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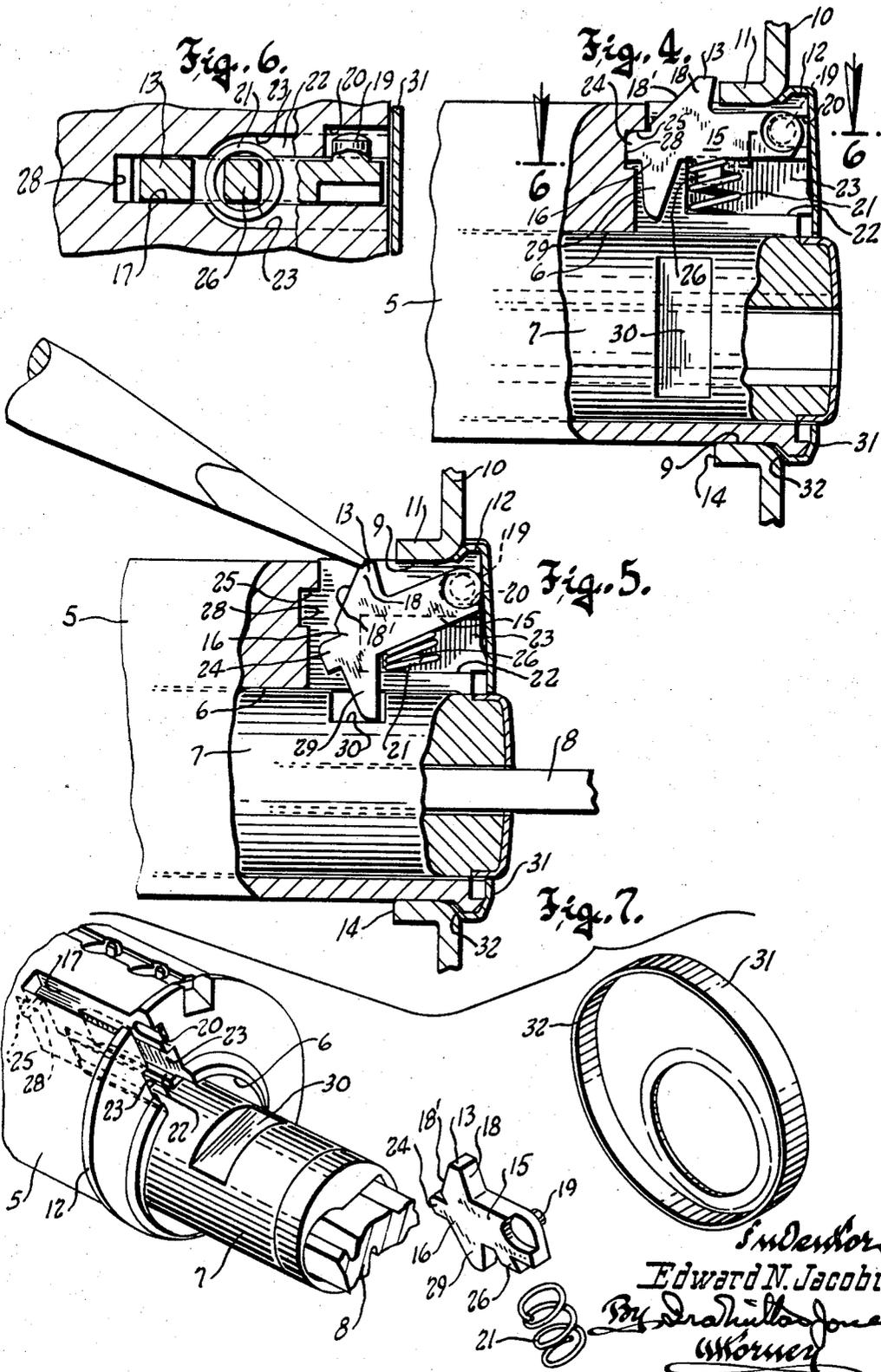
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CYLINDER LOCK WITH IMPROVED RETAINER

