June 1, 1937. W. F. MOORE 2,082,351

LOCK

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Fig. 1.

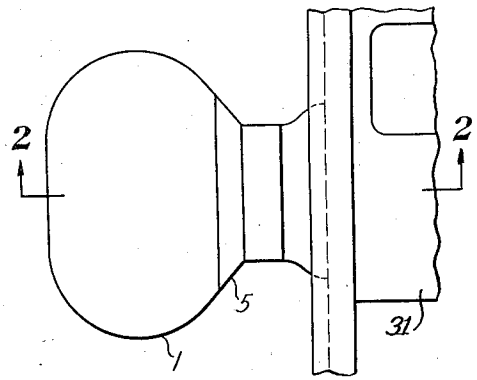


Fig. 2.

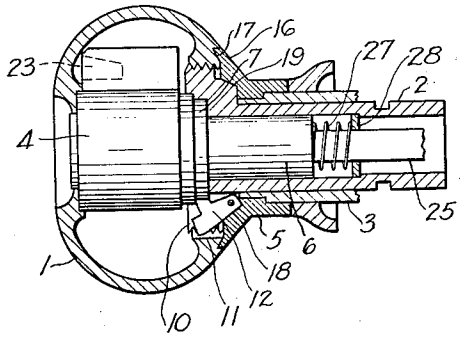


Fig. 3.

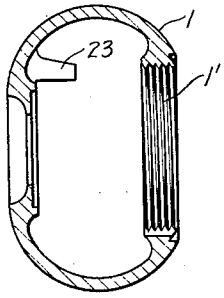


Fig. 5.

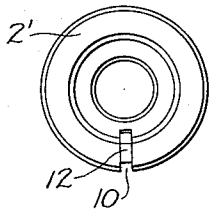


Fig. 4.

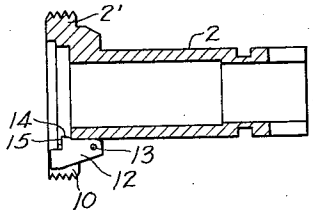


Fig. 6.

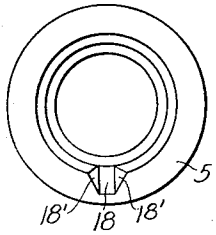


Fig. 7.

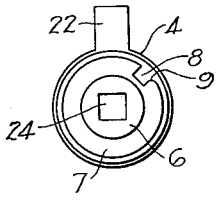
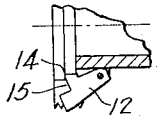


Fig. 8.



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Fig. 9.

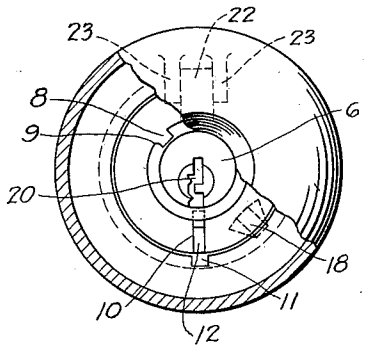


Fig. 10.

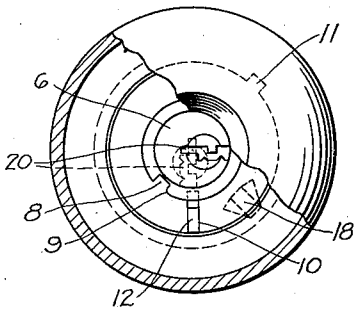


Fig. 11.

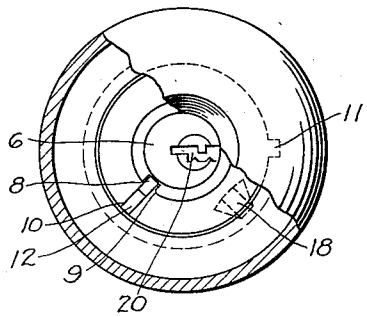


Fig. 12.

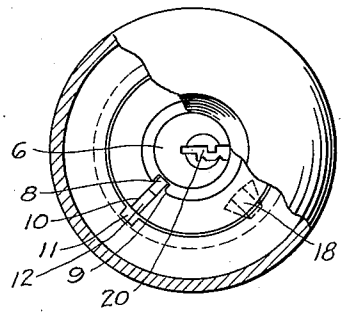


Fig. 13.

