

(No Model.)

4 Sheets—Sheet 1.

A. KIRKS.
SAFE LOCK.

No. 438,317.

Patented Oct. 14, 1890.

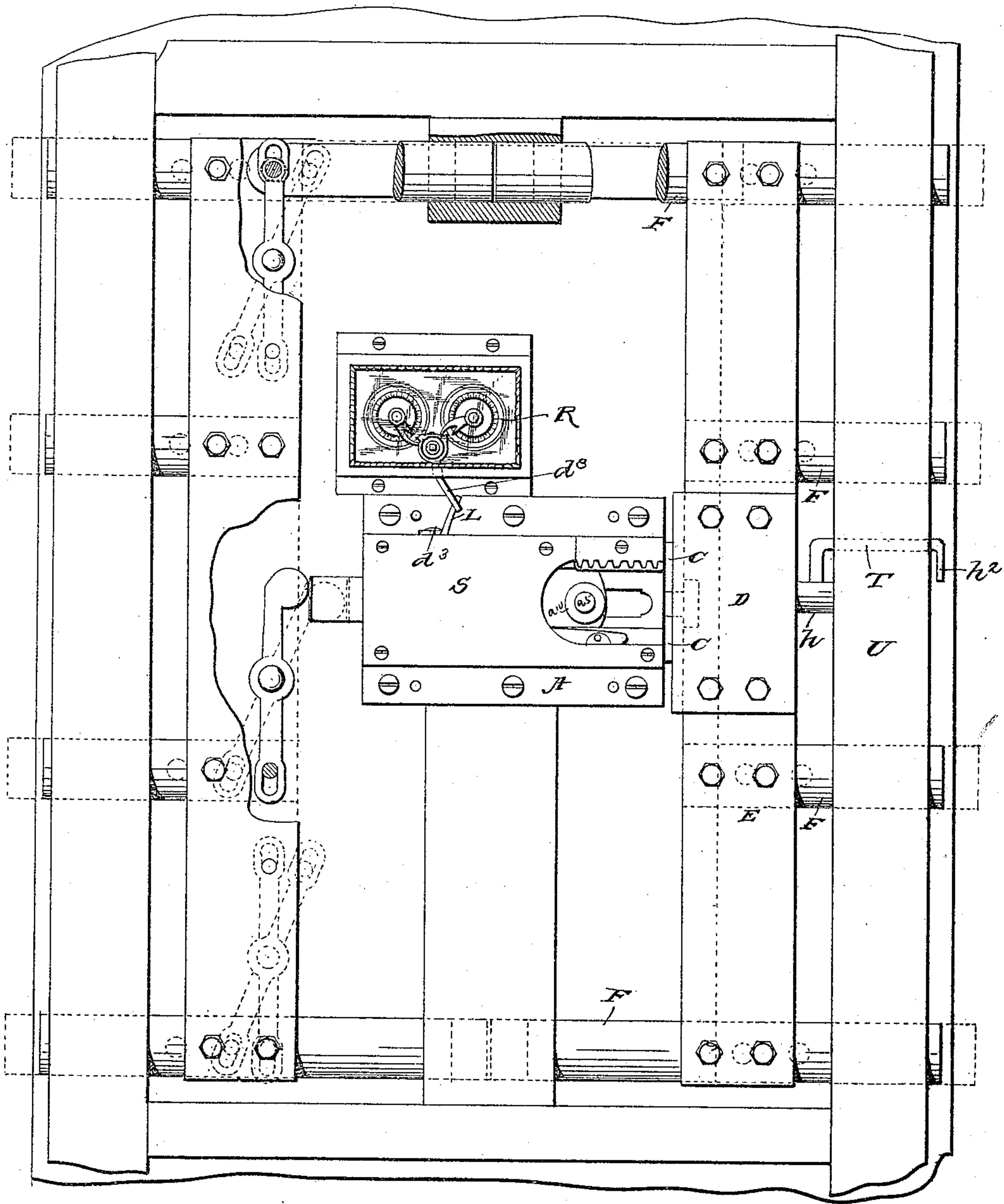


Fig. 1.

WITNESSES:

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Chas. R. Miller

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ATTORNEY.

