

H. WINN.

Locks.

No. 151,461.

Patented May 26, 1874.

Fig. 1.

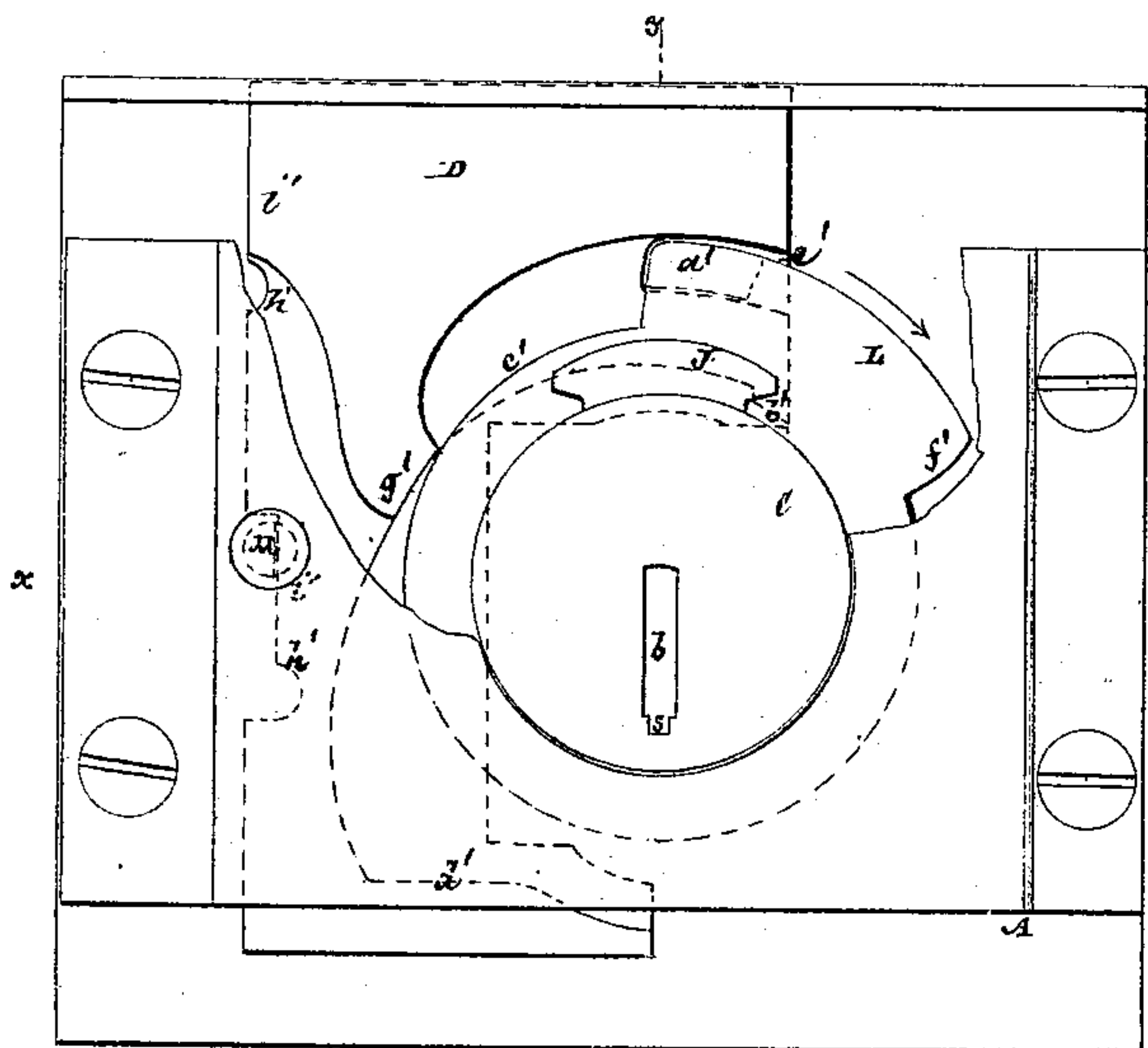


Fig. 2.

