

C. C. BLISS.  
Permutation-Locks.

No. 156,906.

Patented Nov. 17, 1874.

Fig. 1.

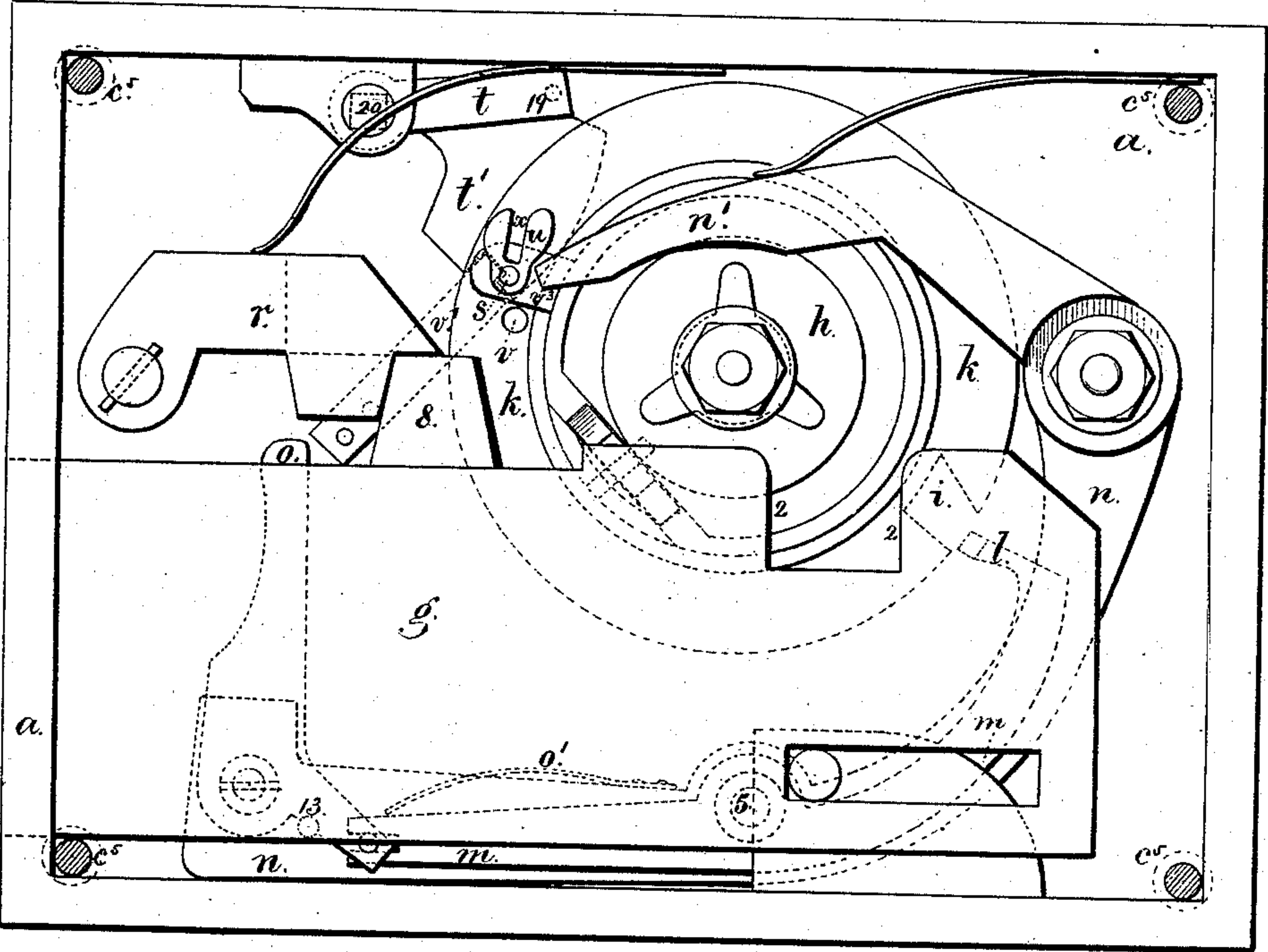
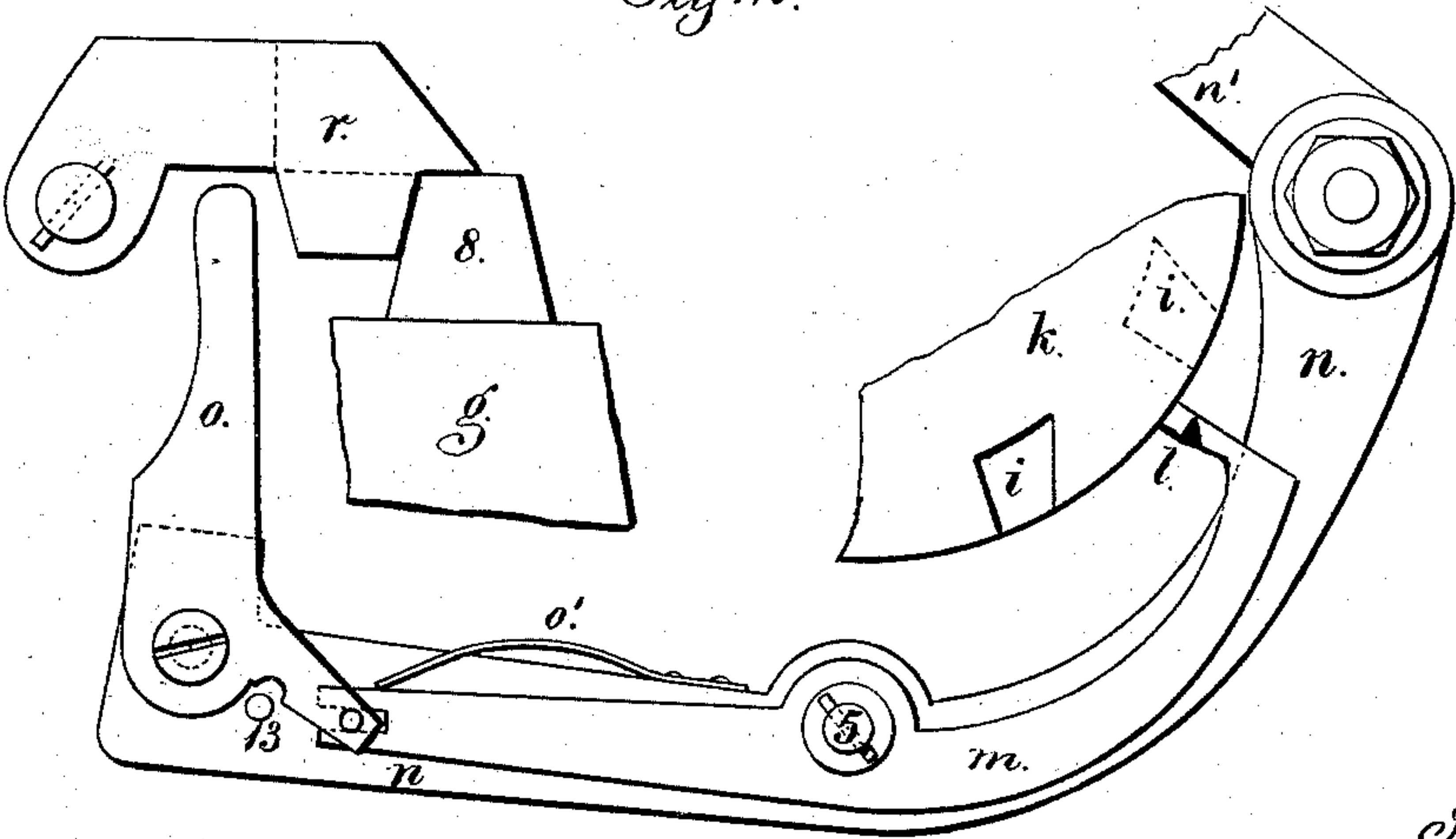


Fig. 2.



