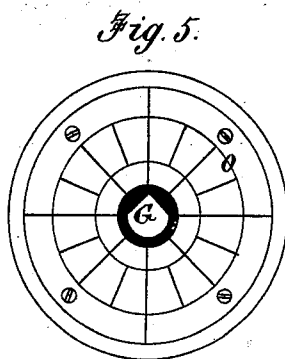
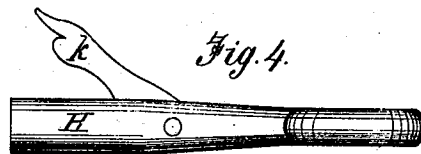
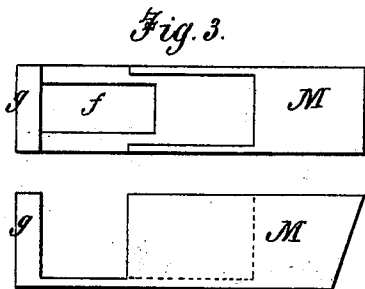
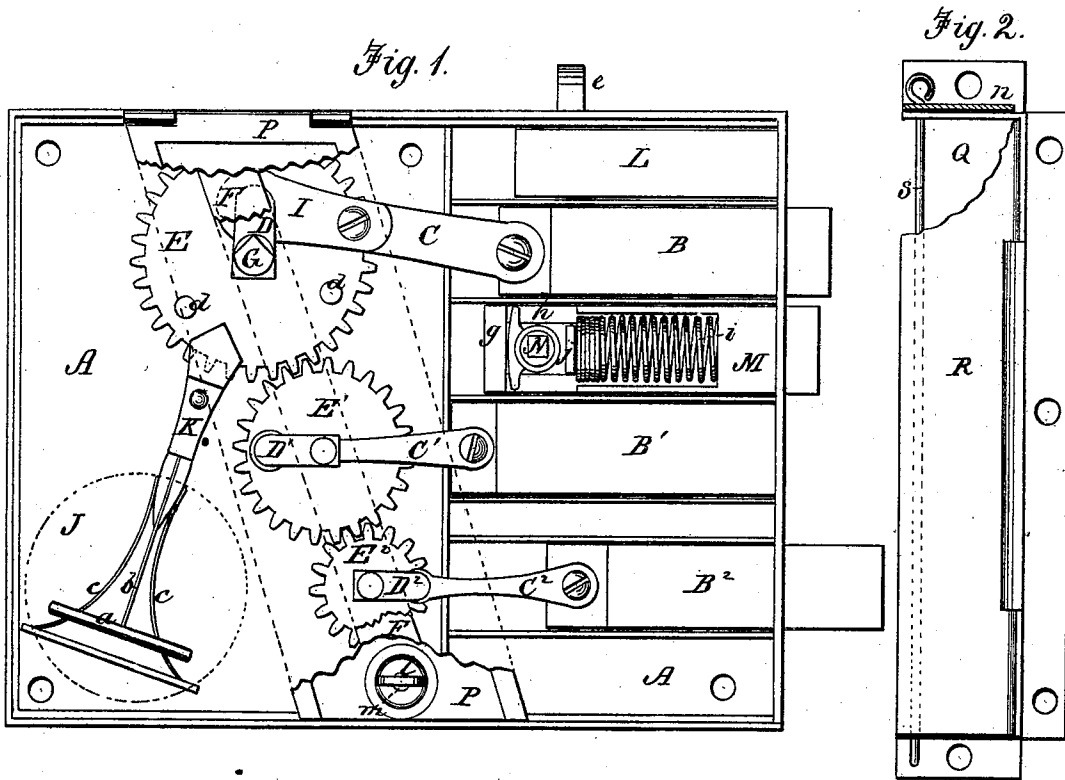


G. F. KNIGHT.
COMBINATION-LOCK.

No. 171,820.

Patented Jan. 4, 1876.



WITNESSES:

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BY

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UNITED STATES PATENT OFFICE.

GEORGE F. KNIGHT, OF CARROLL, OHIO, ASSIGNOR TO HIMSELF, J. H. NAN,
AND NATHANIEL HAVENS, OF SAME PLACE.

IMPROVEMENT IN COMBINATION-LOCKS.

Specification forming part of Letters Patent No. **171,820**, dated January 4, 1876; application filed
November 29, 1875.

To all whom it may concern:

Be it known that I, GEORGE F. KNIGHT, of Carroll, in the county of Fairfield and State of Ohio, have invented a new and Improved Combination-Lock; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming a part of this specification, in which—

Figure 1 is a view of the lock, with the face-plates removed and the hinged leaf and journal-frame broken away; Fig. 2, a side view of the bolt-keeper; Fig. 3, a detail of the latch-bolt; Fig. 4, a detail of the key, with pivoted index-hand; Fig. 5, a detail of the dial-plate and key-shaft.

This invention relates to certain improvements in combination-locks, applicable to store-houses, dwellings, safes, vaults, &c., and designed to increase the security of the same against the efforts of burglars and thieves. It consists, principally, in a number or series of bolts, so arranged with small gear-wheels and connecting-rods, or their equivalents, that the withdrawal of one bolt shoots into place and locks another, until a certain number of turns are made, which constitutes the combination at which all of the bolts are withdrawn and the door unlocked. It also consists in the particular construction of a bell-ringing device, which, operating in connection with the bolts, keeps up an incessant ringing during any attempt to unlock the same. The invention also consists in other details of construction, hereinafter described, and pointed out in the claims.

