July 3, 1934. H. G. VOIGHT 1,964,787

LOCK WITH REMOVABLE CYLINDER MECHANISM

Filed March 9, 1932

Fig. 1.

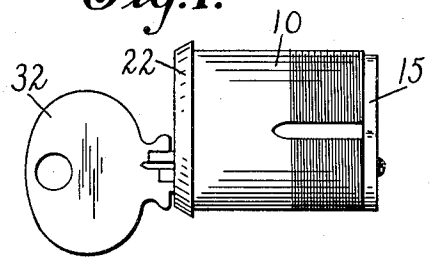


Fig. 2.

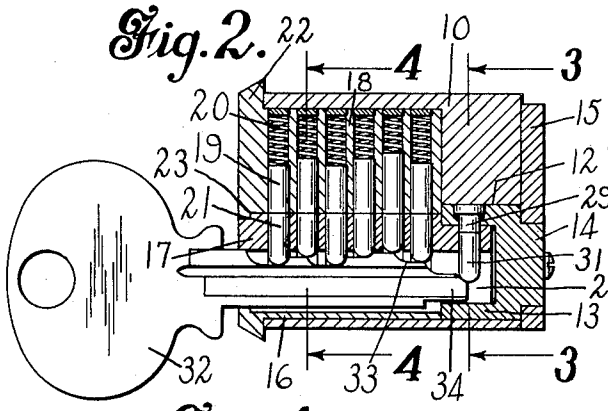


Fig. 3.

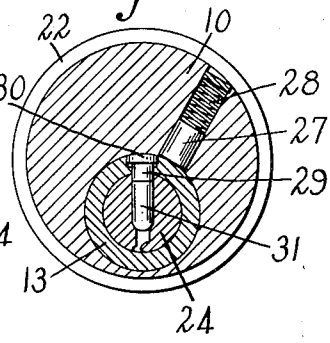


Fig. 4.

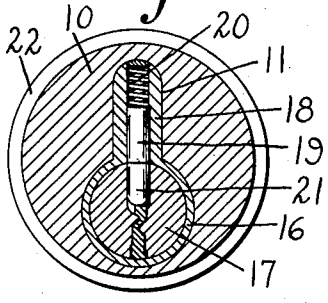


Fig. 5.

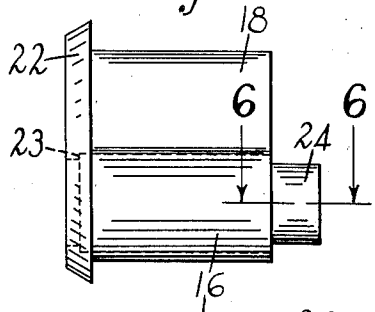


Fig. 7.

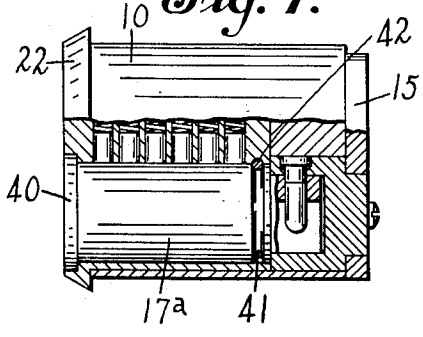
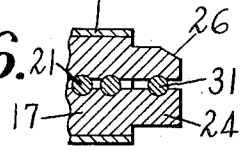


Fig. 6.



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Patented July 3, 1934

1,964,787

UNITED STATES PATENT OFFICE

1,964,787

LOCK WITH REMOVABLE CYLINDER MECHANISM

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Application March 9, 1932, Serial No. 597,723

15 Claims. (Cl. 70—47)

This invention relates to locks, and more particularly to locks provided with a removable core or lock mechanism, whereby the lock mechanism can be readily removed from the case and another replaced therein in order to provide for a change of keys. When a key change is effected in this manner, it, of course, obviates the necessity of replacing the entire lock, and the change can therefore be made much more economically than is the case if the entire lock must be replaced, and also more conveniently and expeditiously, particularly when it is arranged to remove the lock mechanism by the action of a key, as is the case in the present embodiment of my invention.

It will be realized that when a key is lost or has been carried away by someone who should not be permitted to retain a key to the lock in question, it is necessary either to provide a new lock or to change the mechanism of the old lock so that a new key will be necessary to operate. This is particularly true in the case of hotel locks, for example, where keys are very often carried away or lost, and in such event it is necessary to so change the lock that it will no longer be operable by the old key.

