Sept. 27, 1938. J. W. BARRINGTON ET AL 2,131,033

DOOR LOCK

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Fig. 1.

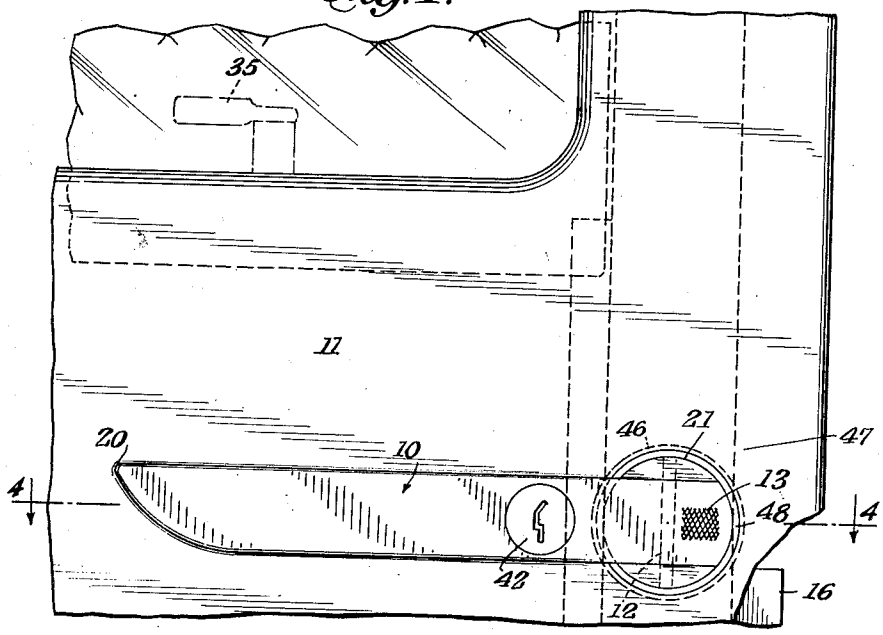


Fig. 2.

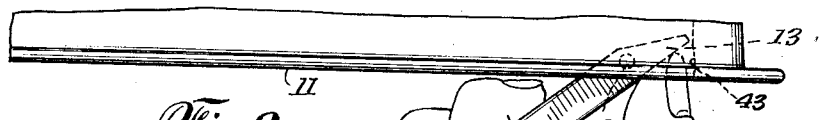
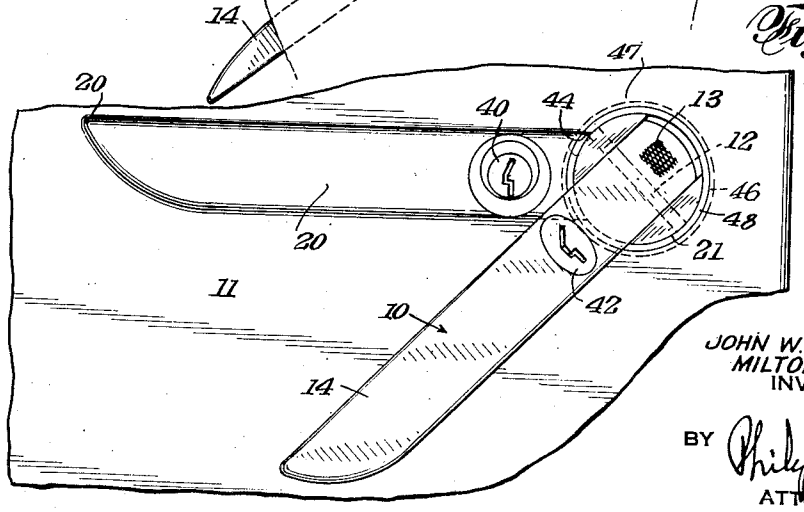


Fig. 3.