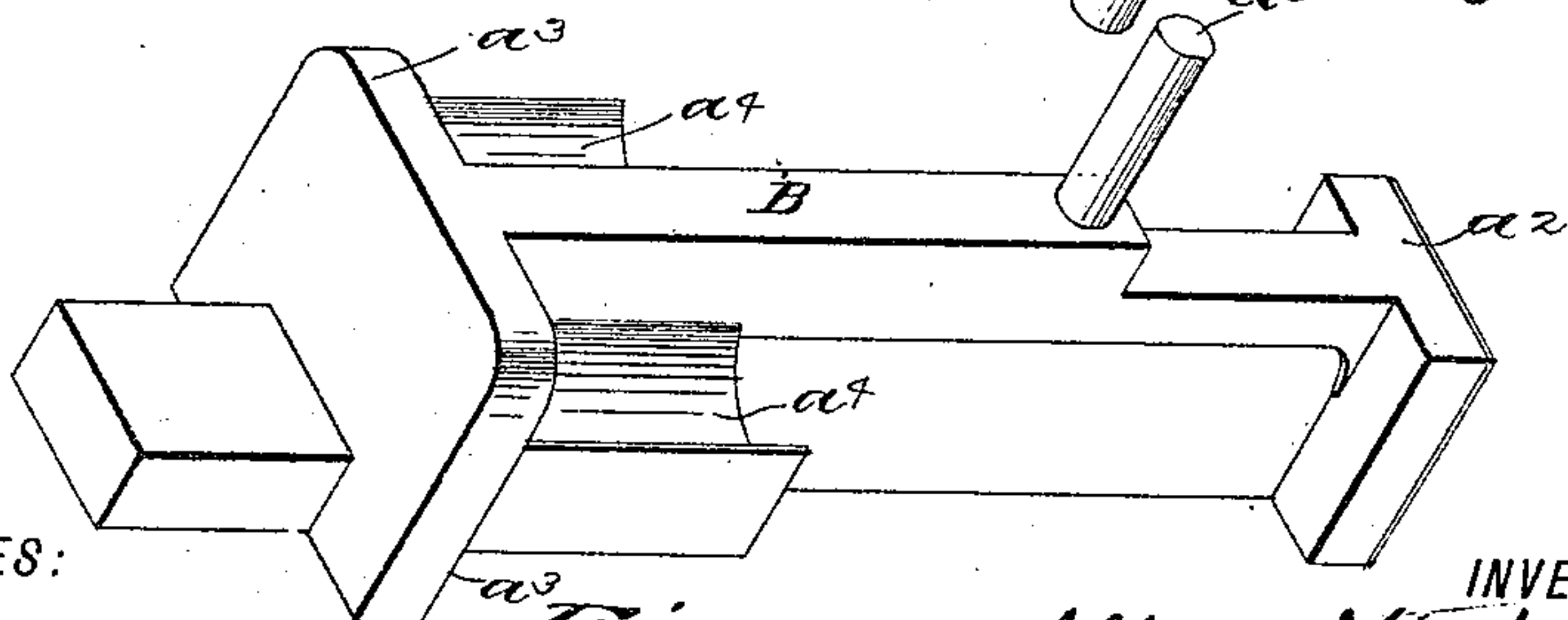
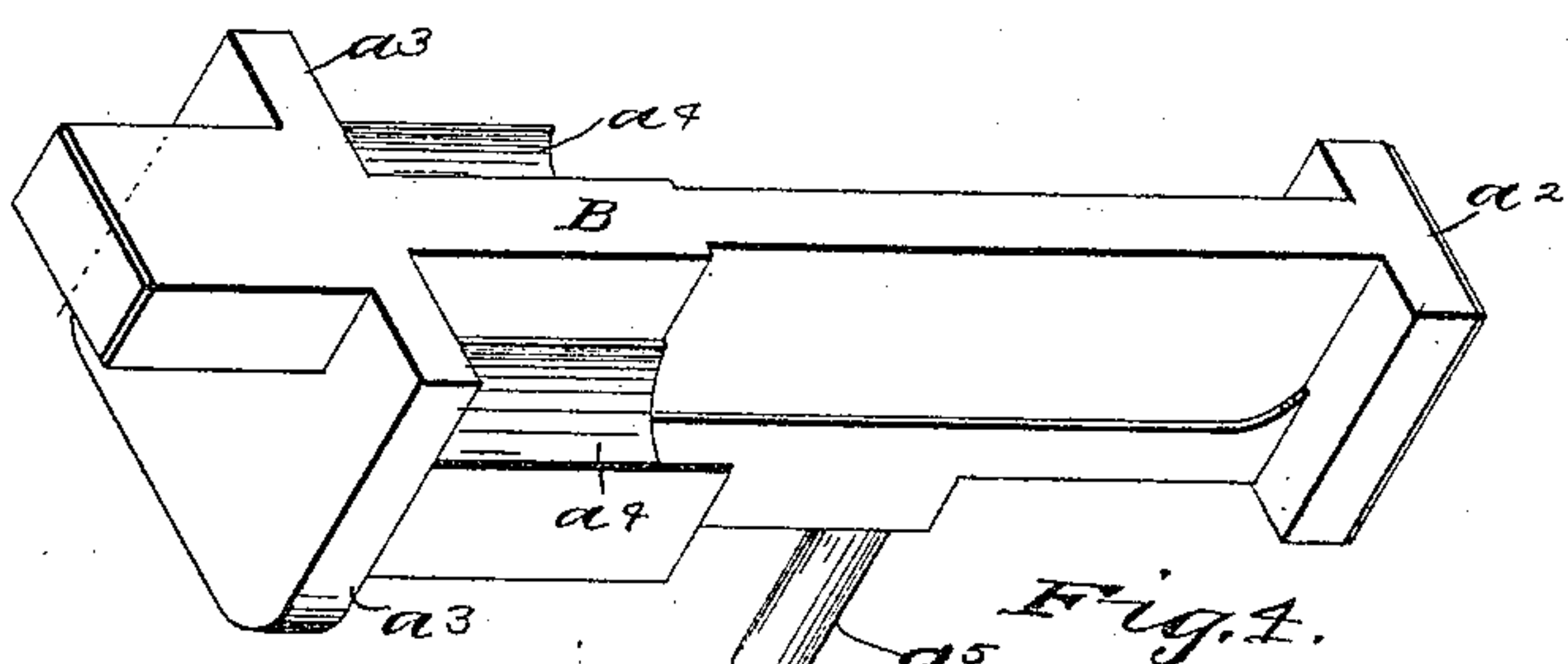
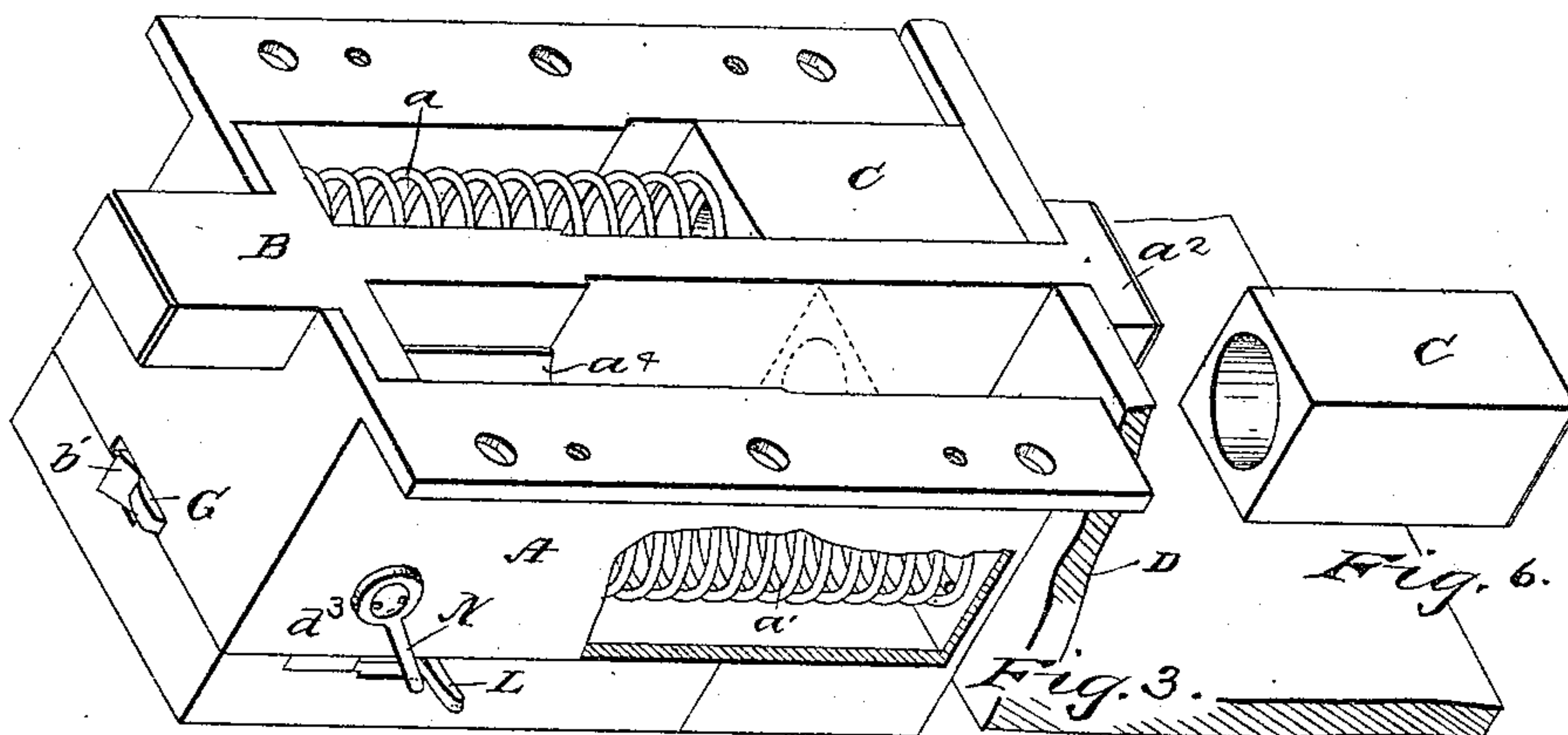
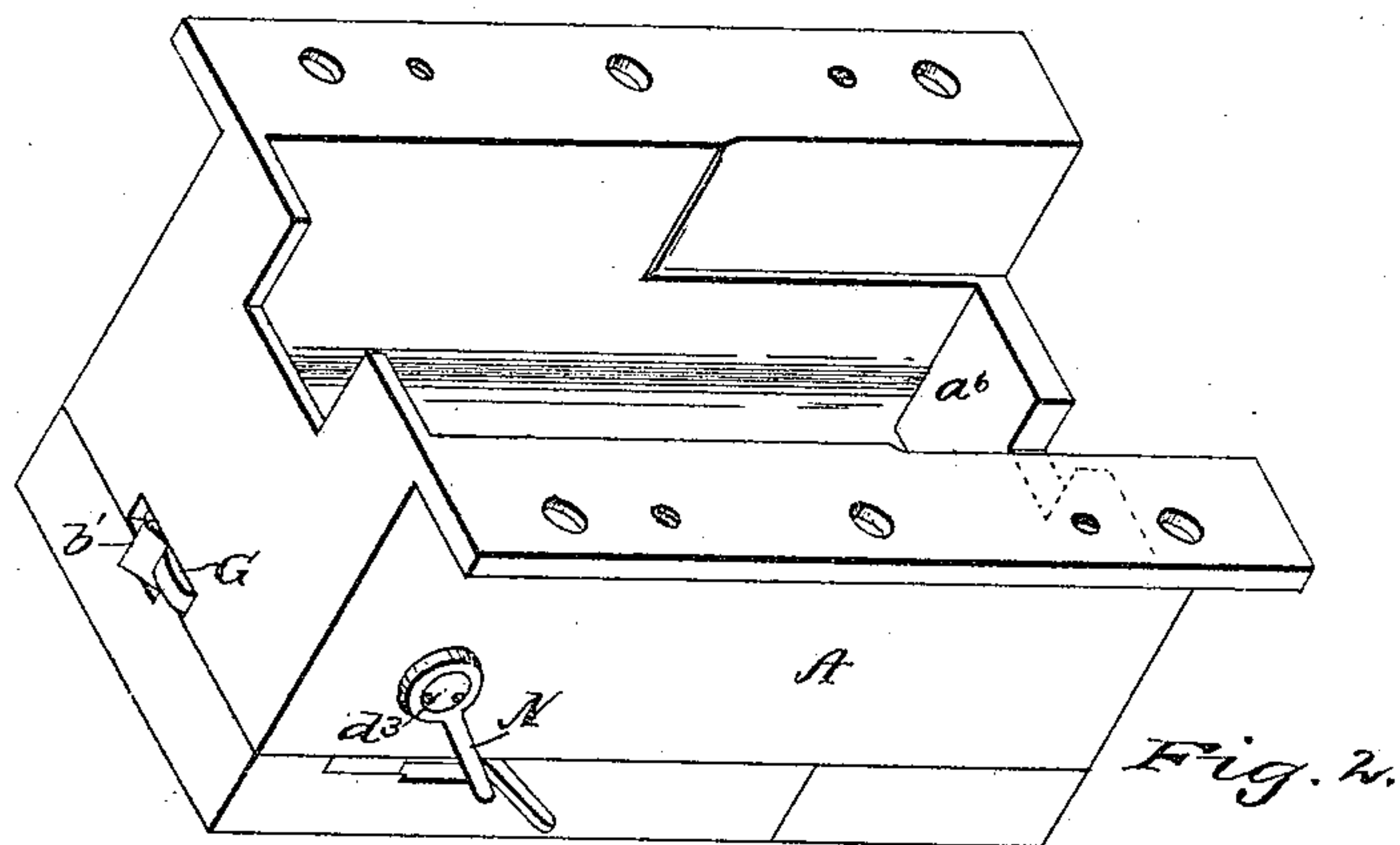
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4. Sheets—Sheet 2.