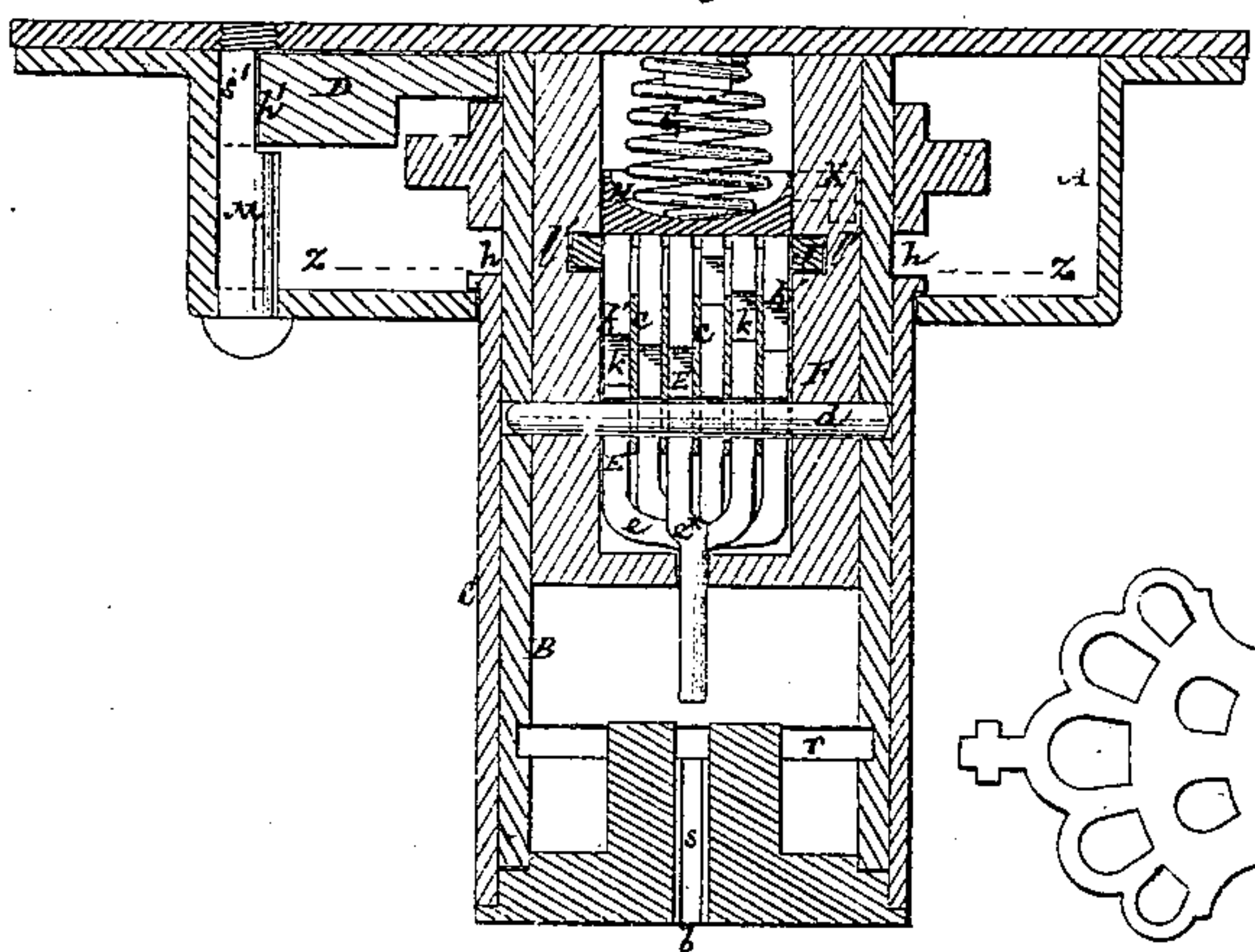


Fig. 3.

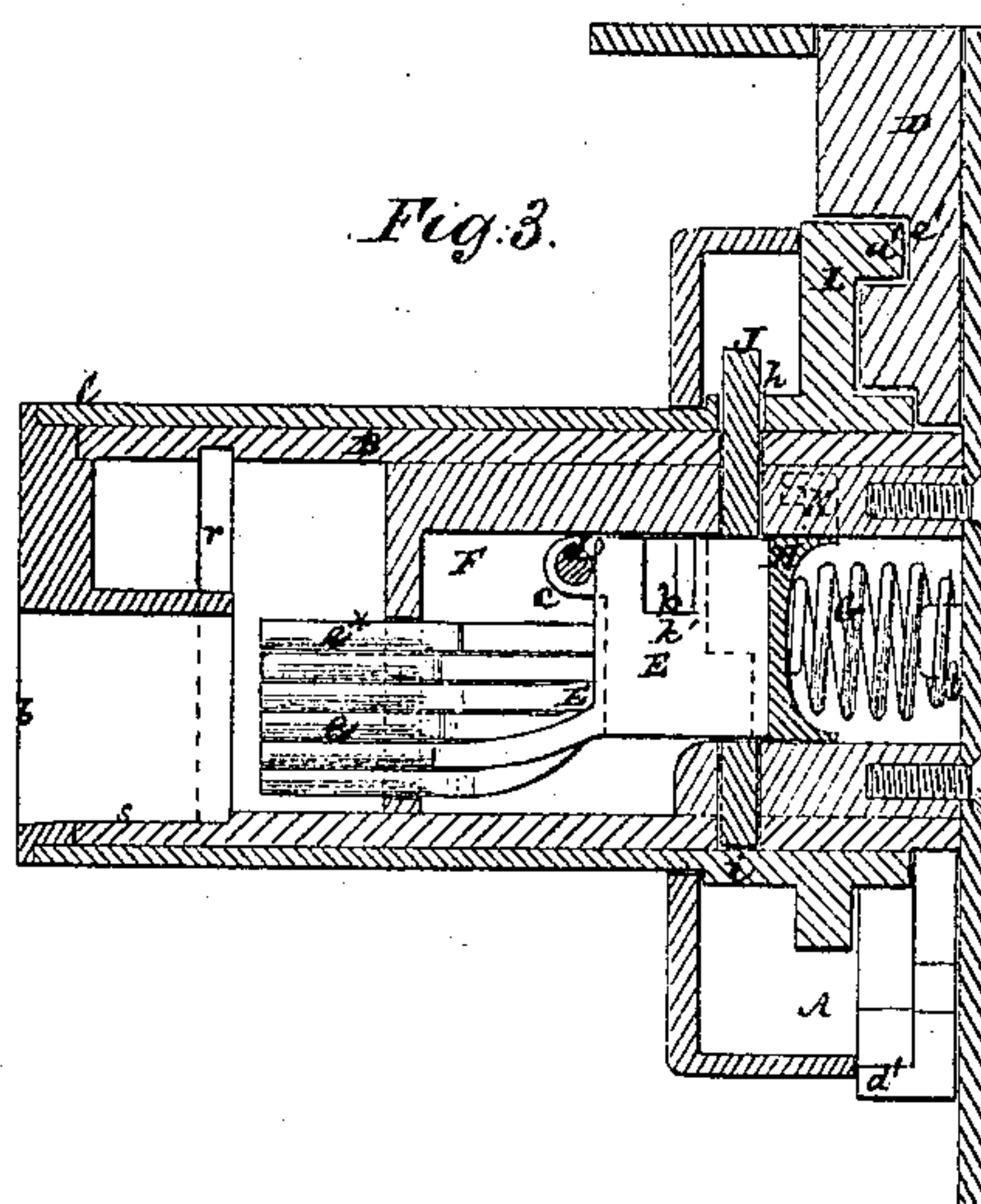


Fig. 4.

