

Oct. 26, 1937.

E. N. JACOBI

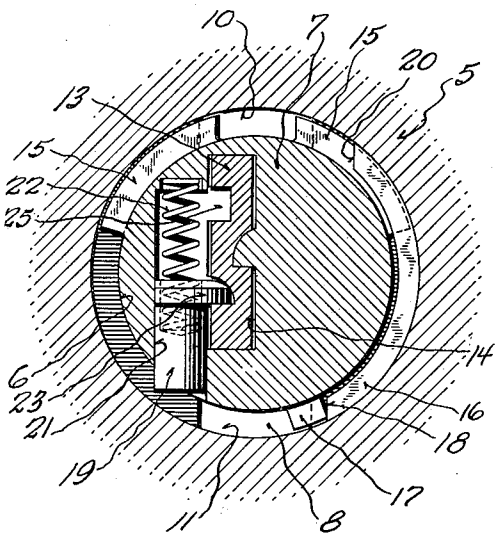
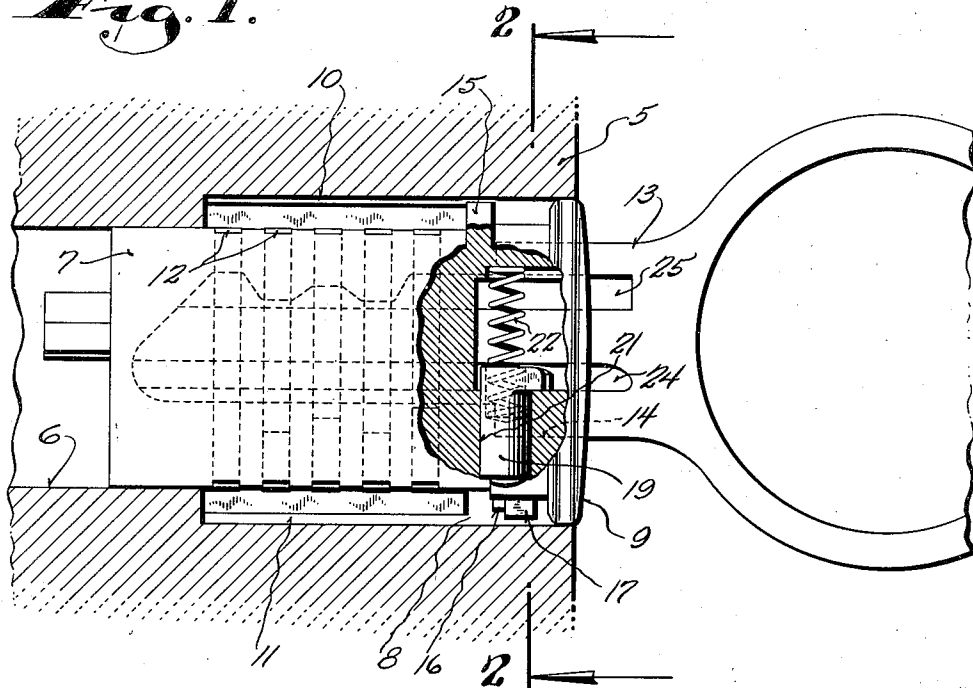
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CYLINDER LOCK

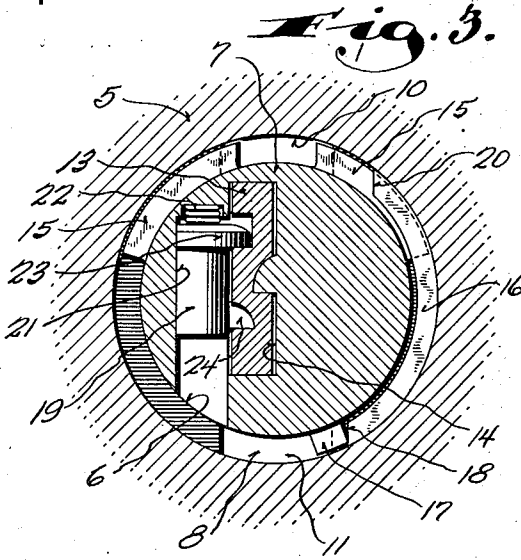
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2 Sheets-Sheet 1