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(No Model.)

4 Sheets—Sheet 3.

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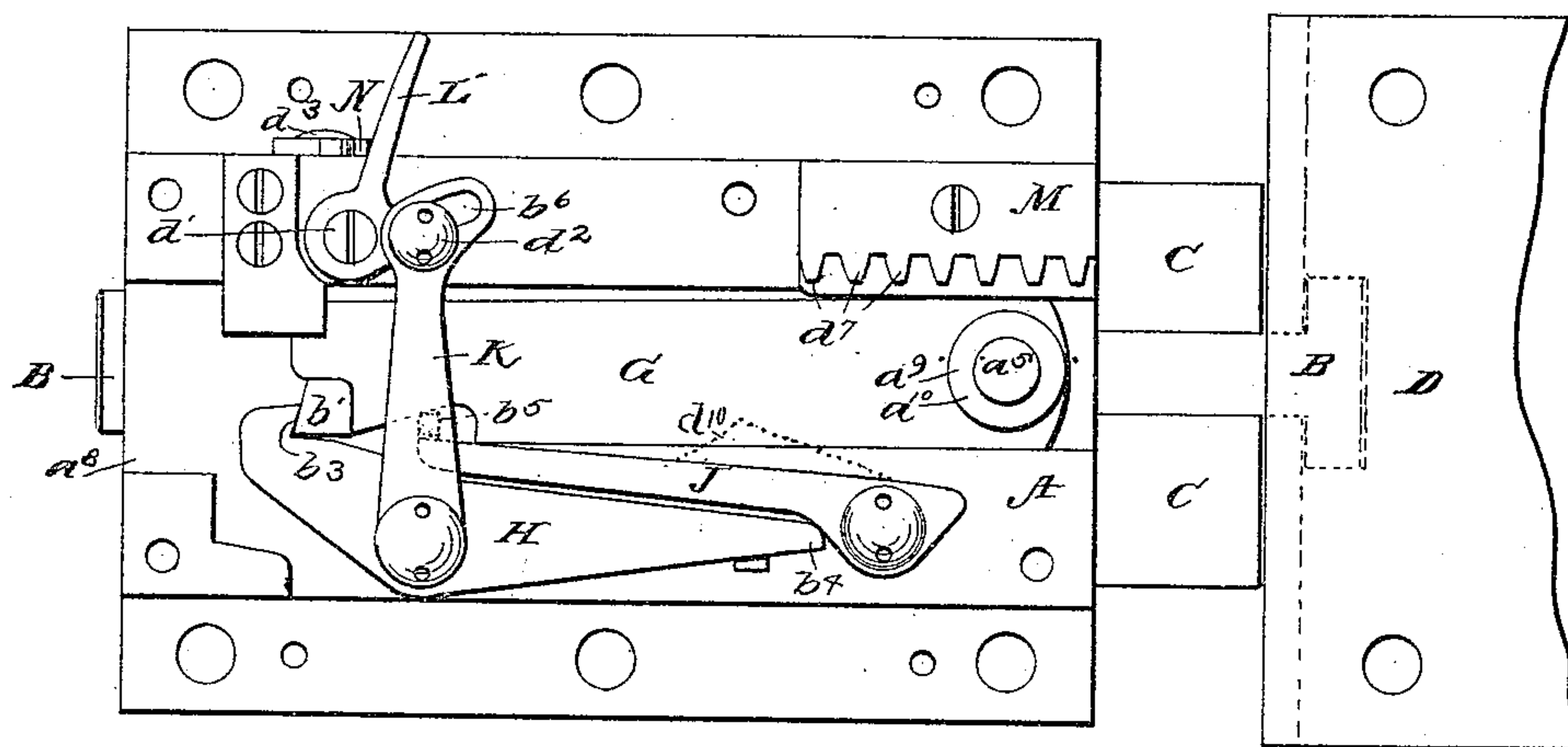


Fig. 7.

