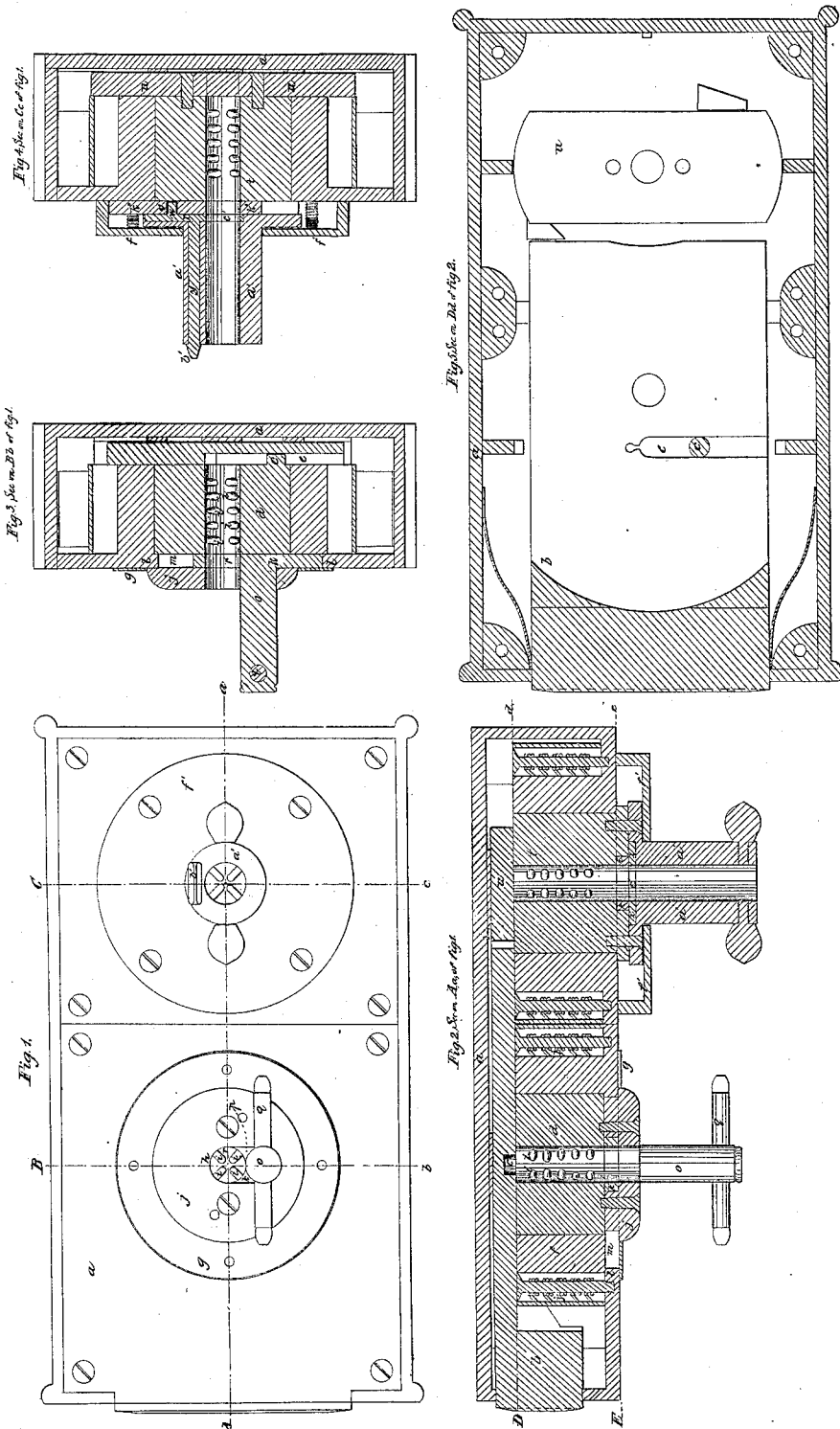


L. YALE.
LOCK AND LATCH.

No. 6,111.

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Fig. 6, Sec. on Etc. of Fig. 2.

