

No. 709,078.

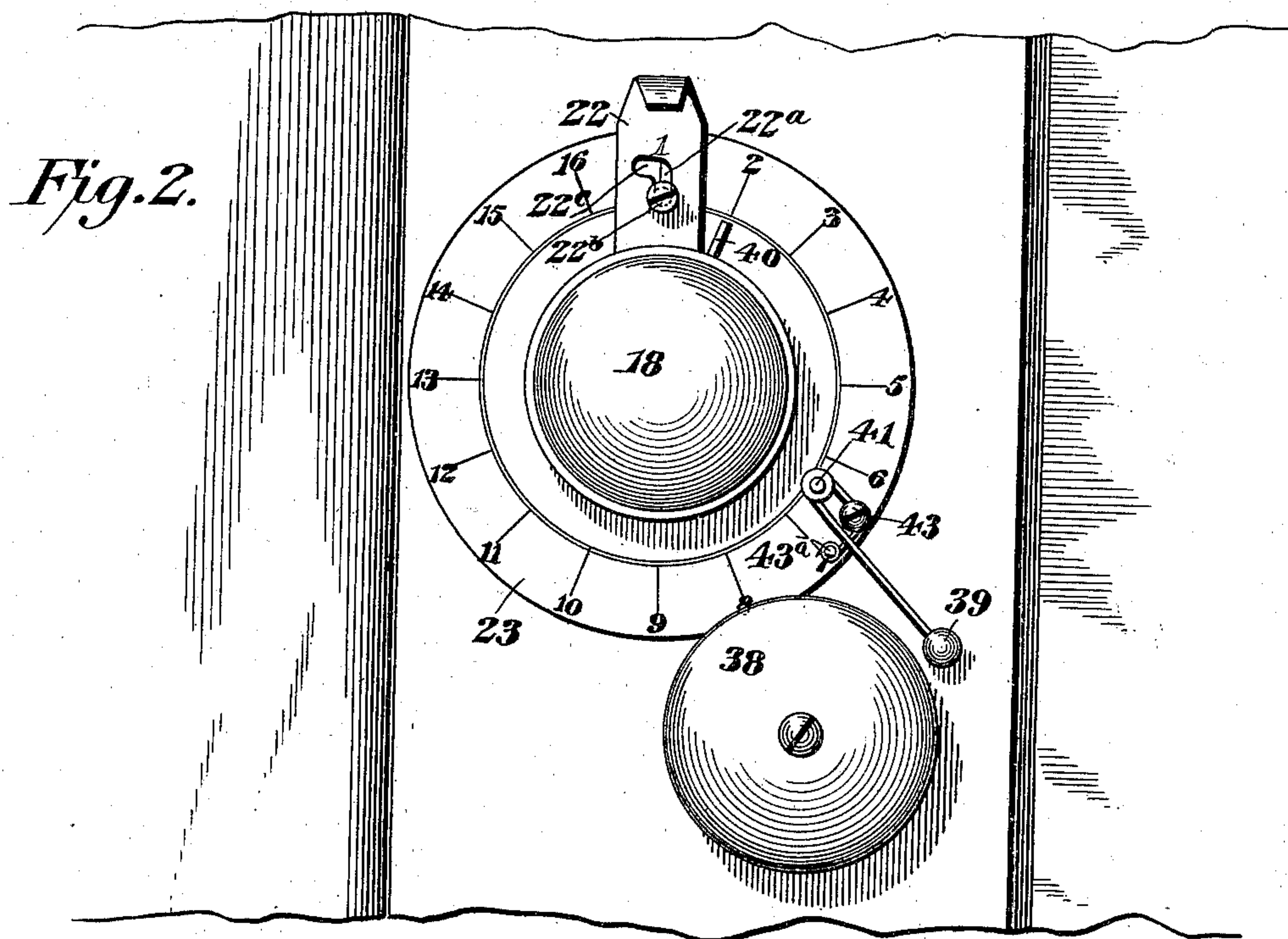
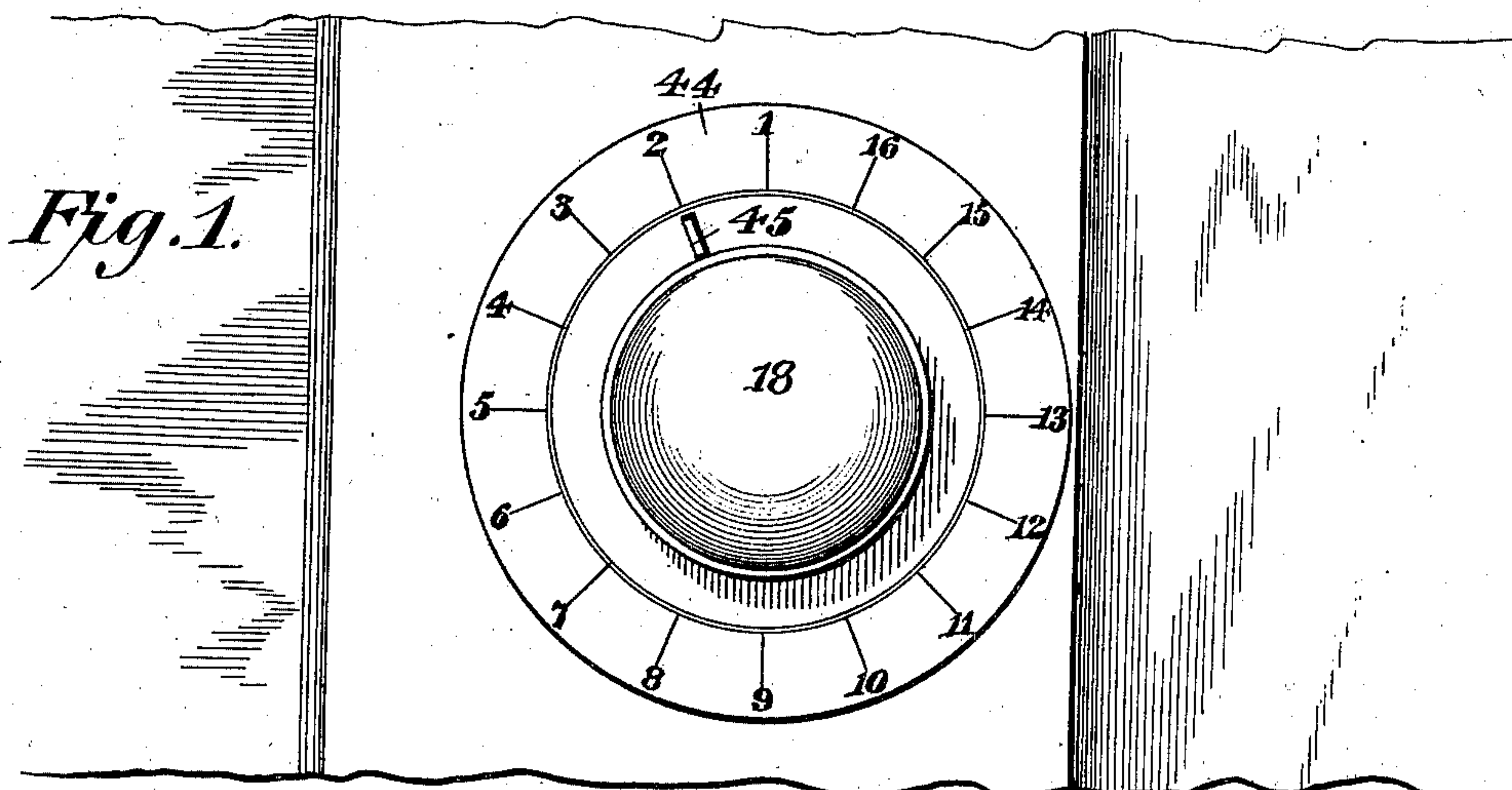
Patented Sept. 16, 1902.