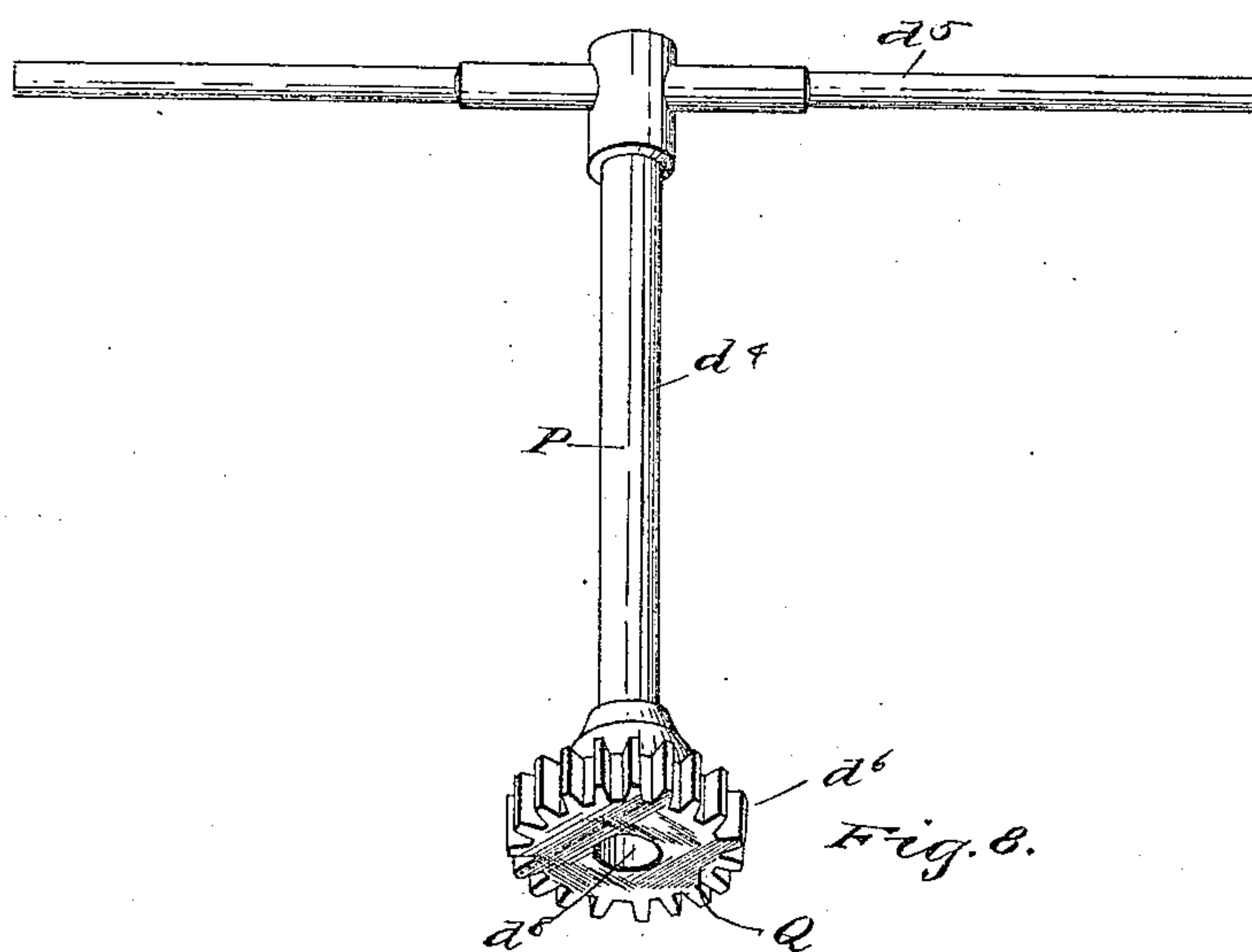


Fig. 8.

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(No Model.)

4 Sheets—Sheet 4.

A. KIRKS.
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Patented Oct. 14, 1890.

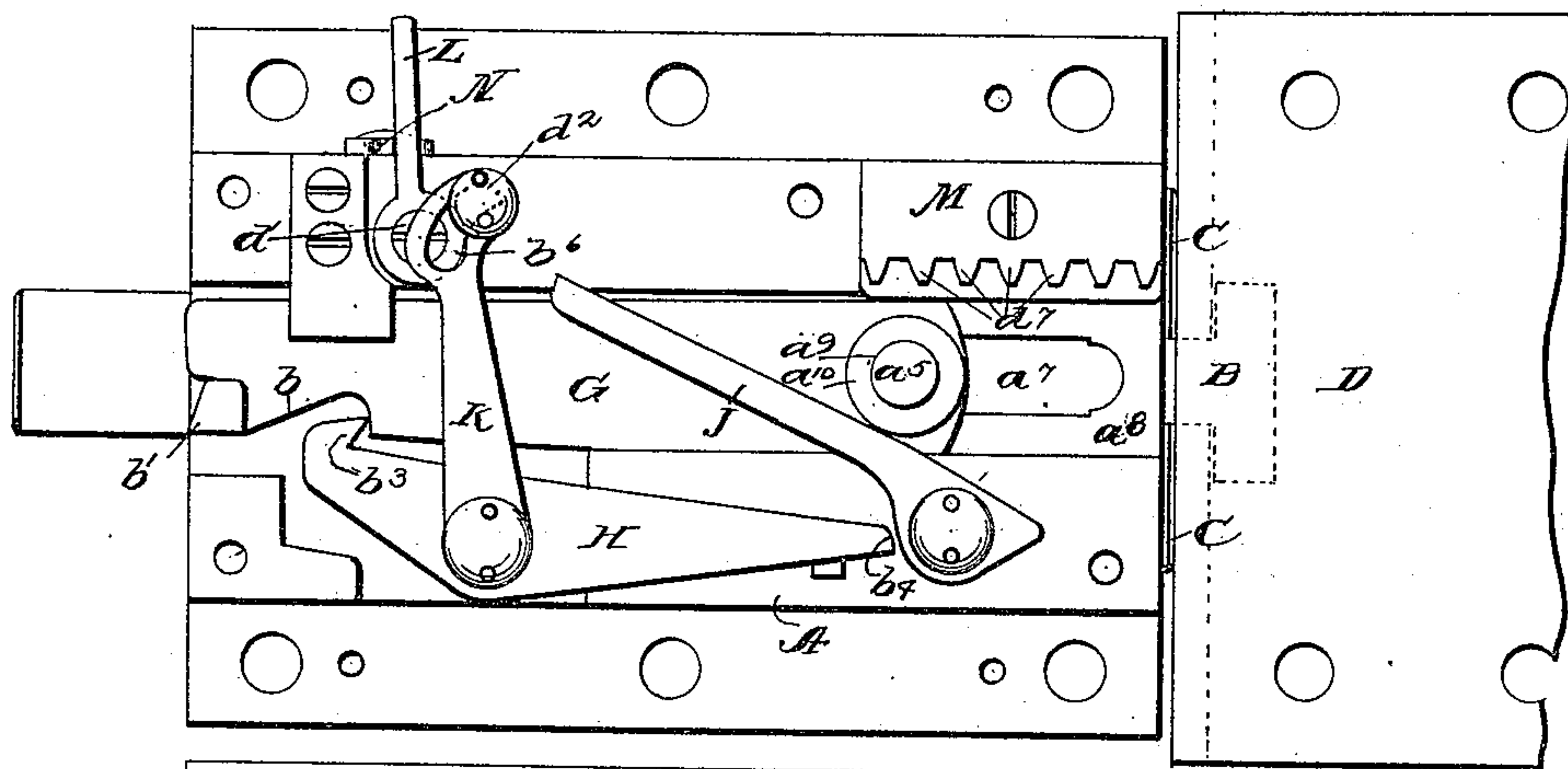


Fig. 9.

