Feb. 25, 1930. M. TIBBETTS 1,748,255

LOCK

Filed Dec. 11, 1926

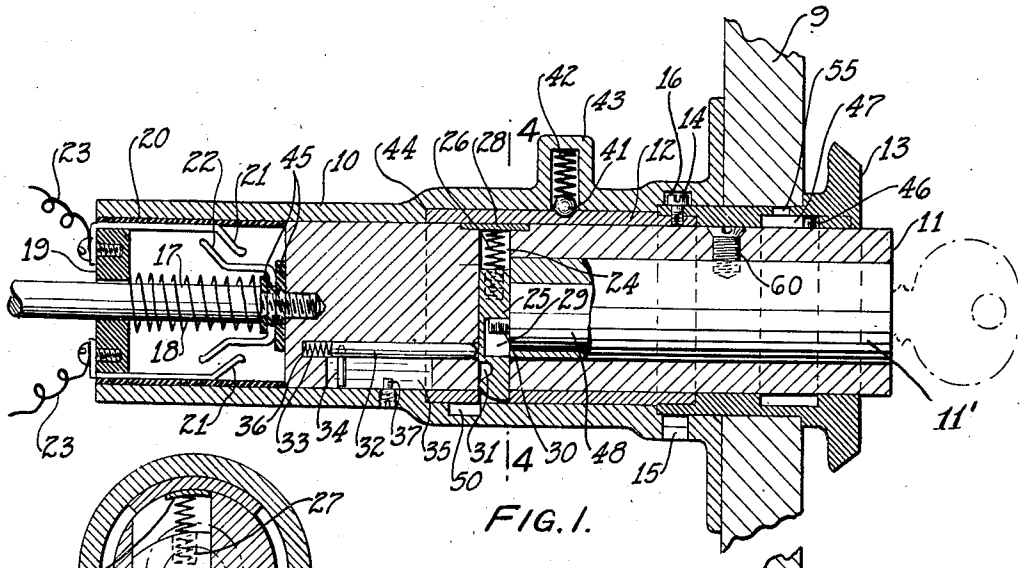


FIG. 1.

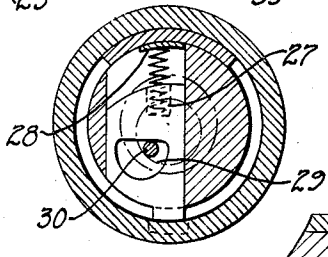


FIG. 4.

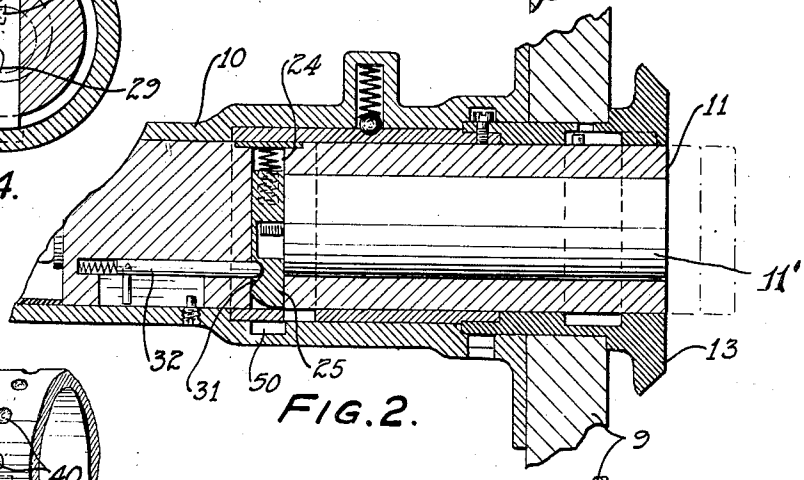


FIG. 2.

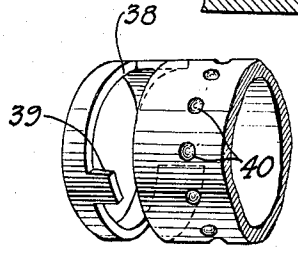


FIG. 5.