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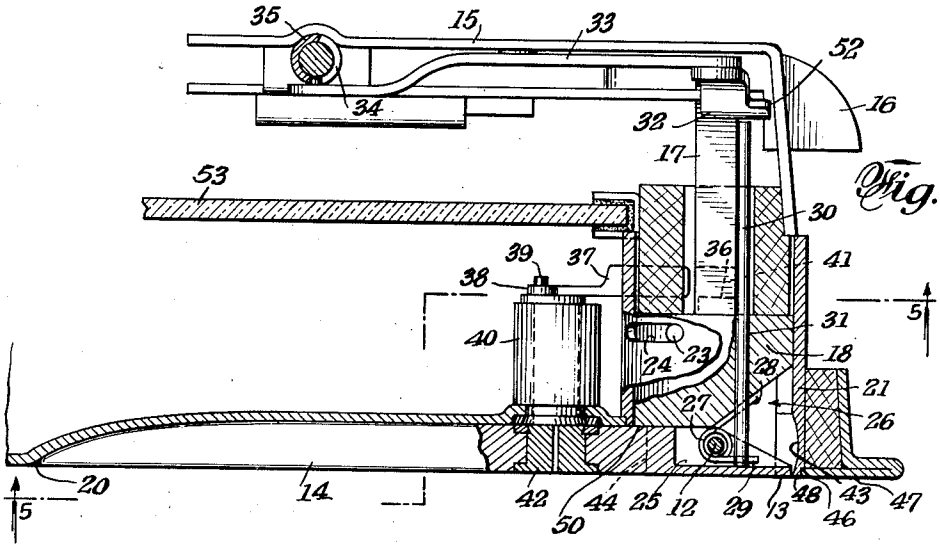
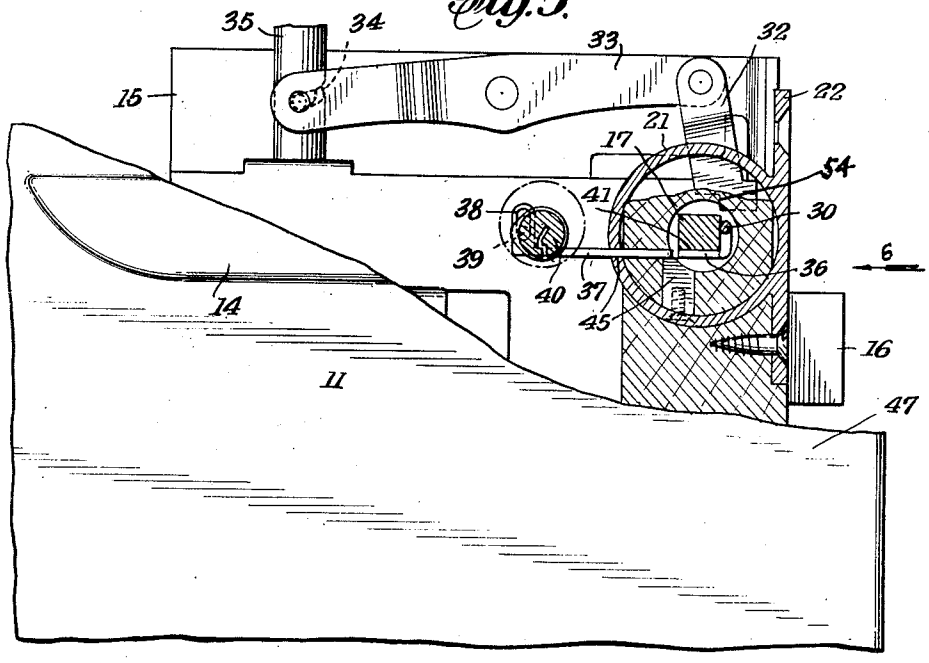


Fig. 4.

Fig. 5.



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Fig. 6.

