

W. C. OWINGS & E. CARTER.
LOCK.

No. 576,609.

Patented Feb. 9, 1897.

Fig. 1.

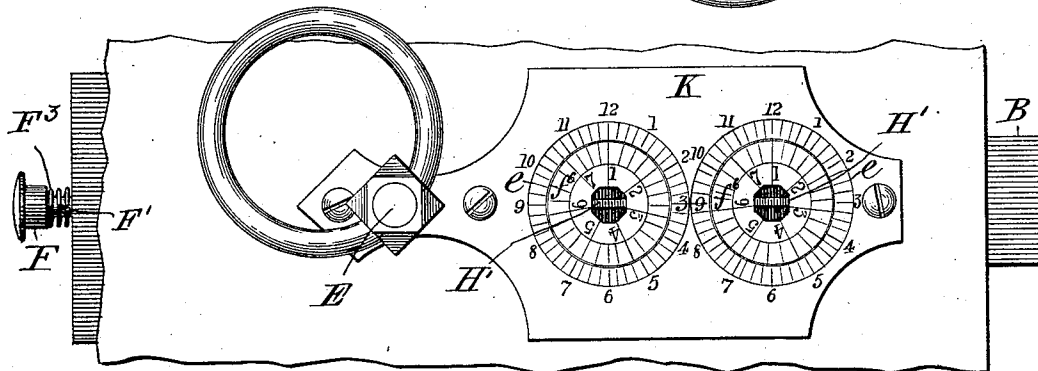
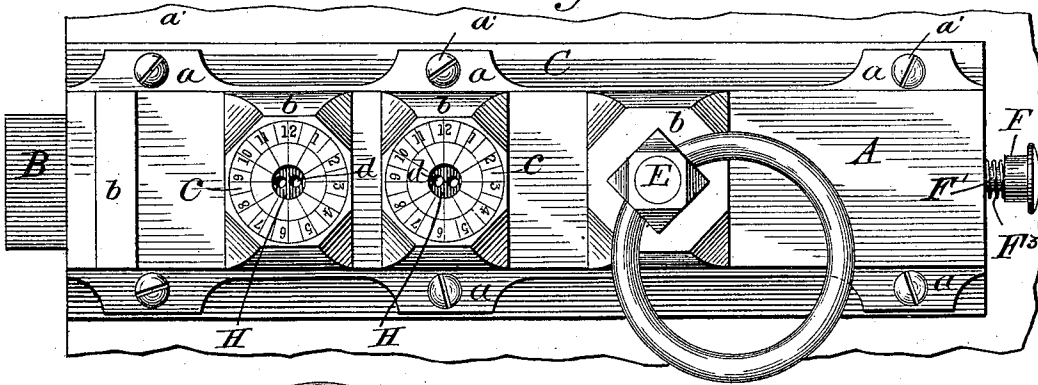
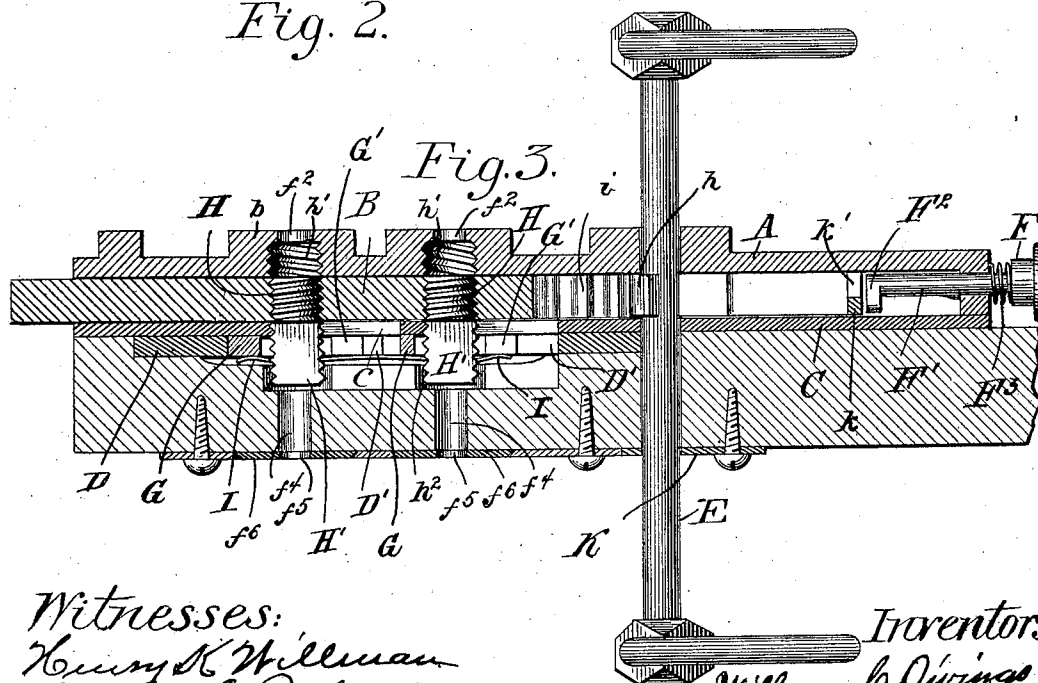


