Jan. 24, 1939. F. K. HEYER 2,145,085

CYLINDER LOCK

Filed Aug. 5, 1936

Fig 1

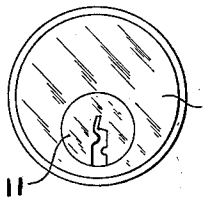


Fig 2

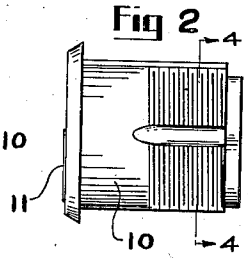


Fig 3

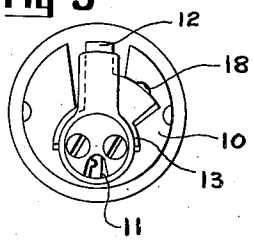


Fig 4

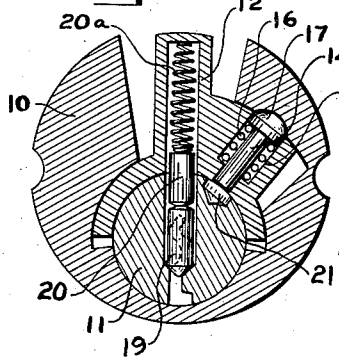


Fig 5

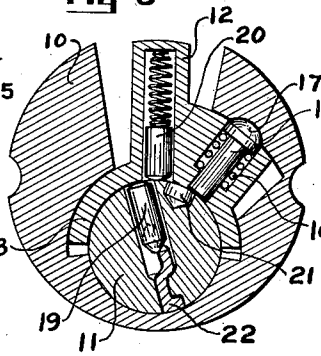


Fig 6

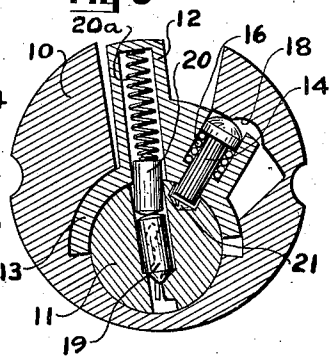


Fig 8

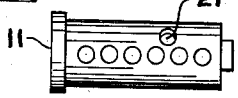


Fig 7

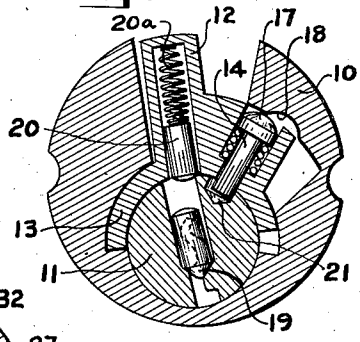


Fig 9

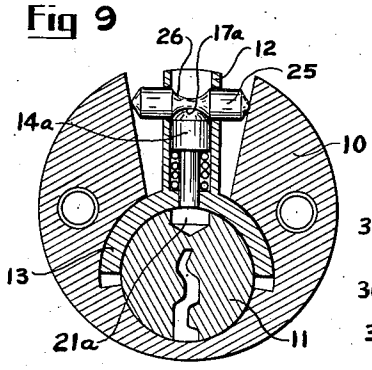
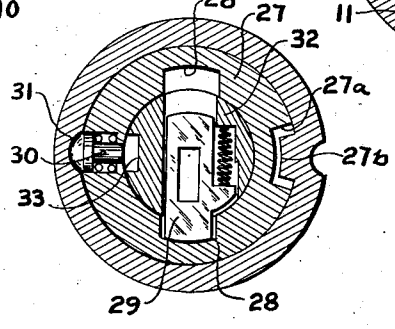


Fig 10



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Patented Jan. 24, 1939 2,145,085

UNITED STATES PATENT OFFICE

2,145,085

CYLINDER LOCK

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Application August 5, 1936, Serial No. 94,306

21 Claims. (Cl. 70—419)

This invention relates to a pick-proof cylinder lock. For many years experts in the lock art have attempted to devise an effective pick-proof cylinder, and many types of structures have resulted. It is extremely difficult to devise a pick-proof cylinder which is comparatively cheap to manufacture, is actually pick-proof, and is reliable in action so that it will operate properly when actuated by a proper key.

