May 9, 1933. E. N. JACOBI 1,908,672

LOCK

Filed June 22, 1929 2 Sheets-Sheet 1

Fig. 1.

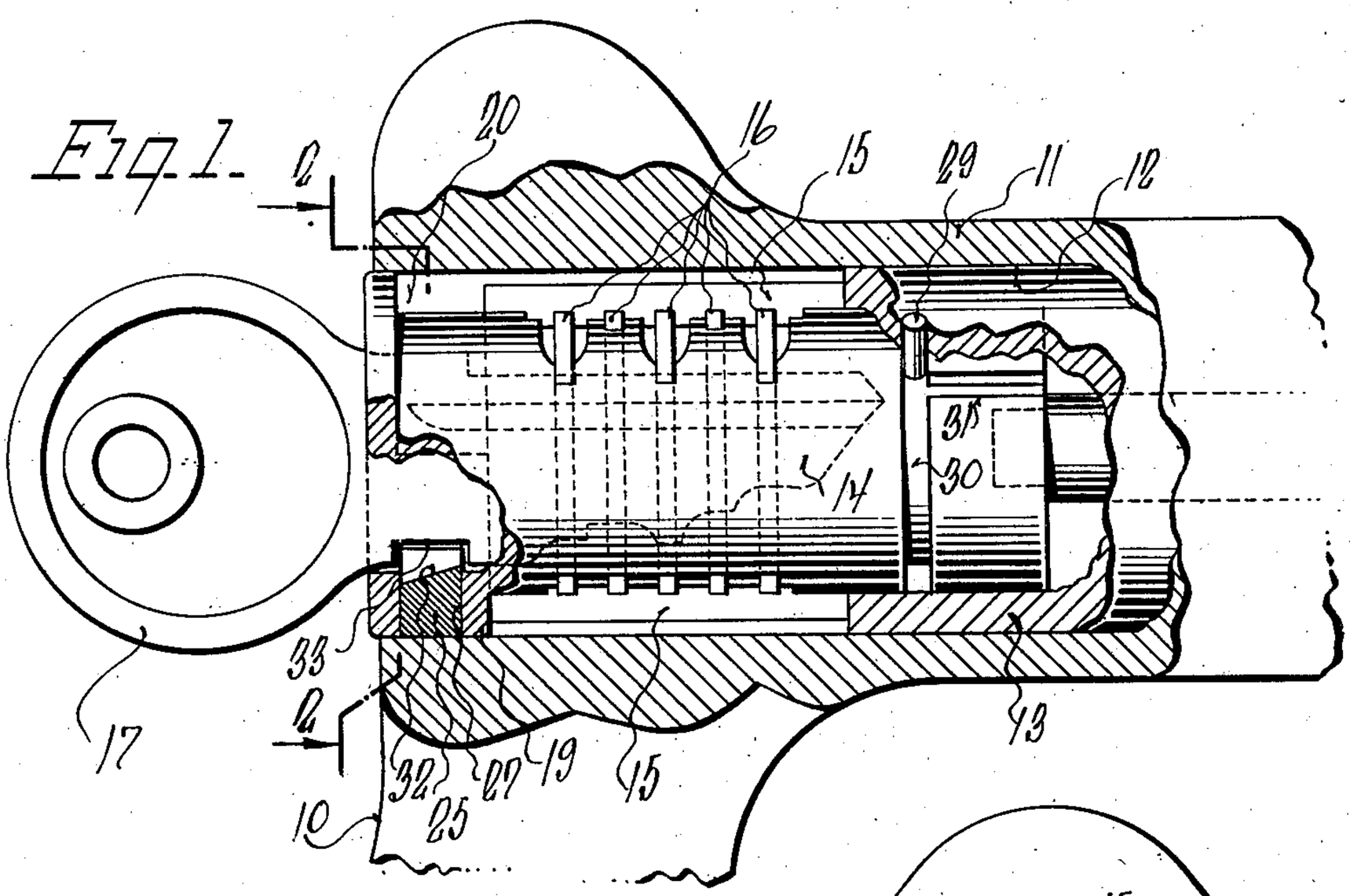


Fig. 2.