Witnesses

Charles Smith  
Geo. J. Pinckney

Inventor

Charles C. Bliss.  
per L. M. Serrell  
att'y.

C. C. BLISS.  
Permutation-Locks.

No. 156,906.

Patented Nov. 17, 1874.

Fig. 3.

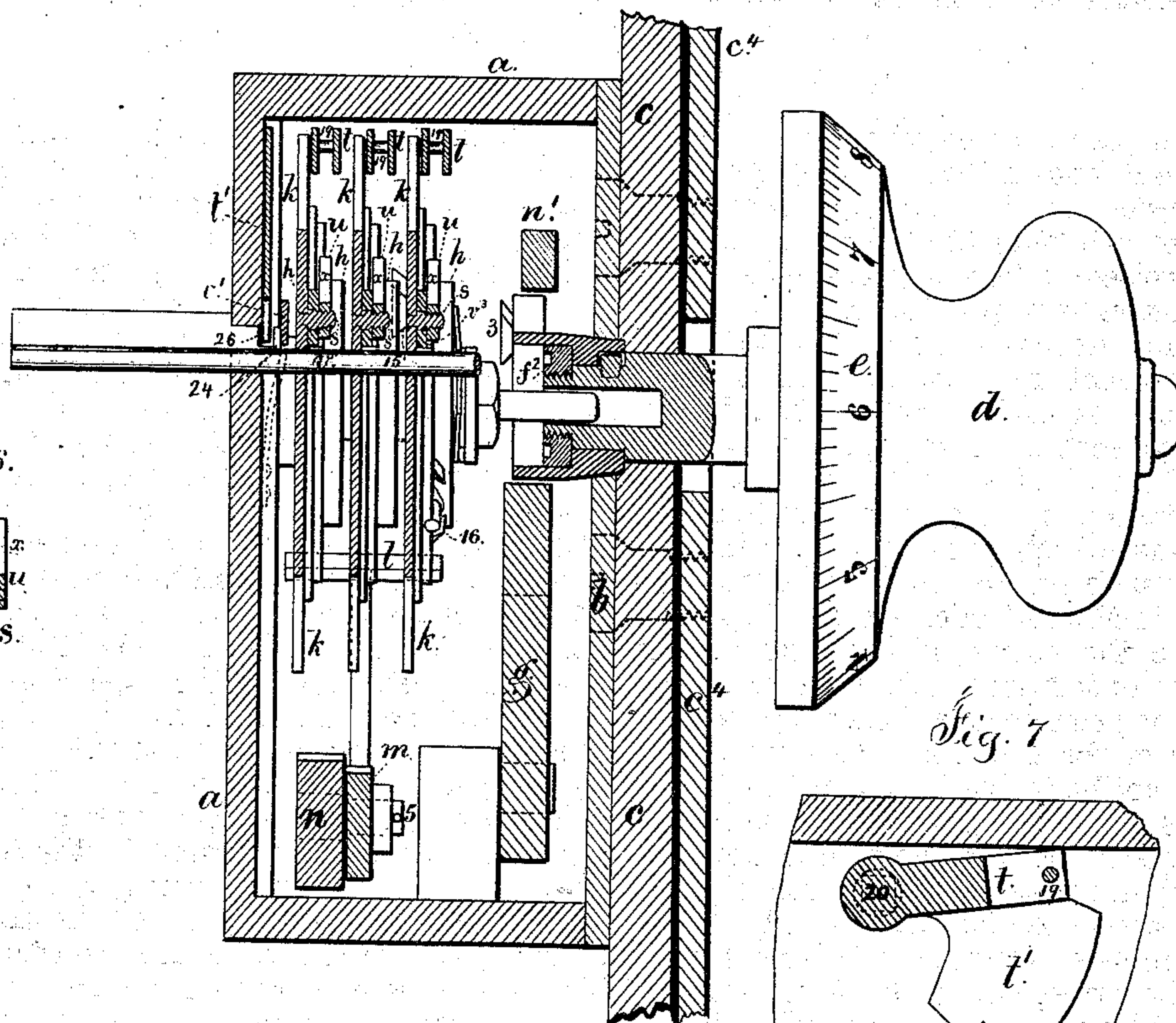


Fig. 6.