W. J. CARROLL.
COMBINATION LOCK.

(Application filed Oct. 3, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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3 Sheets—Sheet 2.

Fig. 3.

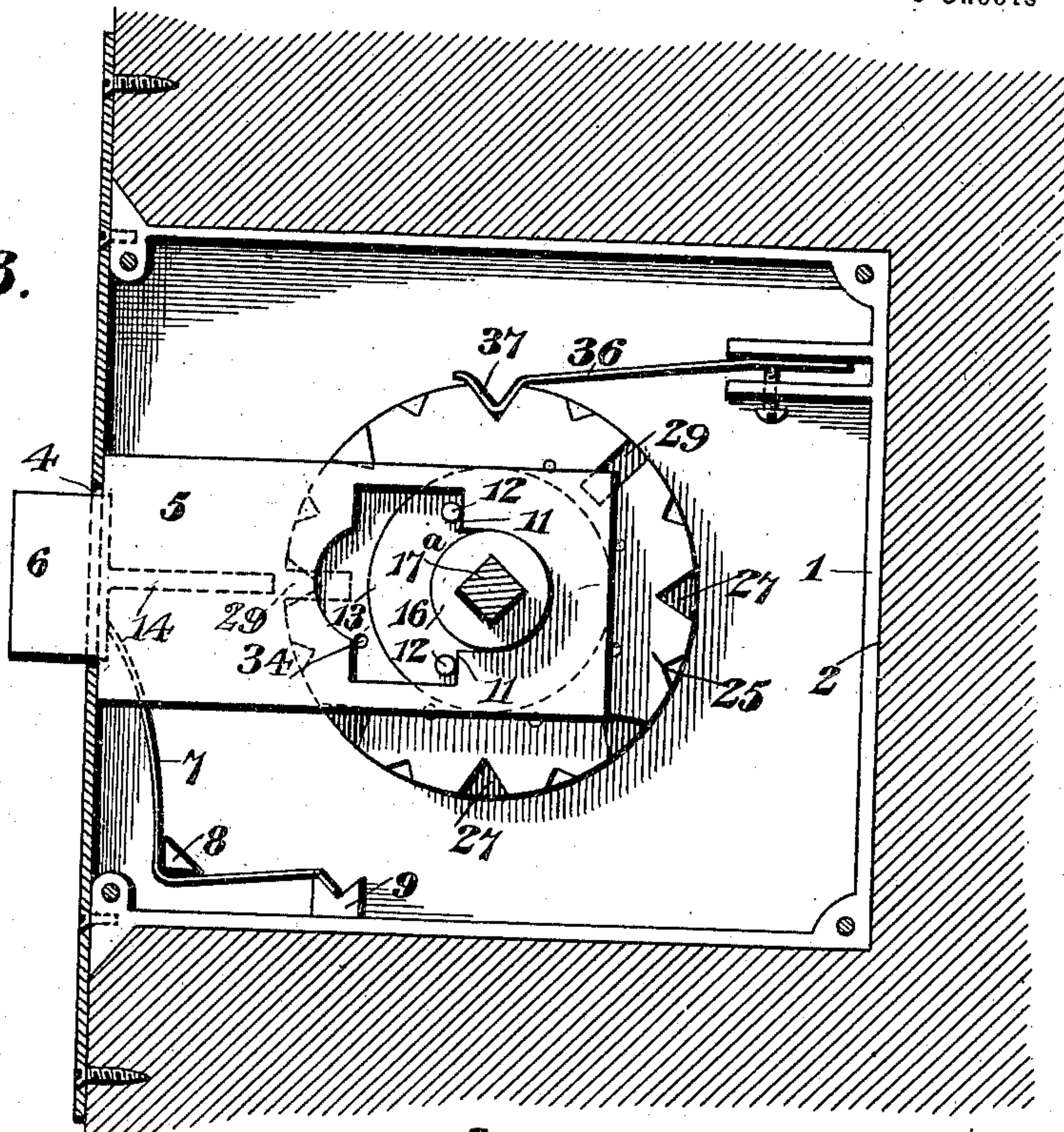


Fig. 11.