My invention provides an improvement in a cylinder lock whereby it may readily be made substantially pick-proof without the addition of complicated structure, and while substantially pick-proof, will be reliable in action when actuated by a proper key. Incidentally, my invention is adapted for use in a sliding tumbler or pin tumbler lock, and is probably effective in any type of lock in which a key operated plug operates relatively to a lock body when properly released by a key.

More particularly, my invention comprises a cylinder lock having a rotatable key plug adapted to be rotated relatively to a control member when the tumblers carried by the key plug are properly set. In a sliding tumbler lock, the control member will be a sleeve having the usual tumbler locking grooves. On the other hand, in a pin tumbler lock, the control member will be the usual sleeve and driver bible. This control member, regardless of the type of lock construction, is mounted for rotation and preferably, this rotation is limited to a very slight amount ineffective to operate the locking structure. Because the control member is mounted for rotation, however slight it may be, the application of picking torque to the key plug tends to rotate the control member with the key plug. This rotation of the control member by the application of picking torque, is relied upon to lock the key plug against rotation sufficient to actuate whatever locking mechanism is provided.

More particularly, a locking pin is provided for locking the key plug and control member together so that relative rotation between the two will not be possible. As a further feature of the invention, the locking pin is utilized for normally holding the control member in a predetermined operative position. The locking pin therefore really has two functions.

For a detailed description of my invention, I shall now refer to the drawing wherein Fig. 1 is a front view of a cylinder lock to which my invention is applied. Fig. 2 is a side view, and Fig. 3 is a rear view of the cylinder lock of Fig. 1. Figs. 4, 5, 6 and 7 are sections taken substantially along lines 4—4 of Fig. 2, showing the cylinder parts in various positions. Fig. 8 is a plan view of the key plug used in Figs. 1–7, inclusive, showing the special feature thereof. Fig. 9 is a modification of another application of my invention to a cylinder lock of the pin tumbler type. Fig. 10 is a section through a sliding tumbler lock showing the application of my invention to that type of cylinder.

Referring now more particularly to the drawing, my cylinder lock body is indicated by reference numeral 10, and my plug by reference numeral 11. Instead of having the driver containing bible fixed to the cylinder body, I provide a control member comprising a bible portion 12 and a sleeve portion 13 which operates just as does the stationary bible and the adjacent cylinder lock body portion in a regular cylinder pin tumbler lock.

For maintaining the driver bible 12 and the sleeve portion 13 in a particular proper initial position, I utilize a pin 14 carried in a bore 15 of the bible 12 and spring pressed by a spring 16, so as to bring the head 17 of the pin 14 into a depression 18 in the lock body 10, as is probably best shown in Fig. 4. The key plug 11 carries a series of key operated tumblers 19, and the driver bible 12 has a series of drivers 20 spring pressed by springs 20a in a manner well understood by those skilled in the art.

The key plug 11 has a bore 21 maintained opposite the pin 14, as shown in Fig. 4, so that the pin 14 may move downwardly against the pressure of spring 16 into the said bore 21 to lock the key plug 11 to the driver bible 12 and sleeve 13. It should be pointed out at this time that the bore 21 is located as shown in Fig. 8, that is, between a pair of tumbler bores, so that the drivers 20 will not enter the bore 21. If desired, the bore 21 may be put in alignment with one of the tumbler bores, but in that case, it will be of smaller diameter than the driver 20 to be brought opposite it, so that the driver cannot enter the said bore.

Fig. 5 illustrates the action of the parts of Fig. 4 when the tumblers 19 are set by a key 22, as shown in section. Rotation in a counter clockwise direction of the key plug 11 is then possible, the driver bible 12 and the sleeve portion 13 remaining in the same position as in Fig. 4, due to the action of the pin 14, as will be quite readily understood by those skilled in the art.

Fig. 6 illustrates just what happens when picking torque is applied to the parts of Fig. 4 in a manner to facilitate the picking of the drivers and tumblers, as is well understood. In such a case,

the drivers 20, not being properly set by a key as in Fig. 5, lock the sleeve 13 and bible 12 to the key plug 11 so that torque applied to the key plug 11 will tend to rotate the bible and sleeve relatively to the lock body 10 to the limit of the rotation permitted by the construction of the parts.

Such rotation will cause the pin 14 to leave the depression 18 and slide downwardly against the pressure of spring 16 until the lower end of the pin enters the bore 21 of the key plug. At this point, the key plug will be locked securely to the bible and sleeve 12, 13, and even if the drivers 20 are picked, as shown in Fig. 7, rotation of the key plug 11 will not be possible, as is quite obvious.