Fig. 7.

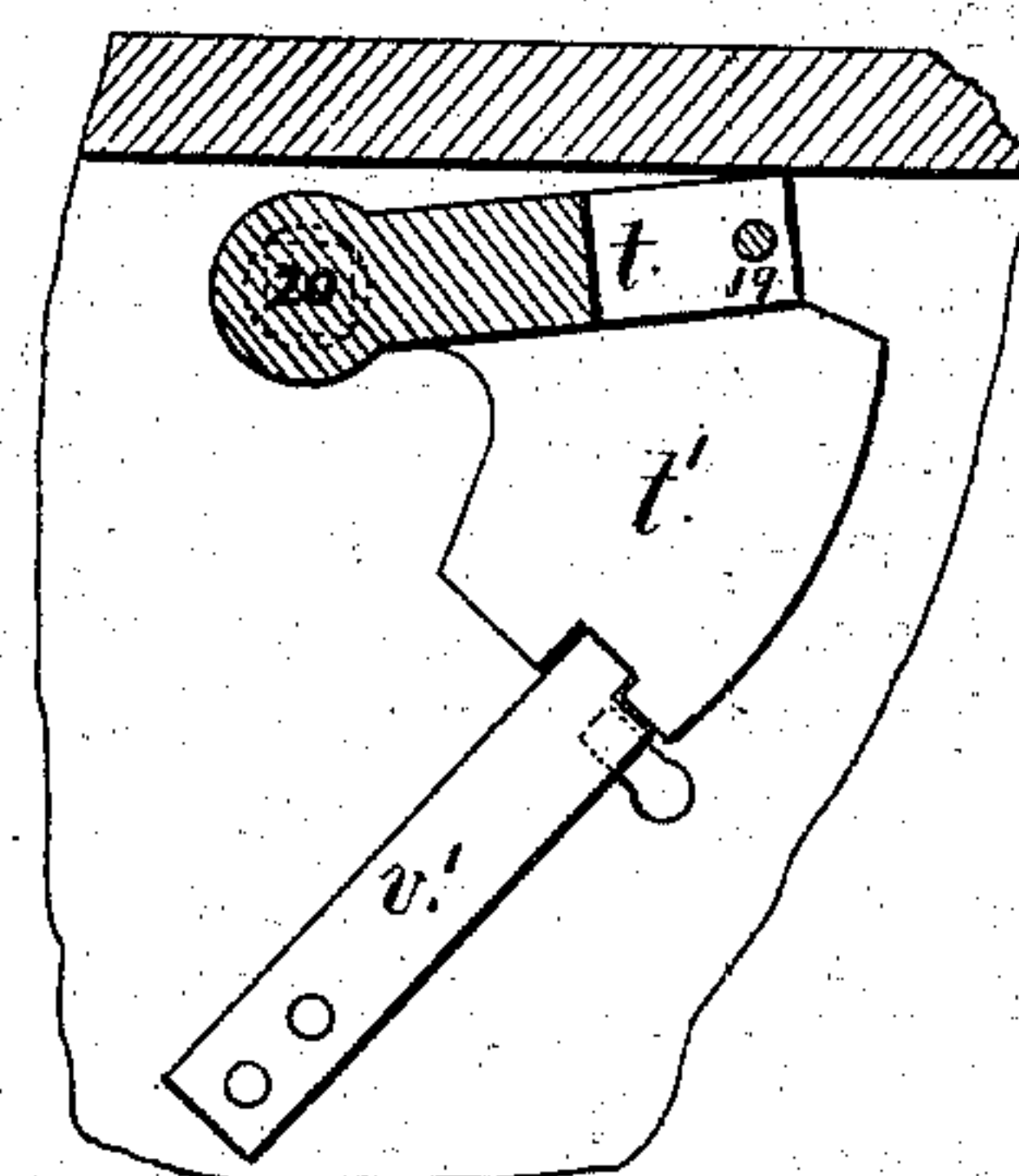


Fig. 5.

