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2,879,658

CYLINDER LOCK

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2 Sheets-Sheet 1

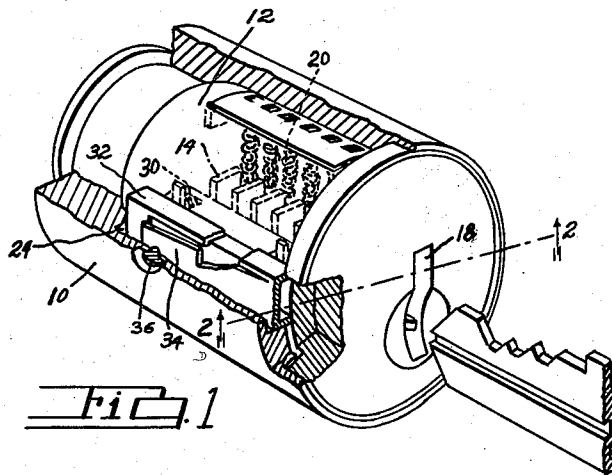


Fig. 1

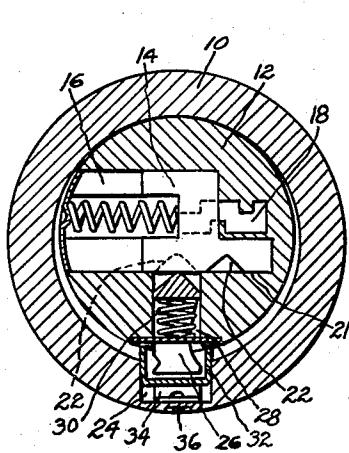


Fig. 3

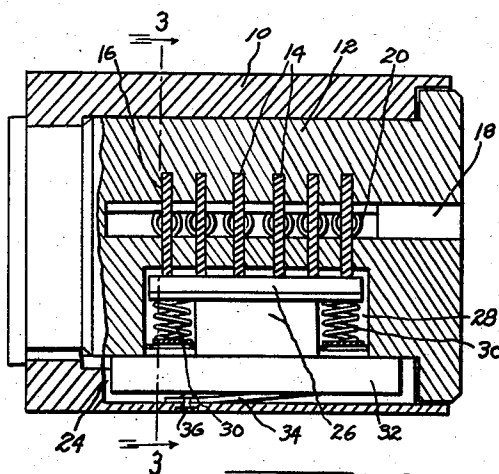


Fig. 2

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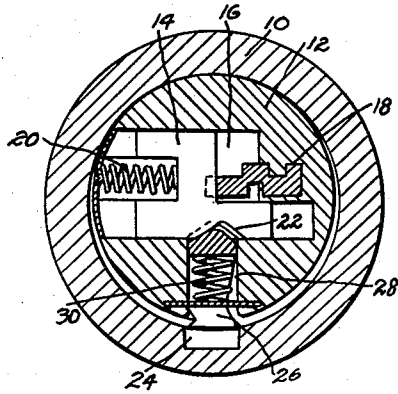


Fig. 4

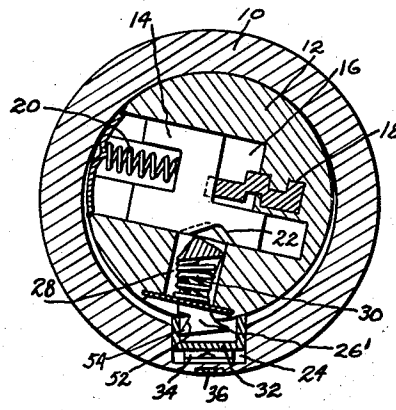
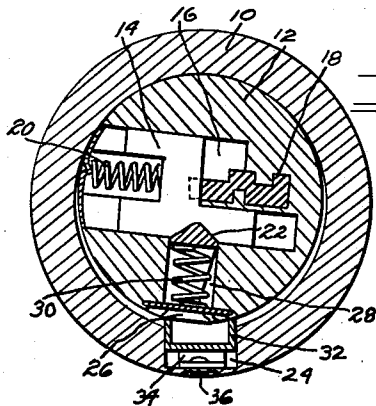
Fig. 5

