June 19, 1928. 1,674,513

E. N. JACOBI

TUMBLER LOCK

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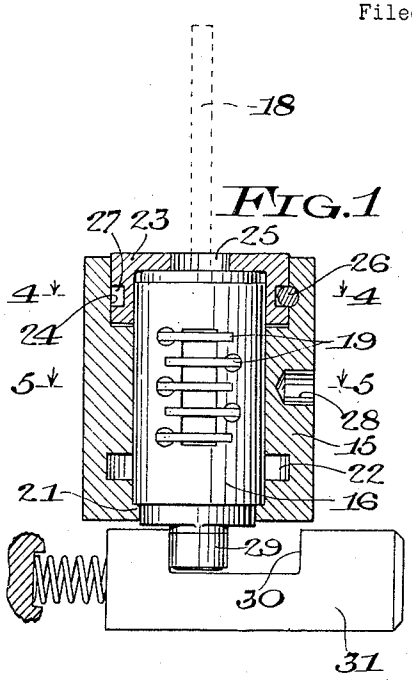


FIG. 1

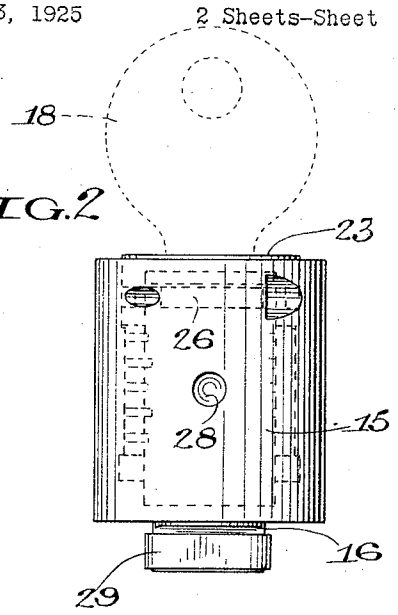


FIG. 2

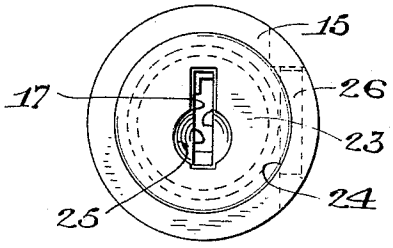


FIG. 3

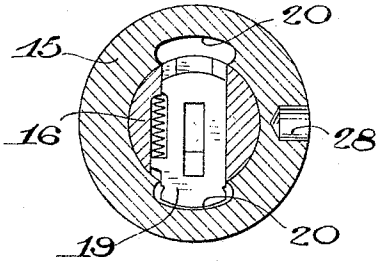


FIG. 5

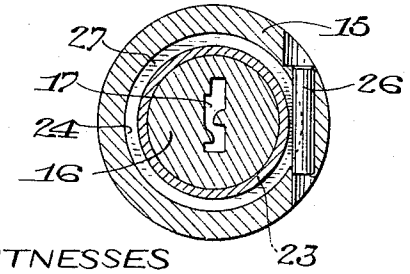


FIG. 4

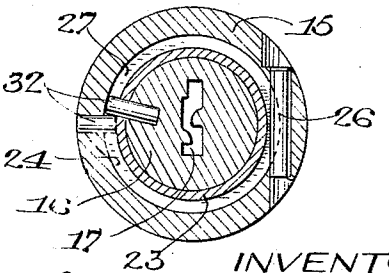


FIG. 6

WITNESSES

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FIG. 7

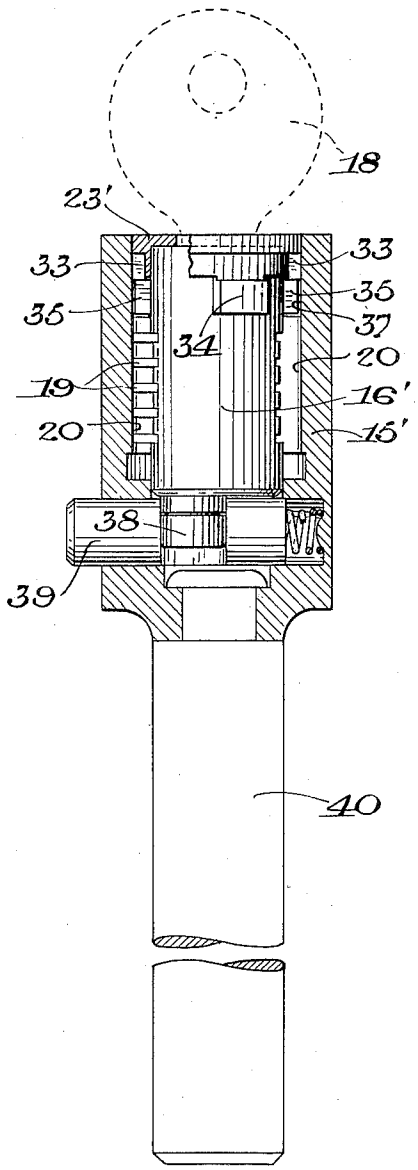


FIG. 8

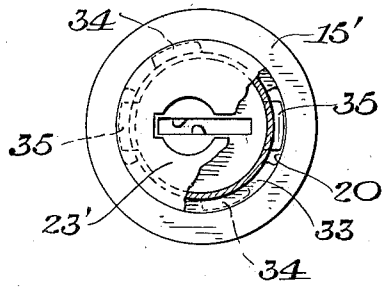


FIG. 9

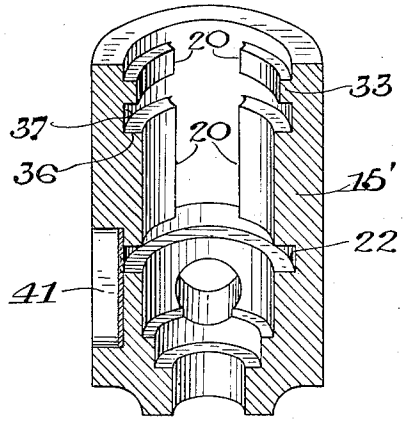
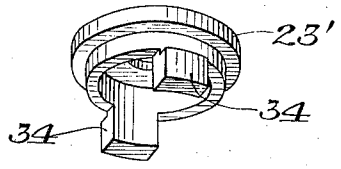


FIG. 10



WITNESSES

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Patented June 19, 1928. 1,674,513

UNITED STATES PATENT OFFICE.

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TUMBLER LOCK.

Application filed December 23, 1925. Serial No. 77,295.

This invention has for its object to provide a tumbler lock in which the lock barrel enters the lock-case from the front and is confined in place by means of a metal cap turning therewith and having a sealing engagement with the lock-case that will effectually prevent tampering with the lock barrel.

Another object of the invention is to provide such a sealing cap of soft steel so as to render it of greater protection against damage.

Another object of the invention is to utilize the sealing connection of the lock protecting cap as a stop for limiting the turning movements of the lock barrel.

Another object of the invention is to simplify the construction of locks of this character so as to render them inexpensive to manufacture and at the same time difficult to damage in such a way as to obtain the use of the parts locked thereby.