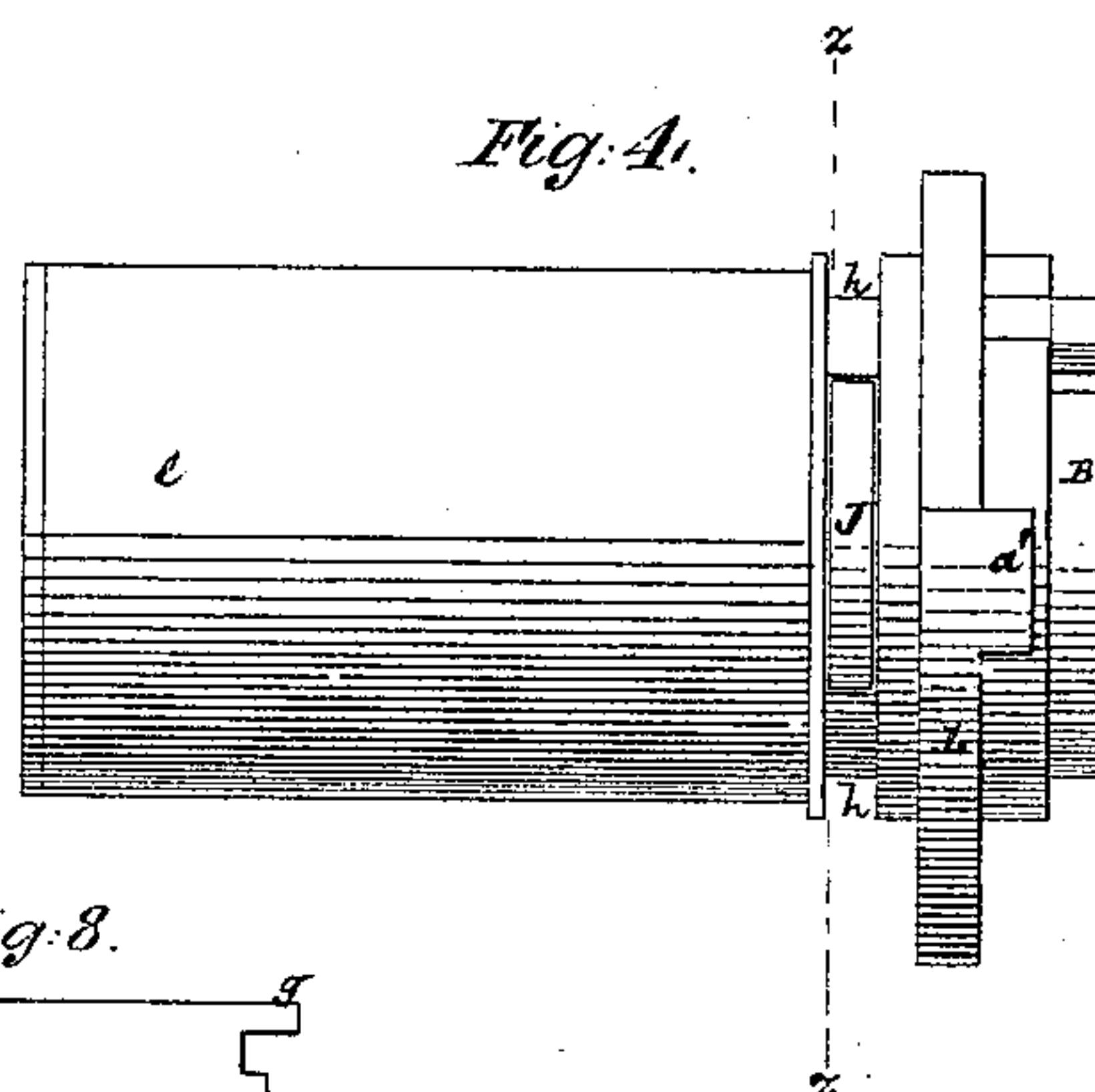


Fig. 8.

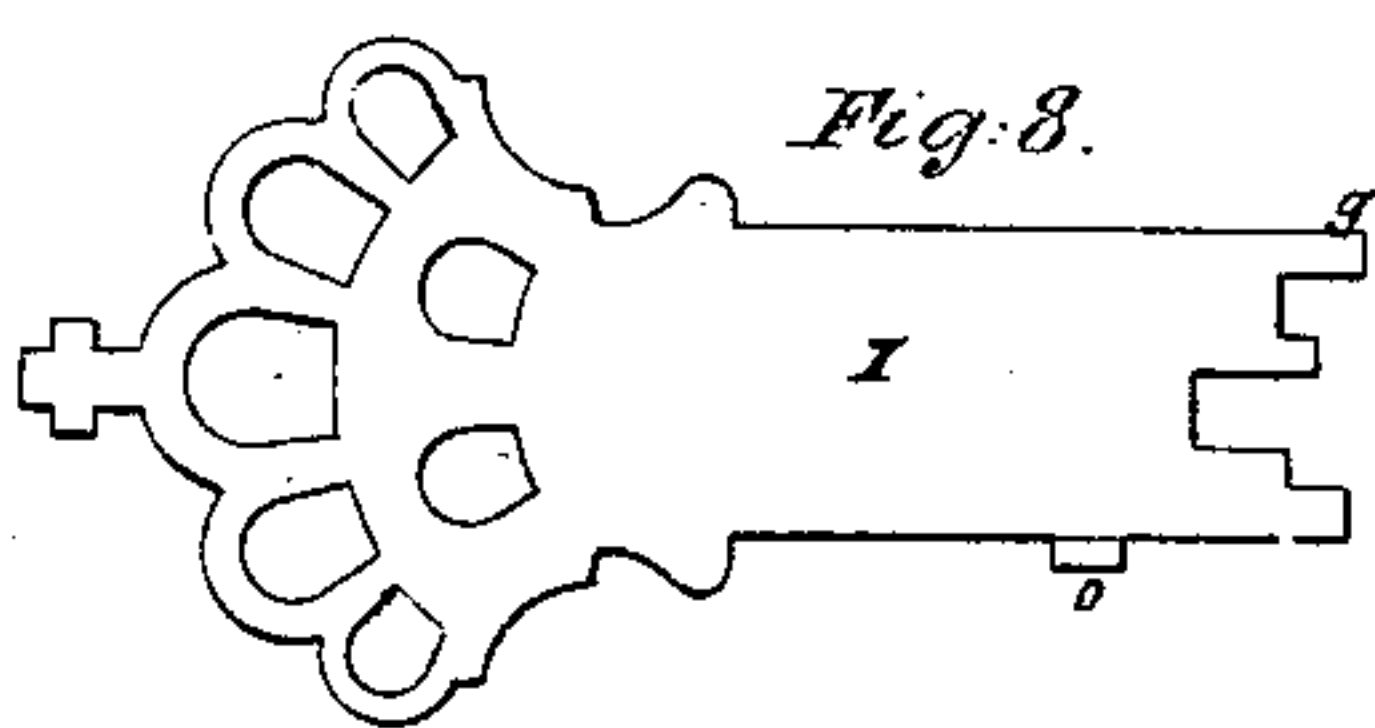


Fig. 6.

