Nov. 2, 1937. M. PAPST 2,098,012

LOCK AND MORE PARTICULARLY DOOR LOCK FOR AUTOMOBILES

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Fig. 1

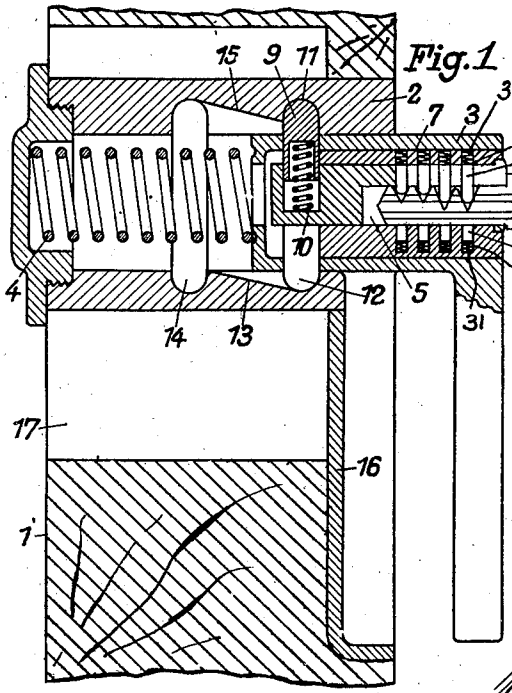


Fig. 10

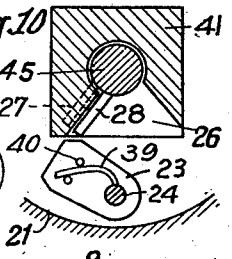


Fig. 2

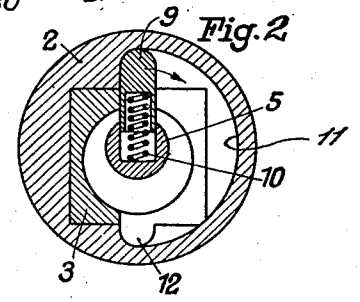


Fig. 7

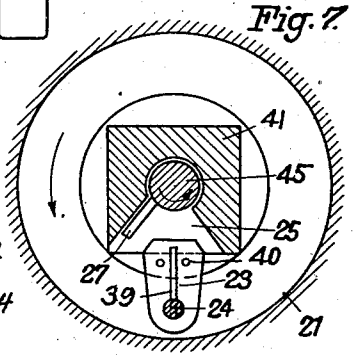


Fig. 3

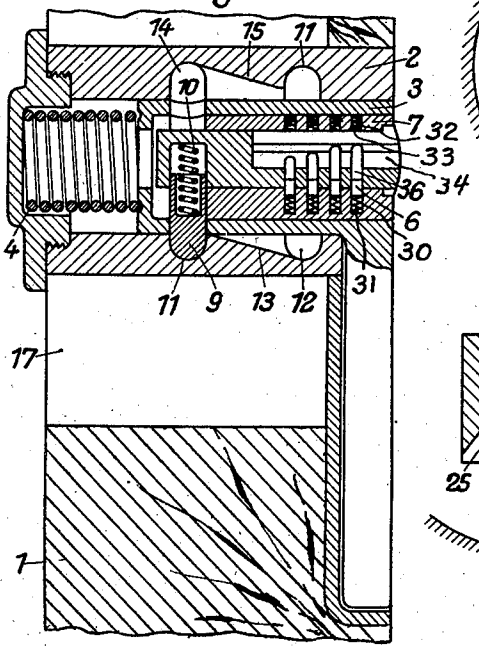


Fig. 8

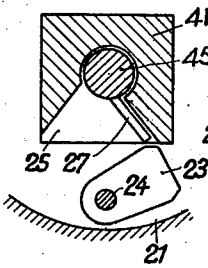
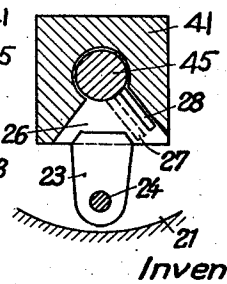