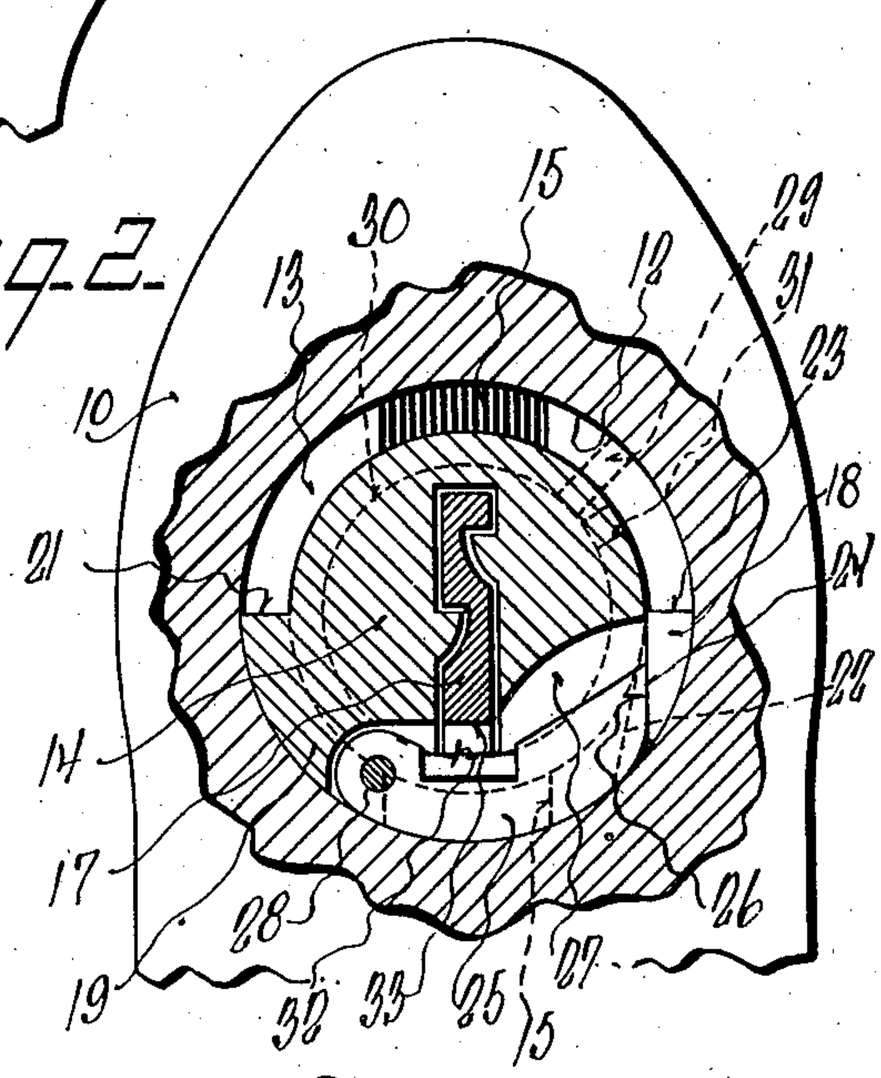
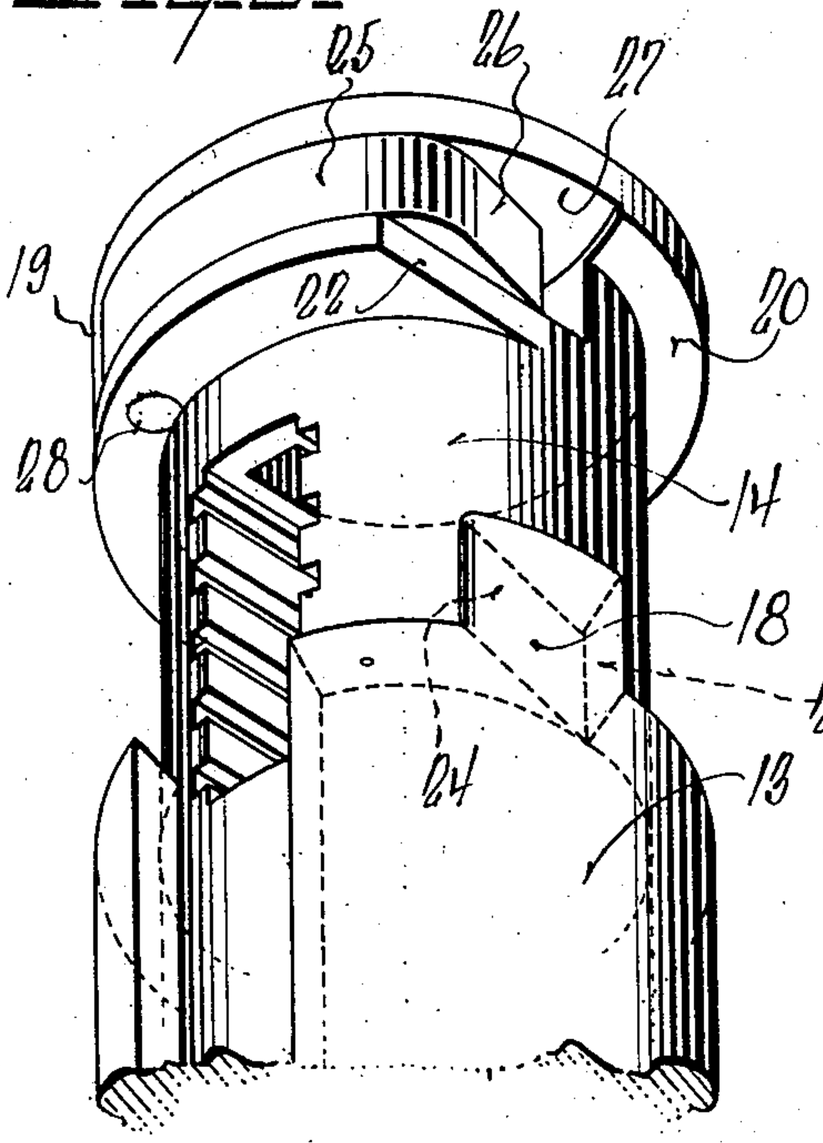


Fig. 3.