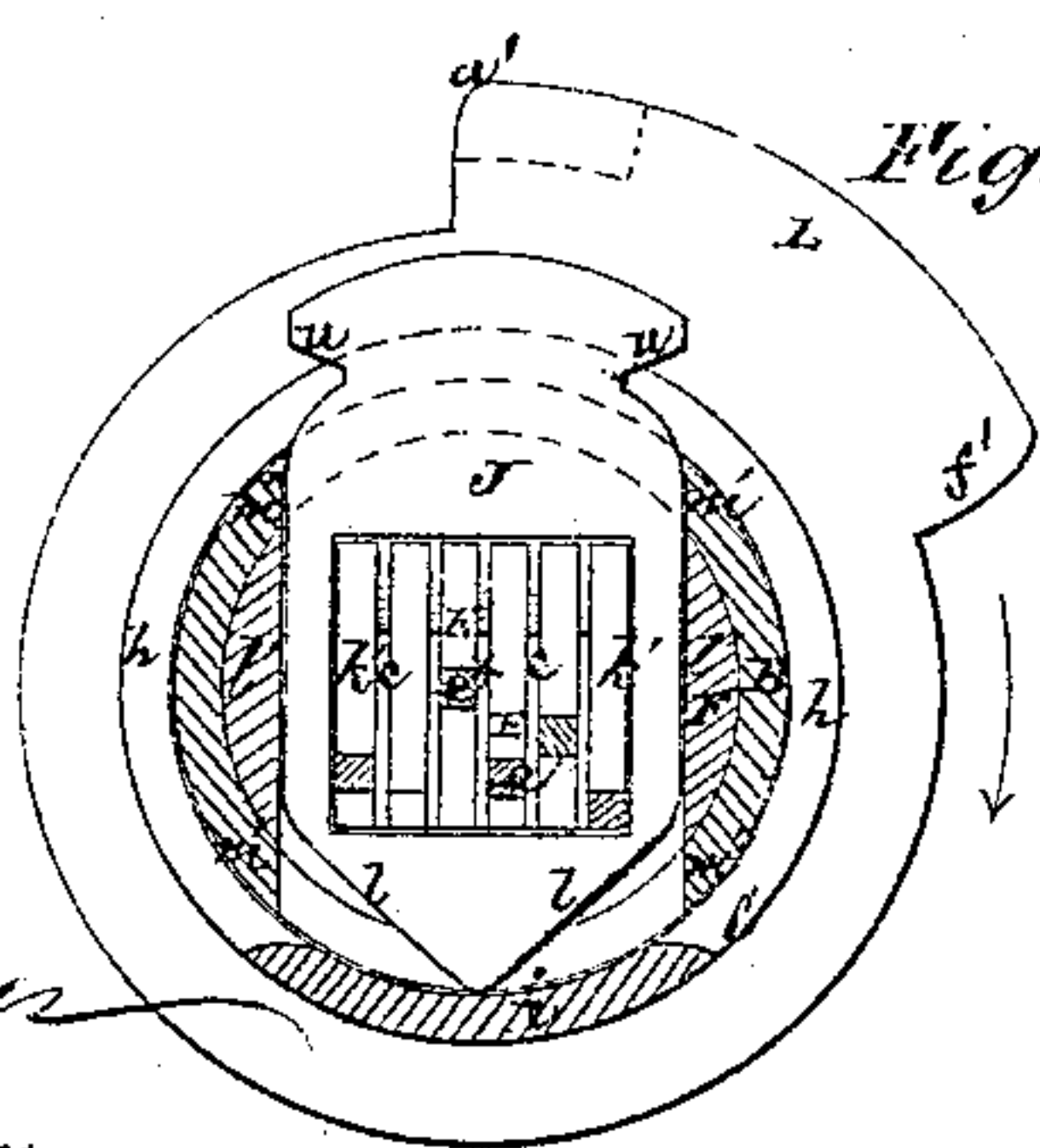
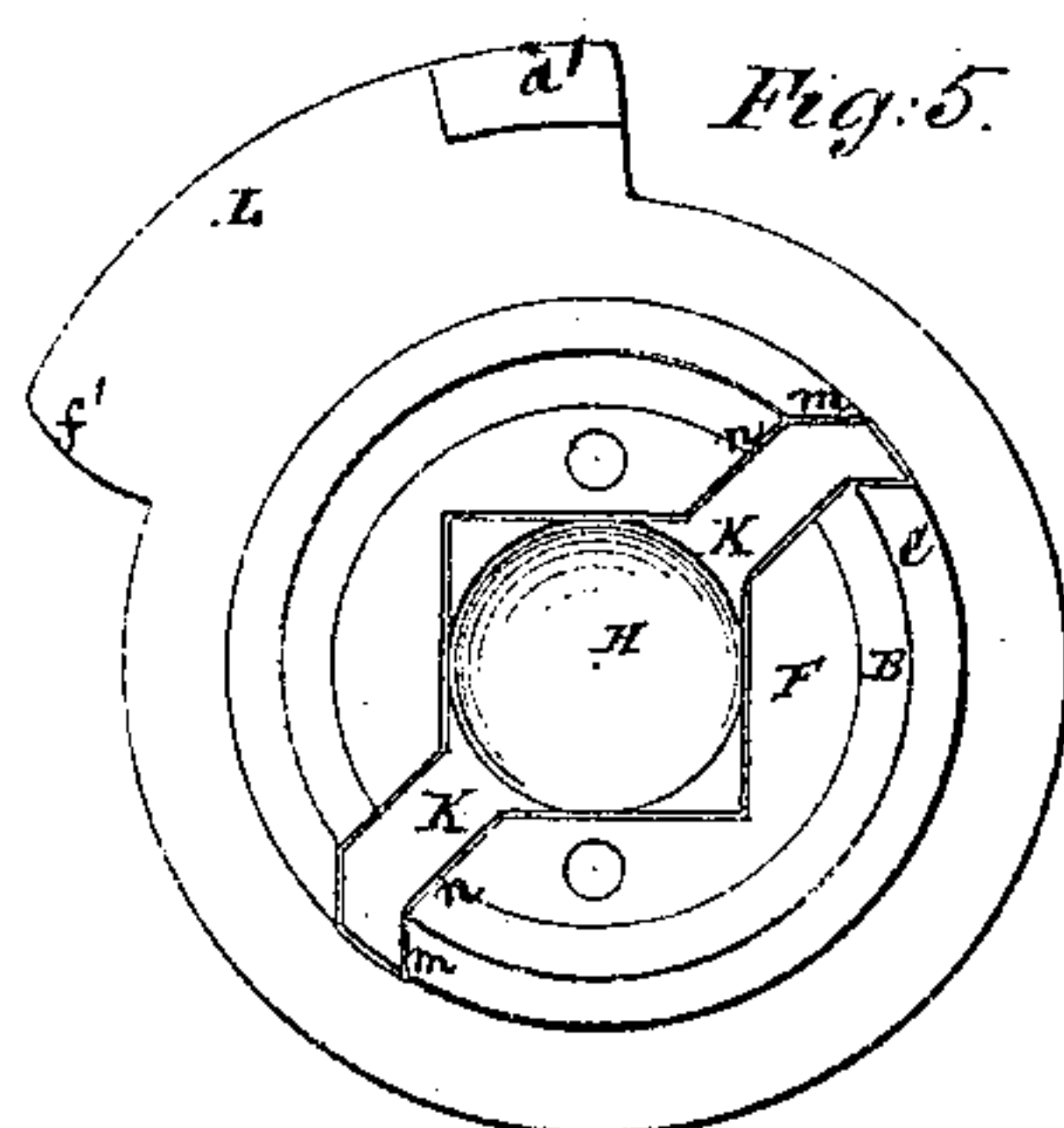


