March 1, 1949. T. W. FRIZZELL 2,462,954

CYLINDER LOCK

Filed Nov. 26, 1947 2 Sheets-Sheet 1

Fig. 1.

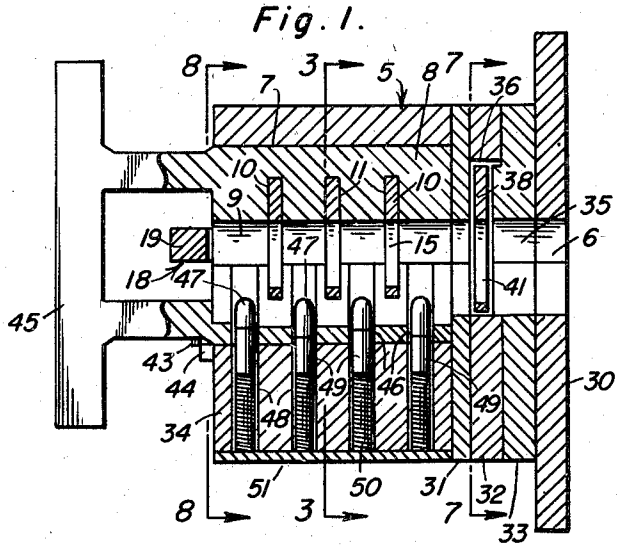



Fig. 2.

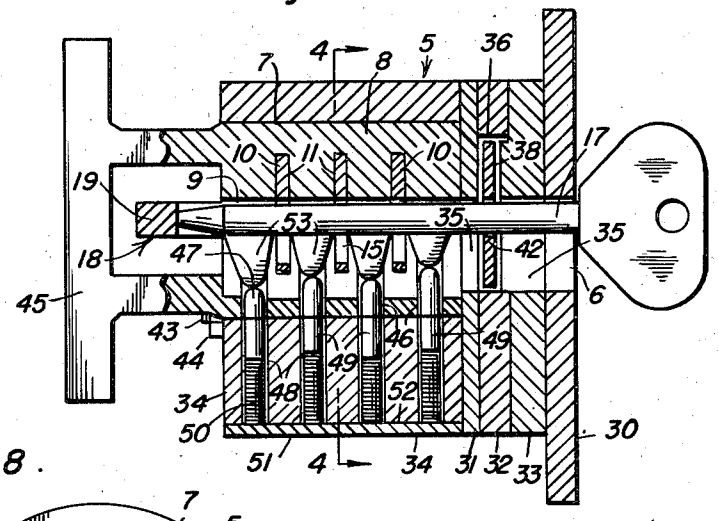
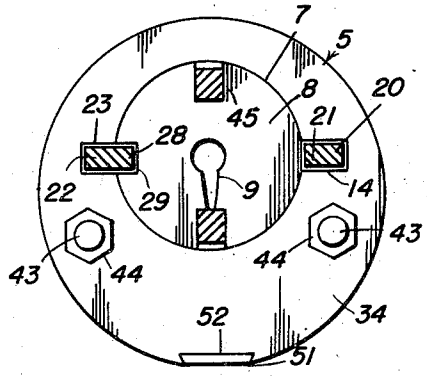



Fig. 8.




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March 1, 1949. T. W. FRIZZELL 2,462,954

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Filed Nov. 26, 1947 2 Sheets-Sheet 2

Fig. 3.

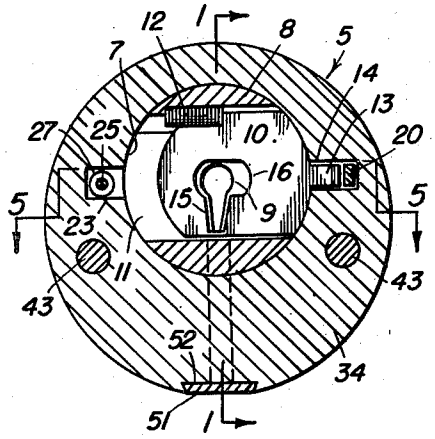



Fig. 4.

