(No Model.) 3 Sheets—Sheet 1.

J. W. ESTES.

COMBINATION LOCK.

No. 493,259. Patented Mar. 14, 1893.

FIG. 1.

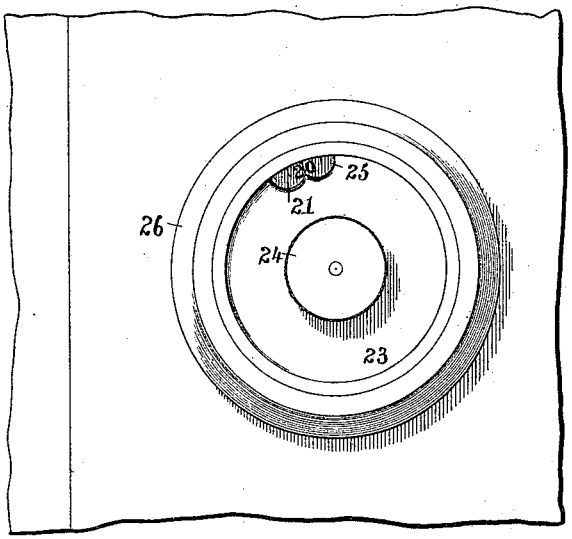


FIG. 4.

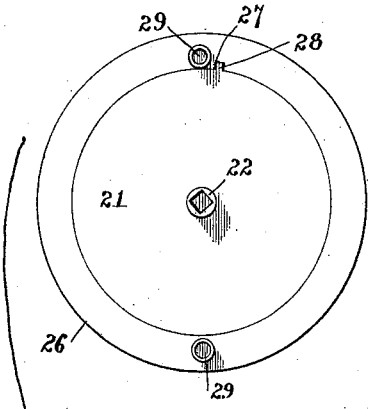
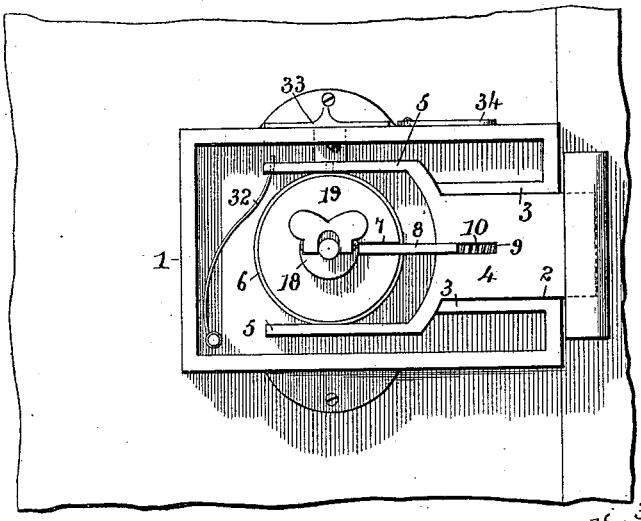
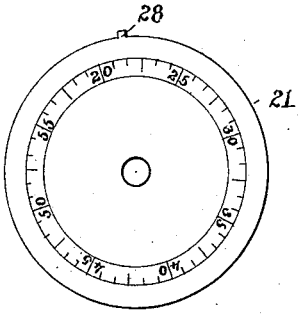


FIG. 2.





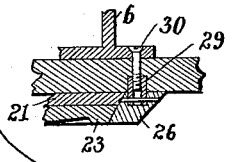
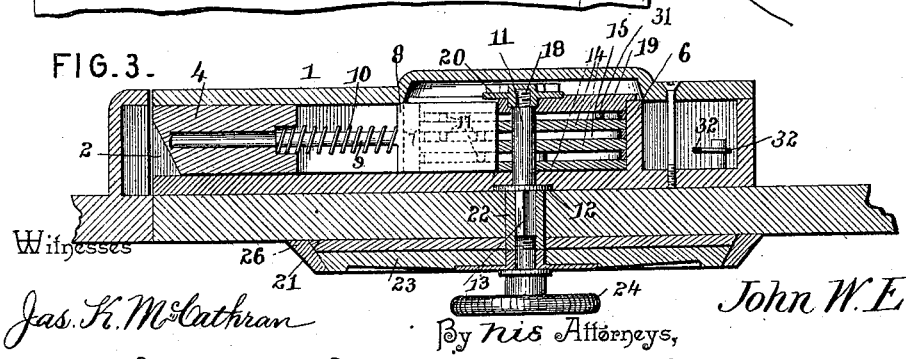


FIG. 3.