One object of the present invention is to provide a lock with a removable core such that the core may be readily removed by an authorized person, and a new one inserted in its place to effect a key change.

A still further object of the invention is to provide a lock with a removable core, or like mechanism, such that the core may readily be removed by means of a special key in the hands of an authorized person, to whom the operation of the lock has been explained.

Still another object of the invention is the provision of a lock with a removable core, which core may be removed by the action of a special key, which key will also be required to operate the lock mechanism, as in the case of a regular key whereby the retaining means which holds the core in place will not be accessible for operation until after the key cylinder has been rotated to some extent by a key which will fit the lock.

To these and other ends, the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the drawing:

Fig. 1 is an elevational view of a lock structure embodying my improvements;

Fig. 2 is a longitudinal sectional view of the lock shown in Fig. 1;

Fig. 3 is a transverse section on line 3—3 of Fig. 2;

Fig. 4 is a transverse section on line 4—4 of Fig. 2;

Fig. 5 is a side elevational view of the removable lock mechanism or core;

Fig. 6 is a fragmentary sectional view on line 6—6 of Fig. 5, and,

Fig. 7 is an elevational view partly in section showing a modification.

To illustrate a preferred embodiment of my invention, I have shown a lock comprising a housing 10, which is provided through the greater part of its length with an opening 11 of irregular shape to receive the lock mechanism or core, and which is provided adjacent its rear end and communicating with the irregularly shaped opening, with an opening 12 of cylindrical shape, which latter opening will be in line with the key plug or key cylinder of the lock.

Rotatably mounted within the opening 12 is a cylindrical member 13 having a reduced end 14, to which is secured the roll-back 15, this cylindrical member being hollow to receive the end of the key cylinder, as will be hereinafter explained.

The removable core or lock mechanism comprises, as shown more especially in Fig. 5, a cylindrical housing 16, within which is rotatably mounted the key barrel 17, and a pin tumbler extension 18 which contains the pins 19 and springs 20 which cooperate with the drivers 21 in the key barrel 17.

Secured to the cylindrical portion 16 of the core and to the pin tumbler extension 18 is the face plate 22 which, as shown in Figs. 1 and 2, serves as the face plate of the lock casing. This face plate is provided with a shouldered opening 23 so that the key barrel may be positioned within the core from the rear thereof, and lodged against this shoulder, as shown in Figs. 2 and 5. It will, of course, be understood that the key barrel will ordinarily be held in place within the core by the pin tumblers, as they will not be aligned except when the proper key has been inserted in the lock. The key barrel or cylinder 17 is provided with a reduced end 24 which projects from the part 16, and which is provided about a portion of its rear edge with a bevel 26.

As shown in Fig. 3 of the drawing, the lock body is provided with a special pin 27 located rearwardly of the usual lock tumblers, and also being out of line with the regular tumblers. This pin lies opposite the cylindrical member 13 mounted in the lock case and is urged toward this member by the spring 28. The member 13 is pro-

vided with an opening in longitudinal alignment with the pin 27, this opening being countersunk and having mounted therein a pin 29 having an enlarged head portion 30. It will be noted that the pin 27 is somewhat larger than the pins 19, this pin being substantially the same size as the head 30 of the pin 29, while the body portion of the last named pin is substantially the same size as the pins 19.

The extended end 24 of the key cylinder is provided with a pin tumbler opening in which is mounted a driver 31, which is adapted to register with the pin 29, as shown in Fig. 3. It will be noted that the pin 29 is slightly longer than the thickness of the wall of the hollow cylindrical element 13, so that the body portion of this pin will project into the key barrel, as shown in Fig. 2, to lock the element 13 to the key barrel, or when moved upwardly against the spring 28, will project into the lock body and permit the break between the pins 29 and 31 to register with the break between the extended end 24 of the key cylinder and the element 13, which will, of course, release the key cylinder from this element.

It will be noted that the pins 27, 29 and 31, which, as will be hereinafter explained, hold the removable core in place, are accessible through the key opening, but that in the locked position of the parts shown in Figs. 2 and 3, the pin 27 is not in alignment with the pin 29, and, hence, an unauthorized person may not insert a slender tool into the key opening, and by moving the pin 31, withdraw the lock core from the housing. Before the pin 31 may be moved, it is necessary to rotate the key cylinder and the element 13 through a slight angle to align the pins 29 and 27. For removing the core, I employ a special type of key, bitted like that shown in the patent to John H. Shaw, No. 1,821,361. This key 32 is longer than the regular key and also is provided with extended surfaces 33 to engage and align the pin tumblers 19. It is also provided with an extended end 34 to engage the pin 31. It will, of course, be understood that the usual key will only reach and operate the tumblers 19 and is not long enough to reach the pin 31.

