casing; substantially as specified.

6. In a permutation-lock, the combination of a door-casing, a supporting-plate pivoted therein, rotating tumblers carried by said plate and provided with toothed peripheries, bolt-operating mechanism cooperating with said tumblers, a throw-off slide supported by said plate and provided with pawls adapted to engage and move said tumblers in the movement of the slide, and a yielding device adapted to normally project one end of the throw-off slide beyond the edge of said supporting-plate whereby the slide may engage the door-casing and be forced inward to rotate the tumblers; substantially as specified.

7. In a permutation-lock, the combination with a tumbler and bolt-operating mechanism cooperating therewith, of a throw-off slide having one of its ends normally projecting beyond the edge of a lock-casing and adapted to engage the door-casing, means carried by said slide to operatively engage said tumbler when the slide is moved in one direction and to be inoperative in the return movement of the slide, and means for restoring said slide to its normal position; substantially as specified.

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

J. HOLT LIVINGSTONE.

Witnesses:

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APPLETON P. CLARK.