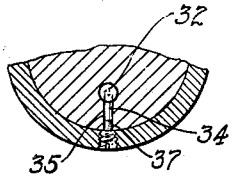


FIG. 6.

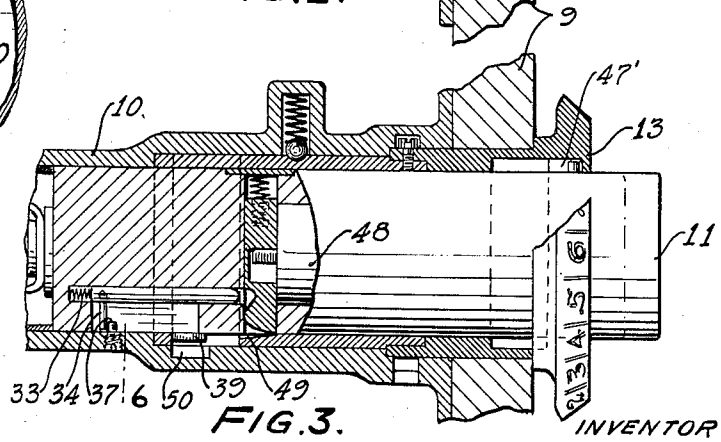


FIG. 3.

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UNITED STATES PATENT OFFICE

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LOCK

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This invention relates to locks and more particularly to locks operable with or without a key.

It has been found that an important phase of the problem of preventing the theft of movable property, such as automobiles, is the failure or negligence on the part of owners to use the locks provided. This negligence is caused principally by the fact that motor vehicle locks generally require the use of a key and are, in this and other respects, more or less inconvenient, if not actually difficult to lock and unlock. It therefore, appears that the proper line of attack upon the car theft problem is to induce the operators and owners to lock their cars and that this may be accomplished by providing locks that may be readily and conveniently operated, preferably without the insertion and manipulation of a key.

An object of this invention is to simplify the construction and operation of lock mechanisms.

A related object is to control the release of a locked member either by means of a key or by suitable manipulation of a control member.

A further object is to control the release of a key operated lock independent of the key.

An additional object is to control the release of a combination lock by means of a key.

A feature of the invention is a combined key and combination lock.

Another feature of the invention is a combined key and combination lock comprising co-axially arranged members of substantially only cylindrical form.

A further feature is a lock adapted for key or combination control, wherein the key controlled member and the combination controlled member are arranged co-axially.

Broadly, this invention comprehends a member to be locked and means for releasing said member under control of a key or, independently thereof, in accordance with predetermined manipulation of a separate control member. Specifically, the member to be locked may be an electric switch actuating mechanism, for example, an ignition switch on an automobile. The locking mechanism may include a retaining latch, adapted to be actuated by means of a suitable key, and also by proper manipulation of another means, capable of a plurality of different manipulations, to release the lock. The latch is adapted to engage a plurality of different elements, for locking the member in a plurality of positions, for example, to lock the member in an additional position, other than its normal locked position, upon improper manipulation thereof. This device is also adapted to render the manipulative means inoperative when an improper manipulation thereof is made.

Other features and objects of the invention will appear from the following description, taken in connection with the accompanying drawings.

Like reference characters have been used to indicate like parts in the several figures of the drawings, wherein:

Fig. 1 is a view, in longitudinal section, of applicant's device, showing the cylinder in locked position;

Fig. 2 is a partial view, in longitudinal section, of the device of Fig. 1, showing the position of the cylinder preparatory to unlocking;

Fig. 3 is a view similar to Fig. 2 showing the lock cylinder released;

Fig. 4 is a transverse section on line 4—4 of Fig. 1;

Fig. 5 is a perspective view of one end of the bushing 12 of Fig. 1, and

Fig. 6 is a partial sectional view, on line 6 of Fig. 3.

The device, shown in Fig. 1, includes a cylindrical casing 10, suitably supported by a panel member 9. An outer lock cylinder 11 is inserted in the casing 10. This cylinder is surrounded by a two-part bushing 12 having a dialed knob 13.

The casing 10 is of such diameter at its inner end as to fit the cylinder 11, and adjacent to the bushing 12, it is enlarged to accommodate the bushing. The bushing is fitted to the casing and abuts against a shoulder 44 formed in the enlargement thereof.