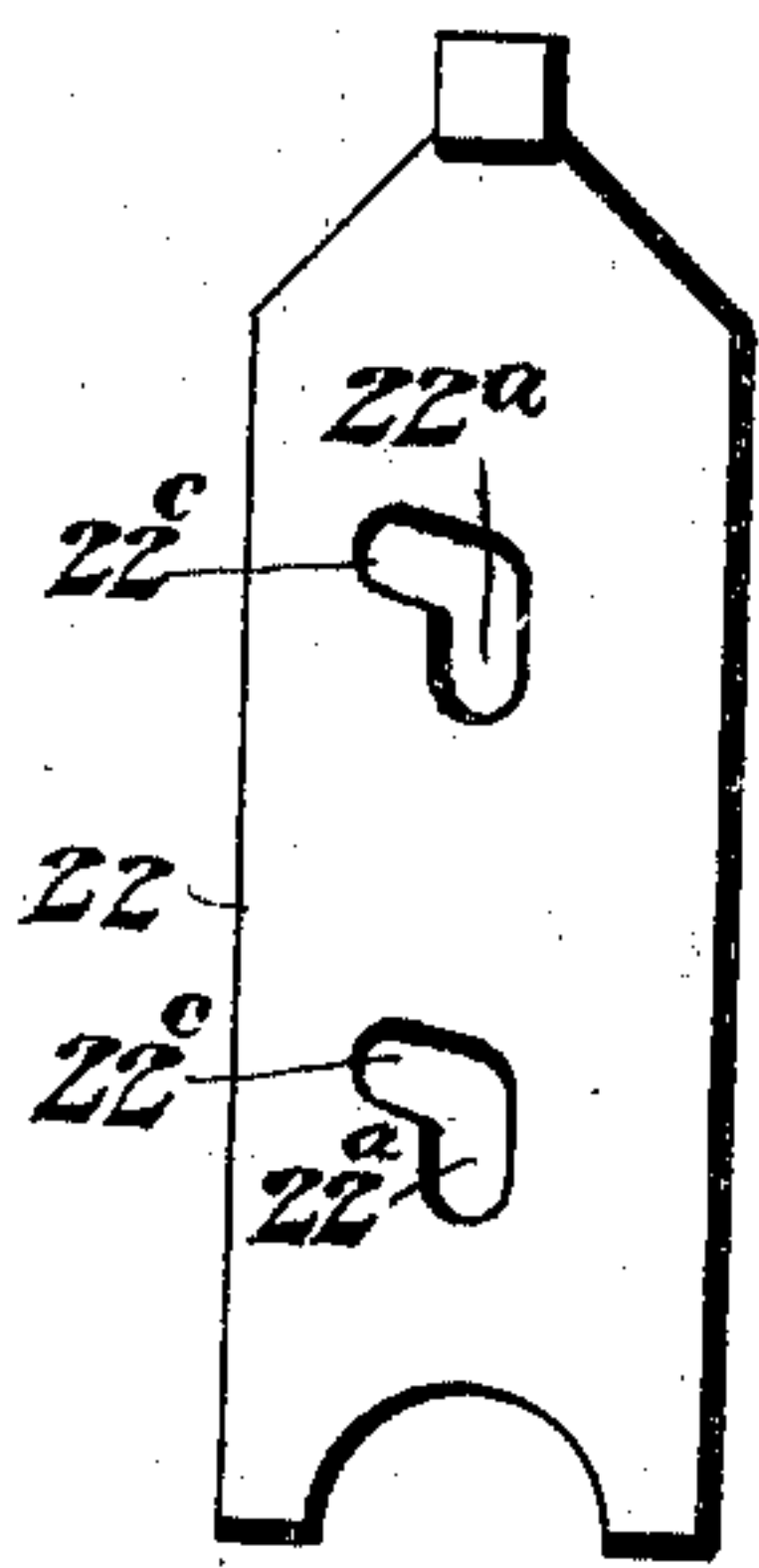
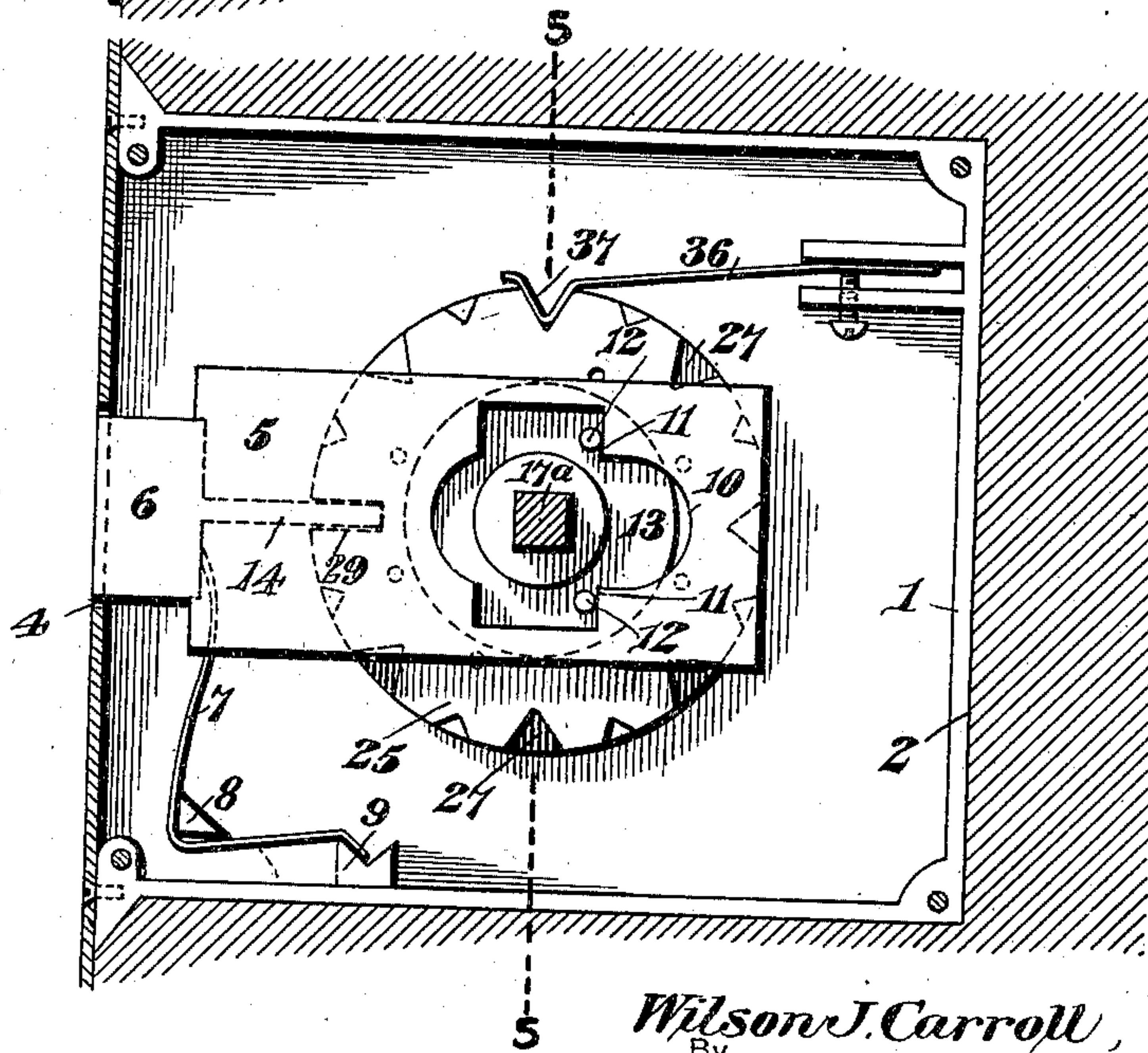


Fig. 4.