Fig. 2.



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Fig. 4.

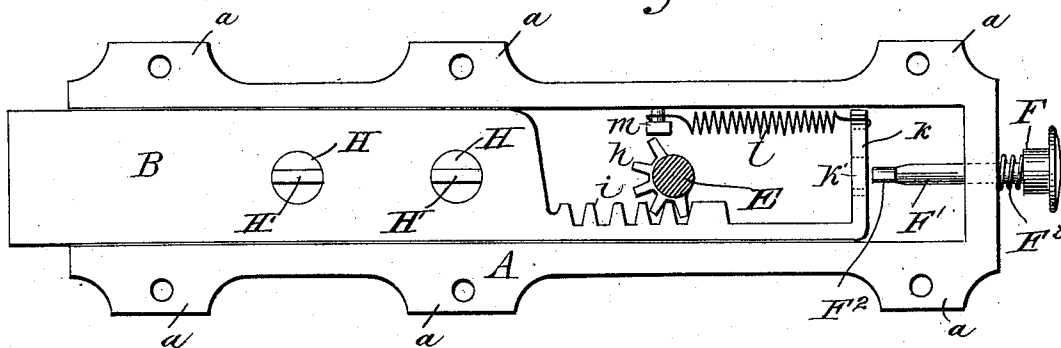


Fig. 5.

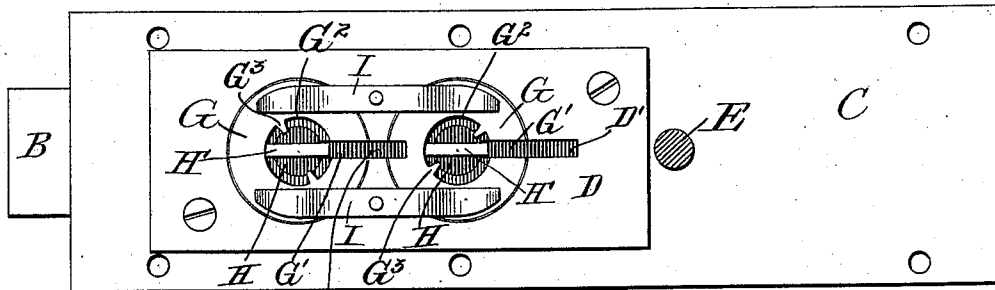


Fig. 6.

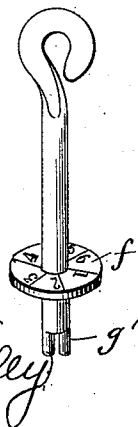
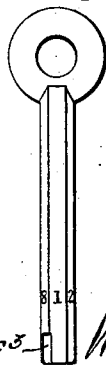


Fig. 7.



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3 Sheets—Sheet 3.

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Fig. 8.

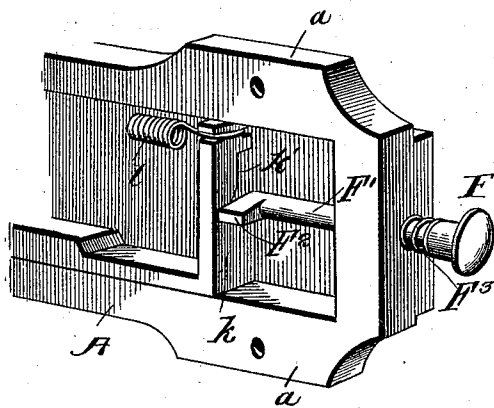


Fig. 9.