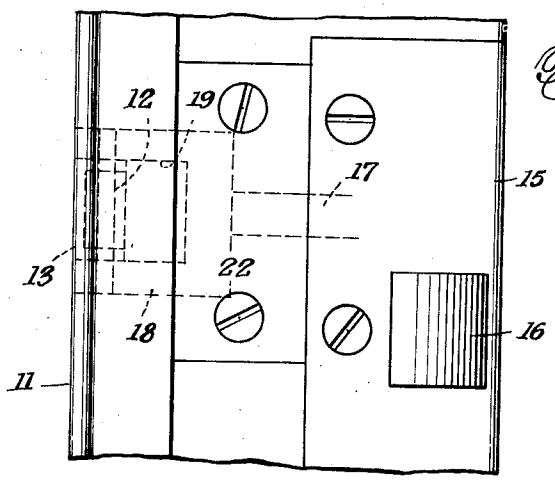
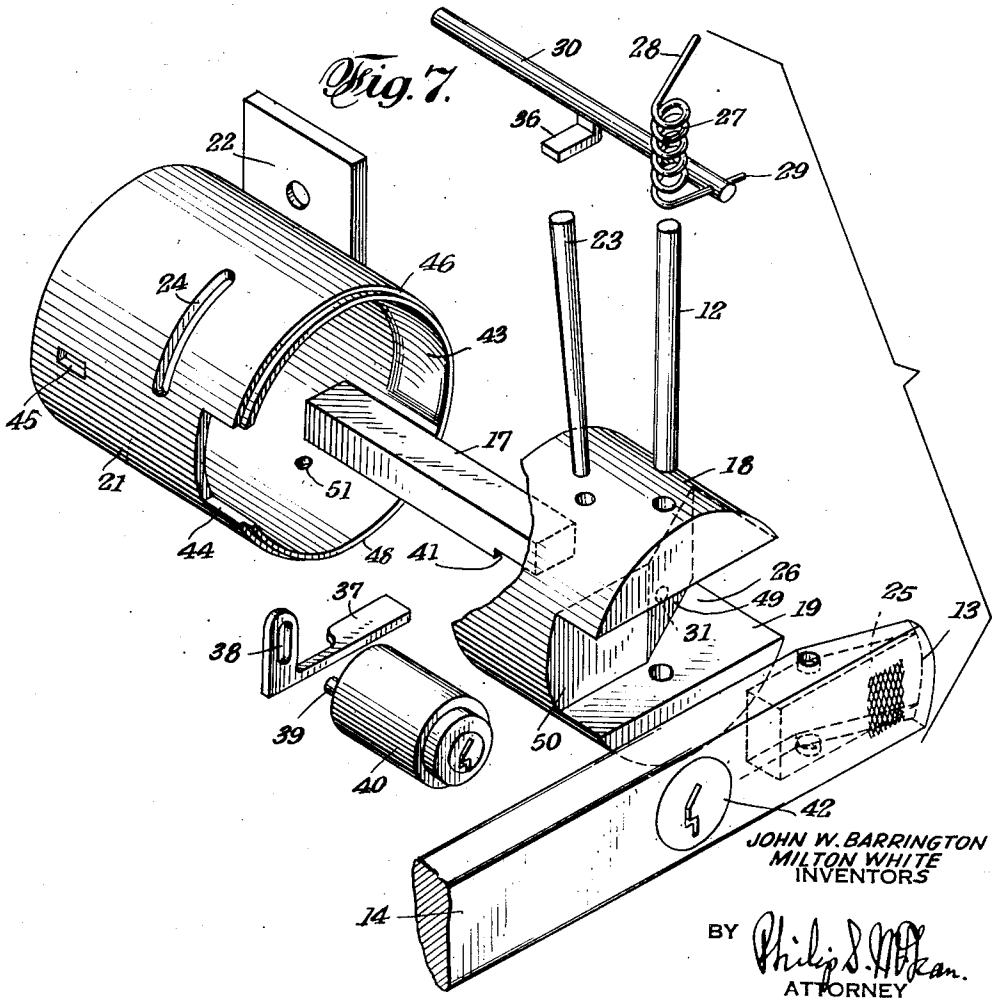


Fig. 7.