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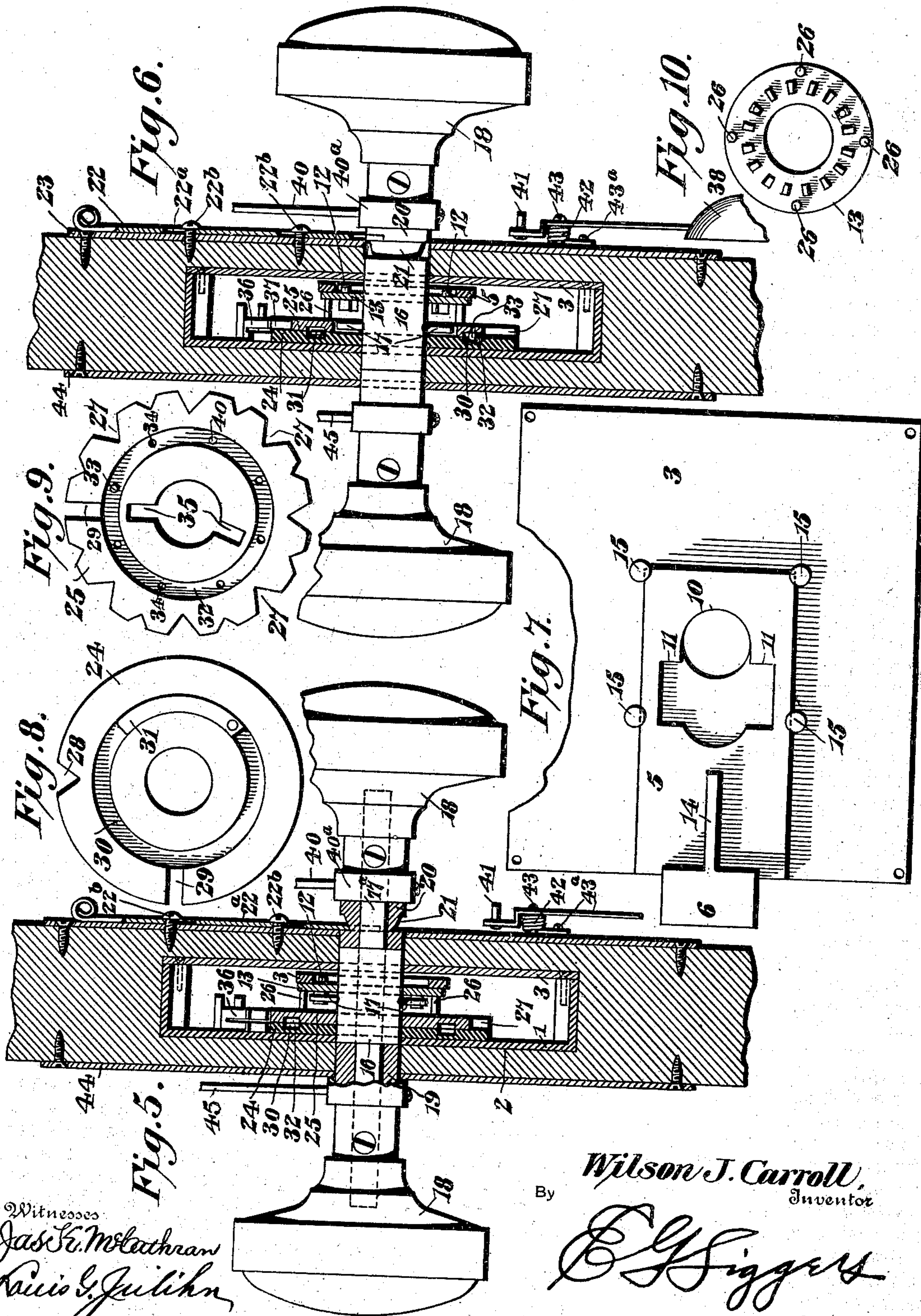
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

WILSON JOHN CARROLL, OF CRIPPLECREEK, COLORADO.

COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 709,078, dated September 16, 1902.

Application filed October 3, 1900. Serial No. 31,856. (No model.)

To all whom it may concern:

Be it known that I, WILSON JOHN CARROLL, a citizen of the United States, residing at Cripplecreek, in the county of Teller and State of Colorado, have invented a new and useful Combination-Lock, of which the following is a specification.

My invention relates to improvements in permutation-locks, in which we have combined a tumbler mechanism and a slidable bolt with a single spindle, which is adapted to be rotated on its axis and to have an end-wise movement for the purpose of individually operating said tumbler mechanism and the latch-bolt.

The object of the invention is to provide a lock of this character which is simple in construction, efficient and reliable in operation, and cheap of manufacture, so that it may be used as a substitute for ordinary key-operated locks on doors and in other relations.

A further object is to provide an improved structure of this class which dispenses with drop or click tumblers falling into place on proper setting of the permutation members, which operation is objectionable, owing to the fact that burglars and other evil-disposed persons are able by skill and patience to inform themselves of the nature of the combination or permutation members, and thus open the lock.

With these ends in view the invention consists in the novel construction and arrangement of parts, which will be hereinafter fully described, illustrated in the accompanying drawings, and embraced within the scope of the appended claims.

In said drawings, in which I have illustrated a preferred embodiment of my invention, Figures 1 and 2 are fragmentary elevations of the opposite sides of a door equipped with my lock. Fig. 3 is a sectional view through a portion of a door, showing one side of the lock-casing removed and illustrating in elevation the mechanism of the lock with the bolt in the shot position and locked by the permutation members or tumbler mechanism against retraction. Fig. 4 is a view similar to Fig. 1, with the bolt in its retracted position and with the tumbler mechanism positioned to permit such retraction. Fig. 5 is a transverse sectional view through a portion

of a door and through the lock on the line 5 5 of Fig. 4, the spindle being shown in operative relation with the bolt. Fig. 6 is a similar view showing the spindle in operative relation with the tumbler mechanism. Fig. 7 is a detached elevation of the detachable side of the lock-casing, showing the bolt slidably retained thereon. Figs. 8 and 9 are detail views of the opposed faces of the permutation members or tumblers. Fig. 10 is a detail view of the bolt-throwing disk, and Fig. 11 is a detail view of the detent.

