

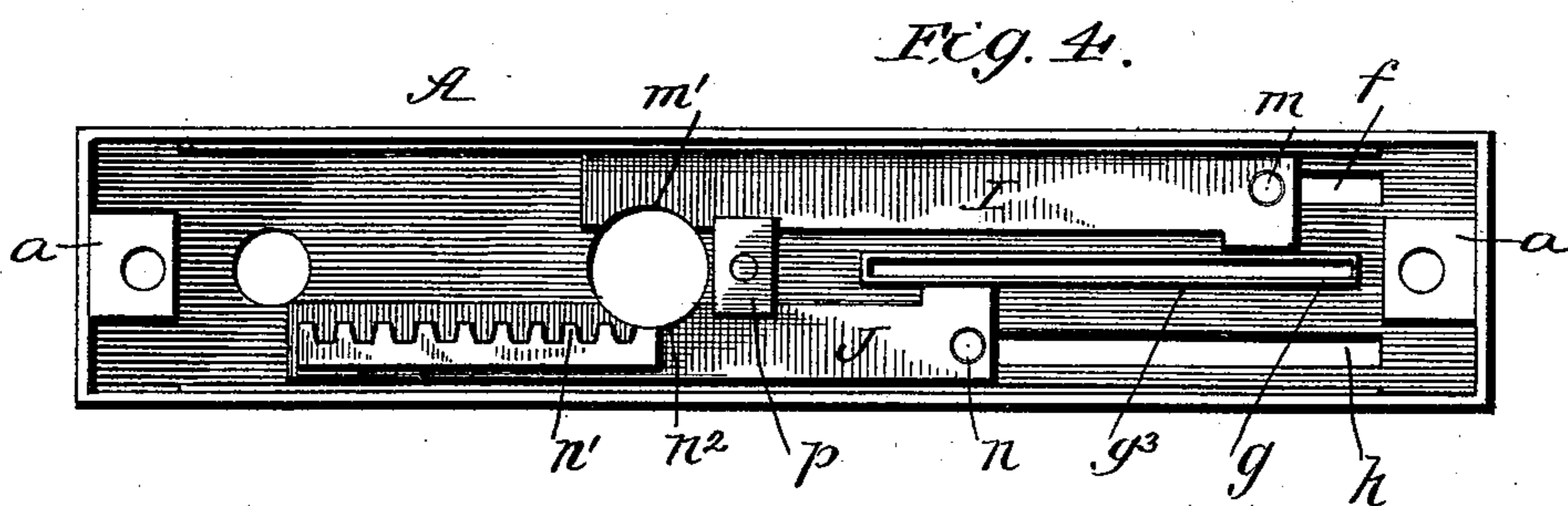
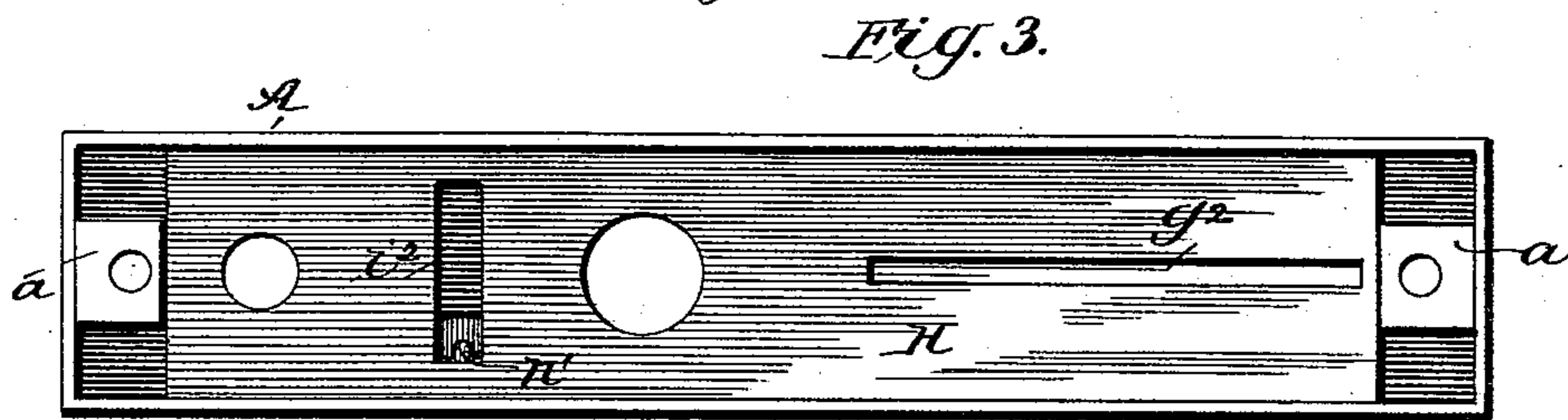