Fig. 9



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Fig. 4

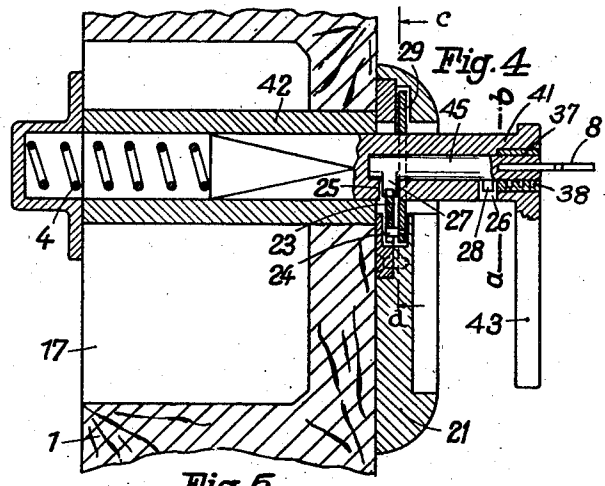


Fig. 6

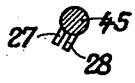
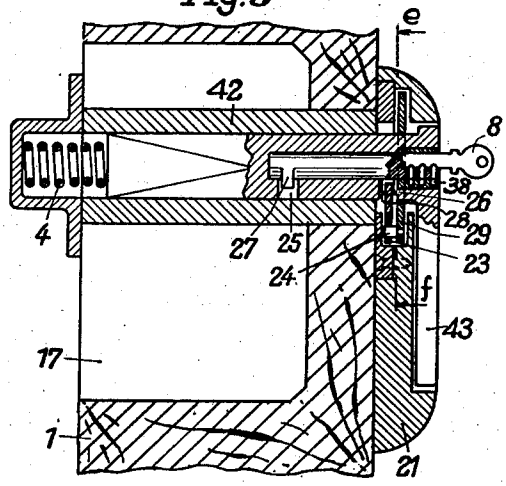


Fig. 5



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Fig. 11

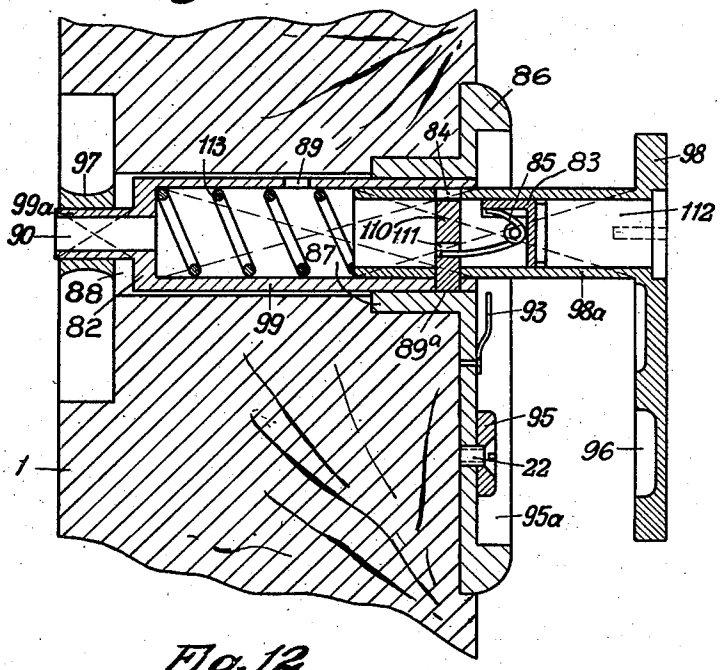
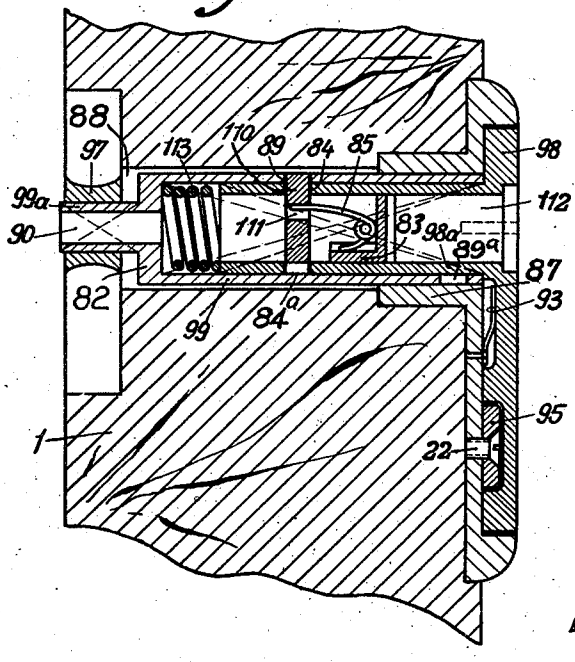


