July 27, 1965 F. J. RUSSELL ETAL 3,196,644

SPINDLE DEVICE FOR RELEASABLY RETAINING A LOCKING MECHANISM ASSEMBLY

Filed Nov. 29, 1962 3 Sheets-Sheet 1

Fig. 1

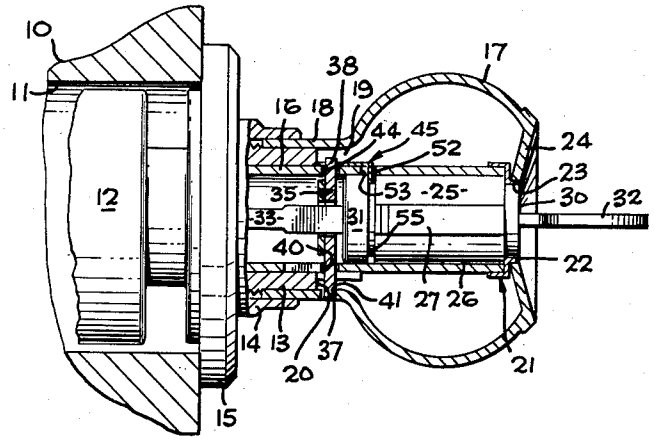


Fig. 7

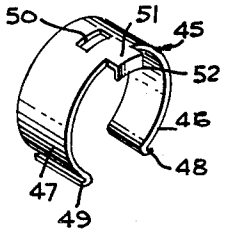


Fig. 6

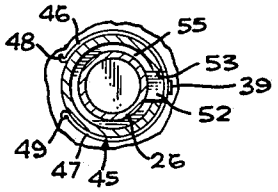


Fig. 2

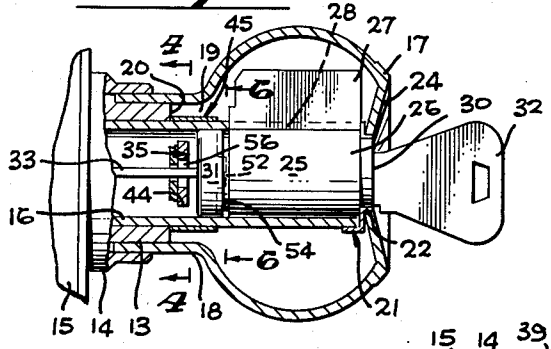


Fig. 3

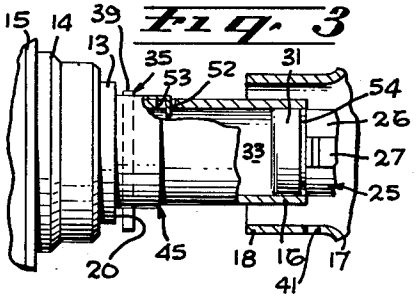


Fig. 5

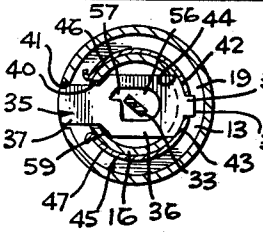
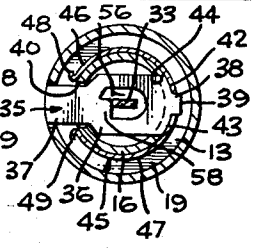


