(Model.) 2 Sheets—Sheet 1.

C. A. BEGGS & J. S. COXEY.

PERMUTATION LOCK.

No. 345,270. Patented July 13, 1886.

Fig. 1.

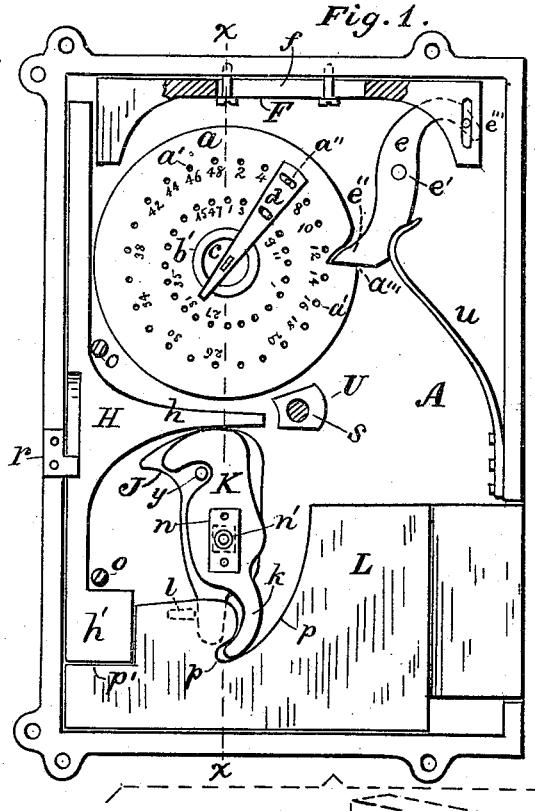


Fig. 2.

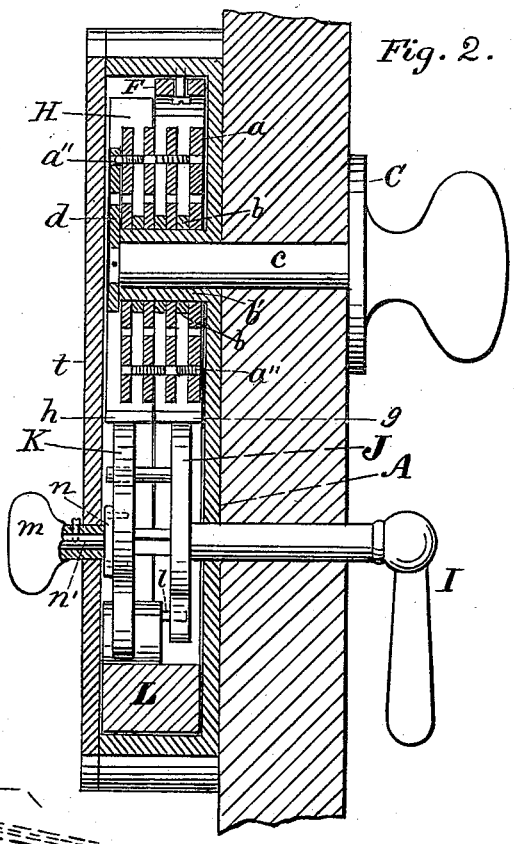


Fig. 3.

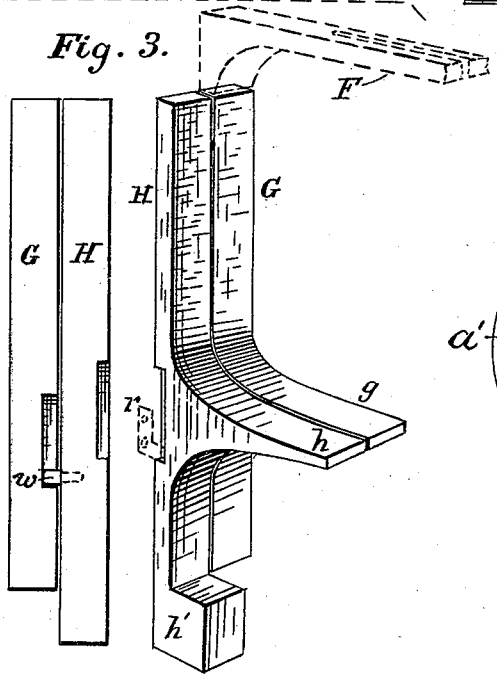
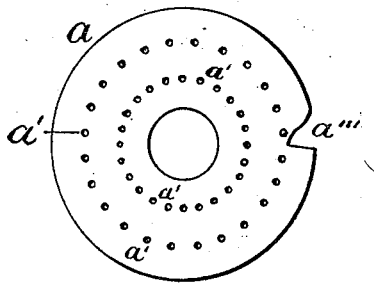


