May 24, 1949. H. S. HARVEY 2,470,771

LATCH

Filed Jan. 24, 1945

2 Sheets-Sheet 1

Fig. 1.

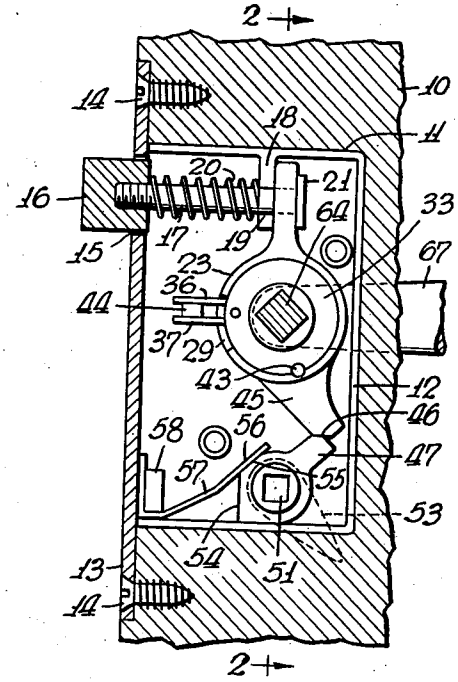


Fig. 2.

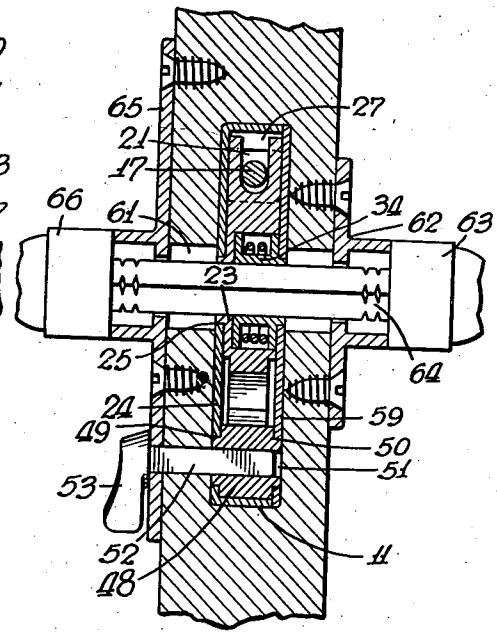


Fig. 3.

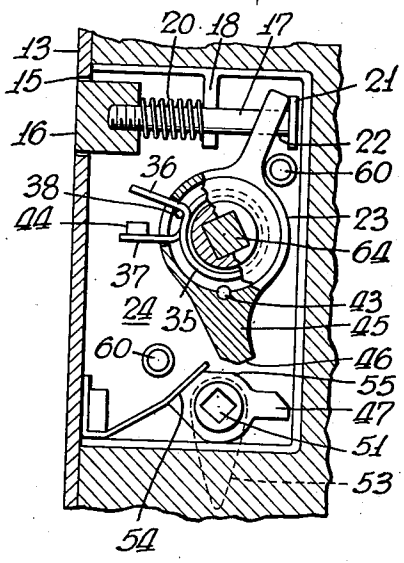


Fig. 4.

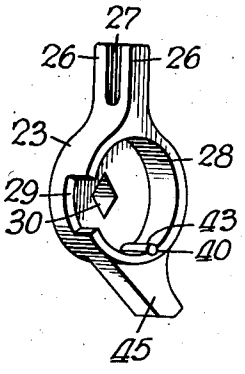
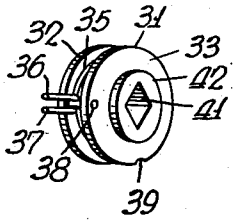


Fig. 5.



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FIG. 6.