In Fig. 9, I show a modification of my invention in which a locking bore 21*a* functioning as does the bore 21 in Fig. 4, is on the rear end of the key plug. The locking pin 14*a* is the same as the locking pin 14 of Fig. 4, except that it is mounted on the end of the bible 12 instead of on the side of the bible as in Fig. 4. An auxiliary pin 25 maintains the bible 12 in a central position, being chamfered as at 26 for cooperation with the upper rounded end 17*a* of the pin 14*a*. It will be quite readily understood that the application of picking torque to the key plug 11 in Fig. 9 will cause a rotation of the bible 12 and sleeve 13, as in Fig. 6, and will force the pin 14*a* downwardly into the bore 21*a*, thus setting up the same conditions as set up in Figs. 6 and 7 in the first modification described.

In Fig. 10, I show the application of my invention to a sliding tumbler lock. There, instead of a sleeve and driver bible, I use a control sleeve 27 which has the usual tumbler locking slots 28 cooperating with the spring pressed sliding tumblers 29, in a manner well understood by those skilled in the art. The sleeve 27, instead of being integral with the cylinder, is separate from the cylinder, and rotation thereof relatively to the cylinder is limited to the amount permitted by its slot 27*a* and lug 27*b* on the lock body.

The sleeve 27 is maintained in a proper operative position by a pin 30 having a rounded head 31, very much the same as the bible 12 is retained in proper position by the pin 14 in the modification of Fig. 4. Upon the application of picking torque to the key plug 32, carrying the sliding tumblers 29, the control sleeve 27 will also be rotated and the pin 30 will be cammed upwardly into a locking slot 33 of the key plug 27, so as to lock the key plug and the sleeve together in very much the same way as in the modifications already described.

While I have described generally my invention and several modifications of the same, it should be understood that my contribution to the art is relatively broad, and I do not wish to be limited except as may be required by the state of the art.

I claim:

1. In a lock of the class described, a lock body, a key plug, a series of tumblers, a control part to which said key plug is locked by said tumblers and relatively to which said key plug rotates when said tumblers are properly aligned by a key, means mounting said control part for rotation in said lock body, said control part and key plug being rotatable together when picking torque is applied to said key plug in an attempt to pick the tumblers, and means movable relatively to said control part and adapted to lock said plug to said control part, actuated by the rotation of said control part by the application of picking torque to the key plug.

2. In a lock of the class described, a lock body, a key plug, a series of tumblers, a control part relatively to which said key plug rotates when said tumblers are properly aligned by a key, means mounting said part for rotation in said lock body, said part and key plug being rotatable together when picking torque is applied to said key plug in an attempt to pick the tumblers, and means movable relatively to said control part and adapted to lock said plug to said control part actuated by the rotation of said control part by the application of picking torque to the key plug.

3. In a lock of the class described, a lock body, a key plug, tumblers in said key plug, a driver sleeve and bible relatively to which said key plug rotates when its tumblers are properly aligned by a key, means mounting said driver sleeve and bible for rotation in said lock body, said driver sleeve and bible and key plug being rotatable together when picking torque is applied to said key plug in an attempt to pick the tumblers, and means adapted to lock said plug against release rotation actuated by the rotation of said driver sleeve and bible by the application of picking torque to the key plug.

4. In a lock of the class described, a lock body, a key plug, a sleeve and driver bible relatively to which said key plug rotates, drivers and tumblers in said key plug and bible adapted to lock said plug and bible to prevent rotation of the key plug relatively to said sleeve and driver bible until said tumblers are properly aligned by a key, means mounting said sleeve and driver bible for rotation with said key plug upon application of picking torque to said key plug, and a locking pin movable into locking engagement with said key plug upon rotation of said sleeve and driver bible by the application of picking torque to said key plug.

5. In a lock of the class described, a lock body, a key plug, a sleeve and driver bible relatively to which said key plug rotates, drivers and tumblers in said key plug and bible adapted to lock said plug and bible to prevent rotation of the key plug relatively to said sleeve and driver bible until said tumblers are properly aligned by a key, means mounting said sleeve and driver bible for rotation with said key plug upon application of picking torque to said key plug, a detent maintained spring pressed into a position to yieldingly maintain said sleeve and driver bible properly positioned, and means whereby said detent is moved to interlock the key plug and the sleeve and driver bible when said key plug rotates said sleeve and driver bible as upon the application of picking torque to said key plug.

