(No Model.)

J. LUEBBERS.

LOCK.

No. 570,032. Patented Oct. 27, 1896.

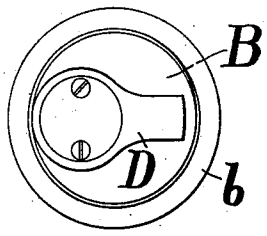

FIG. 1.

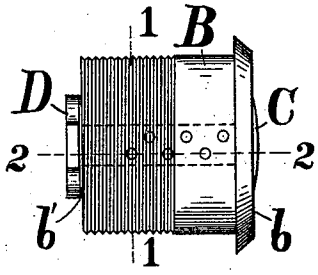

FIG. 2.

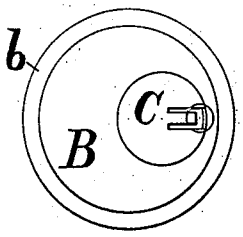

FIG. 3.

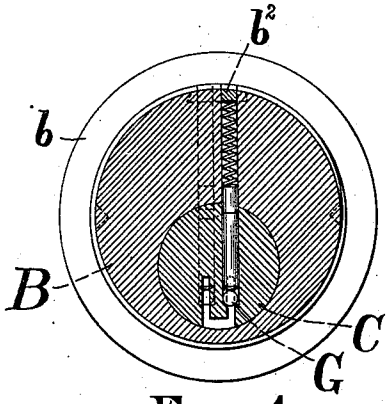

FIG. 4.

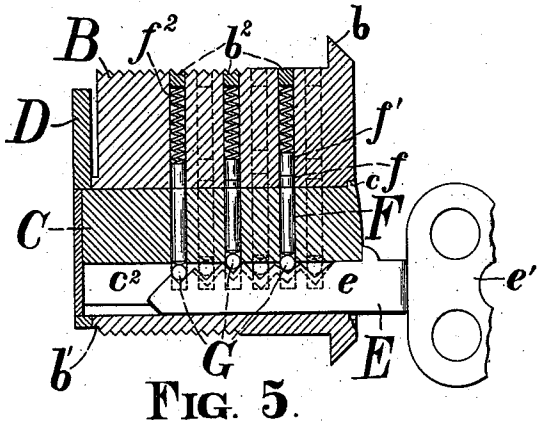

FIG. 5.

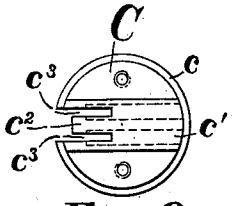

FIG. 6.

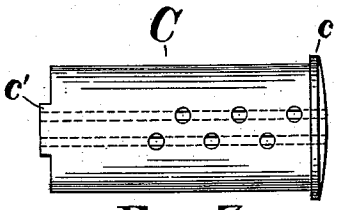

FIG. 7.

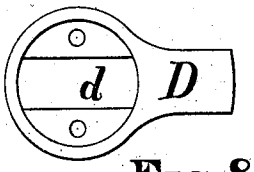

FIG. 8.

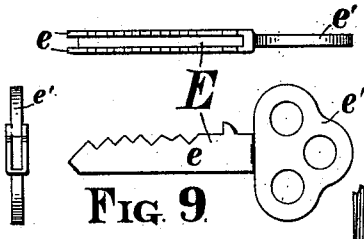

FIG. 9.

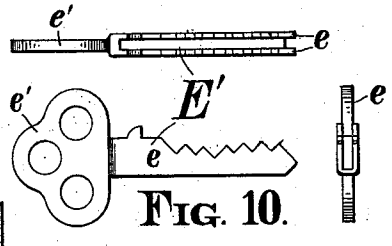

FIG. 10.

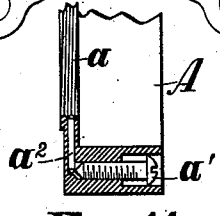

FIG. 11.

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JOHN LUEBBERS, OF CINCINNATI, OHIO, ASSIGNOR TO J. B. SCHRODER & CO., OF SAME PLACE.

LOCK.

SPECIFICATION forming part of Letters Patent No. 570,032, dated October 27, 1896.

Application filed September 7, 1895. Serial No. 561,786. (No model.)

To all whom it may concern:

Be it known that I, JOHN LUEBBERS, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Locks, of which the following is a specification.