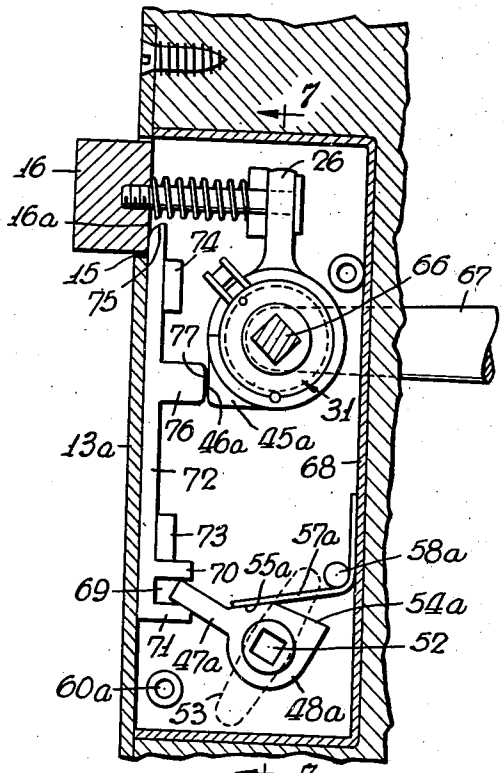


FIG. 8.

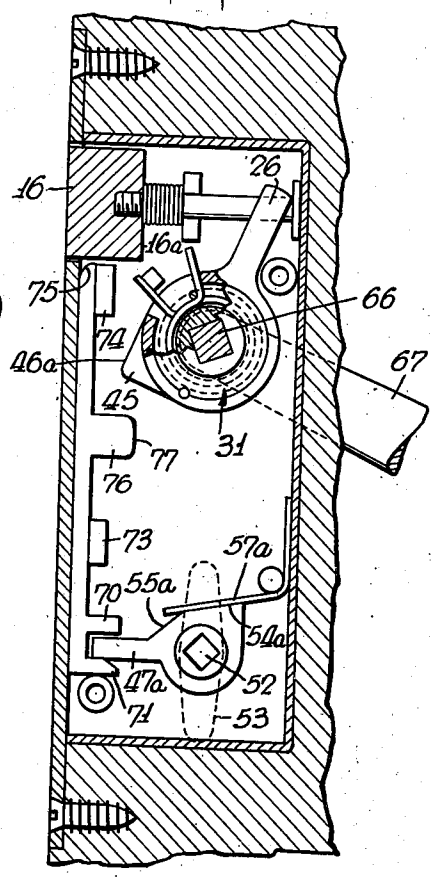


FIG. 7.

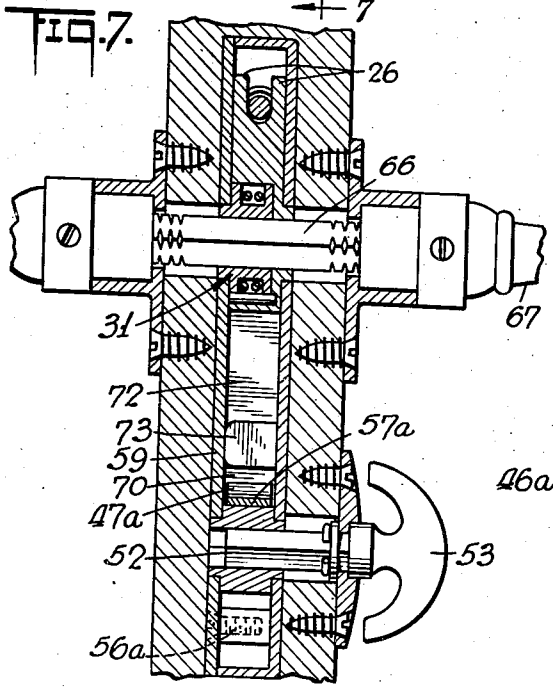


FIG. 9.

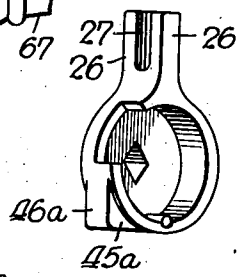
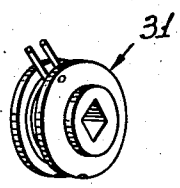


FIG. 10.



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UNITED STATES PATENT OFFICE

2,470,771

LATCH

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Application January 24, 1945, Serial No. 574,316

9 Claims. (Cl. 292—173)

1

This invention relates to door locks, more particularly to door locks having spring projected latch bolts, and still more particularly to a hub construction forming part of a door lock mechanism.

It is an object of my invention to provide a door lock construction in which a latch projected bolt is retracted by a retractor or rollback which is of exceedingly sturdy construction and involves the employment of parts which are simple in design and which minimize the labor of assembly, maintenance, and replacement.

