Jan. 29, 1963 F. J. RUSSELL ET AL 3,075,796

DUAL DRIVER TORSION SPRING MECHANISM

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Fig. 1

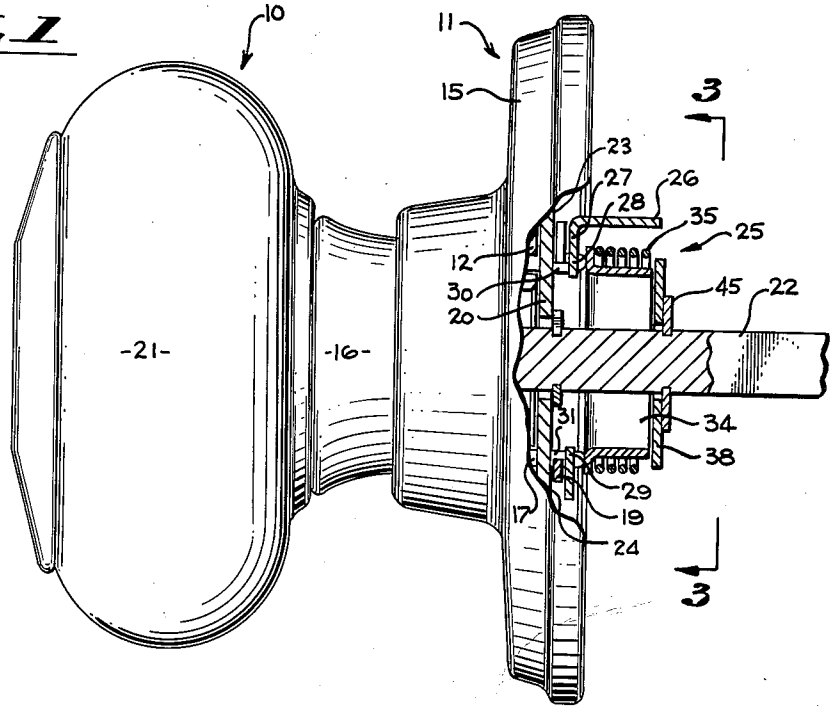
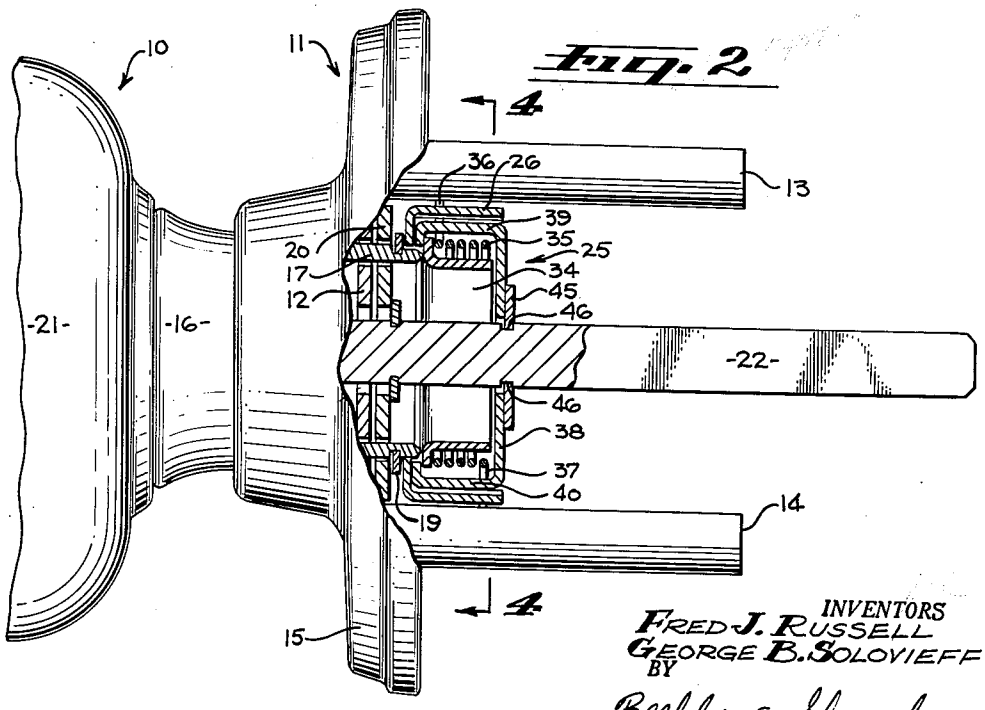