Witnesses

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Inventor

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By his Attorneys,

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C. A. Snow & Co.

(No Model.) 3 Sheets—Sheet 2.

J. W. ESTES.

COMBINATION LOCK.

No. 493,259. Patented Mar. 14, 1893.

FIG. 5.

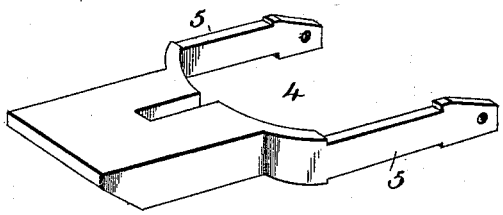


FIG. 6.

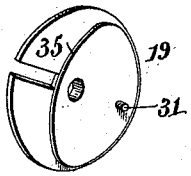


FIG. 7.

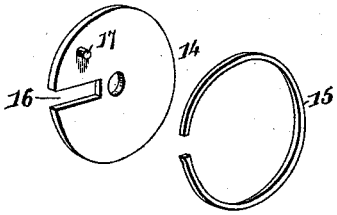


FIG. 8.

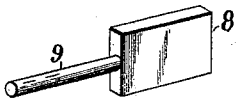


FIG. 9.

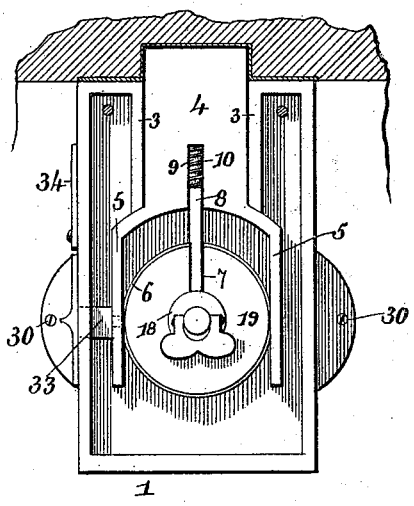


FIG. 10.

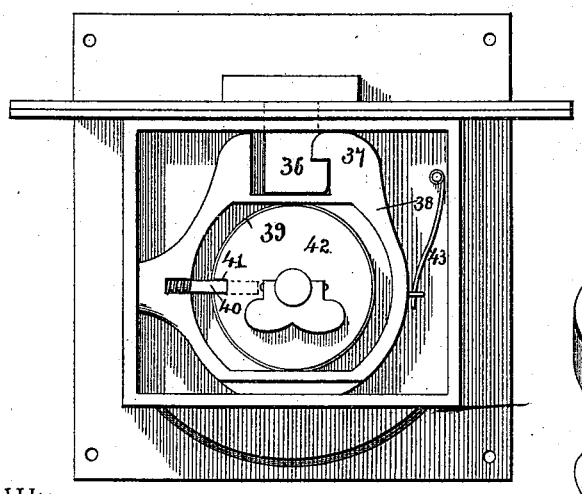
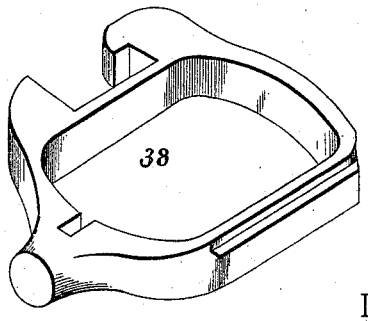


FIG. 11.



Witnesses

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(No Model.) 3 Sheets—Sheet 3.

J. W. ESTES.

COMBINATION LOCK.

No. 493,259. Patented Mar. 14, 1893.

FIG. 12.

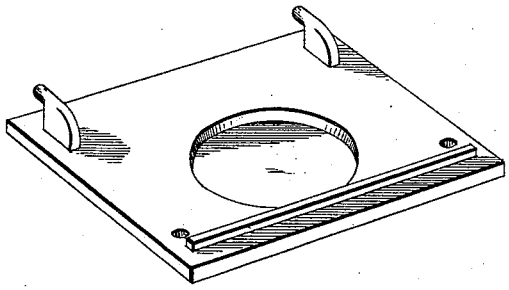


FIG. 13.