The operation of my lock may be briefly described, as follows:

The pin 29 is placed in the opening in the cylindrical element 13, the enlarged head of this pin preventing it dropping through the opening into the hollow portion of this element, which is then placed within the lock body 10. The core, shown in Fig. 5 with the key barrel mounted therein, is then inserted in the lock body 10 from the front end thereof, it being understood that the element 13 is in the proper position to align the pin 29 with the pin 27. When the core is inserted in the housing, the bevel 26 on the extended end 24 of the key plug will engage the end of the pin 29 and move it upwardly against the action of the spring 28, into the lock housing, and thus permit the extended end 24 of the key barrel to enter the hollow portion of the cylindrical element 13. The key barrel may then be slightly rotated until the pin 31 is aligned with the pin 29, which will permit the last named pin to be driven downwardly by the spring 28, so as to secure the key cylinder to the element 13. When the key plug is turned to the position shown in Figs. 2 and 3, the lock is ready for operation, with the core securely locked in place.

When operated by the usual key, the operation is, of course, like any ordinary lock, as the pins 27, 29 and 31 will not be engaged by the usual key, and as the face plate 22 is in appearance exactly like that of the ordinary lock, there will be nothing to indicate that the core is removable.

When it is desired to remove the core, the key 32 is inserted in the lock to the position shown in Fig. 2. It will be noted that the key is not completely inserted in the key opening, but its progress has been stopped by the end of the key engaging the pin 31, which pin cannot be driven upwardly as long as the pin 29 is not in registration with the pin 27. With the key in the lock, as shown in Fig. 2, the key cylinder is rotated through a slight angle to align the head 30 of the pin 29, with the pin 27. The key is then pushed inwardly to a further extent, its extended end 34 driving the pin 31 upwardly until the break between it and the pin 29 coincides with the break between the extended end 24 of the key cylinder and the element 13. It will be noted that during this further insertion of the key, the extended tumbler-engaging surfaces 33 simply ride under the drivers 21 and do not change the position of the drivers, so do not disturb the alignment of the regular tumblers. The core may now be removed from the lock and a new core inserted. When the core is removed, the pin 29 will, of course, drop downwardly as far as permitted by the head 31, but will be cammed upwardly upon the insertion of a new core, by the bevel 26.

In Fig. 7 of the drawing, I have shown a somewhat modified form of my invention, in which the key barrel 17^a is provided with the usual enlarged head 40 and is adapted to be inserted in the core from the front thereof. In this instance, the key barrel will be provided with a groove 41 and a pin 42 driven through the pin tumbler extension 18 of the core, rests partly in this groove, so as to hold the key barrel against removal. In other respects, the lock shown in Fig. 7 is like that shown in Figs. 1 to 6 of the drawing.

It will be obvious that in effect the key plug, or key cylinder, of my lock is divided into two parts which are separable longitudinally, one of these parts remaining in the lock housing and retaining the other therein by means of the locking pins 29 and 30, and that these locking pins may only be actuated to release the core after the key cylinder has been turned to a given position by means of a key which will fit the lock. I have, therefore, provided a very secure type of lock, having a removable core and one which may be economically manufactured, and which will be efficient in its operation.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the appended claims.

What I claim is:

1. In a lock, a casing, a core removably mounted within the casing and including a rotatable key cylinder, said core being insertable and removable through the front of the casing, means for retaining said core in the casing, comprising a member rotatably mounted in the casing but secured against removal through the front thereof, and means to secure said key cylinder directly to said member, including a tumbler engaging said member and key cylinder, and accessible for release from the front of the lock case.

2. In a lock, a casing, a core removably mounted within the casing and including a rotatable key cylinder, said core being insertable and removable through the front of the casing, means for

retaining said core in the casing, comprising a member rotatably mounted in the casing but secured against removal through the front thereof, and means to secure said key cylinder to said member, including a special tumbler in said key cylinder and engaging said member and adapted to be operated by the key to release said core.

3. In a lock, a casing, a core removably mounted within the casing and including a rotatable key cylinder, said core being insertable and removable through the front of the casing, means for retaining said core in the casing, comprising a member rotatably mounted in the casing but secured against removal through the front thereof, and means to secure said key cylinder to said member, including a special tumbler in said key cylinder and adapted to be operated by the key to release said core, and means for preventing actuation of said tumbler by said key until said key cylinder has been rotated through a partial revolution.