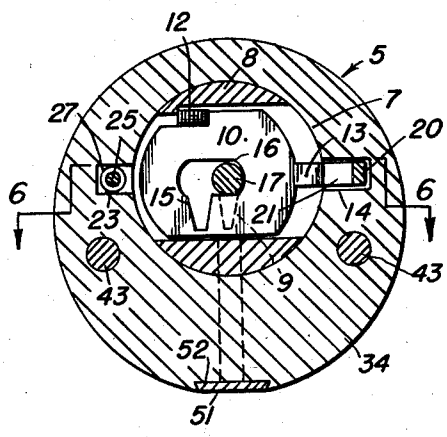



Fig. 7.

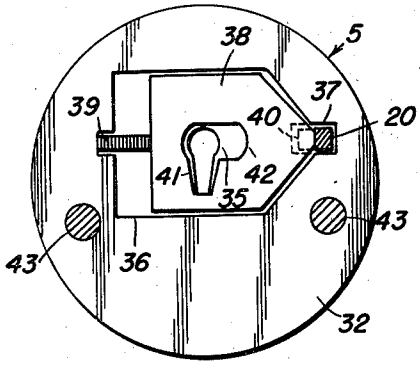



Fig. 5.

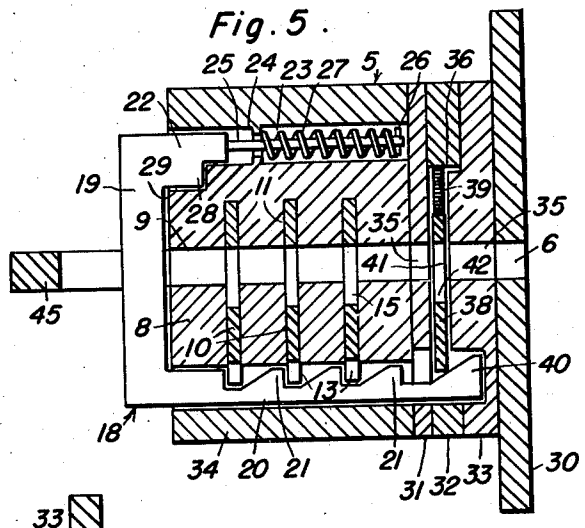
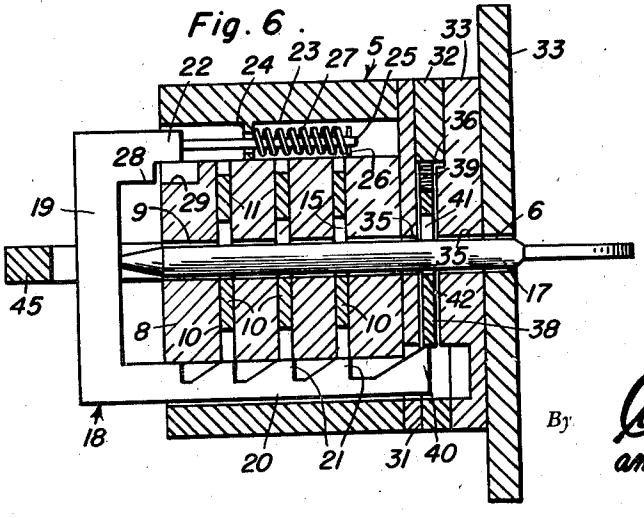



Fig. 6.




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## CYLINDER LOCK

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Application November 26, 1947, Serial No. 788,153

4 Claims. (Cl. 70—358)

1

This invention relates to improvements in cylinder locks, and more particularly to cylinder locks of the combined pin tumbler and plate or wafer tumbler type.