Fig. 5.



Witnesses:  
*Thos. Hurner*  
*R. R. Rabeau*

Scale. 0 1/2 inch.

*Henry Allen*

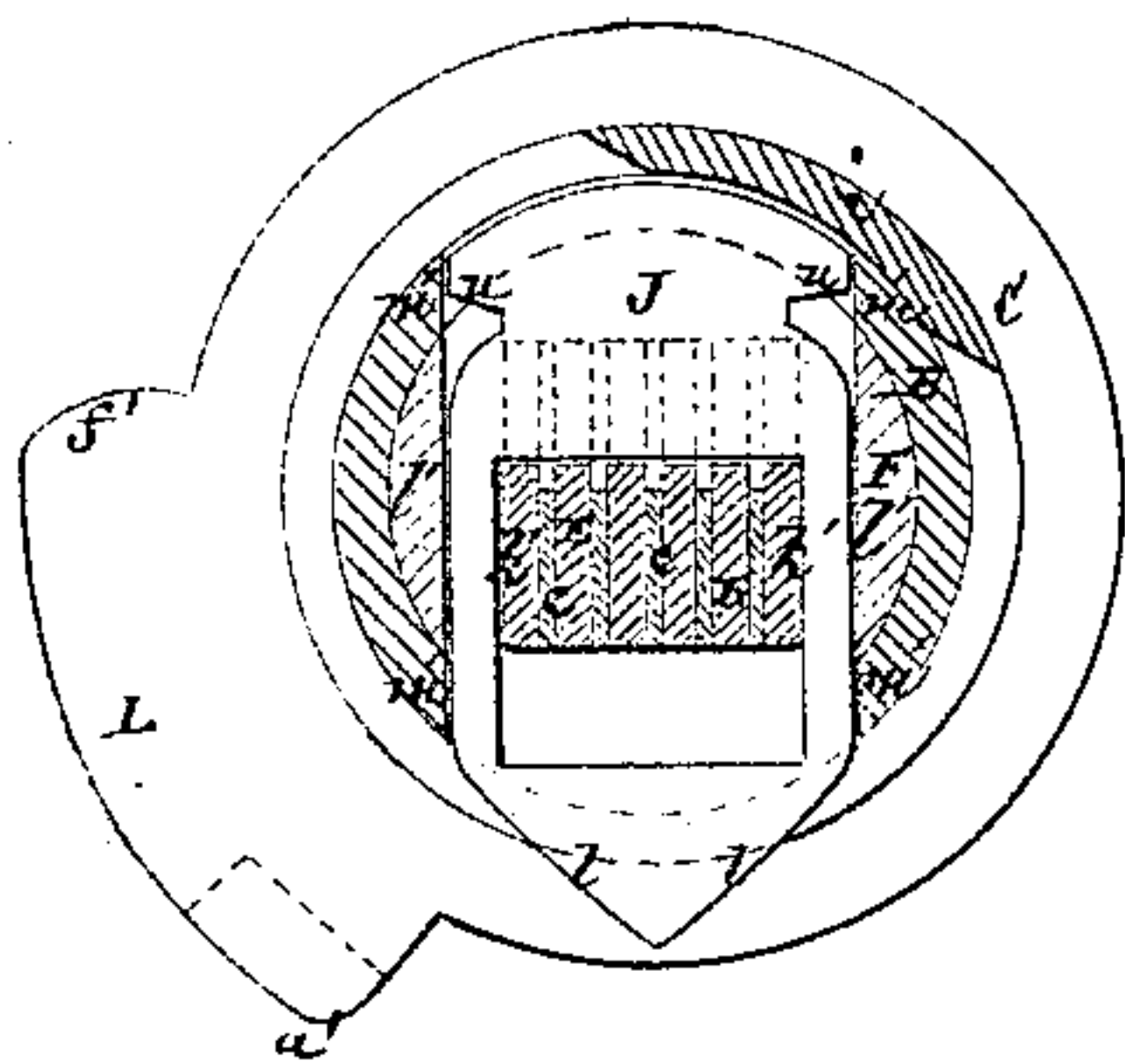
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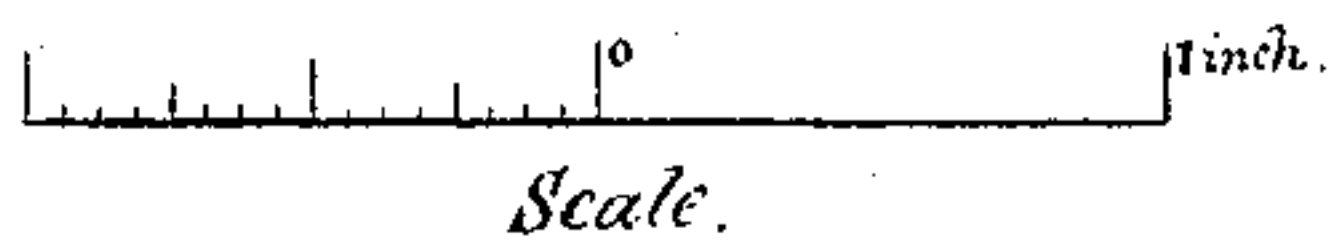
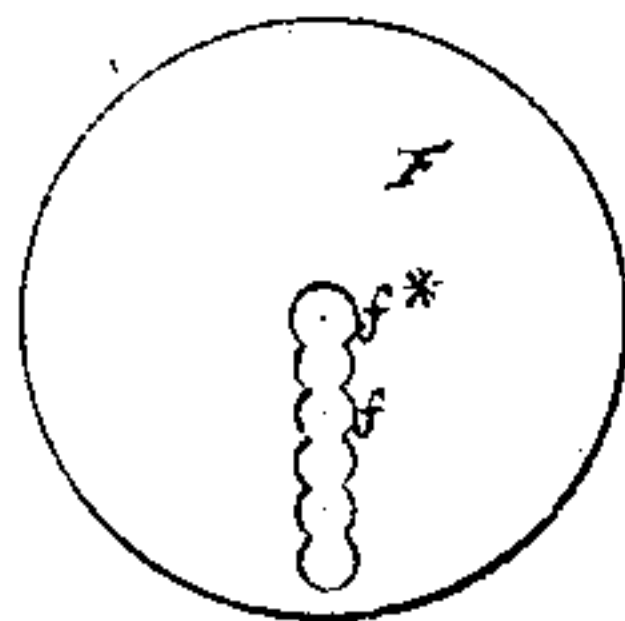
*Fig: 7.*



