

Nov. 18, 1924.

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L. W. GATES

LOCKING HANDLE WITH ADJUSTABLE SAFETY COLLAR

Filed Dec. 4, 1923

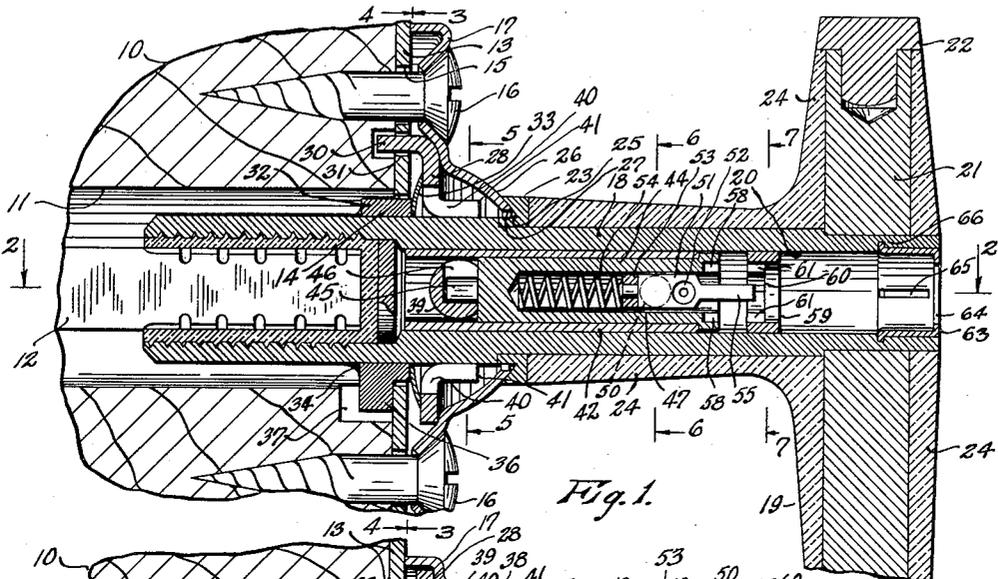


Fig. 1.

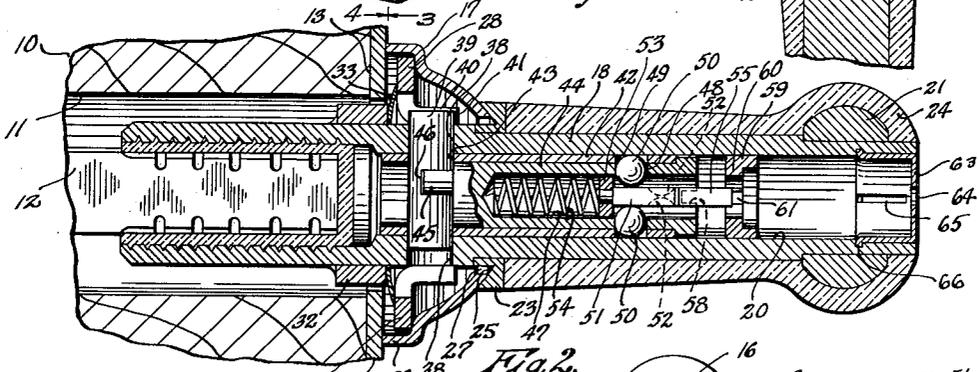


Fig. 2.

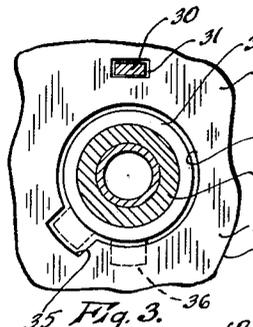


Fig. 3.

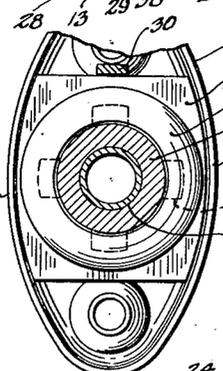


Fig. 4.

