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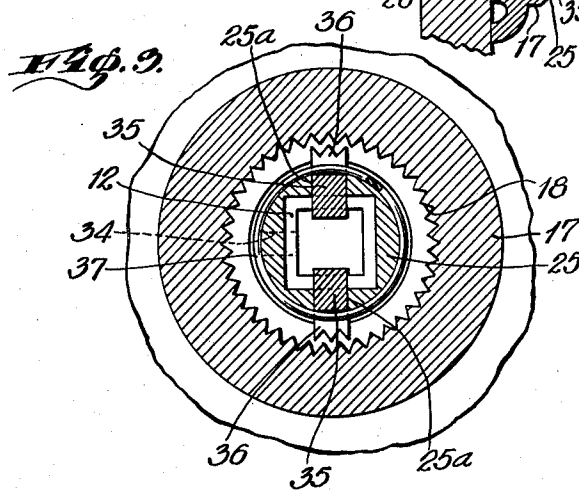
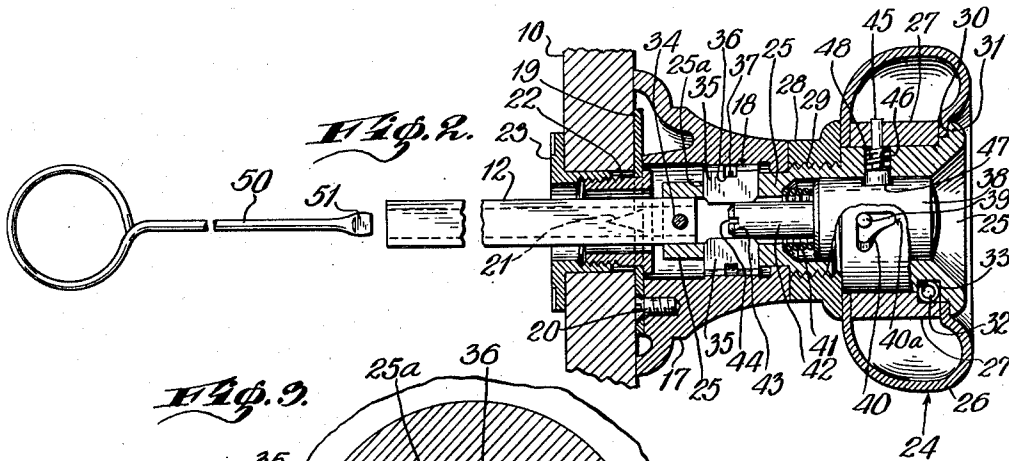
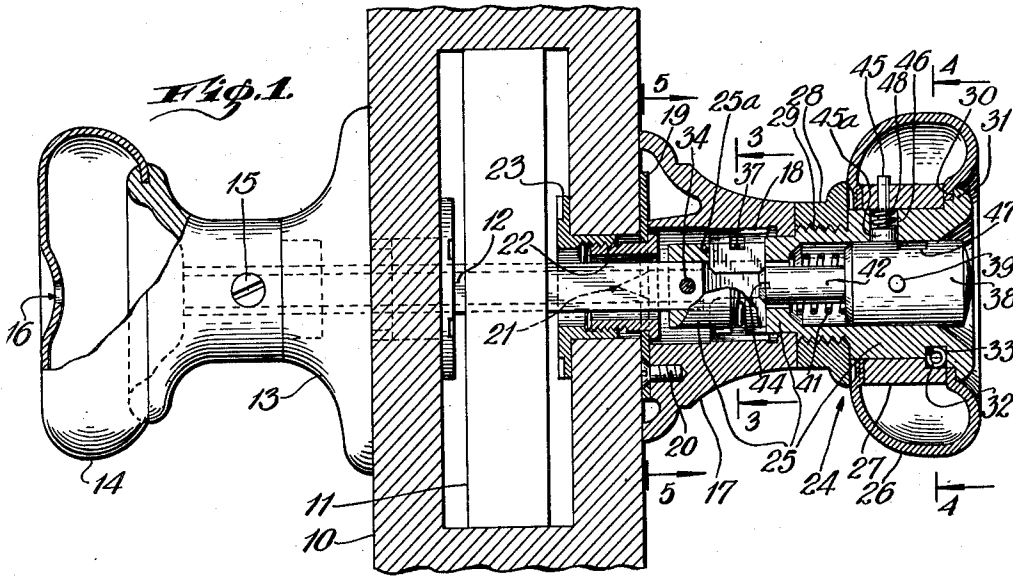
C. LEDIN