A switch contact spring 22 is attached to the cylinder 11, between two insulating

washers 45, by a rod 17 threaded in one end of the cylinder. One washer provides a bushing for the spring 22 and these washers co-operate to completely insulate the spring from the rod and the cylinder. The rod extends, co-axially with the cylinder, through a circular aperture in the center of an insulating plug 19, fitted to the end of the casing 10 inside of an insulating bushing 20. This rod may be utilized to actuate any desired member. The elements 19 and 20 serve to support the fixed contact spring 21 of the switch and to insulate it from the casing 10. Suitable terminals 23, on these springs, are adapted to be connected to an external circuit. The switch 21—22 may be closed or opened i. e. the contacts may be electrically engaged or disengaged by axial movement of the cylinder 11, inwardly or outwardly, respectively, within the casing 10 and the bushing 12.

A coil spring 18, positioned around the rod 17, abuts at one end against the plug 19 and at its other end against the inner insulating washer 45. This spring exerts a longitudinal thrust upon the cylinder 11, tending to move this cylinder outwardly, to close the switch. The cylinder 11 is adapted to be pushed inwardly by the operator in order to open the switch. The axial movement of the cylinder, under the action of spring 18, is prevented under certain conditions by a latch 25, slidable in a rectangular slot 24 provided in the cylinder 11. When the latch is released, the cylinder moves outwardly, closing the switch. Its motion in this direction is limited by a pin 46 attached thereto and projecting into a slot 47 having a lateral extension 47′ provided in the inner periphery of the bushing 12, adjacent to the dial knob 13. This pin, by engaging a side wall of the slot 47, prevents movement of the cylinder to the position where the switch is closed, except when the bushing 12 is rotated to aline the extension 47′, of the slot, with the pin (see Fig. 3). In other positions of the bushing, the cylinder will be stopped in the position shown in Fig. 1. The pin 46, therefore, compels the rotation of the dial 13, away from the position at which the latch is released, before the switch can be closed. This prevents any unauthorized person from discovering the combination while the mechanism is unlocked.

An opening 55, in the bushing 12, communicating with the slot 47, permits insertion and removal of the stop pin 46 in assembling or disassembling the lock. This opening, in the installed position of the lock, is rendered inaccessible by the panel member 9, hence the lock cannot be disassembled, when the mechanism is locked.

A position of the cylinder 11, at which it is retained by the latch 25 and stopped by the pin 46, is shown in Fig. 1, and a position thereof, at which it is stopped only by the pin 46, is shown in Fig. 3.

The two parts of the bushing 12 are joined by a suitable screw or screws 14, access to which is provided by a radial slot 15 in the casing 10. The slot 15 is positioned back of the panel 9 so as to be inaccessible, when the mechanism is locked. An annular way 16, in the inner periphery of the casing 10, communicates with the slot 15 and accommodates the projecting head of the screw 14. The head of screw 14 travels in the way during rotation of the bushing 12, within the casing 10, but prevents axial movement of the bushing, by engaging a side of the way.

Fitted within the cylinder 11 is an inner lock cylinder 11′, of any well known type, having a key cylinder 48 fitted therein and retained by suitable spring actuated plungers, adapted to be released by a suitable key, to permit rotation of this cylinder, in a manner well understood. The plungers and key are not illustrated, because they are of well known construction, but the outline of the key handle is shown in broken lines in Fig. 1. The cylinders 11 and 11′ are rigidly fastened together by a set screw 60.

In the locked position of the cylinder 11, as shown in Fig. 1, the tongue of the latch 25 is normally, yieldingly pressed, through the slot 38 in bushing 12, against the inner wall of casing 10, by a coil spring 26. The tongue thus engages the edge of the bushing and retains the cylinder 11 in locked position. One end of the spring 26 is inserted in a recess 27 of the latch, (Fig. 4) and the other end abuts against a plate 28. The plate 28 is fitted in a suitable slot, in the outer periphery of the cylinder 11. The outer surface of this plate is flush with the surface of the cylinder so as to permit the cylinder to slide within the bushing 12.