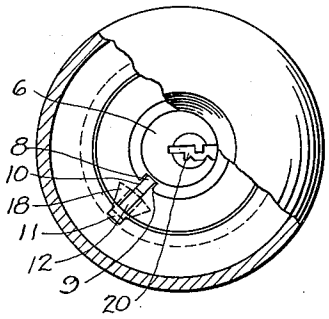
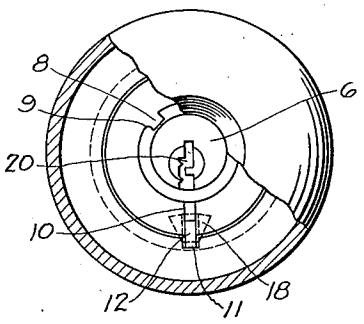


Fig. 14.



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UNITED STATES PATENT OFFICE

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LOCK

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Application August 19, 1932, Serial No. 629,415

12 Claims. (Cl. 70—224)

This invention relates to locks.

One object of the invention is a novel lock construction permitting the ready replacement of the key combination.

A further object of the invention is a lock embodying a pin tumbler lock cylinder and a knob and permitting the ready removal and assembly of the knob and the lock cylinder whereby the cylinder may be replaced by another lock cylinder of a different combination of tumblers. A further object of the invention is a lock embodying a knob and a knob shank which are readily detachable and attachable for the replacement or change of the lock cylinder. A further object of the invention is a lock of this character embodying a knob unit which is readily removable upon releasing the lock and inserting the key to release the key plug.

A further object of the invention is a lock of the character indicated which requires a key to remove the cylinder and which is not dependent upon the special settings of pin tumblers for its operation and particularly wherein the use of a special key does not reduce the number of changes possible on the pins of the cylinders. A further object of the invention is a lock of this general character wherein the cylinder may be replaced by the use of a regular change key or by the use of a master key.

A further object of the invention is a lock of this general character which is characterized by the simplicity of its construction and manipulation and which can be economically manufactured.

Further objects of the invention will hereinafter appear by reference to the accompanying drawings wherein:

Fig. 1 is a plan view of a door lock embodying the invention with certain parts of the door lock omitted for convenience;

Fig. 2 is a section along the line 2—2 of Fig. 1;

Fig. 3 is a sectional view through the knob;

Fig. 4 is a sectional view through the knob shank;

Fig. 5 is an end view of the latter;

Fig. 6 is an end view of a cooperative locking member;

Fig. 7 is an end view of the cylinder;

Fig. 8 is a view corresponding to Fig. 4; and

Figs. 9 to 14 inclusive are end views of the lock with part of the knob broken away showing the steps when assembling the lock parts and assembling the cylinder and knob.

Referring to the drawings, parts of the door lock casing 31 and the door lock mechanism have been omitted for convenience in illustration. The invention is illustrated as embodied in a door lock comprising a knob 1, and a knob shank 2. It is understood that the shank 2 may be locked by a mechanism, omitted from the drawings, against rotation and when this is thus locked the door can be opened only by the insertion of the key within the cylinder plug; whereas when this shank 2 is unlocked, as for example from the inside, the whole knob 1 together with the shank 2 may be turned to unlock the door. The shank 2 is journaled in a suitable bearing 3 carried by the door lock case.

The knob assembly includes the knob 1, the shank 2, the lock cylinder 4, and a locking ring 5. The lock cylinder 4 is of standard construction except that the plug 6 has a shoulder 7 formed with a notch 8 (Fig. 7), the latter having one straight side and one side rounded off at 9 to form a cam surface. The shank 2 and the knob 1 are adapted to be fastened to each other by a relative rotary movement and in the particular embodiment shown they are provided with mating screw threads for this purpose, the enlarged end 2' of the shank having external threads for engaging the threaded opening 1' of the knob. The screw threaded parts of the shank and knob are provided with locking slots 10 and 11. One of these members, as for example the shank 2, is provided with a latch or trip 12 pivoted at 13 which is disposed in the slot 10 of the shank and is adapted to enter the slot 11 to lock the shank and the knob together in their assembled position. This trip 12 is normally held in locking engagement by means of the shoulder 7 formed on the end of the cylinder plug, and is provided with a heel 14 which engages the periphery of the shoulder or collar 7 in the locked and assembled position.

The ring 5 is provided with a flaring skirt 16 which in the assembled position of the parts makes a close fit with the interior peripheral edge 17 of the knob, as indicated in Fig. 2. This ring 5 is provided on its interior peripheral edge 19 with a slot 18 having rounded off or inclined cam sides 18' for cooperating with the trip 12 as will hereinafter be described.