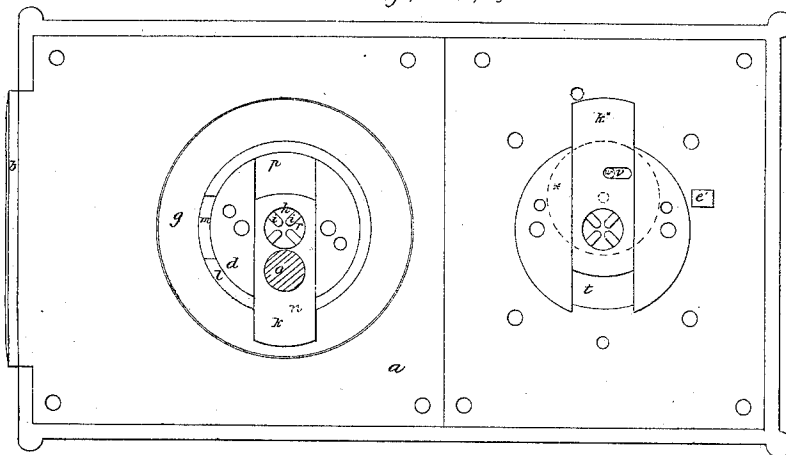


Fig. 7.

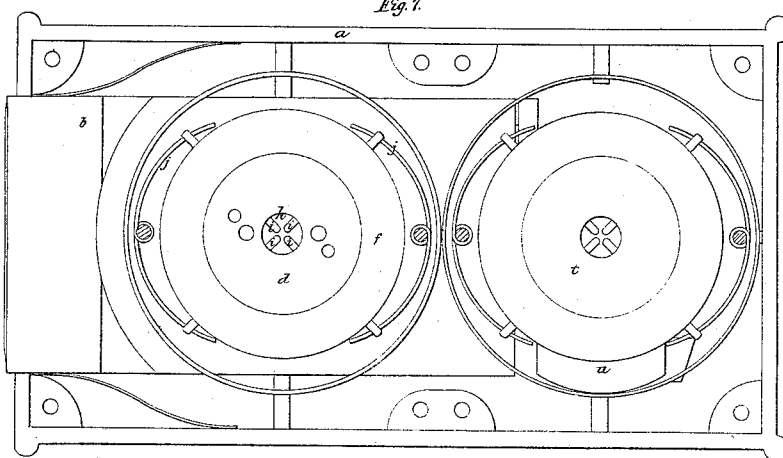
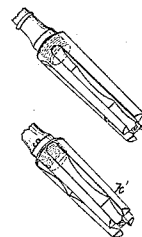


Fig. 8.



UNITED STATES PATENT OFFICE.

LINUS YALE, OF NEWPORT, NEW YORK.

COMBINATION REVOLVING TUMBLER-LOCK.

Specification of Letters Patent No. 6,111, dated February 13, 1849.

To all whom it may concern:

Be it known that I, LINUS YALE, of Newport, in the county of Herkimer and State of New York, have invented certain new
5 and useful Improvements in the Combination-Lock for Vaults, Banks, &c., and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other
10 things before known and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

15 Figure 1 is a face view of the lock; Fig. 2, a longitudinal section taken at the line (Aa) of Fig. 1; Figs. 3 and 4 cross sections taken at the lines (Bb) and (Cc) of the same figure; Fig. 5 a longitudinal section taken at the line (Dd) of Fig. 2; Fig.
20 6 a like section taken at the line (Ee), and Fig. 7, another face view with the top plate removed. Fig. 8 a view of the keys used.

The same letters indicate like parts in all
25 the figures.

The invention now claimed by me consists of a series of improvements on a lock patented by me on the 13th day of June, 1844, in which the locking bolt is thrown out and
30 in by a pin on the face of what I term a "rotating tumbler," which works in a groove in the face of the bolt, the said rotating tumbler being operated by a key which as it is inserted forces out to the required distance a series of radial stops that
35 pass through holes in a cylindrical tumbler and enter corresponding holes in a surrounding hollow cylinder. In the lock as improved by me I employ two series of rotating tumblers, one to operate the main
40 bolt, and the other to operate a stop against the main bolt, which, according to its position either holds the bolt in place to prevent it from being thrown back, or leaves it
45 free to be moved.

The principle of the first part of my invention consists in combining with the main turning tumbler that operates the main bolt, a sliding bolt and turning plate connected with the tumbler, which sliding
50 bolt being adapted to slide within the turning plate, and the two so connected and adjusted as that the turning plate cannot turn except when the sliding bolt is in a central position relatively to the plate and tumbler,
55 so that this position of the sliding bolt must

be attained before the bolt of the lock can be operated, the sliding bolt being provided with a key hole which only coincides with the key hole in the tumbler when it (the
60 sliding bolt) is thrown out to lock the turning plate and tumbler connected therewith, so that when the said sliding bolt is in its central position to admit of the turning of the tumbler it shall cover the key hole to
65 prevent the admission of it.

