

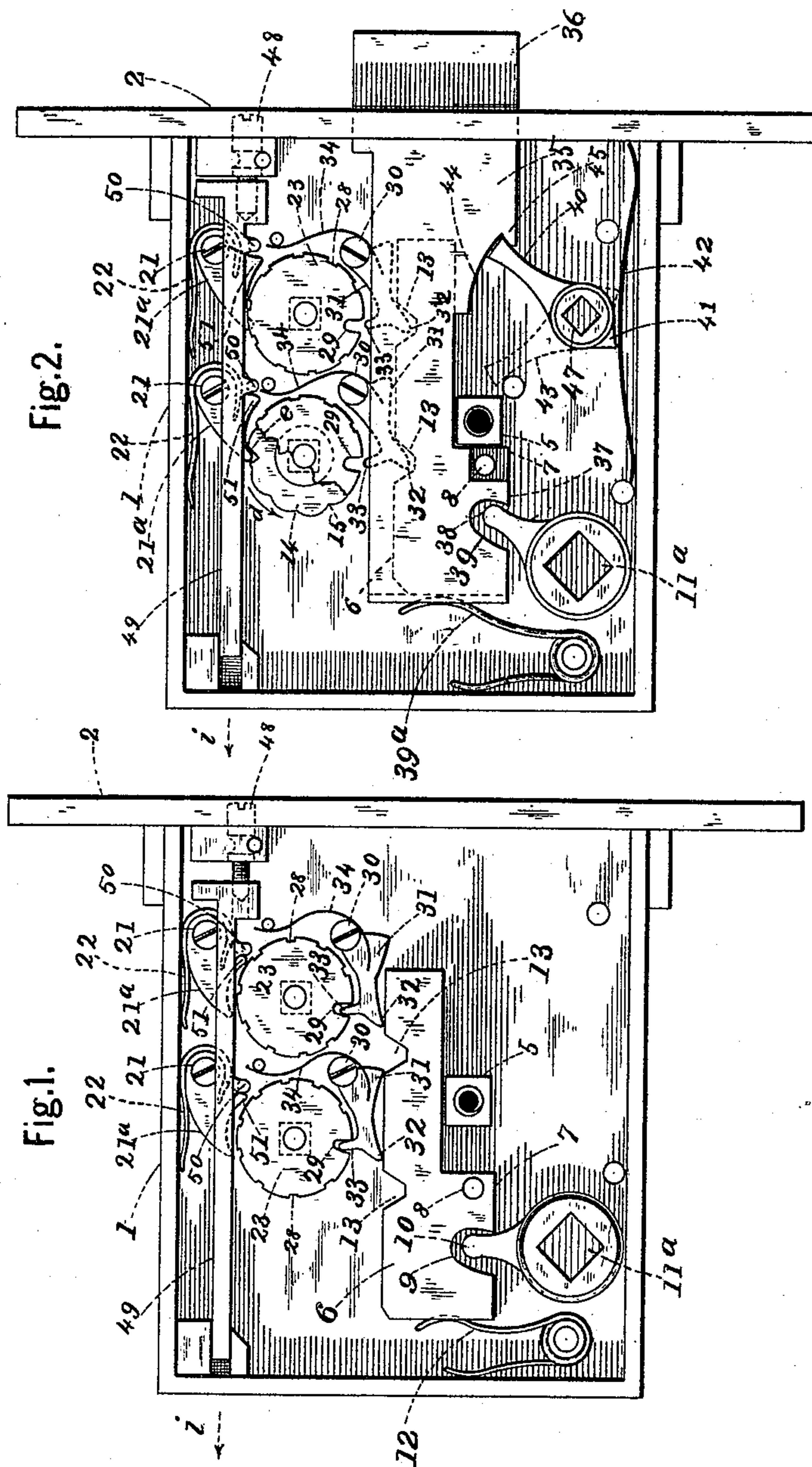
(Model.)

2 Sheets—Sheet 1.

H. BROWN.
COMBINATION LOCK.

No. 441,610.

Patented Nov. 25, 1890.



Witnesses.

Cora J. Blakeley.
Harriet-Johnson

Harvey Brown, Inventor,
By James Sawyer
Attorney.

