Jan. 30, 1962 D. MORRISON, JR 3,018,651

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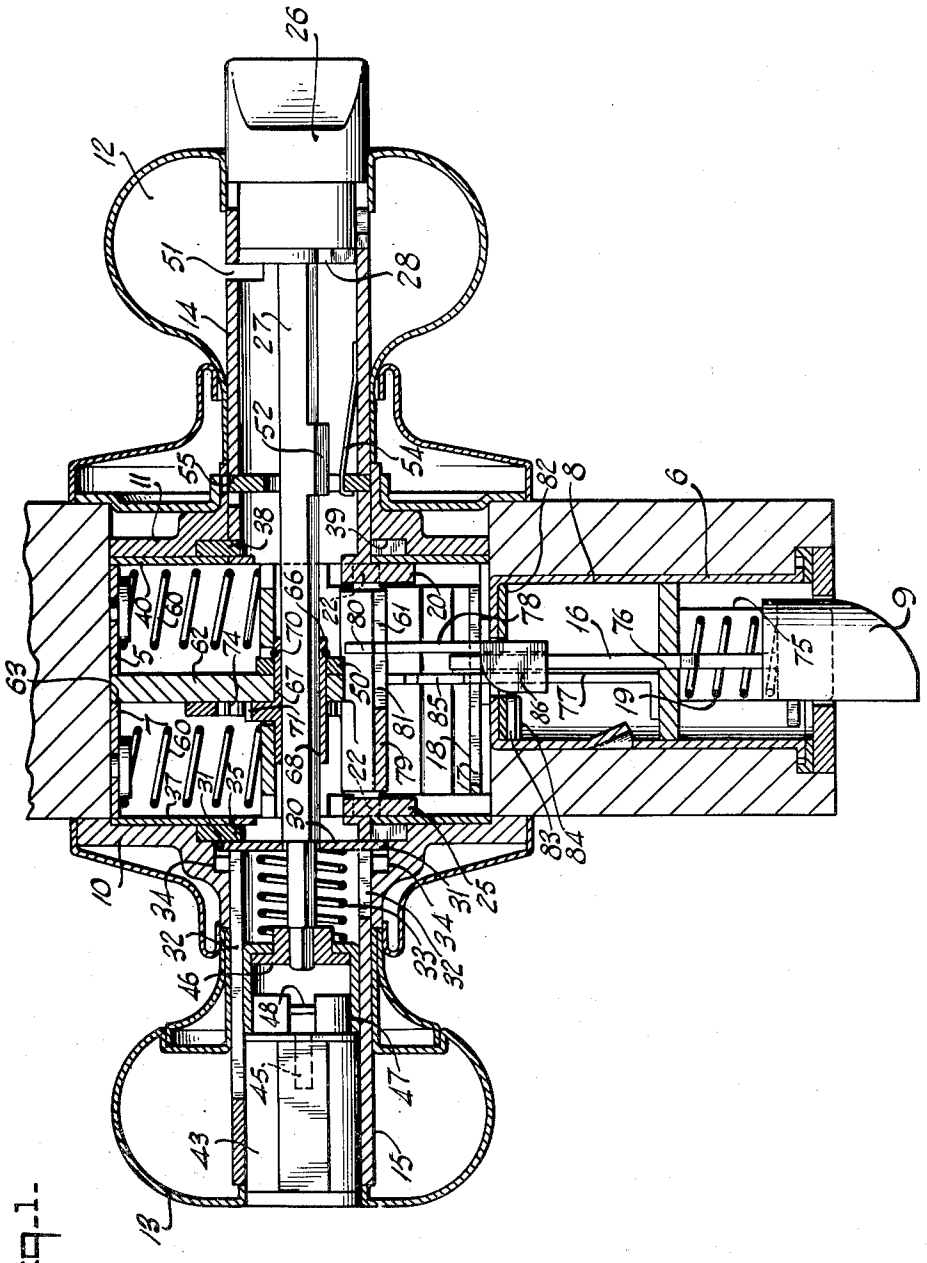


Fig. 1.

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Mitchell Becker
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Fig. 2.

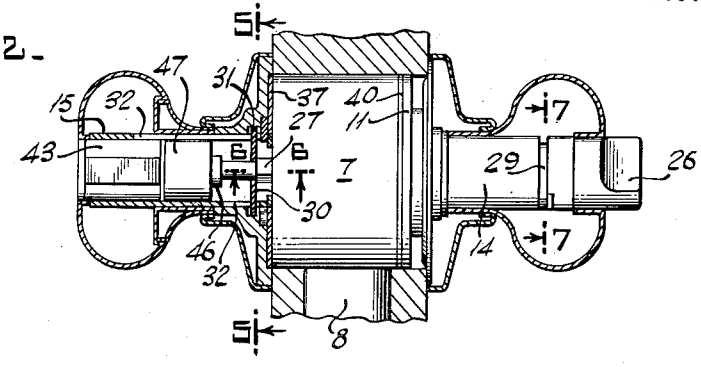


Fig. 3.

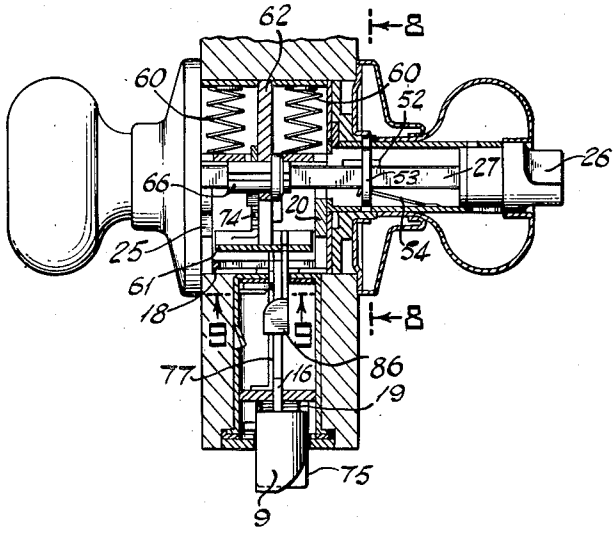
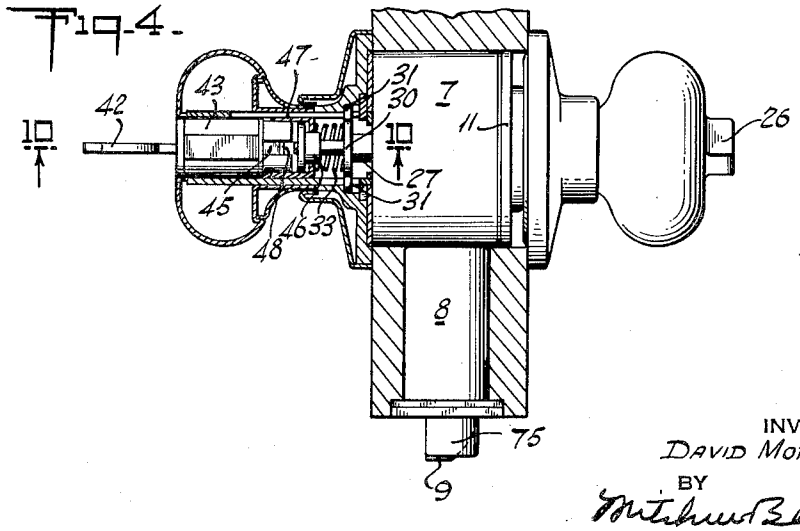


Fig. 4.