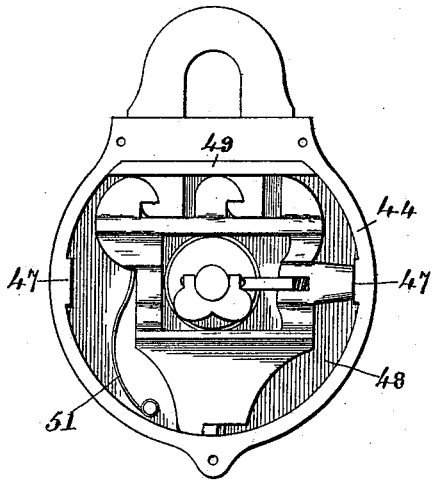


FIG. 14.

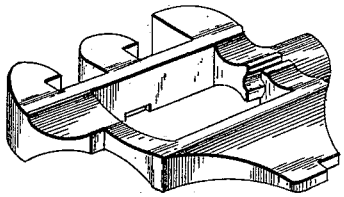


FIG. 15.

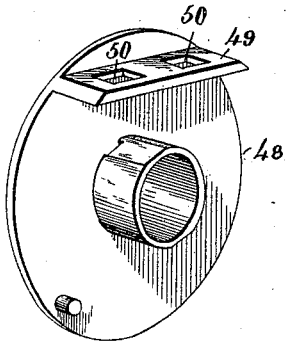
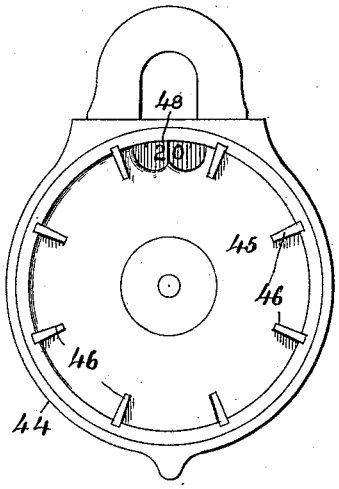


FIG. 16.



Witnesses

Jas. K. McCathran

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C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

JOHN W. ESTES, OF HALE CITY, MISSOURI.

COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 493,259, dated March 14, 1893.

Application filed July 22, 1892. Serial No. 440,890. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. ESTES, a citizen of the United States, residing at Hale City, in the county of Carroll and State of Missouri, have invented a new and useful Combination-Lock, of which the following is a specification.

My invention relates to combination or permutation locks, the object of my improvement being to provide a lock capable of universal application, without the necessity of any vital changes in the construction or arrangement of parts, to safes, doors, drawers, trunks, &c., as well as to pad-locks.

A further object of my invention is to provide a combination or permutation lock which is capable of self-retraction without the aid of a knob to withdraw the bolt.

A further object of my invention is to attain simplicity and directness of operation, whereby the liability of disarrangement of the parts may be avoided.

Further objects of my invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings: Figure 1 is a face view of a lock embodying my improvements, adapted for use on a door or safe, where the bolt operates in a horizontal position. Fig. 2 is a rear view of the same, with the rear plate removed. Fig. 3 is a longitudinal sectional view of the same, taken centrally. Fig. 4 is a detail view of the rotary plate, the dial, and the retaining collar, which are attached to the outside of the door. Fig. 5 is a detail view of the bolt. Fig. 6 is a similar view of the tumbler-plate, showing the cam on the front side thereof. Fig. 7 is a similar view of one of the tumblers and the annular washer, one of which is used above and below each tumbler. Fig. 8 is a detail view of the spring-actuated detent. Fig. 9 is a view of a drawer lock embodying my improvements, looking at the rear side with the rear plate removed. Fig. 10 is a view of a trunk lock with the rear plate removed. Fig. 11 is a detail view of the bolt which is shown in connection with the trunk lock. Fig. 12 is a view of the rear plate, showing the inside thereof, this form of rear plate being used on all the forms of lock which I have illustrated. Fig. 13 is a view of a pad-lock with the rear plate removed. Fig. 14 is a view of the bolt used in connection with the pad-lock. Fig. 15 is a view of the dial-plate used in connection with the same. Fig. 16 is a front view of the pad-lock complete.

