

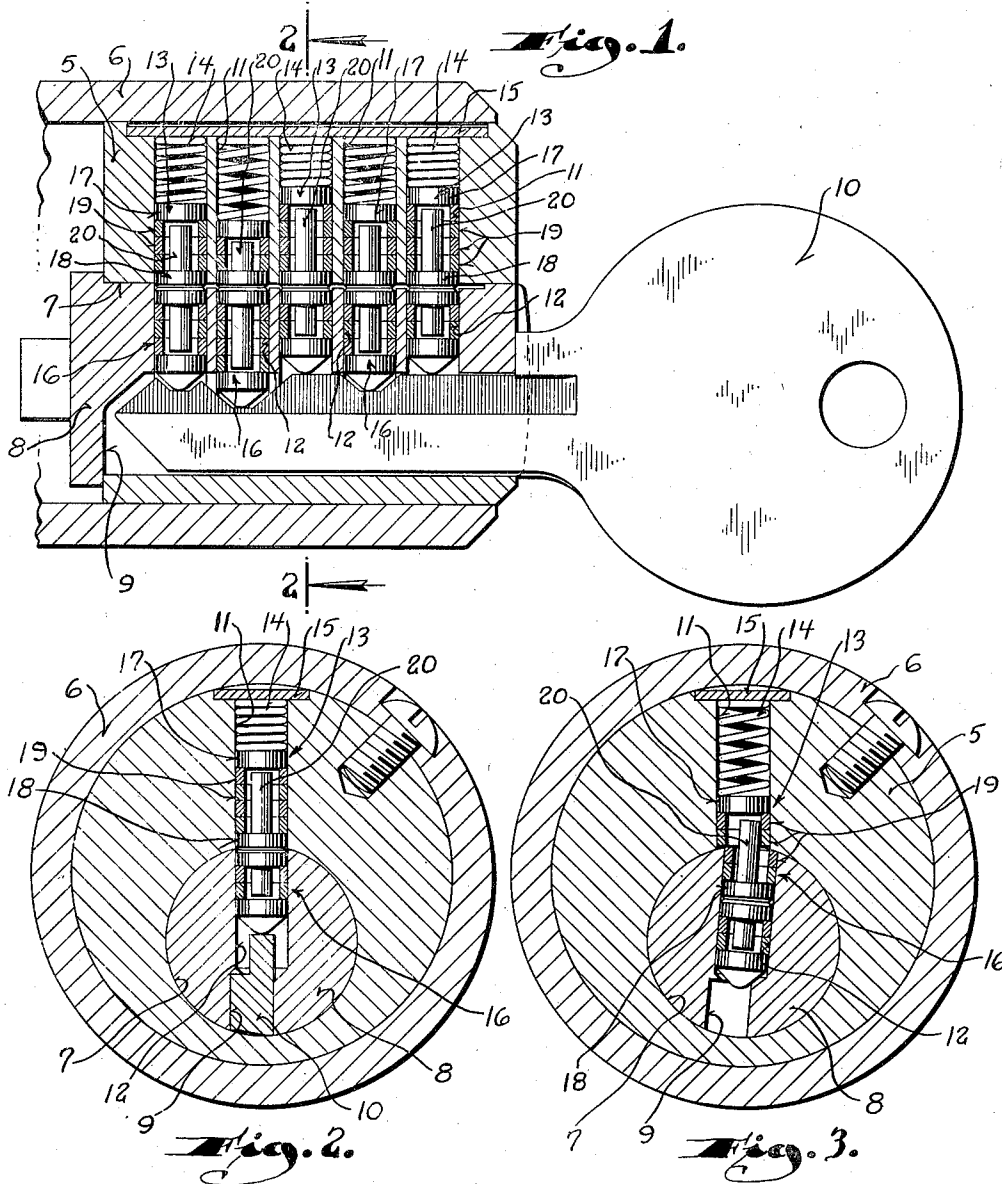
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LOCK

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LOCK

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5 Claims. (Cl. 70—364)

This invention relates to locks and refers particularly to so-called pin tumbler locks.

Many different constructions have been proposed in the past to increase the security of locks of this type against picking, but heretofore, the expedients employed have generally increased the cost of the lock excessively and have usually necessitated revision in the basic design of the lock.

With these deficiencies of past constructions proposed for this purpose in mind, it is an object of the present invention to provide a novel tumbler construction for rendering picking of the lock more difficult.

Another object of this invention is to provide a tumbler construction designed for the purpose in mind, which is so constructed that no revision of the basic design of the lock is required in its use.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

The accompanying drawing illustrates one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a longitudinal sectional view through a pin tumbler lock embodying this invention;

Figure 2 is a cross sectional view taken through Figure 1 on the plane of the line 2—2; and

Figure 3 is a view similar to Figure 2, but showing the cylinders turned slightly to illustrate the manner in which the special tumbler construction renders picking of the lock more difficult.

Referring now particularly to the accompanying drawing in which like numerals indicate like parts, the numeral 5 designates the casing of a pin tumbler lock which may be mounted in a housing 6 and which is bored as at 7 to rotatably mount a cylinder 8. The cylinder 8 is provided with the usual keyway 9 for the reception of a key 10, and the casing and cylinder have tumbler openings 11 and 12, respectively, adapted to register when the cylinder is in its locked position of rotation.

Slidably mounted in the tumbler openings 11 of the casing are locking pins 13 yieldingly urged toward the cylinder and into the cylinder open-

ings 12 by compression springs 14. A plate 15 fixed in the casing closes the outer ends of all of the openings 11 and provides a support against which the springs 14 bear.