The second part of my invention consists in employing, in combination with the rotating tumbler and sliding bolt which covers the key hole when in a central position to
70 admit of turning the tumbler, a key, which when inserted in the key hole will admit of removing the handle that it may remain in place and admit of closing the key hole
75 above it to place the sliding bolt in a central position relatively to the tumbler.

The third part of my invention, which relates to the composition or permutation tumbler that operates the stop to prevent
80 the main bolt from being thrown back, consists in combining therewith a sliding bolt which covers the aperture leading to the key hole, and which only admits of the turning of the tumbler when it closes the key hole,
85 and an eccentric turning plate and thumb piece which operates it and the sliding bolt, the said eccentric being made to traverse over and close the key hole before the tumbler can be operated and this part of
90 my invention also consists in combining with the parts thus combined a key, which when inserted will admit of moving the sliding bolt and eccentric over it to close the key hole, the said sliding bolt being inclosed
95 within a cap plate secured to the front plate of the lock and adapted to the turning of the sliding bolt within it.

In the accompanying drawings (a) represents the lock case which can be made of any other form adapted to the purpose, and
100 (b) is the main bolt which slides therein between appropriate brackets. This bolt is drawn out and in by means of a pin (c) on the under face of a rotating tumbler (d) the said pin being adapted to a groove (e)
105 made in the face of the bolt and at right angles with its length, so that as the tumbler rotates the action of this pin against the sides of the groove forces the bolt in or out. The turning tumbler (d) is a metal cylinder
110 accurately fitted and turning within an outer cylinder (f) and attached to the part

(*g*) of the front plate of the lock case, and provided with a round central hole (*h*) for the reception of the key. The two cylinders are pierced with five series of radial holes, each series consisting of four, for the reception of sliding stops (*i*, *i*) accurately fitted to them. The sliding stops are made in two parts, the inner part in the tumbler and the outer part in the surrounding cylinder. The outer end of the two parts are notched to receive the end of a series of springs (*j*), one for each, the tension of which springs forces them inward toward the center of the key hole, and the inner end of the inner parts project within the key hole and are there rounded to be acted upon by an appropriate key (*k'*) which has as many faces as there are sliding stops in each series, and the faces of the key are so formed in the direction of their length relatively to the length of the stops that when the key is inserted the junctions of the stops in the tumbler and those in the surrounding cylinder shall correspond with the junction of the tumbler and surrounding cylinder to admit of turning the tumbler within the cylinder; but when the relative positions of these parts do not correspond then the tumbler cannot be turned. In this way the permutations of the lock can be varied by making the stops of various lengths and shifting them to require different keys to push them out so that they shall coincide, and permit the tumbler to turn.

To the top of the turning tumbler is secured by means of screws a turning plate (*j*) the under face of which is recessed entirely across to receive a sliding bolt (*k*) which is a flat plate of metal with parallel sides to admit of its sliding freely endwise, but its length is just equal to the diameter of the turning plate the ends forming segments of the circumference of said plate, so that when in a central position the two turn together with the tumbler, and within a ring (*l*) attached to the lock plate, and which is an extension of the cylinder that surrounds the tumbler. But this ring has two openings in it at (*m*) and (*n*) of such capacity as to receive the end of the sliding bolt when thrown out, and these openings are so located that one of them will receive the sliding bolt when the main bolt of the lock is thrown out and the other when thrown in. The sliding bolt is provided with a spindle (*o*) on its upper face which passes through a mortise (*p*) in the turning plate, and the length and position of the mortise is such as to permit the sliding bolt to be moved in one direction for inserting it into either of the openings (*m*) or (*n*), and when moved in the other direction to be concentric with the turning plate, to admit of turning it, the spindle being provided with a handle (*q*) for that purpose. When the sliding

bolt is in a concentric position the key hole in the tumbler is covered by it so that a key can not be inserted, but when pushed out to lock the tumbler to the surrounding cylinder, then a hole (*r*) by the side of the spindle together with part of the mortise in the turning plate constitutes the continuation of the key hole for the continuation of the key, but as the tumbler cannot be turned unless the sliding bolt is in the concentric position, and when in that position it closes the key hole, the key must be made so short as to admit of sliding the bolt over it when in place. For this purpose the key is made with a tapped hole in the upper end to receive the tapped end of a handle (*s*) which when the key is inserted can be withdrawn to permit the sliding bolt to close the key hole.

