Aug. 27, 1935. N. B. HURD 2,012,911

LOCK

Original Filed March 20, 1929

Fig. 1.

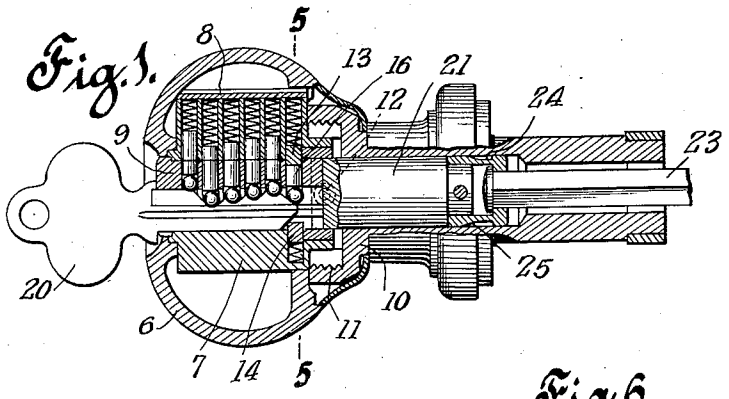


Fig. 3.

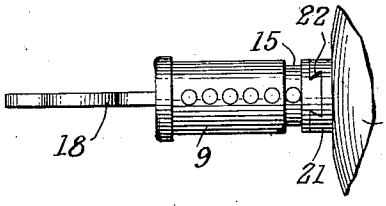


Fig. 6.

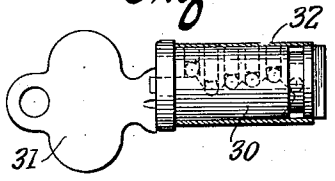


Fig. 2.

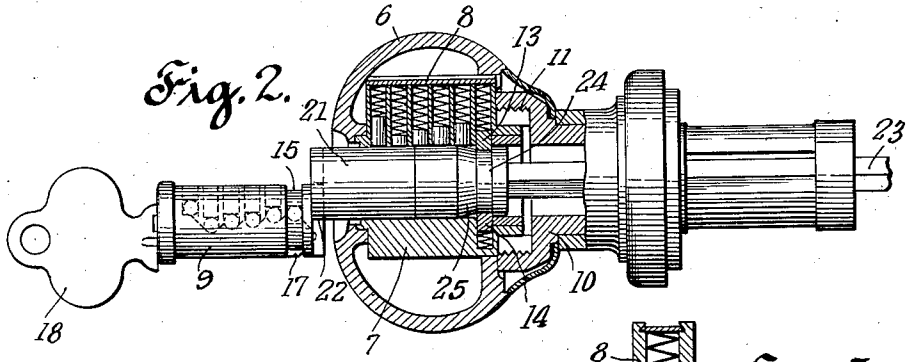


Fig. 4.

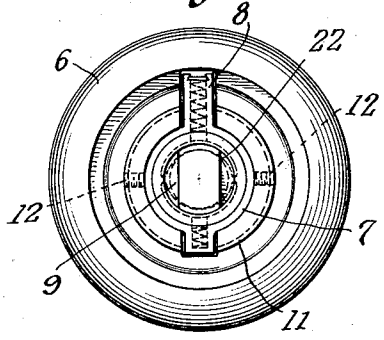
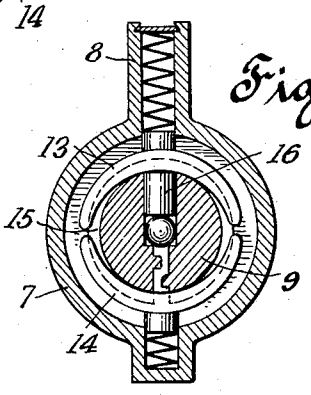


Fig. 5.



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UNITED STATES PATENT OFFICE

2,012,911

LOCK

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Application March 20, 1929, Serial No. 348,519
Renewed May 11, 1934

23 Claims. (Cl. 70—91)

This invention relates to pin cylinder locks and is of particular benefit in that type of lock in which pin cylinder locking mechanism is contained in the outside door knob.