Still more particularly it is an object of my invention to provide a mortised-type lock including a spindle operated spring projected latch bolt in which door knob or lever operation is secured, whereby positive action of the latch bolt is achieved, minimizing lost-motion between the spindle and the latch bolt, assuring long life of the operating mechanism and where the spindle is controlled by lever handles, an unsightly sagging of this control element is avoided.

Still further objects of my invention reside in the provision of door locks, more particularly door locks having spring projected latch bolts wherein positive retractor or rollback action is secured, free from lost-motion between the spindle and latch bolt, by providing a hub construction embodying spring operation controlling the knob or lever spindle, avoiding combersome location of the springs controlling the rollback or retractor, as well as to simplify the installation, maintenance, and replacement of the spring element embodied in locks of this character.

Still more particularly, it is an object of my invention to provide in a lock having a spring projected bolt, hub construction for the rollback or retractor thereof which embodies as part thereof, the spring which controls the knob or lever spindle, achieving unusual compactness of arrangement, avoiding the lost-motion between the actuating mechanism and the latch bolt while providing unusual simplicity of installation and replacement of the spindle actuating spring, not to require special skill or tools to effect installation, maintenance, and replacement.

Still more particularly it is an object of my invention to provide in combination with a spring projected latch bolt, a rollback and retractor assembly and dogging means therefor of rigid construction; and more particularly to provide in a lock having a latch bolt which is independently depressible, features whereby dogging of the latch operating spindle as well as the latch bolt is achieved and formed into an assembly of

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unusual rigidity, without sacrificing space and assuring installation of unusual compactness and simplicity of parts.

Still more particularly it is an object of my invention to provide a lock having a spring projected latch bolt, combining rigidity and compactness, whereby it may be installed in door frames of narrow construction.

To attain these objects and such further objects as may appear herein or be hereinafter pointed out, I make reference to the accompanying drawings, forming a part hereof, in which—

Figure 1 is a longitudinal sectional view through a fragment of the door embodying my lock, with the cap plate removed to show the internal mechanism;

Figure 2 is a section taken on the line 2—2 of Figure 1;

Figure 3 is a view corresponding to Figure 1, with the locking mechanism in the unset position and the latch bolt in the retracted position;

Figure 4 is a perspective of the rollback hub;

Figure 5 is a perspective view of the spring construction assembly before combination with the rollback and hub shown in Figure 4;

Figure 6 is a longitudinal sectional view of another embodiment of my invention for dogging the spindle and latch bolt;

Figure 7 is a section taken on the line 7—7 of Figure 6;

Figure 8 is a view corresponding to Figure 6, with the dogging mechanism unset and latch bolt operated to the retracted position;

Figure 9 is a perspective detailed view of the rollback and hub employed in the embodiment illustrated in Figures 6 to 8;

Figure 10 is a perspective view of the spring assembly before combination with the hub and rollback specifically illustrated in Figure 9.

Making reference to the drawing, I show a fragment of a door or like frame 10, mortised at 11 to provide an opening accessible edgewise of the frame and within which is disposed the casing 12, mounted in position by the end plate 13 by suitable fastening elements, such as the screws or the like 14. Through the orifice 15 of the end plate there is projected a latch bolt 16, whose shank 17, at its forward end, engages the latch bolt 16 and at its rear end is guided through the stud 18 formed with a guide slot 19. A helical spring 20 is mounted on the shank 17 between the rear shoulder of the latch 16 and the stud 18 and maintains the latch bolt spring projected. The shank 17 is provided with a head 21, leaving a neck portion 22.

Within this construction I then mount a hub 23 on the rear plate 24 by a bearing orifice 25 so that the hub may freely rotate therein. The hub 23 preferably has integrally formed therewith spaced retractor fingers 26, 26 defining the slot 27 and arranged to engage the neck 22 of the latch bolt shank 17, to lie between the stud 18 and the head 21, thus forming a rollback for the latch bolt 16. The hub 23 is formed axially with an annular recess 28 and an annular cutout 29. Axially, also, the hub 23 is formed with a keyway 30, preferably of square contour, to receive standard square knob spindles.

With this construction I provide a spool 31, having flanges 32 and 33, extending from the hub 34 thereof. About the spool hub 34 I form a coiled spring 35, preferably including several convolutions, and extend the free ends 36 and 37 outwardly radially by bending, maintaining the spring under tension by the anchoring pin 38, which is passed through the flanges 32 and 33 of the spool.