The latch 25 includes a transverse recess 29, in its front face into which a pin 30, positioned eccentrically on the end of the key cylinder 48 extends. Upon rotation of the key cylinder through an arc of approximately 45 degrees in a clock-wise direction, by turning the key, the pin 30 engages the upper side of the recess 29 and raises the latch.

In the rear face of the latch 25, is provided another transverse recess 31, adapted to receive a pin 32 when the latch is raised (see Fig. 2). The pin 32 reciprocates in a slot 36, positioned in the cylinder 11 normal to the plane of the slot 24. A suitable coil spring 33 yieldingly thrusts the pin 32 against the latch. A radial projection 34 (see Fig. 6) on the pin 32 extends into a rectangular way 35, communicating with a considerable length of the slot 36. The latch, the pin 32, and its projection 34 are carried by the cylinder 11, under the action of spring 18, to the position shown in Fig. 3, when the latch is raised and the dial is in the proper position. During

such travel, the projection 34 engages a lug 37, threaded to the casing 10 and projecting inwardly into the way 35, whereby the pin 32 is retracted. The lug 37 also prevents rotation of the cylinder 11 by engaging the side walls of the way.

The rotatable bushing 12 is provided, at its inner end, with a circumferential slot 38 (see Fig. 5), which defines an inwardly projecting, integral lug 39. This lug is adapted, upon proper manipulation of the bushing, to be positioned in line with, and adjacent to, the tongue of the latch 25. The lug is shown in the position mentioned in Figs. 1 and 2. The bushing also includes on its outer periphery a series of depressions 40, adapted to receive a ball 41 yieldingly pressed by a spring 42, inserted in a recess formed in an integral boss 43 on the casing 10. The depressions 40 correspond in position to the marks on the dial 13. The ball 41 functions to indicate the several positions of the dial, by an audible click, as it falls into the successive depressions, when the bushing is rotated. It also functions to yieldingly retain the bushing in its adjusted position.

In the locked position of the cylinder 11, as shown in Fig. 1, the latch 25 is depressed into the slot 38 by the action of spring 26. In this position, the latch retains the cylinder, to prevent its outward movement and hence prevents switch contacts 21 from engaging contacts 22. The cylinder may be unlocked and the switch closed by means of the key as already described.

The cylinder may also be unlocked by manipulating the dial 13 to the position illustrated in Fig. 1, wherein the lug 39 on the bushing is adjacent to the tongue of the latch, so that by pressing the cylinder 11 inwardly the tongue rides upon the lug 39 to its raised position and the latch is retained in this position by the pin 32. The cylinder 11 moves outwardly, under the action of spring 18, when released by the operator. The pin 46 retains the cylinder in the position shown in Fig. 1, until the dial is rotated to the position shown in Fig. 3. The pin 46 then slides into the lateral extension 47′ of the slot 47; the cylinder assumes the position shown in this figure; and the switch is closed.

When the cylinder 11 moves to the position shown in Fig. 3, the tongue of the latch 25 passes over a beveled portion 49 on the bushing, and the rod 32 is retracted from engagement with the latch by engagement of the extension 34 with lug 37. Accordingly, when the cylinder is again moved inwardly, by the operator, to open and lock the switch the latch slides downwardly along the beveled portion 49, on the bushing, so that the recess 31 drops out of alinement with the end of the pin 32, thus freeing the latch from the pin. The latch, therefore, drops behind the edge of the bushing as shown in Fig. 1 and locks the cylinder.

Should an unauthorized person, in attempting to unlock the device, improperly manipulate the dial 13, the latch 25, upon movement of the cylinder 11 inwardly, will fail to engage the lug 39 and will accordingly be depressed into a circular slot 50 provided in the inner periphery of the casing 10. In this position, neither the cylinder 11 nor the bushing 12 can be manipulated to raise the latch, because the latch retains the cylinder and engages the side of lug 39 when the bushing 12 is rotated. The cylinder therefore remains locked, the switch contacts 21 and 22 remain disengaged, and the mechanism may only be released by using the proper key, in the manner already explained.