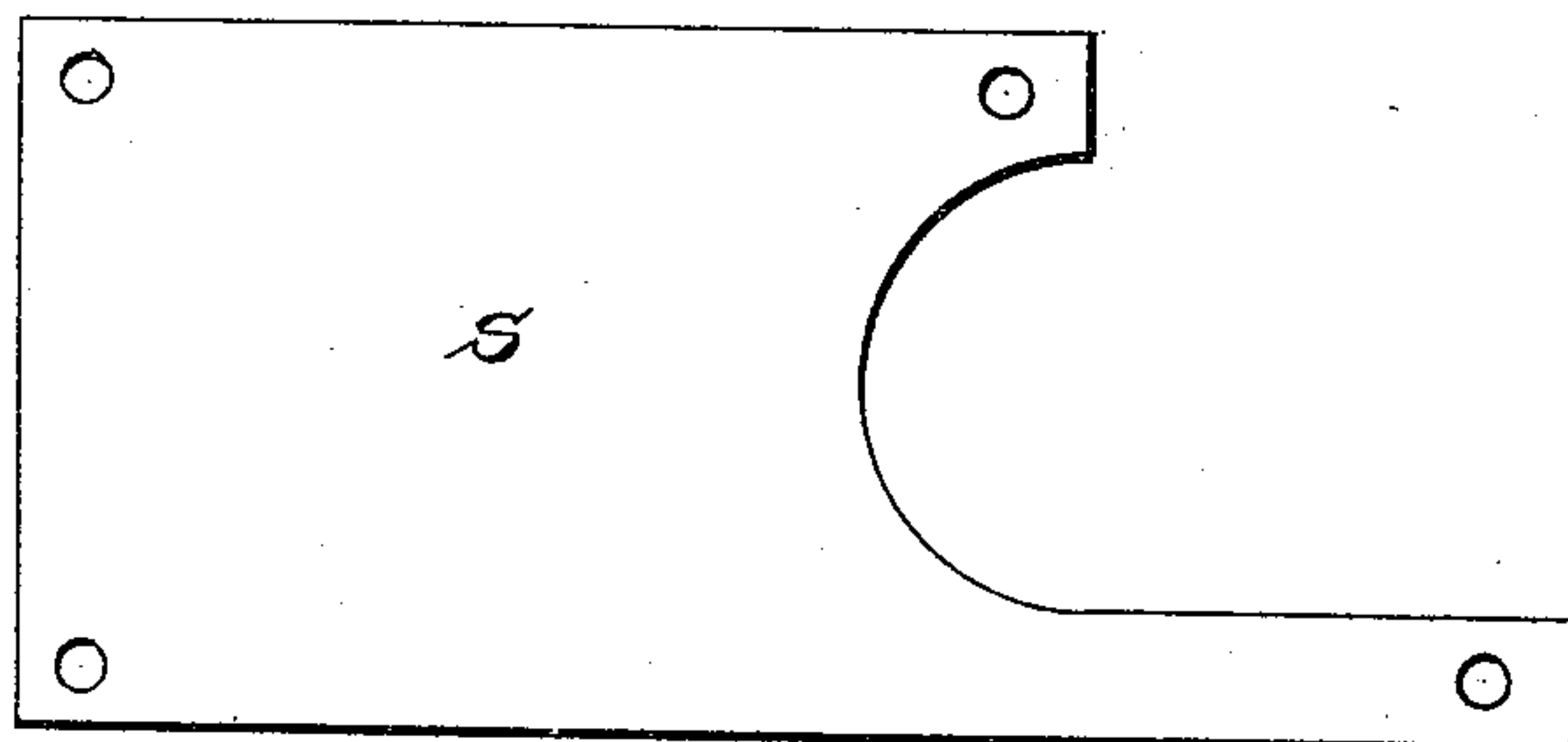
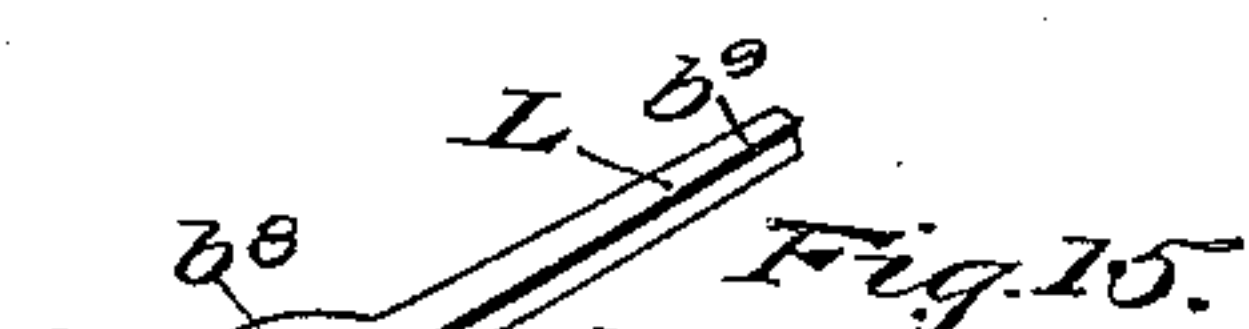
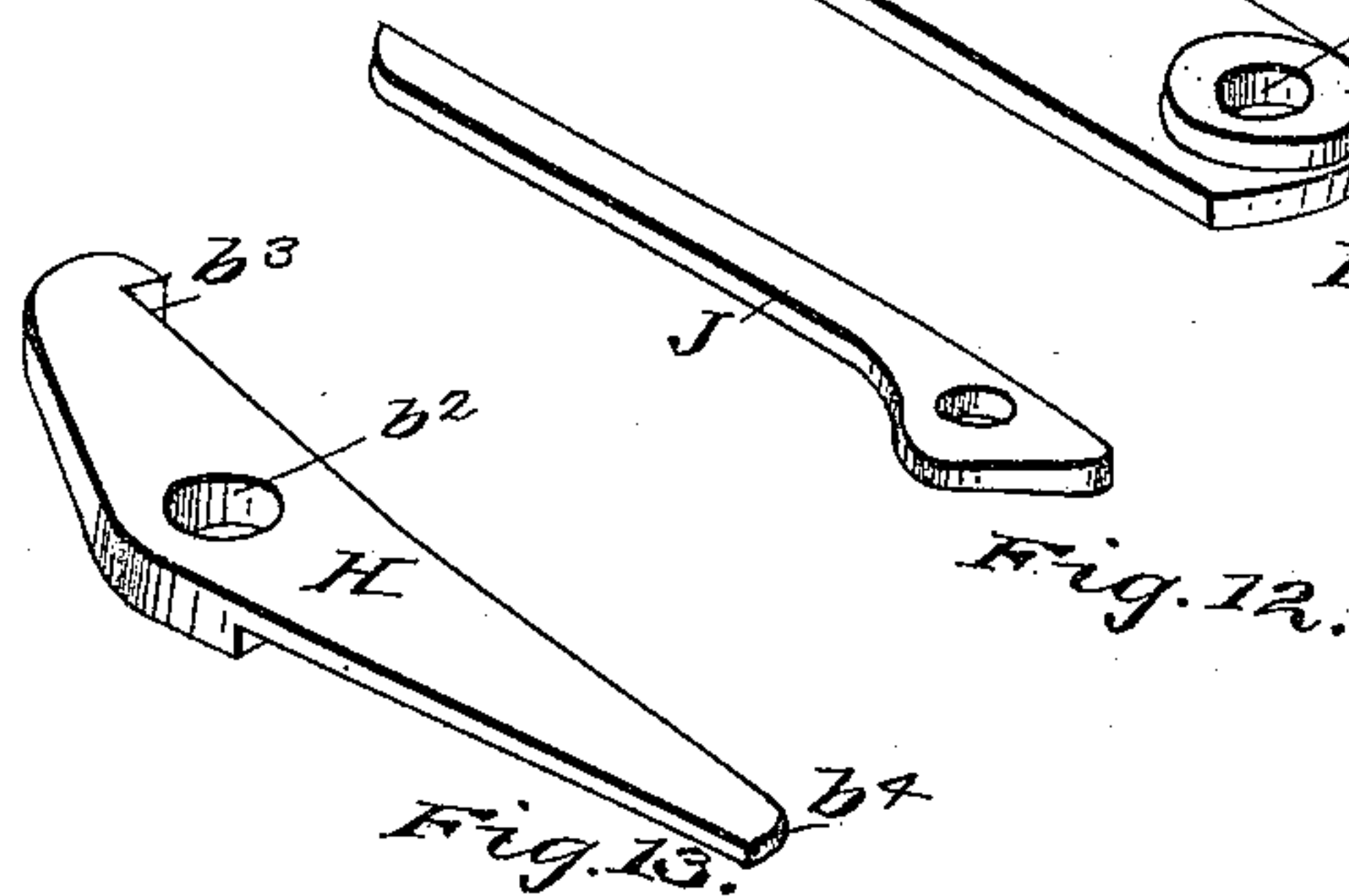