Witness

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May 9, 1933. E. N. JACOBI 1,908,672

LOCK

Filed June 22, 1929 2 Sheets-Sheet 2

Fig. 4.

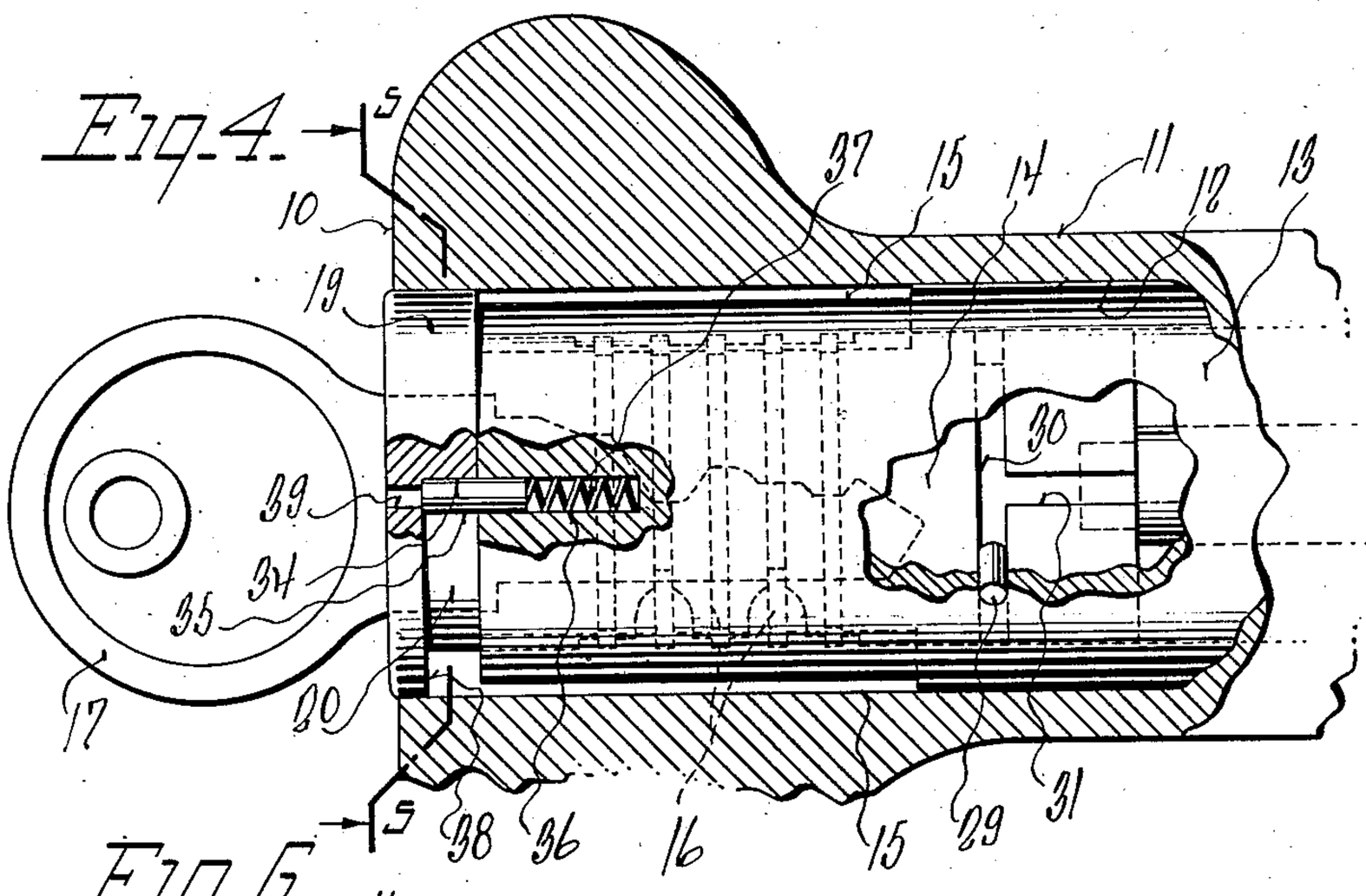


Fig. 6.