6. In a lock of the class described, a lock body, a key plug, a sleeve and driver bible relatively to which said key plug rotates, drivers and tumblers in said key plug and bible adapted to lock said plug to said bible to prevent rotation of the key plug relatively to said bible until said tumblers are properly aligned by a key, means mounting said sleeve and driver bible for rotation with said key plug upon application of picking torque to said key plug, means limiting said sleeve and driver bible to a slight degree of rotation, a detent spring pressed into a position to yieldingly maintain said sleeve and driver bible properly positioned, and means whereby said detent is moved to interlock the key plug and the sleeve and driver bible when said key plug rotates said sleeve and driver bible as by the application of picking torque thereto.

7. In a lock of the class described, a lock body, a key plug, a sleeve and driver bible relatively to which said key plug rotates, drivers and tumblers

in said key plug and bible adapted to lock said plug and bible to prevent rotation of the key plug until said tumblers are properly aligned by a key, means mounting said sleeve and driver bible for rotation with said key plug upon application of picking torque to said key plug, a bore in said key plug, a pin mounted in said sleeve and bible at a point substantially opposite said bore, a spring pressing said pin away from the key plug and against the lock body for yieldingly holding the sleeve and bible in a predetermined position, and means whereby said pin is moved against its spring and into said plug bore when said sleeve and bible are rotated as by the application of picking torque to the key plug.

8. In a lock of the class described, a lock body, a key plug, a sleeve and driver bible relatively to which said key plug rotates, drivers and tumblers in said key plug and bible adapted to lock said plug and bible to prevent rotation of the key plug until said tumblers are properly aligned by a key, means mounting said sleeve and driver bible for rotation with said key plug upon application of picking torque to said key plug, a bore in said key plug, a pin mounted in said sleeve and bible at a point substantially opposite said bore, a spring pressing said pin away from the key plug and against the lock body for yieldingly holding the sleeve and bible in a predetermined position, means whereby said pin is moved against its spring and into said plug bore when said sleeve and bible are rotated by the application of picking torque to the key plug, and means limiting the rotation of said sleeve and bible to a predetermined unimportant degree.

9. In a cylinder lock of the sliding tumbler type, a cylinder lock body, a sleeve member having tumbler locking grooves, a key plug having tumblers and rotatable in said sleeve member, means mounting said sleeve for limited rotation relatively to said lock body whereby it may be rotated with said key plug upon application of picking torque to said key plug in preparation for the picking of the tumblers of said plug, and means movable relatively to said sleeve member for locking said key plug to said sleeve member upon rotation of said sleeve member by the application of picking torque to said plug.

10. In a cylinder lock of the sliding tumbler type, a cylinder lock body, a sleeve member having tumbler locking grooves, a key plug having tumblers and rotatable in said sleeve member, means mounting said sleeve member for limited rotation relatively to said lock body whereby it may be rotated with said key plug upon application of picking torque to said key plug, and means movable relatively to said sleeve member for locking said plug to said sleeve member when said sleeve member is rotated by the application of picking torque to said plug.

11. In a cylinder lock of the sliding tumbler type, a cylinder lock body, a sleeve member having tumbler locking grooves, a key plug rotatable in said sleeve member, tumblers adapted normally to interlock said key plug and sleeve member, means mounting said sleeve for limited rotation relatively to said lock body whereby it may be rotated with said key plug upon application of picking torque to said key plug in preparation for the picking of the tumblers of said plug, a pin adapted to yieldingly maintain said sleeve member against rotation, and means whereby said pin locks said key plug to said sleeve member upon rotation of said key plug and sleeve by the application of picking torque to said plug.

12. In a cylinder lock of the sliding tumbler type, a cylinder lock body, a sleeve member having tumbler locking grooves, a key plug rotatable in said sleeve member and tumblers adapted normally to interlock said key plug and sleeve member, means mounting said sleeve for limited rotation relatively to said lock body whereby it may be rotated with said key plug upon application of picking torque to said key plug in preparation for the picking of the tumblers of said plug, a pin carried by said sleeve member and pressing against said lock body to yieldingly maintain said sleeve member against rotation, and means whereby said pin locks said key plug to said sleeve member upon rotation of said key plug and sleeve by the application of picking torque to said plug.

