J. J. DINNAN.

Locks.

No. 216,260. Patented June 10, 1879.

fig 1.

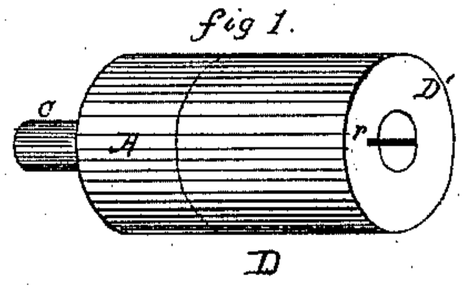


fig 2.

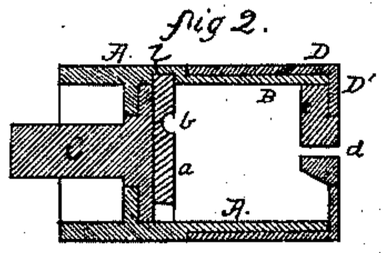


fig 3.

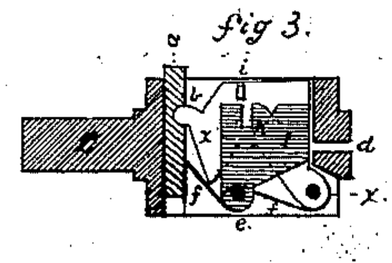


fig 4.

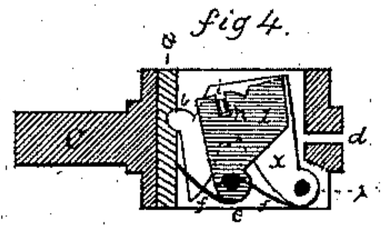


fig 5.

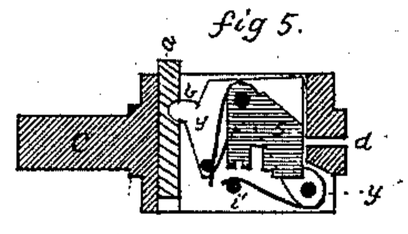


fig 6.

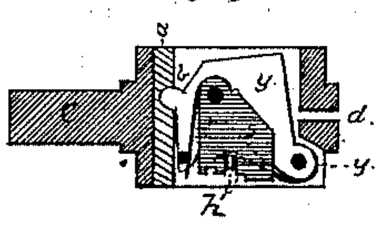


fig 7.

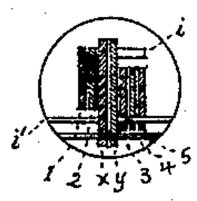


fig 9.

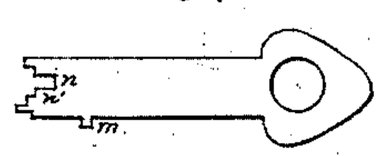
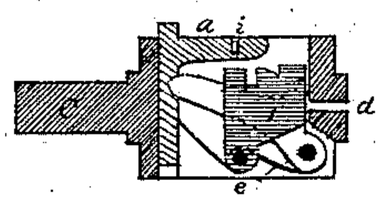


fig 8.



Witnesses

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IMPROVEMENT IN LOCKS.

Specification forming part of Letters Patent No. **216,260,** dated June 10, 1879; application filed March 19, 1879.

To all whom it may concern:

Be it known that I, JOHN J. DINNAN, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Locks; and I do hereby declare the following, when taken in connection with the 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, perspective view of the cylinder complete; Fig. 2, central section through the bolt; Figs. 3, 4, 5, 6, sectional side views of the inner or rotating cylinder; Fig. 7, transverse section; Fig. 8, interior view of a rotating cylinder with a construction slightly different, but embodying my invention; Fig. 9, the key.

This invention relates to an improvement in that class of locks known as "tube or cylinder locks"—that is to say, a rotating cylinder within a stationary cylinder and means for engaging the two, combined with tumblers operated upon by the key to disengage the rotating cylinder from the fixed cylinder, and the rotating cylinder in connection with the bolt of the lock, so that rotating the cylinder draws the bolt; and the invention consists in the construction, as hereinafter described, and more particularly recited in the claims.