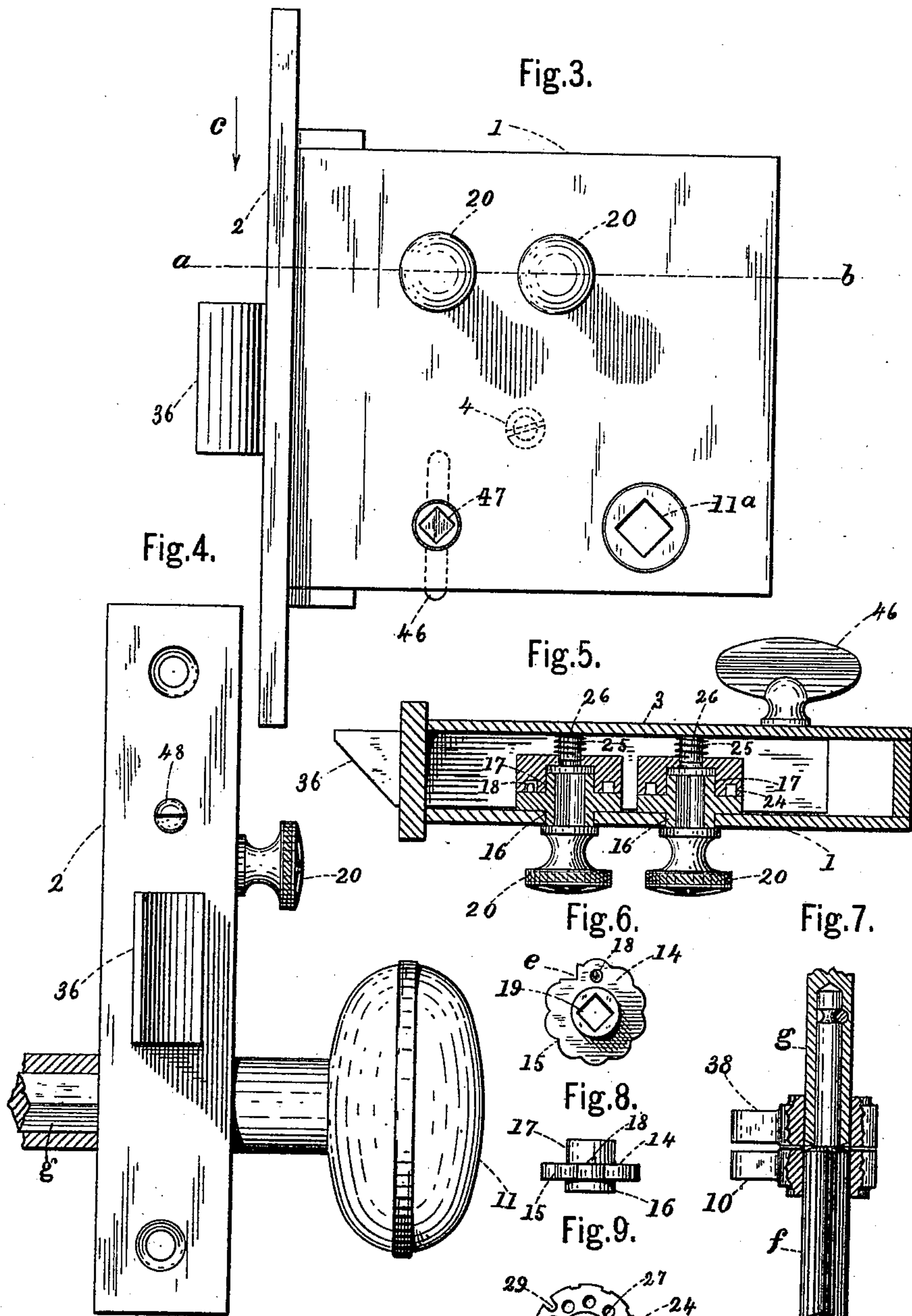
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Harvey Brown, Inventor.
By *James Baugster,*
Attorney.

UNITED STATES PATENT OFFICE.

HARVEY BROWN, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF TO
GEORGE W. COLE, OF SAME PLACE.

COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 441,610, dated November 25, 1890.

Application filed July 5, 1890. Serial No. 357,712. (Model.)