My invention relates to door-locks, and especially to that class of locks in which a handle or knob is arranged to open the door from the inside and a key employed to unlock the door from the outside by turning a key-cylinder which has secured to its inner end a lever to throw the latch-bolt when the ends of the pins or tumblers are thrown to the periphery of the key-cylinder by the key to release the cylinder from the pins which lock it against rotation when the key is withdrawn.

The object of the invention is to simplify the construction of the lock, provide a greater number of tumblers to be actuated by a double key, and provide for a master-key for any number of locks without employing an intermediate cylinder.

The invention will be first fully described in connection with the accompanying drawings, and then particularly referred to and pointed out in the claims.

Referring to the drawings, in which like parts are indicated by similar reference-letters wherever they occur throughout the various views, Figure 1 is an inside end elevation of the lock-cylinders; Fig. 2, a side elevation; Fig. 3, a front or outside elevation. Fig. 4 is a transverse sectional view, upon an enlarged scale, taken on line 1 1 of Fig. 2 and looking toward the outer end of the cylinders. Fig. 5 is a longitudinal sectional view taken through line 2 2 of Fig. 2 with the key proper inserted and the notches or guards of the master-key shown in dotted lines. Fig. 6 is an inside elevation of the inner cylinder with the latch or bolt throwing arm removed. Fig. 7 is a side elevation of the same; Fig. 8, an inside elevation of the latch or bolt throwing arm. Fig. 9 is a compound view of the key, the upper view being an upper edge elevation, the one immediately beneath it a side elevation, and the one to the left an end view, looking from the inner end of the key. Fig. 10 is a similar view of the master-key. Fig. 11 is a detailed view of one corner of the lock-case in which the outer cylinder is secured, with means for locking the outer cylinder against rotation after it has been placed in proper position. Figs. 9, 10, and 11 are upon the same scale as Figs. 1, 2, and 3.

The lock-case proper, with the bolt or latch, may be of any ordinary construction, the only difference between my case and those now in common use being the means shown in Fig. 11 for locking the outer cylinder in the fixed position. In this figure, A represents the corner of the lock-case, the back being removed. The screw-threaded opening a is to receive the outer cylinder B. The corner of the case is perforated, the outer portion of the perforation being countersunk and the inner portion screw-threaded to receive the cone-pointed screw a', which bears against a pin a^2, which is fitted to slide freely in a perforation parallel with the front of the lock-case A and project into the screw-threaded opening a when forced by the cone end of the screw a'. The purpose of this arrangement is to force and hold the end of the pin a^2 in a longitudinal groove cut in the screw-threaded portion of the fixed cylinder B when the same is screwed into its seat a and lock the cylinder against rotation. In cases heretofore in use for locks of this class a pin was forced from the face-plate of the mortise-lock into a groove in the cylinder B for the same purpose, but in this case the screw-head which forces the pin in was exposed, and when the door was open any evil-disposed person might retract the screw and fastening-pin, which would not be observed, and when the door was closed it would be an easy matter for any one to withdraw the cylinder B from the outside and then manipulate the lock-bolt to open the door. In the form shown in Fig. 11 it is impossible to unlock the cylinder from the case without removing the lock from the door.

The case B is a plain cylinder having a flange b at its forward end to bear against the outer face of the door. This cylinder is eccentrically perforated to receive the key-cylinder C, the forward end of the cylinder B being countersunk on its outer face to receive the flange c of the key-cylinder and has a hub b' at its inner end to serve as a bearing

for the locking-dog D, which is secured to the inner end of the key-cylinder C. The inner end of said cylinder has a tenon c' to enter a mortise d cut in the hub of the locking-dog D, the dog and hub being held together by screws in the usual manner.

The key-cylinder C is longitudinally slotted, the slots extending upon each side of and forming a rib c^2, the end of which is a sufficient distance from the periphery of the cylinder to permit the introduction of the U-shaped shank of the key E when the key-cylinder is fitted in its place in the fixed cylinder B. The barrel of the outer or fixed cylinder B is perforated through to its eccentric opening, and the key-cylinder is drilled from these perforations down to some distance past the slots c^3, which receive the sides of the key-shank. The perforations in the outer cylinder and key-cylinder, above the opposite slots c^3, alternate, as seen in Figs. 2 and 7, and in these slots are fitted the pin-tumblers F, f, and f', which lock the two cylinders together when the key is removed and release the cylinders when the proper key is inserted.

