Oct. 31, 1933. R. L. NEER 1,932,706

PIN TUMBLER CYLINDER LOCK

Filed Aug. 5, 1932

Fig. 1.

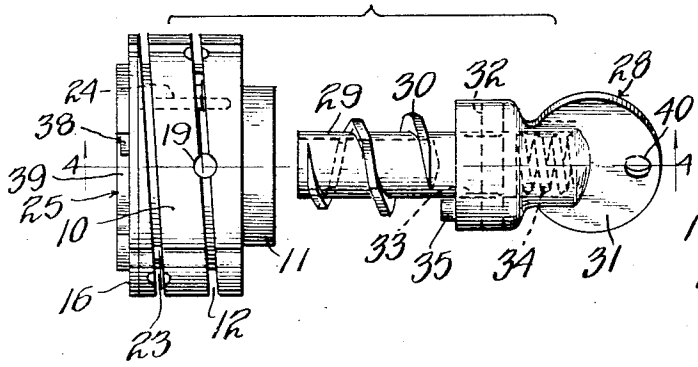


Fig. 2.

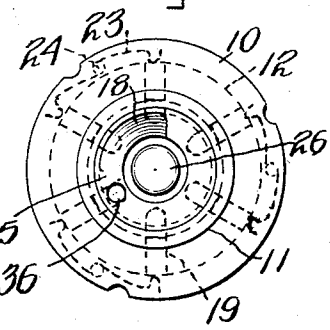


Fig. 3.

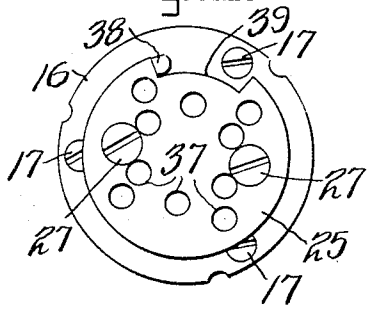


Fig. 4.

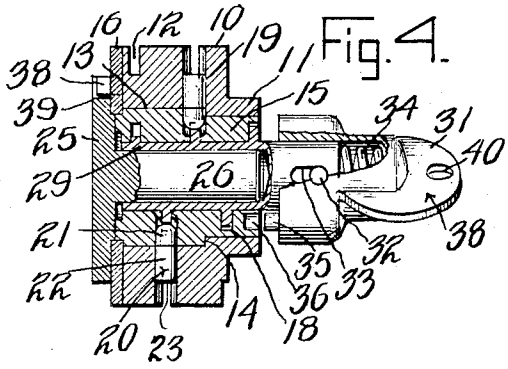


Fig. 5.

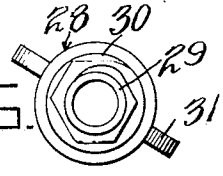
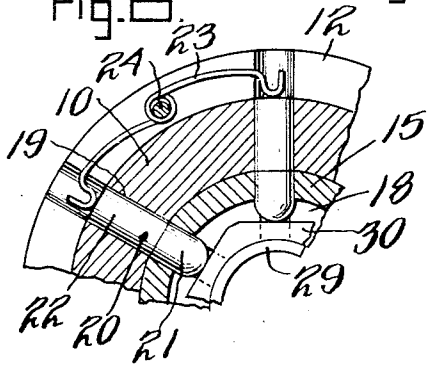


Fig. 6.



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1,932,706

PIN TUMBLER CYLINDER LOCK

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Application August 5, 1932. Serial No. 627,630

7 Claims. (Cl. 70—47)

This invention relates to a pin tumbler lock cylinder and it is an object of the invention to provide a lock cylinder of a construction, design and arrangement which is "unpickable" and thus afford full security to all lock structures in which it may be employed, all of which will be hereinafter more fully described and claimed.

Referring to the accompanied drawing, which is made a part hereof and on which similar reference characters indicate similar parts,

Figure 1 is a plan view of the lock cylinder and key,

Figure 2, an end view of the cylinder as viewed from the front,

Figure 3, an end view of the cylinder as viewed from the back,

Figure 4, a vertical section on line 4—4 of Figure 1 with the key inserted,

Figure 5, an end view of the key as viewed from the forward end, and

Figure 6, a detail section showing two of the pin tumblers and the spring for operating the same.

