

J. D. CRAIG.
COMBINATION LOCK.

No. 491,159.

Patented Feb. 7, 1893.

Fig. 1.

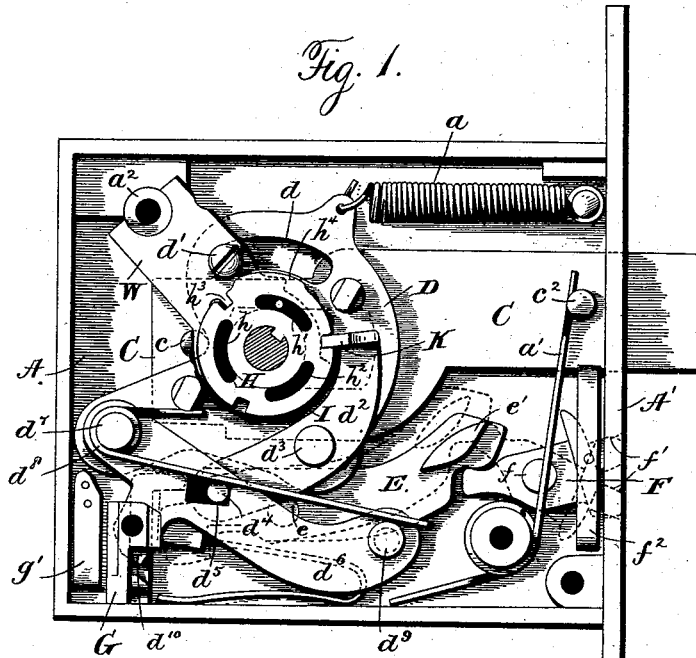
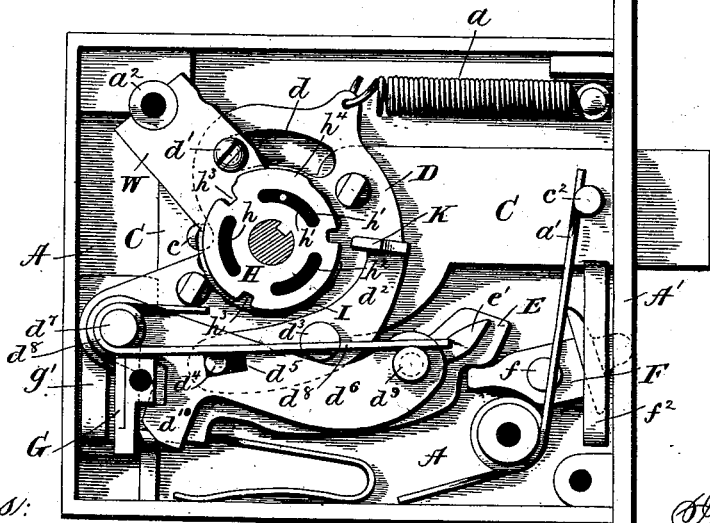


Fig. 2.



Witnesses:

James Hutchinson
Henry Calver.