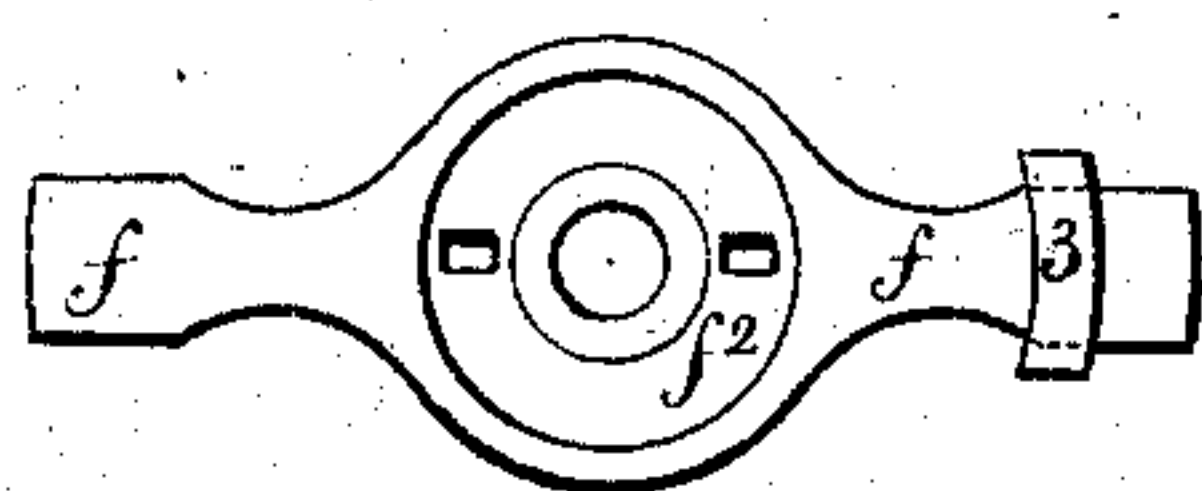
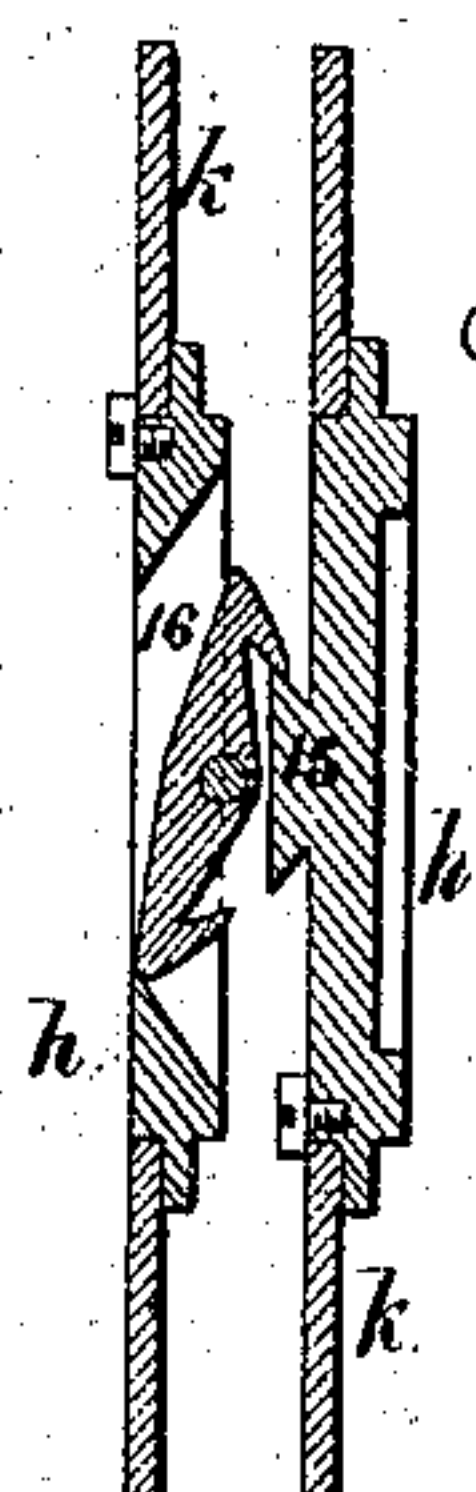


Fig. 4.



