(No Model.) 2 Sheets—Sheet 1.

W. H. TAYLOR.

LOCK.

No. 457,753. Patented Aug. 11, 1891.

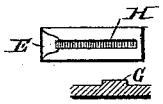

Fig. 6.

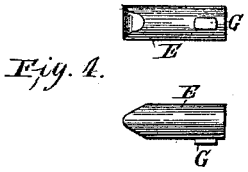

Fig. 4.

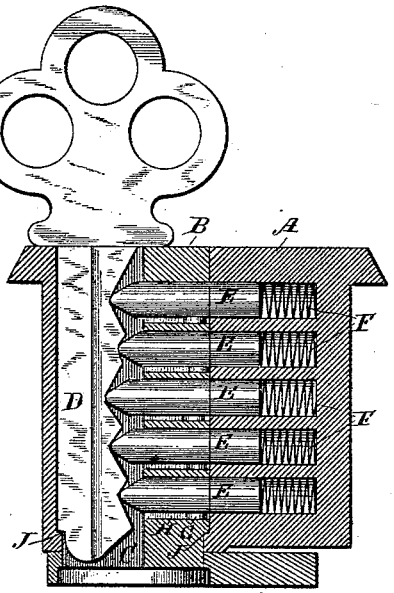

Fig. 2.

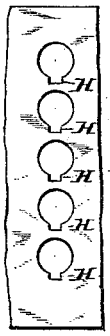

Fig. 5.

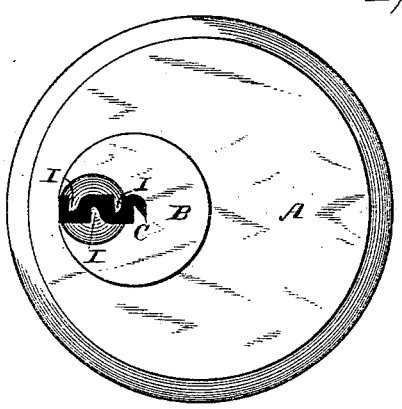

Fig. 1.

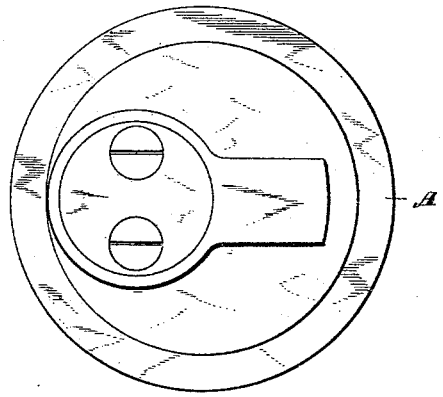

Fig. 3.

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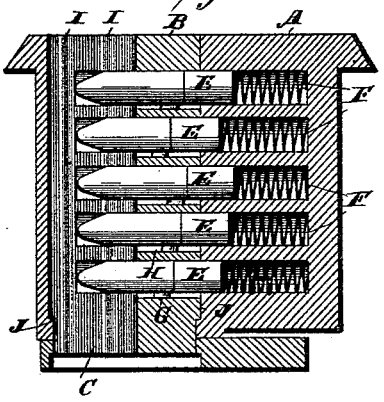
(No Model.) 2 Sheets—Sheet 2.

W. H. TAYLOR.

LOCK.

No. 457,753. Patented Aug. 11, 1891.

Fig. 1.



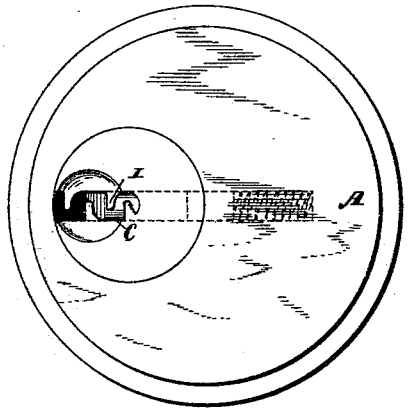


Fig. 8.

Witness
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UNITED STATES PATENT OFFICE.