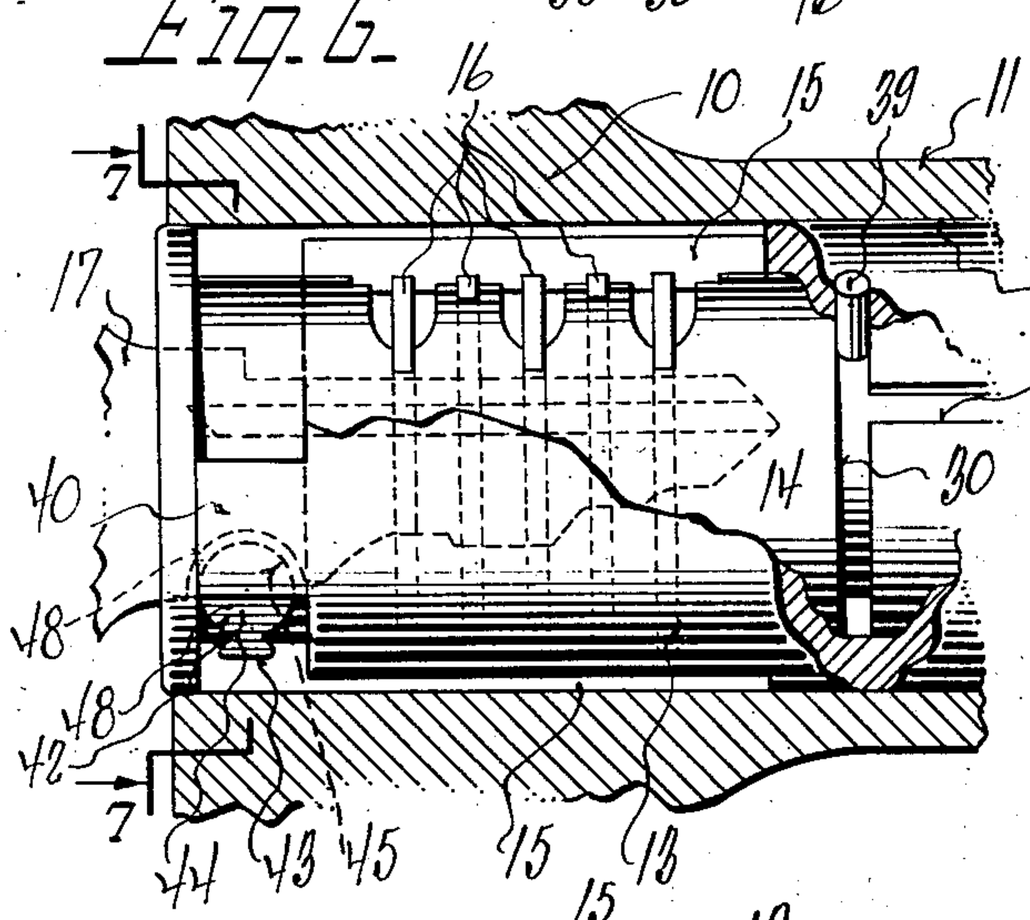
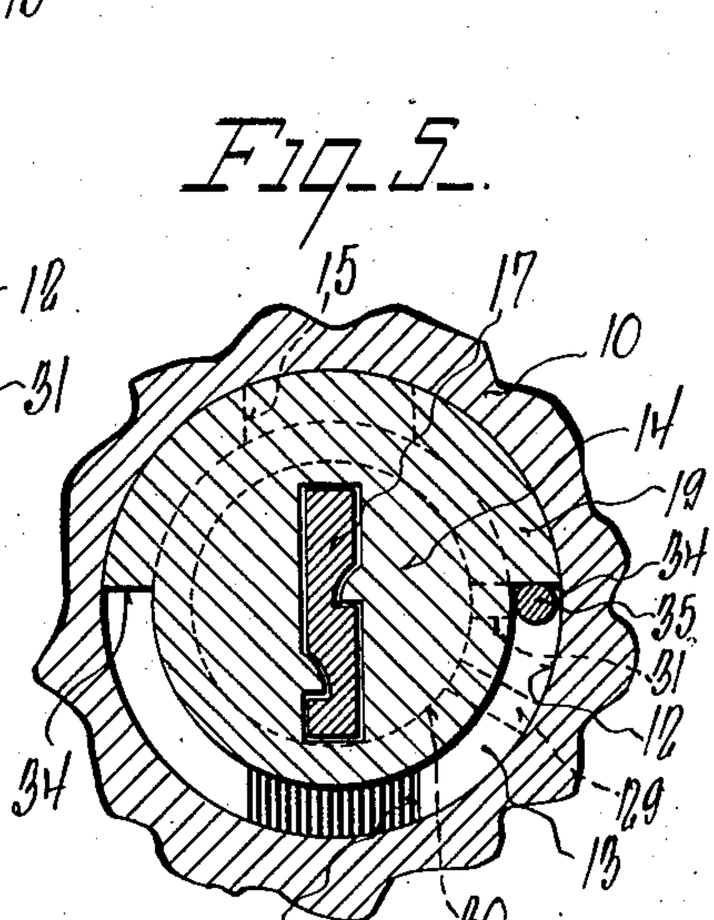


Fig. 5.