Fig. 12



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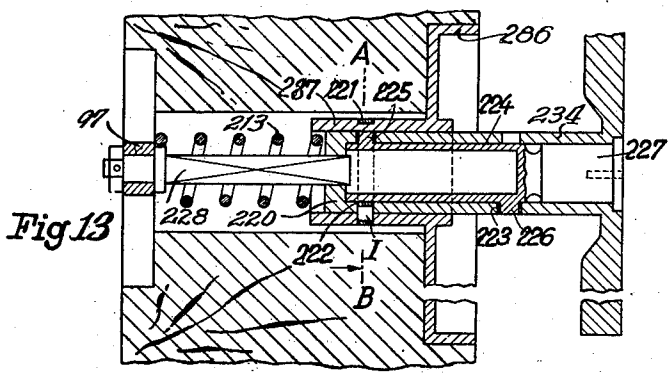


Fig. 13

Fig. 15

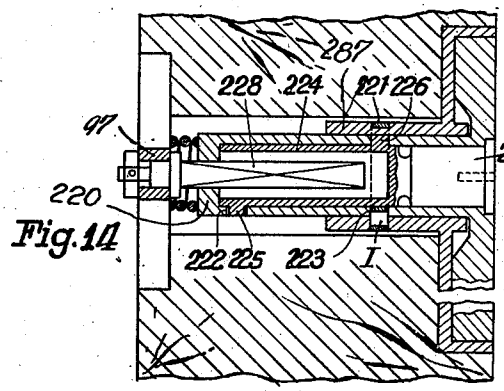


Fig. 14

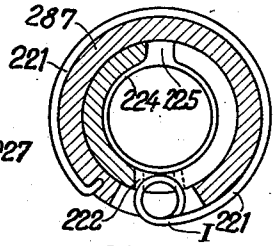


Fig. 16

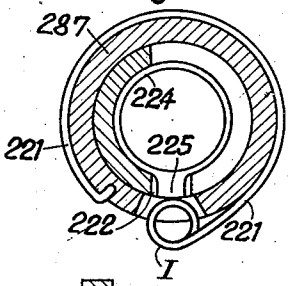
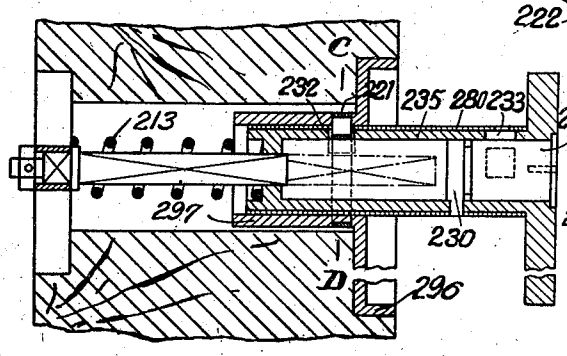


Fig. 17



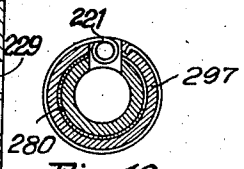


Fig. 18

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Patented Nov. 2, 1937 2,098,012

UNITED STATES PATENT OFFICE

2,098,012

LOCK AND MORE PARTICULARLY DOOR LOCK FOR AUTOMOBILES

Max Papst, Paris, France

Application September 8, 1933, Serial No. 688,608
In Germany December 16, 1932

12 Claims. (Cl. 70—208)

The present invention relates to locks and more particularly to door locks of automobiles. Its main object is the provision of a lock, the handle of which, when locked, is inaccessible to inadvertently violent or surreptitious actions. Another object of the invention is to provide means by which the number of lock parts projecting from the door surface may be sensibly reduced.

The invention essentially consists in a door handle having an inoperative and an operative position respectively close to or remote from the door surface, means for automatically moving the handle into its operative position, means for automatically locking the handle in its two end positions and means under the control of the operator for releasing the elements locking the handle.

Further objects, features and advantages will be apparent from the following description and appending drawings of examples embodying my invention.

