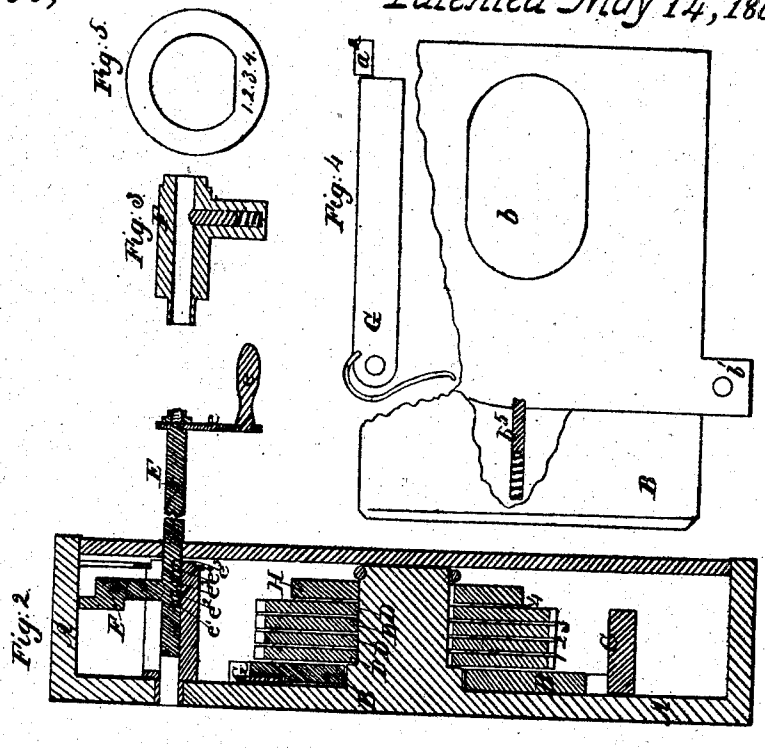
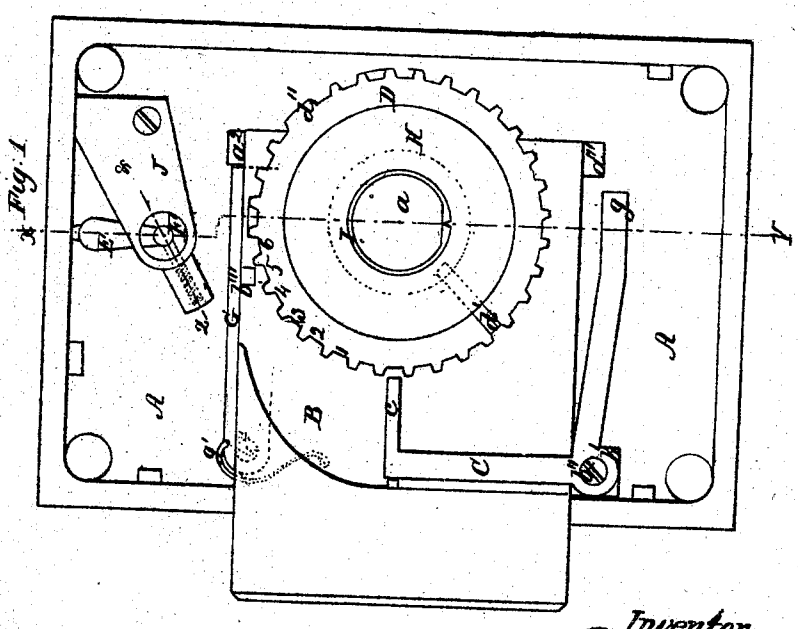
# L. Yale Jr.,

## Combination Lock,

No. 32,330, Patented May 14, 1861.




Witnesses
John Taylor
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# UNITED STATES PATENT OFFICE.

LINUS YALE, JR., OF PHILADELPHIA, PENNSYLVANIA.

## LOCK.

Specification forming part of Letters Patent No. 32,330, dated May 14, 1861; Reissued April 28, 1863, No. 1,470.