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1

2

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CYLINDER LOCK WITH IMPROVED RETAINER
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ABSTRACT OF THE DISCLOSURE

The flanged casing of a tumbler lock received in a hole in a mounting panel with its flange bearing against the front face of the panel, is removably held in place by a T-shaped lever arm pivotally mounted in the lock casing. A spring under this arm yieldingly maintains the arm in a position at which one end of its head protrudes from the side of the casing to engage behind the edge of a cylindrical flange that projects rearwardly from the edge of the hole in the panel. Except in an unlocked position of rotation, the side of the rotatable cylinder of the lock blocks entry of the other end of the head on the T-shaped lever arm into the casing bore to normally prevent retraction of the arm.

This invention relates to key controlled cylinder locks of the type widely used in automobiles and its purpose is to provide improved means for removably securing such locks in mounting panels or other structures.

Locks of the type with which this invention is concerned are ordinarily mounted by insertion of their lock cases into a hole in a panel or other mounting structure, where they are held by a flange at the front end of the lock case which bears against the front face of the panel, and a depressible retainer which projects from the side rearwardly facing portion of the panel, depression of the retainer to free the lock for removal being possible only when the cylinder has been turned by means of its key to a predetermined unlocked position.

This invention likewise employs a flange at the front end of a lock case and a depressible retainer behind the flange to coact with the flange in removably securing the lock to a mounting panel, but the nature of the depressible retainer and its mounting are quite different and greatly improved.

The depressible retainer which this invention supercedes, consisted of a small pin or plunger slidably received in a counterbored hole in the side of the lock case opening to its bore. Because of its location, this hole could not be cored and had to be drilled. The pin or plunger, like the hole, had two diameters, the larger diameter portion being in the middle and the end portions of the pin being smaller in diameter. A coil spring surrounding one of the small diameter end portions of the pin and confined between the bottom of the counterbore and the shoulder formed by the adjacent step in diameters of the pin, yieldingly projected the pin outwardly of the lock body a distance determined by the location of a retaining abutment formed by staking the side of the cylinder wall around the mouth of the drilled hole.

Needless to say, that prior arrangement was rather costly due to the plurality of operations required to produce it and, in addition, it often did not provide the desired accuracy in the degree of outward projection of the pin, since the staking operation could not be depended upon to accurately locate the stop which limited outward projection of the pin. Accordingly, there were instances when the pin did not project far enough to reliably hold the lock in place.

As will be hereinafter more fully explained, the present invention eliminates all of the objections and disadvan-

tages of that earlier way of removably securing a lock in its mounting, by substituting for the retaining pin or plunger a stamped metal retainer pivotally mounted in the fore part of the lock case to swing between an operative position in which a finger on the retainer projects well beyond the side of the lock case, and a depressed position in which the finger lies wholly beneath the surface of the lock case.

The disadvantages and objections of the earlier construction are further overcome with this invention by the novel manner in which the stamped retainer is assembled with the lock case and maintained in assembled relation therewith.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate one complete example of the physical embodiment of the invention, constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

FIGURE 1 is a view partly in side elevation and partly in section, illustrating the fore part of a lock embodying this invention mounted in an instrument panel;

FIGURE 2 is a cross sectional view through FIGURE 1 on the plane of the line 2—2;

FIGURE 3 is a view similar to FIGURE 2 but with the cylinder rotated to a position permitting removal of the lock;

FIGURE 4 is a sectional view through FIGURE 2 on the planes of the line 4—4;

FIGURE 5 is a sectional view through FIGURE 3 on the planes of the line 5—5;

FIGURE 6 is a fragmentary sectional view through FIGURE 4 on the planes of the line 6—6; and

FIGURE 7 is a perspective view of the components of the retainer and the adjacent portions of the lock case and cylinder, shown separated.