Cylinder locks are relatively old in the art, and until recent years they have been regarded as substantially pick-proof. It has been found, however, that some of the persons more skilled in the unauthorized opening of locks have experienced little difficulty in opening, without the aid of a proper key, even the highest grade of cylinder lock, fine needles or picks being employed to move the individual tumblers in order that the barrel may be revolved to perform its bolt operating function.

The primary object of the present invention is to provide an improved cylinder lock having a new combination of elements which render it virtually impossible to actuate without the proper key.

Another object of the invention is to provide a novel cylinder lock having a plurality of releasable elements, including a set of pin tumblers and a set of plate tumblers, which must be actuated at the same instant to effect movements of the bolt.

Still another object of the invention is to provide an improved cylinder lock having a plurality of locking elements of different types, and which is simple and inexpensive in construction and reliable in operation.

The exact nature of the present invention, as well as other objects and features thereof, will become apparent from the following description when considered in connection with the accompanying drawings, in which:

Figure 1 is a central vertical longitudinal sectional view of a cylinder lock constructed in accordance with the present invention, the tumblers being in locking position;

Figure 2 is a view similar to Figure 1, showing a proper key inserted in the lock and the tumblers in released position;

Figure 3 is a transverse section taken on line 3—3 of Figure 1;

Figure 4 is a transverse section taken on line 4—4 of Figure 2;

Figure 5 is a horizontal section taken on line 5—5 of Figure 3;

Figure 6 is a horizontal section taken on line 6—6 of Figure 4;

Figure 7 is a transverse section taken on line 7—7 of Figure 1; and

Figure 8 is a transverse section taken on line 8—8 of Figure 1.

2

Referring in detail to the drawings, the illustrated embodiment of the invention includes a cylindrical casing 5 provided with a key hole slot 6 at the front and with a cylindrical chamber 7 which is open at its inner end. A cylindrical barrel 8 is rotatably fitted in the chamber 7, and it is provided with a longitudinal keyhole 9 in line with the keyhole slot 6 of the casing.

A set of spaced plate or wafer tumblers 10 is carried by and slidable transversely of the barrel, and normally engaged with the casing to prevent turning of said barrel. As shown, the plate tumblers 10 are slidably fitted in transverse slots 11 of the barrel, and they are yieldingly urged in one direction by means of helical compression springs 12. At one end, each plate tumbler 10 is provided with a projecting lug 13 arranged to engage in a longitudinal groove 14 provided in one side of the wall of chamber 7. The plate tumblers 10 have keyhole slots 15 therein which are normally registered with the keyhole 9 of the barrel and which are provided at corresponding ends with lateral enlargements 16, whereby to partially close said keyhole and provide clearance for the shank 17 of a key inserted in the latter, when the tumblers are disengaged from the casing as shown more clearly in Figure 4.

A key actuated member 18, of substantially U-shape in plan as shown in Figures 5 and 6, is carried by the casing and movable rearwardly to simultaneously disengage the plate tumblers 10 from the casing. The member 18 has a part 19 which extends across the keyhole 9 and is disposed behind the barrel 8 for engagement by the inner end of the inserted key as shown in Figures 2 and 6. The member 18 further includes a leg 20 slidable in the groove 14 of the casing and provided with a series of cam lugs 21 engageable with the lugs 13 of the plate tumblers 10 for moving the latter to released position upon rearward movement of said member 18. The member 18 has another leg 22 movable in a further longitudinal groove 23 provided in the opposite side of the wall of chamber 7 from that in which the groove 14 is provided. Within the groove 23, the casing 5 has an abutment 24 through which the reduced end 25 of leg 22 extends. At its terminal, the reduced end 25 of leg 22 is provided with a cross pin 26 or the like, and a helical compression spring 27 is placed on the end 25 between the abutments 24 and 26 so as to move the member 18 forwardly to the normal position of Figures 1 and 5, wherein the lugs 13 of tumbler plates 10 may enter the spaces between the cam lugs 21, thus allowing said tumbler plates 10 to be

normally moved to the locking position of Figure 3 by the springs 12. At its inner end, the leg 22 is widened to provide a locking lug 28 normally engaged in a notch 29 provided peripherally of and in the inner end of barrel 8, so that the member 18 normally acts to lock the barrel against rotation. The arrangement is such that when the member 18 is moved to the tumbler releasing position of Figure 6, the lug 28 is disengaged from the recess 29 so as to free the barrel 8 as shown in Figure 6.