A is the stationary cylinder, which is made fast to the lock or door, and within this the cylinder B is arranged, the one concentric with the other, and so that the cylinder B may be turned within the outer cylinder, A. From the rotating cylinder B a stem or spindle, C, extends to the bolt or mechanism of the lock, and so that the rotation of the cylinder B actuates the lock mechanism in the usual manner for this class of locks. The rotating cylinder B has a mortise, in which is the sliding bolt *a*. This bolt is not pivoted, but is so placed that it may be moved downward as from the position in Figs. 2, 3, 5 to the position in which it appears in Figs. 4, 6. This bolt extends up and into a slot, *l*, in the stationary cylinder A, as seen in Fig. 2, and when in that position the cylinders are engaged, so as to prevent the rotation of the inner cylinder; but when the bolt *a* is moved down or drawn into its cylinder, as in Figs. 4, 6, then the cylinders are disengaged and the inner one may be turned. Combined with this sliding bolt are one or more tumblers, (preferably two,) *x y*, which either have an immediate bearing upon the bolt, as shown at *b*, or are so placed as, when moved by the pressure of the key, to have a downward bearing upon said bolt.

A flat key is used and introduced through a central slit, *d*, in the cylinder, the plane of the key at right angles to the plane of the tumblers *x y*. Pressing the key, therefore, against the tumblers *x y* will force them to bear upon the bolt, and continued pressure upon said tumblers will force the bolt into the rotating cylinder and force it from its engagement with the stationary cylinder. Combined with these tumblers *x y*, which have a bearing upon the bolt, as described, are several tumblers, 1 2, on one side, and 3 4 5 on the other side, (more or less in number,) part of which are pivoted in the cylinder near the lower side of the mortise, as at *e*, and part are pivoted to one of the tumblers, *x* or *y*. These tumblers, as well as the tumblers *x y*, are provided each with its own independent spring, *f*, or other suitable spring, the tendency of which is to force the tumblers toward the key-hole, and preferably so as to bring them into the same line before the key-hole, as seen in Fig. 3. These tumblers are notched, and one of the notches in each of them is made deeper than the others, as at *h*, but at different relative positions in different tumblers. On one side of one tumbler having a bearing on the bolt is a stud, and on the opposite side of the other tumbler having a bearing upon the bolt is another stud. One of these studs is attached to one of the tumblers *x y*, and the other stud to the rotating cylinder. The thickness of these studs correspond nearly to the width of the notches *h* in the tumblers 1 2 3 4 5, the width of said notches being a little more than the thickness of said studs. Hence, when the notched tumblers are all moved to such positions that the slits *h* in the several tumblers on one side come into line below the stud *i* on that side, and the slits *h'* in the sev-

eral tumblers on the other side come into line above the stud *i'* on that side, as in Figs. 4 6, then the tumblers *x y* may, by means of the pressure of the key, be turned downward, the studs *i i'* entering the slits *h h'*, and the bolt will at the same time be forced downward by means of the tumblers *x y* bearing thereon; but in any other position of the tumblers the disengagement of the bolt is impossible, as it is otherwise prevented from being moved downward to accomplish this result by the ends of the tumblers *x y*, upon which the bolt rests. To thus move the tumblers a flat key, such as seen in Fig. 9, is made with shoulders at its end corresponding to the respective notched tumblers, and so that by pressing the key against said tumblers they will be respectively moved to a position where the several slits *h* on the notched tumblers 1 2 will coincide, and where the slits *h'* on the tumblers 3 4 5 will also coincide. Then the shoulders *n n'* on the key, pressing against the front edges of the tumblers *x y*, will, with a continued movement of the key, force said tumblers *x y* to press the bolt down, disengaging the inner cylinder from the stationary cylinder, and so that said inner cylinder may be turned by means of the key. The movement of the key, while pressing the tumblers *x y* upon the bolt to disengage the same, will at the same time continue the movement of the slotted tumblers 1 2 3 4 5; hence the notches *h h'* must be of a shape to allow their respective studs *i i'* to move easily therein. A sleeve, D, is placed over the cylinder, with a head, D', so as to secure the inner cylinder in place longitudinally. The tendency of the springs is to throw the key outward; hence it is desirable that the key should be secured while turning the cylinder. To do this a stud, *m*, on one edge of the key passes through a notch, *r*, in the head of the sleeve, which coincides with the key-hole in the rotating cylinder when the lock is in its normal condition.