To all whom it may concern:

Be it known that I, HARVEY BROWN, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Combination-Locks, of which the following is a specification.

The object of my invention is to produce a combination-lock that can be locked or unlocked at any time, either in the day-time or at night or in the dark, all of which will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation, one side of the lock and the locking-bolt being omitted so as to show the interior mechanism and mechanism below the locking-bolt. Fig. 2 is a similar side elevation, one side of the lock being omitted so as to expose the interior construction. Fig. 3 is a side elevation of the lock, showing the knobs for operating the lock, for locking or unlocking it. Fig. 4 is a front elevation. Fig. 5 is a section on line *a b*, Fig. 3, looking in the direction of the arrow *c*. Fig. 6 is a top plan view of one of the lower combination-disks. Fig. 7 is a sectional elevation of the knob-shank, showing a suitable construction by which it is divided in the center, so that the two parts can be moved independently, whereby the lock-bolt may be moved by turning the knob on the inside of the door, while the knob on the outside cannot move it when locked. Fig. 8 is a side elevation of Fig. 6, and Fig. 9 represents an under side view of the upper combination wheel or disk.

The case of the lock is made of iron or other suitable material in the usual way, and consists of the main portion 1, front portion 2, and the removable cover 3, made removable by means of a screw 4, (shown by dotted lines in Fig. 3, as it is on the opposite side of said figure,) which screws into an interior post 5, projecting up from one side of the case. (Shown in Figs. 1 and 2.)

This lock is adapted for and can be made either in the form of a rim or a mortise-lock; but it is preferred to make it in the form of a mortise-lock.

The locking mechanism consists of two

bolts, the first or lower interior or supplementary bolt and a second or locking bolt. The first or lower bolt 6 consists of a bar of iron or other suitable material, having a horizontal portion cut away on its lower side, so that the part may rest and slide on the upper side of the post 5, and provided with a shoulder 7 to limit its forward movement. Projecting from the top of the shoulder 7 is rigidly secured a pin 8. (Shown in Figs. 1 and 2.) To the rear of the pin 8 is an opening 9, in which the bit 10 projects. (See Fig. 1.) This bit 10 is operated only by the outside door-knob 11 (shown in Fig. 4) without in any way interfering with or turning the inside door-knob, the end of the shank *f* of which fits in the square hole 11^a and turns independent of the shank *g*. At the rear end of the bolt 6 is a spring 12 (see Fig. 1) to force it forward when released, and at the top are two notches or depressions 13, the object of which will be more clearly hereinafter explained.

The combination mechanism for permitting the locking or unlocking of the bolt consists of the lower disks 14. I have shown two of these disks in the drawings; but there may be one, two, or more of such disks. They are each provided with ten notches, nine shallow notches 15 and one deep notch *e*; also, a short hub 16 at one side, which fits in a bearing in the side of the case, and a longer hub 17 on the opposite side. (See Figs. 5, 6, and 8.) In Fig. 5 they are shown in section in their proper positions within the case.

In Figs. 5, 6, and 8 is shown a short upwardly-projecting pin 18, having one side beveled off. This pin 18 is only used when changing the combination.

Through each disk 14 is a square hole 19, into which is fitted the square shanks of the knobs 20. (Shown in Figs. 3, 4, and 5.) These knobs 20 are used when locking or unlocking by means of the combination, which will be more clearly explained when describing the operation of the device.

Above the periphery of each disk 14 is pivoted to the case by a screw-pin 21, so as to turn easily thereon, a pawl 21^a, each kept in engagement with the notches 15 by a spring 22, (see Figs. 1 and 2,) so that while the disks

14 can be easily turned by means of the knobs 20 in the direction of the arrow *d* the pawls will stop them from being turned in the reverse direction.

5 The object of the shallow notches 15 in the disks 14 is to permit them to be turned around the distance of each notch with as little noise as possible, as the ends of the pawls drop into each while the disks are being operated, and
10 the object of the deep notches *e* is to produce a sufficient alarm at that point to indicate the starting-point when about to operate the combination and open the lock.