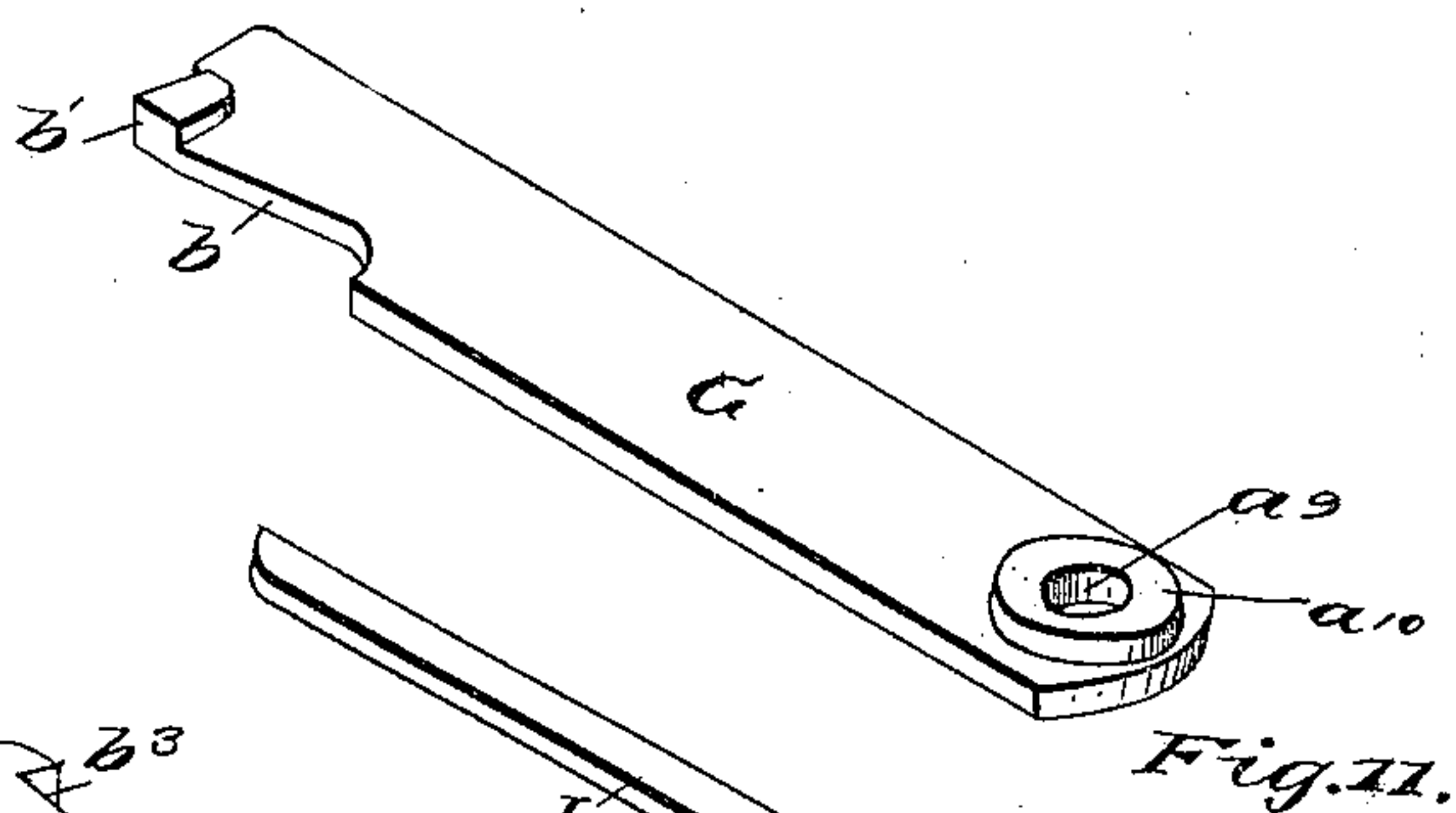
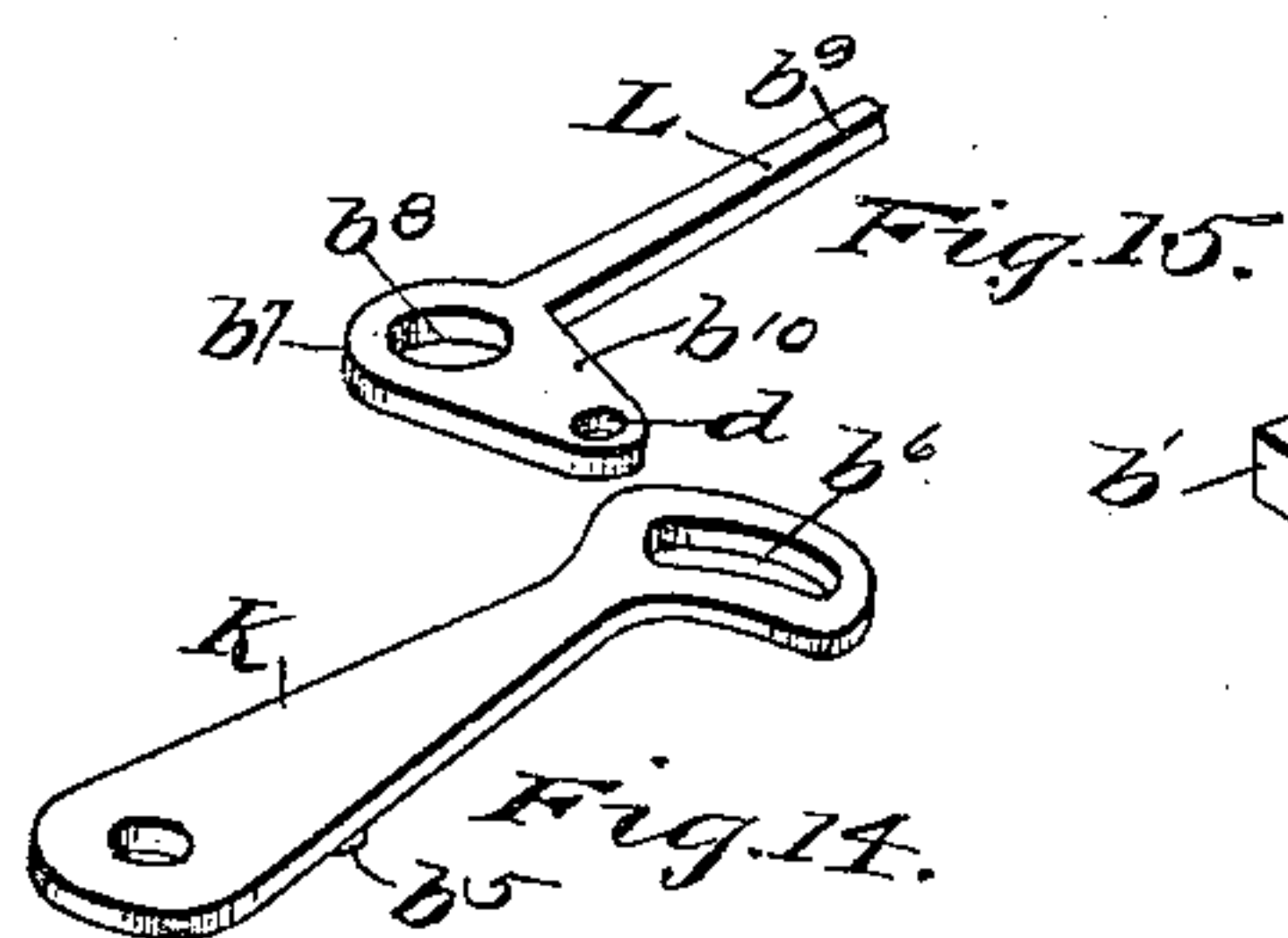