Fig. 4



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Fig. 8

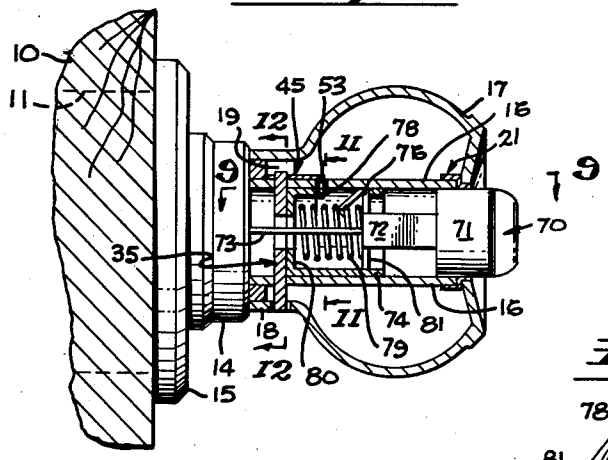


Fig. 11

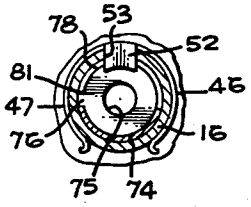


Fig. 9

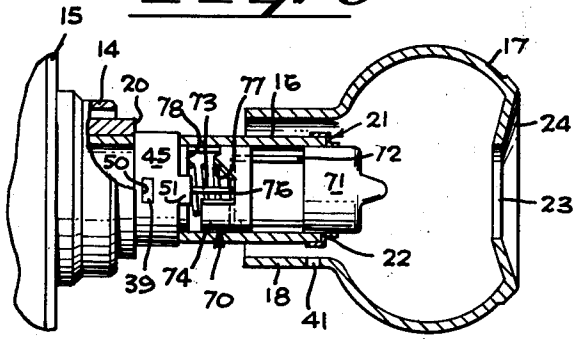


Fig. 12

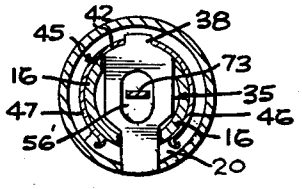
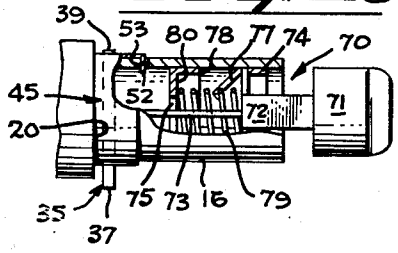


Fig. 10



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Fig. 13

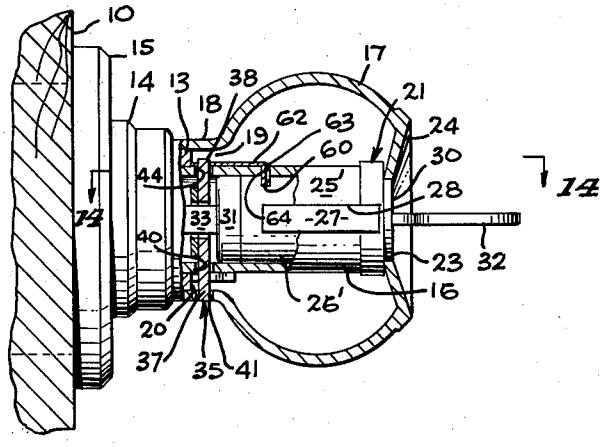


Fig. 14

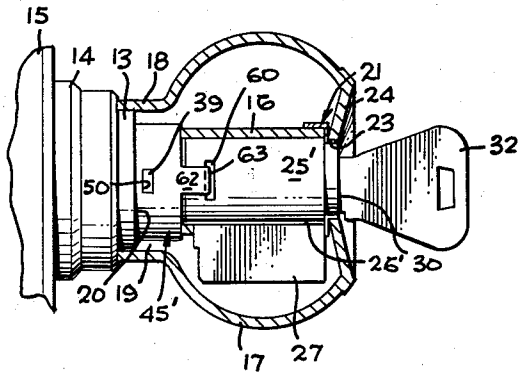
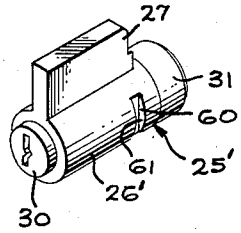


Fig. 15



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3,196,644

SPINDLE DEVICE FOR RELEASABLY RETAINING A LOCKING MECHANISM ASSEMBLY

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Filed Nov. 29, 1962, Ser. No. 240,936
10 Claims. (Cl. 70—224)

The disclosure here under consideration is one relating to door locks and locking devices associated with door locks which need to be retained in position during use but which also need to be constructed in such fashion that the locking devices can be removed and replaced when occasion requires.