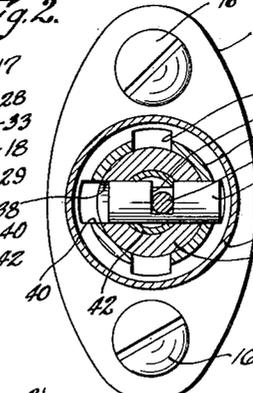


Fig. 5.

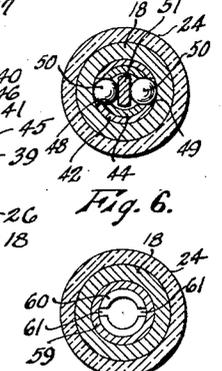


Fig. 6.

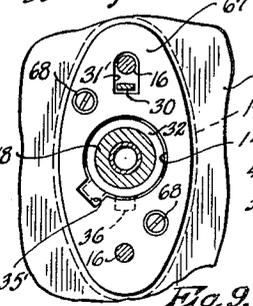


Fig. 9.

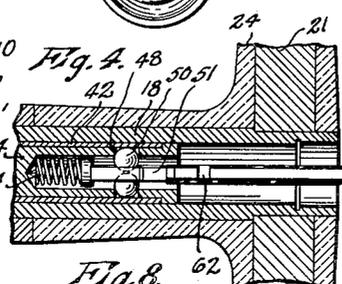


Fig. 8.

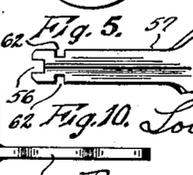


Fig. 10.

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# UNITED STATES PATENT OFFICE.

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## LOCKING HANDLE WITH ADJUSTABLE SAFETY COLLAR.

Application filed December 4, 1923. Serial No. 678,385.

*To all whom it may concern:*

Be it known that I, LOUIS W. GATES, a citizen of the United States, residing at New Haven, county of New Haven, State of Connecticut, have invented new and useful Locking Handles with Adjustable Safety Collars, of which the following is a specification.

This invention relates to latch operating handles, especially to a locking handle for vehicle doors, and has for an object to provide an improved handle of this type which may have an angular adjustment with respect to the escutcheon when applied to the door should the surface of the door be inclined to the axis of the spindle.

It is also an object of the invention to provide an improved locking means for the handle and spindle which will be very simple in construction and easily assembled, and in which the machining operations required in manufacturing are reduced to a minimum.

It is a further object of the invention to provide a door handle and spindle which cannot be removed from the door when the handle is locked, so that even should an unauthorized person remove the securing screws for the escutcheon still the handle and the escutcheon cannot be removed from the door until the handle is unlocked.

With the foregoing and other objects in view, I have devised the construction illustrated in the accompanying drawing forming a part of this specification, similar reference characters being employed throughout the various figures to indicate corresponding elements. In this drawing,

Fig. 1 is a longitudinal central section through a door handle embodying my invention, showing it as applied to a door, the elements being in the position they occupy when the handle is locked.

Fig. 2 is a longitudinal section taken at right angles to the plane of the section of Fig. 1, the section being substantially on line 2-2 of Fig. 1.

Fig. 3 is a detailed transverse section substantially on line 3-3 of Fig. 1.

Fig. 4 is a transverse section substantially on line 4-4 of Fig. 1.

Fig. 5 is a transverse section substantially on line 5-5 of Fig. 1.

Fig. 6 is a transverse section substantially on line 6-6 of Fig. 1.

Fig. 7 is a transverse section substantially on line 7-7 of Fig. 1.

Fig. 8 is a section of the outer portion of the handle and shank substantially on the same plane as Fig. 1 but showing the elements in the position to allow removal of the locking means from the handle.

Fig. 9 is a transverse section similar to Fig. 3 showing a slightly different construction, and

Fig. 10 is an elevation of a key adapted for use with this device.

Figs. 3 to 10 inclusive are drawn to a smaller scale than Figs. 1 and 2.

In the drawing, I have indicated at a section of a door, such as an automobile door, having an opening 11 therethrough for passage of the usual latch operating spindle 12. The latch is not shown as it forms no part of my invention. The surface of the door is covered with the usual sheet steel covering 13 which has an opening 14 for passage of the latch operating spindle and also openings 15 for the securing screws 16 for the escutcheon 17. This escutcheon may be of any shape desired but is preferably oblong, as shown in Figs. 4 and 5 and is also preferably stamped from sheet metal, although, of course, it may be cast if desired.