Fig. 10.



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UNITED STATES PATENT OFFICE.

ALBERT KIRKS, OF CANTON, OHIO, ASSIGNOR TO THE DIEBOLD SAFE AND LOCK COMPANY, OF SAME PLACE.

SAFE-LOCK.

SPECIFICATION forming part of Letters Patent No. 438,317, dated October 14, 1890.

Application filed February 26, 1890. Serial No. 341,853. (No model.)

To all whom it may concern:

Be it known that I, ALBERT KIRKS, a citizen of the United States, residing at Canton, county of Stark, State of Ohio, have invented
5 a new and useful Improvement in Safe-Locks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

10 My invention relates to improvements in safe-locks, and more particularly to that class of locks in which the locking-bolts are cast and retracted for locking and unlocking the safe-door by a spring located inside of the safe.

15 My invention also consists in providing improved devices for compressing the casting and retracting spring.

My invention relates to and consists in providing improved detent-levers by which the
20 springs are held wound or compressed.

With these ends in view my invention relates to and consists in certain features of construction and combination of parts, as will be hereinafter described, and set forth in the
25 claims.

Figure 1 of the accompanying drawings is an elevation showing the inside of a safe-door, illustrating one application of my invention; Fig. 2, a view in perspective of the lock-case, showing interior of case; Fig. 3, a similar
30 view showing the sliding plate and a part of the casting and retracting springs in position; Fig. 4, a similar view of the sliding plate, reverse side; Fig. 5, a similar view of sliding plate, front side. Fig. 6 is a similar view of a sleeve to embrace the end of the casting-springs and to engage the door-bolt mechanism. Fig. 7 is a front elevation of lock, showing the position of the parts with the retract-
40 ing-springs locked or held in compressed position, the casting-springs released, and the detent-lever in locked position; Fig. 8, a perspective of the spring winding or compressing key; Fig. 9, a front elevation of lock, showing the position of the parts the instant the parts have been released by the time mechanism to retract the door-bolts; Fig. 10,
45 a plan view of the cap or cover provided to protect the parts. Fig. 11 is a perspective of the sliding-plate latch; Figs. 12 and 13, simi-

lar views of the restraining and detent levers; Fig. 14, a similar view of the locking-lever, and Fig. 15 a similar view of the detent-releasing lever.

Similar letters of reference indicate corre- 55 sponding parts in all the figures of the drawings.

A represents the lock-case, in which is placed the casting and retracting springs a and a' and the sliding plate B, as shown in 60 Fig. 3, the ends of the case notched to provide a support for the sliding plate, in and through which it may slide.

In Figs. 4 and 5 is shown the sliding plate B, the latter showing the front and the former 65 the reverse side of said plate. On one end of said plate is provided a T-head a^2 , and at its other end portion abutment-wings a^3 and semicircular spring-supports a^4 , and projecting from the front side of said bolt is a spindle 70 a^5 , which will be hereinafter explained.

The retracting-springs are placed in the lock-case A, one end resting against the inside face a^6 of the case and the other end resting on the support a^4 and against the abutment 75 a^3 . In this case provision is made for the use of two retracting and two casting springs, the latter to cast the door-bolts into engagement with the door-jambs to lock the door and the former to retract or draw the bolts from the 80 jamb to unlock the door.

One end of the casting-bolts is supported on the support a^4 and against the abutment a^3 . The other end is embraced by a sleeve C, one end of which engages a plate D, which 85 is secured to a vertical plate E, secured to the door-bolts F, as shown in Fig. 1.

At one end of the front face of the case A, and about central thereto, is provided an elongated aperture a^7 , (shown in Figs. 1 and 9,) 90 through which the spindle a^5 is passed, and longitudinally and about central to said case is provided a through raceway a^8 to serve as a guide to the locking-latch G. At one end of said latch is provided a perforation a^9 , 95 having about it a boss portion a^{10} , and at its other end a portion is cut away to form a graded portion b , and on the lower front end portion of said latch is provided a toe b' , as shown in Fig. 11. The latch G is placed in 100 .

the raceway a^6 and the spindle a^5 passed through the aperture a^9 , the free end in the raceway.

To the face of the case A, below the raceway, is pivotally secured a detent-lever H, and above said raceway a releasing-lever L. The said levers may be of the form substantially as shown, the lever H having a perforation b^2 and a detent-hook b^3 to engage the toe b^1 of the latch G, the free end portion b^4 to take under the restraining-lever J, as shown in Figs. 7 and 9.

The lock-lever K is provided at its lower end portion with an inwardly-projected stud-pin b^5 , (see Fig. 14,) and at its upper end portion with an elongated aperture b^6 . The time-lock-actuated lever L is of the form shown, having a heel portion b^7 , having therein a perforation b^8 , a handle portion b^9 , and a toe portion b^{10} , having a perforation d . The lever L is pivotally secured to the case A by the screw d' , as shown, and the toe loosely secured to the locking-lever K by the screw d^2 , passed through the aperture b^6 into the perforation d to form a sliding engagement between the locking-lever K and the releasing-lever L.

A spring-actuated finger N is pivotally secured to the top portion of the case, as shown in Figs. 2, 3, 7, and 9. In this case the spring is concealed under the body portion of the finger coiled about the screw d^3 , by which the finger is pivoted to the case, the energy of said spring being exerted to press the finger against the lever L.

To compress or wind the casting and retracting springs, a toothed rack M is secured to the face of the case A, as shown in Figs. 1, 7, and 9. A winding-key P, as shown in Fig. 8, is provided, having stem and handle portions d^4 and d^5 , and a winding-pinion Q, having peripheral teeth d^6 , adapted to engage similar teeth d^7 of the rack M, and a central perforation d^8 .

In operation, to compress the springs the pinion Q is placed on the pin or stud a^5 , the teeth d^6 of the pinion Q engaging the teeth d^7 of the rack M. The handle turned from right to left will rotate the pinion about the pin a^5 , by which movement the pinion and the sliding plate will be carried from left to right the distance of the throw of the bolt, and with the sliding plate the latch G is carried into engagement with the detent-hook b^3 at the end portion of the lever H, as shown in Fig. 7, at which point the pinion is withdrawn. By this arrangement of the spring winding or compressing devices on the outside of the inclosing-case A the case may be shortened without encroachment upon the length or efficiency of the casting or retracting springs or the lock-bolt. It will be evident that a much smaller form of lock may be constructed, adapted for use on small doors, and yet retain the usual size of all of the actuating or working parts of the lock.