*Fig. 1.*



*Fig. 2.*



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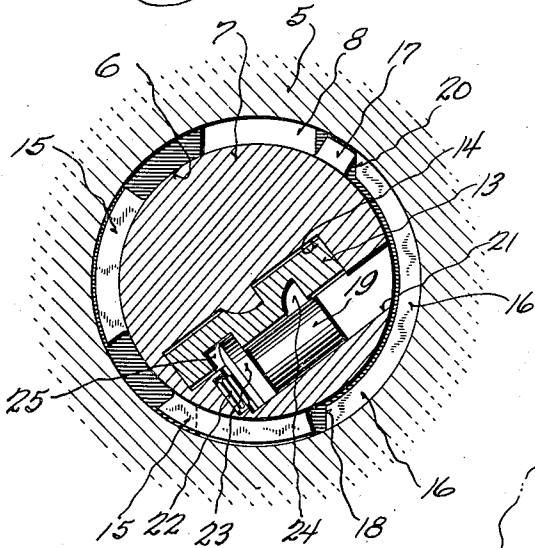
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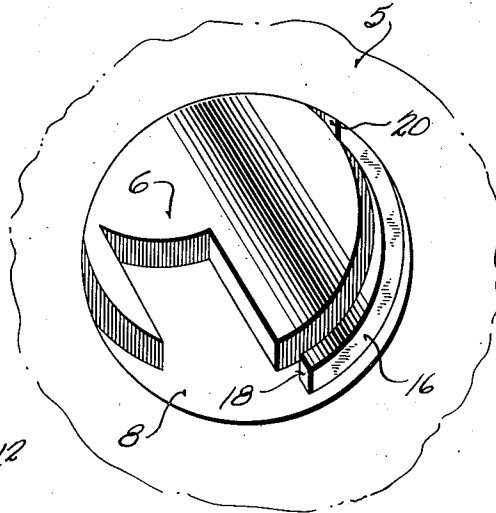
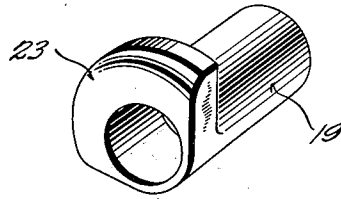
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2 Sheets-Sheet 2

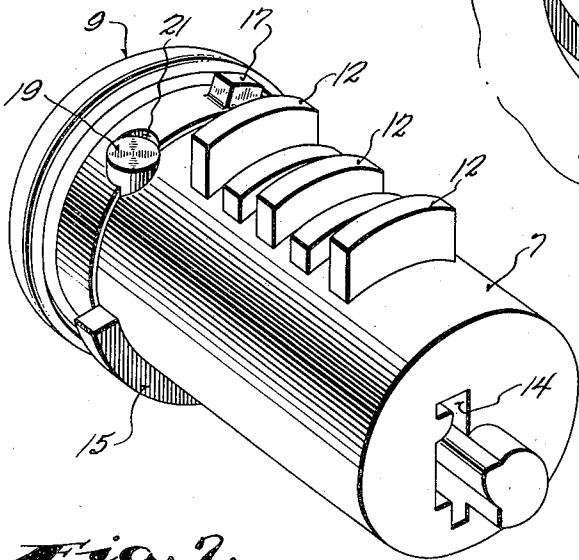
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



*Fig. 7.*

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# UNITED STATES PATENT OFFICE

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## CYLINDER LOCK

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12 Claims. (Cl. 70—368)

This invention relates to locks and refers particularly to removable cylinder locks.

It is an object of this invention to provide novel and improved means for removably securing a lock cylinder in its casing.

More specifically it is an object of this invention to provide a lock in which the cylinder is positively held against withdrawal except in one position of rotation and to which position releasable stop means normally prevents rotation of the cylinder.