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Fig-5-

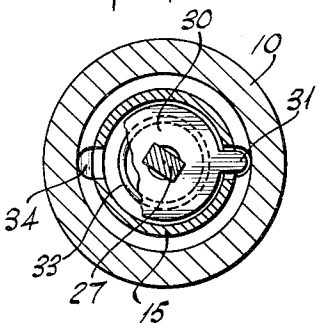


Fig-6-

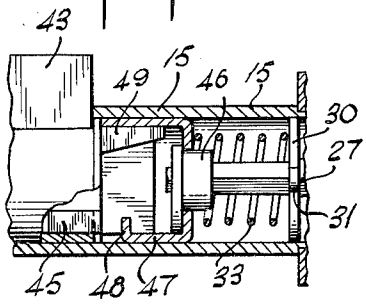


Fig-7-

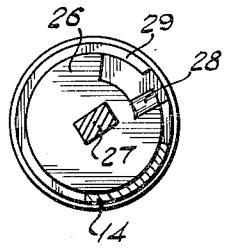


Fig-8-

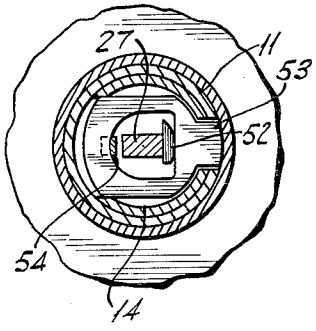


Fig-9-

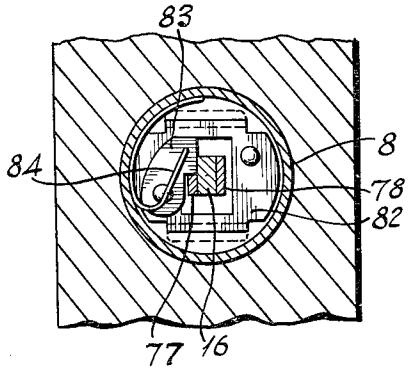


Fig-10-

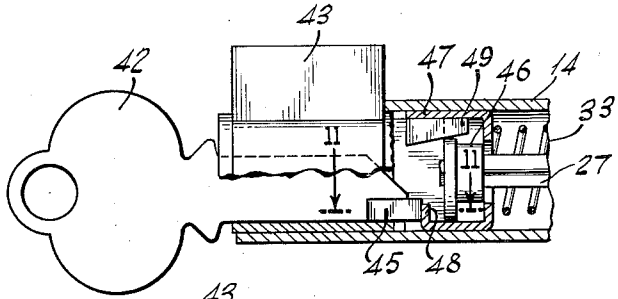
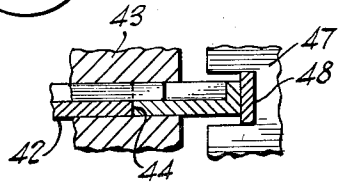


Fig-11-



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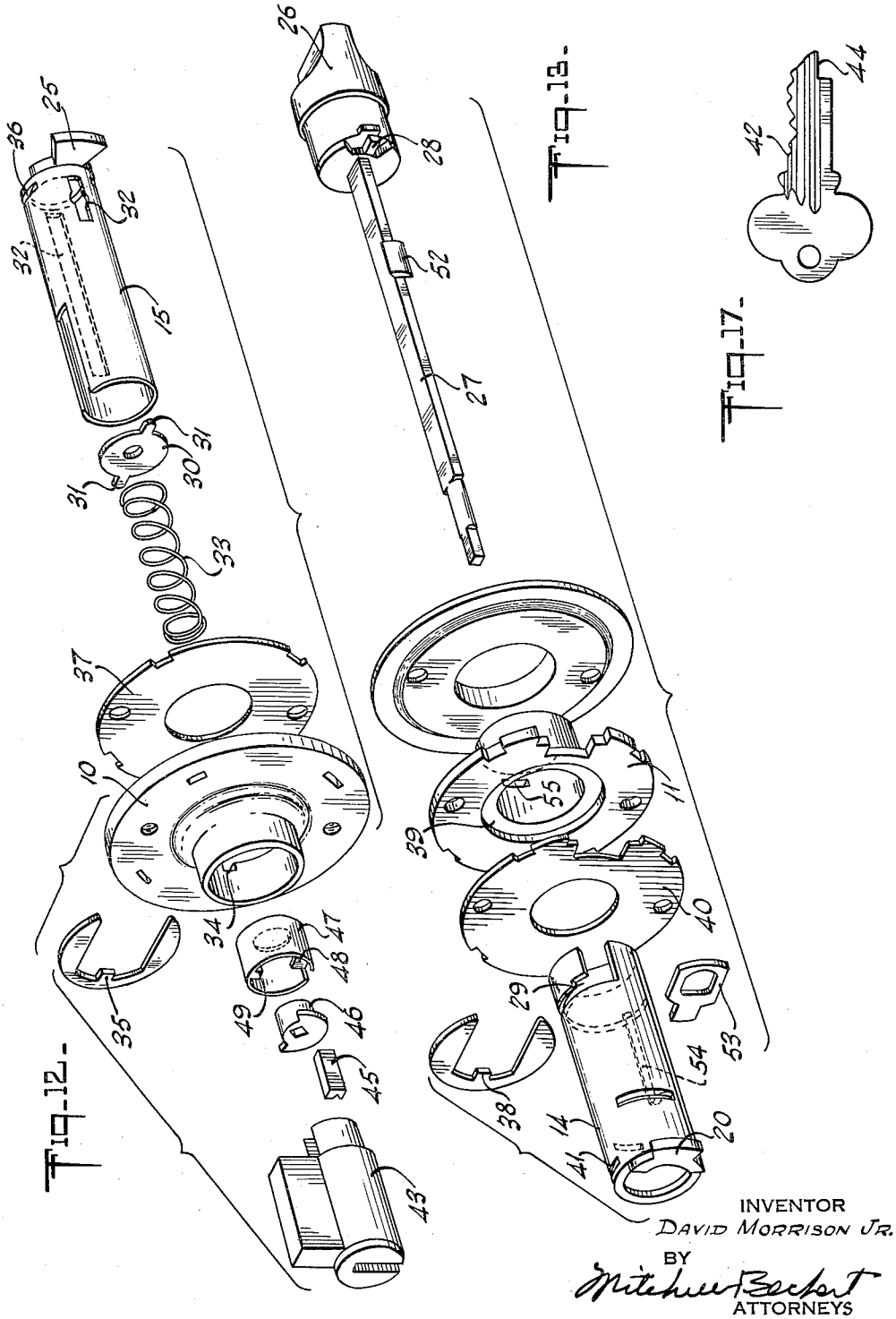