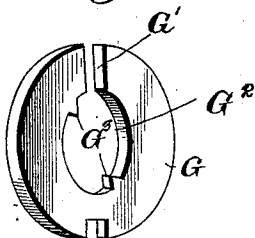


Fig. 10.

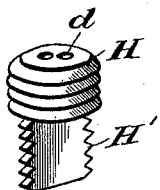


Fig. 11.

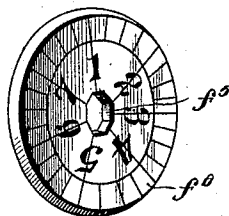
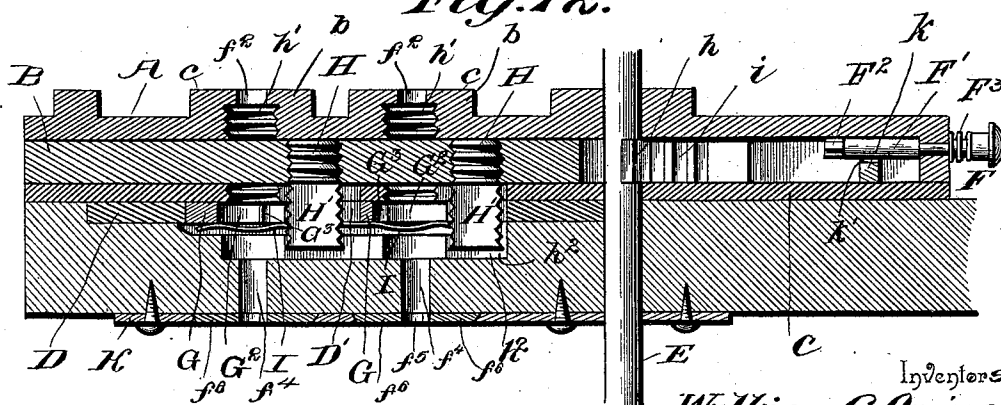


Fig. 12.



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UNITED STATES PATENT OFFICE.

WILLIAM C. OWINGS AND ELIJAH CARTER, OF JONESBOROUGH, INDIANA.

LOCK.

SPECIFICATION forming part of Letters Patent No. 576,609, dated February 9, 1897.

Application filed January 20, 1896. Serial No. 576,232. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM C. OWINGS and ELIJAH CARTER, citizens of the United States, residing at Jonesborough, in the county of Grant and State of Indiana, have invented a new and useful Lock, of which the following is a specification.

Our invention relates to locks particularly adapted for use upon doors and the like, and the object in view is to provide a simple, inexpensive, and efficient combination or permutation lock wherein the parts may be set by the operator to different combinations.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a front view of a lock constructed in accordance with our invention, shown in its operative position, as when placed upon a door. Fig. 2 is a view of the escutcheon-plate designed for arrangement upon the outside of a door and carrying the exterior rotary dials. Fig. 3 is a longitudinal central section of the lock and the contiguous portion of the door and outside escutcheon-plate. Fig. 4 is a face view of the bolt-guide and bolt to show the means for communicating longitudinal motion thereto. Fig. 5 is a rear view of the lock detached to show the tumblers and the cooperating lock-studs. Fig. 6 is a view of a key adapted to operate the lock from the inside of the door. Fig. 7 is a view of a key adapted to manipulate the lock from the outside of the door. Fig. 8 is a detail view in perspective of one end of the bolt-guide and the contiguous portion of the bolt to show the means for securing the bolt against longitudinal movement. Fig. 9 is a detail view in perspective of one of the tumblers. Fig. 10 is a similar view of one of the lock-studs. Fig. 11 is a similar view of one of the exterior rotary dials. Fig. 12 is a longitudinal central section of the lock, similar to that shown in Fig. 3, with the bolt retracted.

Similar letters of reference indicate corresponding parts in all the figures of the drawings.

The bolt-guide A forms the main portion of the casing of the lock, closed at its rear side

by a removable plate C, and B represents the bolt, mounted to slide in said guide and provided with a rack *i* for engagement by a pinion or mutilated gear *h* on the knob-spindle E. The bolt is normally held extended by means of an actuating-spring *l*, which is attached at one end to a fixed pin *m* and at the other end to a transverse arm *k* at the inner end of the bolt. Arranged in operative relation with this transverse arm is a catch F for securing the bolt in either its extended or retracted position, the same being provided at the extremity of its shank or stem F' with a laterally-extending finger F² for engagement with either side of the arm *k*, said arm being provided with a notch *k'* to allow the bolt to operate independently of the catch when the latter is arranged with its finger F² in the operative or folded position illustrated in Fig. 12. When said catch is arranged in the position illustrated in Figs. 3 and 4, the bolt is locked against retraction and said catch is held at the desired adjustment, either folded or extended, by means of a friction-spring F³, which is interposed between the enlarged outer extremity or head of the catch and the contiguous end wall of the bolt-guide or casing.