Another object of this invention is to provide releasable stop means so located as to be accessible through the keyway of the cylinder and capable of being held in inactive position by the key.

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 in side elevation of a lock embodying this invention, parts thereof being broken away and in section;

Figure 2 is a cross section view taken through Figure 1 on the plane of the line 2—2;

Figure 3 is a view similar to Figure 2, but showing the releasable stop means in its inoperative position;

Figure 4 is a view similar to Figure 3 in that the stop is retracted to its inoperative position, but showing the cylinder turned to its withdrawing position;

Figure 5 is a perspective view of the releasable stop per se;

Figure 6 is a perspective view showing the mouth of the casing bore; and

Figure 7 is a perspective view of the cylinder.

Referring now more particularly to the accompanying drawings in which like numerals indicate like parts throughout the several views, the numeral 5 designates the casing of the lock, bored as at 6 to receive a lock cylinder 7. The mouth of the bore 6 opens to a counterbore 8 in which an enlarged head 9 on the front of the cylinder is disposed. At diametrically opposite

points, tumbler receiving grooves 10 and 11 communicate with the bore 6, the front ends of the grooves opening to the counterbore.

These grooves 10 and 11 are adapted to receive the ends of tumblers 12 mounted in the lock cylinder and adapted to be retracted within the periphery of the cylinder upon the insertion of a proper key 13 into the keyway 14 of the cylinder. Obviously, upon retraction of all of the tumblers by the insertion of a proper key, the cylinder is free for rotation.

The means for defining the normal limits of rotation of the cylinder and for securing the cylinder against withdrawal from the bore are located at the mouth of the bore and the front end of the cylinder. To hold the cylinder against withdrawal except when it is turned to a predetermined position, two circumferentially spaced but aligned lugs 15 project from the cylindrical surface of the cylinder inwardly from its enlarged head to engage behind an arcuate lug or ledge 16 projecting from the wall of the counterbore 8. This in effect gives the cylinder head an annular groove extending part way around its circumference into which the lug 16 projects. As long as the lugs 15, or any part thereof, are behind the ledge or lug 16, or stated another way, as long as the lug 16 is disposed in the annular groove of the cylinder head, withdrawal of the cylinder from the casing bore is positively prevented, and at no time throughout the normal range of rotary motion of the cylinder are both lugs 15 moved from in back of the ledge or lug 16.

Attention is directed to the location of the lug or ledge 16. It is to be observed that this lug projects from and is integral with the side wall of the counterbore, that it is spaced from the bottom of the counterbore and that it does not extend radially inside the diameter of the casing bore 6. This permits the lug to be produced in a very simple and expeditious manner. In the die-casting of the casing, which in practice may be an automobile door handle or the like, the lug is cast integral with the bottom of the counterbore, and in machining, its portion directly adjacent to the counterbore is cut away to produce the space in which the lugs 15 are received.

The normal limits of rotation of the cylinder are defined by a fixed stop lug 17 striking the end 18 of the ledge 16 and a releasable stop member 19 engaging the other end 20 of the ledge or lug 16. The releasable stop member 19 comprises substantially a circular pin slidable in a

bore 21 parallel to and alongside one flat side of the keyway 14. An expansive spring 22 confined between the inner end of the bore 21 and entering a bore in the pin or stop member 19 yieldingly projects the same outwardly into operative position, and when a key is not in place, the pin is pushed outwardly of its bore 21 until its outer end strikes the wall of the counter-bore 8.

It is, of course, to be appreciated that the stop pin 19 and the fixed lug 17 are in transverse alignment with the ledge 16 so as to properly engage the ends thereof and limit the rotation of the cylinder as desired.

Opposite the keyway 14, a passage communicates with the bore 21 and with the keyway so that a substantially quadrant-like flange 23 on the inner end of the pin 19 may project into the keyway. At its point of communication with the keyway, the bore 21, or rather the passage which communicates with the bore 21, is so shaped in cross section as to accommodate the quadrant-like flange 23 and thus hold the pin against rotation.