One of the main objects of the invention is to provide a simple and improved means for permitting a ready change of the cylinder lock tumbler combination or "key combination" as it is sometimes called.

In public buildings, it is frequently desirable to change the locks on various doors. Heretofore, and when such changes have been made, it has usually been necessary to open the door and remove the knobs and much of the lock mechanism. In cases wherein the cylinder locks have been located within the knob, the knobs have been made in separable parts so that by removing one part access could be had to the cylinder lock mechanism within. My invention aims to accomplish this object in a new manner and by novel means which avoids the removal of the lock body or the removal of the knob or the separation of any part thereof from another part thereof. While I have shown and will describe my new cylinder lock as supported by a knob, it should be understood that the kind of support is non-essential.

Briefly stated, in one preferred form of the invention which I have shown in the drawing, I provide a pin cylinder lock adapted to be mounted in a door knob, and I construct a special form of key plug for the cylinder lock which, under certain conditions, may be removed from the lock cylinder and readily withdrawn through the front of the knob without removing any part of the knob or cylinder. When said plug has been thus withdrawn, different pin tumbler sections may be set therein for a different key, or, by making the outer section of the plug detachable from its inner section, said outer section may be withdrawn and detached so that another section with a new combination and new key may be instantly substituted. By my new and improved construction, when the plug has been sufficiently withdrawn from the cylinder to permit this change, the locking pins will be retained in operative position within the cylinder which remains in the knob awaiting the introduction of a new outer plug section.

In the drawing which shows, for illustrative purposes only, one preferred form of the invention—

Fig. 1 is a sectional view of a knob and shank carrying a cylinder lock and embodying features of the invention and showing a pass-key in place;

Fig. 2 is a view similar to Fig. 1, but showing a special or master-key in the plug and the plug withdrawn from the cylinder;

Fig. 3 is a top plan view of the plug and adjacent parts shown in Fig. 2;

Fig. 4 is a rear end view of the knob showing the cylinder lock in place;

Fig. 5 is an enlarged sectional view taken substantially in the plane of the line 5—5 of Fig. 1;

Fig. 6 is a side view of a plug and sleeve.

In said drawing, 6 indicates a knob which operates a latch or the like, and which is secured to a door and unit lock or other type of lock. Since the invention is not dependent upon the type of lock or latch operated, neither the door nor the latch and lock parts carried thereby have been shown.

The knob 6 in the form shown is hollow, and at the rear is recessed to permit of the insertion from the rear when the knob is removed of the cylinder 7 carrying pin casing 8, as will be clear particularly from Fig. 4. The front of the knob 6 is provided with an aperture, preferably centrally thereof, in which stands the outer end of the key plug. The cylinder 7 is held in place within the knob in any suitable manner, but in the form shown it is held by means of the knob shank portion 10 threaded as indicated at 11 onto a portion of the knob 6. Means such as set screws 12—12 prevent accidental unscrewing of the shank portion from the knob. The shank portion is carried by the door in the usual or any desirable manner. The plug of the cylinder lock is of special construction and comprises an outer section 9 and an inner section 21, both being of the same diameter and preferably separable as later described. The section 9 carries the usual tumblers for actuating the locking pins in the pin casing in the usual manner when a proper key is inserted. The entire plug is normally rotatable in the cylinder by means of a key, but is normally locked against longitudinal withdrawal from the front of the knob. This locking of the plug in the cylinder may be accomplished by various means, but, in the illustrative form shown, I employ detent means such as yokes or segments 13—14, spring pressed toward the plug and engaging an abutment such as may be formed by a groove 15 in the plug section 9. One segment 13 may be moved as by means of a tumbler 16 upon the insertion of a proper tool such as a special key 18. The other segment 14 may be directly engaged and pressed back by the back 17 of said key, as will be clear particularly from Fig. 2.