The flanges 32 and 33 are formed at edges thereof with splines or keyways 39. With this construction, I likewise form a spline 40 in the side walls of the hub 23 at the recessed portion 28.

The spool 31 is of a size to be housed snugly within the recess 28, but to be freely rotatable therein for alignment of the parts. The splines 39 are located in relation to the fingers 36 and 37 so that the spool may be housed within the recess 28, to have the free ends 36 and 37 project out radially through the annular slots 29. The spool 31 is axially formed with a keyway 41, extending through a face bushing 42 for purposes which will appear more clearly hereafter.

With the assembly thus provided, the spool 31 may now be assembled with the hub 23 by housing the spool within the recess 28, projecting the free ends radially outwardly through the annular slot 29, and aligning the splines 39 with the spline 40, the parts having been so arranged that the keyway 41 is oriented to coincide with the keyway 30 of the hub 23.

With the keyways 30 and 41 oriented to coincide to receive the spindle, I then insert the feather pin 43 in the aligned splines 39 and 40, with the hub set in the bearing orifice 25. The spool 31 is housed within the recess 28 so that the free ends 36, 37 span the anchoring pin 44 which is extended from the plate 24. The location of the anchoring pin 44 in relation to the free ends 36, 37 carried by the hub 23, tends to orient the rollback fingers 26, 26 in counter-clockwise direction, normally to bear against the stop formed by the stud 18. In this position, certain novel features of my invention hereinafter to be more definitely particularized are secured.

Additionally, I provide the hub 23 with an integrally formed dogging finger 45, downwardly radially in a pre-dead-center position so that its camming end 46 is in the path of the locking finger 47. The locking finger 47 is carried by a locking element hub 48, which is suitably formed with radial bosses 49 and 50 to project in bearing orifices in the casing for rotation, and is axially formed with a keyway 51 to receive the locking element spindle 52, whose turn button 53 is accessible from the interior of the door or screen.

The locking element 47 is formed with flattened faces 54, and 55, against which one end 56 of the flat detent spring 57 may bear. The detent spring is wrapped around a stud 58 and anchored in a slot in the space between the stud 58 and

the interior face of the plate 13 forming part of the casing.

In the operation of the locking spindle 52, the detent spring 57 may alternatively engage the face 54 or the face 55. In the former position, the locking finger 47 extends into contact with the camming face 46 of the dogging finger 45, and in the latter position, as shown in Figure 3, the locking element 47 is out of the path of the end 46 of the dogging finger 45.

With the installation thus assembled, the cap plate 59 may be applied to the casing, and is affixed thereto by screw or like fastening means entering the bosses 60. The cap plate 59 is provided with suitable bearing orifices for the bushing 42 and the boss 50 of the locking hub 48 as will be well understood. The casing 12, with the parts assembled and the cap plate 59 in position and with the spindle 52 removed, is inserted within the mortised portion 11 of the door and is fastened in position by passing the screws or fastening elements 14, through the end plate 13 to thus align the keyways 30 and 41 of the hub and spool, adjacent the transverse boring 61 formed in the door.

In this position, the exterior escutcheon plate 62, provided with a knob 63, and the spindle 64, is passed through the keyway 41 of the spool and keyway 30 of the hub 23 extending through the interior escutcheon 65 into engagement with the interior knob 66 after which the escutcheons are affixed, as will be understood. In this position, the locking spindle 52 may be locked in position to engage the keyway 51 with the locking hub 48, to complete the assembly of the installation.

By my construction wherein the hub 23 is oriented by the spring 35, the fingers 26, 26, constituting the rollback for the latch bolt, are urged into neutral position to cause engagement of the fingers 26, 26 with the abutment provided by the stud 18.

With such a construction, the knob spindle 64 is brought to the neutral position independently of the spring 20 for the latch bolt 16. By this action, positive movement is given to the spindle 64 to bring it to the neutral position, permitting the employment of a control lever 67 for the knob spindle instead of the customary doorknob. In this way, knob levers of heavy design may be employed, with the assurance that there is no unsightly sag by reason of lost-motion between the knob spindle 64 and the actuating mechanism of the retractor assembly and rollback mounted in relation to the hub 23.