Witnesses,

Charles Smith  
Geo. J. Pinckney

Inventor

Charles C. Bliss  
per L. M. Serrell  
att'y.



# UNITED STATES PATENT OFFICE.

CHARLES C. BLISS, OF NORWICH, CONNECTICUT.

## IMPROVEMENT IN PERMUTATION-LOCKS.

Specification forming part of Letters Patent No. **156,906**, dated November 17, 1874; application filed June 11, 1874.

*To all whom it may concern:*

Be it known that I, CHARLES C. BLISS, of Norwich, in the county of New London and State of Connecticut, have invented an Improvement in Permutation Locks, of which the following is a specification:

This invention is a modification of and improvement upon the lock for which Letters Patent No. 146,424 were granted to me. In my present improvement the dog that holds the bolt is independent of the main or tumbler-lever, and of its secondary or fence lever, and it is raised by a jack upon the main lever when the tumblers are properly placed, but when the tumbler-notches are not in line with the fence, the movement of the tumbler-lever and its secondary lever causes the jack to be thrown out of position, and hence to pass up at the side of the bolt-dog; therefore the bolt-dog will not be touched, and will continue to hold the bolt. I also make use of swinging hook-shaped stops upon the tumblers to connect one tumbler to the next in its movement, so that the stops will allow each tumbler to be turned a complete revolution, instead of being limited in the movement by the thickness of the contact-blocks, as is the case with circular tumblers having stationary blocks. In order to clamp the notched tumbler-rings to the circular bodies of the tumblers, I make use of a screw and nut on each tumbler, and the screw or nut is turned by a key to slacken up the screw-clamp. The tumbler-rings are held in position by a pin or pick-up wire inserted through them, while the circular bodies of the tumblers are set to given numbers successively by the knob and spindle. A guard prevents the key for the screw-clamps being turned except when the tumbler-rings are held in position by the pin that passes through them, and said pin cannot be withdrawn until the key is turned back to its place, and the tumblers clamped.

In the drawing, Figure 1 is a view of the lock with the front plate and knob removed. Fig. 2 shows the tumbler-lever, jack, and bolt-dog in the position that the parts assume if an effort is made to draw back the bolt when the tumblers are not set. Fig. 3 is a section of the tumblers at the openings in the rings for the pin that holds them while being set.

The spindle of the knob is partly in section in this figure. Fig. 4 shows the hooks of the tumblers for connecting one to the other. Fig. 5 shows the arms on the inner end of the spindle, and Fig. 6 represents a modification in the clamping mechanism.

The lock-case *a*, cap-plate *b*, safe-plate *c*, knob *d*, dial *e*, are of any usual character. When the knob *d* is drawn outwardly the arm *f* will act upon the talon 2 of the bolt *g* to project or retract it, and when the knob is pressed back the hook-ended block 3 upon the arm of the spindle serves to revolve and set the tumblers successively to the pre-arranged number, the dial or indicator *e* being employed as heretofore usual. The circular tumblers are composed of the disks *h* and their surrounding tumbler-rings *k*, and in the latter are the notches *i* for the fence *l* upon the secondary lever *m* that has a fulcrum, 5, upon the main or tumbler lever *n*. The arm *n'* of the lever *n* is operated by the spindle cam or arm *f* just before commencing to move the bolt. If the notches *i* of the tumblers are in line with the fence, then said fence enters the notches, and the jack *o* at the end of the lever *n* lifts the dog *r* clear of the stop 8 on the bolt, and the bolt is free to be moved endwise, but if the tumbler-notches are not in line with the fence *l*, as seen in Fig. 2, then the secondary lever cannot swing with the lever *n*, but its movement is such as to throw the jack aside and out of the way of the dog *r*, so that the same is not raised, but it remains in place to hold the bolt. The jack *o* is a bent or L-shaped lever, and usually occupies the position shown by dotted lines in Fig. 1, and it is held by the spring *o'* pressing the foot against the stop-pin 13. Upon one side of the tumbler-disk is a projection, 15, that is made with hooked ends; and upon the next tumbler-disk is a swinging cam and double-hooked stop, 16. The points of the hooks stand toward each other, so that, as the projection 15 is moved, it presses back one end of the stop 16 by coming in contact with the inclined end of 16, and in so doing the hook at the other end of 16 is moved forward, and brought into line with the hooked end of 15, and the two hooks interlock and connect, so that one tumbler moves the other. Each tumbler-disk is to be