4. In a lock, a casing having an opening therein and a core removably mounted in said opening, said core including a rotatable key cylinder and a key alignable tumbler mechanism, means for securing said core in the case, comprising a lock bolt operating member rotatably mounted in the case and held against removal from the front thereof, and a special tumbler mechanism extending from the key cylinder through said lock bolt operating member into the casing body, and said special tumbler mechanism being operable to release said core mechanism by a member inserted in the key cylinder.

5. In a lock, a casing having an opening therein and a core removably mounted in said opening, said core including a rotatable key cylinder and a key alignable tumbler mechanism, means for securing said core in the case, comprising a lock bolt operating member rotatably mounted in the case and held against removal from the front thereof, a special tumbler mechanism extending from the key cylinder through said lock bolt operating member into the casing body, said special tumbler mechanism being operable to release said core mechanism by a member inserted in the key cylinder, and said special tumbler mechanism when in a position of rest permitting rotation of said lock bolt operating member.

6. In a lock, a casing, a core removably mounted within the casing and insertable and removable through the front end thereof, said core including a key cylinder and locking tumblers, and means for retaining said core in the casing comprising a special tumbler mechanism engaging the cylinder and casing, said special tumbler mechanism being disposed rearwardly of the locking tumblers and a part thereof being out of alignment with the locking tumblers.

7. A lock comprising a case, a bolt-operating member rotatably mounted in the case, a key cylinder mounted in the case, means connecting said key cylinder with said bolt-operating member to retain the key cylinder in the case, and means accessible from the face of the lock for releasing said connection.

8. A lock comprising a case, a bolt-operating member rotatably mounted in the case, a key cylinder mounted in the case, means for connecting said cylinder to said bolt-operating member, said key cylinder being retained in the case by said means, and said means being operable for release through the key opening of the key cylinder.

9. A lock comprising a case, a bolt-operating member rotatably mounted in the case, a key cylinder mounted in the case, means connecting said cylinder with said bolt-operating member to retain the key cylinder in the case, and means operable by a key standing in said key-way to release said connection.

10. A lock comprising a case, a bolt-operating member rotatably mounted in the case, a key cylinder mounted in the case, means connecting said cylinder with said bolt-operating member to retain the key cylinder in the case, and means accessible through the key opening of the key cylinder for releasing said connection, said connection being incapable of being released when the key cylinder is in locked position.

11. A lock comprising a case, a bolt-operating member rotatably mounted in the case, a key cylinder mounted in the case, means connecting said cylinder with said bolt-operating member to retain the key cylinder in the case, means accessible through the key opening of the key cylinder for releasing said connection, and means preventing the release of said connection until said key cylinder has been rotated from its locked position.

12. In a lock, a casing, a core removably mounted in the casing, including a rotatable key cylinder, said core being insertable and removable through the front of the casing, means for retaining said core in the casing comprising a sleeve rotatably mounted in the casing, surrounding a portion of the key cylinder and held against removal from the casing, and means to secure said key cylinder to said sleeve, including a tumbler in the key cylinder engaging said sleeve.

13. In a lock, a casing, a core removably mounted in the casing, including a rotatable key cylinder, said core being insertable and removable through the front of the casing, means for retaining said core in the casing comprising a sleeve rotatably mounted in, and held against removal from, the casing, and means to secure said key cylinder to said sleeve, including a tumbler in the key cylinder engaging said sleeve, said key cylinder being reduced at its rear end and said sleeve surrounding the reduced end of the key cylinder.

14. In a lock, a casing, a core removably mounted within the casing, including a rotatable key cylinder, said core being insertable and removable through the front of the casing, means for retaining said core in the casing comprising a sleeve rotatably mounted in the casing but secured against removal from the front thereof, said sleeve surrounding the rear portion of the key cylinder and secured thereto for rotation therewith during the normal operation of the lock, and said securing means being releasable by a member inserted into the key cylinder to permit removal of the core.

15. In a lock, a casing, a rollback-carrying member rotatably mounted in the casing, a rollback carried by said member rearwardly of the casing, a lock case mounted in the casing and removable through the front face thereof, said lock case including a key cylinder having a part overlapping a part of said rollback-carrying member, and key releasable means connecting said key cylinder and member to retain the core in the casing.

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