The rear plate C, by which the open side of the bolt-guide or casing is closed, is secured to the body portion of the bolt-guide or casing by means of screws *a'* engaging aligned openings in ears *a* and said plate, said screws being also designed to engage the door or other object to hold the device in operative position.

Mounted in transverse openings in and carried by the bolt are lock-studs H, capable of axial movement transversely to the direction of movement of the bolt and adapted to engage seats *h'*, formed in the bolt-guide or casing to lock the bolt in its extended position, said studs being shown opposite the seats in Fig. 3. When the lock-studs are withdrawn from the seats in the guide or casing, their rear ends operate in a suitable cavity *h²* through longitudinal slots D', formed in a cap-plate D, which is secured to the rear surface of the rear plate C to cover an opening formed in the latter, and in this cap-plate are mounted rotary tumblers G, held from displacement and excessive movement by

friction-springs I and provided with radial slots G' for registration with the slots D'. The rear ends of the lock-studs are preferably reduced laterally to form thin blades or ears H', which are adapted to pass through said registering slots G' and D', when alined therewith, to allow the retraction of the bolt, and said reduced portions or ears of the lock-studs are adapted, when out of alinement with said registering slots, to operate in central openings G², formed in the tumblers.

Detents G³ on the tumblers project into the openings G² and are thereby arranged in the paths of the reduced ears H', whereby the tumblers may be turned to move their slots out of registration with the stationary slots in the cap-plate by rotating the lock-studs.

In practice we prefer to thread the lock-studs in the transverse openings of the bolt, and also thread the seats h' in the bolt-guide or casing, whereby the axial adjustment of the lock-studs may be accomplished by rotation. Hence when the lock-studs are withdrawn from the seats, as shown in Fig. 3, the bolt is free to move longitudinally to the retracted position illustrated in Fig. 12, but when the lock-studs are extended outwardly or forwardly into the seats provided for their reception the bolt is securely locked in its extended or operative position. After withdrawing the studs from engagement with the fixed seats h' the interterminal ears or blades must be arranged in alinement with the slots in the tumblers in the cap-plate, and the adjustment of the tumblers is accomplished by the rotation of the lock-studs until the slots G' are in the proper positions, after which independent movement of the lock-studs must be caused to secure the alinement of their ears or blades, as specified. When the several adjustments just named have been accomplished, as shown in Figs. 3 and 5, the bolt may be retracted by turning the knob-spindle E, but the omission to secure the stated adjustment of either one of the parts named will prevent the movement of the bolt, and thus insure the safety of the door or closure against persons unacquainted with the manner of manipulating the lock.

In order to provide for the intelligent operation of the several parts above mentioned, we have adopted an arrangement of combination or permutation devices consisting of rotary and fixed character-bearing dials constructed for operation by detachable keys or their equivalents, the key which is adapted for use to operate the lock from the inside of the door being shown in detail in Fig. 6 and having terminal studs g' for engagement with sockets d in the front extremities of the lock-studs, the extremity of said key being inserted through openings f² in the floors of the seats h'. The shank of this inside key carries a graduated rotary dial f for coöperation with fixed dials c, arranged upon enlargements or bosses b, formed on the face of the bolt-guide or casing A. The outside key is provided

with a notch or kerf f³ to engage the extremities of the ears or blades of the lock-studs after insertion through suitable openings f⁴ in the contiguous portion of the door or closure, and said outside key is preferably of cross-sectionally polygonal construction to engage a polygonal opening f⁵ in either of the rotary dials f⁶, which are mounted in dovetailed seats in the escutcheon-plate K. These rotary dials f⁶ coöperate with fixed contiguous dials e, formed on or carried by the escutcheon-plate.