Referring to the numerals of reference employed to designate corresponding parts in the several views, 1 indicates the casing of my improved permutation-lock, which casing may be of any suitable construction for the purpose of supporting and housing the operating parts; but in the embodiment of the invention selected for illustration in this specification I have shown what is known as a "mortise-lock"—that is to say, the casing is fashioned and constructed to be located within a mortise 2 of a door. One side 3 of this casing is detachable to facilitate access to the interior mechanism, and the front end of the casing is provided with a slot or opening 4, which permits the head of the sliding bolt 5 to play therein and to project a suitable distance from the case for entrance into a keeper upon the door-jamb. (Not shown.) This bolt is illustrated in detail in Fig. 7 of the drawings and is also clearly shown in Figs. 1 and 2, from an inspection of which it will be seen that the bolt is a flat and comparatively thin piece of metal with an enlarged head 6 at its front end. The bolt 5 is associated with an impelling-spring 7, which serves normally to project the head of the bolt beyond the front of the casing to adapt it for use as a latch, inasmuch as it may be actuated by the knob-spindle, although, as premised, the bolt is also adapted to serve as a locking-bolt, because its retraction by the spindle may be prevented by the interposition of the tumbler mechanism in the path of a part of the bolt. The impelling-spring 7 is of angular form, as shown in Figs. 3 and 4, and is retained with its end in contact with the rear side of the bolt-head 6 by a pair of lugs 8 and 9, extending inwardly from the walls of the casing 1. The bolt proper is provided with a longitudi-

nal slot 10 of a width proper to receive the knob-spindle and to enable said bolt to have a limited endwise movement independently of the spindle under the repression of the spring 7 and also to permit the spindle to have interlocking connection with said bolt under certain conditions, whereby the bolt may be retracted through the rotation of said spindle, as will hereinafter appear. This bolt is further provided with recesses, which extend laterally from the opposite sides of the longitudinal slot 10 to form shoulders 11 immediately adjacent to the slot 10 and disposed in the paths of a pair of bolt-engaging studs 12, projecting from one face of a bolt-operating disk 13, mounted upon the spindle adjacent to one side of the bolt and designed, under certain conditions, to be rotated by the spindle to effect the retraction of the bolt through the engagement of the studs 12 with the shoulders 11. Immediately in the rear of the bolt-head 6 and at the horizontal center of the bolt the latter is formed with a tongue 14, said tongue being arranged to enter the bolt-slots of the tumbler mechanism after such mechanism has been reorganized through the manipulation of the spindle by a person acquainted with the permutation arrangement or combination at which the lock is set. The particular means employed for confining the bolt proper within the casing to permit its sliding movement is not essential, but as one means for effecting this result I have shown the recessed guide-lugs 15 extending inwardly from the side 3 of the casing and engaging the edges of the thin body portion of the bolt.

The casing 1 is provided in its opposite sides with aligned transverse openings, which coincide with the slot 10 of the bolt, and through these openings and the slot passes the knob-spindle 16, which is capable of manipulation so as to rotate on its axis and to have a slidable or endwise movement and is provided with a pair of substantially diametrical fingers 17, mounted fast with the spindle, so as to turn or slide therewith at all times. These fingers constitute one embodiment of means for effecting the engagement of the spindle with either the tumbler mechanism or the bolt for the purpose of setting one and retracting the other in a manner which will be more particularly described hereinafter. The spindle 16 is axially pierced by the knob-stem 17^a, of rectangular cross-section, and upon the outer ends of this stem are secured the knobs 18, located at opposite sides of the door and spaced from the opposite ends of the spindle 16 by collars 19 and 20. The collar 20 is provided with a circumferential groove 21, arranged to be engaged by a sliding detent 22, mounted upon a face or dial plate 23, located upon the inside of the door, and said detent is designed to be slid into position to have its lower end engage the groove 21 in the spindle-collar for the purpose of retaining the spindle against longitudinal movement, while permitting its rotation

for the purpose of actuating the bolt or its idle rotation without effecting the actuation of either the bolt or tumbler mechanism. 70

The tumbler mechanism which I have devised for service in connection with the knob-spindle and the latch-bolt is embodied in the form of a series of disks which are constructed to cooperate with the click-springs, adapted to give an audible indication of the progress of the tumbler mechanism, whereby the employment of clicking tumblers actuated by gravity on the setting of the tumbler mechanism is obviated to overcome the objection hereinbefore mentioned. This tumbler mechanism is shown as consisting of a pair of disks 24 and 25 of the same diameter and mounted loosely on the knob-spindle between the fingers 17 and the bottom or stationary side of the casing, lateral displacement of these tumblers being prevented by spacing-pins 26, projecting from the opposed face of the bolt-operating disk 13, these pins being arranged at points sufficiently remote from the axis of the spindle to remove them out of the path of the fingers 17. The disk 25 is provided in its periphery with a plurality of click-notches 27, and the disk 24 is provided with a single click-notch 28, and each tumbler-disk is also provided with a bolt-slot 29, which is considerably deeper than either of the click-notches. The disk 24 is provided with an annular groove 30 in its face opposed to the disk 25, and in said groove is mounted an arcuate engaging spring 31, the free end of which is deflected from the face of the disk 24 to be received within an opposed annular groove 32 in the contiguous face of the disk 25. The spring 31 is designed for engagement with the shifting or setting element 33, for the shiftable or adjustable retention of which the disk 25 is provided with a circular series of openings 34, opening into the groove 32, to permit the end of the element or pin 33 to extend into said groove to engage the free end of the spring 31 when the disk 25 is rotated in one direction or to click idly over said spring during the opposite rotation of the disk. The disk 25 is also provided with a pair of nearly diametrically opposite recesses 35, extending from the opening provided at the center of the disk for the reception of the spindle, which recesses are designed in one position of the spindle to be engaged by the fingers 17 to effect an operative engagement between the spindle and the tumbler mechanism for the purpose of permitting the latter to be operated to permit or prevent the retraction of the bolt. The click-springs 36 are mounted in any suitable manner within the casing to have their free or unconfined ends ride against the peripheral edges of the tumbler-disks and are bent to form projections 37, which click into the notches 27 and 28 of the disks when said notches are brought into coincidence therewith. 130

For the purpose of assisting those acquaint-

ed with the combination and to constitute an alarm for exposing unauthorized attempts to open the lock I provide a sounder 38—as, for instance, a loosely-suspended bar, gong, or other resonant body—preferably mounted upon the inside of the door in position to be struck by a tapper or striker 39, operated through the movement of the knob-spindle. A preferred form of means for effecting the operative connection between the striker 39 and the spindle comprises an index-finger 40, extending radially from a ring 40^a, surrounding the adjacent knob-shank and adjustably retained by a set-screw or the like. The index-finger 40 is designed to have movement in a path obstructed by a trip-arm 41, connected with the striker and arranged to urge the striker against the sounder or gong 38 when swung or tripped by the passage of the finger through the rotation of either knob. The striker 39 and its trip-arm 41 may be formed from a strand of wire bent to form the striker and trip-arm, a loop 42, surrounding a pin 43, extending from the dial-plate 23 and an engaging end 43^a, retained by a similar pin, as shown in Fig. 2 of the drawings.