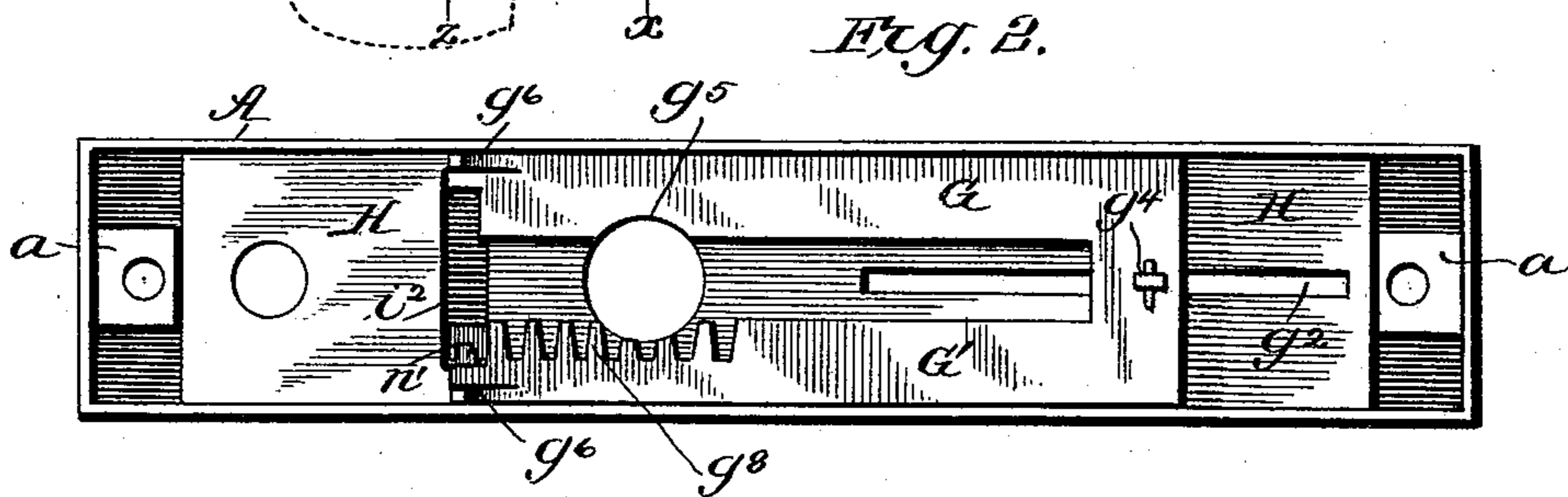
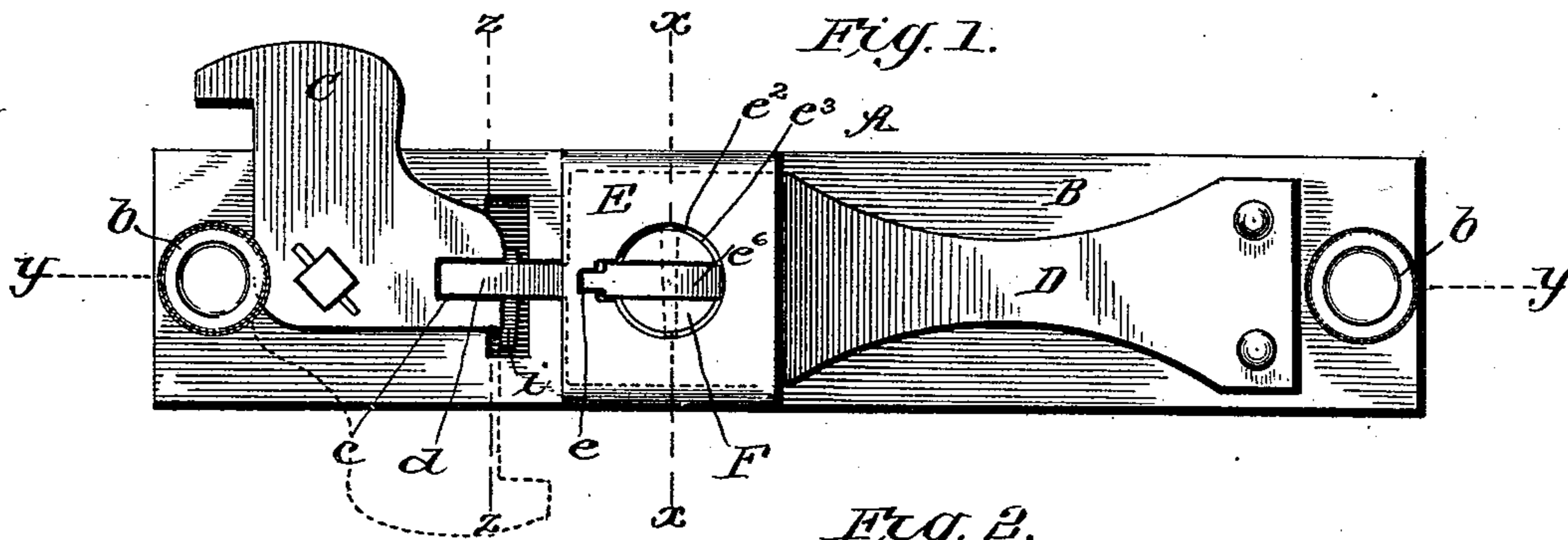
(Model.)