WARREN H. TAYLOR, OF STAMFORD, CONNECTICUT, ASSIGNOR TO THE YALE & TOWNE MANUFACTURING COMPANY, OF SAME PLACE.

LOCK.

SPECIFICATION forming part of Letters Patent No. 457,753, dated August 11, 1891.

Application filed April 18, 1891. Serial No. 389,456. (No model.)

To all whom it may concern:

Be it known that I, WARREN H. TAYLOR, of Stamford, county of Fairfield, and State of Connecticut, have invented certain new and useful Improvements in Locks, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to that class of locks using sliding or pin tumblers, which tumblers lock a key-cylinder or roll-back to its surrounding case until the tumblers are set by the insertion of the key, when the key-cylinder can be revolved to operate the lock. Such a lock is illustrated by my United States patent, No. 208,863, dated October 8, 1878, and my present invention relates to modifications of and improvements upon the construction there shown.

While the construction shown in my said patent accomplishes the object of supporting the key and preventing its tilting, and also is a considerable improvement in the security of the lock against picking, it has been found that by the use of a very thin picking-tool, formed of spring metal, the lock can be picked, notwithstanding the sinuosity of the key-hole, because, although the section of the key-hole is sinuous, the projections from its side walls do not extend beyond the center or axis of the key-hole and therefore do not effectually block the key-hole, so that picking-tools cannot operate the tumblers.

I am aware of the reissue patent of Schade, No. 9,787, which describes projections from the opposite walls of a keyway, each extending past the center of said keyway; but said projections are of different character from mine. Now to increase the difficulty of picking I have devised a key-cylinder having an improved form of keyway, said keyway having projections which extend into it from both sides past its axis or center, so that there is no space for the operation of a picking-tool, however thin or flexible it may be. By referring to the sections of the key-holes shown in the drawings it will be seen that if a picking-tool be inserted at the bottom of the keyway it will not be possible, in consequence of the shape of said keyway and of said projections, to raise the tool sufficiently to actuate the tumblers. If a picking-tool is inserted at about the point to which the tumblers drop or above the bottom of the key-hole, I have increased the difficulty of picking by making the projections of a rounded or beveled contour on the side which must be used for the support of the picking-tool, so that the tool will tend to slide off from said projections as soon as pressure is applied to actuate the tumblers, and when said tool has slid off, the shape of the projections on their other sides is such as will tend to cause said tool to stick in the effort to restore it to the position where it can actuate the tumblers. As shown in the drawings, the surface of the projection which must form the support of a picking-tool is inclined so as to cause the tool to slip and the other surface of adjacent projection presents an obstruction to the raising of the tumbler by the tool. One surface of each projection is inclined to the axis of the keyway at an angle more acute than the other surface of said projection. It may be observed that in this construction it is not essential or in many cases even desirable that a depression in the key should have a corresponding rib or projection opposite thereto; nor is it essential that the keyway should be of unform width, or indeed of any particular section, the desirable feature being that there should be projections into the keyway extending past the center thereof, so as to form a barrier against the operation of a picking-tool and to close the keyway, so that a picking-tool inserted at the bottom cannot raise the tumblers sufficiently to set them. The shape of the projections, as above noted, is also of importance, although not essential, except that it should be such as to accomplish the object above stated. It is preferable that the keyway should be continuous, but it is not essential to this invention, as it is obvious that substantially the same results can be obtained by making a cylinder or plug in sections and having one or more of said sections provided with the keyway of substantially the shape above indicated; or a cylinder might be made of one piece, and then one or more disks inserted at one or more desirable points in its length, said disks having keyways of the shape above indicated. One construction, as just indicated, is shown in