Mounted to rotate in this escutcheon is the shank 18 of the handle 19 to which shank the spindle 12 is connected. The handle, spindle and escutcheon when assembled form a unitary construction which is applied to the door as a complete assembly. The shank comprises a tubular element which is preferably a piece of brass tubing as it requires less careful machining because this tubing may be secured with the longitudinal opening 20 accurate to size. This is important when applying the lock mechanism presently to be described.

The handle preferably comprises a metal cross bar 21 secured to the tube 18, the tube extending through this bar and is finished at its opposite ends by the ferrules 22. Carried by the shank at a distance from this cross bar is a stop collar 23. In finishing, the portion of the shank between this collar and the cross bar and also the cross bar between the ferrules is covered with hard rubber 24 which is applied in a plastic condition and hardened by vulcanizing. The collar 23 is provided with an annular groove 25 adapted to engage the laterally extending

domeshaped portion 26 of the escutcheon. The outer surface of this portion engaging the surface of the groove is preferably substantially spherical and the opening 27 is somewhat larger than the shank to allow relative angular adjustment between the escutcheon and the shank, so that should the surface of the door not be at right angles to the axis of the shank the escutcheon may assume a position flush with this surface.

Mounted within the escutcheon on the opposite side from the collar 23 is an embossed steel locking plate 28, and as shown in Fig. 4, this plate is shaped to substantially fit the curvature of the side flanges 29 of the escutcheon so that this plate is held within the escutcheon and cannot rotate therein. This locking plate is provided with an inwardly extending lug or tongue 30 projecting through an opening 31 in the steel covering 13 of the door which will prevent rotation of this plate and also of the escutcheon on the door. Carried by the shank inwardly of the locking plate is a stop collar 32 which is spaced sufficiently from the locking plate to allow mounting of a sheet metal spring 33 between this collar and the plate. The stop collar is rigidly secured to the shank by any suitable means, such as solder 34, and the spring 33 reacting against this collar tends to hold the collar 23 tightly against the outer surface of the escutcheon, but allows rotary movement of the shank in this escutcheon. The spring also takes up any wear which may occur after long continued use and always maintains the shank tight so that there can be no rattling.

In one side of the opening 14 of the covering 13 of the door is a notch 35, and the collar 32 has a laterally projecting lug 36 adapted to pass through this notch and then to move laterally from the notch and engage the rear surface of the covering plate 13, the door being provided with a recess 37 to allow this movement. Thus under certain conditions, which will be described under operation, the spindle is held against removal from the door.

Within the escutcheon the shank 18 is provided with transverse openings 38 in which is slidably mounted a locking bolt 39, this bolt being of no greater length than the diameter of the shank so that it may be wholly withdrawn into the shank. When projected from the side of the shank the end of the bolt is adapted to seat in any one of a series of notches 40 provided in the locking plate 28, these notches being preferably positioned ninety degrees from each other. To increase the bearing surface for the bolt in the locking plate a tubular flange 41 is formed on this plate embracing the shank, in which flange the notches 40 are

formed. Mounted within the passage or opening 20 in the shank 18 is a tubular member 42, preferably a piece of brass tubing as it may be bought in proper size and does not require accurate finishing. This tubular member is provided with transverse openings 42 in alignment with the openings 38 in the shank so that the bolt also slides in these openings. Mounted to rotate in the tubular member 42 is a cylinder 44 provided at its inner end with an eccentrically mounted stud or pin 45 adapted to seat in a notch or groove 46 in the bolt 39, so that as this cylinder is rotated the end of the bolt may be projected into one of the notches 40 to lock the spindle against rotation or may be retracted into the spindle or shank to unlock it.