Fig. 6

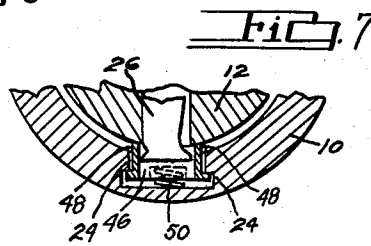


Fig. 7

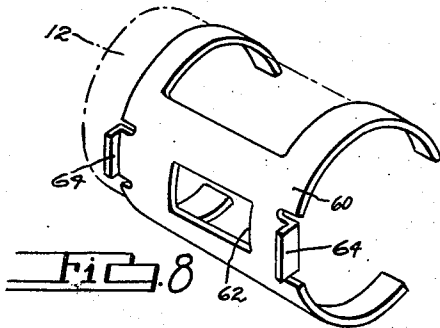


Fig. 8

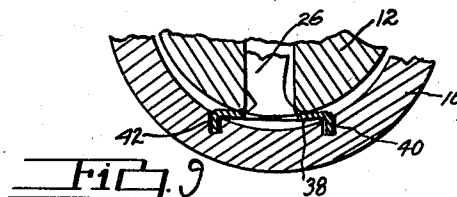


Fig. 9

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CYLINDER LOCK

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5 Claims. (Cl. 70—364)

This invention relates to locks and more particularly to the cylinder type of locks in which the slidable or shiftable tumblers normally lock the cylinder, or control the action of another member to lock the cylinder against rotation in its casing but are shiftable by the insertion of a proper key into the cylinder to release the cylinder for rotational movement.

The cylinder and its casing are generally die cast and are not accurately machined with the result that the cylinder loosely fits the bore in the casing and often is slightly eccentric to the bore. This looseness or eccentricity permits a shifting of the side lock bar relative to the lock opening in the casing for receiving the lock bar with a result that the lock bar may be withdrawn from the opening before it is entirely drawn into the cylinder by use of the proper key.

It is an object of the present invention to provide a member, in or surrounding the opening in the casing, for providing radially movable edge portions which contact the outer periphery of the cylinder at all times and retained by the casing so that the lock bar can only pass the member when it is fully retracted from the outer periphery of the cylinder.

Another object of the invention is to provide an undercut on a side of the lock bar at its outer end and to permit a tipping movement of the bar so that when the bar is not fully withdrawn into the cylinder the movable member catches the sharp corner and tips and draws the bar into the opening in the casing to positively lock rotation between the cylinder and the casing.

Other objects and advantages of the invention will be more fully understood from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a perspective view, partly broken away and showing parts in section, of a lock showing one form of my improved mechanism, the key shown in position for insertion into the lock;

Fig. 2 is a longitudinal sectional view through the lock taken on line 2—2 of Fig. 1;

Fig. 3 is a transverse sectional view through the lock, taken on line 3—3 of Fig. 2;

Fig. 4 is a sectional view corresponding to Fig. 2 but illustrating the lock, without the use of the improved member, wherein the cylinder is rotatable in the casing with the lock bar only partially positioned to their intended unlocking position;

Fig. 5 is a sectional view corresponding to Fig. 3 but showing a modified form of lock bar in the locked position;

Fig. 6 is a sectional view corresponding to Fig. 3 showing the lock bar in the unlocked position;

Fig. 7 is a fragmentary, cross sectional view of the casing, cylinder and lock bar, showing a modified form of my improved insert member;

Fig. 8 is a perspective view of an improved movable

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member which may be carried by the cylinder rather than by the casing; and

Fig. 9 is a fragmentary, cross sectional view showing a further modification of my improved movable member.

The invention has been illustrated in connection with locks of the side tumbler action but it is equally applicable to other types of locks, and it will be apparent that the basic conception of my invention may be embodied in many forms without being limited to the particular form herein illustrated.

