Nov. 17, 1936. M. FALK 2,061,456

REMOVABLE PLUG LOCK

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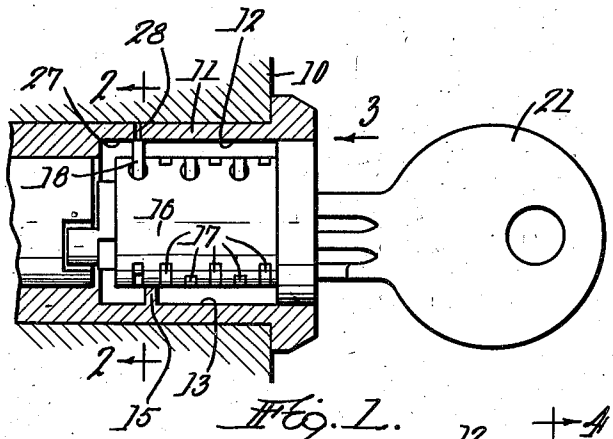


Fig. 1.

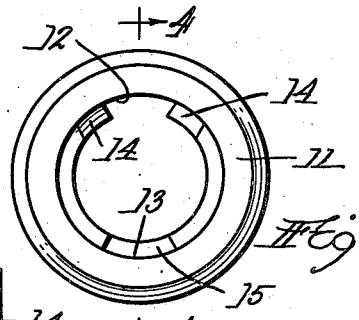


Fig. 3.

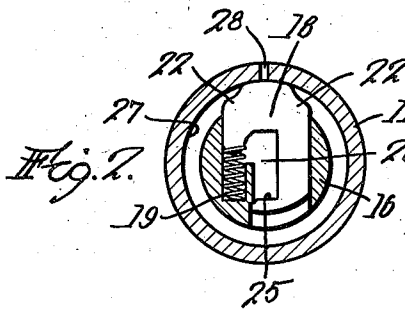


Fig. 7.

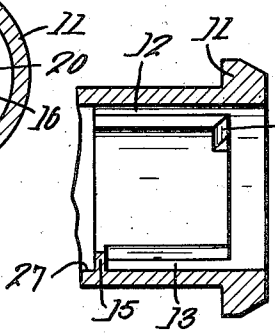


Fig. 4.

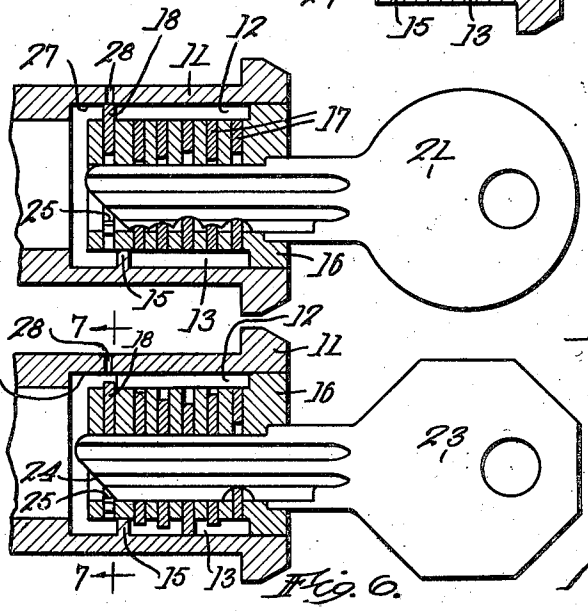


Fig. 6.

Fig. 5.

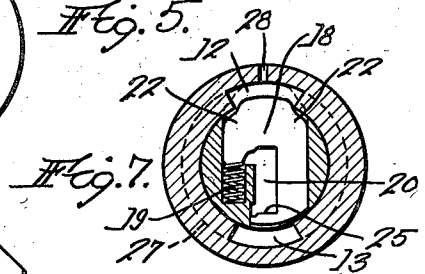


Fig. 7.

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2,061,456

REMOVABLE PLUG LOCK

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Application November 30, 1931, Serial No. 578,061

7 Claims. (Cl. 70—46)

This invention relates to that type of cylinder lock in which the plug is removable.