Fig. 2



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Fig. 3

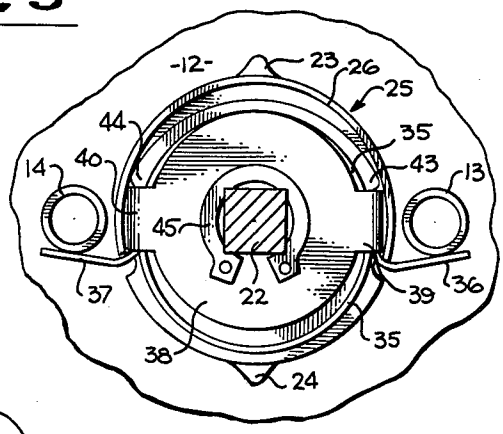


Fig. 4

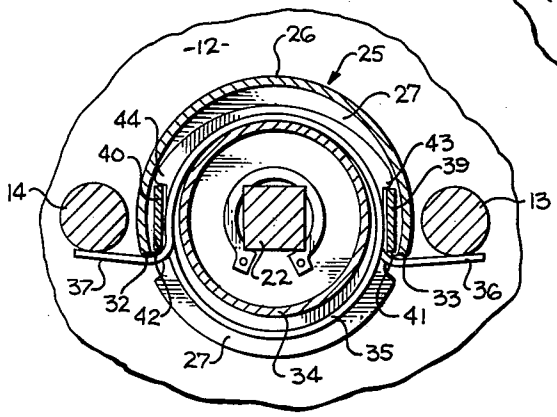


Fig. 5

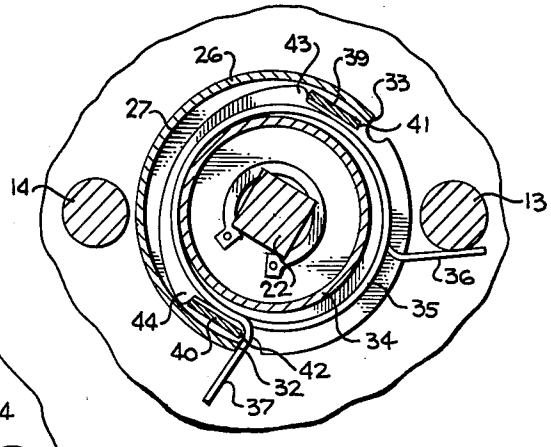
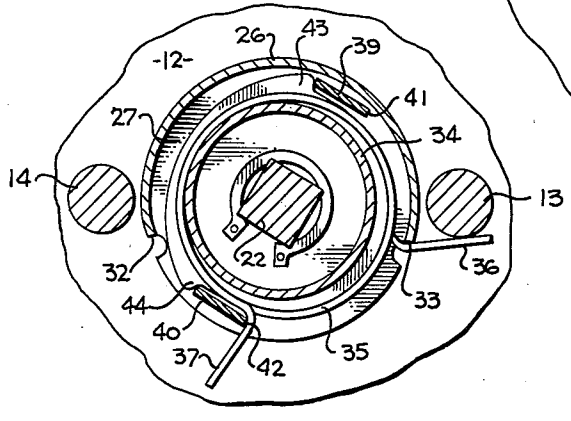


Fig. 6



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DUAL DRIVER TORSION SPRING MECHANISM

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The invention relates to door locks and especially the type which features employment of a key-actuated mechanism in the operation assembly on at least one side of the door. More particularly, the invention herein set forth is directed expressly to a torsion spring mechanism by means of which the operating assembly may be returned to neutral position after being operated.