2 Sheets—Sheet 1.

W. H. THOMPSON.
COMBINATION LOCK.

No. 478,658.

Patented July 12, 1892.



WITNESSES:
Fred G. Dietrich
Edw. W. Lynn

INVENTOR:
W. H. Thompson.
BY *Mum & Co.*
ATTORNEYS

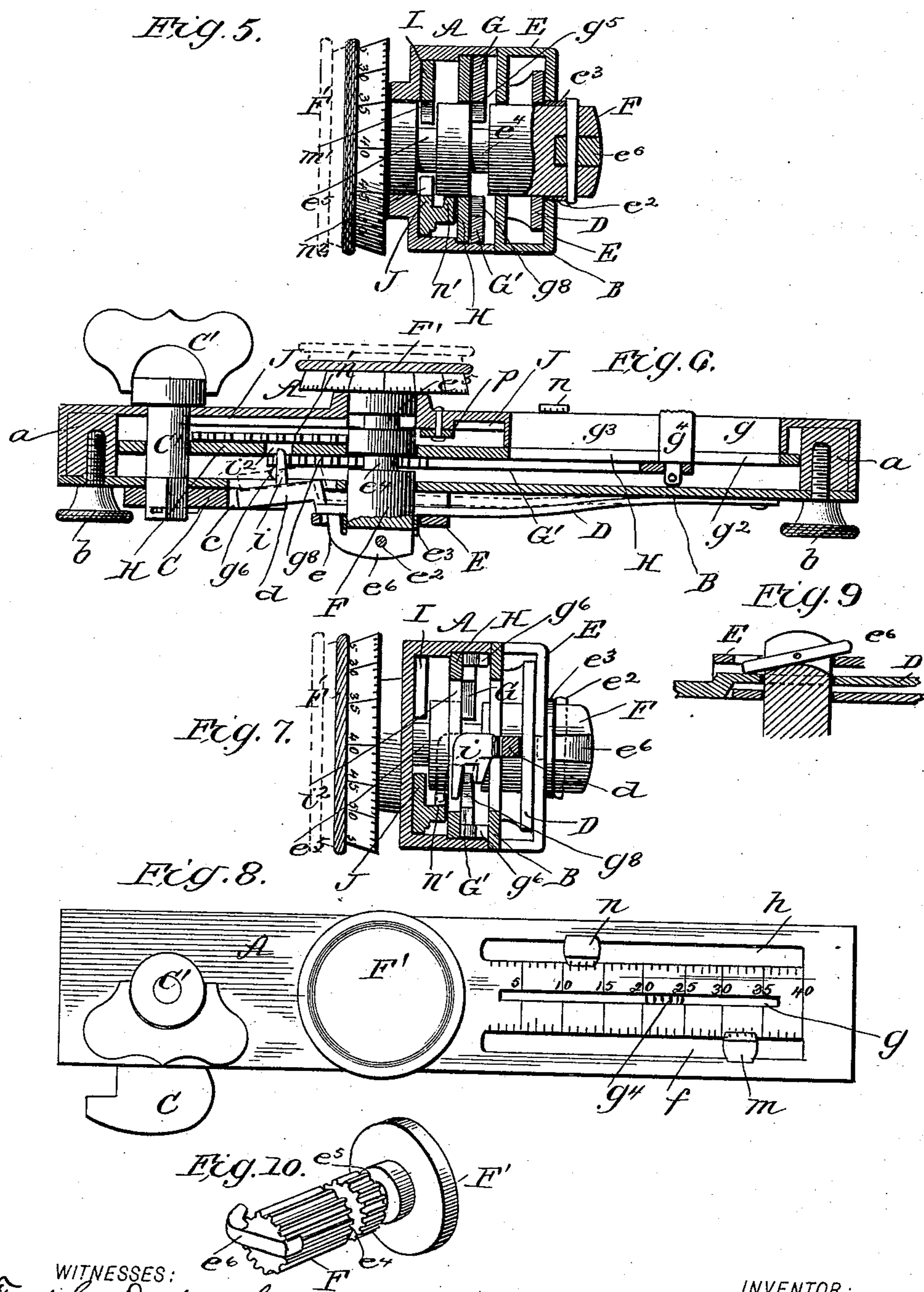
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UNITED STATES PATENT OFFICE.