Normally, an ordinary pass-key **20** (as shown in Fig. 1) may be employed for actuating the pin tumblers to force back the locking tumblers in the casing **8** to the shear line of the plug whereupon the plug may be turned and the latch or bolt operated in the usual manner through the medium of an ordinary spindle **23**. It will be observed that the ordinary pass-key **20** is not long enough to engage the tumbler **16** nor to engage the segment **14**, and therefore the segments **13—14** remain in the groove **15** so as to lock the plug against longitudinal withdrawal while still permitting rotation thereof under the influence of the pass-key **20**. Now, when it is desired to change the combination of the cylinder lock, the special key **18** is inserted in place of the pass-key **20** of Fig. 1. The special key **18** is so bitted as to force the locking tumblers to the shear line and so as to lift the tumbler **16** to the shear line and raise the segment **13** out of the groove **15**. The back side **17** of the key **18**, as will be clear from Fig. 2, extends into the groove **15** so as to directly move the segment **14** out of the groove **15**. Then, after turning the plug slightly by means of the special key, the latter may be drawn outwardly so as to withdraw the plug section **9** from the cylinder while the cylinder, the locking pins, the latch segments, and associated parts all remain in place in the lock supporting knob **6**.

Upon withdrawal of the outer plug section **9**, the locking pins in the cylinder would drop from their chambers were it not for the presence of the inner plug section **21** which now occupies the place formerly occupied by the outer plug section **9**. The outer plug section **9** is preferably made detachable from the inner plug section **21** as by means of an ordinary dovetail connection **22**, as shown in Figs. 2 and 3. Thus, when the outer plug section has been withdrawn to the outside of the cylinder, it may be detached from the inner section **21**, leaving the latter in position to retain the locking pins in place in the cylinder lock. The inner plug section **21** is preferably prevented from removal from the cylinder by any suitable means, but, in the present instance, I provide at the inner end of the section **21** a groove **24** so that the aforesaid latch segments or keys **13—14** will drop into said groove and thus prevent further withdrawal of this section whereby it will continue to stand under the locking pins until the old or a new outer plug section has been applied and inserted. The outer side of the groove **24** is preferably inclined or cammed as indicated at **25** so that when the plug is again pushed in, the segments **13—14** will ride up the incline **25** and over the surface of the remainder of the section **21** and then over the end of the outer section **9** until they drop into the locking groove **15** in the latter.

When the parts are in the position shown in Fig. 2, the outer plug section may be detached from its inner section to permit another outer plug section with a different combination of plug tumblers and key therefor to be substituted, or, if the section **9** is not detachable from the section **21**, a different set of plug tumblers with an appropriate key therefor may be substituted for those in said outer plug section, since in said position free access to all parts of this section may be had as plainly seen.

I may thus readily change the "key combination" of any lock without changing the locking tumblers in the casing **8** of the cylinder and without opening the door or detaching the knob or any portion thereof, or even withdrawing the cylinder therefrom, it being only necessary to withdraw the plug itself with its set of short pin sections.

I have shown in Fig. 6 how a new outer plug section **30** may be provided with a new key **31** and with new tumbler sections adapted thereto, all of said parts being held against separation until ready for use by means of a sleeve **32**. The proprietor of a public building may keep in stock a large number of such plug sections with different "key combinations" so that he may be prepared at all times to make an immediate change in any of the cylinder locks in the building. Before application to the door, the sleeve **32** would, of course, be removed, and this same sleeve could then be applied to the old plug section and key for holding the parts together until it might be applied to some other similar cylinder lock in the building or elsewhere if desired.

While I have described the invention in considerable detail and in a preferred form, it is to be understood that various changes and modifications may be made without departing from the spirit or scope of the invention as defined in the following claims.

I claim:

1. In a lock, a knob, a cylinder, locking pins carried in said cylinder, a plug in said cylinder comprising an inner and an outer section, means for locking said plug against longitudinal movement in said cylinder, said means being key actuated to release said plug to permit the outer section thereof to be withdrawn from said cylinder and locking pins through the front of the same, said inner plug section being connected to said outer plug section to be movable therewith longitudinally and rotatably.