*To all whom it may concern:*

Be it known that I, LINUS YALE, Jr., of the city and county of Philadelphia, in the State of Pennsylvania, have invented a new and Improved Method of Constructing Combination, Numerical, Alphabetical, or Position Locks for Banks and other Purposes; and I do hereby declare the following to be a full and exact description of the same, reference being had to the drawings hereunto annexed.

The same characters refer to like parts in the different views.

*Case.*—A. Figures 1 and 2 is the case.

*a* is a substantial post or pillar rising from the bottom of the case on which rotate the tumblers, D. D. D. D. (hereinafter to be described). This post has a shallow groove around it near the top in which a spring ring or cotterel I is fitted to hold the pack of tumblers in place. This post is "slabbed" off on its under side to admit of the furring 1. 2. 3. 4. Fig. 5. with less than circular holes, (to be more particularly described) and yet to offer no impediment to the free movement of the tumblers which have circular holes.

$a^2$ and $a'''$ are bolt guides, and also serve as stops the one for the bolt tumbler G. and the other for the lever end *g* of the bolt guard C. all to be more particularly described.

The case in its front edge is gated in the usual manner for the bolt B. to protrude when locked.

*Bolt.*—B. is the bolt, the rear end of which is thinned down to pass under the tumblers and is also provided with an oblong opening *b* to span the post *a*. and permit it to move backward and forward thereon. $b'$ is a wing or projection from its lower edge which serves as a seat for the fence or bolt guard C. shortly to be specified. $b'''$ is a talon notch in which the wing of the key E. Figs. 1. and 2. in its farthest plane (or nearest the bottom) engages to move it back and forth. $b^4$ is a pin fulcrum on its lower side on which the bolt lever G. vibrates as is to be hereafter described. This bolt is guided in the ordinary manner by the gating through the front edge of the case and the two guides $a^2$ and $a^3$ above referred to. Projecting from the inner side of the head of the bolts is a spring pin $b^5$ which serves to steady the fence in place, during all natural action of the lock but which yields when an attempt is made to force it as hereinafter particularly described.

*Fence.*—C. is a fence and bolt guard hung to the bolt by means of the screw $b''$ in the projection $b'$. This angular guard will vibrate slightly on $b''$ and is kept from so doing ordinarily by the spring pin in the head of the bolt particularly shown in plan of bolt at $b^5$ Fig. 4.

The lower end or arm *g* lies in such a position that when the bolt moves regularly it shall pass just under the guide $a'''$, but when the bolt is attempted unfairly or without arranging the tumblers properly, the impinging of the blade *c* against any one or more of the tumblers will cause the said arm *g* to rise up and abut against the stop $a'''$ thereby preventing any further retraction while said tumblers remain in said position. And the peculiarity of this device is that whatever the irregularity or inequality of the tumblers when not properly adjusted, it causes the bolt to stop at precisely the same point, thereby preventing said inequalities from being made manifest on the outside of the door by means of the "index" or otherwise.

The blade *c*, when the positions of the tumblers are right, enters the gating without touching and of course offers no impediment to the movement of the bolt.

*Key.*—E is the key. It has a small steel shaft, less than the shaft of the old fashioned winged key, and therefore renders unnecessary any larger perforation through the door and as it is to remain in it, absolutely prevents access through the key hole for explosives, punches or any other article calculated to damage the lock. The size of this shaft is so insignificant that driving it through is impossible as it could not be made to start even moderately strong "fastenings," therefore doubling up under blows. Its outer end is provided with a small crank *e*, *e*, by means of which it can be quite rapidly rotated to bring the tumblers more readily into the required position, and to facilitate the counting the figures or naming the letters, whichever method is used by the operator. As each revolution only counts one it will be seen that the memory has nothing to do with the fractions of a revolution—neither has the eye to be used to tell where to stop. For the crank when within 15° of zero or its normal position is sufficiently close for all purposes. Therefore

this lock can be used in the dark just as well as in the light, in this respect overcoming one of the most serious objections to this class of lock. The crank is put on after the lock is screwed to the door and the shaft projected through.