FIG-13-

FIG-17-

FIG-12-

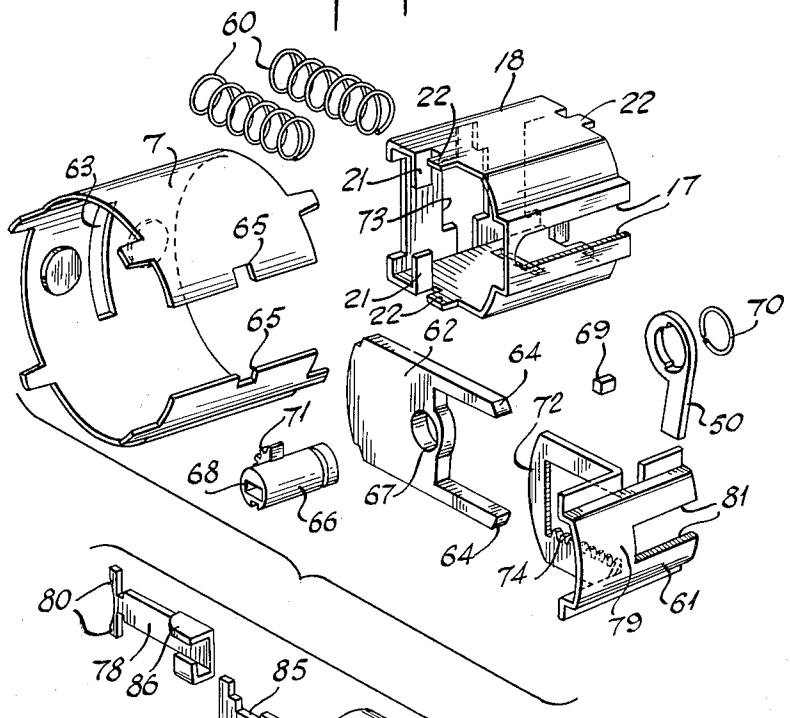
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Fig. 14.



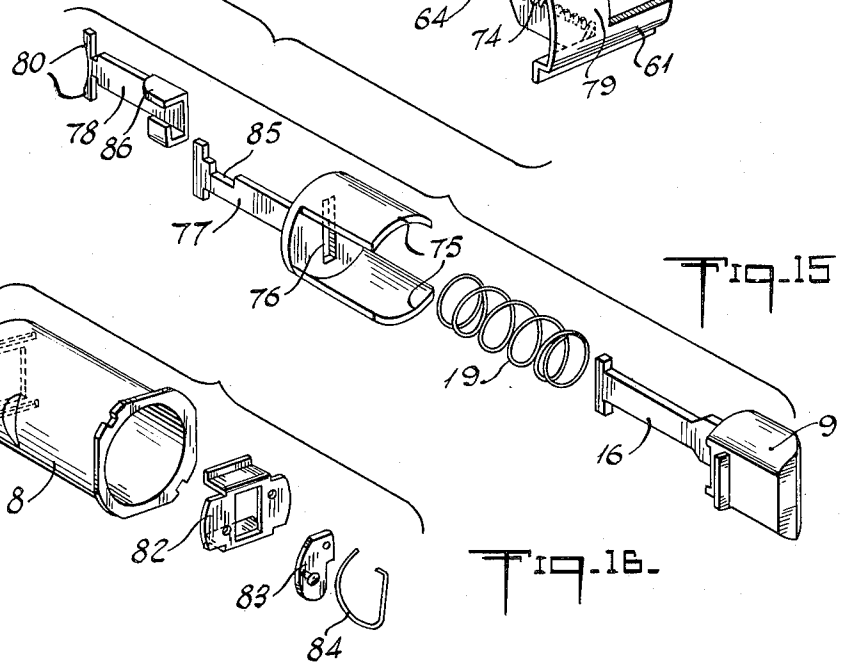


Fig. 15

Fig. 16.

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Fig. 18.

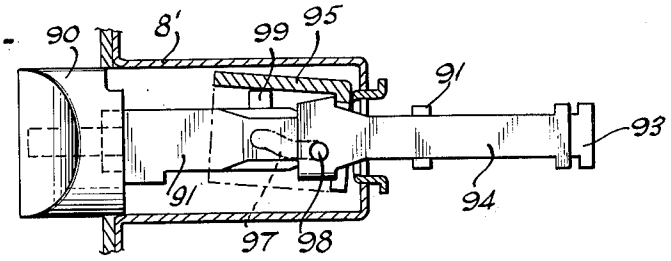


Fig. 19.

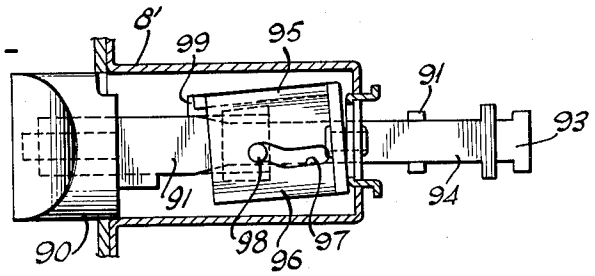


Fig. 20.

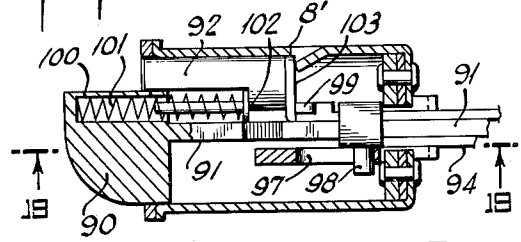


Fig. 21.

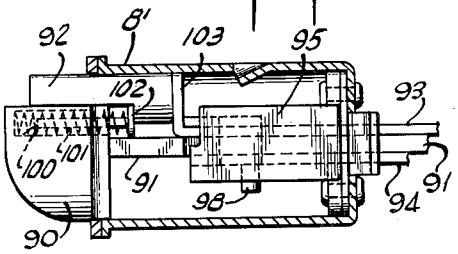


Fig. 22.