The principal objects of the invention are to provide a construction in which the plug can be removed by a master key only when in unlocked condition; to provide a construction in which when the lock is locked the introduction of the master key will not put the parts in such condition as to allow the plug to be removed; to provide a construction in which the master key cannot be used to unlock the lock, and to provide a holding device to keep the plug in the cylinder in all positions except the unlocked position in the form of a disc which is movable to two positions, in one of which it holds the plug in no matter whether it is locked or unlocked, and in the other of which it permits it to be removed when the lock is unlocked.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawing, in which

Fig. 1 is a longitudinal diametrical sectional view of a lock cylinder constructed in accordance with this invention, showing it unlocked by the ordinary key and showing the plug in elevation;

Fig. 2 is a sectional view on the line 2—2 of Fig. 1, showing the position of the holding disc preventing the plug from being removed;

Fig. 3 is an end view of the cylinder of the lock as indicated by the arrow 3 in Fig. 1;

Fig. 4 is a sectional view of the cylinder on the diametrical line 4—4 of Fig. 3;

Fig. 5 is a sectional view similar to Fig. 1 but showing the plug in section also and showing the lock in unlocked position;

Fig. 6 is a similar view showing the retraction of the holding disc with the master key, and

Fig. 7 is a sectional view on the line 7—7 of Fig. 6.

The lock is shown as in general of a well known type in which a stationary casing 10 is provided with an opening for the fixed hollow cylinder 11. This cylinder is provided internally with a longitudinal slot or groove 12 on one side, a passage extending the entire length of the plug 16 and a groove or passage 13 on the other side, which does not extend quite through to the end of the plug, but is blocked at the end by a wall 15 integral, of course, with the cylinder both slots or grooves 12 and 13 being open at the front of the cylinder, the rear end of the groove 12 opening into an internal circular groove 27 and the groove 13 ending at the wall 15. This cylinder is provided with two slanting surfaces 14 on the two sides of the slot 12 for a purpose to be described. Of course, it has a cylindrical opening therethrough for the plug extending clear through from end to end.

The plug 16 has the usual discs 17 and in addition is provided with a similar disc 18 operating in the same way and having a spring 19 for holding it normally in its outermost condition, as shown in Figs. 1, 2, and 5. As is well understood in this art, the several discs 17 and 18 have passageways 20 therethrough, through which the locking key 21 passes. The cylinder 11 has a circumferential groove 27 in which the projecting end of the disc 18 can turn all the way around. The walls holding said springs constitute lugs for guiding the key in the slot. A perforation 28 is shown so that the same lock can be used with a wire inserted from the outside to free the plug.

Now when this key is inserted, as shown in Fig. 5, it will depress all the disc 17 and therefore the plug can be turned and the key can be removed, either in the unlocked or the diametrically opposite locked position. In all cases the disc 18 projects out beyond the wall 15 that extends across the slot 13 thereof so that, in the unlocked position, the shoulders or tongues 22 on the opposite sides of the disc 18 will overlap the extreme square end walls of the slot 12 and the plug cannot be removed.

Now, if the lock is turned to the unlocked position and a longer key 23 inserted, which I call the master key, the extreme end of this key, which is slanted off at 24, will engage the flat surface 25 of the disc 18 and pull it down in opposition to the spring 19. It is not pulled all the way down but only to the position shown in full lines in Fig. 7, but that is far enough for the shoulders 22 to come down below the slot 12. Now this plug can be removed.

On the other hand, if the plug is turned by the key 21 to the locked position and the key withdrawn and then the key 23 inserted, of course, the disc 18 will be drawn down to the same position but still the extreme end of this disc 18 will engage the wall 15 at the end of the slot 13 exactly opposite the slot 12 and the plug cannot be removed.

Upon inserting the plug the slanting surfaces 14 engage the rounded shoulders 22 of the disc 18 and depress the disc as it is pushed in. The master key is so shaped that it will not unlock the lock and will not turn the plug in the lock. It has to be unlocked by the key 21 and left in that position to have the key 23 capable of being inserted to a position to release the plug. It is true that

in the exact opposite position the key can be inserted but as stated above, it will not then release the plug for turning movement. This constitutes a very simple and convenient means for accomplishing the objects above specified.