By the novel feature of housing of the spring and its spool within the rollback, constituting the hub assembly 23, repair and replacement may be quickly accomplished since all that is necessary when the casing is made accessible by removal of the cap plate, is to remove the feather pin 43 from the splines 39 and 40. This permits ready removal of the spool 31, with its spring, for replacement by a new spool and spring assembly which, upon aligning the splines 39 and 40, all that is necessary is to drop the feather pin 43 in required position. The spanning of the anchoring stud 44 by the free ends 36 and 37 of the spring 35 is also accomplished during this assembly operation with comparative ease and with no special tools to effect this operation.

The housing of the spring within the hub 23, which is part of the rollback, makes for an exceedingly compact assembly as well as exercising direct spring action upon the hub, for purposes hereinbefore described.

The novel relationship of the spring **35** to the hub **23**, to eliminate any lost-motion by its positive action, serves to locate the dogging finger in properly oriented position in relation to the locking mechanism and the locking finger **47** thereof.

The positiveness of action of the spring **35** also cuts down the tolerance necessary for bringing the locking mechanism into play and makes for economy of space, further adding to the compactness of the installation, as well as simplifying the labor involved in machining and assembling the parts.

It will be observed that by the positive action which is provided by the spring assembly already tensioned and anchored, in its relation to the hub **23** and the retractor or rollback fingers formed thereon, the extensiveness of the finger from the radial line through the hub supplies magnified movement of the finger **26**, **26** for a small radial displacement of the spindle **64**, enabling the assembly of the casing in screen frames of exceedingly narrow widths, without any sacrifice of the extensiveness of projection of the latch bolt.

The embodiment illustrated in Figures 1 to 3 provides an independently depressible latch bolt, as it will be observed that the latch bolt **16** may be independently depressed, notwithstanding the dogging of the hub by the locking finger **47**.

I will now describe the embodiment illustrated in Figures 6 to 10 wherein by a very slight variation of the essential features of the embodiment illustrated in Figures 1 to 3, a "jimmy proof" latch bolt may be secured, whereby not only is the spindle operated hub locked against rotation, but the latch bolt is dead-locked to prevent picking or "jimmying."

Referring now to Figure 6, I show an elongated casing **68** in which substantially the same construction is provided for the latch bolt in so far as the retractor assembly and spring construction are concerned, and accordingly corresponding parts have been given corresponding numerals.

In this construction, the locking element operating spindle **52** actuates a finger **47***a* formed on the hub **48***a*, engaging the slot **69** defined by the fingers **70**, **71** and carried on the slide **72**, which is guided by the guides **73**, **74**, providing a space between the guides **73**, **74** and the plate **13***a*. The slide **72** is formed with a finger **75** which extends adjacent the latch bolt orifice **15**. In the position shown in Figure 7, the finger **75** may be cammed behind the shoulder **16***a*. Independent projection of the latch bolt **16** is thereby effectively prevented.

The slide **72** carries a locking boss **76**, whose face **77** lies in the path of the dogging extension **45***a* formed on the hub, to engage the face **46***a* in the projected position shown in Figure 6, with the hub assembly in the neutral position. The hub, in all other respects, so far as the roll back and retractor assembly is concerned, for operation of the latch bolt **16**, is otherwise the same as in the prior embodiment.

When the locking spindle is rotated in the counterclockwise direction, the finger **75** is withdrawn from its engagement with the shoulder **16***a*. This likewise depresses the locking boss **76** out of the path of the dogging extension **45***a*, permitting oscillation of the spindle to perform the latch bolt withdrawing operation.

As in the prior described embodiment, the hub **48***a* is formed with eccentric faces **54***a* and **55***a* for contact with the flat detent spring **57***a*,

which is anchored at one end between the stud **58***a* and the interior wall of the casing.

The stud **73** acts as a limiting stop for the slide **72** by engagement with the finger **70** and the lower of the screw bosses **60***a* acts as a limiting stop by engagement with the finger **71** for movement of the latch bolt dogging slide **72** in the opposite direction.

While I have shown and described turn buttons **53** for manipulating the locking element operating spindle **52** for interior operation, it will be understood that exterior key operation of the spindle **52** may be effected. This will involve providing, as will be understood by those skilled in the art, a drill hole in the door to make the exterior end of the spindle **52** accessible for manipulation.