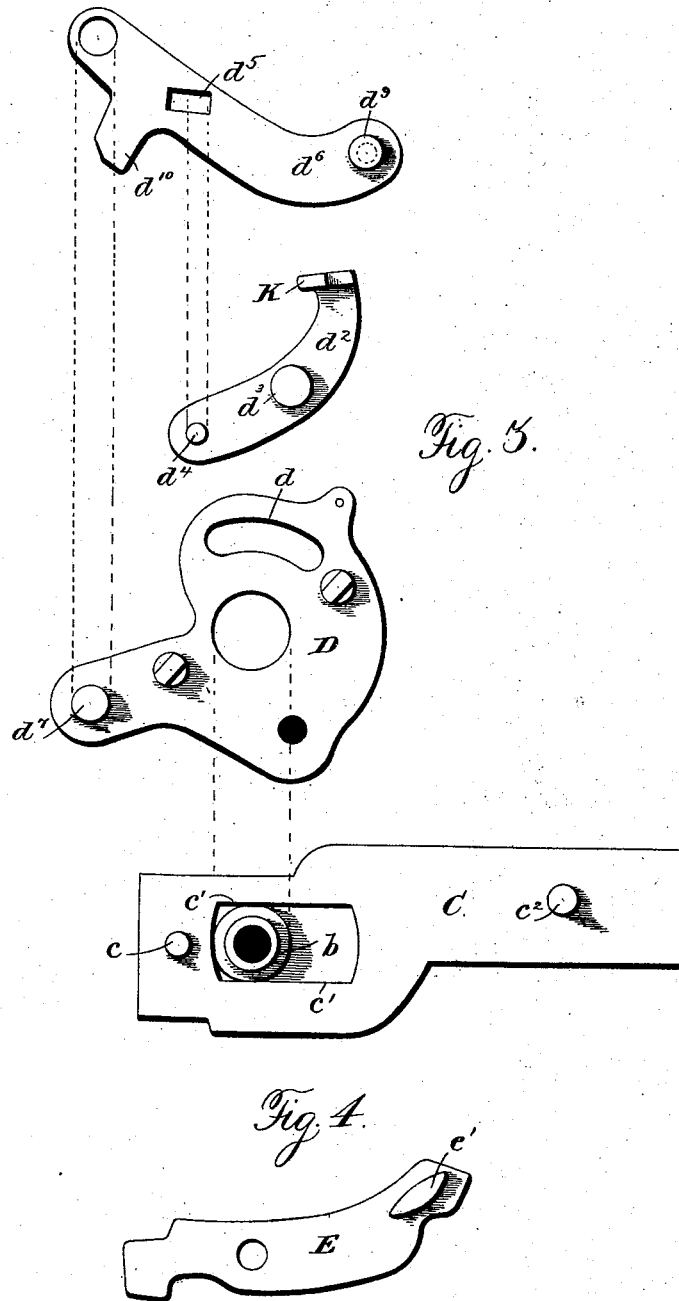
Inventor.

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Witnesses:
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(No Model.)

3 Sheets—Sheet 3.

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Fig. 5.

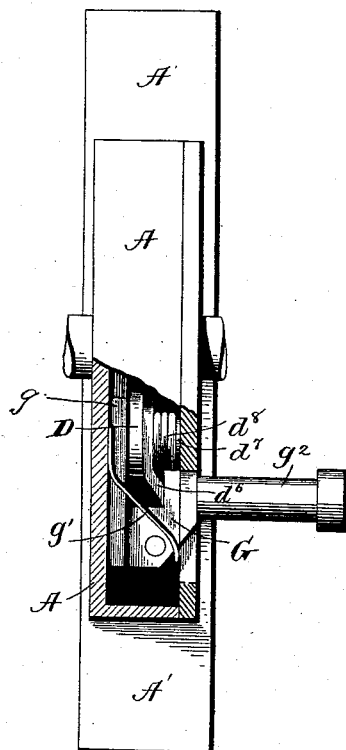
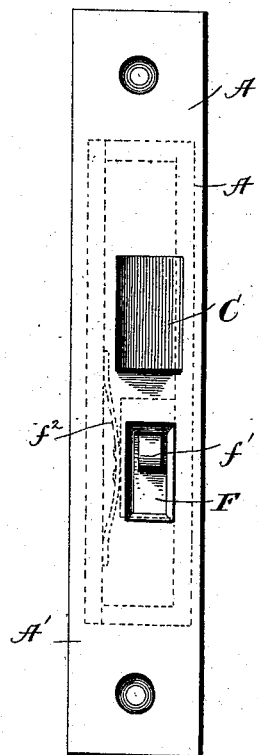


Fig. 6.



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UNITED STATES PATENT OFFICE.

JAMES D. CRAIG, OF ROGERS PARK, ASSIGNOR TO THE KEYLESS LOCK COMPANY, OF CHICAGO, ILLINOIS.

COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 491,159, dated February 7, 1893.

Application filed May 28, 1891. Serial No. 394,356. (No model.)