In the drawings are:

Fig. 1 a longitudinal section of a lock as per my invention with a locking device housed within the handle shank, in the operative position,

Fig. 2 a cross section of the lock shown in Fig. 1,

Fig. 3 a similar view to Fig. 1, the handle, however, in its inoperative position,

Figs. 4 and 5 longitudinal sections of a modification in the operative and in the inoperative position respectively,

Fig. 6 a cross section along line *a—b* of Fig. 4,

Figs. 7 and 8 cross sections along line *c—d* of Fig. 4, and Figs. 9 and 10 cross sections along line *e—f* of Fig. 5, illustrating various positions of the latch member which locks the handle of the lock as per Figs. 4 and 5,

Figs. 11 and 12 longitudinal sections of another modification in the operative and in the inoperative position respectively,

Figs. 13 and 14 longitudinal sections of again another embodiment of my invention, in the operative, and inoperative position of the handle respectively,

Figs. 15 and 16 cross sections along line A—B of Fig. 13 showing the handle locked against longitudinal displacement and, respectively, disengaged,

Fig. 17 a longitudinal section of a modification with the handle in operative position, and

Fig. 18 a cross section along line C—D of Fig. 17.

Throughout the drawings, like characters indicate corresponding parts.

Referring now to Figs. 1, 2 and 3, the lock in the door frame 1 has a roll-back 2 which, when being turned, is able to operate the conventional door catch (not shown) in a suitable manner. Roll-back 2 has a square hole and encompasses the square shank 3 of the door handle. Shank 3 is axially movable within the roll-back 2 in a manner that the handle may be pushed from its operative position (Fig. 1) towards the left side in the drawing into its inoperative position (Fig. 2) against the action of a spring 4. Means are provided for automatically locking the handle in its two end positions and other means for removing the locking means from their locking position under the control of an operator. For this purpose, a cylinder lock 7 is provided in a cylindrical bore of the handle shank 3. This cylinder lock 7 has a rotatable conventional plug 5 and is provided with a set of bores 30 in which detents 6 may slide. The detents are engaged by springs 31 located in the bores 30. Diametrically opposite to the bores 30 another set of bores 32 with springs 33 is also provided in the cylinder. Tumblers 36 are slidably arranged in cylinder plug 5 in such a manner that they may contact the detents 6 and slide into the bores 32 respectively against the pressure of the springs 33. In Fig. 3 the lock is shown in its locked position in which the detents protrude from the bores 30 into the cylinder plug 5, the key being removed. If a key is inserted into the key slot 34 the tumblers move the respective detents 6 against the pressure of springs 31 out of engagement with plug 5 whereupon the latter may be turned about an angle of 180° (Fig. 1). In this position the key 8 may be retracted because the tumblers 36 are able to enter the respective bores 32. A cylinder lock of the type described in the foregoing is well known in the art and does not form part of my invention. At its left-hand end, the cylinder plug 5 is provided with a bore in which a tongue-like latch bolt 9 is slidably mounted and urged outward by a spring 10 so as to pass through a corresponding opening in shank 3 and to enter a recess 11 of the roll-back 2. The recess 11 is shaped as a peripheral groove extending over an arc of 180°, and the opening in shank 3, through which latch bolt 9 is able to project, has the form of a peripheral slot of a corresponding arc length. Starting from the bottom end 12 of the groove 11 and at right angles to said recess 11, an inclined path 13 leads to another peripheral groove 14 in the roll-back, and a second inclined path 15 connects the top ends of the grooves 11 and 14. Due to the inclination of paths 13 and 15 tongue 9 can readily enter path 13 from

groove 11, and path 15 from groove 14 while it is barred from leaving the grooves on the respective other paths.

To the outer surface of the door 1, an escutcheon or handle housing 16 is fitted in which the handle rests when in its inoperative position as per Fig. 3.

The device functions in the following manner: In its operative position of Fig. 1, the handle with its shank 3 can be turned to operate roll-back 2 due to their square connection. The handle and shank cannot be pushed back into their inoperative position by an unauthorized person, since tongue 9 in groove 11 prevents an axial displacement of shank 3 relative to roll-back 2. However, when key 8 is inserted into the slot 34 and turned, plug 5 takes the tongue 9 along in the direction of the arrow in Fig. 2 until the tongue reaches the bottom 12 of groove 11. At this point, the tongue is opposite the entrance of path 13. Now, the handle and the shank 3 may be pushed back, that is, to the left side of the drawing, against the action of spring 4 while tongue 9 compressing spring 10, travels along path 13. The axial displacement of the handle is blocked as soon as tongue 9 snaps into groove 14 (Fig. 3). In this position, the handle is housed in the escutcheon, and, therefore, inoperative and practically inaccessible to a surreptitious action. In order to bring the handle back into its operative position, the operator has to turn tongue 9 by means of plug 5 in the reverse direction. As soon as the tongue has reached the top end of groove 14 and the entrance of path 15, spring 4 returns the handle and shank 3 to the position of Fig. 1.