my United States patent, No. 234,213, dated November 9, 1880. It is clear, also, that the particular means of manufacturing the cylinder and keyway has no bearing on my invention, as it may be made in accordance with any of my methods patented in the United States December 2, 1880, and December 21, 1882, or by forming it in two pieces in the manner indicated in United States patent of Henry R. Towne, No. 234,630, dated November 16, 1880, or in any other manner, as may be most convenient. In the construction shown in my patent, No. 208,863, above referred to, where the projections in the keyway and the grooves or indentations in the key do not extend past their centers or axes, the bearing of the key upon the tumbler is in the center of the tumbler, so that in inserting the key there is no tendency to rotate the tumbler or to move it to one side. Hence the tumbler may be made cylindrical and have also a rounded or pointed bottom upon which the key bears, and still when the key is inserted it will move at right angles to the axis of the cylinder and be set for the operation of the lock; but with my improved key and keyway it is clear that when the key is bitted into its corrugations, inasmuch as the grooves or indentations and projections of the key extend past its axis, the bearing of said key on the tumbler may be central or on one side or the other of the axis of the tumbler, according to the depth of bitting. With the ordinary cylindrical tumbler having a rounded or pointed bearing-surface the result of this would be to push it to one side and to cause a wedging action, which would prevent the operation of the lock. I have, therefore, to overcome this, invented an improved form of tumbler which is cylindrical and provided with a projection which engages with a corresponding groove in the tumbler-chamber, so that the tumbler cannot rotate upon its axis, and the bottom bearing-surface of said tumbler is rounded or beveled on two sides of a central line only to form a proper key-bearing surface, so that it will operate equally well on whatever point of said bottom the key may bear. Of course the groove might be in the tumbler and the projection on the tumbler-chamber, and other formal modifications might be made. It is not material how the key is constructed or of what metal—that is, whether struck up, sawed, planed, or made in any other desirable manner.

Heretofore in constructing locks of this class it has been usual to make the cylinders or roll-backs with a stop or head at the front portions thereof, which construction by diminishing the diameter of the plug back of said head or stop diminished the depth of the keyway. This was some disadvantage, because it is desirable for the sake of combinations or permutations of the tumblers that this keyway should be as deep as possible in a given diameter of escutcheon or tumbler-case. In this lock I have devised an improved construction, which consists in making the stop at the rear of the plug instead of at the forward end, which enables me to make use of the greatest diameter of the plug to increase the depth of the keyway.

I am aware that in the United States patent of C. C. Dickerman, No. 234,002, dated November 2, 1880, the statement is made that "the grooves or depressions of the key admit of corresponding ribs or projections on opposite sides of the keyway, each of which latter may project inward as far as or even beyond the central line of the keyway," but by reference to the drawings of that patent it will be seen that the class of locks referred to is not of the class to which my present improvements relate. In the said patent the disk or roll-back is entirely independent of the tumblers in the sense that there is no connection between the tumblers and the roll-back. In that lock the roll-back acts simply as a support to carry the key when it is being rotated to operate the tumblers which are independently carried in the lock-case. It is clear, therefore, that the only protection which the form of key-hole or keyway in that patent gives against picking is in making it slightly more difficult to get at the tumblers, provided the picking-tool is inserted at the back of the keyway—that is, that portion which when the roll-back is revolved is farthest away from the tumblers; but if a picking-tool sufficiently narrow is inserted in that portion of the key-way in the said lock which, when the roll-back is revolved, will be nearest the tumblers, the projections of the keyway will not seriously obstruct the operation of the picking-tool against the tumblers, because such obstruction as is offered does not extend in any way to what may be termed the "tumbler-space"—that is, the space in which the tumblers themselves move when being actuated by the key or picking-tool; but in my lock the keyway into which the projections extend preferably runs the entire length of the plug or roll-back, although the advantage of my invention may be measurably secured by making the plug in sections, some of which are provided with projections and some not, as above set forth; but in any case in my lock the cylinder or plug itself carries those parts of the tumblers upon which the key and the picking-tool must operate. The tumbler-chambers in which the tumblers slide intersecting the keyway, and also intersecting the projections themselves, the tumblers and tumbler-chambers may be protected by the projections and the operation of a picking-tool therefore rendered extremely difficult. In the Schade patent above mentioned the tumbler-chambers and tumblers do not intersect the projections in the keyway, and the projections therefore do not interpose the same difficulties to the use of a picking-tool as in my improved keyway. It will be seen, therefore, that my invention produces different results

and in a different manner than those produced by the Schade patent or the Dickerman patent. In these patents there is no proper combination or relation between the projections into the keyway and the tumblers, whereas in my lock there may be direct connection between the tumblers, tumbler-chambers, keyway, and projections into it, the result being protection against picking, which is very secure, and much greater than could be produced by the Dickerman or Schade device.