To all whom it may concern:

Be it known that I, JAMES D. CRAIG, a citizen of the United States, residing at Rogers Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Combination or Permutation Locks, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is an inside view of the lock, showing the interior mechanism, the spring bolt in its outwardly projected position, the tumbler key in the radial notch of the driver tumbler (and in the registering notches of the other tumblers) just ready for the turning of the knob to unlock the bolt, and showing a switch cam in its normal position for operating a compound lever to move the tumbler key out of the registering notches and thereby throw off the combination. Fig. 2 is a similar view, showing the tumbler key held entirely off from the tumblers by means of a slide catch piece moved upward into position behind a projection of the compound lever mechanism, and a part of the catch piece extending behind the rear end of the spring bolt. Fig. 3 is a detail perspective, showing plan views of the bolt and the cam plate;—and also the tumbler key carried by a lever and a co-operating lever,—the two latter forming a compound lever. Fig. 4 is a plan view of a lever provided with a switch cam block. Fig. 5 is a rear edge view of the lock, a part of the case being broken away to show the slide catch piece in its operative position behind the rear end of the bolt, the rotary knob spindle being shown as broken off on each side. Fig. 6 is a front edge view, showing the beveled end of the spring bolt, and the finger-hole end of a lever catch piece for throwing and holding the switch-cam lever out of its normal position.

My invention relates to that class of locks known as "combination" or "permutation" locks, it being more especially an improvement on the lock for which Patent No. 408,795 was granted me, August 13, 1889, and is designed for service, principally, as a mortise lock of the spring bolt order.

The objects of the invention are to provide a construction for, at times, throwing off the combination automatically; and, at other

times, permitting the tumbler key to remain in the registering notches of the tumblers, whereby the spring bolt serves as a door latch. Furthermore, to provide means for holding the tumbler key entirely off from the tumblers, when desired, so that the combination can not be found, at all, by a person on the outside of the door. Also, in providing a reversible driver tumbler with an elevated arc-shaped peripheral surface, preferably smooth, to count from, and having the remaining peripheral surface arc-shaped, and also preferably smooth, excepting where it is provided with a straight sided radial notch or notches, the said tumbler being additional to the index tumbler, and any others that may be desired.

The invention consists in the various constructions and combinations of mechanism embodied in the claims.

The base plate A is provided with a rim A' through an opening in which the spring bolt C projects to serve both in the capacity of a lock bolt and a latch bolt.

The cam plate D is similar to that shown in the patent referred to, in its general features, the rear portion being the cam face to act on the pin *c* of the bolt C, to force it back in the act of unlocking. A coiled spring *a* serves to hold the cam plate D in its normal position, or to restore it thereto, while a spring *a'* bearing on a pin *c'* of the bolt C constantly presses the bolt outward, a slot *c'* in the rear end affording a steadying bearing around the base *b* and limiting the amount of the bolt's projecting through the rim of the case.

The cam plate D has a slot *d* for a screw *d'* to pass through, serving to steady the same in its rotary movements and also to hold the washers W together (and in place) that are used between the tumblers, a lug *a*² cast integrally on the plate A holding the rear ends of the washers. The tumbler key K is carried on the vibratory end of the lever *d*² (or formed as an integral part thereof), the lever being carried upon the cam plate D, and pivoted at *d*³ and connected by a pin *d*⁴, in slot *d*⁵, with the lever *d*⁶ pivoted to the cam plate by the pivot *d*⁷, around the projecting end of which is coiled a part of a spring *d*⁸, one end of which presses against the top of a pin *d*⁹, on the vibratory end of lever *d*⁶, thus con-

stantly pressing outward said lever, and through its slotted connection with lever d^2 , pressing the latter toward the tumblers. The pin d^9 is continued through the end of the lever d^6 (and may be provided with a friction roller) where it serves as a friction pin to form part of a switch cam device. A lever E is secured by a pivot e to the base plate A, and is provided with a switch cam block e' on its upper face, against which the lower end of pin d^9 operates, the two parts forming a switch cam mechanism, which, as shown in Fig. 2, serves, immediately after unlocking the bolt through the action of the knob spindle, the tumbler key falling into the registering tumbler notches,—to throw out the tumbler key from the tumbler notches, thus throwing off the combination.