In the modification illustrated in Figs. 4 to 10, the latch bolt for blocking the handle and shank against axial displacement is arranged so as to engage the shank from the outside. Fig. 4 shows handle 43 and shank 41 in their operative position, and Fig. 5 shows the same pushed back against the action of spring 4. In this inoperative position, the handle fits in a housing 21 arranged on the outer surface of the door 1. Shank 41 and roll-back 42 are coupled for rotation by external and internal square surfaces respectively, and movable with relation to each other in axial direction.

A cylinder lock 37 of a type similar to lock 7 shown in Figs. 1 and 3 is arranged within shank 41 of handle 43. Lock 37 differs from lock 7 inasmuch as it permits a rotation of only about 90°. Consequently the two sets of bores for the detents and tumblers respectively are arranged at right angles to each other rather than diametrically opposite each other as in the first mentioned embodiment, only one set of bores 38 being visible in Figs. 4 and 5. The cylinder plug 45 of lock 37 has an elongated shape and is provided with two arms or lugs 27 and 28 which correspond with the two end positions of the handle. These lugs are staggered with regard to each other for a distance equal to the thickness of one of the lugs (see Fig. 6), and adapted to move in corresponding recesses 25 and 26 of the handle shank 41. A latch bolt 23 is adapted to enter the said recesses 25 and 26 respectively and is normally held therein by a spring 39 adapted to bear against pins 40 secured to bolt 23. Spring 39 is fastened to a pin 24 on which latch bolt 23 is pivotally mounted. Spring 39 and pins 40 are indicated only in Figs. 9 and 10 in order to avoid overcrowding of the other figures. Pin 24 is fastened to a plate 29 having a square hole corresponding to the square of shank 41. Plate 29 is carried by shank 41 and adapted to be turned together with the latter when the handle is in its operative position of Fig. 4. The manipulation of the device is the same as in the preceding example. In the position of Fig. 4, the latch bolt 23 engages recess 25 (Fig. 7) and prevents an axial displacement of the handle, which may be turned in order to operate the roll-back 42.

In order to bring the handle back to its inoperative position, the cylinder plug 45 must be turned in the direction of the arrow in Fig. 7. This causes lug 27 to engage latch bolt 23, and to swing it into the position of Fig. 8. Thus the shank 41 is freed for axial displacement against the action of spring 4 (Fig. 5) until latch bolt 23 is able to engage the recess 26 (Fig. 9), and to arrest the shank and the handle 43 embedded in the housing 21. In order to remove the handle from this inoperative position, cylinder plug 45 is to be turned in the reverse direction. This causes lug 28 (Fig. 9) to remove latch bolt 23 from recess 26 whereafter spring 4 will push the handle 43 outward until latch bolt 23 arrests it again in the position of Fig. 4.

As will be apparent, the embodiments of my invention as per Figs. 1 to 10 have as a prerogative a roll-back of ample size for encompassing the parts movable within its hollow space. Such constructions are preferable if the whole door lock, from the start, is intended to comply with the purposes of this invention. If, however, a door lock with a roll-back of conventional standard type is to be used, or if such door lock already exists in the door and is to be subsequently equipped with the device as per my invention, other structures of the handle mechanism are more preferable, such as illustrated in Figs. 11 to 18. Of particular advantage is the structure shown in Figs. 11 and 12 which permits the whole mechanism as an entirety to be inserted into the door and rigidly connected with the standard roll-back.

In these figures, door 1 is provided with a door lock having a conventional or standard roll-back 97 at its inner surface, and with a housing 86 at its outer surface into which housing the handle 98 fits in its inoperative position (Fig. 12). Housing 86 has a tubular extension or stationary sleeve 87 protruding into a bore 88 of the door, coaxial with the roll-back 97. A projection 95 is secured to the bottom of the interior 95*a* of the housing 86 by suitable means such as screw 22, and handle 98 has a recess 96. Housing 86 encompassing the handle 98 as well as projection 95 rigidly connected with the door and engaging recess 96 are means for preventing rotation of the handle in its inoperative position, and it is obvious that either one suffices for this purpose, and that the one is an auxiliary means of the other one if both are simultaneously provided.