Fig. 4.



Witnesses:
A. Ruppert
H. A. Daniels

Inventors:
C. A. Beggs
J. S. Coxey
Per
Thomas P. Simpson
attorney

(Model.) 2 Sheets—Sheet 2.

C. A. BEGGS & J. S. COXEY.

PERMUTATION LOCK.

No. 345,270. Patented July 13, 1886.

Fig. 5.

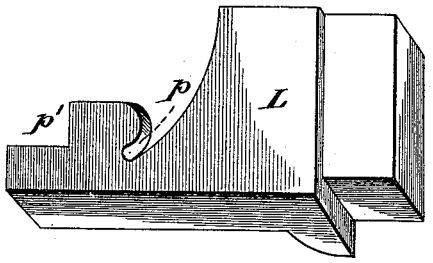


Fig. 6.

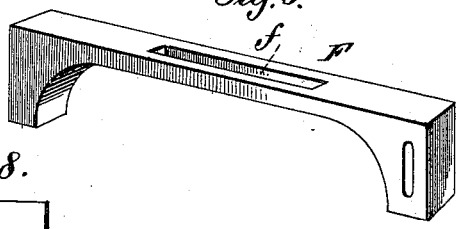


Fig. 7.

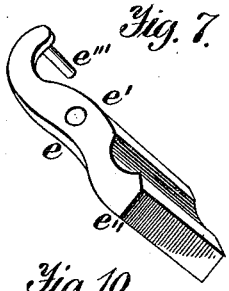


Fig. 8.

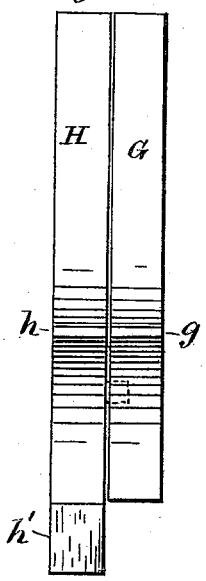


Fig. 9.

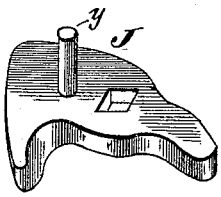


Fig. 10.

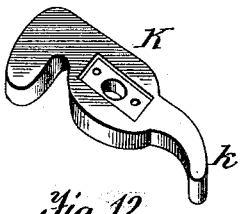


Fig. 11.

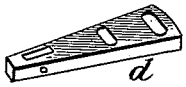


Fig. 12.

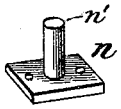
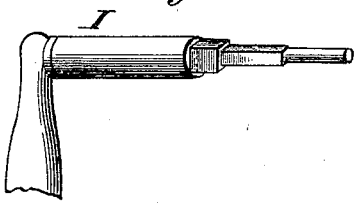


Fig. 13.



Witnesses.
A. Ruppert.
H. A. Daniels

Inventor.
C. A. Beggs.
J. S. Coxey.
Per
Thomas P. Simpson
attorney.

UNITED STATES PATENT OFFICE.

CHARLES A. BEGGS AND JASPER S. COXEY, OF RICE LAKE, WISCONSIN.

PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 345,270, dated July 13, 1886.

Application filed May 18, 1885. Serial No 165,797. (Model.)