A lever catch piece F is pivoted at f to the base plate, A, it having a finger piece f' projecting through an opening in the front rim part of the case, as shown in Fig. 6. The inner end of the lever catch piece F may be turned upward against the front end of lever E, the friction spring f^2 (shown in dotted lines in Fig. 6) pressing against the inside of the cap plate of the case and holding said lever when so turned, thus carrying the forward end of lever E, to the position shown in dotted lines in Fig. 1, in which position the switch cam block e' is forced entirely out of the line of travel of the lever d^6 , and hence the latter becomes wholly inoperative as an automatic means of moving the tumbler key out of the tumbler key notches and throwing off the combination,—and by reason of the tumbler key remaining steadfastly in the radial tumbler key notches, the spring bolt, through the knob spindle and the cam plate and tumbler key connections, becomes a practical spring latch. The dotted lines in Fig. 1 show this state of the lever catch piece F and the co-operating parts, the full lines showing the inner end of the lever catch piece F turned down, as when ordinarily used, wherein the switch cam device comes into full operation to automatically throw the tumbler key out of the tumbler key notches and to throw the combination off at each unlocking of the spring bolt. When it is desired to throw out the tumbler key and hold it entirely off from the tumblers, the slide catch piece G is used, being forced from the position it occupies in Fig. 1 to the position shown in Fig. 2, the toe-piece g going behind the rear end of the bolt C, as shown in Fig. 5, producing a "dead lock" of the latter, and a side bearing face wedging behind the projection d^{10} , and by the compound lever action moving the tumbler key K and holding it away from the tumblers. The rotation of the knob spindle, in this condition, is without any effect whatever on the tumblers other than to rotate them in one direction or the other, as the tumbler key cannot possibly engage therewith until the slide piece G is moved down

to its former position. The friction spring g' bears against the cap plate of the lock case, when that is fastened in place, thus causing sufficient friction to hold the slide piece in the elevated position until returned by the finger piece g^2 to the lower position. The slide piece G wedges behind the projection d^{10} of lever d^6 , thereby forcing said lever upward and the rear end of lever d^2 also, and the tumbler key end thereof and entirely away from the tumblers.

The driver tumbler H is provided with a smooth peripheral arc-shaped portion h^4 , elevated beyond the rest of the peripheral surface which latter is also smooth excepting that it has parallel-sided radial notches h^3 for the tumbler key to engage in. It has, also, one or more slots (preferably three or more, as h , h' , h^2 ;) through its body, they being, preferably arc-shaped and are of different lengths. A driver tumbler of this order in its main features is described and broadly claimed in another pending application of mine filed of even date herewith, wherein the radial notches in the otherwise smooth periphery are V-shaped instead of being notches having parallel sides. An index tumbler I is used along with the driver tumbler, and as many other tumblers may be employed along therewith as desired, and they may be of any of the usual forms, or as shown in my two other pending applications filed of even date herewith Serial Nos. 394,354 and 394,355.

Having thus fully described my invention and its mode of operation, what I claim is—

1. A tumbler key and lever mechanism carrying the same, in combination with one or more tumblers, a switch cam device, and means for bringing the latter into play or throwing it out as may be desired.

2. A tumbler key combined with one or more notched tumblers, the former connected by lever mechanism with a switch cam device, and means for throwing the latter out of operation and holding it out.

3. A driver tumbler and one or more additional tumblers, a tumbler key provided with lever connections, combined with a catch piece having a bearing face to operate the lever connections and hold them in a changed position with the lever key held away from the tumblers.

4. A driver tumbler and an index tumbler, combined with a tumbler key connected with a cam plate by lever mechanism, the latter being provided with a switch cam device, means for throwing the latter out of position for operation, and means for holding the tumbler key, at the same time, in operation.

5. A driver tumbler, and one or more tumblers, a sliding bolt, a tumbler key carried by lever mechanism, combined with a catch piece having a bearing face to engage the lever mechanism, and a toe piece to engage the bolt.

6. A driver tumbler having a continuous

elevated arc-shaped peripheral portion, the remaining peripheral surface of the tumbler being smooth excepting where provided with one or more parallel-sided radial notches.

- 5 7. A driver tumbler having a continuous elevated peripheral portion, h^4 , and a lower circular or curved peripheral portion or surface and provided with one or more parallel-sided radial notches in the said lower peripheral surface, and having one or more slots
10 in its body, in combination with an index tumbler, a tumbler key, and mechanism for moving the latter out of a radial notch.

8. A reversible tumbler having an elevated

peripheral surface, h^4 , and a lower circular or curved peripheral surface and having one or more parallel-sided radial notches in the said lower otherwise smooth peripheral surface, in combination with a tumbler key and mechanism connecting the latter with a sliding
15 bolt.
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In testimony whereof I affix my signature in presence of two witnesses.

JAMES D. CRAIG.

Witnesses:

CHAS. F. RENNE,
GEO. C. LOWELL.