Within the tubular extension 87, a sleeve 99 is rotatably mounted which has a bottom 82 and a square shaft projection 99*a* fitting into the roll-back 97 and adapted to be rigidly connected therewith. In order to facilitate the assembling of the mechanism it is of advantage if the circumference of the projection 99*a* is smaller than that of sleeve 99. The interior of sleeve 99 is square faced and so is the exterior of the handle shank 98*a*, which thus is coupled for rotation with the sleeve and movable within it in axial

direction. In opposite portions of the wall of the sleeve 99, two apertures 89 and 89a respectively are arranged at an axial distance from each other corresponding with the end positions of the handle. A coil spring 113, inserted in the sleeve 99 bears against the shank 98a with one of its ends and against an abutment formed by the sleeve bottom 82 with its other end.

Shank 98a is hollow and has two recesses 84 and 84a diametrically opposite one another in its wall. A latch bolt 110 is inserted in the shank 98a so as to be capable of sliding at right angles to the shank axis and to pass through either one of the recesses 84 and 84a and to enter apertures 89 and 89a respectively, thus locking the shank 98a relative to sleeve 99 against axial displacement in the two end positions. Latch bolt 110 is so dimensioned that in an intermediate position, it does not protrude beyond the circumference of the shank 98a. A cylinder lock 112 is inserted into the shank and a hair-pin spring 85 is secured to cylinder lock 112 in a manner that one arm of the spring bears against a projection 83 of the lock while the other free end extends through a hole 111 of the latch bolt 110 and tends to displace this latch bolt towards the outside.

The square shaft 99a may have a bore 90 in order to permit the insertion of a tool into the interior of the mechanism in an emergency. For similar reasons an emergency spring 93 may be provided between handle 98 and housing 86 capable of creating a gap between these parts for the insertion of another tool if the handle should fail to return to its operative position.

In order to assemble the mechanism in the door which has a roll-back 97 for operating the door catch latch bolt 110 and cylinder lock 112 with spring 85 will be inserted into shank 98a, and spring 113 housed in sleeve 99. Thereafter shank 98a will be put in sleeve 99 thereby compressing spring 113 until latch bolt 110 snaps into one of the recesses 89 or 89a. This being done, sleeve 99 is slipped through the tubular extension 87 of the handle housing 86 and the whole mechanism, as an entirety, pushed into the bore 88 whereby the square shaft 99a enters roll-back 97. When the square shaft 99a has been secured to roll-back 97 and the handle housing 86 to the door surface, the mechanism is ready to be operated.

Starting from the operative position as per Figure 11, a turn of lock 112 retracts latch bolt 110. Then, the handle may be pushed back until latch bolt 110 snaps into the opening 89 under the action of spring 85. In order to return handle 98, lock 112 is turned in the reverse direction. Thereby spring 85 is tensioned in a manner to retract latch bolt 110 from opening 89 and to keep it against the interior side of the opposite wall of sleeve 99. When latch bolt 110 has left opening 89, spring 113 urges shank 98a outward into the operative position which is reached when latch bolt 110 catches in opening 89a.

The embodiment of my invention, as per Figures 13 to 16 operates without a rotatable sleeve, handle shank 234 being directly rotatable within tubular extension or stationary sleeve 287 of the handle housing 286. The latch bolt, capable of locking shank 234 in its operative and inoperative positions, consists of a flat spring 221 surrounding the stationary sleeve 287 and secured against longitudinal displacement thereon. One of its ends is rolled into an eye as at I and is capable of protruding through an opening of sleeve 287 into recesses 222 and 223 respectively of shank 234. The handle shank is hollow and encloses a cylinder lock 227 similar to that shown in Fig. 1 with a tubular extension 224. Extension 224 is provided with two lugs 225 and 226 which are able to move in grooves 222 and 223 respectively of the shank and are capable of displacing eye I of latch bolt spring 221 so as to disengage the handle for its longitudinal displacement. For this purpose, the lugs 225 and 226 are angularly staggered with regard to each other and arranged in different planes. A square driver bar 228 is secured to the roll-back 97 and shank 234 has bottom 220 with a square hole into which the driver bar 228 fits.