Torsion springs are commonly recognized as a practical expedient in door locks for returning operating assemblies or knobs to an initial position. There have, however, been limitations apparent in those torsion spring devices heretofore employed in that even though the spring may be provided with opposite outwardly extending operative ends, the mechanism has been such that the spring has been capable of acting upon only one relatively rotative part. Consequently, when two individual rotative parts have been included in a lock mechanism in such fashion that spring return to initial position would be advantageous, no effective mechanism of particularly simple character has been available to accomplish this purpose.

It is therefore among the objects of the invention to provide a new and improved torsion spring assembly for a lock mechanism which provides torsion spring action effective on rotating elements adapted to be connected to the operating assemblies at both sides of the lock at all times, the torsion spring action, moreover, remaining at all times operative upon the connection to one operating element when the other operating element may be locked.

Another object of the invention is to provide a new and improved dual acting torsion spring assembly attached to the outside operating assembly in such fashion that it is capable of exerting spring force at all times against a rotational extension of the inside operating assembly when the outside operating assembly is locked against rotation.

Still another object of the invention is to provide a new and improved torsion spring mechanism including two separate sets of spring drivers, both being at all times in potentially operative position with one end of the torsion spring while the opposite end of the torsion spring is held against rotation.

Still further among the objects of the invention is to provide a new and improved torsion spring mechanism capable of more accurately urging the rotative extensions of both operating assemblies to neutral position and further to provide an effective spring load on the operating assemblies, thereby to enable employment of a lighter spring action on the latch bolt itself.

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 side elevational view of an outside operating assembly and its mounting partially broken away to show the torsion spring assembly in section.

FIGURE 2 is a side elevational view of the outside operating assembly and its mounting partially broken away and in a position 90 degrees removed from the position of FIGURE 1.

FIGURE 3 is a cross-sectional view on the line 3—3 of FIGURE 1.

FIGURE 4 is a cross-sectional view on the line 4—4 of FIGURE 2, rotated 90 degrees.

FIGURE 5 is a cross-sectional view similar to FIGURE 3 showing actuation of one of the sets of the spring drivers upon the spring assembly.

FIGURE 6 is a cross-sectional view somewhat similar to FIGURE 5 showing the action of the other set only of the spring drivers upon the torsion spring assembly.

In an embodiment of the invention chosen for the purpose of illustration there is shown an outside portion of a lock device comprising an outer operating assembly indicated generally by the reference character **10** rotatably mounted in an escutcheon assembly indicated generally by the reference character **11**. The escutcheon assembly is one of substantially conventional construction including an anchor plate **12** having index posts **13** and **14** mounted thereon by means of which the escutcheon assembly may be fastened to a door and to an opposite inside operating assembly (not shown). Following the usual practice, there is a decorative or ornamental rosette **15** mounted upon the anchor plate and forming an outer portion of the escutcheon assembly.

On the outer operating assembly and forming a part thereof is a shank **16** which includes an extension **17** rotatably confined within an appropriate arcuate recess means in the anchor plate **12** by means of a snap ring **19**. A stop washer **20** also confined by the snap ring **19** has stops **23** and **24** which by engagement against the respective index posts in the usual fashion limit rotation of the outside operating assembly to about 90 degrees in either direction. Following conventional practice, the outer operating assembly, embodied in part in a knob **21** together with the shank **16** and extension **17**, is adapted to rotate with respect to the escutcheon assembly clockwise and counter-clockwise from a neutral position, as viewed in FIGURES 3, 4, 5 and 6, either by hand on the same side or through the rotation of a spindle **22** from the opposite side. To bring a torsion spring assembly, indicated generally by the reference character **25**, into operation, use is made of a housing **26** which has an end wall **27** provided with tabs **28** and **29** confined respectively in slots **30** and **31** of the extension **17** of the shank **16**. As revealed particularly in FIGURES 3, 4, 5 and 6, a substantial portion of the wall of the housing **26** is cut away whereby to provide spring driver shoulders **32** and **33**.