13. In a pin tumbler lock of the class having a cylinder and driver bible, and a key plug rotatable relatively to the cylinder and driver bible when the tumblers and drivers carried by said key plug and driver bible are properly aligned, the improvement which comprises means mounting said bible for limited rotation with the key plug when picking torque is applied to said key plug when said tumblers and drivers are in locking position, and the provision of means for locking said key plug against release rotation moved into locking position by the said limited rotation of said bible with the key plug through the application of said picking torque.

14. In a pin tumbler lock of the class having a cylinder and driver bible, and a key plug rotatable relatively to the cylinder and driver bible when the tumblers and drivers carried by said key plug and driver bible are properly aligned, the improvement which comprises the mounting of said bible for limited rotation with the key plug when picking torque is applied to said key plug, and the provision of means for locking said key plug to said driver bible actuated by the said limited rotation of said bible with the key plug through the application of said picking torque.

15. In a pin tumbler lock of the class having a cylinder and driver bible, and a key plug rotatable relatively to the cylinder and driver bible when the tumblers and drivers carried by said key plug and driver bible are properly aligned, the improvement which comprises means mounting said bible for limited rotation with the key plug when picking torque is applied to said key plug, and the provision of a detent moved by the said limited rotation of said bible with the key plug through the application of said picking torque, said detent when so moved being adapted to lock said key plug against rotation relatively to said bible.

16. In a lock of the class described, a key plug, a control part relatively to which said key plug rotates, said control part being itself mounted for limited rotation, tumblers adapted to lock said key plug to said control part, said tumblers being adapted to release said plug for free movement relatively to said control part when properly aligned by a key, said control part and key plug being rotatable together when picking torque is applied to said key plug in an attempt to pick the tumblers, and means movable relatively to said control part adapted to lock said plug against operative rotation actuated by the rotation of said control part through the said application of picking torque to the key plug.

17. In a cylinder lock of the sliding tumbler type, a cylinder lock body, a sleeve member mounted for limited rotation in said cylinder lock body and having a tumbler locking groove, a key

plug rotatable in said sleeve and carrying tumblers normally projected into said groove except when properly positioned by a key, said key plug and sleeve being rotatable together when said key plug is rotated by the application of picking torque thereto in preparation for the picking of the tumblers, and means for locking said key plug to said sleeve member upon rotation of said sleeve with said key plug, said means normally restraining said sleeve against rotation whereby to overcome the inherent friction incidental to the key rotation of said key plug relatively to said sleeve.

18. In a lock of the class described, a lock body, a key plug, a series of tumblers, a control part to which said key plug is locked by said tumblers and relatively to which said key plug rotates when said tumblers are properly aligned by a key, means mounting said control part for rotation in said lock body, detent means maintaining said control part against rotation, said control part and key plug being rotatable together against the force of said detent means when picking torque is applied to said key plug in an attempt to pick the tumblers, and means whereby said detent means locks said plug to said control part when said control part rotates with said key plug against the force of said detent means.

19. In a lock of the class described, a lock body, a key plug, a series of tumblers, a sleeve-like part relatively to which said key plug rotates when said tumblers are properly aligned by a key, means mounting said sleeve-like part for rotation in said lock body, said sleeve-like part and key plug being rotatable together when picking torque is applied to said key plug in an attempt to pick the tumblers, detent means yieldingly resisting rotation of said sleeve-like part with said key plug, and means whereby said detent means locks said plug to said sleeve-like part when said sleeve-like part is rotated with said key plug.

20. In a lock of the class described, a lock body, a key plug, a series of tumblers, a control part to which said key plug is locked by said tumblers and relatively to which said key plug moves when said tumblers are properly aligned by a key, means mounting said control part for movement in said lock body, said control part and key plug being movable together when picking pressure is applied to said key plug in an attempt to pick the tumblers, and means movable relatively to said control part for locking said key plug against rotation actuated by movement of said control part with said key plug.

21. In a lock of the class described, a lock body, a key plug, a series of tumblers, a control part to which said key plug is locked by said tumblers and relatively to which said key plug moves when said tumblers are properly aligned by a key, means mounting said control part for movement in said lock body, a detent restraining said movement of said control part, and means whereby said detent interlocks said key plug to said control part when said control part is moved as by the application of picking torque to said key plug.

FREDERIC K. HEYER.