Near to the inner end of the shaft is the wing or "nosing" very much like the bolt wing to any ordinary tumbler lock key and in fact used for the same purpose viz. to shoot the bolt. But it is also used for the purpose of arranging the tumblers by means of a peculiar construction of them as more fully to be described. This wing extends just far enough from the center of motion to engage in one talon notch and move it into the position of the next so moving one talon notch each revolution of the crank. On the side of this key shaft nearly opposite to the abovedescribed wing are a series of notches $e^1$ $e^2$ $e^3$ $e^4$ $e^5$ into which a spring pin ( to be described) snaps to mark slightly the spot where the shaft has to rest to be on the plane of any given tumbler or the bolt as the case may be. These notches, of course, must correspond accurately to the distances apart of the tumblers and bolt centrally.

*Tumblers.*—D. D. D. D. are the tumblers. In this form of the lock I use circular tumblers but do not confine myself to this form. The edge or periphery of each is indented with a series of talon notches 1′ 2′ 3′ 4′ 5′ 6′ &c. extending nearly around it in fact leaving only one small spot *d″* of the original rim uncut merely to afford a stop for the key wing, that I may have a point of departure to begin to count off the position from.

*d′* is one of the talon notches deepened for a gating for the fence C above described. This gating may be at any distance from the blank *d″* which may be chosen by the maker but at different distances in the different tumblers.

*Key curb.*—F. is the key curb. Its two ends are supported in holes in the back of the case A. and the bridge J. in which it revolves freely. It is perforated for the key shaft and is also cut open from the front end nearly to the bottom of the lock to admit the wing or "nosing" to protrude and slide back and forth to different depths in the lock as before described. Nearly opposite this opening is a spring pin *f* which bears upon and drops into notches of the key shaft to regulate the stopping it at the proper point to be on the plane required.

*Bolt lever.*—G. is an ordinary bolt lever which is hung to the bolt and moves with it. When the bolt is shot out its spring *g′* forces the lever up so as to abut against the stop $a^2$ thereby preventing the retraction of the bolt without the assistance of the key wing to depress it till it will pass under the stop when of course the wing has entered the talon and it cannot be removed from the talon notch of the bolt without allowing the lever to resume its normal position. Therefore whenever the key is available for the purpose of moving the tumblers this lever is guarding the bolt.

*Washer.*—H. is merely a washer or cap to the pack of tumblers to keep them in place, it in turn is held by the wire ring cotterel I next described.

*Cotterel.*—I is a wire cotterel clasped around the top of the post as before described, fitting in a groove to prevent it slipping up and loosening the tumblers, which it is intended to bind into a compact pile.

*Bridge.*—J. is merely a bridge to enable the lock to work without a cover the better to exhibit its operation.

*Furring.*—1. 2. 3. 4. are thin plates of metal interposed between the tumblers to prevent their interfering with one another. They are perforated with holes the shape of the stubbed off post *a.* or rather a horizontal section of the same, to prevent their revolving with the tumblers.

*Unlocking.*—To unlock, draw the key forward to the first tumbler and turn to the right until it is stopped by the ring striking the blank *d″* in the tumbler. Then revolve the second, then the third and fourth in the same manner, which done, the lock is in its normal position ready to begin to arrange the tumblers. Again drawing the key forward and turning to the left eight revolutions the first tumbler will be right in position, moving the shaft to the second and making eleven revolutions, also to the left, sets that right and again eight turns for the third and three turns for the fourth establishes the whole pack in the proper position to receive the fence—now by pushing the key shaft fully back and turning to the left still, the ring will depress the lever G. and move the bolt to its unlocked position.

*Locking.*—To lock, turn the key crank to the right draw it forward to the plane of some one of the tumblers and turn it in either direction and it will be locked.

Having thus described the construction and use of my invention what I claim as new and desire to secure by Letters Patent is—

1. The piece E or its equivalent used in the manner or an equivalent manner and for the purpose substantially as described.

2. The parts D. D. D. D. or their equivalents receiving motion in the manner substantially as described.

3. The piece C. or its equivalent with its arm *g* for the purpose and object described.

LINUS YALE, JR.

Witnesses:
C. O. YALE,
JOHN HOSKIN.