Referring to the illustrations of the door lock, including the first eight figures of the drawings, 1 represents the case, having in its front end the bolt-opening 2, on opposite sides of which are the parallel bolt-guides 3, 3, and 4 represents the sliding bolt fitting between said guides and bifurcated at its rear end to form the parallel arms 5, which extend on opposite sides of an interposed tumbler-case 6. The tumbler-case is provided in one side, opposite the center of the bolt, with a slot 7, through which is adapted to pass the blade 8 of the spring-actuated detent 9, said detent being fitted in a longitudinal recess in the bolt at the base of the bifurcation, and the stem of said detent being surrounded by a coiled spring 10, by means of which the detent is normally held at its rear end in the slot in the tumbler-case.

Within the tumbler-case is arranged an axial arbor 11, which is provided with a shoulder 12, located in a channel or depression in the front side of the tumbler-case, said arbor being provided with a squared portion or post 13. Upon the arbor, within the tumbler-case, are mounted a series of two or more circular tumblers 14, three being shown in the views relating to the door lock. These tumblers are separated or held out of contact with each other and with the front and rear sides of the case by annular spring washers 15, which are split to correspond with the slot in the side of the case. The tumblers are provided with radial slots 16, adapted to be aligned with the slot in the side of the case, and they are further provided, on their front and rear sides, with pins 17, by which they are mutually rotatable. The washers are held in place in the case, and held from unnecessary friction with the tumblers, by their tendency to spread, and therefore their frictional contact with the walls of the casing. The arbor is provided, near its rear end, with a toothed shoulder 18, and the tumbler-plate 19, which closes the rear side of the tumbler-case, is provided with a corresponding toothed ring to engage said

toothed shoulder, whereby when the thumb-nut 20 is screwed on the threaded extremity of the arbor, the tumbler-plate is held in contact with the toothed shoulder and locked firmly to the arbor, whereby the latter and the tumbler plate may be rotated simultaneously.

The dial-plate 21 mounted upon a sleeve 22, carried by the rotary disk 23, and provided with a squared bore or socket to receive the squared end of the arbor, said rotary disk being provided with an operating-knob 24, whereby it may be rotated, and an opening 25, through which one of the numbers of characters upon the dial-plate may be seen. A pointer at the center of said opening is adapted to be directed toward these characters in making the combinations to open the lock. Fitted over the rotary disk and the dial-plate, and provided with a flared inner surface to correspond with the beveled edge of the said dial, is a retaining collar 26, provided at one side with a notch 27, to receive a projection 28, on the dial-plate, whereby the latter is held from rotation, and further provided, upon its rear surface, with tapped sockets 29, which are engaged by the screws 30, by which the case of the lock is secured to the inner side of the door. It will be seen that by the rotation of the rotary disk, by means of its handle, the arbor will be rotated, and the pin 31, on the inner surface of the latter, engaging with the corresponding pin on the surface of the adjacent tumbler, and the pin on the reverse side of said tumbler engaging with the corresponding pin on the next tumbler, and so on, will enable all of the tumblers to be rotated and adjusted as desired.

When the radial slots in all of the tumblers register with the slot in the side of the tumbler-case, the spring-actuated detent enters said slots, being forced thereinto by its actuating spring, thus liberating the bolt and enabling the latter to be retracted by its spring 32. Thus, to open the lock it is simply necessary to turn the operating knob first to the right and then to the left, and so on, until all the tumblers are adjusted as described, when the bolt will be automatically retracted.

I further provide a slide 33, on the side of the case to enable the bolt to be retracted from the inside of the door, a turn-button 34 being attached to the case adjacent to said slide to lock the bolt in its retracted position.

In order to enable the bolt to be shot, and therefore withdraw the detent from the registering slots in the tumblers, I provide the tumbler-plate on its inner side with a cam-face 35, which cam engaging the end of the detent, forces it out of the slots and enables the tumblers to be turned so that their slots are out of alignment with the slot in the casing.

The only difference between the door lock and the drawer lock, which is illustrated in Fig. 9, is that the retraction-spring for the bolt is not needed in the latter, for the reason that it will be retracted by gravity.

In the trunk lock the hasp 36 enters the case through an opening similar to the bolt-opening as described with reference to the door lock, and is engaged by a shoulder or jaw 37, on the sliding bolt 38, said bolt being similar in operation and general construction to that described hereinbefore. Said bolt embraces a tumbler-case 39, and is provided with a spring-actuated detent 40, which enters the case through a slot 41, and engages the radial slots in a series of tumblers 42, the latter being similar in construction and operation to those already described.