2. In a lock, a cylinder, locking pins carried thereby, a plug rotatably mounted in said cylinder, means for normally locking said plug against longitudinal movement in said cylinder, said means being key actuated to release said plug and permit the outer part thereof to be drawn outwardly from said cylinder, and means to permit the outer part of said plug to be detached from the inner part thereof to leave said inner part in said cylinder to hold the locking pins in place therein.

3. In a lock, a cylinder, locking pins therein, a plug rotatably mounted therein, said plug having a circumferential groove therein, detent means carried by said cylinder for coaction with said groove for locking said plug against longitudinal displacement from said cylinder, and key actuatable means for mechanically displacing said locking pins and also said detent means to permit said plug to be released and bodily withdrawn from said cylinder.

4. In a lock, a lock cylinder having a plurality of locking tumblers therein, a plug comprising an outer part and an inner part both rotatably mounted in said cylinder and having a plurality of tumblers for actuating said locking tumblers, means for normally locking said plug against outward movement in said cylinder, said means being key actuated to release said plug and permit it to be drawn outwardly relative to said cylinder, the outer part of said plug being removable from the inner part whereby the latter will remain in said cylinder under the ends of said locking tumblers when the outer part of said plug has been withdrawn.

5. In a lock, a lock cylinder having a plurality of locking tumblers therein, a plug comprising an outer part and an inner part both rotatably

mounted in said cylinder and having a plurality of tumblers for actuating said locking tumblers, means for normally locking said plug against outward movement in said cylinder, said means being key actuated to release said plug and permit it to be drawn outwardly relative to said cylinder, the outer part of said plug being removable from the inner part whereby the latter will remain in said cylinder under the ends of said locking tumblers when the outer part of said plug has been withdrawn, said means for normally locking the plug against endwise movement also operating to engage and check the outward movement of the inner part of said plug when the outer part has been drawn out of said cylinder.

6. In a device of the character indicated, a cylinder carrying locking pins, a plug rotatably mounted in said cylinder, the front part thereof carrying tumblers for repressing said pins, said plug being movable outwardly in said cylinder, means in addition to said locking pins for locking said plug in its normal longitudinal position in said cylinder and for locking said plug in a second position therein with the outer end of said plug outside of said cylinder.

7. In a lock, a cylinder, locking pins therein, a plug therein, a key slot and key operable means in the front portion of said plug to actuate said locking pins and to release said plug to permit it to be drawn outwardly to expose the key operable means in the front portion and to cause the rear portion to move into position to hold the locking pins in place in the cylinder.

8. In a lock, a cylinder, locking pins therein, a plug having a key slot therein, key operable means in the front portion of said plug to actuate said locking pins and to release said plug to permit it to be drawn outwardly to expose the key operable means in the front portion and to cause the rear portion to move into position to hold the locking pins in place in the cylinder, the front portion of the plug being detachable from the rear portion thereof when said front portion has been drawn out of said cylinder.

9. In a lock, a cylinder, locking pins therein, a plug having a key slot therein, key operable means in the front portion of said plug to actuate said locking pins and to release said plug to permit it to be drawn outwardly to expose the key operable means in the front portion and to cause the rear portion to move into position to hold the locking pins in place in the cylinder, the front portion of the plug being detachable from the rear portion thereof when said front portion has been drawn out of said cylinder, the detachable means for said plug portions comprising a transverse dovetailed connection.

10. In a lock, a cylinder, a plug mounted in said cylinder for rotation and longitudinal movement, locking pins in said cylinder to prevent any movement of said plug, a key and slot connection between said cylinder and plug to normally prevent longitudinal movement of said plug in said cylinder, and means to actuate said parts whereby said plug may be released to be withdrawn from the outer end of said cylinder.

11. In a lock, a cylinder, a key plug rotatable and longitudinally movable therein, locking means in the cylinder for normally locking the plug against movement, a key operable device carried by the plug to release said plug locking means to free the plug for withdrawal from the cylinder, and means to prevent the escape of the plug locking device from the cylinder when the plug has been retracted therefrom to sufficiently expose the key operable device therein.

