J. L. Whetstone,

Lock.

No. 4,640. Patented July 20, 1846.

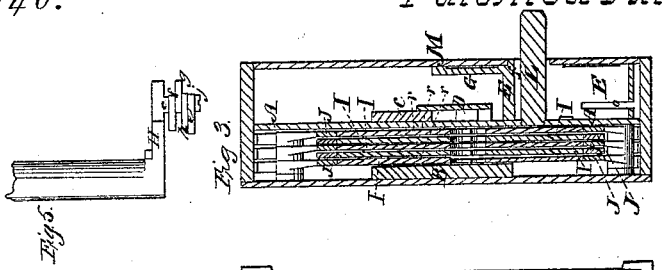

Fig 5.

Fig 3.

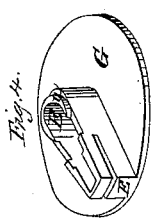

Fig 4.

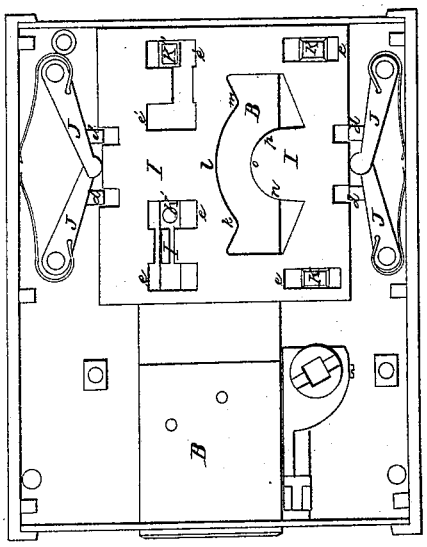

Fig 2.

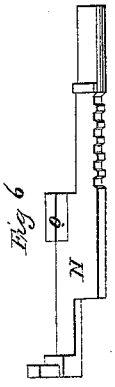

Fig 6

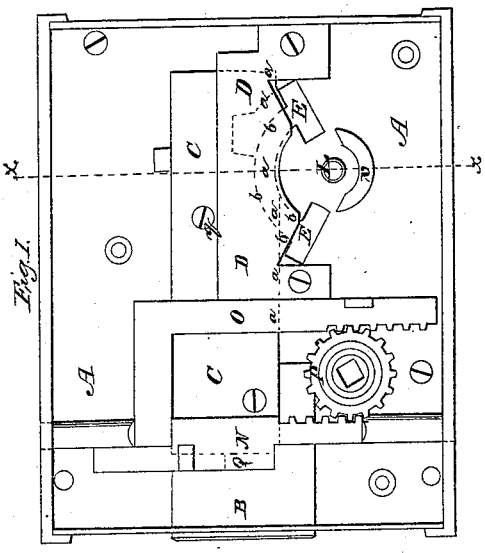

Fig 1.

UNITED STATES PATENT OFFICE.

JNO. L. WHETSTONE, OF CINCINNATI, OHIO.

DOOR-LOCK.

Specification of Letters Patent No. 4,640, dated July 20, 1846.

To all whom it may concern:

Be it known that I, JOHN L. WHETSTONE, of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful improvements in the manner of constructing a lock for the doors of bank, vaults, safes, and other places where special security is required, which lock I denominate the "safety combination-lock;" and I do hereby declare that the following is a full and exact description thereof.

In my combination lock, I adopt the well known principle of permutation, there being any desired number of movable bits to the key which are to act upon a corresponding number of tumblers which slide up and down vertically within the lock.

A principal improvement in my manner of constructing the safety lock consists in my so arranging and combining the tumblers, and the bits of the key, as that the tumblers may either be raised or drawn down, or in part raised and in part drawn down by the action of said bits.

The box of my lock I divide into two separate chambers by inserting a partition plate of the same width and length with the cap plate, midway between the cap plate and the face plate of the box; thus forming what may be denominated the anterior and posterior chambers. When the key is inserted for the purpose of moving the bolt, it is passed first into the anterior chamber and is then turned partially around, until it arrives at a proper opening through the division plate, when it is made to enter the posterior chamber and to operate on the bolt.

In the accompanying drawing Figure 1 is a direct view of the anterior chamber, the cap plate being removed for the purpose of showing the parts immediately within it. Fig. 2 is a view of the posterior chamber the division plate being in like manner removed for the purpose of showing the parts beyond it. Fig. 3 is a section through the lock in the line *x x* of Fig. 1. Fig. 4 is a perspective view of a revolving escutcheon placed between the cap-plate and division-plate of the lock; Fig. 5 shows the lower part of the barrel and bits of the key, and Fig. 6 is a representation of the underside of one of two bolts which may be combined with my lock; these bolts are shown in part in Fig. 1; these are so arranged, that when protruded they cannot be withdrawn until the lock bolt is retracted.

In Figs. 1 and 3, A A is the partition plate that divides the lock into two chambers.

B B is the lock bolt which lies within the box in the usual manner as seen in Fig. 2; but the part of the lock bolt there shown is not that which is immediately acted on by the key, there being an additional plate C C, Fig. 1, screwed on to it, which plate lies upon the division plate A A. This plate C is in part hidden by a bridge plate D D; its continuation under this plate is designated by the dotted lines *a a;* and it is upon this plate that the key operates through the intermedium of the escutcheon in a manner to be presently explained. The key is made to enter through a hole in the cap plate in the usual manner being received within the box E E of the escutcheon G Figs. 3 and 4 which box it fits closely.