provided with a projection, 15, and stop 16, except the last disk, which only requires the swinging stop. The notched ring *h* surrounds the tumbler-disk *h*, and the latter is free to turn in such ring when the clamping mechanism is loosed. The clamping mechanism is composed of a screw and nut acting laterally to press the ring and disk together. The screw *s* may be stationary upon the ring *h*, and the nut *u* movable to press the washer *v*<sup>3</sup> upon the edge of the tumbler-disk *h*, as seen in Figs. 1 and 3, or else the screw may be moved by its arm or lever for the same purpose, as seen in Fig. 6. In either instance the clamping is lateral, and results from partially turning the lever arm or fork of the nut or screw, such arms being acted upon by mechanism outside the tumblers, as follows: The stationary key *t* is made with a polygonal axis, 20, upon which a key outside the lock-case may be inserted. Such key has as many bits as there are tumblers, and each bit carries a pin, 19, that swings into the fork *x* of the nut *u*, or against the lever-arm, and turns the same either one way or the other, to loosen or tighten the mechanism that clamps the tumbler-ring to the disk. This key must not be turned until the picking-up wire or rod *v* is inserted through the holes in the tumblers, retaining them in position for setting.

I employ the spring *v'* that holds the key *t* from being turned by taking against the lower edge of the segment *t'* that is fastened to the same key, and swings with it. These parts are shown more clearly in Fig. 7. When this rod *v* is inserted into the tumblers, the spring *v'* is pressed back out of the way of the segment *t'* by the projection 24 on such rod, (see Fig. 3,) and that segment swings into the notch 26 of the rod *v*, so that the rod cannot be withdrawn until the key is turned back to place, thus preventing the tumbler-disks being released from the screw-clamps until the disks are held by the pick-up rod, and pre-

venting that rod being withdrawn until the disks are again clamped.

The arms *f* at the inner end of the knob-spindle are secured by the counter-sunk nut *f*<sup>2</sup>, and the plate *c* prevents the knob being drawn out or the spindle driven in. This plate *c* is perforated with holes, through which screws, (shown by dotted lines in Fig. 3,) are inserted from the back, so as to attach the lock-plate firmly to the inside of the safe-door *c*<sup>4</sup> before the box of the lock and its parts are applied to the lock-plate, and secured by the screws *c*<sup>5</sup>, (shown in Fig. 1.)

I claim as my invention—

1. The jack *o* upon the lever *n*, in combination with the auxiliary lever *m*, bolt-dog *r*, and circular tumblers, substantially as set forth.

2. The screw-clamps operated by a fork or lever arm, and applied to and combined with the ring-tumblers and disks, and acting to clamp the ring to the disk by lateral pressure, substantially as set forth.

3. The key *t*, applied within the lock-case, and operated from outside that case, in combination with the clamping-screws, lever-arms, and circular tumblers, substantially as set forth.

4. The segmental guard-plate *t'*, connected with the key *t*, and the spring *v'*, in combination with the pick-up tumbler-rod, and the screw-clamps upon the tumblers, as and for the purposes set forth.

5. The hook-ended swinging stop 16 upon the tumbler-disk, and the hook-ended projection 15, in combination with the circular tumblers, as and for the purposes set forth.

Signed by me this 6th day of June, A. D. 1874.

CHARLES C. BLISS.

Witnesses:

SOLOMON LUCAS,  
S. D. BRADFORD.