In the drawing reference character 10 indicates the cylindrical casing of the lock cylinder having a reduced forward end 11 and provided with a spiral groove 12 formed around its periphery. The casing 10 is provided with a cylindrical bore 13 which is also reduced near the front end forming a shoulder 14. A key plug 15 is mounted to rotate in the bore 13 and is maintained in the casing by a retaining plate 16 which is secured to the rear end of the casing by the screws 17 and by the shoulder 14. The plug 15 is also provided with a corresponding spiral groove 18 on its inner surface. The casing 10 and plug 15 are provided with a series of spaced pin tumbler chambers 19 formed therein which register with the spiral grooves 12 and 18. The lower or inner ends are reduced slightly to prevent the pin tumblers from falling inwardly from the pin chambers. The pin tumblers 20 are formed of two portions. The driving or operating portions 21 have rounded inner ends and flat outer ends and are mounted in the chambers in the key plug 15 and the driven portions 22 have flat ends and are mounted in the casing 10 and bear against the drivers 21. The pin tumblers are held in place by means of springs 23 bearing against the outer portion 22 thereof. Each spring is mounted on a pin 24 which passes through the spiral groove 12 and the ends bear against the driven portions 22 of the tumbler pins on each side of the pin 24. The key plug 15 is provided with a cam plate 25 having a stem 26 formed thereon which is concentrically mounted in the bore of the key plug and which is held fixed to the plug by the screws 27 extending through the cam plate 25. The diameter of the stem 26 is slightly less than the diameter of bore of key plug which provides a space into which the key 28 may be turned.

The key 28 is provided with a hollow plunger 29 adapted to fit around the stem 26 and is provided with a spiral bit 30 which may be turned into the spiral groove 18. The bearing surface of the spiral bit 30 is formed with cam surfaces of different heights to actuate and properly set the spirally arranged tumbler pins 20 in order to properly align them to operate the cam and the key plug. The key is also provided with a finger grip 31 which is slidably secured on the plunger 29 by means of the pin 32 in the slot 33. A spring 34 is mounted intermediate the end of the plunger 29 and the grip 31 tending to force them apart. A pin 35 is provided on the grip 31 and engages in an opening 36 in the key plug 15 to rigidly secure them together when the spiral bit 30 has been turned into the groove 18. The finger grip 31 is forced inwardly against the action of the spring 34.

The cam plate 25 is provided with a series of openings 37 therein to which a bolt or other locking mechanism may be secured. The rotation of the cam plate and the key plug is limited by the stop 38 on the retaining plate 16 and the cut-out portion 39 on the edge of the cam plate. The grip 31 is provided with an opening 40 for attaching the key to a key ring, if desired.

The operation of the lock cylinder is as follows:

Considering the cylinder in locked position, the cam plate occupies the position shown in Figure 3. The pin tumblers extend from the casing into the key plug locking them in fixed position. The length of pin tumblers is a matter of choice as well as the bit of the key. Various combinations may be had by varying these two factors as well as the spacing of the pin tumblers. The key is turned into the spiral groove, the spiral bit engages the pin tumblers as it advances. When the pin 35 is directly opposite the opening 36 in the key plug, the tumbler pins occupy the positions as shown in Figure 4. In other words, the key plug is free to rotate since the driver pins are set with their flat ends flush with the outer surface of the key plug and the driven pins are set with their inner ends flush with the inner surface of the casing. The finger grip 31 is then depressed and given a turn clockwise which is limited by the stop 38 stroking one edge of the cut-out portion of the cam, this causes the key plug and cam plate to rotate thereby actuating or unlocking any locking mechanism attached thereto.

To reverse the movement of the key plug and the cam plate, the key is depressed and turned counter-clockwise again limited by the cut-out portion of the cam striking the stop 38. By reducing the pressure and allowing the pin 35 to

disengage the opening 36, the key 28 is removed by further turning. In the particular construction shown should the operator fail to depress the key, the cam will be actuated upon turning the key and the key can not be removed unless the locking mechanism is locked; however, it will be understood that the cylinder can be fitted with different cams, which would in no wise affect the construction of the cylinder, but which would permit removal of the key in either the locked or the unlocked position.

It is evident from the above description that a new and useful device results which is a valuable improvement and addition to what may be termed "the lock family". The particular arrangement of the pin tumblers in a spiral or circular fashion is a new and radical design to prevent picking of locks. It is impossible to insert lock picks since the space between the center pin and the key plug is very small. This feature is vital as well as the particular arrangement and positioning of the pin tumblers.