Attention may be called at this point to the specific construction of the detent 22, which is provided with angular slots 22^a for the accommodation of retaining-pins 22^b, said slots being designed to effect an engagement with the pins 22^b, which will prevent the accidental longitudinal movement of the detent after the latter has been dropped into engagement with the spindle and moved laterally to engage the lateral portions 22^c of the slots with said pins. Assuming the tumbler mechanism to be arranged with the bolt-slots 29 out of alinement with the tongue 14 of the bolt, the operation of the device is as follows: The spindle is first moved longitudinally to present the fingers 17 against the face of the disk 25. The spindle is then rotated until said fingers are engaged with the recesses 35 in the disk to permit said disk to be rotated by the rotation of the spindle. This rotary movement of the disk 25 will obviously remove the bolt-slot 29 in said disk from its position in line with the tongue 14, and continued movement of these parts in the same direction will cause the shiftable member 33 to be brought into contact with the end of the spring 31 to communicate motion to the disk 28, which will obviously effect the removal of the key-slot 29 in the disk 24 from behind the tongue. The tumbler mechanism will thus be unset, and the bolt will be securely located in its shot or engaging position until such time as the key-slots in the disks shall be brought into alinement with each other and with the tongue 14. The effectual locking of the door is now completed by drawing the spindle back to its normal position, where it will be retained by the detent 22 engaging the annular groove 21 in the spindle-collar 20. With the lock thus

assembled it will be impossible for an unauthorized person to open the door, because the spindle must first be pulled endwise to bring the pins 17 into engagement with the tumbler mechanism, and after this is effected the combination determined by the position of the shiftable element 33 upon the disk 25 must be known before the tumbler mechanism can be operated to effect the alinement of the key-slot 29 with the tongue 14. If, however, it is intended that the lock shall be capable of operation by an authorized person understanding the combination, the detent is drawn up out of engagement with the spindle, as shown in Fig. 6 of the drawings. This will permit the outside door-knob to be manipulated for the purpose of moving the spindle endwise to the position shown in Fig. 6 to engage the pin 17 with the recesses 35 within the disk 25. The knob is then turned to the right until the sounder is sounded twice, the second sounding being the starting-point from which the known combination is to be worked. The purpose of rotating the knob until the striker is tripped twice is to insure a complete rotation of the disk 25, so that before the working of the combination is started the connection between the pin or shiftable element 33 and the end of the spring 3 will be effected to insure the actuation of the disk 24 by the rotation of the spindle. Assuming the spring 31 and the key-slot 29 of the disk 24, the pin 33, the finger 40, and the key-slot 29 of the disk 25 to be related, as shown in the drawings, and assuming, further, that the disk 25 is provided with sixteen peripheral notches, including the key-slot, the knob is turned fourteen clicks from the starting-point, which will position the disks 24 and 25, as shown in Fig. 3 of the drawings, the disk 34 having its key-slot 29 in alinement with the tongue 14 and its notch 28 engaged by one of the click-springs. The knob is now turned in the opposite direction until six clicks are heard, the significance of these sounds being that the disk 25 is moved independently of the disk 24 to present its key-slot 29 in alinement with the key-slot 29 of the disk 24 and immediately behind the tongue 14. Thus the setting of the tumbler mechanism is complete, inasmuch as both disks are retained by their click-springs in position to permit the retraction of the bolt. The spindle is now forced endwise to disengage the pins 17 from the recesses 35 of the disk 25 and to effect an operative engagement between said pins and the bolt-disk 13 by locating said pins between two teeth of an annular series of projections or teeth 41^a upon the adjacent face of the disk 13. The spindle may now be rotated for the purpose of retracting the bolt against the resistance of the spring 7. In this position of the parts the bolt may be operated at will by the manipulation of the knob in the manner of an ordinary latch-bolt; but whenever it is desired to lock the bolt in its shot position it is sim-

ply necessary to repeat the operation herein-
before described for the purpose of unsetting
the tumbler mechanism to prevent the re-
traction of the bolt except by an authorized
5 person. While this method of manipulation
of the lock is effective and may be desirable
in some instances, it requires considerable
concentration to follow the sounds or clicks,
which must be accurately noted for the pur-
10 pose of determining the position of the lock
while working out the combination. I there-
fore prefer to provide for a visual indication
of the position of the parts. To this end I
provide the dial-plate 23 and index-finger 40,
15 a similar dial 44 and a second index-finger
45 being mounted, respectively, upon the out-
side of the door and upon the adjacent knob-
shank. The dials are provided with num-
bered graduations corresponding to the num-
20 ber of peripheral notches in the disk 25, and
the index-fingers are disposed in correspond-
ing positions, so that an authorized person
outside of the door after having turned the
knob until the sounding of the alarm indi-
25 cates the starting-point may be guided in
turning the knob-spindle by the graduations
upon the scale, it being simply necessary to
know the position upon the dial which must
be assumed by the finger in order to properly
30 position the key-slot of the disk 24 and the
position which must be assumed thereby
through a reverse movement of the knob in
order to aline the key-slot 29 in the disk 25
with that of the disk 24 for the purpose of po-
35 sitioning the parts for the retraction of the
bolt, as shown in Fig. 4 of the drawings. It
will therefore appear that the use of the dials
and index-fingers obviates the necessity for
following the audible indication of the prog-
40 ress of the coöperating elements; but by the
employment of the construction described
both visual and audible indications are pro-
vided for the guidance of an authorized per-
son in setting the lock for operation.