Contained within the housing **26** is a member which may be appropriately identified as a drum **34** around which a torsion spring **35** is mounted. The torsion spring has opposite ends **36** and **37** positioned respectively to engage index posts **13** and **14**. It will also be noted that simultaneously the spring driver shoulders **32** and **33** are in engagement respectively with the ends **37** and **36** of the spring.

Also forming part of the torsion spring assembly is a cover plate **38** which may be considered as a part of the drum **34** in that the cover plate **38** has legs **39** and **40** which extend inwardly around the drum and are anchored thereto. The legs also have formed thereon a second set of spring driver shoulders **41** and **42**, these shoulders also being positioned normally in engagement respectively with ends **36** and **37** of the torsion spring **35**. An abutment **43** is positioned against the leg **39** and a similar abutment **44** on the opposite side is positioned against the leg **40**, thereby to assist in holding the legs in position and the parts of the torsion spring assembly as a whole in assembled relationship.

The cover plate and the drum are confined in position by employment of a snap ring **45** overlying the cover plate and in engagement with appropriate notches **46** on the spindle.

In operation when the outer operating assembly is in unlocked condition, the knob, the shank 16, and ultimately the housing 26 are freely rotatable with respect to the escutcheon assembly and hence with respect to the index posts 13 and 14. This condition of adjustment assumes that the spindle 22 rotates with the outside knob 21 and is also effective to rotate with an inside knob (not shown). All parts in normal position will occupy the relationship shown in FIGURES 3 and 4. From this position when the knob 21 is rotated, so also is the housing 26 and consequently one of the spring driver shoulders 32 or 33 depending upon whether the rotation of the knob is clockwise or counter-clockwise, as viewed in FIGURE 4. On the assumption that it is counter-clockwise rotation, the spring driver shoulder 32 will move against the end 37 of the torsion spring 35 while the other end 36 remains in position against the index post 13. Inasmuch as in this condition of adjustment as previously noted the spindle 22 rotates with the outside knob 21, the drum, the cover plate, and the legs 39 and 40 thereof will incidentally rotate although the leg 40 and its spring driver shoulder 42 will exert no positive force upon the end 37 of the spring.

Upon release of the knob 21, energy built up in the spring acting through the end 37 will press upon the spring driver shoulder 32 returning the housing 26 from the position of FIGURE 4. Should the rotation on the contrary be clockwise instead of counter-clockwise, under this circumstance just related, the opposite spring driver shoulder 33 in moving from the neutral position of FIGURE 4 to a succeeding position will press upon the end 36 building up tension in the torsion spring. This subsequently will cause the end 36 to move against the spring driver shoulder 33 when the knob is released to return it then in a counter-clockwise position to the normal relationship shown in FIGURE 4.

Under those circumstances where the outside knob 21 is locked by appropriate conventional means (not shown), the housing 26 will remain stationary, as viewed in FIGURE 6, while the drum 34 and the cover plate 38 are rotated by rotation of the spindle 22 on the assumption that this spindle when installed would be subject to rotation by an opposite or inside knob. Under those circumstances where rotation is in a counter-clockwise direction, as viewed in FIGURE 6, the leg 40 will be moved so that the spring driver shoulder 42 thereon will press against the end 37 of the torsion spring, thereby building up tension in the spring while the other end 36 remains positioned against the index post 13. When the spindle is released, the end 37 then presses against the spring driver shoulder 42 of the leg 40, thereby to return the cover plate 38 and the drum 34 to the initial position of FIGURE 4. Contrarily, should the rotation be in a clockwise direction, as viewed in FIGURE 6, the leg 39 and its spring driver shoulder 41 would move against the end 36 of the spring while the end 37 remains positioned against the index post 14, thereby to build up tension in the spring for return of the cover plate and drum upon release of the spindle. During this operation even though the outside knob 21, the shank 16 and accordingly the housing 26 remain stationary, there is no interference with operation of the second set of spring driver shoulders incorporated in the cover plate 38 because either spring driver shoulder 41 or 42 can move against and with the respective end of the torsion spring without interference because of the stationary position of the housing 26.