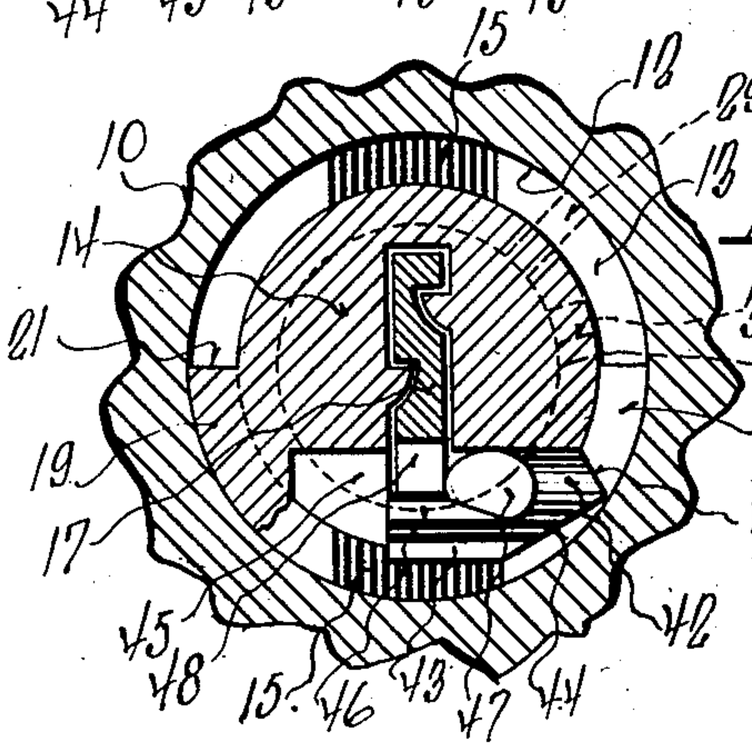


Fig. 7.

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Patented May 9, 1933 1,908,672

UNITED STATES PATENT OFFICE

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LOCK

Application filed June 22, 1929. Serial No. 372,922.

This invention relates to certain new and useful improvements in locks and refers more particularly to that type of lock having a lock cylinder provided with tumblers for maintaining it in certain positions, the tumblers being retractible to inoperative position by the insertion of a proper key, and as it is often necessary to remove the lock cylinder from its mounting member, this invention has as one of its objects the provision of means whereby this result may be conveniently accomplished.

Another object of this invention resides in the provision of a lock of the character described having means for releasing the lock cylinder for withdrawal which is so constructed as to necessitate turning of the cylinder to a predetermined position, thus requiring the use of a proper key and precluding unauthorized removal of the cylinder.

Another object of this invention resides in the provision of a lock of the character described in which the lock cylinder is provided with an annular groove in which a pin or lug carried by the mounting member rides to normally prevent longitudinal movement of the lock cylinder and its consequent removal from its mounting head, the lock cylinder being provided with a means of egress from the annular groove, for the mounting member carried part which is aligned therewith upon turning of the cylinder to a predetermined position.

Another object of this invention resides in the provision of means for securing the lock cylinder in its mounting member which is releasible upon turning of the cylinder to a predetermined position, and having means normally preventing the turning of the cylinder to said position to preclude the unauthorized removal of the lock cylinder.

A further object of this invention resides in the provision of a lock of the character described having means for securing its lock cylinder against removal which may be moved to inactive position to release the cylinder for removal by the use of a special key.

And a more specific object of this invention resides in the provision of a lock of the character described, in which the means for securing its cylinder against removal may be disabled by turning the cylinder to a predetermined position and having means cooperating with the usual key for preventing turning of the cylinder to said predetermined position, said means becoming inoperative with the use of a special key to thus permit withdrawal of the lock cylinder.

With the above and other objects in view which will appear as the description proceeds, my 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 herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawings, I have illustrated several complete examples of the physical embodiment of my invention constructed according to the best modes I have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a view, partly in elevation and partly in section, of a lock embodying my invention, mounted within a vehicle door handle;

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

Figure 3 is a fragmentary, perspective view of the outer end of the lock cylinder and the handle carried receiving shell or sleeve separated to illustrate the cooperating elements thereof;

Figure 4 is a view similar to Figure 1, illustrating a slightly modified form of my invention;

Figure 5 is a cross sectional view taken through Figure 4 on the plane of the line 5—5;

Figure 6 is a fragmentary view similar to Figure 1, illustrating another modified form of my invention, and

Figure 7 is a cross sectional view taken through Figure 6 on the plane of the line 7—7.

Referring now more particularly to the

accompanying drawings in which like numerals designate like parts throughout the several views, the numeral 10 represents a vehicle door handle having a shank 11 provided with an axial bore 12 extended inwardly from the outer front face of the handle to receive a lining member or tubular sleeve 13. The sleeve 13 is preferably formed of pressed steel, or the like, to provide the desired hard wearing surface and rotatably receives therein a lock cylinder 14. The tubular sleeve 13 is non-rotatably secured in the shank of the handle and is provided with diametrically opposed longitudinal slots 15 into which tumblers 16 carried by the lock cylinder extend to restrain rotation of the cylinder, the tumblers being retractible out of the slots 15 upon the insertion of a proper key 17 to free the cylinder for rotation.