To all whom it may concern:

Be it known that we, CHARLES A. BEGGS and JASPER S. COXEY, of Rice Lake, in the county of Barron and State of Wisconsin, have invented an Improved Permutation-Lock, of which the following is a specification.

This invention relates to permutation-locks for use in public buildings, stores, or dwellings; and it consists in certain improvements in the construction of the same, as hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a side view of a permutation-lock having our improvements, a part of the casing being removed. Fig. 2 is a transverse vertical section thereof taken on line *x x* of Fig. 1. Fig. 3 illustrates in perspective and back views the vertical slides G and H, herein described. Figs. 4 to 13 represent details of the lock mechanism detached.

A designates the casing of the lock, which has an inward tubular projection, *b'*, which forms a bearing for the spindle *c* of the dial-plate C, and a journal for the circular tumblers *a*. The said tumblers are four in number, each having forty-eight screw-holes, *a'*, arranged in two rows of twenty-four each on concentric circles, as shown. The screw-holes *a'* are numbered 1 to 48, to correspond with the numbers on the dial. Each of the said tumblers has a screw, *a''*, in the hole *a'*, which projects about one-sixteenth of an inch from either side, the tumblers being spaced apart by the intermediate washers, *b*, on the journal or bearing *b'*. The screws *a''*, by which engagement between the tumblers is effected, may be placed in the holes in either the outer or the inner circle, as may be preferred. A notch, *a'''*, is made in the periphery of each tumbler, to receive the foot or lower end, *e'*, of a lever, *e*, which is pivoted within the casing in position to engage with the tumblers, as shown in Fig. 1, said lever being pressed to them by a spring, *u*, secured to the casing. To the end of the spindle *c* is secured an arm, *d*, having at its outer end an aperture, in which projects a screw, *a''*, of the first tumbler, or the tumbler nearest said arm.

F indicates a slide, which is located above the tumblers and loosely secured to the upper part of the casing by screws passing through a slot, *f*. One end of said slide is loosely connected with the upper end of lever *e* by pin *e'''*, secured upon the latter, engaging a slot cut in the former, the parts being so constructed that when the foot of said lever is pressed by the spring *u* into the notches *a'''* of the tumblers the slide F is drawn to the right, and when the foot of the lever is pushed out of the notches the slide F is moved in the opposite direction.

G and H designate, respectively, two slides, (see Figs. 1, 3, and 8,) placed side by side at the left of the tumblers *a* and against the casing, said slides being retained by the fixed posts *o* and a stud, *r*, fastened to the casing and extending into a recess in the side of slide H. The slide G has a horizontal arm, *g*, extending over a cam-lever, J, for engagement with said lever. The slide H is also provided with a similar arm, *h*, which extends over a cam-lever, K, and a foot or enlargement, *h'*, at its lower end, which fits in a corresponding recess, *p'*, in the lock-bolt. Engagement between the two slides is effected by means of a pin, *w*, on slide H, extending into a slot or recess in slide G, the slide H being raised by slide G in its upward movement, as hereinafter set forth.

The lever J, in position under arm *g*, is fast upon the spindle *i* of the outside knob or handle, I, said spindle being journaled in the front side of the lock-casing, as shown. The upper part of said lever J has a cam form for bearing against arm *g* in raising or lowering slide G, and the lower end of said lever is in position to come in contact with a pin or stud, *l*, (projecting laterally from the lock-bolt L,) when the lever is turned to retract the bolt.

The lever K is placed loosely on the end of spindle *i*, the upper part of said lever being cam-formed to bear against the arm *h* of slide H, and its lower end being formed to enter a recess, *p*, in bolt L. To the inside face of lever K is secured a plate, *n*, from which projects a short spindle, *n'*, the same being on a line with spindle *i*, and extending into the shank of the inside door-knob, *m*, being secured therein and journaled in the plate *t* of the lock-casing, so that lever K may be operated by means of knob *m*.