By reason of the construction just described, it will be clear that not only does each end of the torsion spring supply an engagement adapted to move a rotating member back to initial position, but also that there are two separate and distinct rotating members, one concentrically disposed inside of the other, in such fashion that either or both may be moved against either end of the spring, thereby rendering the spring effective to perform a multiple function without any material alteration in its form or resilient force, the change instead being in a new relationship of parts, all compactly contained within a small space immediately adjacent one or another of the operating assemblies, the outer operating assembly being chosen in the embodiment herein shown and described.

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 and desired to be secured by Letters Patent is:

1. In a lock device including an escutcheon assembly comprising a stationary element having spring engaging means thereon, an operating assembly comprising a hand hold rotatably mounted in said escutcheon assembly, and a latch spindle connected to said hand hold and having one position of adjustment rotatable relative to said hand hold, the combination of a torsion spring assembly comprising a first member having a non-rotatable engagement with said hand hold, a second member having a non-rotatable mounting on said spindle, and a torsion spring having opposite ends extending in positions substantially in engagement with said spring engaging means, a set of circumferentially spaced spring drivers forming part of said second member substantially in engagement respectively with said ends of the spring, another set of spring drivers on the first member in engagement with said ends of the spring whereby said spring at each end thereof comprises a returning means after movement of one spring driver of either of said sets alternatively against the respective end of said torsion spring.

2. In a lock device including an escutcheon assembly comprising a stationary element having spring engaging means thereon, an operating assembly comprising a hand hold rotatably mounted in said escutcheon assembly, and a latch spindle connected to said hand hold and having one position of adjustment rotatable relative to said hand hold, the combination of a torsion spring assembly comprising a housing having a portion in non-rotatable engagement with said hand hold, a drum within said housing having a non-rotatable mounting on said spindle, and a torsion spring operatively associated with said drum having opposite ends in positions substantially in engagement respectively with said spring engaging means on the stationary element, said housing including a first set of circumferentially spaced spring drivers, a second set of circumferentially spaced spring drivers forming part of said drum, both of said sets of spring drivers being substantially in engagement respectively with said ends of the spring, whereby said spring at each end thereof comprises a returning means after movement of one spring driver of either of said sets alternatively against the respective end of said torsion spring.

3. In a lock device including an escutcheon assembly comprising an anchor plate having transversely spaced index posts thereon and a rotational guide therein, and an operating assembly comprising a hand hold, a shank on the hand hold rotatably confined in said guide and a latch spindle connected to said hand hold having a limited rotation with respect to the hand hold, the combination of a torsion spring assembly comprising a housing having an end in non-rotatable engagement with said shank, a first set of circumferentially spaced spring driver shoulders on said housing, a drum within said housing having a non-rotatable mounting on said spindle, and a torsion spring around said drum having opposite ends extending therefrom in positions substantially in engagement respectively with said index posts, a second set of circumferentially spaced spring driver shoulders forming part of said drum substantially in engagement respectively

with said ends of the spring, said first set of driver shoulders being in engagement respectively with said ends of the spring at locations respectively adjacent said second set of spring driver shoulders, whereby said spring at each end thereof comprises a returning means after movement of one spring driver shoulder of either of said sets alternatively against the respective end of said torsion spring.

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