Referring now particularly to the accompanying drawings, the numeral 5 designates the lock case of a key-controlled lock cylinder which, as is customary, is a die casting, and has a bore 6 in which the cylinder 7 of the lock is rotatably received. As is also customary, the cylinder and the lock case have cooperating pin tumblers and drivers, indicated in dotted lines in FIGURE 1, by which the cylinder is secured against rotation except when a proper key 8 is inserted. The tumblers and their drivers are, of course, spaced axially of the lock, and the foremost set thereof, indicated by the numeral 7', is closely adjacent to the front end of the cylinder. Since this invention concerns primarily the means for removably securing the lock in position, and not the function of the lock or the manner in which it performs that function, only the front end portion of the lock has been illustrated.

As shown in FIGURE 1, the lock is mounted by having its lock case inserted into a hole 9 in a wall 10 which may be an instrument board panel of an automobile, or any other mounting structure. If the mounting structure is a panel, as in FIGURE 1, an inturned collar 11 is preferably formed at the edge of the hole to increase the axial dimension of the mounting hole. The additional support thus provided for the lock case, together with the engagement of a flange 12 on the front of the lock case against the front face of the panel, holds the lock case square with the panel, and a depressible retainer 13 which projects outwardly from the side of the lock

case to engage the rearwardly facing edge 14 of the collar 11, removably secures the lock case to the panel. It will be noted (from FIGURE 1) that the point at which the retainer projects from the side of the lock case is rearward of the foremost tumbler and driver.

The depressible retainer 13 is essentially a T-shaped flat-sided arm stamped from sheet metal and having a stem portion 15 and a head portion 16. It is located in a pocket or notch 17 in the front end portion of the lock case, where it is guidingly supported by the flat side walls of the pocket or notch, for pivotal movement about its front end between an operative position in which one end of its head portion 16 projects beyond the side of the lock case to provide a retaining finger 18, and an inoperative position lying wholly beneath the surface of the lock case. The pivot by which the retainer is connected with the lock case comprises an embossure 19 which projects from one side of the stem 15 near the end thereof, and is seated in a cavity or recess 20 in the adjacent side wall of the pocket or notch. For a purpose to be described, the cavity 20 is deep enough to allow some movement of the embossure axially of the lock.

A coil spring 21 confined between the inner edge of the retainer 13, and a spring seat formed by the radially innermost edges 22 of a pair of opposing cavities or recesses 23 in the side walls of the pocket or notch 17, yieldingly urges the retainer to its operative position. This position is defined by the engagement of a lug or nose 24 on the free end of the pivoted retainer with a ledge 25 projecting from the closed end of the pocket.

A tang 26 which projects from the inner edge of the retainer into the adjacent end of the spring holds the spring against slipping away from its proper position and also enables the spring to exert a rearward or axially inward, as well as a radially outward force on the pivoted retainer. The rearward component of the spring force serves to hold the retainer in its rearmost position as defined by the engagement of the embossure 19 with the closed rear end of the cavity 20, in which position of the retainer the lug or nose 24 at its free end projects into a notch 28 in the end wall of the pocket beneath the ledge 25 to preclude accidental inward displacement of the retainer out of its operative position. Thus, as will be evident from FIGURE 4, before the retainer can be depressed to free the lock for removal, it must be slid forwardly far enough to withdraw its lug or nose 24 from the notch 28. It is for this reason that the cavity 20 is deeper than the diameter of the embossure 19.

As in the earlier pin type retainer which this invention has superseded, the lock cylinder must be turned out of its locked position before the retainer can be depressed. To effect this "interlock," the side of the cylinder lies athwart the path of the inner end 29 of the head of the T-shaped retainer when the cylinder is in its locked position. This prevents entry of the retainer part 29 into the bore 6, and since such entry is necessary to enable the pivoted retainer to be depressed far enough to bring its finger 18 below the surface of the lock case, depression of the retainer is not possible until the cylinder is turned to a position at which a notch 30 in the side of the cylinder aligns with the pocket 17, see FIGURES 3 and 5. With the cylinder turned to that position, the retainer may be depressed, as shown in FIGURE 5, to release the lock for removal, it being understood that, to do so, forward as well as inward pressure must be exerted on the finger 18, for otherwise the engagement of the lug or nose 24 in the notch 28 prevents depression of the retainer.