For controlling the operation of this cylinder it is bored from its outer end as shown at 47, and the cylinder and the tubular member 42 are provided with aligned openings 48 and 49 respectively, in which are seated securing elements, such as the balls 50. For controlling these balls there is mounted in the bore 47 a longitudinally slidable element 51 which is flat on its opposite sides and has recesses 52 adapted to receive the balls 50, the sides of these recesses being inclined to form cam surfaces for forcing the balls outwardly under certain conditions. Secured to the inner end of the element 51 is a circular disc 53 to form a guide for this element in the bore of the cylinder and also to provide a bearing for the end of the spring 54 which engages at its opposite end at the bottom of the bore so that this spring always tends to force the element 51 outwardly and hold the balls 50 in the openings 49. At its outer end the element 51 is provided with a pin 55 to engage in a notch 56 in the end of the key 57 (see Fig. 10), and the cylinder 44 is provided in its end on opposite sides of the pin 55 with a pair of notches 58 to receive the end of the key on opposite sides of the notches 56 whereby the cylinder may be rotated to slide the bolt 39. Mounted in the opening 20 outwardly of the end of the cylinder is a key alignment bushing 59. This bushing has a flange 60 provided with notches 61 through which the key is adapted to pass and is positioned so that when the key is in proper position to rotate the cylinder the flange 60 is in alignment with the notches 62 in the sides of the key. Thus the key can be removed from the lock only when the bolt is extended in locking position or retracted from the spindle in unlocking position, and a half revolution of the key is required to move this bolt from either one of these positions to the other position. The outer end of the opening 23 is closed by a metal ferrule 63 which has a slot 64 of a shape corresponding to the shape of the key and which has

saw cuts 65 in its side walls to provide spring sections, the inner ends of these sections having an outwardly extending lip or flange 66 adapted to seat in a groove in the wall of the opening 20 to retain this ferrule in proper position but to allow it to rotate with the key.

The operation is as follows:

In assembling, the tubular member 42 may be inserted in the tubular element 18 with the openings 43 and 38 in alignment and then the bolt 39 inserted in these openings. The bolt will then secure the member 42 against removal from the member 18. The cylinder 44 may then be inserted from the outer end of the element 18 and the pin 45 inserted in the slot 46, the cylinder being inserted with the spring 54, cam element 51 and balls 50 in the position shown in Fig. 8 until the balls 50 come into alignment with the openings 49 in the element 18, as shown in Fig. 2, when the cylinder will be held against rotary movement, and it will also be held against removal from the tubular member 42. The key alignment bushing 59 is then properly positioned in the passage 20 and the ferrule 63 inserted in the outer end. The handle and shank are now ready to be mounted in the escutcheon. The shank is inserted through the opening 27 with collar 23 engaging the outer surface of the spherical portion 26, the locking plate 28 is placed in position in the escutcheon, the spring 33 placed on the shank and then the stop collar 32 secured in the proper position against this spring. This collar is permanently fastened onto the shank as by soldering. It will be noted that the handle, the escutcheon and the locking means is now a complete assembly and may be applied as a whole to the door.

In applying the handle to the door the spindle 12 is inserted through the opening 11 into the latch operating mechanism, not shown, and is moved inwardly until the lug 36 engages the surface of the plate 13, the bolt 39 being in the unlocked position so that the shank may rotate relative to the escutcheon. The handle is then rotated a partial revolution to the right or clockwise, as viewed in Fig. 3, and against the action of the spring in the latch until the lug 36 is in alignment with the notch 35 in the plate 13. The escutcheon is also rotated to bring the lug 30 into alignment with the opening 31 in the plate 13. The assembly is then forced inwardly to bring the rear edge of the escutcheon flush with the surface of the door with the lug 30 projecting into the opening 31 and to pass the lug 36 through the notch 35 to the rear of the plate 13. If the handle is now released the latch will rotate counter-clockwise to the neutral position or the operator may give it this movement to bring the lug 36 to a position back

of the plate 13 out of alignment with the notch 35, as shown in Fig. 3. The whole assembly may now be secured to the door by means of the screws 16 passing through the escutcheon. If the surface of the door is not at right angles to the axis of the spindle the escutcheon may rock angularly to assume the proper position flush with the surface of the door. The handle is now in position and may be rotated to operate the latch in the usual manner.