Rotation of the cylinder is imparted to suitable latching means carried by the handle, but not shown as it forms no part of this invention, to release the handle for turning when the cylinder is in unlocked position, and to secure the same against actuation when in its locked position.

As the longitudinal slots 15 in the sleeve member are diametrically opposite, it follows that the degree of rotation of the cylinder must be 180 degrees to align the tumblers with the slots at the termination of each movement, and to limit the turning of the cylinder to 180 degrees, the outermost end of the sleeve is provided with a lug 18 which forms a stationary stop. Co-operating with the lug 18 are cylinder carried stops, now about to be described. The outermost end of the sleeve terminates inwardly of the front face of the handle, as best illustrated in Figure 1, and the space thus provided receives a flange 19 formed on the adjacent end of the lock cylinder. The flange 19 is stepped or cut away at its rear portion throughout slightly more than half its entire circumference, as at 20, to provide an abrupt abutment 21 and an inclined stop surface 22.

The abutment 21 cooperates with one side 23 of the lug 18 to limit turning of the cylinder in a clockwise direction. As illustrated in Figures 2 and 3, the lug 18 is substantially triangular in cross section, its major side forming an extension of the outer peripheral surface of the sleeve, and its third side or surface 24 being positioned substantially at right angles to its surface 23. Cooperating with the surface 24 of the lug 18 is a dog 25 pivotally carried by the lock cylinder, and normally has its outermost end 26 extended in advance of the inclined stop surface 22 to engage the surface 24 to limit counterclockwise rotation of the lock cylinder at the proper position necessary to align the tumblers with the longitudinal slots 15.

The dog 25 is disposed in a recess 27 formed in the annular flange 19 and normally forms a continuation of the periphery thereof, as best illustrated in Figure 3, being pivotally mounted in the recess 27 by a pin 28 passed through aligned apertures in the dog and the flange 19, but terminating short of the outer front face of the cylinder, to be movable inwardly of its normal position for a purpose to be later described.

Longitudinal movement of the lock cylinder in the sleeve is prevented by the projecting inner end of a pin 29 carried by the sleeve and received in an annular groove 30 formed in the lock cylinder adjacent its inner end. In inserting the lock cylinder into the sleeve, it is turned to a position at which a longitudinal channel 31, forming an entrance to the annular groove from the inner end of the cylinder, aligns with the pin 29, when the cylinder may be longitudinally moved to its proper position.

From Figure 2 it will be noted that it is necessary to turn the cylinder in a counterclockwise direction farther than its normal limit of movement, to align the longitudinal channel 31 with the pin 29. Therefore, when it is desired to remove the cylinder it will be necessary to move the dog 25 inwardly out of its normal position to permit further turning of the cylinder.

During normal operation, the engagement of the lower edge of the key with the top edge 32 of the dog, which is preferably inclined to facilitate the insertion of the key, prevents inward movement of the dog beyond its position illustrated in Figure 2, and thus prevents the turning of the cylinder beyond its normal limit of movement. However, those having authority may remove the cylinder with the aid of a special key which has a recess or notch 33, aligning with the dog 25 when in position, whereby turning of the cylinder in a counterclockwise direction causes the surface 24 of the lug 18 to force the dog 25 inwardly to permit further movement of the lock cylinder the recess 33 in the key, accommodating such movement of the dog.

The cylinder is thus turned in a counterclockwise direction until the inclined surface 22 engages the surface 24 of the lug 18, at which time the longitudinal slot 31 will be aligned with the pin 29 to permit the withdrawal of the cylinder.

In the modification illustrated in Figure 4, the same means of preventing removal of the cylinder is utilized, i. e. by the engagement of the pin 29 in the annular groove 30, but the means of limiting the normal turning of the cylinder is different. In this form of my invention, the ends 34 of the stepped or cut away portion 20 of the annular flange 19 are identical and are both similar to the end 21 in that form of the invention illustrated in Figures 1, 2 and 3. Cooperating with the ends 34 is a pin 35 slidably mounted in a recess 36 in the sleeve 13 and normally yielda-

bly urged outwardly thereof by an expansive spring 37 confined between the bottom of the recess and the inner end of the pin, to engage the back surface 38 of the stepped portion 20 of the annular flange.

During normal operation of the lock, the pin 35 cooperates with the ends 34 to limit the rotation of the cylinder, and when it is desired to align the longitudinal channel 31 with the pin 29 to release the lock cylinder for withdrawal, a piece of wire or other suitable tool is passed through an aperture 39 in the annular flange in axial alignment with the pin 35 when the cylinder is in its locked position, to depress the pin entirely within its recess 36 and out of engagement with the adjacent surface 34 to permit further turning of the cylinder by the key.

In the modification illustrated in Figures 6 and 7, a special key having a recess is again utilized to permit the movement of a stop member out of normal position. In this form of my invention a lug 40 somewhat similar to the lug 18 projects from the inner end of the sleeve 13 to lie within the path of the end 21 of the reduced portion of the annular flange 19 to limit clockwise rotation of the cylinder, and has its lower surface 41 preferably inclined and positioned to be engaged by a slidable stop member 42 carried by the lock cylinder. When the usual key is used, the slidable member 42 is held against movement and its end engages the surface 41 of the lug 40 to limit the turning of the cylinder at the proper time.