From the foregoing description it will be apparent that the device disclosed herein has important advantages. For example the lock mechanism may be released either by means of a key or by means of a suitable manipulation of the dial and upon improper manipulation may only be released by a key. Moreover the several members of the lock are substantially all of cylindrical form and are so arranged that the device occupies a limited space and presents a pleasing appearance. The elements are also of such form that they may be manufactured and assembled at small cost. In addition the arrangement of the several elements of the lock is such as to make it practically impossible for thieves to disassemble or force the lock.

Although the invention has been described in connection with a specific embodiment, the principles involved are susceptible of numerous other applications contemplated within the invention, which will readily occur to persons skilled in the art. The invention is therefore to be limited only as indicated by the scope of the appended claims.

What is claimed is:

1. A lock comprising a cylindrical casing, a cylindrical bushing rotatable within said casing, a lock cylinder axially movable within said bushing, and means for retaining said lock cylinder, said means being adapted to be released by manipulation of said bushing or by means of a key.

2. A lock comprising a cylindrical casing, a manipulatable cylindrical bushing fitted within said casing, a lock cylinder axially movable within said bushing, means for retaining said cylinder, said cylinder being adapted to be released or locked by the same operation thereof, depending upon whether or not the proper manipulation of said bushing has been made.

3. In a lock, a rotatable member, an axially movable member, a stationary member, and a latch on said axially movable member adapted, in one position of said member, to be retained by said rotatable member and in

another position thereof to be retained by said stationary member.

4. In a lock, a rotatable cylinder, a spring actuated axially movable member, a stationary member and means for locking said axially movable member, said means being adapted, in separate positions of said axially movable member, to engage said cylinder and said stationary member.

5. In combination, in a lock mechanism, a cylindrically apertured casing, a bushing rotatably fitted to said casing, a cylinder axially movable within said bushing, and means for locking said cylinder in a plurality of positions.

6. In a lock mechanism, a support, a spring actuated lock cylinder axially movable in said support, a locking member on said cylinder adapted to engage said support and to retain said cylinder against the action of said spring, means for releasing said locking member, a pin in said cylinder, the supporting member having a slot co-operating with said pin to retain said cylinder in a plurality of positions.

7. In a lock mechanism, a member to be locked, a latch supported by said member, a catch for said latch, means for disengaging said latch from said catch, and a spring actuated member adapted to retain said latch in its disengaged position.

8. A lock comprising a bushing, having a slot, a cylinder slidably fitted to said bushing, a latch member and a pin member on said cylinder, the latch member adapted to move in the slot of said bushing, to retain said cylinder in locked position, and the pin member acting to determine the position of said bushing, when said cylinder is in unlocked position.

9. In a locking mechanism, the combination of a rotatable cylindrical bushing having a slot defining a lug, a member to be locked slidably fitted inside of said bushing, a latch on said member normally inserted in said slot, said latch being adapted to be raised upon said lug, by rotation of said bushing to a predetermined position and by subsequent manipulation of said member, whereby said member is released.

10. In a lock, a rotatable cylindrical bushing having a slot therein, a lock cylinder in said bushing having a pin inserted in said slot, and a resilient member adapted to move said cylinder, when released, relative to said bushing, said pin and slot being adapted to require rotation of said bushing to a predetermined position to effect a complete release of said cylinder.

11. A lock mechanism comprising a member to be locked, a bushing on said member capable of a plurality of manipulations, a latch carried by said cylinder engaging said bushing adapted to be released by one only of the several manipulations of said bushing, and a pin cooperating with a slot to retain said cylinder in locked position, after release of said latch, until said bushing is given a different predetermined manipulation.

12. In a lock mechanism, a lock cylinder, a control member including a manipulatable bushing on said cylinder, said cylinder being adapted to be unlocked after predetermined setting of said control member, and means for rendering said control member ineffective to release said cylinder after wrongful manipulation thereof.

13. In a lock mechanism, a manipulatable bushing, a cylindrical member axially movable in said bushing, means for retaining said member in locked position, said member being adapted to be released after a given manipulation of said bushing, but to be additionally locked upon wrongful manipulation thereof.

In testimony whereof I affix my signature.

MILTON TIBBETTS.