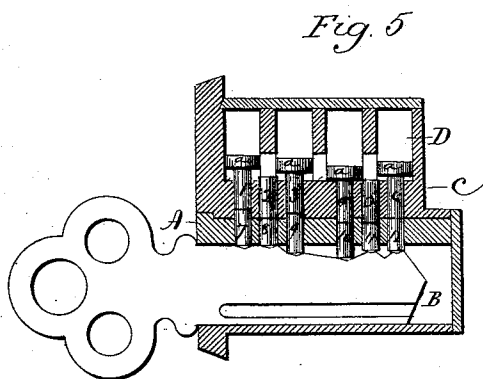
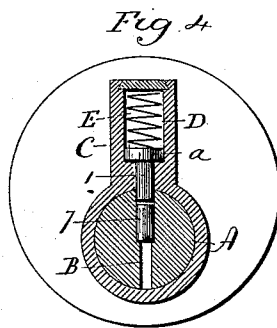
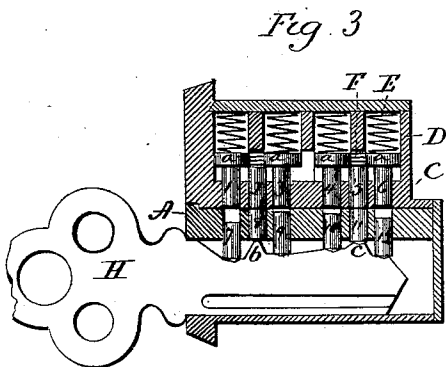
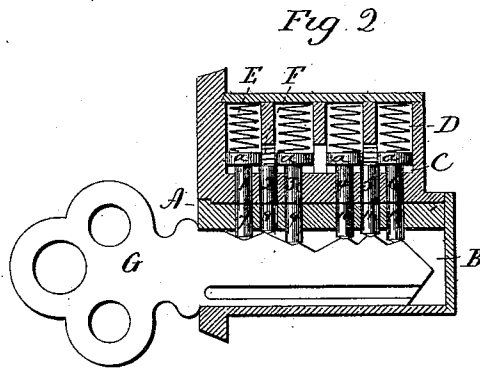
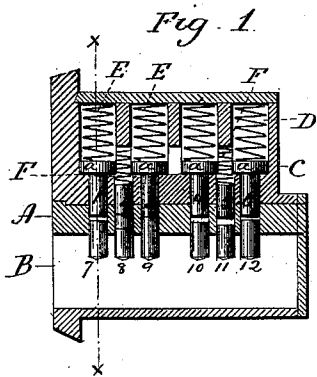


(No Model.)

J. H. SHAW.
LOCK.

No. 469,950.

Patented Mar. 1, 1892.



Witnesses.
J. H. Shumway.
F. W. Pick

John H. Shaw.
Inventor
By *attys*
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UNITED STATES PATENT OFFICE.

JOHN H. SHAW, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE SARGENT
& COMPANY, OF SAME PLACE.

LOCK.

SPECIFICATION forming part of Letters Patent No. 469,950, dated March 1, 1892.

Application filed June 29, 1891. Serial No. 397,950. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. SHAW, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Cylinder-Locks; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a longitudinal central section through the cylinder and case, showing the tumblers and pins in side view, the parts being in the normal condition; Fig. 2, the same parts with the principal key introduced and operating upon all the tumblers; Fig. 3, the same section showing the master-key in place and as operating upon all the tumblers, but through the pins of two tumblers only; Fig. 4, a transverse section of the lock cutting on line *xx* of Fig. 1; Fig. 5, the same section of the lock, representing a false principal key or the key of one lock introduced into another lock for which it is not fitted.

This invention relates to an improvement in that class of cylinder-locks in which the cylinder is constructed to receive a flat key having one edge bitted for the operation of the tumblers, and in which the cylinder is provided with several radial pins extending into the key-hole and which are operated by the bitted edge of the key, and the cylinder provided with corresponding radial tumblers which are adapted to engage with the cylinder when the key is withdrawn to interlock the cylinder with the case, so that when the key is inserted the cylinder-pins force the case-tumblers out of engagement with the cylinder, and so as to permit the cylinder to rotate under the action of the key a common and well-known class of locks.

The object of this invention is to construct a series of locks, each having a principal key differing from all the others, but so that a single master-key may operate all the locks of such series, and yet so that all the cylinder-tumblers may be active tumblers in connection with the principal key—that is to say, so that all the tumblers are required to be operated by the principal key, in order to dis-

engage the cylinder from the case; and the invention consists in the construction as hereinafter described, and particularly recited in the claim.