From the above description it will be seen that the means for operating the lock from either the inside or the outside of the door or closure include a key for engaging the contiguous extremity of the lock-stud, whereby rotary motion may be imparted thereto without interfering with axial movement, and a rotary dial adapted to receive motion from the key and coöperating with a fixed dial. By changing the dials or substituting others any desired number of combinations may be formed. It will be seen, also, that the outside or polygonal key is provided upon its faces with graduations, and the function of the same is to facilitate the insertion of said key into the lock in the desired position, controlled by the combination to which the lock is set.

In operation the key is inserted in the manner above indicated and engaged with the contiguous end of the lock-stud, after which it is turned in one direction (controlled by the movement of the lock-stud necessary to cause it to enter the seat in the bolt-guide or casing) until said movement is checked by the contact of the extremity of the lock-stud with the floor of the seat. This forms a starting-point from which to manipulate the lock in accordance with the combination to which it is set, and when the parts are in said position a comparison of the graduations upon the faces of the polygonal key will show whether said key has been applied to the lock-stud in the proper position to enable the combination to be worked or not. The desired position of the key or the graduations thereon with relation to the graduations on the fixed and movable dials will be controlled by the combination, and hence no fixed rule can be laid down therefor. With the parts in the initial position above mentioned the key should be turned in the opposite direction to that required to bring it to said position a number of revolutions necessary to withdraw the stud from engagement with the seat, (this number of revolutions being controlled by the construction of the lock.) The further manipulation of the lock-studs to cause the registration of the tumbler-slots with the slots in the cap-plate and the final alinement of the ears or blades with said registering slots will be secured by a rotation of the stud alternately in opposite directions through intervals controlled by the combination to which the device is set.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described our invention, what we claim is—

1. In a lock, the combination with a bolt-guide or casing and a bolt mounted to slide therein, said bolt and guide being provided with registering openings, of a lock-stud threaded in one of said openings and capable of axial movement to engage the other, a rotary tumbler mounted coaxially with the lock-stud, and means whereby rotary motion may be communicated from the lock-stud to the tumbler to adjust the latter, substantially as specified.

2. In a lock, the combination with a bolt-guide or casing and a bolt mounted to slide therein, said bolt and guide being provided with registering openings, of lock-studs threaded in one of said openings and capable of axial movement to engage the other, said lock-stud being provided with a terminal flattened ear or blade, and a rotary tumbler mounted coaxially with the lock-stud and provided with detents for engagement by the same, whereby rotary motion may be communicated from said stud to the tumbler to adjust the latter, substantially as specified.

3. In a lock, the combination with a bolt-guide or casing and a bolt mounted to slide therein, said bolt and guide being provided with registering threaded openings, lock-studs threaded in said openings and adapted to engage one or both thereof, said studs being provided with terminal flat ears or bolts, tumblers mounted coaxially with the lock-studs and provided with central openings into which project detents which are thereby arranged in the paths of said ears or blades of the studs, said tumblers being provided with radial slots for registration with fixed slots in the casing, and means for communicating rotary motion to the studs, substantially as specified.

4. In a lock, the combination with a casing

and a bolt mounted to slide therein, the bolt and casing being provided with registering threaded openings, of lock-studs mounted in said openings and provided with flat ears or blades, a fixed cap-plate provided with tumbler-seats and communicating aligned slots, tumblers mounted in said seats and provided with radial slots for registration with the slots in the cap-plate, said tumblers being mounted coaxially with the studs and having central openings into which project detents for engagement by the ears or blades of the lock-studs, keys for engaging terminal key-seats on the lock-studs, and rotary dials adapted to receive motion from the keys to coöperate with fixed dials, substantially as specified.

5. In a lock, the combination with a casing, a sliding bolt, a lock-stud adapted to engage registering openings in the bolt and guide and capable of rotary movement, and a tumbler coöperating with the stud and adapted to be rotated to allow movement of the stud and release the bolt, of a key adapted to engage a terminal seat on the stud, and a rotary dial carried by and removable with the key, to coöperate with a fixed dial on the casing, substantially as specified.

6. In a lock, the combination with a casing, a sliding bolt mounted therein, means for operating the bolt, and locking devices for securing the bolt in its extended position, of a catch consisting of a stem or shank fitted for longitudinal movement parallel with the direction of movement of the bolt and provided with an interior transverse finger and an exterior head, a transverse arm carried by the bolt for engagement by said finger when arranged either in front or in rear thereof, and provided with a notch to allow the arm to pass said finger, and a friction-spring interposed between the end of the casing and the head of the catch, substantially as specified.

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