WILLIAM H. THOMPSON, OF WINNIPEG, CANADA.

COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 478,658, dated July 12, 1892.

Application filed June 23, 1891. Serial No. 397,248. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM H. THOMPSON, of Winnipeg, Manitoba, Canada, have invented a new and useful Improvement in Combination-Locks, of which the following is a specification.

My invention is in the nature of a combination-lock adapted for use on cupboard-doors, drawers, valises, and in connection with the ordinary bolts of safe-locks.

My object is to provide a convenient lock that can be easily opened, but only by the one knowing the proper combination, and also to provide a rotary locking-bolt with suitable appliances for locking it that may be used on doors, drawers, trunks, &c.

My invention consists in the peculiar construction and arrangement of the various parts of the lock, as will be hereinafter fully described with reference to the drawings, in which—

Figure 1 is a side view of the lock from the rotary-bolt side. Fig. 2 is a view from the same side with the bolt and the outer plate and its attachments removed. Fig. 3 is a view from the same side with all the parts in front of the partition-plate removed. Fig. 4 is another view from the same side with the partition-plate removed. Fig. 5 is a transverse section through line *xx* of Fig. 1. Fig. 6 is a longitudinal section through line *yy* of Fig. 1. Fig. 7 is a transverse section through line *zz* of Fig. 1. Fig. 8 is a side view from the side opposite to that shown in Fig. 1. Figs. 9 and 10 are modifications of parts of the lock.

The external case of the lock is of an elongated rectangular shape, composed of a boxing or chamber A and a removable side B. The casing A has in its ends socket-blocks *a*, into which are seated screws *b b*, which pass through the removable side B and secure it.

Journaled in bearings in the side walls of the case at one end is a rotary key or knob-shaft C', which is squared at its end to receive the squared hole of the rotary hook-shaped bolt or catch C. This bolt by a rotary action is made to lock into a hasp, staple, or other fastening upon the door-jamb or the opposite face or jaw of the opening and by its direct action serves to lock or unlock the parts. Its movements, however, are dependent upon

combination adjusting devices, which I will now proceed to describe.