12. In a lock, a cylinder, a key plug rotatable therein, plug locking pins in said cylinder to normally lock the plug from rotation, means in said plug to repress said plug locking pins to permit said plug to be moved in the cylinder, means in said cylinder to release said plug to permit it to be moved outwardly from said cylinder, and means to prevent the locking pins in the cylinder from escaping when said plug is moved outwardly.

13. In a lock of the pin cylinder type, a cylinder, a plug rotatable therein, pin tumbler sections contained partially within the plug and partially within the cylinder for locking said plug against movement in said cylinder under one condition and key actuatable to free said plug whereby it may be moved in said cylinder, means for normally holding said plug against longitudinal movement in said cylinder when in one position and actuatable by a key to another position to free said plug to permit the same to be bodily removed from the cylinder, and means to hold those pin tumbler sections within the cylinder in place therein when said plug is removed.

14. In a pin cylinder lock, a body, a plug rotatably mounted therein and having a longitudinal key slot, sectional pins carried partially by said body and partially by said plug to lock the latter against rotation and free it for rotation, said plug being removable from said body, latch means carried by said body to normally hold said plug against removal, said pin sections and said latch means being operable by the longitudinal movement of a key in said slot to release said plug for removal from said body.

15. In a cylinder lock, a body, a plug rotatably mounted therein and having a longitudinal key slot, coacting locking means between said body and plug for normally locking the latter against rotation in said body, and latch means carried by said body for normally holding said plug against removal from said body, said coacting locking means and said latch means being actuated by the longitudinal movement of a key in the key slot to release said plug both for rotation and for removal from said body.

16. In a pin cylinder lock, a body, a plug rotatably mounted therein, said plug having a circumferential holding shoulder, a spring pressed latch carried by said body and normally cooperating with said shoulder for holding the plug against withdrawal from said body, said latch being repressible by the longitudinal movement of a key in said plug to release the latter to permit it to be drawn outwardly relatively to said cylinder.

17. In a pin cylinder lock, a cylinder, a plug rotatable therein and having a longitudinal key slot, a shoulder on said plug, means comprising a repressible latch carried by the cylinder and normally extending into position relatively to said shoulder to prevent the removal of the plug, said means being movable by the longitudinal movement of a key in said plug keyway to shift it out of position relatively to said shoulder to free the plug to permit it to be removed from said cylinder.

18. In a pin cylinder lock, a cylinder, a plug rotatably mounted therein and removable therefrom, a keyway in said plug, and coacting means carried by said cylinder normally preventing both the rotation and removal of the plug from said cylinder, said means being operable by the longitudinal movement of a key in the keyway of said

plug to release all of the aforesaid means to permit the plug to be removed.

19. In a cylinder lock, a cylinder body, a rotatable plug mounted therein and removable from the outer end of said body, means carried by said body to prevent both the rotation and removal of said plug, and other means carried by said body to prevent only the removal of said plug, the first mentioned means being operable by one key to release the plug for rotation only, both means being operable by a different key to release the plug for removal.

20. In a cylinder lock, a cylinder body, a rotatable plug insertable into and removable from the outer end of said body, two separate means carried by said body, one for normally preventing rotation of the plug in said body, the other for normally permitting the rotation of said plug, but preventing removal of the same, the first means being operable by one key to permit plug rotation, both means being operable by a different key to permit plug removal.

21. In a cylinder lock, a cylinder body, a rotatable plug insertable into and removable from the outer end of said body, two separate means carried by said body to resist removal of the plug from said body, one means being operable by one key to permit plug rotation only, both means being operable by a different key to permit plug removal.

22. In a cylinder lock, a cylinder body, a rotatable plug insertable into and removable from the outer end of said body, two separate means carried by said body to control both the rotation and removal of said plug, one of said means comprising a tumbler operable by one key to permit plug rotation only, both means being operable by a different key to permit plug removal.

23. In a pin cylinder lock, a cylinder body, a plug, a locking pin tumbler therefor normally operating to prevent both rotation and removal of said plug, latching means normally operating to prevent only the removal of said plug, both of said means being carried by said body, said tumbler being operable by one key to permit plug rotation, said tumbler and said latching means being operable by a different key to permit plug withdrawal.

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