Referring more particularly to the accompanying drawings, there is a casing 10, of cylindrical form, which is usually die cast, and a cylinder 12 rotatable in the casing which is also usually die cast. The cylinder 12 is provided with tumblers 14, herein shown as six, of plate like formation having their surfaces extending in a plane transversely of the lock cylinder. The tumblers 14 are mounted in guideways 16 extending diametrically through the cylinder 12, intersecting the keyway slot 18 which extends longitudinally down the cylinder in open communication with all of the guideways 16, so that upon the insertion of a proper key into the keyway 18, all of the tumblers will be actuated to a predetermined position as determined by the contour of the key.

Compression springs 20 urge the tumblers 14 laterally of the cylinder intersecting the keyway 18. One edge 21 of each tumbler 14 is provided with a V notch 22. These notches are arranged in staggered relation to each other when the key is withdrawn but are in alignment when a proper key is inserted into the keyway 18.

The inner periphery of the casing has a longitudinally extending groove 24 which receives a slide bar 26 which is the locking pin between the cylinder 12 and the casing 10. This slide bar is in the form of a flat bar and is slidably mounted in a radial recess 28 in the cylinder 12. The bar 26 is of sufficient length to contact with the edge having the V notch 22 of each tumbler 14. Springs 30 at each end of the slide bar urge the slide bar radially inwardly of the cylinder into contact with the tumblers 14.

Without the key inserted in the lock, the springs 20 urge the tumblers 14 inwardly of the cylinder and the straight edge 21 of the tumblers rides on the inner edge of the lock bar 26 forcing it outwardly, against the pressure of the springs 30; with the outer edge of the lock bar 26 in the groove 24. Any one individual tumbler spring 20 is stronger than the springs 30, so that any one tumbler will hold the lock bar 26 in operative engagement in the groove 24. With the proper key, one with the proper bittings, spacing, depths and angle on its operative edge, the tumblers 14 are properly positioned transversely of the cylinder 12 with the notches 22 in longitudinal alignment, the lock bar 26 is urged inwardly by the springs 30 into the aligned notches 22 and out of operative engagement with the side wall of the groove 24. The cylinder 12 is then free for turning movement within the casing 10.

In the manufacture of locks, the casing and cylinder are usually die cast and the outer diameter of the cylinder does not accurately fit the inner diameter of the casing. Often the casing is made by one manufacturer and the cylinder made by another manufacturer, so that an accurate fit between the casing and the cylinder is difficult to maintain. Temperature changes will not permit close tolerances between the outer periphery of the cylinder and the inner periphery of the casing and as a result of one or more of these conditions, there is a clearance between the two surfaces. The lock bar, tumblers and key are machined and can be held to close limits so that the locations of the outer edge of the lock bar can be accurately positioned. The results of accu-

racy are lost when the accurately machined parts are used in commercially manufactured cylinders and casings.

For the purpose of illustrating the present invention, I have shown the cylinder as being eccentric to the casing. As illustrated in Fig. 4, if the lock bar 26 is fully retracted from the groove 24, the cylinder 12 is free for turning within the casing, yet the lock bar has not reached its final position fully within the V notch 22. Thus, the unlocking of the cylinder 12 may be accomplished by an inferior key and the close tolerances in key design is lost.

It is an important feature of the present invention to provide a movable member co-operating with the cylinder and lock bar for positioning the opening held by the casing, into which the lock bar is inserted, thus eliminating the inaccuracies in the casing and cylinder. The movable member may be a channel shaped member 32 received in the groove 24 of the casing, as shown in Figs. 1, 2 and 3. The base of the channel is provided with a resilient arm 34 which is secured to the casing by a rivet 36. The side edges of the channel are urged inwardly into contact with the outer periphery of the cylinder so that there is provided, in effect, a groove or opening having lock bar retaining edges which are movable toward the cylinder to eliminate inaccuracies between cylinder and casing diameters.

The movable member may be an apertured body 46 having side flanges 48, as shown in Fig. 7. The body is radially slidable in the groove 24 and spring 50 urges the member into contact with the outer periphery of the cylinder 12.

If desired, the movable member may be in the form of an apertured spring plate 38 having side flanges 40 which are received in grooves 42 in the casing 10, as shown in Fig. 9.