45 In conclusion, attention may be directed to
the special utility for that arrangement of the
fingers 17 with respect to the bolt-operating
disk and tumbler mechanism, which permits
the fingers to engage either the bolt-operating
50 disk or the tumblers or neither of them, as
desired. Ordinarily where a shiftable spin-
dle is employed it is of necessity connected
with either one or the other of these mechan-
isms—that is to say, it is either connected
55 with the bolt or with the tumbler—and is in-
capable of idle movement entirely independ-
ent of either of these elements of the lock.
In the present invention, however, the pro-
vision of the recesses 35 in the tumbler for
60 the reception of the fingers 17, as distin-
guished from the usual method of having the
projections upon the face of the tumbler, com-
pels the operator to first bring the pins oppo-
site the recesses and then force the spindle
65 endwise to effect the engagement, and unless,
therefore, a person is acquainted with this
peculiarity of the lock he will be unable to

effect its manipulation, even though he is
acquainted with the usual form of locks of
the shiftable-spindle type—that is to say, 70
supposing the detent is not in its engaging
position to hold the spindle against endwise
movement and that a person unacquainted
with the lock, but recognizing the shiftable
spindle, endeavors to effect an entrance, 75
his first move will naturally be to shift the
spindle to what appears to be its tumbler-
engaging position, but which in this form of
the lock would be that position in which the
fingers 17 will clear the ends of the projec- 80
tions above the bolt-operating disk, and the
result will be that the spindle will rotate idly
and without giving an unauthorized person
the slightest clue as to the manner of effect-
ing the engagement between the fingers and 85
the tumbler. A still further utility of this
idle movement is that an authorized person
may, after casting the bolt, shift the tumblers
to any desired position, and by noting the
position of the indicator-finger 40 upon the 90
dial may be able whenever he desires to open
the lock and insure the alinement of the fin-
gers 17 with the recesses 35 by simply bring-
ing the finger 40 again at the place upon the
dial which has been previously noted. After 95
having set the tumblers in the manner speci-
fied the spindle may be shifted sufficiently to
bring the fingers out of engagement with both
the tumblers and the bolt-operating disk, and
after the spindle has thus rotated idly to 100
carry the fingers 17 out of alinement with the
recesses 35 the unauthorized operator can ma-
nipulate the spindle only in two ways: first,
by shifting it endwise into engagement with
the bolt-operating disk, which is held sta- 105
tionary by the bolt, and, second, by shifting
the spindle back again and rotating it idly, it
being impossible to effect the engagement be-
tween the fingers 17 and the tumbler without
first locating them opposite the recesses 35 110
and then pushing the spindle endwise in a
manner which will be well understood. A
still further utility for this feature resides in
the fact that instead of the unauthorized per-
son being permitted to operate the tumbler- 115
operating mechanism at liberty when the de-
tent is raised he is encountered with the very
delicate problem of first effecting an engage-
ment between the tumbler mechanism and
the spindle, as this connection is not only 120
effected by the endwise movement of the spin-
dle, but also by the rotary movement thereof
to aline the fingers and recesses and the sub-
sequent additional endwise movement which
is necessary to effect the engagement. 125

From the foregoing it will be observed that
I have produced a novel and highly efficient
combination-lock embodying a construction
best calculated to effect the accomplishment
of the several objects stated; but while the 130
present embodiment of the invention is be-
lieved at this time to be preferable I do not
wish to limit myself to the structural details
defined, as it is obvious that many changes,

modifications, and variations might be effected without departing from the scope of the protection prayed.

What I claim is—

5 1. In a permutation-lock of the single-spindle type, the combination with a single rotary and endwise-shiftable spindle extending entirely through the lock for actuation from either side thereof, a bolt, and tumbler mechanism in effective relation to the bolt, of means
10 for effecting the operative connection of the spindle with the bolt or tumbler mechanism through the endwise movement of the spindle, and means for locking the spindle against
15 such endwise movement to prevent the shifting of the spindle from one side of the lock.

2. In a permutation-lock of the single-spindle type, the combination with a single rotary and endwise-shiftable spindle extending entirely through the lock for actuation from either side thereof, of a bolt and tumbler mechanism in operative proximity, means for effecting the operative connection of the spindle with the bolt or tumbler mechanism through
25 the endwise movement of said spindle, and a sliding detent exterior to the lock and engaging the spindle to prevent the endwise movement thereof whereby the manipulation of the lock will be under the control of a person at
30 one side of the door, but will be impossible by a person at the other side thereof.

3. In a permutation-lock, the combination with a rotary and endwise-shiftable spindle, of a bolt and tumbler mechanism, a sounder,
35 and a sounder-operating device mounted for movement into, or out of operative relation with, the sounder through the endwise movement of the spindle.

4. In a permutation-lock, the combination
40 with a rotary and endwise-shiftable spindle, a bolt, and a plurality of tumblers, of means for effecting an operative connection of the spindle with the bolt or tumblers when said spindle is shifted in opposite directions, a
45 sounder designed to indicate the initial position of the tumbler preparatory to the working of the known combination, and operating means presented in operative relation with the sounder when the bolt is shifted into op-
50 erative relation with the tumblers.

5. In a permutation-lock, the combination with a spindle and bolt, of a plurality of tumblers, means for audibly indicating the extent of movement of the tumblers, a shift-
55 able element for effecting an operative connection between the several tumblers, a sounder, and a trip device mounted upon the spindle exterior to the lock and arranged to actuate the sounder for the purpose of indi-
60 cating the initial position of the tumbler mechanism preparatory to the working of a known combination whereby the trip device carried by the spindle is exposed to the view of the operator and serves first to indicate the initial
65 position of the tumbler by sounding the alarm, and then indicates the extent of movement of the spindle from its initial position.

6. In a permutation-lock, the combination with a spindle and bolt, of a plurality of peripherally-notched tumblers mounted upon
70 the spindle and arranged to control the movement of the bolt, individual click-springs in operative relation to the periphery of each tumbler, a shiftable member carried by one tumbler and arranged for operative connec-
75 tion with the next adjacent tumbler in a predetermined relative position of the parts, a sounder, and a shiftable finger mounted upon the spindle exterior to the lock and arranged to operate the sounder when the tumblers
80 have assumed predetermined relative positions, said finger being exposed to the view of the operator to indicate the progressive position of the spindle from the starting-point.

7. In a permutation-lock, the combination
85 with a spindle and a bolt having a fixed tongue, of a plurality of tumblers provided with peripheral notches and bolt-slots, individual click-springs engaging the peripheries of the tumblers for the reception of said
90 tongue, a shiftable member serving to operatively connect the tumblers, a shiftable finger movable with the spindle and mounted thereon exterior to the lock, and a sounder embodying a striker having a trip-arm lo-
95 cated in the path of the finger when the spindle is shifted endwise to one position.

8. In a permutation-lock, the combination with the tumblers, of a spring secured to one tumbler and having a free end, and a pin or
100 projection extending from another tumbler into the path of the free end of said spring to effect the operative connection of the tumblers when rotated in one direction only.