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UNITED STATES PATENT OFFICE

2,131,033

DOOR LOCK

John W. Barrington, Baldwin, and Milton White, Brooklyn, N. Y., assignors of ten percent to Joseph P. Canfield, Brooklyn, N. Y., ten percent to Philip S. McLean, Bloomfield, N. J., forty percent to said Barrington, and forty percent to said White

Application July 18, 1936, Serial No. 91,290

15 Claims. (Cl. 70—208)

This invention relates particularly to door handles for conveyances such as automobiles and airplanes.

Special objects of the invention are to provide a handle construction for releasing the door-securing bolt and for opening the door, which, when not in actual use, will fit smoothly and in effect be streamlined to the face of the door, which can be readily brought to position for gripping by the hand and which can be easily operated both to exert the necessary bolt-releasing force and to swing the door open.

Further objects of the invention are to provide a door handle construction having the characteristics mentioned and which will be adaptable to, and readily combined with, the forms of door bolts now in use, which will be of simple, sturdy, inexpensive construction and which will be practical and efficient for the purposes intended.

The foregoing and other desirable objects are attained by the novel features of construction, combinations and relations of parts hereinafter described, illustrated in the accompanying drawings and broadly covered in the claims.

The drawings show a practical and at present preferred embodiment of the invention, but it will be understood that the structure may be modified and changed in various ways, all within the true intent and broad scope of the invention.

Fig. 1 is a broken face view of a form of the invention applied to an automobile door;

Fig. 2 is a broken top plan view of the door, illustrating the feature of pushing in the short end of the lever handle to swing the longer gripping portion out within the grasp of the hand;

Fig. 3 is a broken face view similar to Fig. 1, but showing the handle swung out as in Fig. 2 and rotated downwardly to retract the latch bolt;

Fig. 4 is a broken, detailed view with portions in section partly on the line 4—4 of Fig. 1;

Fig. 5 is a broken detail of the locking elements, partly in section, as on line 5—5 of Fig. 4;

Fig. 6 is a broken edge view of the door with the lock incorporated;

Fig. 7 is a partly sectional exploded view of parts forming the handle and spindle mechanism.

As shown particularly in Figs. 1, 2 and 3, the handle comprises a special operating lever 10 which normally seats flush or flat against the face of the door 11 and is pivoted near one end at 12 to provide a short push lever portion 13 by which the longer handle portion 14, Fig. 2, may be swung out into the full grasp of the hand. This double-ended lever handle is connected with the bolt-retracting spindle of the lock so that after the handle is swung outward, as in Fig. 2, it may then be rotated as in Fig. 3 to turn the spindle and retract the bolt.

The invention is applicable to existing forms of locks and such a lock is here shown, involving a frame 15, Figs. 4 and 6, attached to the door and in which there is mounted a spring-pressed bolt 16 retractable by a rotary shank or spindle 17.

In applying the invention to this particular lock, a cylindrical head or enlargement 18 is formed with or secured to the outer end of the spindle, and this, in the present illustration, is made with a cross slot 19 to receive the end of the handle. This spindle head or enlargement provides ample material for the handle-receiving cross slot and for carrying the hinge pin 12.

In the construction illustrated, the slotted end of the bolt-retracting spindle and the handle portion seated in the cross slot are flush, or substantially flush, with the outer face of the door, when the handle is not in use, and the gripping portion 14 of the handle then seats in a recess 20 so as to lie substantially flush with the face of the door.

The cross-slotted spindle head is shown as rotatably supported in a cylindrical bearing 21, having a face plate portion 22 (Figs. 5 and 6) by which it is mounted in the door. The spindle head is shown as rotatably secured in this bearing by a transverse pin 23 operating in an arcuate slot 24, which may be proportioned to limit the turning movement of the handle to a definite angular extent.

In the particular form of the invention here shown the back of the push portion of the lever handle is hollowed out to provide a recess 25 and the cross slot of the spindle is angled back to form a co-extensive recess at 26, these cooperating to receive the spring 27 coiled about the hinge pin 12 and having one end 28 thrusting against the back of the spindle recess and the other end 29 exerting outward thrust against the push end of the handle lever. Actually, in the illustration, the outward thrusting end of this spring is extended through the end of a slide rod 30 which bears against the back of the lever, as in Fig. 4.