At the rear end of the main bolt there is a rotating permutation tumbler (*t*) constructed and operated in manner similar to the one used for operating the main bolt with such differences as follow: to the lower surface of the tumbler is attached a plate (*n*), denominated the "bolt stop," of the form represented in the drawings, that when in the position represented the main bolt can be drawn into the lock but when turned in the position at right angles to this, (which requires the main bolt to be thrown out) it rests against the rear end of the main bolt to prevent it from being forced in. Instead of the turning plate (*j*) used in connection with the tumbler before described, this tumbler extends sufficiently outside of the lock plate to receive a sliding bolt (*k'*) similar to and corresponding with the one (*k*) before described, but instead of being operated by a spindle attached to it there is a transverse groove (*v*) made in it which receives an eccentric pin (*w*) that projects from the under face of an eccentric plate (*x*), on the lower end of a spindle (*y*), that turns in a hole by the side of the key in the key hole tube (*a'*) and provided with a thumb piece (*b'*), by which it is turned, so that when the eccentric plate is turned to make the hole (*c'*) in it coincide with the keyhole, it causes the sliding bolt (*k'*) to slide and lock the tumbler, and at the same time to place the whole in it over the main key hole, that the key may be inserted, and after the handle of the key has been withdrawn then the thumb piece is turned back to cover the key with the eccentric plate and the sliding bolt, and to place the latter in a concentric position to admit of turning the tumbler. The sliding bolt in this part instead of entering recesses when protruded as in the first tumbler merely strikes against a stud (*e'*) on the lock plate to prevent the tumbler from turning.

The lower end of the key hole tube of this tumbler is flanged to cover the tumbler, and

to form the attachment thereto by screws or other means, and over the whole is secured a circular cap plate (*f'*) for further security. The keyhole tube which projects beyond the
 5 outer surface of the cap plate is provided with horns by means of which the tumbler is turned when all the parts are promptly set.

The mode of operating this lock is as follows, viz: After the permutations of the two
 10 tumblers are set to the required key or keys, for one key may answer for both although it is better to use one for each, the thumb piece is turned to place the sliding bolt and
 15 the eccentric plate in the position which will bring the keyholes through them to coincide with the keyhole in the tumbler; the key is then inserted and the handle withdrawn, that the eccentric plate and sliding bolt may
 20 be turned back to cover the key and bring the sliding bolt in a central position, the tumbler is then turned into the position represented in the drawings to permit the main bolt to be thrown in. The sliding bolt in
 25 the first tumbler is then removed to insert the key, the handle of which is withdrawn to admit of the sliding of the said bolt back to its central position, and then the tumbler can be turned by the handle to throw back
 30 the main bolt. And for the purpose of locking or throwing out the main bolt the same operations are performed except that the tumbler which operates the main bolt is first turned.

35 It will be obvious that any variation may be made either on the principle or in the structure of the permutation tumblers, as these make no part of the invention which I now claim, but it is necessary that they be
 40 so constructed as to admit of the application

of the improvements herein specified, the tumblers described being merely given as illustrating the modes of application of the principle of the invention now claimed as new.

What I claim as my invention and desire to secure by Letters Patent, is—

1. The combination of the sliding bolt with the rotating tumbler, substantially as described, for the purpose of locking the
 50 tumbler independently of the permutation stops, as described.

2. I also claim the turning plate in combination with the sliding bolt and tumbler, substantially as described by means of which
 55 the motions of the sliding bolt are regulated and its combination with the tumbler effected, substantially as described.

3. I also claim in combination with the tumbler and the sliding bolt, the employment of a key which when inserted will permit the sliding bolt in unlocking the tumbler
 60 to close up the keyhole over the key, substantially as herein described, by means of which combination the tumbler must be
 65 locked to admit of inserting the key, and the key must be shut into the keyhole to admit of unlocking the tumbler, substantially as herein described.

4. And finally I claim in combination
 70 with a rotating tumbler and the sliding bolt by which it is locked and unlocked, the employment of the turning eccentric plate, which operates the sliding bolt and at the same time also closes up the keyhole, sub-
 75 stantially as described.

LINUS YALE.

Witnesses:

ALONSGING BARNEY,
 DANIEL BULLARD.