9. In a permutation-lock, the combination
105 with a spindle and bolt, of a bolt-operating disk carried by the spindle, said bolt-operating disk being provided with pins engaging the bolt and with a circular series of projections extending from its opposite face, tum-
110 bler mechanism loosely carried by the spindle and in effective relation with the bolt, and diametrically-opposed fingers carried by the spindle and arranged for engagement with the tumbler mechanism or with the teeth of
115 the bolt-operated disk.

10. In a permutation-lock, the combination with a spindle capable of rotary and endwise-shiftable movement, of a bolt, a bolt-operating disk and tumbler mechanism mounted
120 upon the spindle in spaced relation, and an engaging device carried by the spindle between the bolt-operating disk and tumbler mechanism to permit the independent rotation of the spindle or to be engaged with
125 either the disk or tumbler mechanism by the endwise-shiftable movement of the spindle.

11. In a permutation-lock, the combination with a rotary and endwise-shiftable spindle, a bolt, and a bolt-operating disk mounted
130 upon the spindle to one side of the bolt, tumbler mechanism mounted upon the spindle, the elements of said tumbler mechanism being operatively connected by a shiftable ele-

ment, and a finger upon the spindle, said finger being located between the disk and tumbler mechanism to permit the independent rotation of the spindle, and means for effecting the engagement of said finger with the disk and tumbler mechanism by endwise-shiftable movement in opposite directions of the spindle.

12. In a permutation-lock, the combination with a rotary and endwise-shiftable spindle, of a bolt-operating disk carried by the spindle and having operative engagement with the bolt, and a plurality of rotary tumblers loosely mounted upon the spindle, a finger extending from the spindle at a point intermediate of the tumblers and bolt-operating disk, means for effecting the engagement of said finger with the disk and tumblers through the endwise movement of the spindle, and means for maintaining the spaced relation of the bolt-operating disk and the adjacent tumbler to permit the independent rotation of the spindle with the finger out of engaging relation with both the disk and tumblers.

13. In a permutation-lock, the combination with a rotary and endwise-shiftable spindle, of a bolt, a bolt-operating disk and tumbler mechanism carried by the spindle, spacing-pins intermediate of the disk and tumbler mechanism, and fingers mounted upon the spindle for engagement with either the disk or tumbler mechanism through the endwise movement of the spindle, or with neither of said elements to permit the independent rotation of the spindle.

14. In a permutation-lock, the combination with a rotary and endwise-shiftable spindle provided with an annular groove, of a bolt and tumbler mechanism, means for effecting an operative engagement between the spindle and the bolt or tumbler mechanism through the endwise movement of said spindle, a slotted detent arranged for engagement with the groove of the spindle, said slot being provided with lateral offsets, and detent-retaining devices located within the slot of the detent and designed to engage the offsets to retain the detent in one position.

15. In a permutation-lock, the combination with a rotary and endwise-shiftable spindle, of a bolt and tumbler mechanism, means for effecting an operative engagement between the spindle and the bolt or tumbler mechanism through the endwise movement of said spindle, a sounder, and a finger movable with the spindle and designed by the endwise movement of the latter to be presented in operative relation to the sounder, whereby the rotation of said spindle, after such endwise movement, will cause the finger to operate the sounder.

16. In a permutation-lock, the combination with an endwise-shiftable spindle and bolt, of a plurality of tumblers, a shiftable element for effecting an operative connection between said tumblers, means for connecting the spindle with one of the tumblers, a dial, and an index-finger carried by the spindle and mov-

able over the face of the dial to indicate the positions of the tumblers, said finger serving to indicate the endwise positions of the spindle, as well as the rotary positions thereof.

17. In a permutation-lock, the combination with a spindle and bolt, of a plurality of tumblers, a shiftable element for effecting an operative connection between said tumblers, a dial, an index-finger movable with the spindle and over the dial, means for adjusting the position of the finger with respect to the spindle, and a sounder operatively related to said finger.

18. In a permutation-lock, the combination with a casing and dials at opposite sides thereof, of a spindle and bolt, a plurality of tumblers, means for operatively connecting said tumblers with each other and with the spindle, index-fingers carried by the spindle and movable over the faces of the dials, a striker located exterior to the lock and provided with a trip-arm located in the path of one of the fingers, and a sounder in operative relation with the striker.

19. In a permutation-lock, the combination with a rotary and shiftable spindle, a bolt and tumbler mechanism, of a sounder, and a finger adjustable to various radial positions upon the spindle and movable therewith into or out of operative relation with the sounder.

20. In a permutation-lock, the combination with a rotary and endwise-shiftable spindle, a bolt and tumbler mechanism, of a sounder, and a finger adjustable to various radial positions upon the spindle and shiftable by the endwise movement thereof into or out of operative relation with the sounder.

21. In a permutation-lock, the combination with a casing, of a rotary and endwise-shiftable spindle extending entirely through the casing and projecting beyond opposite sides thereof, of tumbler mechanism and a rotary bolt-actuator both mounted directly upon the spindle within the casing, a bolt engaged by the actuator and having a fixed tongue directly obstructed by the tumbler mechanism when the latter is unset, and means for effecting the operative connection of the spindle with the tumbler mechanism or bolt-actuator through the endwise movement of said spindle, said means being normally free from the tumbler mechanism and bolt-actuator.

22. In a permutation-lock, the combination with tumbler mechanism and a bolt controlled thereby, of a spindle and means for operatively connecting the spindle with either the bolt or tumbler mechanism or with neither of said elements as desired.

23. In a permutation-lock, the combination with a casing, a rotary and endwise-shiftable spindle extending through the casing and provided with operating devices beyond each side thereof, a bolt, tumbler mechanism, and an actuator in operative aggroupment, means for effecting an operative connection between the spindle and either the tumbler mechanism or bolt-actuator through the endwise move-

ment of said spindle, and means disposed beyond one side of the casing for locking the spindle against such endwise movement when desired, whereby the spindle when unlocked 5 may be operated from either side of the casing and when locked will be under control from one side only of the casing.

24. In a permutation-lock, the combination with a spindle and bolt, of a bolt-operating 10 disk carried by the spindle, tumbler mechanism likewise carried by the spindle, spacing means disposing the tumbler mechanism and bolt-operating disk in separated rela-

tions, a projection extending from the spindle intermediate of the disk and tumbler, and 15 means for effecting the engagement of said projection with either the disk or tumbler mechanism as desired.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in 20 the presence of two witnesses.

WILSON JOHN CARROLL.

Witnesses:

CHAS. K. PHILLIPPS,
W. T. JENISON.