In the drawing, A represents the frame or case of my improved combination-lock. B B¹ B² are three bolts, which are located in guide-ways, and connected by pivoted connecting-rods C C¹ C² with the double cranks D D¹ D² of the three different-sized gear-wheels E E¹ E², which said bolts, connecting-rods, and wheels constitute the combination part of the lock. F is a detachable frame-piece, fastened inside the lock by means of keys, in which frame are journaled the ends of the crank-shafts of the gear-wheels. G is the main shaft of the gear-wheel E, which is made to project on each side of the lock far enough to receive the key H. The end of said shaft, in-

stead of being of the ordinary shape, is made with one side round and the other angular, and the hole in the key is made to correspond, the object of which construction will be hereinafter explained.

I is a pivoted hook, attached to the connecting-rod of the larger wheel, which forms with the hooked end of the said connecting-rod a fastening for the crank-shaft, which may be readily detached when desirable, for changing the combination or for other purposes. J is a bell placed inside the lock, and *a* is a hammer, attached through a spring, *b*, to a pivoted lever, K. Said lever is held between two springs, *c c*, and has a double-inclined head, which is operated upon by the studs *d d* of the gear-wheel E to ring the bell. L is a supplemental bolt or dead-latch, which is operated through a thumb-piece, *e*, by hand, which bolt does not form a part of the combination, but is intended to be used in an emergency to give greater security. *M* is the knob latch or bolt, which is to be used in the day-time. Said bolt is recessed in its rear portion, slotted at *f*, and provided with an abutment, *g*. N is the knob-shaft, which passes through slot *f*, and is provided with an armed hub, *h*, which, when the shaft is turned, bears against the abutment *g* to withdraw the bolt, the said bolt being forced out again by a spiral spring, *i*, which is contained in the recess of the bolt, and bears against a piece, *j*, attached to the lock-frame. O is a graduated dial-plate, placed upon one side of the lock and around the end of the shaft G, by means of which the number of turns which unlocks the combination may be accurately determined. The angular or pointed side of the shaft operates as an index-hand for this purpose, so that it will be seen that the peculiar shape of the said shaft serves a twofold purpose, one of which is to prevent keys of the ordinary construction from being used upon the lock, and the other is to ascertain accurately the position of the key-shaft with respect to the dial-plate, so as to find the unlocking position. To determine the number of turns for opening the combination an index-hand, *k*, is used. Said hand is pivoted at one end in the shank of the key, and is arranged to turn lon-

gitudinally in a slot in the shank or be projected at right angles when in use. P is a hinged leaf, which forms a part of the outer casing of the lock, and is designed to admit of ready access to the working parts of the same. Said leaf is provided with a thumb-nut, *l*, which is permanently swiveled in the same, and is intended to engage with a screw-bolt, *m*, so as to form a secure fastening for said leaf, and yet admit of the easy opening of the leaf without the use of a screw-driver or wrench, and without running the risk of dropping or losing the nut. Q is a specially-constructed keeper, which receives the protruding bolts and holds the door closed. Said keeper is intended to be placed upon the inside of the door-jamb, and is provided with a hinged front portion, R, with upper and lower flanges *n n*, perforated to receive a bolt or rod, S, so that when the rod is in, the portion R is fastened to Q, and securely holds the bolt.

The object of this construction is to enable any one to escape from the inside of the building, in case of fire or other emergency, by simply removing the rod, without stopping to unlock the bolts by the combination.

The operation of my improved combination-lock is as follows: The lock being provided with a given number of bolts and gear-wheels, and arranged to open by a given number of revolutions of the main shaft, (which in the device illustrated in the drawing is three in number,) it will be seen that any greater or less number of revolutions, or partial revolutions, will only have the effect to withdraw one bolt and introduce another, and as the rotation of the wheel carrying the studs causes an alarm to be rung upon the bell, any tampering with the lock will arouse the inmates of the building.

I do not confine myself to any number of bolts or gear-wheels, as different numbers of

bolts, and also different sizes of wheels, may be employed for different combinations.

By disconnecting the bolts from the gear-wheels and placing a knob upon the main shaft, it will be seen that the balance of the devices may be readily transformed into a door-bell.

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

1. The series of bolts B B¹ B², combined and operated together simultaneously through different-sized gear-wheel, E E¹ E², but in different positions, until a given combination is reached, substantially as and for the purpose described.

2. The combination, with the bolt B, connecting-rod C, crank D, and gear-wheel E, carrying studs *d*, of the pivoted lever K and bell J, as and for the purpose described.

3. The combination, with the crank-shafts of the gear-wheels, the bolts, and their connecting-rods, of a pivoted hook, I, substantially as and for the purpose described.

4. The key-shaft, having one side round and the other angular, in combination with a graduated dial-plate, substantially as and for the purpose described.

5. The combination, with the graduated dial-plate, of the key, having a pivoted index-hand, as and for the purpose described.

6. The combination, with the lock, having a screw-bolt, of the hinged leaf P, having a permanently-swiveled thumb-nut, for the purpose described.

7. The combination, with the stationary part of a keeper, Q, of a rod, S, and the hinged portion R, having perforated flanges *n n*, for the purpose described.

GEORGE F. KNIGHT.

Witnesses:

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