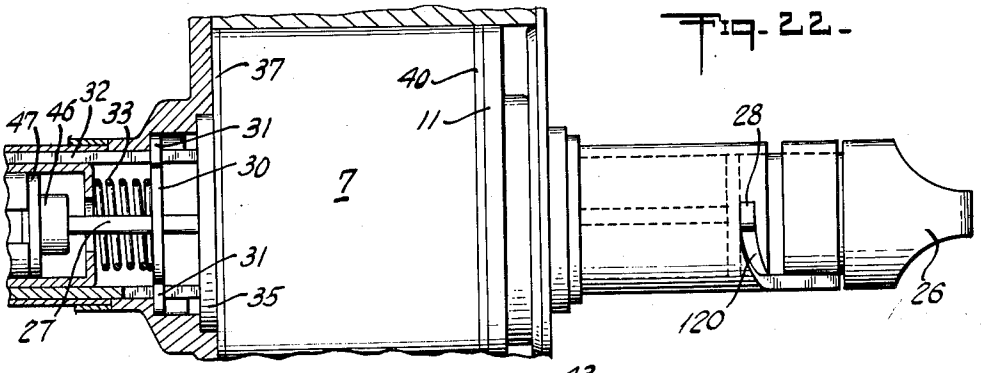
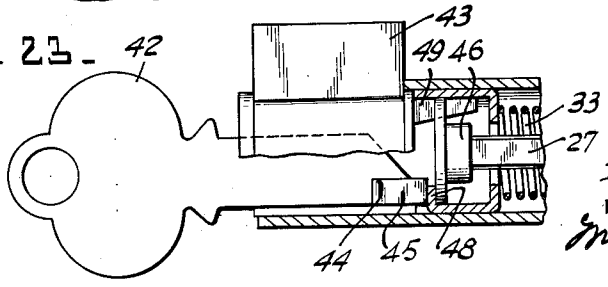


Fig. 23.



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Fig. 24.

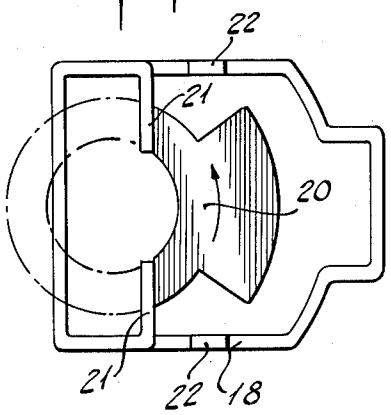


Fig. 25.

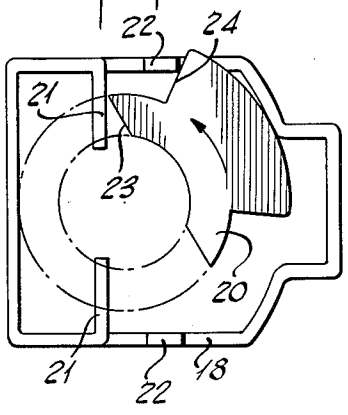


Fig. 26.

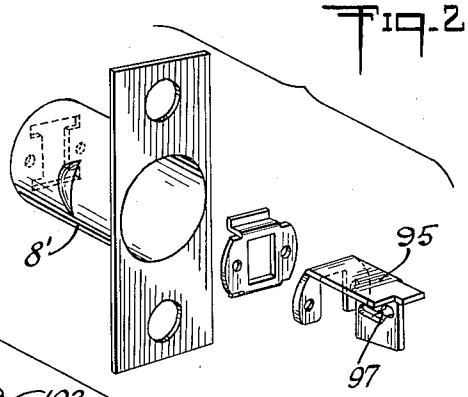


Fig. 27.

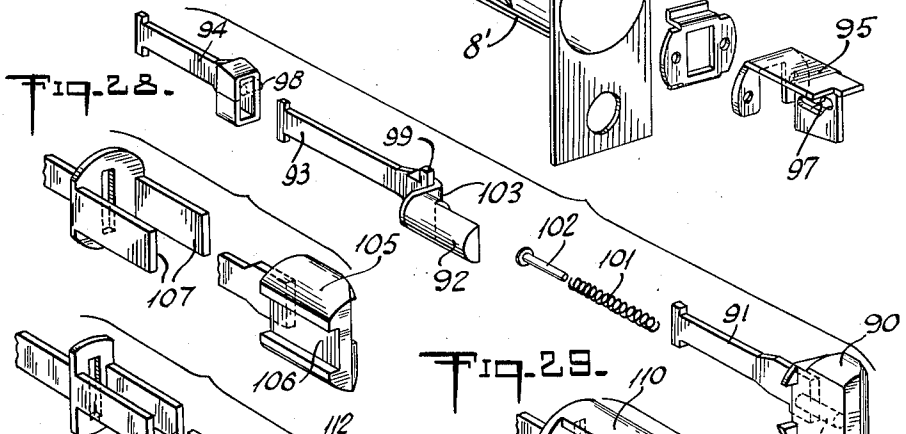


Fig. 28.

Fig. 29.

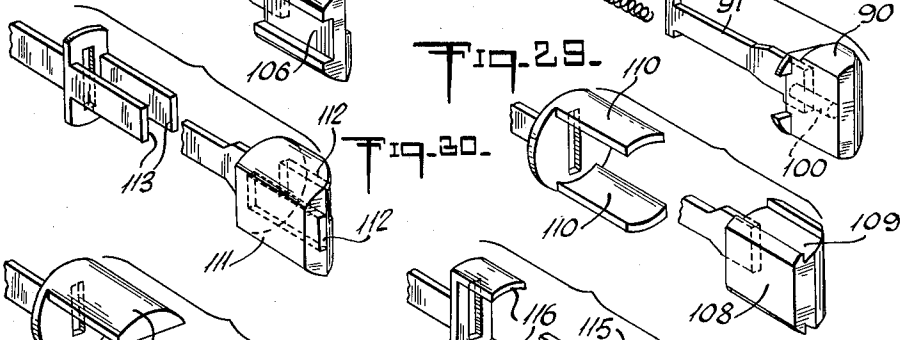


Fig. 30.

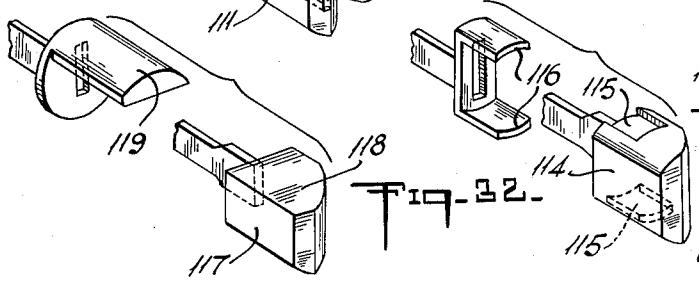


Fig. 31.

Fig. 32.

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United States Patent Office 3,018,651 Patented Jan. 30, 1962

3,018,651

LOCK

David Morrison, Jr., 240 Dorchester Road, Garden City South, N.Y.

Filed July 29, 1957, Ser. No. 674,801
6 Claims. (Cl. 70—146)

My invention relates to a lock, particularly of the cylindrical type, which comprises a lock case fitting in a transverse bore through a door, and a latch case fitting in an intersecting bore from the edge of the door. The lock has the usual inside and outside knobs, and may act as an ordinary simple door latch, when desired.

It is the general object of the invention to provide an improved lock of the cylindrical type.

It is a more specific object to provide an improved lock of the cylindrical type having improved means for locking the outside knob by means of a push-and-turn button in the inside knob.

Another object is to provide a lock of the character indicated having improved means for locking the outside knob by means of a button in the inside knob, and improved key-actuated means for withdrawing the latch from the outside.

Another object is to provide an improved lock of the character indicated, wherein both knobs may be locked against rotation by means of a push-and-turn button in the inside knob.