A represents the cylinder, which is constructed with a flat key-hole B, as usual in this class of locks, and the cylinder is arranged within a case C, also in the usual manner and so that when free the introduction of a flat key into the key-hole affords an instrument for the convenient rotation of the cylinder within the case. On one side of the case is the usual spring and tumbler chamber D, in which a series of tumblers, as 1, 2, and 3 and 4, 5, and 6, are arranged, the tumblers 1 and 3 and 4 and 6, provided with like springs E, and the intermediate tumblers 2 and 5, also provided with springs F, the tendency of all the springs being to force the tumblers into engagement with the cylinder and so that in their normal position all the tumblers will engage with the cylinder, as seen in Fig. 1. The tumblers 1 and 3 and 4 and 6 are each constructed with a projecting head *a*, and these heads extend over the outer end of the intermediate tumblers 2 and 5, and so that while the tumblers 1, 3, 4, and 6 may have each a movement independent of the intermediate tumblers 2 and 5 an outward movement of the tumblers 2 and 5 will operate upon the heads of their adjacent tumblers and impart to the said adjacent tumblers an outward movement corresponding to the movement imparted to the intermediate tumblers 2 and 5. In the cylinder the pins 7, 8, and 9, and 10, 11, and 12 are arranged, corresponding, respectively, to the tumblers 1 2 3 4 5 6, and, as seen in Fig. 1, and so that when the cylinder is in its normal position, as seen in Figs. 1 and 4, the tumblers may drop, and so as to engage and interlock the cylinder with the case. The principal key G, Fig. 2, has its edge bitted corresponding to all the cylinder-pins and so that it will force all those pins to bring their outer ends into the plane of the periphery of the cylinder, as seen in Fig. 2, and whereby all the case-tumblers will be brought with their ends into the same plane and so as to disengage the cylinder from the case to permit its rotation. When the key is withdrawn, the tumblers and pins will all

return to their normal position, as seen in Fig. 1, the tumblers 2 and 5 dropping onto their respective pins, while the tumblers 1, 3, 4, and 6 will drop until they come upon their respective pins or until their heads come to a bearing prepared for them in the case, as seen in Fig. 1. The diameter of the intermediate tumblers 2 and 5 is greater than the distance between the heads $a a$ of the adjacent tumblers, and so that if the tumblers 2 and 5 be raised they will respectively engage their adjacent tumblers and correspondingly raise those tumblers irrespective of the cylinder-pins corresponding to the said adjacent cylinder-tumblers. Consequently the master-key H, Fig. 3, is constructed with its edge bitted at two points b and c , corresponding to the position of the intermediate pins 8 and 10, and so that those points b and c of the key will force the pins 8 and 10 outward until their outer ends come into the plane of the periphery of the cylinder, and correspondingly force their tumblers 2 and 5 into the same position, and in this movement of the pins 8 and 10 and the tumblers 2 and 5, the adjacent tumblers 1, 3, 4, and 6 are correspondingly moved, and so as to bring their inner ends into a position in the plane of the periphery of the cylinder or outside of it, so that through the movement of the tumblers 2 and 5 thus produced the tumblers adjacent to each of the said tumblers 2 and 3 are forced from their engagement with the cylinder, the bitted edge of the key, except at the points $b c$, is plain or recessed so as not to operate upon the pins of the said adjacent tumblers, and as seen in Fig. 3.

In the make up of the locks the intermediate pins and tumblers are alike throughout the one series of locks, while the adjacent tumblers and their pins are of varying lengths. Consequently the master-key will operate upon the intermediate tumblers throughout the series to the same extent, and so as to disengage the cylinder from the case, as before described. The bit of the key, so far as the two points $b c$ are concerned, will be the same throughout the keys for the whole series of locks; but the other portions of the bitted edge of the key will vary according to the variation in the adjacent pins and tumblers, and so that a different extent of movement will be imparted to the said adjacent pins and tumblers by the introduction of the key of one lock into another lock, and such variation will prevent the proper movement of all the pins and tumblers—as, for illustration, in Fig. 5, the lock is represented with a key of one lock introduced into another lock for which the key is not fitted. By this key it will be observed that whereas the interme-

diate pins and their tumblers have been forced to the unlocking position, one or more of the pins of the adjacent tumblers have been forced beyond that position and which interlocks the cylinder with the tumbler, so as to prevent that key from turning the cylinder. By this construction all the tumblers become locking or active tumblers under the operation of the principal key, the same as if the lock were not adapted to be operated by a master-key.

A slight variation in the principal keys is all that is necessary, it only being essential that in the principal key the variation shall be such that with an unfitted key one or more of the pins adjacent to the intermediate pins shall be forced so far from the cylinder as to engage the case to prevent rotation.

I prefer to arrange the tumblers in sets, as I have shown, the tumblers 1 2 3 forming one set and 4 5 6 another set; but it will be understood that either of the adjacent tumblers may be omitted, so that the tumblers will be in sets of two, or the lock may be constructed with a single set of tumblers, only the greater the number of sets of tumblers the greater the protection.

I am aware that cylinder-locks provided with a series of pins and tumblers have been constructed, so that the tumblers may be operated by either a principal or a master key through the pins in the cylinder, and therefore do not claim, broadly, such a construction of cylinder-lock.

I claim—

In a cylinder-lock, the cylinder arranged within a case and so as to be rotated therein, the cylinder constructed to receive a flat key having its edge bitted, one or more sets of radial tumblers arranged in the case, each tumbler provided with its spring and each adapted to interlock the cylinder with the case, radial pins arranged in the cylinder and in the plane of the key-hole, corresponding, respectively, to the individual tumblers of the sets, one tumbler of a set adapted for action by the master-key through the pin of that one tumbler, as well as by the principal key, the other tumblers of the set constructed with lateral projections or heads adapted to be engaged by the said one tumbler in its outward movement and independent of the pins of the said other tumblers, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOHN H. SHAW.

Witnesses:

F. S. HAMLIN,
E. E. COBB.