It will also be understood that while I have illustrated the locking element spindle and hub therefor positioned below the rollback, further rearrangement of the parts may be effected, to secure compactness, without departing from the spirit of my invention.

In general, it will be observed that I have provided a hub construction for a latch bolt, of simple and compact arrangement, in which lost-motion between the spindle actuating mechanism and the latch bolt is eliminated, and more particularly making possible the use of lever knobs for trimming the hardware, without resulting in unsightly sagging or displacement of this member.

It will also be observed that I have provided a spring assembly which simplifies installation, maintenance and repair.

It will also be observed that I have provided a latch bolt and locking means therefor which, in one embodiment, includes dogging means for the latch bolt as well as for the spindle actuated mechanism, involving exceedingly simple parts of rigid structure, as well as compact assembly.

It is further to be observed that while my invention has utility when all of the elements are assembled as combined, isolated features thereof may have utility apart from the general assembly, and my invention therefore is to be limited only by the scope of the appended claims.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. In a lock including a casing having a spring projected latch bolt and a retractor assembly including a rollback operated by a spindle, a hub for said retractor including spring means for orienting the rollback to a neutral position, comprising a coiled spring mounted upon a spool and housed within the rollback and axially thereof, the spring having its opposite ends anchored against expansion in said spool, said spool being keyed with said rollback, an end of said spring having anchoring engagement with respect to said casing, to urge said rollback to the neutral position.

2. In a lock including a casing having a spring projected latch bolt and a retractor assembly arranged for spindle operation, a hub assembly including a rollback, said hub assembly being axially recessed and laterally open for slidably receiving and housing a coiled spring, the free ends of said coiled spring having its opposite ends anchored against expansion in respect of the rollback and formed for engagement with an anchoring portion in said casing.

3. In a lock including a casing having a spring projected latch bolt and a retractor assembly arranged for spindle operation, a hub assembly including a rollback recessed for housing a spool

and hub, a coiled spring, the free ends of which are anchored against expansion on said spool, the free ends of which extend for engagement with a fixed portion of said casing.

4. In a lock including a casing having a spring projected latch bolt and a retractor assembly arranged for spindle operation, a hub assembly including a rollback, an axial recess on said rollback, a spool carrying a hub portion arranged to be housed within the recessed portion of said rollback, means for keying the spool and rollback, said spool carrying a coiled spring with its opposite ends anchored against expansion and under tension, the free ends of said spring being arranged to engage a fixed portion of said casing.

5. In a lock including a casing having a spring projected latch bolt and a retractor assembly arranged for spindle operation, a hub assembly including a rollback, an annular recess formed on said rollback housing a spool, a coiled spring convoluted about said spool, the opposite ends whereof are anchored against expansion and under tension on said spool whereby said spool may be housed in said rollback as a unit, the free ends of said spring being radially directed to engage a fixed portion in the casing, and means for keying said spool for operation in unison with said hub assembly.

6. A rollback for latch bolts including a hub portion having a recessed portion for housing a spool, said spool having mounted thereon a coiled spring anchored against expansion and under tension and means between said hub portion and spool to key them to each other, the free ends of said spring extended for engaging a fixed portion of the casing in which said hub may be mounted.

7. A rollback orienting spring assembly for a spindle operated latch bolt comprising a unitary assembly of a spool having flanges and a hub portion, a coiled spring convoluted about the hub portion with its free ends anchored against expansion and under tension between said flanges, the free ends of said spring being extended for engagement for spring oscillation

of the rollback and having means for keying the spool removably from the rollback.

8. A rollback orienting spring assembly for a spindle operated latch bolt, comprising a unitary assembly of a hub portion, flanges mounted on the hub portion forming a spool therewith and a coiled spring convoluted about the hub portion having its opposite ends radially extended from said flanges and an anchoring element for maintaining the ends of said spring under tension and against expansion whereby said spring assembly thus tensioned may be inserted for use with the rollback as a unit.

9. A rollback orienting spring assembly for a spindle operated latch bolt comprising a unitary assembly of a hub portion and flanges forming a spool axially formed with a keying portion engaging the spindle for the latch bolt and a coiled spring convoluted about the hub portion having its opposite ends extended from said flanges and an anchoring element engaging said ends maintaining said spring under tension and against expansion whereby said spring assembly thus tensioned may be combined with a rollback as a unit.

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