Still another object is to provide an improved lock of the character indicated having a plurality of retractors in the latch case, one for the normal door latch and the other for a dead bolt.

Another object is to provide an improved lock of the character indicated, having a door latch and a dead bolt in the same latch casing and operable independently of each other.

A further object is to provide an improved lock of the cylindrical type having a dead bolt which may be actuated by key means from the outside and by push-and-turn button means from the inside.

Still another object is to provide an improved type of latch.

A further object is to provide a combined door latch and dead bolt.

Still another object is to provide a normal door latch and dead bolt, both operable in the same latch casing.

It is another object to provide a latch with improved dead bolt means acting parallel thereto and compactly arranged therewith.

Another object is to provide an improved lock of the cylindrical type having means for projecting the dead bolt together with a key-actuated means for normally retracting the same, and further means for dead-locking the dead bolt so that it may not be actuated by the key-actuated means.

Briefly stated, in a preferred form of the invention, I provide a lock case, preferably cylindrical in form, and fitting in a transverse bore through a door. There is a latch case for a latch which fits in an intersecting bore extending in from the adjacent edge of the door. The lock has normal inside and outside knobs for normal latch actuation.

The lock is provided with a push-and-turn button in the inside knob which may serve to lock the outside knob against rotation and which may also be used for forcing a dead bolt into dead locking position. The dead bolt may normally be retracted by key-actuated means in the outside knob or by the push-and-turn button in the inside knob. In one form of the invention, the dead bolt locking arrangement is such that it can not be thrown off by key-actuated means in the outside knob.

The latch case embodies the usual door latch actuated by the knobs or, on occasion, by a through spindle controlled by the push-and-turn button in the inside knob or by a key. A separate dead bolt is actuated and serves to dead lock a lock in closed position. The dead bolt and the normal latch are preferably in the same latch case, and the dead bolt and latch bolt preferably contact each other and slide relatively to each other. There is a retractor in the lock case for normal actuation of the latch bolt, and there is a second retractor in the lock case for actuation of the dead lock bolt in the latch case. Other features of the lock and the latch will be more fully described hereinafter.

Other objects and various further features of novelty and invention will be pointed out or will occur to those skilled in the art from a reading of the following specification in conjunction with the accompanying drawings. In the drawings, which show, for illustrative purposes only, preferred forms of the invention:

FIG. 1 is an axial sectional view through the lock and the latch case, illustrating features of the invention;

FIG. 2 is a fragmentary view, similar to FIG. 1 but on a reduced scale and in partial section, with the push-button turned and pushed for locking the outside knob against rotation;

FIG. 3 is a view similar to FIG. 1, but on a reduced scale, with the button on the inside knob turned further to project the dead bolt for dead locking the lock;

FIG. 4 is a view similar to FIG. 3, illustrating a key in place which upon rotation in the proper direction would cause the push-and-turn button to return to an unlocked position and which would unlock or withdraw the dead bolt;

FIG. 5 is a sectional view on an enlarged scale, taken substantially in the plane of the line 5—5 of FIG. 2, and showing part of the means for locking the outside knob against rotation;

FIG. 6 is a fragmentary sectional view, taken substantially in the plane of the line 6—6 of FIG. 2;

FIG. 7 is a fragmentary sectional view, taken substantially in the plane of the line 7—7 of FIG. 2, illustrating a part of the push-and-turn button, and the spindle or shaft actuated thereby;

FIG. 8 is a sectional view, taken substantially in the plane of the line 8—8 of FIG. 3 and illustrating means for locking the inside knob against rotation;

FIG. 9 is a sectional view, taken substantially in the plane of the line 9—9 of FIG. 3, and illustrating latch mechanism for holding a dead bolt in forward and projected position;

FIG. 10 is a sectional view, taken substantially in the plane of the line 10—10 of FIG. 4, and illustrating a key in position to actuate the latch or to rotate the center spindle for withdrawing the dead bolt projected;

FIG. 11 is a fragmentary sectional view, taken substantially in the plane of the line 11—11 of FIG. 10;

FIG. 12 is an exploded view of the left hand portion of the lock shown in FIG. 1, the casing and knobs and some other parts being omitted;

FIG. 13 is a view similar to FIG. 12, but illustrating the right hand portion of the lock shown in FIG. 1;

FIG. 14 is an exploded view of parts of the central portion of the lock shown in FIG. 1, and illustrating the cylindrical lock casing and retractors and some other parts located in the lock casing;

FIG. 15 is an exploded view of parts shown in the latch casing of FIG. 1 and of FIG. 16, and illustrating the normal latch and a dead bolt designed to fit over the latch;

FIG. 16 is an exploded perspective view of the latch case shown in FIG. 1 and into which the parts shown in FIG. 15 are designed to operate;

FIG. 17 is a detail view of the key used in operating the lock;

FIG. 18 is a sectional view of a latch casing, showing a latch and dead bolt and means for actuating and locking the dead bolt in full dead locking position, this view illustrating a modification;

FIG. 19 is a view similar to FIG. 18, but showing the parts moved so as to lock the dead bolt in dead locking position, this section being taken substantially in the plane of the line 19—19 of FIG. 20;

FIG. 20 is a sectional view, taken at substantially right angles to the view of FIGS. 18 and 19, but showing the dead bolt in retracted position;

FIG. 21 is a view similar to FIG. 20, but showing the dead bolt in full forward or projected position;

FIG. 22 is a fragmentary partially sectional view of the lock shown in FIG. 1, the inside knob being omitted and illustrating a push-and-turn button arranged for an extreme forward movement so as to lock the outside knob and prevent entrance, even by the usual key;

FIG. 23 is an enlarged fragmentary view of a lock plug and key in place, and the parts being arranged as in FIG. 22 wherein the key cannot be inserted sufficiently far to line up tumblers for rotating the plug;

FIG. 24 is a detail view of the main retractor in the lock of FIG. 1, and shown more particularly in FIG. 14, together with means for operating the same;

FIG. 25 is a view similar to FIG. 24, but showing a retractor being moved in its second stage of movement;

FIG. 26 is an exploded view in detail of a latch case for the latch shown in FIGS. 18 to 21;

FIG. 27 is an exploded view in perspective of the latch parts fitted in the latch case of FIG. 26, these being the modified parts shown in FIGS. 18 to 21;

FIGS. 28, 29, 30, 31 and 32 are exploded fragmentary perspective views of modified latches and dead bolts.

As illustrated, a lock of the cylindrical type is received in a bore 5 near the edge of the door and a latch case is received in a bore 6 intersecting the bore 5 and extending in from the edge of the door. The lock case 7 (FIGS. 1, 15, 16) is preferably formed of sheet metal of any generally cylindrical form and fitting the bore 5. The latch case 8 also preferably formed of tubing or rolled up sheet metal or the like, fits in the bore 6 and cooperates with the casing 7 in any desired or usual manner so that the latch 9, and other parts, may be actuated by the lock mechanism. The lock case is preferably closed by end plates and there is an outside support plate 10 (see also FIGS. 12, 13) and an inside support plate 11 attached to the door. There is an inside knob 12 and an outside knob 13, the inside knob being attached to the inside sleeve 14, and the outside knob being attached to the outside sleeve 15, as will be understood.