The current trend in the manufacture of door locks is to assemble as much as possible of the mechanism compactly in a small space, usually in axial alignment with the hand hold or knob as the case may be. More particularly, much of the mechanism is housed within the spindle attached to the knob and which carries the rotary motion of the knob to the latching or locking mechanism. Because there is relatively little space available for the assembly of the various operating parts of a door lock, improvements and changes which are brought about from time to time have to take into consideration the rather confined space and limited opportunity for moving parts to be shifted one with respect to the other.

From time to time, the locking mechanism, whether it be a key-operated mechanism or button-operated mechanism, needs to be removed and replaced, rekeying of the key-operated mechanism being frequently necessary. Although it is desirable to permit removal and replacement from one side only of the locking mechanism, namely, the inside, it is, nevertheless, important that when authorized removal is provided for the operation be simple and easy to execute and further that the lock parts involved be kept relatively few in number and of relatively simple construction.

It is therefore among the objects of the invention to provide a new and improved retaining and releasing means for a locking mechanism which is mounted upon the spindle at a location preferably within the confines of the hand hold and which engages whatever locking mechanism is employed in a secure fashion but which can be quickly and easily disengaged by authorized means.

Another object of the invention is to provide a new and improved retaining and releasing subassembly for incorporation in a lock spindle which can reach through the spindle into releasable engagement with the locking mechanism to either hold it or release it as required.

Still another object of the invention is to provide a new and improved retaining and releasing device for a locking mechanism constructed in such fashion that it can be used for jointly retaining and releasing both the locking mechanism and the hand hold or which may be used only for retaining and releasing the locking mechanism only irrespective of the hand hold if occasion should require it.

Still further among the objects of the invention is to provide a new and improved resiliently mounted retaining and releasing device for a locking mechanism such that it can be easily manipulated by authorized personnel when the lock is in unlocked condition only by simple and easy means.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter set forth,

pointed out in the appended claims and illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a longitudinal, sectional view of a door lock mounted in an appropriate door on what is usually considered as the outside face of the door.

FIGURE 2 is a longitudinal, sectional view taken in a direction 90 degrees with respect to the section of FIGURE 1.

FIGURE 3 is a fragmentary, side-elevational view partially broken away showing the locking mechanism and the knob partially removed.

FIGURE 4 is a cross-sectional view taken on the line 4—4 of FIGURE 2.

FIGURE 5 is a view similar to FIGURE 4 but with the key rotated sufficiently to allow the locking mechanism to be removed.

FIGURE 6 is a cross-sectional view taken on the line 6—6 of FIGURE 2.

FIGURE 7 is a perspective view of the retaining device.

FIGURE 8 is a longitudinal, sectional view of another form of the device.

FIGURE 9 is a longitudinal, sectional view taken on the line 9—9 of FIGURE 8 but showing the hand hold partially removed.

FIGURE 10 is a fragmentary, side-elevational view partially broken away showing the locking mechanism partially removed.

FIGURE 11 is a cross-sectional view taken on the line 11—11 of FIGURE 8.

FIGURE 12 is a cross-sectional view taken on the line 12—12 of FIGURE 8.

FIGURE 13 is a longitudinal, sectional view of still another form of the device.

FIGURE 14 is a longitudinal, sectional view of the form of FIGURE 13 taken on the line 14—14 of FIGURE 13.

FIGURE 15 is a side perspective view of the key-operated device of FIGURES 13 and 14.

In an embodiment of the invention chosen for the purpose of illustration, there is shown a section of door **10** having therein an opening **11** in which is mounted a housing **12** containing conventional portions of a door lock with which the device here under consideration is adapted to operate. Extending from the housing is a bushing **13** on the exterior of which is a sleeve **14** and a rosette **15**. A spindle **16** extends outwardly from the housing **12** and is rotatably mounted within the bushing **13**.