Perhaps the most important feature of this invention resides in the manner in which the retainer and its spring are assembled with the lock case and retained in assembled relation therewith. Note that this assembly merely requires sliding the retainer with its spring attached thereto, into the pocket 17. By this simple expedient, the embossure 19 is seated in the cavity 20 to pivotally mount the re-

tainer in the lock case; and to hold the parts assembled it is only necessary to attach the customary metal finishing cap or bezel 31 to the flanged front end of the lock case, in which position the cap covers the mouth of the pocket.

Following conventional practice, the cap or bezel 31 is held in place by having its marginal edge portion 32 clinched over the periphery of the flange 12.

Since the pocket 17 is in the nature of a notch having open communication with the bore 6, with the outer side of the lock case, and also with its front face, all surfaces of the pocket may be formed by a core or die portion which pulls out of the die cast piece in the same direction as the core which forms the bore. This affords a decided cost advantage over the prior practice which required drilling a two diameter hole into the side of the lock case.

The substitution of a stamped metal retainer for the previously used multidiameter pin or plunger, is another significant improvement over the prior construction, since it assures greater accuracy in the critical dimension of the retainer and, in addition, makes assembly of the retainer with the lock case easier. The insertion of the stamped retainer and its spring into the pocket 17 and the securing of the cap 30 to the front of the lock case, is considerably easier than staking the metal around the mouth of a bore, as was needed in the prior constructions, to say nothing of the lack of accuracy in the location of the motion-limiting stop which the staking operation formed. With this invention, the finger 18 always projects the same distance beyond the side of the lock case, whereas with the old construction the distance the retainer pin projected depended upon the depth of the staking as well as on the machined dimensions of the pin.

Attention is directed to the shape of the retainer finger 18. Its front edge, which confronts the rearwardly facing edge 14 of the collar 11, has a slight forward rake angle to provide secure engagement with the edge of the collar and also reduce the likelihood that outward axial force applied to the lock case, as by a pinch bar engaged under the edge of the flange 12, will cause the retainer to rock about its pivot. Moreover, any such force applied to the flange will tend to draw the lock case forwardly and tighten the engagement of the lug or nose 24 in the notch 28, thus further guarding against lock-releasing movement being imparted to the retainer.

However, insertion of the lock into the hole in the panel is facilitated by the shape of the retainer finger 18. For this purpose, the rear edge 18' of the finger slopes forwardly. Accordingly, during insertion of the lock, the retainer is first slid forward in the pocket 17 until its pivoted front end bears against the cap or bezel 30. This withdraws the lug or nose 24 from the notch 28 and allows the pivoted retainer to be depressed by the camming action of its sloping edge 18' bearing against the edge of the hole in the panel.

From the foregoing description and the accompanying drawings, it should be apparent to those skilled in this art that while this invention concerns itself with specific details in the design and structure of a particular type of lock, by virtue of the improvements effected by the invention, very significant cost advantages are achieved, as well as greater reliability in the securing of such locks in their mounting structures.