The latch 9 has a chill 16 interfitted with shoulders 17 in the main retractor 18 operating in the housing. Thus, when the retractor moves back and forth in the housing, the latch 9 is pulled back and is urged to projected position by means of the spring 19. In order to actuate the retractor 18, the inside sleeve 14 has a cam or rollback 20 which has two rollback or cam surfaces, best seen in FIGS. 24 and 25. The retractor will be seen to include inturned lugs or fingers 21 and projecting lugs or fingers 22. Thus, when the rollback 20 is rotated by the inside knob, the rollback surface 23 engages the inturned lug 21 and moves the retractor 18 in rearward direction. At about the time the surface 23 disengages the lug 21, the cam surface 24 engages the lug 22 and further rotation of the rollback will retract the retractor to a greater extent. Thus, the two surfaces 23 and 24 will give a substantially long throw to the latch by a simple and not too extensive rotation of the rollback 20. The outside sleeve 15 has a similar rollback 25 which may act on lugs at the opposite side of the main retractor 18 for retracting the same by the outside knob. Thus, the latch 9 may be retracted by either knob and the latch may have a considerable throw greater than normal due to the two-step method of withdrawal of the retractor. The latch may be projected forwardly by any means, such as the spring 19 heretofore described.

The outside knob 13 may be dead locked or locked against rotation by means at the inside of the door. The structure required in the operation thereof may be as follows. In the inside knob (FIGS. 1, 12, 13) and fitting in the sleeve 14 is a push-and-turn button 26 which has attached thereto a through spindle or axial shaft 27 extending through the lock and to the outside knob. This push-and-turn button 26 has a lug 28 thereon which is designed to fit into a longitudinal and cross slot 29 (FIG. 13). Thus, when the push-and-turn button 26 is pushed inwardly and turned, it is held in the forward push-in position. At the other end of the spindle or shaft 27 there is a washer 30 (also FIG. 5) having two teeth or prongs 31 which are designed to fit in slots 32—32 in the sleeve 15 to project beyond the surface thereof. This washer 30 fits over the shaft 27 and is held rearwardly thereon by means of a spring 33. The outside side plate 10 has a pair of notches 34 therein in position to receive the two lugs 31—31 on the washer 30. Thus, when the spindle 27 is moved inwardly by the push-and-turn button 26, that is toward the left as shown in FIG. 1, these lugs 31—31 fit in the notches 34 in the side plate 10 and thus the outside sleeve 15 and the knob 13 carried thereby is locked against rotation so long as the lugs are in the notches 34.

It might here be stated that the outer sleeve 15 is held in place, as shown in FIG. 1, by means of a lug 35 (FIG. 12) on a U-shaped washer which fits a slot 36 in the sleeve 15 and the washer is located in a counterbore in the plate 10 and held therein by the lockcase cover 37. Similarly, the inner sleeve 14 is held in place by the lug 38 (FIG. 13) on the U-shaped washer which fits in a counterbore 39 in the inner plate 11 and is held therein by the lock cover 40. The lug 38 fits in the slot 41 in the inner sleeve 14.

With the push-and-turn button 26 pushed in and turned clockwise, the outer knob will be held against rotation (also FIG. 2), and therefore the latch 9 cannot be withdrawn by the outer knob. At the same time the inner knob 12 may be rotated and through the rollback arrangement described, the main retractor 18 will be retracted so as to retract the main latch 9. In order to enter the door by means of a key, the key 42 (FIG. 10) is pushed into the key plug 43. The key, in the preferred form, has a notch 44 cut in the end thereof, as shown particularly in FIG. 17. Within the key plug is a little slide block 45 which is engaged by the notch part 44 of the key so as to move it forward. The spindle or shaft 27 at the extreme entrance carries what may be termed a cam washer 46 non-rotatably secured thereon. The spring 33 about the end of the spindle 27 engages at one end against the washer 30 and at the other end against a cup 47 which fits over the cam washer 46. Thus, when the key is forced in, the slide block 45 engages a lug 48 in the cup 47 and forces the latter rearwardly until the lug 49 engages in a slot or notch in the cam washer 46. Then rotation of the key in clockwise direction will cause the lug 49 (FIG. 12) mounted in the notch in the cam washer 46 to rotate the spindle 27 in a clockwise direction (from the outside). Rotation of the spindle 27 by the key will cause a retraction lever or crank 50 (FIG. 14), keyed on the spindle 27 to rotate and engage the main retractor 18 so as to retract the latter and with it the latch 9, and thus entry by key may be obtained. The outer knob however remains locked.

If it is desired to lock both the outside and inside knob against rotation, the outside knob is locked as by means of the push-and-turn button and washer 30, as described. Further clockwise rotation of the push and turn button 26 will cause the lug 28 to enter the longer slot 51 (FIG. 1) and further rotation will then cause the cam

surface 52 to engage the little locking washer 53 (FIG. 13) and force the same against the action of the leaf spring 54 into registering slots 55 between the inside plate 11 and the sleeve 14. Thus, both the inside and the outside knob may be locked by means of the push-and-turn button 26.

In addition to the normal latch bolt 9 heretofore described, I provide a dead locking bolt preferably of very hard metal which is contained in the same case as the normal latch bolt 9 and preferably coacts therewith during operation. It will be recalled that for a normal latch 9, the retractor 18 serves as a retracting member and is retracted by either knob, as shown particularly in FIGS. 24 and 25, or by the lever 50 on spindle 27 shown particularly in FIG. 14. Retractor 18 is constantly urged in forward direction, that is toward the latch case by spring means, preferably coil springs 60, interposed between the retractor 18 and the top of the case 7.

Within the case 7 and employed for operating a dead bolt or dead latch, I have a second retractor 61 (FIGS. 1, 14). Within the case 7 is a central girder 62 having its top end passing through a slot 63 and riveted or otherwise secured therein. The separate legs 64 of the girder are riveted or otherwise secured in the notches 65—65 in the case 7. The girder 62 has a bearing opening 67 therein and a bearing member 66 is rotatably mounted in the bearing hole 67 in the girder. This bearing member 66 has a central hole 68 therethrough for receiving the spindle 27 and, in the form shown, both the spindle and the aperture 68 are angular so that the bearing 66 rotates with the spindle. The bearing 66 has the lever 50 keyed thereon as by means of the key 69 and held in place by the lock spring 70. On the opposite side of the girder 62 the bearing member 66 carries a gear segment 71 to cooperate with and actuate the secondary retractor 61.

The secondary retractor 61 has an upstanding back plate 72 which fits flat against the girder 62 and is of a width to pass through the slot 73 in the top of the main retractor 18. Part of the back plate 72 has rack teeth 74 formed thereon for coaction with the teeth of the segment gear 71 on the bearing member 66. Thus, the secondary retractor 61 is guided on the girder 62 and held by means of the primary retractor 18. Normally, of course, the primary retractor 18 is in the down position, as shown particularly in FIG. 1, while the secondary retractor is in the up position, as shown in FIG. 1.