For locking the handle in its seated relation, the slide rod 30 is shown as operating through a bearing 31 in the spindle head and as extending back along the spindle to a position in front of a blocking member 32 (Figs. 4 and 5) which can be lowered by lever 33 into position to prevent backward movement of such rod. The locking lever 33 is indicated as operable through a

cam connection 34 from a rotary handle member 35 (Figs. 1, 4 and 5).

A further lock for preventing outward swinging movement of the hand lever is shown in the present disclosure in the form of a lug 36 on slide rod 30 positioned beneath the square portion of spindle 17 and adapted to be blocked by the locking slide 37 having a slotted lug 38 engaged by the roll back 39 of the cylinder lock 40 and the locking slide 37 is further shown as adapted to extend into a locking recess 41 in the underside of the spindle for securing the latter against rotation; hence this one cylinder lock operates both to lock the handle in its retracted position and to lock the spindle against a turning movement which would retract the bolt.

The cylinder lock 40 is shown as mounted in the lock housing or casing back of the handle portion of the lever, Fig. 4, and the covering portion of the handle is shown as having a rotary escutcheon 42 for admitting the key to the lock.

With the operating lever mounted as shown in Fig. 4, the push end of the lever swings on an arc intercepting the inner circumference of the bearing 21. To accommodate this end of the lever the bearing is therefore hollowed out through an arc sufficient for the full movement of the lever, substantially as represented at 43.

The usual bolt-projecting spring of the latch bolt shown has the effect of rotating the spindle to bring the handle back into line with its recess in the door and the spring 27 has the effect of rocking the handle to carry it back and hold it seated in such recess. Hence the combination of such spring means has the effect of both turning the handle back into line and retracting it into its seat so that when released the handle will automatically find its seat and stay there until projected through the definite operation of the push lever.

While the completely flush construction as shown is at present considered the preferred form, it will be realized that many of the advantages will still be retained if the handle, instead of being fully recessed, is only partially seated, or merely streamlined flat against the outer surface of the door. Further securing of the handle in its retracted position is obtained by having it seat in the notch 44 (Fig. 7) in the edge of the spindle bearing and support 21. The key actuated, sliding lock bar 37 is shown in Figures 4, 5 and 7 as guided and supported at 45 in the bearing member 21. The push portion 13 of the hand lever may have a roughened, curved or otherwise distinguishable thumb spot, such as indicated in Figure 1. The cylindrical bearing 21, is shown as shouldered at 46, to receive the door facing 47, Fig. 4 and this shouldered portion may be upset or riveted over the edge of the door facing, thus making the facing a part of the lock casing.

After the handle is swung out of the holding notch 44 (Fig. 7), as indicated in Figure 2, and partly rotated, as in Fig. 3, the rim portion 48, then underlying the outwardly swung handle will provide a rail supporting the handle in its turning movement, preventing said handle from swinging inward against the fingers grasping it. The internal clearance groove 43 inside the supporting barrel 21 provides additional space about the inwardly pressed end of the handle for the tip of the thumb, as can be seen in Fig. 2. This inward movement of the thumb end of the handle may be definitely limited by the inclined back wall 49 of the recess 46 in the spindle head 18, Fig. 7, and similarly the wall 50 of the cross slot 19 back of the grip portion of the handle serves to limit the inward folding movement of the handle, as in Fig. 4. While the cross pin 23 positively secures the handle mounting head 18 in the bearing 21, the latter may be readily removed as for purposes of repair or replacement by simply driving out this pin through an opening 51 (Fig. 7) provided for the purpose in the bearing 21 opposite the arcuate slot 24. As a general rule, the handle head 18 may be formed as an integral part of the squared shank or spindle 17, but it will be appreciated that it may be connected with this shank or bolt-retracting element in any suitable manner. The spring 27 through its connection with the locking pin 30 (Figs. 4 and 7) serves to hold that pin outward against the inner face of the thumb portion of the lever so that in the closed position (Fig. 4) the slide rod or pin is ready to have the blocking member 32 slipped down in back of the same. This blocking member 32 may brace and guide itself against the inner face of the lock casing at 52 in Fig. 4.