*Fig. 10.*



Fig: 9.



*Witnesses:*

Fred Barnes  
R. E. Rabreau

Henry Allison,



# UNITED STATES PATENT OFFICE.

HENRY WINN, OF PIERMONT, NEW YORK.

## IMPROVEMENT IN LOCKS.

Specification forming part of Letters Patent No. 151,461, dated May 26, 1874; application filed October 18, 1871.

*To all whom it may concern:*

Be it known that I, HENRY WINN, of Piermont, in the county of Rockland and State of New York, have invented certain new and useful Improvements in Locks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

It may be stated, preliminarily, that escutcheon-locks have been made in which the tumblers project into or lie and move together with the key in an escutcheon beyond the bolt-case which revolves to throw the bolt. By this construction the interior or working parts are cut off from easy access by picking-tools, and a short key, regardless of the thickness of the door or part to which the lock is applied, may be used.

Tumblers moving rectilinearly with the axis of the key have been used because they afford greater length of variable part by utilizing the length of the escutcheon and the thickness of the lock than any others, except where the wing of the key or the escutcheon itself is made of impracticable size, thereby allowing of a greater number of combinations; they are also better adapted to the use of improved styles of fence.

These are advantages which my improved lock possesses; but in such class of locks it has been usual to make the tumblers rotate in common with the bolt-operating case or shell, so that they would be projected against a fence with such pressure that if one tumbler be felt down past the fence a sense of relief would be communicated to the operator when the tumbler-notch reached the fence, thus determining the length of key-bit for that tumbler, thereby enabling the lock to be picked, which is further facilitated by the exposure of the tumblers opposite the key-hole in all vital points of action by reason of the rotation of the tumblers at all times in common with the shell.

I obviate these and other defects by making the bolt-operating shell, case, or device independent, as regards its rotation, of the tumblers, and use, in combination with such tumblers, a fence which is operated by gravity or other force not transmitted by the operator, and consequently beyond his control; and by

using a gravitating or like fence, in combination with tumblers setting rectilinearly with the key's axis, preventing any perceptible pressure from being brought upon the tumblers by the fence, and rendering picking difficult or impossible.

Similar tumblers, with fences acting upon similar principles, may have been used before, but in conjunction with special apparatus to throw the bolt, inconvenient, and either not applicable to large classes of locks, or too cumbersome and costly to be practicable, while the variable key does not rotate for the purpose as it does in my lock.

I use a cut-off to restrain the tumblers' restoring force at such times as the tumblers, if projected, would fail to impinge on their proper key-planes, and thus avoid cramping of the tumblers against the sides of the key.

Many of these features have not been practicable or expedient in locks of the description heretofore named.

The invention also comprises a central spring-tumbler, on which the key rotates as on a pivot, repressing the spring from projecting the tumblers when, if projected, the cramping aforesaid would occur in case of failure of the cut-off from wear or other cause; the use of a fence, of the nature described, as a detached piece, whereby it may be very small, and presents its surface evenly on the surface of all the tumblers, and is of great convenience in the adjustability of the escutcheon to doors of varying thickness, coupled with the inclosure or part inclosure of the fence in the rotating shell, thereby insuring compactness, as well as aiding in adjustability of such an escutcheon, together with various other peculiarities.