The casing 5 includes a front part composed of a face plate 30 and three discs 31, 32 and 33, and a larger rear part 34 having an opening which forms the chamber 7. The discs 31 and 33 have keyhole slots 35 similar to and registered with the keyhole slot 6 of the face plate 30, and the intermediate disc 32 is provided with a relatively large opening 36 as more clearly shown in Figure 7, which communicates at one side with the groove 14 as indicated at 37. Slidable transversely in the opening 36 is a keyhole guard plate 38 that is normally moved in one direction by a spring 39 and in the opposite direction by a further cam lug 40 provided on the forward end of the leg 20 of member 18 when the latter is moved rearwardly. The guard plate 38 has a keyhole slot 41 therein which is normally registered with the keyhole slot of disc 32 as shown in Figure 7, and which is provided at one end with a lateral enlargement 42, whereby to partially close the keyhole slot 35 and provide clearance for the shank 17 of the key when said guard plate 38 is shifted against the action of the spring 39 upon rearward movement of member 18.

The parts 30, 31, 32, 33 and 34 are rigidly secured in contigous relation by means of longitudinal tie bolts 43, and nuts 44 threaded on the inner ends thereof at the back of part 34, said tie bolts being fixed to the face plate 30 and extending through aligned apertures or openings in the parts 31, 32, 33 and 34. A suitable bolt operating member 45 is rigid with and provided on the inner end of the barrel 8.

The present lock also includes a conventional pin tumbler arrangement which constitutes the primary locking means of the lock. As shown, the barrel 8 is provided with a plurality of vertical apertures 46 extending from the surface thereof to the keyhole 9 and slidably receiving the tumbler pins 47. The casing member 34 is provided with vertical apertures 48 aligned with the apertures 46 in the barrel, and a plurality of driver pins 49 are slidable in the apertures 48. The driver pins 49 are normally positioned in both apertures 46 and 48 by means of coil springs 50 disposed in the apertures 48 outwardly of the pins 49 and held in place by a plate 51 slidably engaged in an undercut groove 52 provided in the outer surface of and extending longitudinally of the casing member 34.

As shown in Figure 2, the proper key for the present lock has its shank 17 provided with a plurality of spaced lateral tumbler pin releasing lugs 53 of differing lengths to accord with the differing lengths of the tumbler pins 47 whereby, upon insertion of the key for actuation of member 18 as shown in Figure 2, the lugs 53 will shift the tumbler pins 47 so that the outer ends of the latter and the inner ends of the pins 49 are flush with the surfaces of the barrel 8 and casing member 34, respectively. Obviously, with the plate tumblers 10 and the pin tumblers 47 thus released, and the lug 28 of member 18 moved out of the notch 29 of the barrel, the latter may be rotated for throwing the bolt, not shown. It will be seen that the plates 11 and 38 alternate with the pin tumblers 47. Thus, when the barrel 8 is unlocked, the plates 11 and 38 will be caused to partially close the keyhole 9 and the keyhole slot 35 of casing member 31. Accordingly, should a pick be inserted so as to actuate the member 18 for releasing the tumbler plates 10, the latter and the guard plate 38 will so restrict the keyhole 9 and keyhole slot 35 of casing member 31 that insufficient room will be left for the insertion of additional picks to individually release the pin tumblers 47. It will thus be apparent that it will be virtually impossible to release the barrel without the proper key. By providing the member 18 for releasing the plate tumblers 10, the construction of the key is simplified, because it is not necessary to provide such key with individual actuating elements for the plate tumblers.