In the assembled position of the knob and cylinder as shown in Fig. 14, the slot 18 of the ring 5 and the slots 10 and 11 in the shank and knob respectively are in alinement, with the trip 12 alining these three members and holding them in alined position. In the particular embodiment therein shown the cylinder and cylinder plug with its notch 8 are as indicated in

Fig. 14, the notch 8 being disposed 135° from the alined slots and keyway 20, that is, with the key in a vertical plane and knob and shank locked against rotation.

With the knob assembled as in Figs. 1, 2 and 14 the knob may be removed as follows:

The key is inserted in the keyway 20 (Fig. 14) to permit the turning of the plug 6 and hence the spindle 25 relatively to the cylinder 4 and, of course, the shank 2 is unlocked to permit the turning of knob 1 and shank 2 in the door lock. The key plug is then turned relatively to the knob and shank and in the particular embodiment of the invention shown the key is then turned counter-clockwise (Fig. 14) and the knob and shank are turned clockwise to bring the slot or notch 8 into alinement with the trip 12. The trip 12 is then caused to drop into the notch 8 either by gravity or by the turning of the ring 5 to force it into this notch, thereby releasing the knob 1 from the shank 2 and permitting the relative turning thereof to unscrew the knob 1 from shank 2. The cam surfaces 18' of the slot 18 formed in the ring function to force the trip 12 into the notch 8 and out of the slot 11 formed in the knob 1. The removal of the knob 1 permits the replacement of the lock cylinder with one of a different combination within the knob 1.

The steps in the assembling or reassembling of the knob are indicated in Figs. 9 to 14. The cylinder 4 is first inserted into the knob 1 with the projection 22 thereof placed between the lugs 23 formed on the interior of the knob. The key is then inserted into the cylinder and the square hole 24 in the cylinder plug is placed over the spindle 25 in the body of the door lock. The ring 5 is turned to a position where the slot 18 is out of alinement with the trip 12. The knob 1 may then be screwed partly onto the shank 2'. The trip 12 is in the position indicated in Fig. 4 and the knob 1 is arrested by the shoulder 7 of the plug coming into engagement with the face 15 of the heel 14 of the trip 12. The initial position before the screwing operation begins is indicated in Fig. 9. Fig. 10 indicates the relative position of the knob 1 and the shank 2 with the shoulder 7 in position against the face 15, that is in the particular embodiment of the invention herein shown. It is then necessary to bring the notch 8 into alinement with the slots 10 and 11 to permit the trip 12 to enter the notch 8. This is effected by rotating the key plug 6 counter-clockwise from the dotted position shown in Fig. 10 to the full line position there shown, namely 90° and by turning the knob 1 and shank 2 clockwise through 45° as indicated in Fig. 11. The knob 1 and the shank 2 now turn together by reason of the engagement between the shoulder 7 and the heel 14 of the trip. The notch 8 then being in alinement with the trip 12 the cylinder together with the plug 7 may be pushed home to the position indicated in Fig. 2 whereupon the knob 1 may be screwed home to the final position indicated in Fig. 12. The next step is the turning of the ring 5 with the slot 18 into alinement with the slots 10 and 11 indicated in Fig. 13, whereupon the key is then turned clockwise to the vertical position shown in Fig. 14. The turning of key plug 6 causes the cam surface 9 of the notch 8 to cam the trip 12 into the slots 11 and 18 and the shoulder 7 holds these parts in the position indicated in Fig. 14.

In the particular embodiment shown the knob 1 together with the shank 2 are turned to the position shown in this Fig. 14, the notch 8 being disposed 135° from alinement with the slots 10, 11 and 18. It is observed that with the shank 2 locked in position against turning, the key may be turned to lock and unlock the door without the notch 8 coming into alinement with the slots 10 and 11. It is only when the shank 2 is unlocked to permit an approximate 45° turn in either direction that the notch 8 and the slots 10 and 11 may be brought into alinement which is utilized for the assembly above described. In the final assembly the ring 5 is retained in locking position by the trip 12 entering the slot 18.

A coil spring 27 coiled about a roll back spindle 25 is disposed between the end of the key plug and the movable abutment plate 28 within the knob shank, the abutment plate being in the form of a washer resting upon an annular shoulder formed on the interior of the shank. This spring maintains the end of the cylinder against the outer end wall during the unscrewing of the knob.