Slidably disposed in the openings 12 of the cylinder are drivers 16, the inner ends of which project into the keyway 9 to be engageable by the blade of the key. These drivers are of different lengths so that the insertion of a proper key lifts all of the tumbler or locking pins to align the junctures of the tumbler pins and drivers with the line of parting between the cylinder and casing.

In picking a lock, a picking tool is inserted into the keyway and the drivers of the different pin tumblers are successively vibrated while at the same time, a turning force is applied to the cylinder. As the pin tumblers are vibrated into positions at which their junctures between the drivers and locking pins align with the line of parting, the torsional stress on the cylinder causes the locking pins to catch on the shoulders which result from the slight misalignment of the tumbler openings in the casing and cylinder so that after all of the locking pins have been vibrated into such positions, the cylinder is free for rotation.

To render this picking process more difficult, the locking pins 13 and the drivers are of special construction as now about to be described, and as the locking pins and drivers are of the same construction except that the drivers have pointed inner ends, a description of one will suffice for both.

The improved construction consists of two cylindrical inner and outer end members 17 and 18, respectively, of a diameter to slidably fit the bore in which it is mounted. Confined between the two end members are stacked rings 19, all of which have the same outside diameter as the end members.

Extending through the bores of these rings is a spindle 20 carried by one of the end members and projecting to within a short distance from the other end member. Inasmuch as the spindle is of less diameter than the bores of the rings, a limited degree of relative lateral displacement is permitted the rings. Hence, it will be seen that the alignment of the junction between any two rings or between either end member and its adjacent ring with the line of part between the cylinder and casing permits the cylinder to be turned.

The degree of rotation permitted the cylinder is determined by the difference in the diameters

of the spindle and the bores of the rings. Attention is directed to the fact that with this construction, a substantial displacement and consequently a comparatively large degree of rotation is permitted the cylinder, so that when the cylinder is turned with the locking pins at improper positions, as shown in Figure 3, further lifting of the locking pins is positively prevented. Picking the lock thus is extremely difficult, if not entirely impossible.

It is also desired to particularly point out the fact that there is no direct connection between the end members 17 and 18 and that all endwise force from one to the other end member is applied through the rings. Consequently, there is no restraint upon the rotation of the cylinder as permitted by the relative lateral displacement of the rings except the friction between the rings.

From the foregoing description taken in connection with the accompanying drawing, it will be readily apparent to those skilled in the art, that this invention greatly increases the security of pin tumbler locks against picking, and that this desired security is attained without a costly construction and without in anywise altering the basic design of the lock.

What I claim as my invention is:

1. In a pin tumbler lock: a casing; a cylinder rotatably mounted therein; a pin tumbler carried by the casing and biased to a position extending across the line of parting between the casing and cylinder and into an opening in the cylinder to lock the cylinder against rotation, said tumbler comprising a plurality of separate units stacked one on the other so that the alignment of the junction between any two units with the line of parting allows rotation of the cylinder; and a spindle carried by one of the endmost units and extending loosely through the intermediate units to within a short distance from the other end unit for limiting relative lateral displacement of said units and thereby restricting the permitted rotation of the cylinder.

2. In a pin tumbler lock: a casing; a cylinder rotatably mounted therein; a pin tumbler carried by the casing and biased to a position extending across the line of parting between the casing and cylinder and into an opening in the cylinder to lock the cylinder against rotation, said tumbler comprising a plurality of separate units stacked one on the other so that the alignment of the junction between any two units with the line of parting allows rotation of the cylinder; and means carried by one of said end units for limiting relative lateral displacement of said units to restrict the permitted rotation of the cylinder, said means being free from the other end unit so as not to form an endwise driving connection between the two end units.

3. In a pin tumbler lock: a bored casing; a cylinder rotatable in the casing bore and having a key slot; the cylinder and casing having tumbler openings adapted to register when the cylinder

is in a predetermined position of rotation; a pin tumbler in the tumbler opening of the casing; a spring urging said tumbler out of its opening and into the cylinder opening when said openings are in register to lock the cylinder against rotation; a driver in the cylinder opening operable by a key in the slot to lift the tumbler to a predetermined position at which the junction between the tumbler and driver is at the line of parting between the cylinder and casing to free the cylinder for rotation; and said tumbler comprising an outer end member engageable with the driver, an inner end member engageable by the spring, one or more rings confined between said end members to transmit endwise force from one end member to the other, and a spindle carried by one of the end members and extending through the rings toward the other end member to hold the rings against complete relative lateral displacement while permitting a degree of relative lateral displacement so that the cylinder is permitted to turn a limited degree whenever the junction between any two rings or between either end member and its adjacent ring is in line with the line of parting between the cylinder and casing, said spindle being spaced from said other end member so that no endwise stress is transmitted from one to the other of said end members except through the rings.

4. A pin tumbler for locks comprising: two spaced cylindrical end members; a plurality of stacked rings interposed between the end members to transmit endwise force from one to the other end member, said rings having an external diameter equal to that of the end members; and a spindle carried by one end member and extending through the bores of said rings toward the other end member but terminating short of said other end member, said spindle having a diameter smaller than the bore of the rings so as to permit a degree of relative lateral displacement of the rings.

5. In a pin tumbler lock: a casing; a cylinder rotatably mounted therein; a pin tumbler carried by the casing and biased to a position extending across the line of parting between the casing and cylinder to lock the cylinder against rotation, said tumbler comprising a plurality of separate units stacked one on the other so that the alignment of the junction between any two units with the line of parting allows rotation of the cylinder; and a spindle carried by one of the endmost units and passing through the intermediate units to have its end disposed adjacent to the other endmost unit to limit relative lateral displacement of said units and thereby restrict the permitted rotation of the cylinder, said spindle being loose from said other endmost unit so as to preclude the transmission of endwise force from one endmost unit to the other except through the intermediate units.

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