From the foregoing description, it is believed that the construction, operation and advantages of the present invention will be readily understood and appreciated by those skilled in the art. Modifications and changes in details of construction are contemplated, such as fairly fall within the spirit and scope of the invention as claimed.

Having thus described the invention, what is claimed as new is:

1. In a cylinder lock, a casing provided with a keyhole slot at the front and with a cylindrical chamber which is open at its inner end, a cylindrical barrel provided with a longitudinal keyhole in line with the keyhole slot of the casing, said barrel being rotatably fitted in said chamber, spaced spring pressed plate tumbers carried by and slidable transversely of the barrel and normally engaged with the casing to prevent turning of the barrel, said tumblers having keyhole slots therein normally registered with the keyhole of the barrel and provided at corresponding ends with lateral enlargements whereby to partially close said keyhole and provide clearance for the shank of a key inserted in the latter when the tumblers are disengaged from the casing, a key actuated member carried by the casing and movable rearwardly to simultaneously disengage the tumblers from the casing, said member having a part extending across the keyhole of and disposed behind the barrel for engagement by the inner end of the inserted key, and a spring acting to move said member forwardly so as to permit the tumblers to engage the casing when the key is removed from the keyhole.

2. In a cylinder lock, a casing provided with a keyhole slot at the front and with a cylindrical chamber which is open at its inner end, a cylindrical barrel provided with a longitudinal keyhole in line with the keyhole slot of the casing, said barrel being rotatably fitted in said chamber, spaced spring pressed plate tumblers carried by and slidable transversely of the barrel and normally engaged with the casing to prevent turning of the barrel, said tumblers having keyhole slots therein normally registered with the keyhole of the barrel and provided at corresponding ends with lateral enlargments whereby to partially close said keyhole and provide clearance for the shank of a key inserted in the latter when the tumblers are disengaged from the casing, a spring pressed keyhole guard plate mounted within and slidable transversely of the casing in front of said chamber and having a keyhole slot therein normally registered with the

keyhole slot of the casing and provided at one end with a lateral enlargement whereby to partially close said keyhole slot of the casing and provide clearance for the shank of a key inserted in the latter when shifted against the action of its spring, a key actuated member carried by the casing and movable rearwardly to simultaneously shift the guard plate and disengage the tumblers from the casing, said member having a part extending across the keyhole of and disposed behind the barrel for engagement by the inner end of the said key, and a spring acting to move said member forwardly so as to permit the tumblers and the guard plate to return to normal position when the key is removed from the keyhole.

3. A cylinder lock including a casing, a barrel rotatably fitted therein, a set of plate tumblers and a set of pin tumblers normally locking the barrel against rotation, said plate tumblers alternating with the pin tumblers and movable in a direction at right angles to the direction of movement of the latter, and a key actuated member carried by the casing and movable rearwardly to simultaneously disengage the plate tumblers from the casing, said plate tumblers having key hole slots therein normally registered with the keyhole of the barrel and provided at corresponding ends with lateral enlargements whereby to partially close said keyhole and provide clearance for the shank of a key inserted in the latter when the plate tumblers are disengaged from the casing.



4. In a cylinder lock, a casing, a barrel rotatably fitted therein and having a keyhole, said casing having a keyhole slot in front of the barrel, plate tumblers slidable transversely of the barrel and normally engaging the casing to lock the barrel against rotation, a keyhole guard plate sidable transversely of the casing in front of the barrel, said plate tumblers and said guard plate having keyhole slots therein normally registered with the keyhole of the barrel and provided at corresponding ends with lateral enlargements whereby to partially close said keyhole and provide clearance for the shank of a key inserted in the latter when the tumblers are disengaged from the casing, and a spring pressed key actuated member carried by the casing and movable rearwardly by the key to simultaneously shift the guard plate and disengage the tumblers from the casing.

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