In order to lock the handle against rotation all that is necessary is to insert the key 57 through the slot 64 and notches 61 until its end on opposite sides of the notch 56 is seated in the notches 58 in the end of the cylinder 44. This movement will also slide the member 51 inwardly as the end of the pin 55 engages the bottom of notch 56, and these elements are so proportioned that when in this position the cam element 51 is pushed inwardly against the action of spring 54 until the recesses 52 are in alignment with the balls 50. The inward movement of the key is limited by engagement of the end of the key against the bottoms of notches 58 in the outer end of cylinder 44. The depth of these notches, the depth of notch 56 in the end of the key and the length of pin 55 are so proportioned that when the end of the key engages the bottoms of notches 58 the recesses 52 are in alignment with openings 48. These balls may then move inwardly out of the openings 49 and the cylinder 44 may be rotated by turning the key. It requires a half revolution of the key and the cylinder to advance the bolt 39 into one of the notches 40 in the locking plate 28. In this position the balls 50 are again in alignment with the openings 49 and if the key is withdrawn the spring 54 will move the cam element 51 outwardly and the inclined surfaces of the recesses 52 will force the balls 50 into the openings 49, as shown in Fig. 2. The cylinder 44 is not locked against rotation and the bolt 39 is held in locking position. If it is desired to unlock the spindle, insertion of the key as described above will again allow the balls 50 to move inwardly from the openings 49 and allow rotation of the cylinder 44, which through the eccentric pin 45 will retract the bolt into the shank and unlock it from the escutcheon.

Assuming that the owner has left his car with the door locked, in which case the elements would be in the position shown in Figs. 1 to 7. If now an unauthorized person should attempt to gain access to the car by removing the screws 16, as the spindle is locked against rotation it cannot be withdrawn from the latch. This is because even though the screws 16 are removed the handle cannot be rotated because it is locked to the plate 28 and this plate cannot rotate be-

cause the tongue 30 extends through the opening 31 in the steel plate 13. Therefore, the lug 36 cannot be moved into alignment with the notch 35 and as it engages the rear surface of the plate 13 it will prevent withdrawal of the handle. Thus this handle is just as secure against operation by an unauthorized person when the screws 16 are removed as when they are in position. An authorized person may, however, easily remove the handle from the door if desired. All that is necessary is to unlock the handle from the escutcheon by retracting the bolt 39. Then even though the plate 28 and escutcheon 17 cannot be rotated relative to the door the shank may, however, be turned to bring the lug 36 into the alignment with the notch 35 when by pulling outwardly on the handle the whole assembly may be removed from the door.

In the showing of Figs. 1, 2 and 3 I have used the usual sheet metal covering 13 which is secured to the door by suitable means, not shown, as the means for coacting with the plate 28 and the lug 36 for preventing removal of the handle when this handle is locked. It may be, however, that a door might not be provided with this covering or it is not desired to go to the trouble of cutting the notch 35 in this plate. Under these conditions I provide a separate plate 67 (Fig. 9) which is secured to the surface of the door under the escutcheon, the flange of the escutcheon being shown in dotted lines. This plate is also secured to the surface of the door by means independent of the securing means for the escutcheon, but as this is a small plate these securing means are located where they are inaccessible. I have shown screws 68 for this purpose which are out of alignment with the screws 16 and are covered by the escutcheon. This plate has an opening 14' corresponding to the opening 14 in the plate 13 through which the shank extends and it has the notch 35' in one edge of this opening corresponding to the notch 35. The plate also has an opening 31' corresponding to the opening 31 in the plate 13 to receive the tongue 30 to prevent rotation of the escutcheon the same as in the first form. The operation of this plate is exactly the same as in the first form, the lug 36 engaging behind the plate 67 when the handle is locked to prevent withdrawal of this handle from the door.

If for any reason it should be desired to remove the locking mechanism from the handle this may be done, as shown in Fig. 8. First the ferrule 63 and the key positioning bushing 59 are removed. The key is then inserted in the notches 58 in the end of the cylinder 44 which will force the cam element 51 inwardly to allow the balls 50 to move from the openings 49. The key may now be turned a quarter revolution which

will bring the balls half way between the openings 49. This is the position shown in Fig. 8. The key may then be withdrawn and a suitable tool inserted to withdraw the cylinder 44, it being apparent that in this position the cylinder is not locked to the tubular member 42.