The dead bolt or dead latch shown in FIG. 1 and particularly in FIG. 15, is a cup-shaped member having parts cut away but having two hardened ends 75 designed to fit over the top and bottom portions of the latch bolt 9. The bottom of the cup having the arm 75 has an aperture 76 therethrough for the passage of the chill 16 on the main latch 9. The spring 19 may surround the chill 16 and be housed between the latch 9 and the bottom of the dead latch or dead bolt 75. Thus, the dead bolt will always be urged to the retracted position while the main latch bolt 9 will always be urged to the forward or latching position. The dead bolt 75 has a chill 77 parallel to the chill 16 and there is a latching chill 78. The main latch chill 16, has been heretofore described, as having projected lugs which fit behind the shoulder 17 in the main retractor 18. The chill 77 on the dead bolt has a broad head to fit against the bottom part 79 of the secondary retractor 61. The latching chill 78 has projections 80 which extend behind shoulders 81 on the secondary retractor. The three chills 77, 16 and 78 all fit side-by-side and extend through the back of the latch casing 8 and through the insert 82 therein, as shown particularly in FIGS. 15—16. Attached to the insert 82 is a small latching lever 83 urged in the clockwise or latching direction by means of a spring 84. Thus, when the secondary retractor 61 is moved downwardly, as viewed in FIG. 1, the surface 79 engages the end of the dead bolt chill 77 and moves the latter forwardly so that the dead bolt parts 75 extend about coextensively with the latch bolt 9. When the dead bolt 75 is in about its forward position, the little latch 83 engages behind the shoulder 85 so as to hold the dead bolt in forward position. When the dead bolt is in forward position and extended into a strike, there is no way to force it back because it is latched on the inside by means of the latch 83, and since it is made preferably of very hard metal, it cannot be sawed or otherwise mutilated to get into the door. When it is desired to retract the dead bolt, then the secondary retractor 61 is moved backwardly or upwardly, as viewed in FIG. 1, by means of the rack 74 and sector gear 71 until the release cam 86 engages the little latch 83 and turns it against the force of the spring 84 so as to release the chill 77 of the dead bolt. Then the spring 19 immediately snaps the dead bolt to its rearward position. The operation of the secondary retractor 61 is always by means of the spindle or through shaft 27.

When it is desired to dead lock the door from the inside the push-and-turn button 26 will be rotated in a clockwise direction until the segment gear 71 on the bearing member 66 engages the rack teeth 74 on the secondary retractor 61. This action, as stated, forces the dead bolt forward until it latches. When it is desired to release the dead bolt from the inside, the push-and-turn button 26 is simply turned in the opposite direction, for instance, counterclockwise from the inside, and the inside retractor is retracted and carries the release cam 86 with it so as to release the chill 78 and the dead bolt from its holding latch 83, and its spring 19 thereafter returns the dead bolt to the unlocked position.

When the lock is dead locked from the inside by reason of the fact that the push-and-turn button 26 has been rotated in clockwise direction, sufficient to cause the sector gear to engage the dead bolt and lock it, the dead bolt may be released by a key in the outside knob. As has been heretofore described, particularly in connection with FIGS. 1 and 10, the key is inserted in the key plug and the little sliding block 45 moves the cup 47 rearwardly and causes it to engage the shoulders of the cam ring 46. Clockwise rotation of the key, for instance from the outside, then rotates the cam ring 46 with the plug and the spindle or shaft 27 rotates so as to cause the sector gear 71 engaging the rack teeth 74 to retract the secondary retractor 61 and release the dead latch or dead bolt, as heretofore described.

It is possible to dead lock the entire lock by means of a key from the outside. This is accomplished by first rotating the push-and-turn button 26 clockwise so as to lock the outside knob against rotation. Thereafter when the door is closed, the key may be inserted from the outside and the plug rotated by means of a key, and, as explained in connection with FIG. 10, the spindle 27 is rotated in this case in a counterclockwise direction (corresponding to a clockwise rotation on the push-and-turn button rotation on the inside) and this action causes the gear segment and rack to advance the dead bolt and permit it to become latched in the forward or dead locking position. The key may then be rotated in position to withdraw the same, this action being permitted by a spread between the lugs on the cam portion 46 (FIG. 12). Of course, re-entry by the key may be accomplished, as heretofore described, by turning the key in a clockwise direction so as to first withdraw the dead bolt and thereafter by means of the lever 50, the main retractor is withdrawn so as to withdraw the latch 9 and permit entry through the door. It should be noted that in dead locking the door from the outside, the outside knob is already dead locked and it is possible to dead lock the inside knob by rotating the spindle 27 so as to cause engagement of the lock washer 53 (FIGS. 1, 13) in the slot in the inside plate so as to dead lock the inside knob. In that way, the entire lock would be

dead locked against entry from the outside except by the key.

The dead bolt **75** has been described as held in dead locking or forward position by means of a spring latch (FIG. 16), and the minute the spring latch is released, the dead bolt will be retracted. I have devised other means for positively latching the dead bolt so that it will not be retracted, except positively. In other words, the latch itself will be positively latched and unlatched.

In the particular form shown in FIGS. 18, 19, 20 and 21, as well as in FIGS. 26 and 27, the latch case 8' is similar to the case heretofore described. The latch and dead bolt could be about as heretofore described, but I have shown a modification in the form of the dead bolt and a substantial variation in the method of latching or holding the dead bolt in forward position. The latch **90** has a chill **91** and the dead bolt **92** has a chill **93**, and there is a what may be termed a latch chill **94**. Pivoted within the case is a latching shoe or plate **95** which has a plate portion **96** with a cam slot **97** therein. The latching chill **94** has a pin **98** to fit in the slot **97** and the latter is so shaped that when the latching chill **94** is retracted, as shown in FIG. 18, the latching plate **95** is in withdrawn position as there illustrated. On the other hand, when the latching chill **94** is moved forwardly so as to move the pin **98** forward in the slot **97**, the latching plate or shoe **95** is tipped in a counterclockwise direction until it attains the positon shown in FIG. 19 in which position it falls behind the lug **99** on the dead lock chill **93**. Thus, if the dead bolt **92** be moved to its forward position by means of its chill **93** and the chill **94** is moved forward so as to cause the pin thereon to work in the slot **97** and swing the shoe **95** in a counterclockwise direction, the dead bolt **92** would be positively locked in forward position (FIG. 19). These chills will be operated in the same way as the chills heretofore described, particularly in connection with FIG. 14, wherein the main latch chill **91** would be actuated rearwardly to withdraw the latch **90** by means of the main retractor **18**. The dead bolt chill **93** would simply be pushed forward by the flat part **79** of the secondary retractor, and the locking chill **94** would be moved in both forward and reverse directions by means of the shoulders **81** on the secondary retractor.