As clearly shown in the drawings, this flange 23 by projecting into the keyway is receivable in either one of the two longitudinal grooves 24 and 25 in the adjacent side of the key. Normally, that is, when it is not intended to withdraw the cylinder, the flange 23 engages in the groove 24, as shown in Figures 1 and 2. In this position, the outer end of the stop member 19 projects sufficiently far to have its desired rotation limiting effect.

When it is intended to withdraw the cylinder from the casing bore, any suitable tool is inserted into the front end of the keyway along with the key and in this manner the flange 23 is engaged in the groove 25 of the key which holds the same fully retracted, as shown in Figures 3 and 4, thus freeing the cylinder for rotation after the key has been fully inserted to retract the tumblers, beyond one of its normal limits of rotation to a withdrawing position defined by the engagement of the fixed stop lug 17 with the end 20 of the flange 16, as specifically shown in Figure 4. In this position of rotation, both lugs 15 are disengaged from in back of the lug or ledge 16 and the cylinder is free for withdrawal.

The tool used to engage the flange 23 in the groove 25 of the key may be any suitable pointed or chisel-ended instrument sufficiently narrow to allow its introduction through the front end of the keyway while the nose of the key is being inserted. Inasmuch as the groove 25 at the front end of the key is completely cut away at its top, the use of such a tool to lift the stop pin 19 and engage its flange 23 on the ledge formed by the bottom of the groove 25 of the key is a simple matter.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art to which this invention appertains that this invention provides an exceptionally simple and efficient manner of removably securing a cylinder in its casing.

What I claim as my invention is:

1. In a lock, a bored casing, a lock cylinder rotatable in the casing bore through predetermined normal limits upon the insertion of a proper key into the cylinder, means for positively preventing withdrawal of the cylinder from the bore except in a predetermined position of rotation which lies beyond one of its normal limits, releasable

means for defining said limit of rotation, and means on said last named means engageable with a shoulder on the key for holding said limiting means in an inoperative position permitting turning of the cylinder to said predetermined position.

2. In a lock, a bored casing, a cylinder rotatable in the casing bore between predetermined limits upon the insertion of a proper key, means for positively preventing withdrawal of the cylinder from the bore except in a predetermined position of rotation which lies beyond one of its normal limits of rotation, a releasable stop carried by the cylinder and operable to define said limit of rotation, means for yieldingly holding said stop in its operative position, and means on said stop engageable by a tool insertable into the cylinder along with the key for retracting the stop from its operative position to free the cylinder for rotation past said limit.

3. In a lock, a bored casing, a lock cylinder rotatable in the casing bore between predetermined limits upon the insertion of a proper key into its keyway, means for preventing withdrawal of the cylinder except in a predetermined position of rotation which lies beyond one of said normal limits of rotation, a stop member yieldingly projected from the cylinder for engagement with the casing to define said limit of rotation, and means on said stop member projecting into the keyway to be engageable with a shoulder on the key when said stop member is retracted out of its operative position so that the stop member is holdable out of operative position by the key to permit turning of the cylinder past said limit of rotation.

4. In a lock, a bored casing, a lock cylinder rotatable therein between predetermined normal limits of rotation upon the insertion of a proper key into its keyway, means for preventing withdrawal of the cylinder from the casing bore except in a predetermined position of rotation which lies beyond one of said normal limits of rotation, a stop member slidable in a bore opening to the cylindrical surface of the cylinder, a spring yieldingly urging the stop member outwardly of said bore into an operative position engageable with the casing to define said limit of rotation, and means on said stop member projecting into the keyway to be engageable by a tool insertable into the keyway for retracting the stop member when it is desired to turn the cylinder past said limit of rotation.