In the operative position of the handle, latch bolt spring 221 engages recess 222 in shank 234 (as in Fig. 15). On a turn of the lock 227, lug 225 removes spring 221 from this recess in a manner that the handle may be pushed into the inoperative position of Fig. 14 spring 221 entering recess 223. On a turn of lock 227 in the reverse direction, lug 226 heaves spring 221 out of recess 223 whereupon the spring 213 pushes handle and shank 234 back into the operative position.

The embodiment of Figs. 17 and 18 shows a modification of the latch bolt mechanism illustrated in the preceding figures. A locking sleeve 280 encloses the handle shank 235. The cylinder lock 229 is provided with a lug 230 extending through a slot in the wall of shank 235 and connected to locking sleeve 280. When the cylinder lock is turned, lug 230 moves the sleeve 280, and turns it about its center line. The eye of the locking spring 221 secured to sleeve 297 of the handle housing 296 projects through openings 232 and 233 respectively of the shank and the sleeve 280. When sleeve 280 is turned by means of cylinder lock 229 and its lug 230, it enters between the spring eye and the handle shank 234 and thus disengages the latter from the said spring eye in a manner that the handle may be displaced in an axial direction into one of its end positions.

Various modifications may be made in the details of the constructions without departing from the principle herewith set forth. I particularly wish to emphasize that I described and illustrated a cylinder lock in the handle merely as an example of means adapted to move the latch bolt member in a suitable manner and that other means within the scope of my invention are obvious by which the same result may be obtained.

I claim:—

1. In a door lock having a roll-back the combination of a handle having a shank, said handle and shank having an operative and an inoperative position, coupling means coaxial with said shank and adapted to prevent relative rotation of said shank and said roll-back and to permit axial displacement of said shank and said handle into the operative position and out of the same against the door surface, means in connection with the door surface for preventing rotation of said handle in its inoperative position, a spring actuated latch bolt having two locking positions with respect to said shank and adapted to automatically lock said handle in its two end positions, a cylinder lock within the shank, and eccentric means adapted to retract the latch bolt from one of its locking positions and to tension the latch bolt spring for engagement of the latch bolt in the second locking position on a turn of the lock in one direction, and to retract the latch

bolt from its second locking position and to tension the latch bolt spring for engagement of the latch bolt in its first locking position on a turn of the lock in the reverse direction.

2. In a door lock having a roll-back the combination of a handle having a shank, said handle and shank having an operative and an inoperative position, a sleeve rigidly connected with the roll-back and adapted to axially guide said shank and to couple said roll-back and said shank for rotation, a spring between said roll-back and said shank, a spring actuated latch bolt, holes in said sleeve and corresponding holes in said shank adapted to be engaged by said latch bolt in the two end positions of the shank, a cylinder lock within the shank, the latch bolt spring secured to said cylinder lock, and the cylinder lock adapted to tension said latch bolt spring in a sense to withdraw the latch bolt from one of its locking positions and to push it into its other locking position on a turn of said lock.

3. A handle lock comprising a handle having a shank, said handle and shank having an operative and an inoperative position, a locking device for said handle comprising a latch bolt adapted to move at right angles with respect to the axis of the shank into two locking positions, one opposite the other one, a cylinder lock within the shank, a spring secured to said lock and engaging said latch bolt, said spring adapted to force said latch bolt in one direction and, on a turn of the lock, in the opposite direction.

4. A handle lock comprising a handle having a shank, said handle and shank having an operative and an inoperative position, a locking device for said handle comprising a latch bolt adapted to move at right angles with respect to the axis of the shank into two locking positions, a cylinder lock within the shank, a spring engaging said latch bolt and adapted to be tensioned in a sense to remove said latch bolt from one locking position and to prepare it for engagement in the second locking position on a turn of the lock in one direction, and to remove the latch bolt from the second locking position and to prepare it for engagement in the first locking position on a turn of the lock in the reverse direction.

5. In a door lock having a roll-back the combination of a handle having a shank provided with holes, a sleeve formed integral with the roll-back and receiving the shank, a tongue-like member adapted to move radially to the axis of the shank under spring pressure, two semi-circular grooves in the sleeve and two inclined paths from one groove to the other one, and means within the shank adapted to turn said tongue-like member, said member being adapted to move in said grooves and on said inclined paths.