It will be seen that the bolt in the trunk lock operates horizontally, as in the door lock, and therefore a retraction-spring 43 is required to disengage the bolt from the hasp when the correct combination has been formed.

In the pad-lock, 44 represents the approximately circular case, within which fits the rotary disk 45, which is provided on its outer face with radial ribs 46, by which the disk may be rotated. In rear of said disk, and bearing upon projections 47 on the inner surface of the case, is the dial-plate 48, having a perpendicular flange 49, provided with openings 50, which register with corresponding hasp-openings in the side of the case to receive the ends of the hasp.

The bolt, tumblers, and other members of the lock correspond with those already described, a retracting spring 51 being employed in this form of lock as in the door lock.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a combination or permutation lock, the combination with a sliding bolt and a spring-actuated detent which is carried by and operates in the direction of the movement of said bolt, of the rotatable tumblers provided with slots to receive the said detent to permit the retraction of the bolt, substantially as specified.

2. In a combination or permutation lock, the combination with a sliding bolt and a spring-actuated detent which is carried by and operates in the direction of the movement of said bolt, of the rotary tumblers mounted upon a common arbor and provided with slots to receive the said detent to permit the retraction of the bolt, and means substantially as described for operating said arbor, substantially as specified.

3. In a combination or permutation lock, the combination with a sliding bolt provided with a spring-actuated detent, of the rotary tumblers mounted upon a common arbor and provided with pins on their adjacent faces, and a tumbler-plate secured to one end of said arbor and provided with a cam-face to engage said spring-actuated detent, substantially as specified.

4. In a combination or permutation lock, the combination with the sliding bolt provided with a spring-actuated detent, of the rotary tumblers mounted upon a common arbor

and provided with radial slots to receive said detent, and pins to engage each other, means to operate said arbor, and a tumbler-plate secured to the latter and provided with a toothed ring to engage a toothed shoulder on said arbor, whereby they are simultaneously rotatable, said tumbler-plate being provided with a cam to engage the detent, substantially as specified.

5. In a combination or permutation lock, the combination with a sliding bolt carrying a spring-actuated detent, of a circular tumbler-casing, a central arbor arranged therein, the independent slotted tumblers mounted upon said arbor, the split annular washers interposed between said tumblers, and a cam-faced tumbler-plate secured to said arbor and carrying a pin to engage a corresponding pin on an adjacent tumbler, substantially as specified.

6. In a combination or permutation lock, the combination with a self-retracting sliding bolt carrying a spring-actuated detent which operates in the direction of the movement of said bolt, of rotary tumblers slotted to receive said detent, substantially as specified.

7. In a combination or permutation lock, the combination with the sliding bolt, the spring-actuated detent, the arbor, and the rotary tumblers mounted thereon and having slots to receive said detent, of a stationary dial-plate, a rotary disk arranged in juxtaposition thereto, and a knob attached to said disk and provided with a squared sleeve to engage a squared end of said arbor, substantially as specified.

8. In a combination or permutation lock, the combination with a sliding bolt, an arbor, and tumblers mounted on said arbor and capable of adjustment thereby, of a dial-plate, a superimposed rotary disk provided with an indicator and carrying a sleeve to engage said arbor, and a retaining collar fitted over said disk and attached to said dial-plate, substantially as specified.

9. In a combination or permutation lock, the combination with the case having parallel bolt-guides upon opposite sides of its bolt-opening, of a sliding bolt, provided with a bifurcated rear end and having a spring-actuated detent, a tumbler-casing interposed between the arms of said bifurcation, the slotted tumblers mounted in said casing upon a common arbor, said slots to receive the detents, and means to operate said arbor, substantially as specified.

10. In a combination or permutation lock, the combination with the case, the sliding bolt, the slotted bolt-controlling tumblers, and the arbor forming the pivot of said tumblers, of the stationary dial-plate, the superimposed rotary disk provided with an operating knob, and the retaining collar provided with sockets to receive the screws by which said case is secured in place, substantially as specified.

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

JOHN W. ESTES.

Witnesses:
GEORGE STATON,
W. T. DIXON.