The bolt L, located in the lower part of the

lock-casing, has at its rear end a recess, p', to receive the foot h' of slide H when the bolt is retracted, as seen in Fig. 1. It also has a recess, p, formed to receive the tail k of lever K, the bolt being enlarged toward its forward end, and formed to receive the impinging or outward bearing of levers J and K in shooting the bolt. It will be seen from this construction of slides, cam-levers, and bolt that when the lock-bolt is either shot or retracted from the outside of the door by turning handle I the operation is effected through the fast lever J, which actuates the bolt in both movements, and also engages with the slide G, which connects with slide H through pin w, formed upon the latter; but in locking or unlocking from the inside of the door, by means of knob m, the operation is effected through the loose lever K, by which the bolt may be actuated in both movements, said lever engaging with slide H. A pin, y, on lever J serves to produce similar movement of lever K.

To set the tumblers for the required combination, the first tumbler a, or that connected with arm d, is, by means of said arm and spindle c of the dial-plate, turned four revolutions to the left, the first of which revolutions brings the screw a'' of said tumbler in contact with screw a'' of the next or second tumbler. Another like revolution brings the screw of said second tumbler against the screw of the third tumbler, and a third like revolution brings the screw of the third tumbler against the screw of the fourth tumbler, which is brought by continued turning to the number on which it is set, with its notch a''' directly opposite or in line with the foot of lever e. The dial-plate is then turned three revolutions to the right, which brings the third tumbler to the number on which it is set. Then by two revolutions to the left for the second tumbler, and, finally, one revolution to the right for the first tumbler, all of said four tumblers are brought in position, with their notches a''' in line to receive the foot of lever e, which is then pressed into said notches by the spring u, the combination being complete. The lever e, by its movement to connect with the tumblers a, draws the slide F, leaving room for the upward movement of slide G when the bolt is retracted. When the bolt is shot, the slides G and H sink by gravity, the slide H resting at the bottom of the lock-casing, just in rear of the lock-bolt.

To unlock from the outside of the door, turn the knob or handle I, and the lever J, being fast on the spindle i, is turned, and bearing upward against arm g of slide G raises said slide, and by means of pin w, extending into a recess in slide G, the slide H is also raised. The lower end of lever J catches the pin l on bolt L, withdrawing said bolt. The arms g and h of the slides rest on the upper parts of levers J and K, and the foot h' of slide H rests in the recess p' of the lock-bolt, as seen in Fig. 1. By a reverse movement of knob I the lock-bolt is shot, the locking being effected by the fast lever J acting against the bolt.

To unlock from the inside of the door, turn the knob m, and the lever K, through spindle n', secured thereto, is turned, and the upper part of said lever, bearing against arm h, raises slide H, and the tail k catches in recess p of the bolt, retracting said bolt. In locking or unlocking by means of knob m, through spindle n', neither the combination nor slide G is disturbed, as the slide H is raised by lever K independently of slide G, such independent movement being allowed by the elongated slot or recess in G, into which projects the pin w on slide H. When the bolt L is shot and slides G and H are down, the horizontal slide F extends over the slide G, as indicated in dotted lines in Fig. 3; but the slide H is left free to be operated, in locking or unlocking from the inside, by means of knob m, spindle n', and cam-lever K.

To break the combination after shooting the bolt into the keeper, turn the dial around to the right two or three times. The inner plate, t, of the casing, being removable, is held in place by a screw, s, driven into a central post, U.

We claim as our invention—

1. The combination, with the notched tumblers and detent-lever, of the horizontal slide F, vertical slides G and H, having arms g and h, cam-lever J, and bolt L, substantially as set forth and described.

2. The combination, with vertical slide H, provided with arm h, of the cam-lever K, with spindle n', fastened thereto and provided with a knob, and the bolt L, substantially as set forth, for the purpose specified.

3. In combination with slide F and detent-lever e, the vertical slides G H, provided with arms g h, fast lever J, provided with pin y, loose lever K, provided with spindle n', and bolt L, adapted to be moved by either of levers J K, substantially as shown and described.

CHARLES A. BEGGS.
JASPER S. COXEY.

Witnesses:
EDEN W. BOOTH,
FREMONT D. BOOTH.