When the time mechanism R shall have reached a period previously determined upon,

the pendant d^8 will engage the releasing-lever L and press it over to position shown in Fig. 9, at which instant the restraining-lever J will be released from the stud b^5 on the locking-lever K, at which instant the sliding plate B will be carried from right to left. To retract the door-bolts, the levers H and J take for an instant the position shown in Fig. 9, and will drop back into the position shown in Fig. 7, and the locking and releasing levers will remain in the position shown in Fig. 9 until the time mechanism is again wound and the springs compressed, when they too will take the position shown in Fig. 7 and again hold the spring compressed for another period of time. When the parts have been moved to the position shown in Fig. 9, the levers J and H are caused to assume the position shown in Fig. 7 by the boss a^{10} , hereinbefore referred to, which travels in the track of the lever J, when the sliding plate is shot and forces the said lever downward beneath the lug b^5 before the lever K has time to return to the position shown in Fig. 7, thus resetting the said levers. It has been discovered, however, that in some instances the lever K after the bolts have been shot is forced from its position shown in Fig. 9 to its position shown in Fig. 7 by the spring-actuated releasing-lever L, and in this event the lever J is unable to reach a point below and engage the under side of the lug b^5 to lock the said levers when the springs are compressed. In other words, the lever J must be held against vertical movement by the lug b^5 to retain the lever H in locked position against the action of the springs when compressed, this being the object of resetting the levers when the sliding plate is shot. To provide a positive means for causing the lever to assume its position beneath the lug b^5 , as shown in Fig. 7, I enlarge said lever by a graded portion d^{10} , (shown in dotted lines in Fig. 7,) which should the lever fall with its free end upon the upper surface of the lug aforesaid, will be engaged by the boss a^{10} , which will force the free end of the said lever, which may be slightly rounded against the lug, which, with its lever K, will be moved slightly to one side and permit the lever J to drop beneath the lug, which, through the action of the spring-actuated releasing-lever L and the lever K, will return to its position above the lever J and hold it against vertical movement. It will therefore be seen that I provide a positive means for resetting the levers.

It will be observed that when the releasing-lever L is thrown by the time or other actuating mechanism into a position to release the sliding plate, and hence the locking-bolts, the same stroke of the lever will throw the parts into such position that a locking of the bolts cannot be effected until the same lever shall have been positively and intentionally again moved.

The door-bolts (shown in Fig. 1) and the manner of operating them is similar to that

shown and described in my application filed on the 20th day of February, 1890, Serial No. 341,237.

The cap S is provided to cover and protect the detent and other levers, hereinbefore mentioned.

A detent T is loosely secured to the plate U, the head portion *h* having dropped into position, as shown, in front of the plate E in the line of its movement, and the tail portion *h*² projected outwardly to meet the door-jam, by which the detent will be rocked in its pivotal connection with the supporting-plate U.

It will be observed that the spring-compressing devices and the devices for holding and releasing said springs are located outside of the case, and by thus locating the parts access may more readily be gained to them for any purpose whatever—such, for instance, as to repair or remove the parts or for cleaning or lubricating them. Thus the obstacles heretofore experienced in devices of this character wherein the mechanism above mentioned is inclosed in the casing adjacent the springs are entirely overcome.

In operation the time mechanism is wound and set, and the casting and retracting spring compressed, as before stated, the detent T engaging and resisting the movement of the door-bolts until the door is closed. The tail *h*² engaging the door-jamb will swing the detent out of engagement with the plate E, when the casting-springs will cast the door-bolts into engagement with the door-jambs, in which position they will remain until the retracting-springs are released by the time mechanism, when the bolts will be disengaged from the door-jamb and the door unlocked.

Having thus fully described the nature and object of my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the bolts of a safe-door, of springs for casting and retracting the bolts, a sliding plate against which the springs act, and a spring-compressing device located outside of the case, comprising a stationary rack-bar and a pinion having a bearing on the sliding plate, the teeth of said pinion engaging the teeth of the rack-bar and adapted to be rotated about its bearing and to travel longitudinally with said plate, substantially as set forth.

2. The combination, with bolts of a safe-door, of springs for casting and retracting the bolts, a sliding plate against which the springs act, and a spring-compressing device comprising a stationary rack-bar secured to the lock-case and a removable pinion having teeth to engage the teeth of the rack and adapted to be rotated by hand, substantially as set forth.

3. The combination, with the bolts of a safe-door, of springs for casting and retracting the bolts, a sliding plate against which said springs act, a detent, a latch pivoted to said sliding plate to move longitudinally therewith and to

engage the detent by which said springs are held compressed, and a lever to hold the detent in engagement with said latch, substantially as set forth.

4. The combination, with the bolts of a safe-door, of springs for casting and retracting the bolts, a sliding plate against which the springs act, a latch pivotally secured to said sliding plate to move therewith, and detent-levers, which are reset by the movement of the sliding plate when the bolts are retracted, substantially as set forth.

5. The combination, with the bolts of a safe-door, of springs for casting and retracting the bolts, a sliding plate against which the springs act, and a latch pivoted to said sliding plate to move longitudinally therewith, said latch having at one of its ends a boss or outwardly-projected portion to move in the track of the restraining-lever and at its other end a toe to engage an undercut hook on the detent-lever, substantially as set forth.

6. The combination, with bolts of a safe-door, of springs for casting and retracting said bolts, a sliding plate against which the springs act, a latch pivoted on said sliding plate, a detent to engage said latch, a restraining-lever to engage the detent-lever, a lock-lever provided with a stud for holding the restraining-lever against the detent-lever, and a releasing-lever connected therewith to operate the locking-lever and adapted to be actuated by a time mechanism, substantially as set forth.

7. The combination, with bolts of a safe-door, of springs for casting and retracting said bolts, a sliding plate against which the bolts act, a latch secured to said plate, a detent-lever to engage said latch, a restraining-lever to engage said detent-lever, provided with a graded surface, a locking-lever provided with a stud for holding the end of the restraining-lever, a boss or stud carried by the latch to engage the graded portion, and mechanism for releasing the locking-lever, substantially as set forth.

8. The combination, with bolts of a safe-door, of a casing, springs inclosed within said casing, a sliding plate against which the springs act, said casing provided with a longitudinal opening, and said sliding plate provided with a shaft projecting through said opening, a latch pivoted to the said shaft, mechanism for holding the latch against the tension of the springs, mechanism for releasing the latch, and a device for compressing the springs, substantially as set forth.

9. The combination, with bolts of a safe-door, of a casing, springs secured within the casing, a sliding plate against which the springs act, said casing provided with a longitudinal opening and a series of rack-teeth, and said sliding plate provided with an axis or stud projecting through said opening, a latch pivoted to said axis, mechanism for holding the latch against the action of the springs, mechanism for releasing the latch, and a shaft pro-

vided with a pinion for engaging the stud or axis and to mesh with the rack for compressing the springs, substantially as set forth.

- 5 10. The combination, with bolts of a safe-door, of an inclosing-casing and a sliding plate mounted on said casing to move therethrough, each end of said plate adapted to engage the bolt-operating mechanism, substantially as set forth.

In testimony whereof I have hereunto set to my hand this 21st day of February, A.D. 1890.

ALBERT KIRKS.

Witnesses:

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