It will be apparent from the foregoing description that the handle including the lock mechanism and the escutcheon may be applied to the door as a complete assembly, that the escutcheon may rock angularly with respect to the axis of the spindle so that it will lie flush with the surface of the door, that wear incident to continued operation will be automatically taken up so that the device will not work loose and rattle, and that when the handle is locked it cannot be removed from the door even though the escutcheon securing screws are removed.

Having thus set forth the nature of my invention, what I claim is:

1. In combination, a handle including a tubular element having a transverse opening, a tubular member in said element having openings in alignment with the first mentioned opening, a bolt slidable in said openings, a cylinder rotatably mounted in the tubular member, an operative connection between the bolt and cylinder, cooperative locking means carried by the cylinder and tubular member to lock the cylinder against rotation, means whereby the locking means may be released, and a stationary securing element adapted to coact with the bolt to secure the handle against rotation.

2. In combination, a handle including a tubular element having a transverse opening, a tubular member in said element having openings in alignment with the first mentioned opening, a bolt slidable in said openings, a cylinder rotatably mounted in the tubular member, an operative connection between the bolt and cylinder, said tubular member being also provided with one or more additional openings, one or more laterally movable securing elements carried by the cylinder and adapted to seat in said opening or openings, to lock the cylinder against rotation, and a key controlled element for determining the position of said securing element or elements.

3. In combination, a handle including a tubular element having a transverse opening, a tubular member in said element having openings in alignment with the first mentioned openings, a bolt slidable in said openings, a cylinder rotatably mounted in the tubular member, an operative connection between the bolt and cylinder, said tubular member being provided with additional openings, laterally movable securing elements carried by said cylinder and adapted to seat in said openings, and a slidable key controlled element having cam surfaces for

moving said securing elements into said openings and retaining them therein.

4. In combination, a handle including a tubular element having a transverse opening, a tubular member in said element having openings in alignment with the first mentioned openings, a bolt slidable in said openings, a cylinder rotatably mounted in the tubular member, an operative connection between the bolt and cylinder, said tubular member being provided with additional openings, laterally movable balls carried by said cylinder and adapted to seat in said openings, an element slidable in said cylinder having cam surfaces adapted to move the balls into said openings and retain them therein, a spring tending to hold said element in locking position, and means carried by said element adapted to coact with a key to release said balls.

5. In a latch operating handle, a shank, an escutcheon embracing said shank, means for securing said escutcheon to a door, a plate carried by said escutcheon and provided with one or more notches, a movable element carried by said shank and movable to and from engagement with said notches to lock the shank against rotation, and key controlled means for operating said element.

6. In a latch operating handle, a shank, an escutcheon embracing said shank, means for securing said escutcheon to a door, said escutcheon being provided with a dome-shaped lateral extension, a collar carried by the shank engaging the outer surface of said extension, a plate carried by the escutcheon on the opposite side from said collar provided with one or more notches, a movable securing element carried by the shank and adapted to engage one of said notches to secure the shank against rotation, and key controlled means for operating said securing element.

7. In a latch operating handle, a shank, an escutcheon embracing said shank, means for securing said escutcheon to a door, said escutcheon being provided with a dome-shaped lateral extension, a collar carried by the shank engaging the outer surface of said extension, a plate carried by the escutcheon on the opposite side from said collar provided with one or more notches, a second collar secured to the shank on the opposite side of said plate from the escutcheon, a spring between the plate and said second collar, a movable securing element carried by the shank and adapted to engage one of said notches to secure the shank against rotation, and key controlled means for operating said securing element.

8. In combination, a door, an escutcheon, a latch operating spindle mounted in said escutcheon, means for locking the spindle to prevent operation of the latch, means for securing the escutcheon to the door, and in-

dependent means for securing the spindle to the door when the spindle is locked.

9. In combination, a door, an escutcheon, a latch operating spindle mounted in said escutcheon, means for locking the spindle to prevent operation of the latch, means for securing the escutcheon to the door, and independent means for securing the spindle to the door when the spindle is locked, said latter means adapted to be released by moving the spindle to release the latch.