The structure as set forth above affords greater security than afforded when using any device of a similar character due to the features pointed out. Various materials of suitable characteristics may be used in constructing the various parts, as desired.

It will be obvious to those skilled in the art that various changes may be made in my device without departing from the spirit of the invention and therefore I do not limit myself to what is shown in the drawing and described in the specificaiton, but only as indicated by the appended claims.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:

1. A locking device of the character described comprising a casing having a spiral groove in its outer periphery and a bore extending axially therethrough, a key plug having a corresponding spiral groove in its inner surface mounted to rotate in said bore, radially positioned pin chambers connecting said grooves, spring-pressed pins mounted in said chambers adapted to lock said plug in said casing, and a cam plate secured to said plug having a stem extending into said plug being slightly spaced from the inner surface thereof, said device being operable by a key adapted to fit over said stem and having a spiral bit thereon engageable in said groove in said key plug to set said pins to permit rotation of said cam plate and said key plug with respect to said casing, substantially as set forth.

2. A lock cylinder comprising a casing having a plug rotatably mounted therein, said plug being provided with an axial bore therethrough, a plurality of pin chambers extending through and connecting said casing and said plug, said pin chambers being positioned in a spiral formation, spring-pressed tumbler pins mounted in said chambers normally locking said plug in said casing, and a cam plate connected to said plug having a stem concentrically mounted in said plug and of a diameter less than the bore of said plug and extending through said bore, said lock cylinder being operable by a key adapted to fit over said stem and having a spiral bit thereon engageable with said pins to set them to allow said plug to rotate with respect to said casing, substantially as set forth.

3. A lock cylinder comprising a casing having a key plug rotatably mounted therein, a retaining plate secured to the casing for holding said plug in said casing, a cam plate secured to said plug having a stem extending into said plug slightly spaced from the inner surface thereof, spirally positioned pins extending through said casing and said plug, and elongated springs pivoted at their centers to said casing, the ends of which are adapted to engage and normally hold said pins in position to lock said plug in said casing, said lock cylinder being operable by a key having a spiral bit adapted to be turned into said plug to set said pins to permit said plug to rotate thereby actuating said cam plate, substantially as set forth.

4. A lock cylinder comprising a casing having a key plug rotatably mounted therein, spirally positioned spring-pressed pins connecting and normally locking said plug to said casing, and a cam plate secured to and having a stem extending into said plug, the juncture of said cam plate and said stem forming an abutment for the end of a key telescoped over said stem for operating said pins, said key plug having a recess for receiving a pin on the finger grip of said key for rotating the plug after said key has been fully inserted, substantially as set forth.

5. A lock cylinder comprising a casing and a key plug rotatably mounted therein, said plug having a bore axially formed therethrough, a cam having a stem of a diameter less than said bore secured thereto and extending through said bore, and spirally positioned spring-pressed pins connecting and normally locking said plug to said casing, the juncture of said cam plate and said stem forming an abutment for the end of a key telescoped over said stem for actuating said spring-pressed pins, said key plug having a recess for receiving means on the finger-grips for positively rotating the plug after said key has been fully inserted, substantially as set forth.

6. A locking device of the character described comprising a casing having a plug rotatably mounted therein, said plug being provided with a bore extending therethrough, spirally arranged spring-pressed pins connecting said casing and said plug to prevent rotation with respect to each other, and a cam plate secured to said plug having a stem concentrically mounted in the bore of said plug and being slightly spaced from the inside surface thereof, said device being operable by a key adapted to fit over said stem and having a spiral bit thereon engageable with said spring-pressed pins to set them to permit rotation of said cam plate and said key plug with respect to said casing, substantially as set forth.

7. A locking device of the character described comprising a casing having a bore extending axially therethrough, a key plug mounted to rotate in said bore, said key plug likewise having a bore extending axially therethrough, spirally positioned spring-pressed pin tumblers connecting said casing and said key plug to normally prevent relative rotation between said casing and key plug, a stem connected to and extending into said key plug bore slightly spaced from the inner surface thereof, said device being operable by a hollow key adapted to fit over said stem and having a spiral bit thereon engageable to set said pins to permit said key plug to rotate in said casing, substantially as set forth.

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