The present handle construction is so designed that it may be readily applied to existing automobile door locks, practically by constructing the handle head 18 to fit over the end of the lock shank 17, or by making this handle head with a shank extension equivalent to the part 17 adapted to replace the shank in the standard lock. This new handle construction also can be applied without interfering with the sliding glass 53 usually present in such doors.

The invention may thus be made up practically as a replacement for present door handles and at little, if any, additional cost since all that is required, in the main, is a suitable mounting which enables the handle first to swing out of its seated relation in the door and then to rotate to turn the shank in a bolt-retracting direction. As this first movement is merely to swing the handle out into a position for grasping by the hand, no great force is required and in the outwardly swung position the leverage portion of the handle may be firmly grasped and then all necessary force be applied to retract the bolt and pull the door open. In other words, the outward swinging of the handle is not employed for withdrawing the bolt, as practiced in prior constructions, but, after the handle is withdrawn to a position where it can be properly grasped, it may then be turned, as an ordinary door handle to pull back the bolt and swing the door open. Consequently, a woman or a child may apply sufficient force to operate a stiff bolt or open a door in which the parts may have been sprung more or less.

It will be appreciated that the structure may be modified and changed, particularly to suit different kinds of locks. The handle may be pivotally and rotatably supported and be connected with the bolt operating element in different ways.

The blocking member 32 when lowered to act as a stop for the rod or pin 30 (Figs. 4 and 5) may also operate to block the shank 17 against turning, it being shown in Fig. 5 as notched at 54 to interlock over said shank in its lowered position. In such case the shank would be held against movement even if the locking pin 30 were broken or rendered inoperative.

What is claimed is:

1. In combination with a bolt retracting spindle having a cross slot in the end of the same, a lock casing substantially flush with the slotted end of said spindle and having a handle recess in the face of the same extending to one side from said

slotted end of the spindle, a substantially straight lever having a handle end seating substantially flush in said recess in the casing and a fulcrum end seating substantially flush in said cross slot in the spindle, a hinge pin pivotally securing said fulcrum end of the lever in said cross slot and located inward from the end of said lever to render the end portion of the lever beyond the pivot point operable as a push button to swing the opposite handle end of the lever out of the handle recess into position for gripping and then turning by the hand and spring means acting on said spindle and lever to return the spindle to position with the lever aligned with the recess and to yieldingly hold the handle portion of the lever retracted in said recess.

2. In combination with a rotary bolt retracting spindle having a cross slot in the end of the same, a lock casing substantially flush with said slotted end of said spindle and having a handle recess in the face of the same extending to one side from said slotted end of the spindle, a substantially straight handle member having a handle end seating substantially flush in said recess in the casing and a push lever end seating substantially flush in said cross slot in the spindle, a hinge pin pivotally securing said handle member in said cross slot with said push lever end operable inwardly to swing said handle end out of the handle recess into position for gripping and then turning to operate the spindle in a bolt retracting direction and spring means for returning the spindle to position with said handle aligned with the handle recess and for rocking the handle member into retracted position in said recess.

3. An operating handle of the character disclosed, comprising in combination with a rotary bolt-retracting spindle, a handle pivoted transversely on said spindle and having a push lever extension for swinging the handle on its pivot, a slide operable by said push lever extension, and lock means for blocking said slide.

4. In combination with a rotary bolt retracting spindle, a handle pivoted transversely on said spindle, a key operable lock in back of said handle, and an escutcheon for said lock in the covering portion of said handle.