In the particular form shown in FIGS. 18 to 21 and 26—27, the latch **90** has a longitudinal bore **100** therein for housing a spring **101** and a stop pin **102**. Thus, the spring **101** always urges the main latch **90** in forward direction and always urges the dead bolt **92** in rearward direction. It will also be seen that when the dead bolt **92** is in forward projected position, that is the dead locking position, the rear side **103** of the dead bolt or a part thereof, engages the rear of the stop pin **102** and definitely dead locks the latch bolt **90** in forward position so that the latch bolt is locked in forward position and the dead bolt is also locked in such forward position. Here again, the dead bolt is preferably formed of exceedingly hard metal so as to resist cutting, in case one tries to enter the lock by force. Thus, in the form there shown, the dead lock is definitely held in locked position not by means of a spring, but by means of a positively moved latching plate which is positively moved and held by a pin and slot connection. There is little or no likelihood of the dead bolt becoming unlatched once it is projected to fully forward position.

In the forms shown in FIGS. 28, 29, 30, 31 and 32, the operation may be substantially as heretofore described, but the form of the latch bolt and of the dead bolt mechanism are slightly different.

In the form shown in FIG. 28 the main latch **105** corresponding to the latch **90** heretofore described, has slide ways **106** at opposite sides thereof for receiving legs or prongs **107** constituting portions of the dead locking mechanism. In other words, the prongs **107** constitute in effect a dead lock or dead bolt.

In the form shown in FIG. 29, much like that shown in FIG. 15, the top and the bottom of the main latch **103** has ways **109** for rounded plate prongs **110** constituting the dead bolt, as heretofore described.

In the form shown in FIG. 30, the latch **111** has spaced apart bores or slots **112** therethrough for the endwise passage of the legs or prongs **113** forming the dead bolt.

In FIG. 31 the latch **114** has short notches **115** therein for receiving short legs or prongs **116** which fit therein and may themselves act to some extent as dead bolts, but principally simply act to dead lock the latch **114** forwardly. In this case, the latch itself may be made of hard metal so as to resist cutting.

In the form shown in FIG. 32, the latch **117** has simply a flat top **118** for receiving a flat bottom of a dead bolt **119** which would slide over the top **118** on the latch **117**.

Thus, the forms shown in FIGS. 27 to 32 illustrate modifications of a latch bolt and dead bolt which might be enclosed in place of those heretofore described. In any of the cases noted, the dead bolts may be held in forward position by means of a spring latch (FIGS. 15, 16) or be positively held by means of a locking plate, as described in connection with FIGS. 18 to 21. All latches and dead bolts shown in FIGS. 28–32 may be actuated by springs such as the spring **19** (FIG. 15) heretofore described.

In all cases heretofore described, it is possible to open the door from the outside by means of a key. However, it may be desirable at times to prevent entry by means of a key from the outside. In that case the outside knob would be locked against rotation and the dead lock would be projected into the full forward or dead locking position, so that the door would be definitely locked. In order to dead lock the door so that it would be impossible to enter with a key, the lug **28** on the push-and-turn button **26** (FIG. 22) would enter the inclined or bias slot **120** which will move the spindle **27** very far forward. In that case when the key shown in FIG. 23 is moved in the little sliding plug **45** will cause the cup lug **48** to engage and be stopped by the flange of the washer **46** before the key can enter the plug far enough to line up the tumblers, and therefore the key cannot be turned in the lock.

It will be seen that by the omission of certain parts and certain functions of my improved lock, locks of various descriptions may be formed.

While the invention has been described in considerable detail and preferred forms illustrated, it is to be understood that various changes and modifications may be made within the scope of the invention, as defined in the appended claims.

I claim:

1. In a lock of the character indicated, a lock case, a latch case, a latch and dead bolt in said latch case, inside and outside knobs in said lock case, a spindle concentric with said knobs and having means for key actuation at one end and a push-and-turn button at the other end, a primary retractor in said lock case, means for connecting said knob means to said primary retractor for actuating said latch, a secondary retractor in said latch case, means connecting the secondary retractor to said dead bolt, latch means for latching said dead bolt in full forward position and means controlled by said concentric spindle for releasing said latch means holding said dead bolt, whereby the same may be retracted.

2. In a lock of the character indicated, a lock case, a latch case, latch and dead bolts in said latch case, knob means for retracting said latch bolt, a spindle extending through said latch case and having a push-and-turn button at the inside end and having key-actuable means at the outside end, means actuated by said spindle for projecting said dead bolt to dead locking position, means for latching said dead bolt in full forward

position, and a member actuable by said spindle for releasing said means latching said dead bolt.

3. In a lock of the character indicated, a lock case, a latch case, a latch and a dead bolt in said latch case, inside and outside knobs on said lock case, a rotary spindle concentric with said knobs and having a push-and-turn button in the inside knob and key controlled means in the outside knob for turning said spindle, a primary retractor in said lock case, a secondary retractor in said lock case, a chill connecting said latch and said primary retractor and means actuated by said knobs for retracting said primary retractor for withdrawing said latch, a chill between said dead bolt and said secondary retractor, means actuated by said spindle for projecting said dead bolt to full forward position, a latch means for latching said dead bolt in full forward position and a latch release means for releasing said latch means and spring means for urging said dead bolt to retracted position and urging said latch bolt to full forward position.

4. In a lock of the character indicated, a lock case, inside and outside knobs rotatably secured to said case, a latch case, a latch bolt and a dead bolt therein, means actuated by said inside and outside knobs for retracting said latch bolt, spring means for urging said latch bolt to full forward position, a rotary spindle in said lock case and having a push-and-turn button in the inside knob and having key controlled means for locking the same in the outside knob, means controlled by said rotatable spindle for moving said dead bolt in said latch case, and means controlled by said rotatable spindle for locking both said inside and outside knobs against rotation, and means controlled by said spindle for releasing latching means for said dead bolt.

5. In a lock of the character indicated, a lock case, a latch case, a latch and dead bolt in said latch case, inside and outside knobs for said lock case, a rotatable spindle concentric with said knobs and having a push-and-turn button in the inside knob and having key controlled means on the outside knob, means for connecting said rotatable spindle and said latch bolt for actuation by the knob, and means controlled by said rotatable spindle for locking both said knobs against rotation on said lock case and means controlled by said spindle for moving said dead bolt to full forward position and means controlled by said spindle for releasing latching means for said dead bolt to permit same to return to full retracted position.

6. In a lock of the character indicated, a lock case, a latch case, inside and outside knobs for said lock case, a rotatable spindle concentric with said knobs and extending through said lock case, said spindle having a push-and-turn button in said inside knob and accessible for manual operation, said spindle at the opposite end having means of connection to key control means in said outside knob, means operable upon the inward push of said push button for locking said outside knob against rotation, means for latching said push button in said push in position, means actuable by and upon a rotation of said spindle for locking said inside knob against rotation, means operable by said spindle for projecting said dead bolt to full forward position, latching means for latching said dead bolt in said full forward position, a latch release operable by said rotatable spindle for releasing said dead bolt from full forward position and spring means for returning said dead bolt to full retracted position and for urging said latch bolt to full projected position.

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