In the lower ends of the tumbler-seats in the key-cylinder are fitted ordinary steel balls G, upon which the lower ends of the pin-tumblers F rest. The tumblers are held in their normal position by coil-springs f^2, inserted in the openings in the fixed cylinder above the pins and held in place by plugs b^2, as seen in Figs. 2, 4, and 5, or by a slide having dovetailed edges fitting into an undercut or dovetailed groove in the periphery of the cylinder B, as shown in dotted lines, Figs. 2 and 4. The ball-bearings render the key easy to insert and withdraw, and also make it difficult to pick the lock by the ordinary methods known.

The main or lower set of pin-tumblers F are of such length that they come flush with the periphery of the key-cylinder C when the tumblers are raised by inserting the key E, and permit the key-cylinder to be revolved within the fixed cylinder B, as clearly shown in Fig. 5. When the key is removed, the tumblers F are forced down and the intermediate tumblers f forced by the springs and held partly in the key-cylinder and partly in the fixed cylinder, the key-cylinder thus being locked against rotation. For an ordinary lock only two sets of tumbler-pins F and f need be employed, but when it is desired to employ a master-key for any number of locks, each having different keys, the upper set of tumblers f' is necessary, and the master-key E', Fig. 10, is so arranged that the top of the intermediate set of tumblers will come flush with the periphery of the key-cylinder C when the master-key is inserted in any of the locks. The notches or guards in the master-key must be on a lower plane or nearer to the loop of the key-shank than are those of the key E, as shown in Figs. 9 and 10 and in dotted line, Fig. 5. By employing three sets of tumblers in my lock I am enabled to adapt the lock to receive a master-key for any number of locks without employing an intermediate cylinder between the key-cylinder proper and the fixed cylinder.

In making my improved key for economy the guard or shank e of the key is preferably bent up out of sheet metal to the U-shaped form shown, and riveted or brazed to the shank of the loop e', which passes between the U-shaped sides of the shank, but it is obvious that the key may be made in a single piece and the groove between the sides milled out. It is also obvious that instead of bending the shank to form a U-shaped piece two flat pieces may be secured to the loop, forming thus practically two separate shanks, but the form shown is the best, because the bend in the shank forms a bearing-joint with the fixed cylinder, is stronger, and insures a steadier movement in turning the key-cylinder to throw the lock-bolt.

There are other obvious mechanical modifications of my invention that would occur to a skilled mechanic from an examination of my improvement, as shown and described, but I have shown what I believe to be the best form of my invention, and shall therefore consider all mere mechanical changes or modifications within its spirit and scope.

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

1. In a cylinder-lock, the combination of the fixed cylinder, having longitudinal opening to receive the key-cylinder and two parallel rows of transverse perforations leading to the key-cylinder opening, a revoluble key-cylinder having two longitudinal key-grooves and transverse perforations extending from its periphery into the key-grooves and registering with the perforations in the fixed cylinder, pin-tumblers in the perforations in both cylinders, a locking-dog secured to the inner end of the key-cylinder, and a two-shank key to actuate the said tumblers to unlock the key-cylinder from the fixed cylinder, substantially as shown and described.

2. In a cylinder-lock, the combination of the fixed case, the key-cylinder revolubly secured therein, both case and key cylinder having two rows of transverse holes to receive pin-tumblers, said key-cylinder having also two longitudinal key-grooves crossing the tumbler-holes, ball-bearings in the bottom of said holes, pin-tumblers resting upon said balls, a locking-dog on the inner end of the key-cylinder, and a key to actuate the tumblers for the purpose of releasing the revoluble cylinder and turning it to throw the lock-bolt, substantially as shown and described.

3. The combination of the fixed cylinder or case transversely perforated to receive sliding pins, the revoluble key-cylinder therein slotted to receive the key and having transverse bores to receive pins, said bores registering with the transverse perforations in the fixed cylinder, a dog secured to the inner end

of the revoluble cylinder to throw the lock-bolt when the cylinder is turned, the outer pin-tumblers, as f', to lock the revoluble cylinder to the fixed cylinder when the key is removed, and the pins as F and f, both within the bores of the key-cylinder when the key is removed, whereby the revoluble cylinder is released by bringing either the outer or inner ends of the intermediate pins, f, flush with the periphery of the key-cylinder, substantially as shown and described.

4. In a cylinder-lock, the combination of the case, A, having screw-threaded opening, a, the cylinder, B, screw-threaded to enter said opening and having its end grooved, the pin, a^2, fitted to slide in the case, A, and the cone-pointed screw, a', to force said pin, a^2, against the cylinder, B, and lock it from turning, substantially as shown and described.

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