5. In a lock, a bored casing, a lock cylinder rotatable therein between predetermined normal limits of rotation upon the insertion of a proper key into its keyway, means for preventing withdrawal of the cylinder from the casing bore except in a predetermined position of rotation which lies beyond one of said normal limits of rotation, a stop member yieldingly projectable from the cylindrical surface of the cylinder for engagement with the casing to define said limit of rotation, and means on said stop member projecting into the keyway to be accessible to a tool by which the stop member may be retracted out of operative position, and said means being engageable with a shoulder on the key so that upon being moved to retracted position and engaged with the shoulder on the key, said stop member is held in inoperative position by the key.

6. In a lock, a bored casing, a lock cylinder rotatable in the casing bore between predetermined limits upon the insertion of a proper key into the keyway of the cylinder, means for positively preventing withdrawal of the cylinder from the bore except in a predetermined position of ro-

tation which lies beyond one of its normal limits, a movable stop member carried by the cylinder and engageable with the casing for defining said limit of rotation and having a part projecting into the keyway and so located as not to interfere with insertion of the key for normal actuation of the cylinder and engageable with the same key upon said stop member being moved to an inoperable position to be held by said key in said inoperable position.

7. In a lock, a bored casing, a lock cylinder rotatable in the casing bore between predetermined limits upon the insertion of a proper key into the keyway of the cylinder, means for positively preventing withdrawal of the cylinder from the bore except in a predetermined position of rotation which lies beyond one of its normal limits, a movable stop member carried by the cylinder and engageable with the casing for defining said limit of rotation, means on said stop member projecting into the keyway and so located as not to obstruct the passage of the key into the keyway for normal actuation of the cylinder and being engageable with the same key upon movement of said stop member to an inoperative position to be held by said key in said inoperative position, and said stop member being positioned near the mouth of said keyway.

8. In a lock, a bored casing, a lock cylinder rotatable in the casing bore between predetermined limits upon the insertion of a proper key into the keyway of the cylinder, means for positively preventing withdrawal of the cylinder from the bore except in a predetermined position of rotation which lies beyond one of its normal limits, a stop member movably carried in a bore in the cylinder and engageable with the casing for defining said limit of rotation, said bore in the cylinder communicating with the keyway near the mouth of the same to enable a part on said stop member to be projected into the keyway and be engageable with a shoulder on the key to be held in a position in which it is disengaged from the casing.

9. In a lock, a bored casing having a counterbore, a lock cylinder removably mounted in the casing and having an enlarged head disposed in the counterbore, said head being formed with an annular groove extending part way around the head and opening to the underside of the head,

a lug projecting radially inwards from the side wall of the counterbore at a distance from the bottom of the counterbore for disposition in the groove of the cylinder head to secure the cylinder against withdrawal except when turned to a predetermined position, and releasable means for limiting rotation of the cylinder and normally preventing rotation thereof to said predetermined position.

10. In a lock, a bored casing, a cylinder rotatable therein between predetermined normal limits upon the insertion of a proper key, means for positively preventing withdrawal of the cylinder except when the same has been turned to a predetermined position which lies beyond said normal limits, and means for defining the normal limits of rotation of the cylinder comprising circumferentially spaced abutments on the casing, and a stop member carried by the cylinder and biased to an operative position to collide with said abutments, said stop member being movable out of its operative position by a tool inserted into the front end of the cylinder.

11. In a lock, a bored casing, a lock cylinder rotatable therein between predetermined normal limits upon the insertion of a proper key, a flange directed inwardly from the wall of the bore with its inner wall forming an annular shoulder and one end thereof forming a substantially radial shoulder, means on the cylinder engaging the annular shoulder to positively prevent withdrawal of the cylinder except when said means is moved out of alignment with said annular shoulder, and releasable means carried by the cylinder and normally engageable with said radial shoulder to prevent rotation of the cylinder to its position freeing the first named means from said annular shoulder.

12. In a lock, a bored casing, a cylinder rotatable therein between predetermined limits, means for positively preventing withdrawal of the cylinder from the casing except when the same is in a predetermined position of rotation, and means for normally preventing rotation of the cylinder to said predetermined position, both of said means including separate cylinder carried parts and a single casing carried part coacting with the cylinder carried parts.