In the accompanying drawings, illustrating my invention, Figure 1 is a front end elevation of a pin-tumbler lock, showing one form of my improved keyway. Fig. 2 is a longitudinal diametrical section, showing the key in place. Fig. 3 is a rear end elevation of the same. Fig. 4 is a group of two detached tumblers, showing them in different positions. Fig. 5 is a plan view of tumbler-chambers in the casing, showing recesses to correspond with the projections upon the tumblers; and Fig. 6 is another group showing a formal modification, in which there is a projection from the wall of the tumbler-chamber and a corresponding recess in the side of the tumbler. Fig. 7 is a section similar to that shown in Fig. 2, except that the key is not shown in place and the tumblers are shown as pressed down by their springs, so as to intersect the projections in the keyway. Fig. 8 is a front end view of the device shown in Fig. 7 with tumbler-chambers dotted in.

Referring to the letters upon the drawings, A indicates an escutcheon or tumbler-case, such as ordinarily used in this class of locks. The shape of the tumbler-case is not material, because this invention may be applied to locks of any other class, such as cabinet-locks, padlocks, &c.

B indicates the hub or roll-back; C, the keyway therein; D, the key; E, the pin-tumblers, and F their springs. The tumbler-chambers extend from the escutcheon into the roll-back, as usual, and in general construction and operation my lock is the same as those of its class. The tumblers, it will be seen, have projections G fitting into corresponding recesses or guideways H in the casing. In Fig. 6 the projection G is shown as upon the casing and the recess H in the tumbler.

The keyway is provided with projections I from its opposite side walls, which extend past its center, as illustrated, and which incline upon their upper surfaces downwardly within the keyway—that is to say, on those surfaces which must be used for the support of a picking-tool—for the purpose and with the advantage above described. The lower ends of the tumblers with which the key-bits engage in the operation of the lock are beveled into approximate V shape, as described, or may be curved into approximate U shape, so that they are tapered suitably on opposite sides of a horizontal line transverse to the length of the keyway.

J indicates a stop at the rear of the plug instead of at the front end.

What I claim is—

1. In a lock, the combination of a plug or key-cylinder provided with a keyway into which projections extend from both sides past the center thereof, and tumbler-chambers intersecting said keyway and said projections, substantially as described.

2. In a lock, a key-cylinder or plug provided with a keyway into which projections extend from both sides past the center thereof, and tumbler-chambers intersecting said keyway and said projections, one surface of one of said projections which must serve to support a picking-tool being inclined to the axis of the keyway at an angle more acute than the other surface of said projection, substantially as set forth.

3. In a lock, a plug or roll-back carrying a sliding tumbler and provided with a keyway having projections extending from both sides past the center thereof, and tumbler-recesses intersecting said projections, in combination with a key which has key-bittings either central or on one side of its axis, said tumbler having a continuous key-bearing surface wide enough to be operated by the bitting of the key farthest from its axis, substantially as set forth.

4. In a lock, a cylindrical pin-tumbler with the end upon which the key bears rounded or beveled only from opposite sides of a central line so as to form a broad key-bearing surface, substantially as described.

5. In a lock, the combination of a cylindrical pin-tumbler rounded or beveled on one end from opposite sides of a central line to provide a broad bearing-surface, and provided with a projection or groove which engages with a corresponding groove or projection in the tumbler case or chamber, so that when the key is inserted the tumbler will not revolve on its axis, substantially as described.

6. In a lock, the combination of a tumbler case or escutcheon and a key-cylinder or roll-back, with a stop against longitudinal motion in both directions at one end only thereof, so that said cylinder at the face of the escutcheon may be of its maximum diameter to permit a deeper keyway, substantially as described.

In testimony of all which I have hereunto subscribed my name.

WARREN H. TAYLOR.

Witnesses:
SCHUYLER MERRITT,
GEO. E. WHITE.