With the above and other objects in view the invention consists in the lock as herein claimed, its parts and combinations of parts and all equivalents.

Referring to the accompanying drawings, in which like characters of reference indicate similar parts in different views,

Fig. 1 is a central sectional view of one form of lock constructed in accordance with this invention;

Fig. 2 is a side elevation thereof;

Fig. 3 is a front view thereof;

Fig. 4 is a transverse sectional view on the plane of line 4—4 of Fig. 1;

Fig. 5 is a similar view on the plane of line 5—5 of Fig. 1;

Fig. 6 is a view similar to Fig. 4 showing a modification wherein the sealing groove of the cap is utilized for containing stop pins for limiting the turning of the lock barrel;

Fig. 7 is a longitudinal sectional view of a modified form of lock;

Fig. 8 is a plan view thereof partly sectioned;

Fig. 9 is a perspective longitudinal sectional view of the lock-case thereof, and

Fig. 10 is a perspective view of the sealing cap thereof.

In these drawings, 15 indicates a cylindrical lock-case in which is mounted to rotate or oscillate a lock barrel 16 having a longitudinal key slot 17 to receive a key 18 and provided with transversely extending slide tumblers 19 adapted to engage grooves 20 in the walls of the lock-case when the key is removed but fitting the variously lengthened bits of the key so as to be withdrawn thereby when the key is inserted to lie flush with the surface of the lock barrel and permit the lock barrel to be turned by means of the key. This lock barrel 16 is let into the lock-case from the front thereof and may or may not seat against a shoulder 21 formed in the lock-case. The annular groove 22 formed in the bore of the lock-case near the lower end thereof is to permit the longitudinal grooves 20 to be broached therein.