In the back part of the bolt is cut or formed a notch *c*, Fig. 1, in which lies a locking-tumbler *d*, which must be removed before the bolt can be turned. This tumbler *c* is formed upon the end of a spring-bar D, Figs. 1 and 6, which at its other end is riveted to the plate B and plays within a housing E laterally to and from the plate B, carrying the tumbler *d* into or out of the notch *c* of the bolt. To operate this spring-bar D and tumbler *d*, a shaft F is arranged to rotate and also to slide longitudinally in the side walls of the case and the housing E. On the outer end of this shaft F is a graduated pull-knob F', which when turned to the right position and pulled will deflect the spring-bar D. This shaft is, however, locked by a combination which has to be set properly before it can be pulled out. On the inner end of the shaft in a slit there is pivoted upon a pin *e*² a small pivoted catch *e*⁶, whose toe projects beyond the shaft and overlaps the housing E, except at one point *e*, Fig. 1, where the housing has a keyhole-slot to permit the toe of the catch to pass through. When the toe is turned around to coincidence with this slot, it can pass through the same and bear against the spring-bar D, Fig. 6, and at all other points the housing locks the toe, so that pressure cannot be applied to the spring-bar. To enable the operator to know when this toe is in coincidence with this slot, the head of the knob is graduated all around and marked with figures, one of which is arranged to register with a mark on the case whenever the toe and slot are in coincidence.

Surrounding the end of the shaft F, just within the catch *e*⁶, is a small collar *e*³, that rests against the spring-bar and is acted upon by the catch (or the pin that secures the catch) to sensitively move the spring-bar with the initial movement of the shaft for reasons hereinafter explained.

The shaft F is provided within the case with two deep circumferential grooves *e*⁴ *e*⁵, Figs. 5 and 6, in which operate slides to lock the shaft, and which slides are so arranged with reference to three slits in the case as to be operated from the exterior and be set

to the adjustment which constitutes the combination.

In the outer case are formed three parallel longitudinal slits fgh , Figs. 8 and 4. Through the slit f there projects a thumb-piece m , which is attached to a longitudinal slide I, Fig. 4, which is guided and retained in place by the overlapping head of a button p , and which slide has in its edge next to the shaft F a curved notch m' . The lower edge of this slide plays in the groove e^5 , Fig. 5, of the shaft F and prevents the latter from being withdrawn; but when said slide is adjusted so that its curved notch m' is opposite the shaft F, as in Fig. 4, it does not hold the shaft. This position of the slide is indicated by the figure of the graduated scale of the slit f , which is immediately opposite the thumb-piece m , and this is the first figure of the combination. Through the slit h there projects another thumb-piece n , which inside the case is attached to a longitudinal slide J, Figs. 4 and 5. This is held in place by the same overlapping button p and lies below the shaft F. This slide plays in the same groove e^5 of shaft F as the slide I, but upon the opposite side, and it co-operates with I to hold the shaft against being pulled out. This slide J has a circular notch n^2 , which when brought opposite the shaft F allows the latter to move longitudinally. This slide J has its position indicated (like slide I) by the position of its thumb-piece n on the graduated scale adjoining the slit h , Fig. 8, the figure opposite the said thumb-piece being the second figure of the combination. This slide also bears the series of teeth n' , which serve as locking-points to hold the slide against being moved when the shaft is pulled out, as hereinafter described.

Around the middle slit g there is an inwardly-projecting flange or boxing g^3 , and upon this boxing or flange there lies a partition-plate H, Fig. 3, running lengthwise the lock. This has a transverse slit i^2 and a longitudinal slit g^2 and also holes for the key and knob-shaft. Upon the opposite side of this partition from slides I and J there is another double slide $G G'$, Fig. 2. This is connected to a thumb-piece g^4 , that passes through slit g^2 in partition H and through slit g , Fig. 8, in the outer case between the flanges g^3 . This slide has an upper portion G , having a curved notch g^5 and a lower portion with teeth g^8 , having a portion of them cut away opposite notch g^5 . Tongues g^6 , split off from the ends of these slides and bent down, serve as guides to hold the slide as it slides over the plate H. This slide has its sections $G G'$ in the plane of the groove e^4 , Fig. 5, in the knob-shaft, and locks the knob-shaft, except when the notch g^5 is opposite the shaft, at which position the thumb-piece g^4 , that works this slide upon the outside, marks the third figure of the combination. Now it will be seen that whenever the thumb-pieces m , n , and g^4 are adjusted to