A hand hold here shown as a knob **17** has a neck **18** located within the sleeve **14** and rotatably supported by the outside circumference of the bushing **13**. Since the neck is spaced from the spindle **16** by the interposition of the bushing **13**, there is provided an annular space **19** immediately outward relative to the end edge **20** of the bushing.

A footing ring **21** is mounted upon the outer end of the spindle **16** and the ring is provided with a projection **22** extending through a hole **23** in an outer face **24** of the knob.

For manipulation of the internal lock mechanism (not shown) associated with the housing **12**, there is provided in the embodiment of FIGURE 1 a locking mechanism consisting of a key-operated mechanism indicated generally by the reference character **25**. By way of example, this mechanism is shown as comprising a cylindrical housing or barrel **26** along one side of which is a pin tumbler housing **27**. The cylinder housing **26** occupies the interior of the outer end of the spindle **16** which in the embodiment shown is a tubular spindle, the spindle being provided with an elongated opening **28** for the accommodation of the pin tumbler housing.

Within the barrel is a cylinder plug having an outer exposed end 30 and a cap 31 at its inner end. The cylinder plug represented by the end 30 identified above and extending through the barrel is rotatable, along with cap 31, by manipulation of a key 32 between locked and unlocked conditions. Extending rearwardly from the cap 31 is a tailpiece 33 having an innermost end (not shown) which enters the housing 12 for the customary purpose of manipulating the lock mechanism contained therein.

A keeper 35, forming part of a keeper means, is mounted transversely of the spindle near the cap 31. The keeper is a relatively flat member which has a special shape as shown advantageously in FIGURES 4 and 5. The parts which give the keeper the shape shown comprise a mid-portion 36, a retaining end 37, and a boss 38 forming a pressure end 39. The retaining end extends outwardly in a diametrical direction relative to the axis of the spindle through an opening 40 in the spindle and an aligned opening 41 in the neck. At the opposite end, the boss 38 defines opposite shoulders 42 and 43 on the keeper at a relatively wider portion and this portion is adapted to extend through a relatively larger opening 44 in the spindle diametrically opposite the opening 40.

For retaining the key-operated mechanism 25 in position and forming part of the keeper means, there is provided an arcuate spring indicated generally by the reference character 45 and shown in perspective view in FIGURE 7. The arcuate spring includes legs 46 and 47 on opposite sides terminating respectively in tips 48 and 49. In the chosen embodiment, the legs extend over the exterior of the spindle for a distance in excess of half the circumference. On the side of the spring opposite the tips 48 and 49 is an aperture 50 which is adapted to receive the boss 38 of the keeper. On the spring adjacent the aperture 50 is an extension 51 terminating in a retaining tab 52. The tab extends through a hole 53 in the spindle and inwardly beyond the inside wall surface of the spindle.

For engagement with the tab, the key-operated mechanism is provided with a configuration here taking the form of an annular space 54 in the cap 31 which provides access to a shoulder 55 which is actually a forwardly facing area of the cap 31. Movement of the keeper 35 inwardly against the arcuate spring causes the spring to yield and move outwardly far enough to have the retaining tab 52 disengage from the shoulder 55 in order to release the key-operated mechanism 25 so that it can be withdrawn. Movement in the opposite direction is limited by shoulders 59.

Since it is necessary to prevent withdrawal of the key-operated mechanism by unauthorized persons, the device is so arranged that the keeper can be manipulated only when the key-operated mechanism has been unlocked by a person having the proper key 32. Unlocked condition of the key-operated mechanism, and the attached tailpiece 33, is illustrated in FIGURE 5. The tailpiece extends through a hole 56 in the mid-portion 36 of the keeper and in unlocked condition is disposed at the angle illustrated in FIGURE 5 with one edge of the tailpiece aligning with a cutout 57. When the parts are in this relative position, pressure can be exerted upon the retainer end 37 of the keeper by employment of some conventional tool such as a screwdriver or nail in order to move the keeper in a direction from left to right as viewed in FIGURES 4 and 5. When this is done, the legs of the arcuate spring yield and the shoulders 42 and 43 of the keeper press against the spring adjacent the aperture 50 moving the spring outwardly away from the exterior of the spindle far enough so that the tab 52 disengages from the key-operated mechanism as previously described.