The lock barrel 16 may be made of a die casting as a convenient and inexpensive construction for obtaining uniformity and, as the alloy metal of such die castings is not suitable for withstanding attempts at mutilation for access to or unauthorized use of the parts locked, a protecting sealing cap 23 is used, preferably of soft steel, as better resisting intentional damage than the harder metal. This cap is provided with a recess to fit over the upper end of the lock barrel and have a tight forced fit therewith so as to turn with the lock barrel, the lock-case being provided with a counterbore 24 of larger diameter than the bore in which the lock barrel fits to receive the cap and form a bearing therewith to take the wear. The sealing cap 23 is provided with a key-hole 25 registering with the key slot 17 of the lock barrel and to prevent the removal of the parts a tangent pin 26 is driven through an opening in the lock-case and through an annular groove 27 in the sealing cap so as to not interfere with the turning movements of the lock barrel and the cap by taking end thrust thereof. The edges of the opening in the lock-case through which the tangent pin 26 is driven are peened over the ends of the pin to prevent its removal.

The lock-case is secured in a suitable housing, not shown, by means of a set screw entering an opening 28 in its side and the lock barrel 16 is provided with a cam projection 29 at its lower end to engage in a slot 30 of a spring-pressed locking bolt 31, which serves to lock the mechanism controlled in any suitable manner, the turning of the lock barrel by means of the key serv-

ing to move the bolt against the pressure of its spring in a well known manner.

With this lock the lock barrel is assembled in the lock-case from the front, making it inexpensive to manufacture, and is protected by the sealing cap which holds it in place, the wear and resistance to tampering being assumed by the sealing cap, making the lock strong and durable and efficient for the purposes intended. The present lock is designed particularly for locking the gear shift mechanism of automobiles but is not confined thereto and is capable of general use.

In the modification shown in Fig. 6, the annular groove 27 of the cap is further utilized as a space in which to contain a pair of stop pins 32, one of which is driven through openings provided for it in the wall of the cap and in the lock barrel and the other is driven through an opening in the lock-case and both project into the groove 27 so as to come into engagement in the position of the lock barrel in which the key may be removed although it is obvious that a similar stop may be provided for determining the other position of the lock barrel.

In that form of the invention shown in Figs. 7 to 10 inclusive, the sealing cap is provided with its own means for locking it to the lock-case. The lock-case 15′ is provided with an annular flange 33 in its counterbore interrupted by the same broaching operation that produces the tumbler grooves 20 and the sealing cap 23′ fits within this flange and bears thereon, its lower end, however, being cut away to leave only the opposite pair of downwardly and outwardly extending hook-like locking lugs 34, as shown in Fig. 10, which may be entered through the slots 20 and then turned into locking engagement with the flange 33. The lock barrel 16′ is also provided with a pair of oppositely positioned projecting locking lugs 35, which may also enter through the slot 20 and then turn into engagement beneath the flange 33, the spacing of the flange 33 from the shoulder 36 formed between the bore and the counterbore of the lock-case providing an annular groove 37 to receive said locking lugs 34 and 35.

The sealing cap 23′ in this construction also has a forced fit on the end of the lock barrel 16′, but in this instance these parts are forced together during the assembly. The lock barrel is entered in the lock-case, its locking lugs 35 passing through the slots 20 and then being turned into groove 37 to clear the slots 20 for the reception of the locking lugs 34 of the cap. The cap is then forced onto the end of the lock barrel, its lugs 34 entering through the slots 20 to the level of the groove 37. This latter operation is performed while a key is in place withdrawing the tumblers 19 and while the lock barrel is held thereby in the unlocking position of the lock. When the key is then turned to the locking position of the lock so that it may be removed, both sets of locking lugs turn together in the groove 37 to the position shown in Figs. 7 and 8, where the lugs 35 of the lock barrel register with the slots 20.

It will be seen that both the lugs 35 of the lock barrel and the lugs 34 of the steel cap serve by their engagement with the flange 33 to prevent the withdrawal of the cap and the lock barrel and that at such times as the mechanism is locked and the key is withdrawn the stronger steel lugs 34 of the sealing cap are in locking engagement with said flange 33. At such times as the mechanism is unlocked with the key in place there will be no occasion for tampering with the lock and the engagement of the die cast lugs 35 of the lock barrel with the flange 33 will be adequate protection against the withdrawal of the parts.