5. In combination with a rotatable bolt-retracting spindle, a stationary cylindrical bearing for rotatably supporting said spindle, provided with a notch in the end of the same, a handle lever pivoted transversely on said spindle and thereby adapted to swing into said notch in said cylindrical bearing to be thereby held against turning the spindle, said lever having a push portion beyond the center of pivotal support for enabling said lever to be swung out of said notch, and means for locking said handle lever seated in said notch.

6. In combination with a bolt-retracting spindle, a cylindrical bearing for said spindle, provided with a notch in the end of the same, a handle lever pivoted on said spindle adapted to swing into said notch to be thereby held against turning the spindle, said lever having a push portion beyond the center of pivotal support for enabling the same to be swung out of said notch, and means for locking said handle lever seated in said notch, including a push rod at the back of the push portion of said handle slidable along the spindle, and means for blocking said push rod against such sliding movement.

7. In combination with a rotary bolt-retracting spindle, a cylindrical bearing for the same having an internal arcuate cavity, a hand lever pivoted on the end of the spindle and having a push portion projecting past the center of pivotal support and operable in said internal arcuate cavity.

8. In combination, a rotary bolt-retracting spindle, a hand lever pivoted transversely at the end of the same, and having a push portion extended beyond the center of pivotal support for swinging the hand lever on its pivotal support, a lock casing against which said hand lever closely fits and spring means for yieldingly holding said hand lever in close fitting relation to said lock casing.

9. In combination, a rotary bolt-retracting spindle, a hand lever pivoted transversely at the end of the same, and having a push portion extended beyond the center of pivotal support for swinging the hand lever on its pivotal support, a lock casing against which said hand lever closely fits, spring means for yieldingly holding said hand lever in close fitting relation to said lock casing, and key actuated lock means for securing the handle in such close fitting relation and for holding the same against turning of the spindle.

10. In combination, a rotary bolt-retracting member and a handle pivoted transversely thereon at a point intermediate its ends to provide thereby an inwardly operating push lever at one end of said handle for swinging the opposite end of said handle outwardly in the reverse direction, securing means engaged by said handle in its inwardly swung position for securing same against rotary bolt-retracting movement of said member and a guard for preventing inwardly swinging movement of said handle after said handle has been swung outwardly clear of said securing means and then turned in a rotary bolt-retracting movement.

11. In combination with a rotatable bolt-retracting shank, an angularly related handle for rotating said shank in bolt-retracting direction, means for mounting and holding said handle including a pivotal support for enabling said handle to swing on an axis transverse to the axis of the shank, means for yieldingly retaining said handle in a predetermined retracted position relative to said shank and key operable lock means for positively securing said handle in said retracted position.

12. In combination with a rotatable bolt-retracting shank, an angularly related handle for rotating said shank in bolt-retracting direction, means for mounting and holding said handle, including a pivotal support for enabling said handle to swing on an axis transverse to the axis of the shank, means for yieldingly retaining said handle in a predetermined position relative to said shank, and an annular support for guiding said handle in the out-swung position for the same, said guiding support having a notch therein to receive the handle in the predetermined inwardly swung position.

13. In combination, a rotatable bolt retracting spindle, a handle pivoted transversely on said bolt retracting spindle at a point intermediate its ends and providing thereby an inwardly operable push button extension at one end of the lever for swinging the opposite end of the lever outwardly into a hand grasping position and means for locking said push button extension against such operation of the lever.

14. A door handle comprising in combination with a rotatable spindle, a handle pivotally mounted on said spindle intermediate its ends to

provide a hand grasping portion at one side of the pivotal mounting and a thumb push portion at the opposite side of the pivotal mounting and key operable lock mechanism for securing said pivoted handle against said thumb push operation of the same.

15. A door handle comprising in combination with a rotatable spindle, a handle pivotally mounted on said spindle intermediate its ends to provide a hand grasping portion at one side of the pivotal mounting and a thumb push portion at the opposite side of the pivotal mounting, key operable lock mechanism for securing said pivoted handle against said thumb push operation of the same and including a member for blocking the inward swinging movement of said thumb push portion of the lever.

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