Although I have illustrated and described only one form of the invention I am aware of the fact that modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited in this respect otherwise than as set forth in the claims, but what I claim is:—

1. As an article of manufacture, a cylinder lock having a cylinder and a plug in said cylinder, the plug being provided with a series of locking discs, an additional disc, said additional disc holding said plug from removal, the cylinder having an interior longitudinal slot extending along it, said additional disc being retractible far enough to pass inside said slot when the plug is in unlocked position so that the plug can be withdrawn if a key element is introduced to retract the said disc.

2. As an article of manufacture, a cylinder lock having a cylinder and a plug in said cylinder, the cylinder having an interior slot from one end to the other, an interior slot having a terminal wall at the extreme inner end on the opposite side of the cylinder, the plug having the usual locking discs and an additional disc projecting normally beyond the edges of said first slot so that the plug cannot be withdrawn, and means whereby said disc can be retracted enough by an implement inserted through the keyhole to pass into the first slot and allow the plug to be removed when the plug is in unlocked position, the said disc in its retracted position projecting beyond the surface of the plug to prevent removal of the plug by engagement of said additional disc with said wall in the locked position of the plug.

3. As an article of manufacture, a lock comprising a cylinder and a plug therein, the cylinder having a slot from end to end, the plug having the usual key slot locking discs and a normally projecting plug-holding disc, the plug-holding disc having a projection on one end provided with opposite shoulders, the edges of which extend beyond the ends of the walls of said slot to hold the plug in the cylinder when the plug is in locked or unlocked position, said disc having means accessible from the key slot by which the disc can be retracted part way into the plug to allow the said shoulders to be moved out of engagement with the ends of the walls of said slot when said disc is retracted with the plug in unlocked position.

4. In a lock, the combination of a casing having a bore extending longitudinally therethrough and provided with a shoulder at the inner end of the bore, a cylindrical plug insertable endwise into and rotatable in the bore of the casing, key-operable tumblers mounted in and movable transversely of the plug and adapted to lock the plug against rotation in the casing, said casing having a longitudinal groove along the bore for receiving the ends of the tumblers when the plug is in its locked position, and a second longitudinal groove along the bore for receiving the ends of the tumblers when the plug is in its unlocked position, the front end of said second groove being open, and a device mounted movably in the inner end of the plug and provided with a part for engaging the shoulder and holding the plug against axial displacement in the casing, said shoulder having a notch therein communicating with the inner end of the second groove and adapted, when the device is shifted partially into the plug and the plug is in its unlocked position, to permit the holding part to pass therethrough so as to release the plug for withdrawal from the casing.

5. In a lock, the combination of a casing having a bore extending longitudinally therethrough and provided with a shoulder at the inner end of the bore, a cylindrical plug insertable endwise into and rotatable in the bore of the casing and embodying a key slot at the outer end thereof, key-operable tumblers mounted in and movable transversely of the plug and adapted to lock the plug against rotation in the casing, said casing having a longitudinal groove along the bore for receiving the ends of the tumblers when the plug is in its locked position, and a second longitudinal groove along the bore for receiving the ends of the tumblers when the plug is in its unlocked position, the front end of said second groove being open, and a special tumbler in the inner end of the plug provided with a part for engaging the shoulder and holding the plug against axial displacement in the casing, and shiftable partially into the plug by a key other than the key for the locking tumblers, the shoulder having a notch therein communicating with the inner end of the second groove and adapted, when the plug is in its unlocked position and the special plunger is shifted partially into the plug by the key therefor, to permit the holding part of said special tumbler to pass therethrough so as to release the plug for withdrawal from the casing.

6. In a locking device, a housing, a cylinder mounted in the housing and provided with a key slot, tumblers mounted in the cylinder and having portions extending into the key slot to be engaged by a key, said housing having a recess for receiving one of the tumblers, said one tumbler remaining inoperative during the normal operation of the locking device but being operable to permit the withdrawal of the cylinder from the housing.

7. In a locking device, a housing, a lock cylinder mounted in the housing and provided with a key slot, outer and inner tumblers mounted in the cylinder, said housing being provided with a longitudinal groove and a circumferential groove, the outer tumblers being received in said longitudinal groove and an inner tumbler being received in the circumferential groove, and said inner tumbler having a portion extending into the key slot to be engaged by a key and cammed to a position in which it is withdrawn from the circumferential groove.

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