The member 42 is substantially cylindrical in cross section and is slidably mounted in a transverse recess 45 in the lock cylinder, a portion 43 projected from the bottom of the member being received in a correspondingly shaped groove communicating with the recess 45 to form a longitudinal guide to prevent turning of the member.

The outermost end of the member 42 is inclined to correspond with the inclination of the surface 41 of the lug and has its bottom cut off at an angle, as at 44, for a purpose to be later described, and the upper inner portion thereof is cut away and has a bottom inclined surface 46 and a side inclined wall 47. The inner end of the inclined wall 47 terminates in line with the adjacent side of the key when in normal position to prevent inward movement of the member 42 and thus provides a rigid stop to limit the rotation of the cylinder, the inclination of the bottom surface 46 and the side wall 47 facilitating the insertion of the key, as will be readily apparent.

When the special key, which has a recess 48 conforming to the shape of the member 42, is used, counter-clockwise rotation beyond the normal limit is permitted as the recess 48 allows the member 42 to be forced into its recess 45 by the lug 40, the inclined lower wall 44 providing a clearance and engaging the inner edge of the surface 41 of the lug 40 at the proper time to align the longitudinal channel 31 with the pin 29 and permit withdrawal of the cylinder.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art to which an invention of the character described appertains, that I provide a lock in which the lock cylinder is removed upon movement thereof beyond its normal limit of movement and in which such movement of the lock cylinder may be effected by the use of a special key or by the use of the usual key with the aid of a suitable tool od piece of wire.

What I claim as my invention is:

1. A clock device, comprising a mounting member, a key operable lock cylinder movable therein between predetermined limits in the performance of its normal locking functions, cooperating means carried by the mounting member and the lock cylinder defining said limits of movement, means securing the lock cylinder against removal from the mounting member which may be disabled by movement of the lock cylinder beyond one of its normal limits of movement, and means whereby the use of a special key enables the cooperating means between the mounting member and the lock cylinder to be disabled to permit the lock cylinder to be moved beyond said limit of movement to release the lock cylinder for removal from the mounting member.

2. In a lock device, comprising a mounting member, a key operable lock cylinder normally movable therein between predetermined limits in the performance of its locking functions upon the insertion of a proper key, cooperating means carried by the mounting member and the lock cylinder forming stops to define the limits of movement, an abutment carried by the lock cylinder, a part carried by the mounting member and engaged with the abutment to secure the lock cylinder against removal from the mounting member, said abutment being disengageable from the mounting member carried part upon movement of the lock cylinder beyond one of its normal limits of movement, and means whereby the insertion of an element other than the regular key into the lock cylinder enables authorized removal of the lock cylinder by disabling the cooperating means between the mounting member and the lock cylinder defining the limits of movement to permit movement of the lock cylinder beyond said limit of movement to release the same for removal from the mounting member.

3. A lock device, comprising a mounting member, a key operable lock cylinder movable therein between predetermined limits in the performance of its normal locking func-

tions upon the insertion of a proper key, cooperating means carried by the mounting member and the lock cylinder for defining said limits of movement, one of said means being movable to permit movement of the lock cylinder beyond one normal limit of movement, cooperating means carried by the mounting member and the lock cylinder for normally securing the lock cylinder in the mounting member without interfering with its locking functions, and being disabled by movement of the lock cylinder beyond said normal limit of movement to release the lock cylinder for removal from the mounting member, and means whereby the insertion of an element other than the regular key into the lock cylinder enables persons authorized to move said movable means which cooperates to define the normal limits of movement to permit movement of the lock cylinder beyond said normal limit and release the same for removal from the mounting member.

4. A lock device, comprising a mounting member, a key controlled lock cylinder movable therein between predetermined limits in the performance of its normal locking functions, cooperating means carried by the mounting member and the lock cylinder defining said limits of movement, one of said cooperating means being movable to permit the lock cylinder to be moved beyond one of its limits of movement, means for securing the lock cylinder against removal from the mounting member, said means being disabled by movement of the lock cylinder beyond said one limit of movement, and means whereby the use of a special key enables movement of said movable means cooperating to define the limits of movement of the lock cylinder, to permit the lock cylinder to move beyond said one limit and disable the securing means and release the lock cylinder for removal from the mounting member.

5. A lock device, comprising a mounting member, a key controlled lock cylinder movable therein between predetermined limits in the performance of its normal locking functions, cooperating means carried by the mounting member and the lock cylinder to define said limits, one of said cooperating means being movable, means for securing the lock cylinder against removal from the mounting member and being disabled by movement of the lock cylinder beyond one of its limits, and means whereby the usual key cooperates with the means defining the limits of movement of the lock cylinder to prevent movement of the lock cylinder beyond its limit and whereby a special key permits movement of the movable member cooperating to define the limits to permit the cylinder to be moved beyond its limits to release the lock cylinder for removal.