In order to prevent withdrawal of the key-operated mechanism by unauthorized persons who cannot unlock the lock, the keeper is provided with a projection 58 which extends into the hole 56. As shown in FIGURE 4, when the key-operated mechanism is in locked condition, the tailpiece 33 has the angular position there shown. In this position, the tailpiece is in engagement with the projection 58 and this engagement blocks shifting of the keeper from left to right as it would have to be shifted in order to release the key-operated mechanism. Hence, by the physical interposition of the tailpiece, release of the key-operated mechanism is prevented.

Incidentally, in the embodiment of FIGURE 1, the keeper 35 by extending through the opening 41 in the neck 18 is also instrumental in holding the knob in position on the spindle. When the key-operated mechanism is in unlocked condition, the keeper can be depressed sufficiently to release both the knob and the key-operated mechanism which are shown in partially withdrawn position in FIGURE 3. Once the tab has been released from the shoulder 55 and the key-operated mechanism withdrawn, pressure on the keeper can be immediately released and tension in the legs 46 and 47 of the arcuate spring will draw it downwardly again into engagement with the outside surface of the spindle at which time the tab will again project all of the way into the spindle as shown in FIGURE 3. To return the key-operated mechanism to engagement in the device, all that is necessary is to move it inwardly from right to left as shown in FIGURE 3 until the space 54 of cap 31 engages the tab 52.

In a slightly different form of the device illustrated in FIGURES 13, 14, and 15, a barrel 26' of a key-operated mechanism 25' is provided with a recess 60 on sides forming a shoulder 61, comprising a configuration on the exterior of the key-operated mechanism. When the shoulder 61 is made use of to retain the key-operated mechanism in position, an arcuate spring 45' will be provided with a slightly longer extension 62 terminating in a tab 63. A hole 64 in the spindle will be spaced slightly further from the opening 44 than in the first described form of the invention. In all other respects, the parts have the same form and relationship as already described in connection with the first form of the invention and operate in the same fashion. In this instance, however, the entire cap 31 of the cylinder plug fits snugly against the barrel 26.

In still another form of the invention illustrated in FIGURES 8 through 12 inclusive, the locking mechanism is identified in a button-operated mechanism indicated generally by the reference character 70. The button-operated mechanism chosen for the purpose of illustration is embodied in part in an outwardly extending turn button 71 having a yoke 72 at the inner end to which is attached a tailpiece 73. A substantially cylindrical casing 74 is received in the spindle 16, the casing being provided with an aperture 75 at the inner end through which the tailpiece passes.

Following substantially conventional practice, there is provided on the yoke 72 a cam 76 which extends outwardly through a recess or cutout portion of the casing defining in part a camway 77. The same cutout portion furthermore defines in part a forwardly facing shoulder 78 at the inner end. A spring 79 abutting at the left end against the interior of an end wall 80 of the casing presses outwardly against a crosspiece 81 of the yoke 72.

For this form of the invention, the keeper 35 may be the same in all respects, except that it has a hole 56' which clears the tailpiece 73 in all of its positions and may operate with the arcuate spring 45 as hereto disclosed. In this instance, the extension 51 terminates in the retaining tab 52 and the tab 52 after extending through the hole 53 engages the shoulder 78 of the button-operated mechanism thereby to retain the casing of the button-operated mechanism in the operating position shown in FIGURES 8, 9 and 10. The casing may, by employment of a notch (not shown) in the shoulder 78 be prevented from rotation so that the turn button 71 when manipulated rotates with respect to the casing and rotates the tailpiece 73 between locked and unlocked conditions. When the button-operated mechanism is to be returned, it is necessary only that it be moved inwardly

in a direction from right to left as viewed in FIGURE 10 until the shoulder **78** falls behind the tab **52** in which position the tab **52** again extends inwardly into engagement with the shoulder **78** and holds the button-operated mechanism in assembled position.