6. In a door lock having a roll-back the combination of a handle having a shank provided with holes, a sleeve formed integral with the roll-back and receiving the shank, a spring pressed tongue-like member adapted to move radially to the axis of the shank, two semi-circular grooves in the sleeve and two inclined paths from one groove to the other one and a cylinder lock within the shank and engaging said tongue-like member, said member being adapted to move in either one of said grooves on a turn of said lock and on either one of said paths on an axial displacement of said shank and lock.

7. In a door lock having a roll-back the combination of a handle having a hollow shank, a sleeve secured to the door and in which the shank is adapted to move axially into the operative position and out of the same against the door surface, a guide rod forming a connection for the roll-back with the shank and on which the shank is adapted to slide without rotation with respect to the roll-back, a spring between the roll-back and the shank, said spring surrounding said guide rod and adapted to automatically move the shank into the operative position, a latch bolt resiliently secured to the sleeve and adapted to enter the shank, and means within the shank for removing said latch bolt from its engagement with said shank.

8. In a door lock having a roll-back the combination of a handle having a hollow shank, a sleeve secured to the door and in which the shank is adapted to move axially into the operative position and out of the same against the door surface, a guide rod forming a connection for the roll-back with the shank and on which the shank is adapted to slide without rotation with respect to the roll-back, two semicircular grooves in said shank, a locking spring secured to said sleeve and adapted to enter said shank grooves, a rotatable plug within said shank and provided with two lugs engaging said shank grooves, and means for turning said plug.

9. In a door lock having a roll-back the combination of a handle having a shank, said handle and shank having an extended or operative and a retracted or inoperative position, a rotatable sleeve adapted to axially guide said shank within said sleeve and to prevent relative rotation between said shank and said sleeve, an abutment within said shank at its end remote from said handle, a coil spring within said sleeve adapted to bear with one of its ends against said shank and with its other end against said abutment, resiliently operated latch bolt means within said shank and adapted to engage said sleeve and to automatically lock said handle in its two end positions, means within said shank operable for moving said latch bolt means from its locking positions, and means coaxial with said sleeve and circumferentially smaller than said sleeve for coupling said sleeve with said roll-back, whereby said sleeve with said handle and shank, said coil spring, said latch bolt means, and said latch bolt moving means, are adapted to form an entirety capable of being inserted into the door and said roll-back.

10. A handle lock comprising a handle having a shank, said handle and shank having an extended or operative and a retracted or inoperative position, a locking device for said handle comprising a cylinder lock within said shank, a latch bolt movable with said cylinder lock and at right angles with respect to the axis of said shank in two locking positions, a spring tending to shift said latch bolt into its locking positions, and guiding means outside said shank for moving said latch bolt from one locking position and tensioning said spring for the engagement of the latch bolt in its second locking position on a turn of the lock and a shifting of the handle in one direction, and for moving the latch bolt from its second locking position and tensioning the spring for the engagement of the latch bolt in its first locking position on a turn of the lock and the shifting of the handle in the opposite direction.

11. In a door lock having a roll-back, the combination of a handle having a shank, said handle and shank having an extended or operative and a retracted or inoperative position, coupling means coaxial with said shank and adapted to permanently hold said shank and said roll-back

against relative rotation but slidable relative to each other in axial direction so as to permit axial displacement of said handle into the operative position and out of the same to inoperative position against the door surface, means in connection with the door surface for preventing rotation of said handle in its inoperative position, a spring adapted to move the handle automatically into the operative position, resiliently operated latch bolt means adapted to automatically couple said handle in its two end positions with said roll-back against relative axial displacement, and means within the shank operable for removing said latch bolt means from its coupling position.

12. In a door lock having a roll-back the combination of a handle having a shank, said handle and shank having an extended or operative and a retracted or inoperative position, coupling means coaxial with said shank and adapted to prevent relative rotation of said shank and said roll-back and to permit axial displacement of said shank and said handle into the operative position and out of the same to inoperative position against the door surface, means in connection with the door surface for preventing rotation of said handle in its inoperative position, a spring adapted to move the handle automatically into the operative position, a resiliently operated latch member having two latching positions with respect to said shank and adapted to automatically lock said handle in its two end positions, and means within the shank operable to remove said latch member from one of its locking positions by a movement in one direction and from the other locking position by a reverse movement.

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