Referring to Fig. 5, I have shown the locking bar 26' provided with a notch 52 in a side thereof adjacent its outer edge to form a knife edge 54. When the lock bar 26' is not fully retracted from the opening in the movable member the knife edge catches on the edge of the aperture and the bar is tilted in the cylinder permitting the inner edge of the channel to enter the slot 52 and drawing the lock bar 26 into locking engagement between the cylinder and casing.

Referring to Fig. 8, I have shown the improved member 60 in the form of resilient band partially embracing the outer periphery of the cylinder 12. The band 60 has an opening 62 through which the lock bar 26 may be projected and outwardly projecting flanges 64 which are received in notches in the casing 10. The band 60 is free for turning movement on the cylinder 12 and, when assembled, is held stationary in the casing by the projecting flanges 64. Such a design permits the member to be assembled with the cylinder 12.

From the foregoing description and accompanying drawings it will be readily apparent that this invention materially improves the construction of cylinder locks and that by maintaining accuracy between the tumblers and a movable member associated with the casing or cylinder, the inaccuracies between casing and cylinder do not interfere with the successful operation of the lock.

I claim:

1. In a lock, a casing, a rotatable cylinder in said casing, a lock bar carried by said cylinder for radial movement in said cylinder to be projected beyond the outer surface of said cylinder and withdrawn to a position flush with the outer surface of said cylinder, movable tumblers for operating said lock bar, a radially movable member having an opening therein carried by said casing co-operating with the outer periphery of said cyl-

inder and adapted to receive said lock bar in the opening of said radially movable member, to prevent rotation of said cylinder relative to said casing when said lock bar is in the opening in said member, and resilient means for urging said member toward said cylinder.

2. In a lock, a casing, a rotatable cylinder in said casing, a radially movable member carried by said casing in frictional engagement with the outer periphery of said cylinder, resilient means for urging said member into engagement with said cylinder, a lock bar carried by said cylinder, tumblers for moving said lock bar radially into inter-locking engagement with said member, and resilient means for urging said lock bar inwardly of said cylinder.

3. In a lock, a casing, a rotatable cylinder in said casing, a radially movable member between said casing and said cylinder, resilient means for urging said member into sliding engagement with the outer periphery of said cylinder, said member being held against angular movement with said cylinder and having side walls for receiving a lock bar, a radially movable lock bar carried by said cylinder for locking engagement with the side walls of said member when outwardly projected from said cylinder and free from said walls when inwardly retracted into said cylinder, tumblers for moving said lock bar radially outwardly of said casing, and resilient means for moving said lock bar radially inwardly.

4. In a lock, a casing, a rotatable cylinder in said casing, a plurality of sliding tumblers in said cylinder, a radially movable lock bar slidable in a radial opening in said cylinder and operated by said tumblers, a radially movable member in said casing for resilient contact with the outer surface of said cylinder, an opening in said radially movable member for receiving the outer end of said lock bar when said lock bar is moved outwardly by said tumblers, a V-cut in one side of said lock bar adjacent its outer end providing a knife edge for initial contact with an inner edge of the opening in said radially movable member when said lock bar is partially projected outwardly of said cylinder, and a recess in the opposite side of said lock bar for receiving an edge of the radial opening in said cylinder, whereby said lock bar is shifted in the radial opening in said cylinder by a binding action on said lock bar between one edge of said radially movable member and one edge of said cylinder when said lock bar is projected outwardly beyond the outer surface of said cylinder and an angular turning force is applied to said cylinder relative to said casing.

5. In a lock, a casing, a rotatable cylinder in said casing, a lock bar carried by said cylinder for radial movement in said cylinder to be projected beyond the outer surface of said cylinder, movable tumblers for operating said lock bar, a radially movable member between said casing and said cylinder having an opening therein supported against movement circumferentially to said casing and adapted to receive said lock bar in the opening of said radially movable member to prevent rotation of said cylinder relative to said casing when said lock bar is in the opening in said member, and resilient means for urging said member into contact engagement with said cylinder.

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