From the foregoing description, it will be clear that despite the employment of different forms of locking mechanisms and configurations thereon of sundry types, the expedient of employing a resilient retaining means associated with the spindle and preferably extending partially around its circumference can be employed with the agency of a tab on it to interlock the locking mechanism with the spindle in order to retain the parts together and in such fashion that the tab can yield to permit disengagement of the parts, preferably when and only when the locking mechanism is in unlocked condition.

While the invention has herein been shown and described in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having described the invention, what is claimed as new in support of Letters Patent is:

1. In a lock comprising a tubular spindle having a hand hold thereon and a subassembly comprising a lock operating mechanism mounted in said spindle, a keeper means movably mounted on the spindle, a shoulder on the lock operating mechanism, a portion of said keeper means being in releasable engagement with said shoulder, said hand hold having an opening therein in alignment with said keeper means, said keeper means being manually movable between positions alternatively of engagement and disengagement with said shoulder whereby to hold said lock operating mechanism in place in the spindle and in the alternative to release said lock operating mechanism for removal from the spindle.

2. In a lock comprising a hand hold, a spindle for said hand hold having an exterior wall forming a space therein and a lock operating mechanism mounted in said space, a keeper means movably mounted on the spindle, a shoulder on the lock operating mechanism, one portion of said keeper means comprising an arcuate spring extending at least partially around the wall of said spindle, and having an end in releasable engagement with said shoulder, said hand hold having an opening therein in alignment with said keeper means, said spring being movable between positions alternatively of engagement and disengagement with said shoulder whereby to hold said lock operating mechanism in place in the spindle and in the alternative to release said lock operating mechanism for removal from the spindle.

3. In a lock comprising a spindle having a wall forming a space therein and a lock operating mechanism mounted in said space, a keeper means reciprocatably mounted in a transverse position in the spindle and which includes a rigid portion, having a retaining end extending through the wall to the exterior and a pressure end, said spindle having a hole in the wall, a shoulder on the lock operating mechanism adjacent said hole, a resilient retaining means forming part of said keeper means, said retaining means being on the exterior of said wall and including an end extending through the hole into releasable engagement with said shoulder, the pressure end of said rigid portion being in engagement with said retaining means and being adapted to move said retaining means to a position of disengagement from said shoulder whereby to release said lock operating mechanism for removal from the spindle.

4. In a lock comprising a spindle having an exterior wall forming a space therein, a lock operating mechanism mounted in said space and having a tailpiece extending through the space in an axially inward direction and having positions of rotation in locked and unlocked condition, and a shoulder on the lock operating mechanism adjacent said wall, a keeper means reciprocatably mounted in a transverse position in said spindle adjacent said tailpiece, said tailpiece having a position relative to said keeper means in locked condition barring reciprocation of said keeper means and a position relative to said keeper means in unlocked condition enabling reciprocation of said keeper means, said keeper means having a portion thereof normally extending into engagement with said shoulder and being released upon reciprocation of said keeper means whereby to permit removal of said lock operating mechanism from said spindle.

5. In a lock comprising a hand hold, a tubular spindle, a lock operating mechanism mounted within the spindle, a keeper means movably mounted on the spindle, a shoulder on the lock operating mechanism, said spindle having a hole in alignment with said shoulder, said hand hold and said spindle having aligned openings, a portion of said keeper means extending through said hole in releasable engagement with said shoulder and another portion of said keeper means extending through said aligned openings, said keeper means being movable between positions alternatively of engagement and disengagement with said shoulder whereby to hold said lock operating mechanism in place in the spindle and in the alternative to release said lock operating mechanism for removal from the spindle.

6. In a door lock, a spindle, a lock operating mechanism mounted in said spindle, a hand hold having a neck surrounding said spindle, and a keeper assembly having a movable mounting on the spindle and adapted to retain said lock operating mechanism and said hand hold in releasable engagement with said spindle, said lock operating mechanism and the neck of said hand hold each having a shoulder thereon, one portion of said keeper assembly being in releasable engagement with the shoulder on the lock operating mechanism whereby to hold said lock operating mechanism in place and another portion of said keeper assembly being in releasable engagement with the shoulder on said neck whereby to hold said hand hold in place, said keeper assembly being adapted to be moved to a position releasing both said lock operating mechanism and said hand hold for removal from the spindle.