the figures of the combination the notches m' , n^2 , and g^5 are opposite the shaft F, and the slides being thus taken out of the grooves e^5 and e^4 of the knob-shaft the latter can be pulled out, as in dotted lines, Figs. 5, 6, and 7, the spring-bar D deflected, and the tumbler d removed from the notch c of the rotary bolt C, so that the latter can be turned by its key. In this movement of the shaft outwardly the slides are to be locked, and for this purpose a double detent i , Figs. 6 and 7, is attached to the tumbler d and plays through a transverse slot in the plate B and also slot i^2 of partition H. This detent is fork-shaped, as seen in Fig. 7, and normally straddles the lower member G' of slide $G G'$, Fig. 2. When, however, the knob-shaft F is pulled longitudinally and the tumbler d is drawn away from the notch c of the bolt, the same movement pulls the double detent i into the case and throws one of its prongs into engagement with teeth g^8 of slide G' and its other prong into engagement with teeth n' of slide J, (see Fig. 7,) holding these slides to their adjustment. This motion is transmitted to the detent by the first part of the movement of the shaft F by reason of the intervention of the collar e^3 , which lies between the shaft F and spring-bar D, and by locking the slides by the initial pull of the knob prevents the surreptitious opening of the lock by feeling for the combination, (or the registration of the curved notches $g^5 m' n^2$ with the shaft,) which the looseness of the slides in the grooves of the shaft F might otherwise allow to be done.

In making use of the lock I may, if desired, construct the catch e^6 so as to project upon both sides of the shaft, (see Fig. 9,) so that when the latter is pulled one side of said catch will rest outside the housing, while the other side will tilt and pass through the keyhole-slot and when the shaft is turned will rest inside the housing.

As a modification of the locking devices for the slides, also, I may make the shaft F with circumferential teeth, as in Fig. 10, which when the shaft is pulled will register with the teeth of the slides and lock the same. If desired, the slide I may have teeth for engagement by the detent in a manner similar to the slides G' and J. The double slide $G G'$ has its curved notch g^5 provided with a certain amount of play, so that one of its teeth below may be pushed so as to catch under the detent, and thus hold the tumbler d from locking the bolt. The slides I and J should also be made somewhat longer than shown in Fig. 4, so as to always cover the slits $f g h$ and keep out dust. The rotary locking-bolt may be also made with double locking ends, as shown by dotted lines in Fig. 1.

Having thus described my invention, what I claim as new is—

1. The combination, in a lock, of a rotary pull-shaft having one or more circumferential grooves, a series of notched slides playing

therein transversely to the shaft, and means for adjusting them to the opening-combination, substantially as shown and described.

2. The combination, in a lock, of a rotary bolt having a locking-notch, a spring-bar having a tumbler on its end resting in said notch, a grooved pull-shaft arranged at right angles to the spring-bar and arranged to operate thereon, and one or more slides playing in the grooves of said shaft, and means for adjusting the same, substantially as shown and described.

3. The combination, in a lock, of the spring-bar having a tumbler at its end, a grooved pull-shaft operating thereon at right angles, one or more slides arranged in the grooves of said shaft, means for operating said slides, teeth arranged upon the slides, and a detent operated upon by the pull-shaft to be thrown into engagement with the teeth of the slides, substantially as shown and described.

4. The combination of the outer case having longitudinal slits *f g h*, with graduations

and figures, a series of slides arranged inside the case and provided with exteriorly-projecting thumb-pieces, and a pull-shaft arranged at right angles to the slides and having one or more grooves to receive said slides, substantially as shown and described.

5. The combination of the rotary bolt C, having notch *c*, the spring-bar D, having tumblers *d*, the housing E, having a slot *e*, and the pull-shaft F, passing through the housing and having a projecting toe upon the outside, substantially as shown and described.

6. The lock consisting of the case A, with slits *f g h*, partition H, removable side B, bearing spring-bar D, tumbler *d*, and housing E, the rotary bolt C, with notch *c*, the grooved pull-shaft F, and the notched and toothed slides G G', I, and J, substantially as shown and described.

WILLIAM H. THOMPSON.

Witnesses:

ALFRED J. ANDREWS,
SIDNEY WERTHEIM.