Obviously instead of pivoting a part of the notched tumblers 1 2 3 4 5 to the inner cylinder and a part to one of the tumblers *x y*, they may be all be pivoted to the tumblers *x y* or all to the inner cylinder, and instead of placing the studs *i i'* one upon a tumbler, *x*, and one upon the inner cylinder, as shown, said studs may be respectively attached to the tumblers *x y* or to the inner cylinder, or one stud attached to the inner cylinder might serve to engage with the slits *h h'* in all the notched tumblers, the shape of the tumblers *x y* and the pivoting of the notched tumblers thereto being such as to permit this; and instead of placing said studs *i i'* upon either the tumblers *x y* or attaching them to the inner cylinder, they may be placed on the bolt, as shown in Fig. 8; and the bolt and the notches *h h'* might be so placed that when the tumblers 1 2 3 4 5, more or less in number, were pressed forward by the key, so that the studs on the bolt and the notches intended to engage with them should coincide, the key, being still pressed forward, would move the tumblers *x y*, and thus force the bolt from its engagement with the outer cylinder.

It will also be readily seen that the shape of the bolt and tumblers and key may be varied, as may also their positions relative to the axis of the cylinders, without departing from the spirit of my invention. For instance, a bolt, as shown in Fig. 8, may be used, having a stud or studs to enter slots in the notched tumblers, and the tumblers *x y* may be made without studs; or one tumbler, as shown in Fig. 8, may be used with or without tumblers 1 2 3 4 5.

All the notched tumblers may be placed on one side of a tumbler having a bearing upon the bolt, although, by preference, I place part on one side and part on the other. The bolt may be placed on one side of all the tumblers or between them. The bolt may have its own spring to force it to its engagement with the stationary cylinder, and the springs in connection with tumblers *x y* may be dispensed with. Two or more bolts may be used with one or more tumblers, *x y*, bearing on each.

As thus far described, the device is applicable to spring or night locks; but in deadlocks—that is, those in which the bolt is thrown or drawn so as to remain in either position—the movement of the rotating cylinder would be but half a revolution. In that case there may be a slot in the stationary cylinder opposite the slot *l*, so that the bolt *a* will enter that slot when fully unlocked and the other slot when fully locked; and in order to move the key in that second position there may be a notch in the head D', opposite and corresponding to the notch *r*, to release the stud *m*.

I claim—

1. The combination of the sliding bolt in the inner rotating cylinder with one or more tumblers, each pivoted to swing in the same plane as, or a plane parallel with, a plane in which said bolt slides, each tumbler provided with a leverage-bearing upon the bolt, so that when the tumblers are subjected to the direct pressure of the key they will, by a continued movement thereof, move the bolt so as to unlock it, substantially as described.

2. The combination of the stationary cylinder, an inner rotating cylinder, a sliding bolt in said rotating cylinder moving so as to automatically engage with a slot in the stationary cylinder, and one or more hinged or pivoted tumblers hung within said rotating cylinder, so as to move in planes parallel with each other, and having a bearing upon said bolt and adapted to be moved by the pressure of the key thereon, so as by means of their pressure upon said bolt to force said bolt to disengage from the slot in the stationary cylinder, substantially as described.

3. The combination of the bolt, a tumbler or tumblers not forming a part of said bolt, but having a leverage-bearing thereon, the inner cylinder, and the stationary cylinder, whereby

the pressure of the key upon said tumbler or tumblers, and of said tumbler or tumblers upon the bolt, unlocks the bolt from its engagement with the stationary cylinder, substantially as described.

4. The combination, in the rotating cylinder, of a tumbler, with one or more notched tumblers pivoted thereto, and a fixed stud so placed that when the slits *h* in said notched tumblers coincide the continued pressure of the key will move both the notched tumblers and the tumbler to which they are pivoted until said slits *h* are engaged with said stud, substantially as described.

5. The combination of the rotating cylinder, the bolt sliding therein, a tumbler or tumblers having a leverage-bearing thereon and adapted when pressed forward to force said bolt from its locked position, one or more notched tumblers provided with slits *h* and pivoted to swing in parallel planes, and a stud, substantially as described, the arrangement within the rotating cylinder being such that when the notched tumblers are moved by the pressure of the key slits *h* in said tumblers will first coincide, and then by a continued movement of the key become engaged with the stud, the lever-tumblers being also so adjusted in relation to the stud, the bolt, and the notched tumblers that the bolt cannot be unlocked until the tumblers are forced to a position in which the slits are engaged with the stud.

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