F F are openings through the division plate, through one of which the movable bits of the key must be passed when the bolt is to be shot in or out; the arm H of the key remaining above the division plate to operate on the plate C, while the movable bits operate on the tumblers I I in the posterior chamber; I have shown five bits and tumblers only, but in the best locks I may use ten or twelve. The curved dotted lines *b b* Fig. 1 show an opening in the division plate terminating in the opening, F F and allowing the part *c* of the bit of the key to pass around.

J J J J are levers that are borne up against the edges of the tumblers by suitable springs there being one above and one below each of the tumblers; these levers are stopped against the studs *d d;* by this arrangement the tumblers may be either raised or drawn down by the key they moving with equal freedom in either direction.

K K K′ K″ are stumps which enter the racking *e e e* in the tumblers.

K′ is the rack stump which is made fast to the lock bolt, and is to pass through the horizontal racking when the bolt is moved; the screw *q* in the plate C passes into this stump. The stump K′ is shown as so situated that the outer tumbler must be depressed to enable the stump to pass through the horizontal racking from *e* to *e;* but if this tumbler was inverted, and its ends reversed, so as to allow what is now its rear

end to become its forward end, it would have to be raised to enable the stump to pass through the horizontal racking in *e'*; and so of either of the tumblers. When the tumblers are to be raised, the movable bits, *f*, *g*, *h*, *i* and *j* of the key act upon the curve *k*, *l*, *m* of said tumblers; when they are to be drawn down, the bits are made to operate on the curve *n*, *o*, *p*.

The tumblers I usually make precisely alike in the curves on which the bits are to act, the horizontal racking alone being varied; this however is not absolutely necessary as the curves may be varied and the bits be adapted to them, should it be preferred without altering the principle of action. I place washers *r r* between the tumblers to separate them from each other and to lessen the friction; there is no danger however of the adhering of the tumblers to each other, as in some other combination locks, the levers J always restoring them to their proper place.

The bridge plate D D stands at such distance from the division plate as is necessary to allow the arm H of the key to pass between them, and the slot *s* through the parities of the box E of the escutcheon receive the bridge plate as the key is turned round. The whole of the escutcheon is contained between the cap and division plates excepting a projecting fillet *t* Fig. 3 which passes into the circular opening that surrounds the barrel of the key, and the drill pin L, thus serving to guide it as it revolves. The fillet *u* Fig. 4, is received, for like purpose, by the curved segment *v* on the division plate. I intend to make the plate G of the escutcheon of steel or of case hardened iron to prevent its being drilled through. The cap plate M I intend to protect in a like way. The bits of the key, and the respective tumblers are to be duly numbered or lettered so as to show their correspondence, and to guide in arranging them. The bits have square holes through them, are received upon a square pin, and are secured to the key in the usual way.

The operation of this lock is as follows: When the key has been inserted it is turned around upon the drill pin, and carries the escutcheon with it until it is opposite one of the openings F through the division plate; the bits are then passed through said opening until the arm H bears upon the division plate; the bits will now be in the posterior chamber, and as the key is turned they will operate upon the tumblers, either to raise or depress them, as may be desired, while the arm in the anterior chamber operates on the bolt bar, or plate C,—the arm passing between the bridge and the division plate; the bolt may thus be shot in or out as the case may be, the outer end of the box E, and not the bit H, coming into contact with it. The key is to be withdrawn through the corresponding opening F into the anterior chamber and is turned round therein until it arrives opposite to the keyhole in the cap plate.

The double racking not only allows of the reversing of the tumblers but affords additional security in another way. The guide stump K″ being placed as herein represented, it is evident that if in attempting to open the lock, an undue pressure will be made upon the bolt, and the tumbler be moved improperly it may become fast upon the stump K″ instead of K′, and thus effectually arrest all further proceeding. The probability of this occurrence is very great, as it will not be possible to ascertain whether the tumbler is to be raised or depressed, as they are each capable of both actions.

On account of the incasement of the key hole in the escutcheon no more instruments can be introduced than will enter a space of the size of the key hole, for in order to get at the tumblers the escutcheon must be turned thus shutting up the key hole with the exception of the annular space occupied by the barrel of the key. It will be seen moreover that when the escutcheon is turned into the position to act upon the plate C, the instruments would be brought into the circular opening *b b b*, the narrowness of which is such as to forbid as much motion upward or downward as some of the tumblers would require to allow the rack stump to pass. The bridge plate also would effectually prevent the moving of the instruments inward or outward from one tumbler to another; with ten or twelve tumblers it would be utterly impossible to introduce a sufficient number of instruments, and of sufficient strength to effect an opening.

N and O Fig. 1 are two bolts, which may be shot up and down by means of a knobbed handle operating on the pinion P. When these are used they are so arranged as that they cannot be retracted until the lock bolt has been turned back, the projecting piece Q on the underside (Fig. 6) of the bolt N being in contact with the lower edge of the plate C and serving as an effectual stop to such withdrawal.

Having thus fully described the manner in which I construct my lock, and shown the operation thereof, what I claim therein as new and desire to secure by Letters Patent, is,

1. The manner in which I have arranged and combined the tumblers and the key, so as to allow the tumblers to be moved either up or down by reversing them upon the racking stump, and by causing the bits of the key to act upon the upper or lower curve of said tumblers, substantially as herein set forth.

2. I also claim the manner in which I have

arranged and combined the revolving escutcheon, and the bridge plate, the box E of the escutcheon being adapted to the arm of the key, and to the bridge plate in such manner as that by the aid of the slot or opening *s* in said box, the arm of the key is allowed to pass between the bridge plate and the division plate for the purpose, and in the manner set forth.

JOHN L. WHETSTONE.

Witnesses:
GEORGE MCGREGOR,
WM. GLENN.