In the accompanying drawings, Figure 1 represents a face view of the lock constructed in accordance with my invention; Fig. 2, a sectional view thereof, taken at the line *xx* in Fig. 1; Fig. 3, a sectional view at the line *yy* in the same figure; Fig. 4, a plan of the revolving shell, showing also the fence and stationary shell; Fig. 5, a rear or inner-end view of said shells, with a cut-off applied thereto; Figs. 6 and 7, transverse sections, taken mainly at the lines *zz* in Figs. 2 and 4, showing the operating parts in different positions;



Fig. 8, a longitudinal view of the key; Fig. 9, a face or front-end view of the inner stationary portion which contains the tumblers, showing the plate or surface through which the shanks of the tumblers project, and by which they are guided; Fig. 10, a slatted screw, to fasten the lock to its place of attachment.

Similar letters denote corresponding parts throughout the several figures of the drawing.

A represents the bolt-case, and B the stationary shell or tubular portion of the case, on or around which the rotating or incasing shell C, that operates the bolt D, moves. If desired, an outer guard may be secured to the bolt-case, or the latter be extended, so as to surround the revolving shell or section of shell C, to secure freedom of action for the latter. E E are the tumblers, arranged within a stationary inner cylinder or chamber, F, and so that they project beyond the bolt case A toward the key-hole *b*, which is in the front-end portion of the revolving or incasing shell C. These tumblers E E are independent of the incasing-shell or partly-incasing shell C—that is, they have a movement which is substantially rectilinear with the key's axis, and do not revolve in common with said shell throughout its rotation. Thus they may be arranged to slide in and out between the furrings *c c*, attached to a stationary cross-pin, *d*, that also acts as a stop to the tumblers when thrown forward or out by a restoring-spring, G, arranged to act upon a follower, H, which, with its ends K K, forms a cut-off at the back of the tumblers, and within the stationary inner cylinder F, said spring controlling all the tumblers. Said tumblers E E are operated or forced inward by a flat key, I, introduced through the key-hole, and are provided with bent extensions or prongs *e e\**, which project through guide holes or bearings *f f\** in the forward end of the cylinder F, the ends of said prongs, when the tumblers are restored by the spring, being brought into a line with each other transverse to the planes of the tumblers. Furthermore, these tumblers are so arranged that the shank or prong *e\** of one of them, which passes through the guide-hole *f\**, is in a central or axial position with respect to the rotary motion of the key, so that a bit, *g*, of the key shall, when the latter is rotated, move upon it as a pivot or center, and so that said tumbler, being made to take the lead, will be the operating one in the compression of the restoring-spring, and will, when driven down by the key-bit, protect the other tumblers from the action of the spring. J is the fence, which may be wholly detached, and is made to intersect the stationary shell B, inner stationary cylinder F, and a cut-away portion, *h h*, of the revolving shell C, and is inclosed, or partly so, by the circle described by the connecting portion *i* of said shell in its rotation, said fence resting, when raised, on the connecting portion *i* of said shell C, but dropping into the notches *k k* of the tumblers, when

the latter have been adjusted by the key to receive it, and the shell C has been turned to carry the portion *i* from under the fence. Said fence is raised, in the operation of the lock, by the portion *i* of the shell as the latter is rotated, bearing against the one or other of the inclined surfaces *l l*, which constitute the outline of the bottom of the fence, and causing the fence to react against one of the tumbler sides *k' k'*, or against one of the sides *l' l'* of the cylinder F, or one or more of the points *m' m' m' m'* of the cylinder B, one or more of all these parts acting as a guide, and said part *i* keeping the fence lifted while the tumblers are opposite the key-hole, away from the sides of the tumblers which contain the fence-notches. The body of the fence is cut away to inclose the tumblers. This feature and the intersecting arrangement of the fence render the lock compact. The dropping of the fence J into the notches of the tumblers E E allows of the portion *i* clearing the top of the fence during the rotation of the bolt-operating shell C. The inner cylinder F, holding the tumblers and fence, is inclosed, or partly inclosed, with said fence and tumblers in the outer shell C, the circumference of which in the plane occupied by the fence is cut away, as shown, and if the fence fails to enter the tumbler-notches in an attempt to throw the bolt, its end is held out into the cut-away part of said circumference by the tumblers and inner cylinder, and the impact of the fence with the uncut part *i* (the one rotating while the other does not) stops the rotation of the key or instrument used to throw the bolt before it is connected with the same. Said shell C is held from rotating till one or more of the tumblers have been forced back by the ends K K of the cut-off, which are constructed of different shapes or angles, so that only after the shell C has completed a revolution, and thrown or drawn back the bolt, can said cut-off be forced by the restoring-spring G into notches *m m* of the shell C at its back to lock the same and keep the tumblers thrown out. The said cut off has the further function to restrain the action of the spring from the tumblers during the the time after the proper impressing planes or bits on the key end have moved away in the key's rotation from the front ends of said tumblers, until said key planes or bits move again to the front ends of the tumblers, during which time, if the tumblers were projected by said spring, they would not impinge upon their said respective planes or bits, but would advance into position to collide with the side of the key at or near the close of its rotary motion, said cut-off thereby preventing said collision by restraining the force which would project said tumblers during said time. The first action of the key, in forcing back the tumblers by its pressure on the prong *e\** of the spring-tumbler, is to compress the spring G, and as the tumblers are forced back to take the ends K K of the cut-off out of the