Over each of the disks 14 is fitted another
15 disk 23, each having an opening adapted to fit over and turn easily on the hub 17 of each disk 14, and on the side facing the disks 14 are ten holes or depressions 24, (shown in Fig. 9,) either of which pass over the beveled pin
20 18. From this construction it will be seen that as the disk 23 is turned around on the hub 17 in one direction the pin 18 will alternately lift the disk and pass into a hole 24, but that it cannot be turned in the opposite
25 direction.

To the removable side 3 are inwardly-projecting pins 25, (shown in Fig. 5,) corresponding in number with the disks 23, each pin 25 having a spiral spring 26, so that when the
30 side 3 is put on and secured the ends of the pins 25 project into the small hole 27 (shown in Fig. 9) in the center of the disks, while the springs 26 press against the outside of the disks, substantially as shown in Fig. 5, and
35 thereby allow either of the disks 23 to alternately rise and fall where it passes over the pin 18 in a direction that brings the holes 24 toward and over the beveled side of said pin, the straight or vertical side of the pins 18 and
40 the springs 26 preventing either from being turned in the opposite direction.

On the periphery of each disk 23 are ten notches, consisting of nine shallow notches 28 and one deep notch 29. (Shown in Figs. 1, 2,
45 and 9.)

To the side of the case is pivoted by screws 30 (see Figs. 1 and 2) the pawls 31, adapted to catch into the notches 28 and 29 in the disks 23. These pawls 31 are located so that
50 their lower projecting ends 32 rest in the notches or depressions 13 in the supplementary bolt 6, when the bolt 6 is moved forward as when in position for locking it, substantially as shown by the dotted lines 6 in Fig. 2.

55 When the disks 23 are in the proper position for permitting the bolt to be moved back, the deep notches 29 are in the position shown in Fig. 1, so that the projecting points 33 of the pawls 31 can pass up easily into the deep
60 notches 29. The springs 34 tend to force the ends 32 of the pawls 31 down toward the bolt 6, so that they always rest in the notches 13 when the bolt is in the position shown in Fig. 2.

65 The locking-bolt 35 (see Fig. 2) is provided with the usual beveled end 36, (see Figs. 2, 3, 4, and 5,) so as to act as a spring-bolt when clos-

ing a door to which the lock may be attached, which end 36 projects through the front plate 2. A portion of the under side of this bolt is
70 cut out, substantially as shown in Fig. 2, so as to leave a straight portion to slide along back and forth on the upper side of the square post 5 and of the proper form to limit the forward and back movements of the bolt. Near
75 the rear of this bolt 35 is a shoulder 37, against which the pin 8 (shown in Figs. 1 and 2) rests so as to push the bolt 35 back when the lock is being operated. Directly over the bit 10
80 is another bit 38, into which is fitted the shank *g*, which is adapted to turn the bit 38 without moving the bit 10, substantially as shown in Fig. 7. Near the rear of the bolt
35 is an opening 39, in which the end of the bit 38 is inserted to operate the bolt 35 by
85 means of a knob similar to the knob 11, and connected in the well-known way to the outer end of the shank *g*. At the rear end of the bolt 35 is a spring 39^a, for pushing the bolt forward when released so it is free to
90 move.

To secure the lock from the inside, so it cannot be unlocked by any means from the outside, (see Fig. 2,) I provide a bit 40, which
95 is fitted in the usual bearings in the case. At the rear end of the bit 40 is a pointed projecting portion 41, adapted to press against a spring 42, so that it is held by the spring when in the position shown in said Fig. 2,
100 and also when turned back in the position shown by the dotted lines 43. A curved portion 44 is cut out of the under side of the bolt 35 to allow the point of the bit 40 to pass
freely around until it strikes the shoulder 45, when the bolt is secured, so that it cannot be
105 moved while the bit is in that position.

To operate the bit 40, the shank of a key 46 (shown in Figs. 3 and 5, being shown mostly in dotted lines in Fig. 3,) is fitted and
110 secured in the square hole 47, which passes through the bit 40.

To change the combination, all that is necessary is to take a screw-driver and turn the
115 screw 48, so as to move the bar 49 in the direction of the arrow *i*, Figs. 1 and 2, which brings it in the position shown in Fig. 1, so that the two downwardly-projecting pins 50
(shown in Figs. 1 and 2) will press against the heels 51 of the pawls 21, which operation
120 lifts the points of the pawls out of engagement with the notches 15 or *e*. In this position the combination can be changed by using the knobs 20 and turning one disk under the other until the desired combination
125 is obtained.