10. In combination, a door, an escutcheon, a latch operating spindle mounted in said escutcheon, means for locking the spindle to prevent operation of the latch, means for securing the escutcheon to the door, and cooperating means carried by the door and spindle arranged to prevent removal of the spindle when the latch is in securing position but to allow removal of the spindle when the latch is in releasing position.

11. In combination, a door, an escutcheon, a latch operating spindle mounted in said escutcheon, means for locking the spindle to prevent operation of the latch, screws for securing the escutcheon and the spindle to the door, and independent means for securing the spindle to the door when said spindle is locked.

12. In combination, a door, an escutcheon, a latch operating spindle mounted to rotate in said escutcheon, coacting means carried by the escutcheon and spindle adapted to lock the spindle against rotation, means for securing the escutcheon to the door, coacting means carried by the door and escutcheon adapted to prevent rotation of the escutcheon should said securing means be removed, and coacting means carried by the door and the spindle adapted to prevent removal of the spindle when said spindle is locked.

13. In combination, a door, an escutcheon, a latch operating spindle mounted to rotate in said escutcheon, coacting means carried by the escutcheon and spindle adapted to lock the spindle against rotation, means for securing the escutcheon to the door, a plate secured to the door, cooperating means carried by the plate and escutcheon adapted to prevent rotation of the escutcheon should said securing means be removed, and cooperating means carried by the plate and the spindle adapted to prevent removal of the spindle when locked but to allow removal of the spindle when the spindle is unlocked.

14. In combination, a door, an escutcheon, means for securing the escutcheon to the door, a plate between the escutcheon and the door, means for securing the plate to the door independent of the escutcheon securing means, a latch operating spindle mounted to rotate in said escutcheon, a locking plate carried by said escutcheon, cooperating means carried by the locking plate

and the first mentioned plate adapted to prevent turning movement of the escutcheon should its securing means be removed, means for locking the spindle against rotation in the escutcheon, and cooperative means carried by the first mentioned plate and the spindle adapted to prevent removal of the spindle from the door when the spindle is locked.

10 15. In combination, a door, a plate secured to the door, an escutcheon secured over said plate, a latch operating spindle mounted to rotate in said escutcheon, a locking plate carried by said escutcheon, said  
15 locking plate having a projection adapted to engage said first mentioned plate to prevent rotation of the locking plate, cooperating means carried by the locking plate and the spindle for locking the spindle against  
20 rotation, and a lug carried by the spindle adapted to engage the rear of the first mentioned plate when said spindle is locked.

16. In combination, a door, a plate secured to the door, an escutcheon secured to the door  
25 over said plate, a latch operating spindle mounted to rotate in said escutcheon, said plate having an opening for passage of said spindle with a notch in one edge of said  
30 opening, a locking plate carried by said spindle, cooperating means carried by the first mentioned plate and the locking plate to prevent rotation of the locking plate, cooperating locking means carried by the locking plate and the spindle adapted to lock the  
35 spindle against rotation, and a laterally projecting lug carried by the spindle adapted to engage the rear of the first mentioned plate, said lug being out of alignment with the

notch in the plate when the spindle is locked to prevent removal of the spindle but adapted to be brought into alignment with the notch to allow removal of the spindle when the spindle is unlocked. 40

17. In combination, an escutcheon having a laterally extending substantially spherical  
45 portion, a latch operating shank extending through said escutcheon, a collar carried by said shank and engaging said spherical portion, a locking plate carried by the escutcheon on the opposite side thereof, a stop  
50 means carried by the shank on the inner side of said locking plate, a resilient element between the stop means and the plate, said escutcheon and shank being adapted for relative angular movement, and locking  
55 means carried by the shank and adapted to engage said plate to secure the shank against rotation.

18. In combination, a door, an escutcheon, means for securing the escutcheon to the  
60 door, a latch operating means including a shank extending through said escutcheon, said shank and escutcheon being adapted for relative angular and also relative rotary  
65 movements, cooperating means carried by the shank and the escutcheon adapted to lock the shank against rotation, cooperating means carried by the door and the escutcheon to prevent rotation of the escutcheon, and cooperative means carried by  
70 the door and the shank adapted to prevent removal of the shank from the door when the shank is locked to the escutcheon.

In testimony whereof I affix my signature.

LOUIS W. GATES.