Feb. 14, 1939. F. H. RICE 2,147,061

PICKPROOF LOCK

Filed Sept. 26, 1934

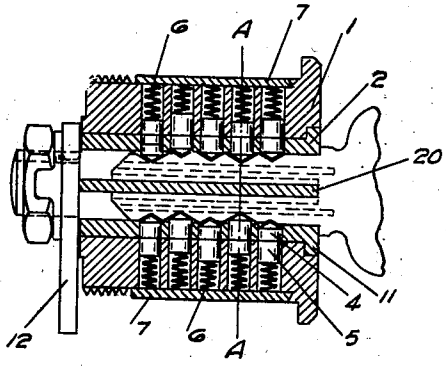


FIG. 1

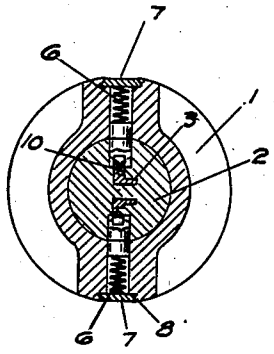


FIG. 2

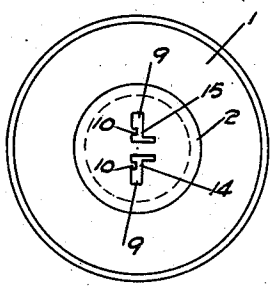


FIG. 4

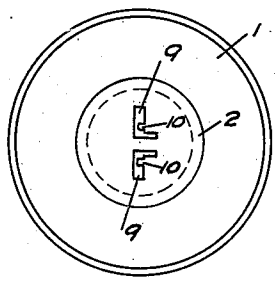


FIG. 3

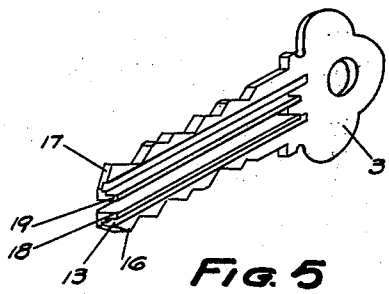


FIG. 5

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Patented Feb. 14, 1939 2,147,061

UNITED STATES PATENT OFFICE

2,147,061

PICKPROOF LOCK

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Application September 26, 1934, Serial No. 745,618

11 Claims. (Cl. 70—358)

The present invention relates to pin tumbler locks and to keys used in connection therewith, such locks being of the kind that consist of an outer barrel and an inner rotatable lock barrel, the two barrels being locked together except when free to be unlocked by the operation of a key by means of tumblers or locking pins divided transversely into two parts, the key for operating being a modification of the well known flat or non-tubular type, having a slot along its longitudinal center line, grooves on its sides, bevelled ends and provided along its two longitudinal edges with sets of notches and projections or wards for actuating the tumblers which latter are forced by the bevelled end of the key along transverse holes in the barrels on the key being inserted in a key slot in the rotatable barrel.

The primary object of this invention is to provide a new and improved cylinder or barrel for locks that is constructed in a way that will prevent picking of combinations in said cylinder or barrel.

Another object of this invention is to provide a new and improved cylinder or barrel that can be used in locks where one-half turn is essential to operate.

Another object is the provision of a keyway to cooperate with a key to operate the lock which is so shaped as to prevent picking by several well-known types of automatic lock-pickers.

Other objects and advantages of the invention will appear in the following specification.

Figure 1 shows a longitudinal vertical section through a cylinder or barrel type lock with locking pins and key at releasing position.

Figure 2 shows a cross section on AA in Figure 1.

Figure 3 is an end elevation of the lock with the key removed.

Figure 4 is an end elevation of a modified form of the lock.

Figure 5 is a perspective view of a key formed according to this invention.

In the several figures corresponding parts are indicated by corresponding letters. 1 is the outer barrel. 2 is the inner barrel. 3 is the key for operating the lock. The tumblers consist of a plurality of members and comprise the lock pins 4 and plungers 5 which are forced toward the center of the inner barrel by springs 6. The tumblers and their springs are retained by any suitable means in the holes provided for their reception within the barrels; for instance, as shown by the help of plates 7 forced into dovetail grooves 8 in the top and bottom of the barrel 1. The inward movement of the tumblers when the key is withdrawn from the keyway or slots 9 is limited by their engagement with the lateral parts 10 of the key slots, which parts are arranged to fit grooves formed on either side of the key.

These projections 10 are sometimes termed wards and fit in grooves 13 of the properly designed key. The wards project a substantial distance across the openings 14 and 15 of the keyway so as to leave only a comparatively narrow portion for the admission of the two portions 16 and 17 of the split key. The key is provided with lips 18 and 19 so as to provide the desired strength for the key which is necessarily weakened due to the depth of the grooves 13. The widened portions or lips also provide bearings and guides for the key when inserted in the barrel.

The key is split so as to provide the solid portion 20 in the lock itself which divides the keyway into two separate openings.

In locks where one-half turn operation is essential, the same combinations are used in both sets of tumblers and plungers. This is done to maintain uniform compression of the springs, 6, and also allow withdrawal of the key when displaced one-half turn from original position.

In cases where the key is to be withdrawn at the position of insertion, the combinations may be varied in each set of tumblers.