The lock structure controlled by the turning movements of the lock barrel may be of any type, but, as shown, a cam or wrist-pin 38 projecting from the lower end of the lock barrel 16′ engages a groove in a spring-pressed locking bolt 39 slidably mounted in the lock-case and serves by its engagement in a housing, not shown, to prevent longitudinal movement of the lock-case which forms the head of a locking bar 40 for locking the mechanism, such as the gear shift of an automobile.

With this construction the soft steel sealing cap not only retains the lock barrel in the lock-case, but protects it from being tampered with and should an attempt be made to force it to a position for removal, such attempt will be effectively prevented by the engagement of the lugs 34 thereof with the locking lugs 35 that block the slots 20. Any attempt at driving the sealing cap further would cause the rupture of the die cast lock barrel in the plane of one of the tumbler slides and so prevent access to the locked mechanism.

The vertical slot 41 in the side of the lock-case 15′ is to receive a set-screw from the housing in which said lock-case is slidably mounted to prevent the lock-case from turning.

What I claim as new and desire to secure by Letters Patent is:

1. In a lock, a lock-case having a bore opening at the front end thereof, a lock barrel fitting in said bore, a cap fitting on the end of the lock barrel and in the end of the bore, and means for preventing removal of the cap.

2. In a lock, a lock-case having a bore from the front end thereof, a lock barrel fitting in the bore, a cap secured on the end of the lock barrel and fitting within the

bore, and means for preventing the removal of the cap.

3. In a lock, a lock-case having a bore at the front end thereof, a lock barrel mounted in the bore, a cap fitting on the end of the lock barrel and loosely mounted in the end of the bore and forming a bearing therewith for the lock barrel, and means for preventing removal of the cap.

4. In a lock, a lock-case having a bore with a counterbore at the front end thereof, a lock barrel fitting in the bore, a cap fitting on the end of the lock barrel and in the counterbore, and means for preventing the removal of the cap.

5. In a lock, a lock-case having a bore entering it from its front end with a counterbore at the front end, a lock barrel fitting in the bore, a cap fitting on the end of the lock barrel and fitting in the counterbore to form a bearing for the lock barrel, and means for preventing the removal of the cap.

6. In a lock, a lock-case having a bore entering it from its front end with a counterbore at such front end and an annular internal groove spaced from the counterbore and provided with tumbler slots broached in the wall of the bore from the counterbore to the groove, a lock barrel fitting in the bore and provided with tumblers projecting into said tumbler slots, a cap fitting on the end of the lock barrel and within the counterbore, and means for preventing the removal of the cap.

7. In a lock, a lock-case having a bore entering it from its front end with a counterbore at said front end, a lock barrel fitting in the bore, a soft steel cap fitting around the end of the lock barrel and within the counterbore, and means for preventing the removal of the cap.

8. In a lock, a lock-case having a bore entering it from its front end with a counterbore at the front end, a lock barrel fitting in the bore, a cap fitting on the end of the lock barrel and contained within the counterbore, there being a groove in the cap, and a pin passing through the wall of the lock-case and entering the groove for preventing withdrawal of the cap.

9. In a lock, a lock-case having a bore entering it from its front end with a counterbore at the front end, a lock barrel fitting in the bore, a cap fitting on the end of the lock barrel and contained within the counterbore, there being a groove in the cap, and a tangent pin fitting in the wall of the lock-case and entering the groove for preventing the removal of the cap.

10. In a lock, a lock-case having a bore entering it from the front end with a counterbore at the front end, a lock barrel fitting in the bore, a cap fitting on the end of the lock barrel and contained within the counterbore, there being a groove around the cap, and a tangent pin driven through the wall of the lock-case and entering the groove, said pin fitting in an opening in the wall of the lock-case and being confined by having the edges of said opening peened over thereon.

11. In a lock, a lock-case having a bore opening at the front end thereof and a counterbore at said front end, a lock barrel fitting in the bore, a cap fitting on the end of the lock barrel and contained within the counterbore, there being a groove around the cap, and stop pins projecting into the groove from the lock-case and the cap respectively for limiting the movement of the lock barrel.

12. In a lock, a lock-case, a lock barrel fitting therein and provided with an integral projection on its end forming an oval shaped cam, a hard metal band surrounding the oval shaped cam and secured thereto, and a lock bolt having a slot to receive the cam.

In testimony whereof, I affix my signature.

EDWARD N. JACOBI.