notches  $m\ m$ , and so permit the rotation of the shell C; but as soon as the latter is started in its rotation by the key, its back end or edge holds the cut-off back, compressing the spring till said shell completes a revolution, thus performing the function aforesaid. Furthermore, even if the cut-off should fail in its action, from wear or other cause, the pressure of the spring would be borne by the central tumbler E through its prong  $e^*$ , arranged centrally, so that the bit of the key at  $g$  rotates on it as on a pivot during its entire rotation, and keeps it down, thus preventing the tumblers from being projected and colliding with the key side, as aforesaid; and, further, preventing any backlash which the cut-off might have on the tumblers through its part H at the time when, if said tumblers were projected, they would fail to impinge against their proper key planes or bits. And the use of a cut-off with stationary or non-rotating tumblers, together with their rectilinear motion with the key's axis, and a fence operating in the manner described, necessitates so little wear that the vital parts will remain accurate for many years, and a soft-metal key, not liable to corrosion, may be used. Also, the key is so guided by its bit  $o$ , traveling in an annular groove,  $r$ , having its only place of exit and entrance at  $s$ , that it cannot be withdrawn when the tumblers cannot be restored by the spring. By the revolving shell C being cut away, as at  $h\ h$ , any excessive improper force being applied to said shell will only shear it off in advance of the moving of the bolt by the bolt-operating wing L, as at  $i$ , and so sever the operating connection with the bolt, which will still remain in its place with particular certainty in all locks of similar construction, except drawer-locks. The fence J is constructed with upper inclinations  $u\ u$  on opposite sides or edges of it, and in such relation to the line of motion of the key, or piece receiving impulse therefrom, that, in case the fence should fail to drop into the tumbler-notches when the shell C is turned, said shell or its portion  $i$  will bear on either incline  $u$ , and, by its reaction against its guide, will lift or carry and hold the fence away from the notched sides or edges of the tumblers, so that any effort to throw the bolt when the tumblers are not properly set fails to transmit pressure from the fence on the tumblers. Said guide consists of the tumbler sides  $k'\ k'$ , the sides  $l'\ l'$  of the cylinder F, and the points  $m'\ m'\ m'$  of the cylinder B, one or more of all of these. It may also be a recess to receive the fence in the bolt-case. The wing L operates to shoot and to draw back the bolt when the shell C is suitably turned, as follows: Said wing is provided at or near its one end with a lip or angular projection,  $u$ , which, when the bolt is thrown out and it is required to unlock it, travels during the first portion of the shell's rotation from a stop,  $b'$ , on the bolt, and within or along a curved way or surface,  $c'$ , in the bolt, till it strikes a leg,  $d'$ , of the

bolt and draws the latter in, as required, after which, and at the completion of the shell's rotation, the projection  $a'$  enters a notch or opening,  $e'$ , on the bolt, to lock or hold the latter down, and to serve as a stop to the shell C. The bolt is thrown out during and toward the close of the reverse rotation of the shell C—that is, in the direction of the arrow in Figs. 1 and 6—by the end  $f'$  of the wing L striking a projection,  $g'$ , of the bolt, after which the projection  $a'$  travels along the curved way or surface  $c'$  till it reaches the stop  $b'$ , and rests to hold out the bolt. In the operation, the fence is lifted, to allow the restoration of the tumblers by the spring, in the manner hereinbefore described. On the return rotation the said projection  $a'$ , moving along the curved way  $c'$ , holds out the bolt until the part  $i$  of the shell C will impinge on the fence if any tumbler is incorrectly set, thus preventing the bolt from being affected by driving down the central tumbler E  $e^*$ , and rotating the shell, when any of the other tumblers are incorrectly set. The fence J is projected downward in this lock by its own weight; but it is obvious that a spring might easily be added, if desired. The bolt D is notched in one or more places, as at  $h'\ h'$ , for the passage of one or more slatted screws, as M, Figs. 1 and 10, for fastening the parts of the lock together, and securing it to its place of attachment, while other portions of the bolt act as projections, as at  $i'\ i'$ , to prevent said screws from turning, said notches and projections being so arranged relatively to the places for the screws that said screws can only be turned when the bolt is thrown out. This prevents the lock from being removed or tampered with without the key to throw out the bolt, and while the lock is unlocked.

It may be further remarked that by the use of a thin fence and extra tumbler-notches—for instance, two or more in a single tumbler, with corresponding key-bittings—master-keys can be made to pass numerous locks, while each lock shall have its own key dissimilar to the others.

What is here claimed, and desired to be secured by Letters Patent, is—

1. An inner shell, a set of tumblers, and a fence, all inclosed, or partly inclosed, by an outer shell, when the latter has a portion of its circumference in the plane occupied by the fence cut away, as described, whereby, in the rotation of the key to operate the lock, the uncut portion of the outer shell and the fence are first separated to allow said fence to enter the notches in the tumblers, while, in case said fence fails to enter said notches, a portion of it is left in position to stop, by impact with said uncut portion, the rotation of the key before the bolt can be operated.

2. The combination of a system of tumblers which have a movement substantially rectilinear with the axis of a rotary push-key, but are independent, or partially so, of the rotary motion of said key, and a fence projected into



the notches of said tumblers by a force independent of the key and the operator.

3. The combination, with the tumblers of a lock, of a restoring-spring and a cut-off, operating substantially as described.

4. The combination of the rotating shell with one or more of the inclinations *u u* on the fence, for the purposes set forth.

5. The combination, with the tumblers *ee* and one or more of the inclinations *l l* on the fence, and the reacting guide or support for said fence, of the shell constructed to lift and hold the fence out of the tumbler-notches, essentially as specified.

6. The arrangement of one of a series of tumblers, which drives to its place a restoring-spring common to the others, centrally with respect to the rotary motion of the key, so that the corresponding controlling bit of the key shall move on it, as on a pivot, during the rotary motion of the key, substantially as specified.

7. The combination of the depressions and projections *h' h' i' i'* in or on the bolt with one or more slatted screws for fastening the parts of the lock together and securing it to its place of attachment, when so arranged as to prevent the screw or screws from being turned, except when the bolt is thrown out.

8. The combination, with a flat key, of a series of tumblers provided with bent extensions or prongs, the ends of which are brought into a line with each other transverse to the planes of the tumblers, essentially as specified.

9. The combination of the fence, the rotating shell, the recess *E'* in the bolt, the lip or annular projection *a'* on the wing, and the curved way or surface *c'* on the bolt, all operating substantially as specified.

10. The combination of a fence and a system of tumblers, which have front ends projecting forward in position to be impressed through the key-hole, and which also have a motion substantially rectilinear with the axis of the key, with a rotating shell and a key of which the bits rotate with said shell, when said shell has a key-hole which, before the fence is projected into the tumbler-notches or against the sides of the tumblers which contain said notches, is rotated away by said shell from opposite the said front ends of one or more of the tumblers.

HENRY WINN.

Witnesses:

FRED. HAYNES,  
R. E. RABEAU.