One plunger and tumbler unit in each combination is so arranged that they are at releasing point when the key is removed or the correct key in place. This is done in order that any displacement of these particular tumbler units, in attempting to pick the lock, will immediately put them in a locked position. For example as shown in Figure 1 the unit at the left end of the barrel will remain in the same position when the proper key is inserted in the lock or when no key is used. When the proper key is in position this unit will serve no purpose but if a key is inserted which is incorrect the unit will be moved upwardly and out of releasing position. Locks of this type are sometimes picked by snapping the tumblers upwardly while simultaneously rotating the inner barrel but in this case, the tumbler customarily in releasing position would be moved into locking position when driven upwardly and so prevent the lock from being picked. In other words, the combination of tumblers is set with one plunger and tumbler in released position whether the correct key is in or out of the lock but when the wrong key or a picking tool

is inserted in the lock the plunger and tumbler will be moved into locking position.

In order to pick the lock, it, therefore, becomes necessary to displace the tumblers the proper amount without disturbing either the tumbler unit in each combination that is set at the releasing point with the key removed. Also, in order to pick the lock it becomes necessary to pick two separate combinations simultaneously.

It can therefore be readily seen that due to the constricted openings by wards 10 and the dual opening, the lock is extremely difficult to pick and could not be picked by the type of automatic lock-picker generally in use.

The lock barrel may be formed as shown in Figure 3 or 4. The inner barrel 2 is secured in the outer barrel 1 by means of its front flange 11 and the cam plate 12 which is secured to the inner barrel by any suitable means and is controlled in its operation by the movements of the inner barrel.

Various changes in the construction and arrangement of the several parts herein shown and described may be employed without departing from the spirit of my invention as described in the appended claims.

I claim:

1. An inner lock barrel consisting of a cylindrical portion having a plurality of series of opposed openings therein, adapted to retain lock tumblers, said portion having a keyway therein for the reception of a key, said keyway being divided into a plurality of sections by intervening portions of the barrel, each section having a substantially widened portion and an upstanding lip.

2. A barrel for locks comprising an outer barrel, an inner barrel with a key slot therein, a combination of a plurality of tumblers in said inner barrel, said combination being set with one tumbler in releasing position when the proper key is in or out of the lock, and said key slot being substantially constricted by a projecting ward on the inner barrel spaced a substantial distance from the top and bottom of said slot, said tumblers being limited in their inward movement by said ward.

3. An inner lock barrel consisting of a cylindrical portion having a plurality of diametrically opposed openings therein and a keyway communicating with said openings, said keyway being separated into a plurality of sections by a web integral with said cylindrical portion, each of said sections having a base of substantial width and an upstanding lip, said lip being substantially of uniform width throughout its height, and said barrel having a ward projecting into each of said lips longitudinally thereof.

4. A substantially cylindrical inner lock barrel having a plurality of diametrically opposed sets of openings adapted to retain lock tumblers and an L-shaped keyway communicating with each of said sets of openings, said keyways being separated by an intervening web integral with the barrel, the base of the L being adjacent the web and the leg of the L communicating with the openings, and longitudinally extending wards projecting into the leg of the L so as to constrict the width of the leg in a lengthwise direction.

5. An inner lock barrel having a keyway extending longitudinally thereof, said keyway being formed of a plurality of independent sections separated by a web integral with the barrel, each of said sections being substantially L-shaped in cross-section.

6. An inner lock barrel having a keyway extending longitudinally thereof and a plurality of openings communicating therewith adapted to retain lock tumblers, a web coextensive with said keyway dividing said keyway into a plurality of independent sections, and a ward integral with said barrel extending into each of said keyway sections and extending the length thereof, said wards being spaced from the top and bottom of their respective keyway sections, said wards serving to limit movement of the tumblers into the keyway.

7. An inner lock barrel having a keyway extending longitudinally thereof, a web separating said keyway into a plurality of sections, said sections being substantially L-shaped with the base of said L being adjacent said web, and wards extending into each of said sections coextensive with the length thereof, each of said wards being spaced from the top and bottom of its respective section.

8. A pin tumbler lock consisting of an outer barrel having a cylindrical bore therein, an inner barrel in said bore, said barrels having two communicative sets of diametrically opposed openings therein, said inner barrel having a keyway therein, divided into two sections by an intervening web, a pin and tumbler unit in each of said openings extending into said keyway sections and the shape of said keyway sections being substantially L-shaped.

9. A lock consisting of an outer barrel having a bore therein, an inner barrel in said bore having a keyway separated into a plurality of sections by a web integral with the inner barrel, said barrels having a plurality of communicating sets of apertures therein, said apertures also extending into said keyway sections and being adapted for the reception of tumblers, and wards projecting into said keyway sections longitudinally thereof and substantially constricting said sections and serving to limit movement of the tumblers in their inward movement.

10. A pin tumbler lock comprising an outer casing, an inner casing rotatably mounted in said outer casing, said casings having two sets of communicating apertures, said sets being diametrically opposed, said inner casing having a keyway therein, a web in said inner casing dividing said keyway into two sections, each of said sections being substantially L-shaped in cross-section and having the base of said L adjacent said web and the leg of said L extending to and communicating with the aforementioned apertures, a ward on said inner casing extending into said keyway lengthwise thereof and constricting the leg of said L at a distance spaced from the base and top of said L, pin and tumbler units in said apertures, springs forcing said units inwardly and a cam plate attached to said inner barrel.

11. A lock barrel having a keyway therein adapted to receive a key, a web separating said keyway into a plurality of sections, each of said sections having a portion of substantially uniform width and a second portion extending in the same direction as said first named portion, said second portion extending laterally beyond and being of greater width than the first named portion.

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