I claim:

1. A lock comprising a knob, a knob shank, a cylinder with a key plug contained within the knob, said knob and said shank being adapted to be fastened together by relative rotary movements, means for locking the shank and the knob against relative turning movements and means operative upon relative turning movements of the key plug and the knob for unlocking said locking means, wherein the locking means comprises a pivoted latch member, and said knob and shank are provided with slots, said latching means operating when said slots are in alinement.

2. A lock comprising a knob, a knob shank, a cylinder with a key plug contained within the knob, said knob and said shank being adapted to be fastened together by relative rotary movements, means for locking the shank and the knob against relative turning movements and means operative upon relative turning movements of the key plug and the knob for unlocking said locking means, wherein the locking means comprises a pivoted latch member operating in registering slots formed in the shank and the knob, and wherein the unlocking means comprises a notch formed in the key plug and adapted to be brought into alinement with the slots in the shank and knob.

3. A lock comprising a knob, a knob shank, a cylinder with a key plug contained within the knob, said knob and said shank being adapted to be fastened together by relative rotary movements, means for locking the shank and the knob against relative turning movements and means operative upon relative turning movements of the key plug and the knob for unlocking said locking means, wherein the locking means comprises a pivoted latch member operating in registering slots formed in the shank and the knob, and wherein the unlocking means comprises a notch formed in the cylinder plug and adapted to be brought into alinement with the slots in the shank and knob and a ring having a cam surface for engaging the latch member and forcing the same into said slot.

4. A lock comprising a knob, a cylinder and a key plug contained within said knob, a knob shank upon which said knob is screw threadedly attached and means for locking the knob to the knob shank comprising a pivoted latch mem-

ber and a swivelling ring with a slot and cam surface cooperating with said latch member.

5. A lock comprising a knob, a cylinder with a key plug contained within the knob, a knob shank screwthreadedly attached to said knob, said knob and said shank comprising registering slots, a latch member carried by one of said members and adapted to enter said registering slots, and a swivelling ring cooperatively engaging said latch member to hold the latch member out of locking engagement and to permit the locking engagement, the said key plug also having a part cooperating with the latch member to permit the releasing of the latch member and to compel the engagement of the same.

6. A lock of the character set forth in claim 5, a shoulder on said latch member disposed in the path of and engaged by the key plug to cause turning of the knob and knob shank in unison after the knob is partially screwed upon the shank, said plug being provided with a slot which is alinable with said latch member to permit the longitudinal movement of the plug to permit the shoulder to enter the slot for the completion of the screw attachment of the knob to the knob shank.

7. A lock of the character set forth in claim 5 wherein the swivelling ring is provided with a cam surface for forcing the latch member out of locking engagement with the knob and the knob shank and the key plug is provided with a cam surface for forcing the latch member into operative engagement.

8. A lock comprising a knob shank, a knob, a lock cylinder with a key plug contained within the knob, a spindle for operating a door lock associated with said key plug, means for attaching the knob to the knob shank and latching means pivotally mounted upon the shank and operative upon relative movements of the key plug and knob shank for locking the knob to the shank.

9. A lock comprising a knob shank, a knob and a lock cylinder and key plug combination which is readily detachable and attachable as a unit to the knob shank for the replacement of the cylinder, including a latching means pivotally mounted upon the shank which is released upon turning movements of the key plug and knob shank.

10. A lock comprising a spindle, a knob shank, a knob, a lock cylinder with a key plug contained within the knob, said key plug adapted to engage said spindle, means for attaching the knob to the knob shank and latching means pivotally mounted upon the shank and operative upon opposite turning movements of the key plug and knob shank for locking the knob to the shank and a key for releasing the key plug from the cylinder to first control the knob locking means and thereafter operate the spindle.

11. A lock comprising a knob shank, a knob and a cylinder combination, and latching means pivotally mounted on the shank to permit the knob and cylinder combination to be readily detachable from or attachable to said knob shank as a unit for the replacement of the cylinder.

12. A lock comprising a knob shank, a knob, a cylinder and key plug combination which is readily detachable from or attachable to said knob shank as a unit for the replacement of the cylinder and latching means pivotally mounted on the shank for securing said combination thereto, said combination being detachable upon imparting to the key plug and the knob a relative turning movement of a predetermined degree to release said locking means.

WALLACE F. MOORE.