6. A lock device, comprising a mounting member, a key-controlled lock cylinder movable therein between predetermined limits in the performance of its normal locking functions, means for securing the lock cylinder against removal from the mounting member, said means being disabled by movement of the lock cylinder beyond one of its limits of movement, and means whereby the insertion of an element other than the regular key into the lock cylinder enables persons authorized to move the lock cylinder beyond said limit of movement to release the lock cylinder for removal.

7. A lock device, comprising a mounting member, a key controlled lock cylinder movable in the mounting member in the performance of its normal locking functions upon the insertion of a proper key, an abutment carried by the lock cylinder, a mounting member carried part engageable with the abutment to secure the lock cylinder against removal from the mounting member, the abutment being disengageable from the mounting member carried part when the lock cylinder is in a predetermined position, means normally preventing movement of the lock cylinder to said position while allowing its movement in the performance of its normal locking functions, and means whereby the use of an element other than the regular key enables persons having authority to disable the movement preventing means of the lock cylinder and move the lock cylinder to said predetermined position to disengage the abutment from the mounting member carried part and release the lock cylinder for removal.

8. A lock device comprising a mounting member, a key operable lock cylinder movable therein between predetermined limits in the performance of certain locking functions upon the insertion of a proper key, cooperating means carried by the mounting member and lock cylinder to define said limits of movement, and means whereby the insertion of an element other than the regular key enables authorized persons to disable said limiting means and move the cylinder beyond said predetermined limits to release the lock cylinder for withdrawal from the mounting member.

9. A lock device, comprising a mounting member, a lock cylinder movable in the mounting member upon the insertion of a key therein between predetermined terminal limits in the performance of certain locking functions, cooperating means carried by the mounting member and the lock cylinder to define said limits, one of the cooperating means being movable to permit the lock cylinder to be moved beyond its normal limits, means for securing the lock cylinder in the mounting member and being releasable to permit the withdrawal of the lock cylinder upon movement thereof beyond its normal limits of movement, and means whereby the usual key prevents movement of movable means coop-

erating to define the limits of movement of the lock cylinder and whereby the use of a special key having a recess to receive said movable means permits its movement and the movement of the lock cylinder beyond its limits of movement to release the lock cylinder for withdrawal from the mounting member.

10. A lock device, comprising a mounting member, a key controlled lock cylinder movable in the mounting member in the performance of its normal locking functions upon the insertion of a proper key, an abutment carried by the lock cylinder, an abutment carried by the mounting member and engageable with the other abutment to retain the lock cylinder in the mounting member, the abutments being disengageable from each other when the lock cylinder is in a predetermined position, means normally preventing movement of the lock cylinder to said position while allowing its movement in the performance of its normal locking functions, and means for disabling said means for preventing movement of the cylinder to said predetermined position.

11. A lock device, comprising a mounting member, a key controlled lock cylinder movable in the mounting member in the performance of its normal locking functions upon the insertion of a proper key, cooperating means carried by the mounting member and lock cylinder for retaining the lock cylinder in the mounting member without interfering with its movement in the performance of its normal locking functions, said means becoming inoperative upon movement of the lock cylinder to a predetermined position, and key controlled means normally preventing movement of the lock cylinder to said predetermined position.

12. A lock device, comprising a mounting member, a key controlled lock cylinder movable in the mounting member in the performance of its normal locking functions upon the insertion of a proper key, cooperating means carried by the mounting member and lock cylinder for retaining the lock cylinder in the mounting member without interfering with its movement in the performance of its normal locking functions, said means becoming inoperative upon movement of the lock cylinder to a predetermined position, and means whereby the movement of the lock cylinder to said predetermined position is dependent upon the key used.

13. A lock device, comprising a mounting member, a lock cylinder movable in the mounting member between predetermined limits in the performance of its normal locking functions, cooperating means carried by the mounting member and the lock cylinder for retaining the lock cylinder in the mounting member while allowing its movement in the performance of its normal locking functions, said means becoming inoperative upon movement of the lock cylinder to a predetermined position, means normally effective to define one of said limits of movement of the lock cylinder and prevent movement of the lock cylinder to said predetermined position, and means whereby the insertion of a tool into an opening in the lock cylinder makes said limiting means inoperative and permits the lock cylinder to be moved to said predetermined position.

14. A lock device comprising a mounting member, a key operable lock cylinder movable therein between predetermined limits in the performance of certain locking functions, upon the insertion of a proper key, cooperating means carried by the mounting member and lock cylinder to define said limits of movement, and means securing the lock cylinder in the mounting member and releasable upon movement of the lock cylinder beyond said predetermined limits of movement, one of said cooperating means being movable out of its operative position upon the insertion of an element other than the regular key, whereby the lock cylinder is movable beyond said predetermined limits to release the same for withdrawal from the mounting member.

In testimony whereof I have hereunto affixed my signature.

EDWARD N. JACOBI.