The operation of the invention is as follows:
When it is desired to open the lock, the knobs 20 are all turned until the pawls 21^a
130 are all felt or heard to fall into the deep notches *e*, which operation gives the starting-point. If the combination consists of five movements or notches forward of one knob 20 in the direction of the arrow *d* and six movements of the other knob in the same di-

rection, then each knob is turned that number of notches which will bring the disks 23 in the position shown in Fig. 1, so that the lock can be opened by turning the knob 11.

5 To lock it, all that is necessary is to turn the knobs 20 so as to break the combination.

The combination can be changed at will, as hereinbefore mentioned, and by increasing the number of combination-disks the number
10 of different combinations can be increased to any extent desired.

The object of the shallow notches 28 in the disks 23 is to prevent any possibility of getting at the combination, which they do effectually, as any attempt to draw the bolt 6
15 back by turning the outside knob 11 throws the points 33 of the pawls 31 into some one of the notches 28, and thereby prevents the knobs 20 or the disks from being operated.
20 Consequently the bolts cannot be moved until all pressure on the outside knob 11 is removed.

I claim as my invention—

1. In a combination-lock, the combination,
25 with a series of upper and lower changeable combination-disks, provided with outside knobs for operating them, each disk having a series of shallow and one deep notch, of a series of pivoted pawls 31, having upward and
30 downward projecting portions 33 and 32, a supplementary bolt 6, provided with a vertical pin 8, and notches for receiving the portions 32, a spring for pushing it forward, and a knob and bit for operating the bolt, substantially as described.
35

2. In a combination-lock, a series of lower changeable pivoted combination-disks mounted within the case so as to turn in bearings therein, each disk having a series of shallow
40 notches and one deep notch, a pawl actuated by a spring for each of said disks, which permits the disks to be moved but one way, knobs for turning said disks, located outside of the case, an upper combination-disk mounted on
45 each of the lower disks, each also having a series of shallow notches and one deep notch, a means, substantially as described, for preventing them from turning thereon while operating the combination, a pivoted pawl for
50 each upper disk, and a spring for keeping it away from the disks, each pawl having at its head an upwardly-projecting portion adapted to pass into the deep notch and a lower projecting portion adapted to pass into a notch
55 in the supplementary bolt, an upwardly-pro-

jecting pin on the supplementary bolt, and a spring for pushing the supplementary bolt forward, a spring-actuated locking-bolt, and a means, substantially as described, for moving both bolts backward when the combination is
60 set to admit it, substantially as described.

3. In a combination-lock, a series of pairs of combination-disks, the one mounted on the other and kept together by springs, each disk
65 being provided with a series of shallow notches and one deep notch, and pivoted spring-actuated pawls for engaging with each lower disk of the series, in combination with a corresponding series of pawls for each upper
70 disk, springs for keeping the pawls away from the disks, and a supplementary bolt having a spring for pushing it forward and provided with a corresponding series of notches to receive and operate the pawls by sliding the
75 bolt back when the deep notches 29 of the disks are opposite the points 33 of the pawls 31, so that they can pass in and thus allow the locking-bolt to be moved back, substantially as described.

4. In a combination-lock, a longitudinal bar
80 mounted in a slideway within the case, a screw for adjusting it longitudinally back and forth, and a series of downwardly-projecting pins mounted on the bar, in combination with a series of pivoted spring-actuated pawls for
85 engaging with the combination-disks, whereby the whole series of pawls may be either brought into engagement or released therefrom, substantially as described.

5. In a combination-lock, the combination
90 of two combination-disks, one mounted upon the other, each provided with a series of shallow notches and one deep notch, a series of holes in that face of one disk that rests upon the other, a short pin on the opposite disk
95 having one side beveled off and adapted to catch in either of the holes so as to allow the perforated disk to turn in one direction only, and a spring for keeping the two disks together, whereby the combination may be
100 changed by turning one disk on the other, so as to cause the holes to pass up over the beveled side of the pin, the spring forcing the disks together again, substantially as described.

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