7. In a door lock, a spindle, a key-operated mechanism mounted in said spindle, a hand hold having a neck surrounding said spindle, and a keeper assembly having a movable mounting on the spindle and adapted to retain said key-operated mechanism and said hand hold in releasable engagement with said spindle, said key-operated mechanism and the neck of said hand hold each having a shoulder thereon, one portion of said keeper assembly being in releasable engagement with the shoulder on the key-operated mechanism whereby to hold said key-operated mechanism is place and another portion of said keeper assembly being in releasable engagement with the shoulder on said neck whereby to hold said hand hold in place, said keeper assembly being adapted to be moved to a position releasing both said key-operated mechanism and said hand hold.

8. In a door lock, a spindle, a lock operating mechanism mounted in said spindle, a hand hold having a neck surrounding said spindle, said spindle having diametrically opposite openings therein and said neck having an opening in alignment with said openings, and a keeper assembly including an element having a transverse reciprocatable mounting in the openings in said spindle and having a releasable engagement with the hand hold, said lock operating mechanism having a shoulder thereon, said keeper assembly including a spring having a portion thereof in engagement with said spindle, a portion of said keeper assembly being in releasable engagement with said shoulder whereby to hold said lock operating mechanism releasably in place, said element of the keeper assembly being in engagement with said spring and extending slidably through said spindle, said keeper assembly being

adapted to be moved to a position releasing both said lock operating mechanism and said hand hold.

9. In a door lock, a spindle, a key-operated mechanism mounted in said spindle, a hand hold having a neck surrounding said spindle, and a keeper assembly having a movable mounting on the spindle and adapted to retain said key-operated mechanism and said hand hold in releasable engagement with said spindle, said key-operated mechanism and the neck of said hand hold each having a shoulder thereon, one portion of said keeper assembly being in releasable engagement with the shoulder on the key-operated mechanism whereby to hold said key-operated mechanism in place and another portion of said keeper assembly being in releasable engagement with the shoulder on the neck whereby to hold said hand hold in place, a tailpiece on the key-operated mechanism extending past said keeper assembly, said tailpiece being in blocking engagement with said keeper assembly when the key-operated mechanism is locked whereby to inhibit movement of said keeper assembly to released position and being in released position relative to said keeper assembly when the key-operated mechanism is in unlocking position whereby to enable release of both said key-operated mechanism and said hand hold.

10. In a door lock, a spindle, a key-operated mechanism mounted in said spindle, a hand hold having a neck surrounding said spindle, said spindle having diametrically opposite openings therein and said neck having an opening in alignment with said openings, and a keeper assembly including an element having a transverse reciprocatable mounting in the openings in said spindle and having a releasable engagement with the hand hold and adapted to retain said hand hold in releasable engagement with said spindle, said key-operated mechanism having a shoulder thereon, said keeper assembly comprising an arcuate spring having a portion thereof extending around said spindle and another portion of said spring being in releasable engagement with said shoulder whereby to hold said key-operated mechanism in place, said keeper element having one end in engagement with said arcuate spring and another end extending slidably through said spindle and into engagement with the hand hold, said keeper element having a hole extending transversely therethrough, a tailpiece on the key-operated mechanism extending through said hole, said tailpiece having a blocking engagement with said keeper element when the key-operated mechanism is unlocked whereby to inhibit removal of said hand hold and said key-operated mechanism and having an unlocking relationship with said keeper element when said key-operated mechanism is unlocked whereby to enable release of both said hand hold and said key-operated mechanism.

References Cited by the Examiner

UNITED STATES PATENTS

2,059,695	11/36	Jacobi	70—224 X
2,301,751	11/42	Schlage	70—224
3,149,871	9/64	Russell et al.	292—352

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