What is claimed as my invention is:

1. In a key controlled cylinder lock wherein a cylinder is rotatably received in the bore of a lock case, and key controlled means secures the cylinder against rotation until insertion of a proper key, means for removably securing the lock in a mounting member having a hole in which the lock case is received, said means comprising: a depressible retainer projecting from the side of the lock case to engage a rearwardly facing portion of the mounting member,

said lock being characterized by:

A. a pocket in the front portion of the lock case between its bore and one side of the lock case,

5

said pocket communicating with the bore through one side thereof, and the inner end of the pocket having a port which opens to said side of the lock case;

B. the retainer being a finger on the free end of an arm which is pivotally seated in the pocket and extends lengthwise alongside the cylinder with its front end at the front portion of the lock case and its free end in line with said port at the inner end of the pocket;

C. cooperating means on the front end portion of the arm and an adjacent wall of the pocket providing a pivot for the arm about which it may rock in one direction to project its finger through said port and in the opposite direction to retract the finger below the surface of the lock case;

D. means biasing the pivoted arm in said first direction; and

E. a part on said pivoted arm which must project into the bore in the lock case for the finger to be retracted below the surface of the lock case, and the cylinder having a portion thereof shaped to block projection of said part into the bore except when the cylinder is in a predetermined position of rotation to which it can be turned only by its key.

2. The lock of claim 1, further characterized by interengageable abutments on the inner end of the pocket and the adjacent portion of the pivoted arm providing a stop to limit outward pivotal motion of the pivoted arm.

3. The lock of claim 1, further characterized by means to prevent accidental retraction of the finger when the cylinder is in a position of rotation at which it does not block entry of said part into the bore, said means comprising

cooperating abutments on the inner end of the pocket and the adjacent portion of the pivoted arm which collide unless the pivoted arm is slid forwardly in the pocket,

the pivot-forming means permitting such forward sliding of the pivoted arm, and the biasing means yieldingly urging the pivoted arm rearwardly as well as in the direction to project its finger beyond the side of the lock case.

4. The lock of claim 1, wherein the pocket has substantially parallel side walls,

wherein said pivoted arm is a T-shaped stamping with flat parallel sides and a thickness to be guidingly received between said side walls of the pocket; and wherein one end of the head of the T-shaped stamping provides said finger and the other end of its head provides said part which must project into the bore for the finger to be retracted.

5. The lock of claim 4 wherein the side walls of the pocket have opposing cavities providing shoulders facing the arm and lying between the arm and the bore in the lock case, and

wherein said biasing means comprises a spring received in said pocket with opposite portions thereof in said cavities, the spring being confined between said shoulders and the arm.

6. In a key controlled cylinder lock wherein a cylinder is rotatably received in a bore of a lock case, and a plu-

6

rality of key controlled tumbler means spaced lengthwise of the lock secure the cylinder against rotation until insertion of a proper key, means for removably securing the lock in a mounting member having a hole in which the lock case is received, said means comprising

a depressible retainer projecting from the side of the lock case to engage a rearwardly facing portion of the mounting member, said lock being characterized by:

A. a pocket in the front portion of the lock case between its bore and one side of the lock case, said pocket communicating with the bore through one side thereof and having a mouth opening to the front face of the lock case, and the inner end of the pocket having a port which opens to said side of the lock case rearwardly of the foremost of said tumbler means;

B. the retainer being a finger on the free end of an arm which is pivotally seated in and inserted into the pocket through its mouth and extends lengthwise alongside the cylinder with its front end in the front end portion of said pocket and the finger on its free end in line with said port at the inner end of the pocket;

C. cooperating means on the front end portion of the arm and an adjacent wall of the pocket providing a pivot for the arm about which it may rock in one direction to project its finger through said port and in the opposite direction to retract the finger below the surface of the lock case;

D. means biasing the pivoted arm in said first direction; and

E. cap means covering the front face of the lock case and closing the mouth of said pocket so that said arm cannot be displaced from said pocket.

7. The lock of claim 6, wherein said cooperating pivot forming means comprises a trunnion on the arm and a recess in said adjacent wall of the pocket,

the mouth of the recess opening to the front face of the lock case and the trunnion being seated in the recess and being insertable thereinto through its mouth during insertion of the arm into the pocket,

so that assembly of the arm with the lock case requires only the placement of the arm into the pocket and the engagement of the trunnion into the mouth of the recess,

and wherein the trunnion is held against displacement from said recess by closure of its mouth by the cap means.

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