2,226,499

LOCK

Filed Sept. 2, 1938

2 Sheets-Sheet 1



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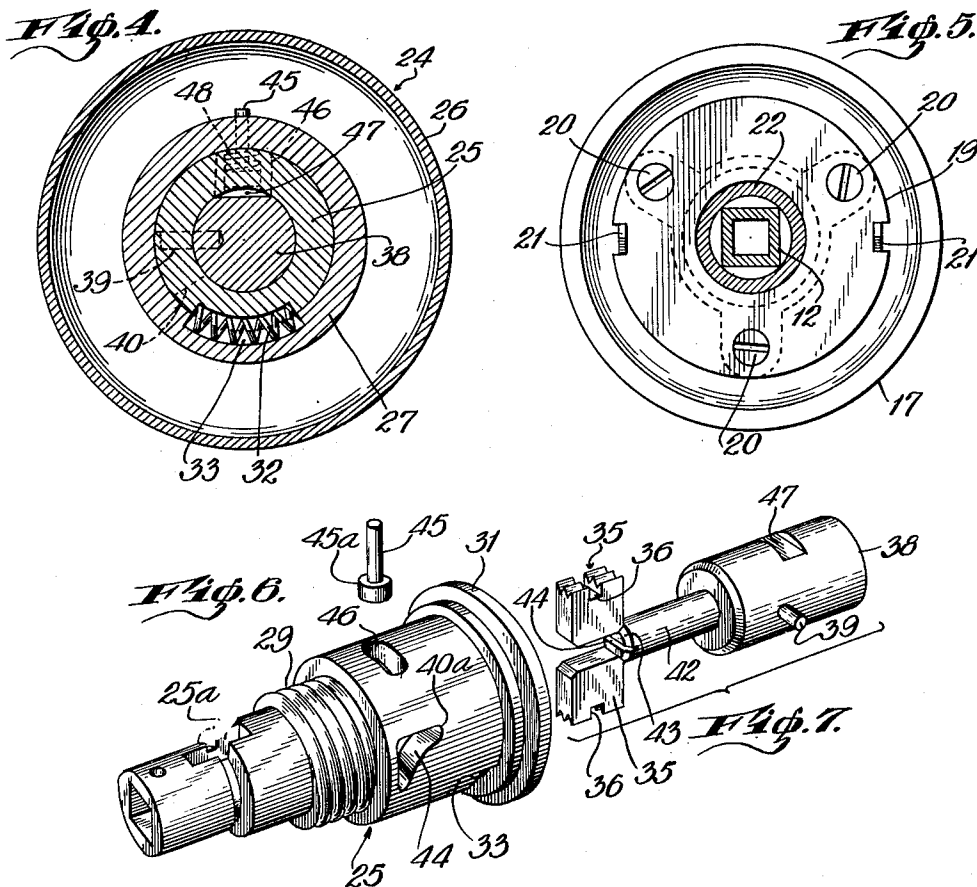
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LOCK

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17 Claims. (Cl. 70—216)

This invention relates to a novel knob and spindle combination for controlling and actuating lock mechanism.

More particularly, my invention relates to a knob and spindle combination wherein the spindle is readily locked against rotation, thus locking an outside knob which is carried by the spindle. An inside knob is adapted to rotate the spindle and outside knob to retract a latch bolt. I utilize, preferably, an unusual type of knob control whereby through partial rotation of the inside knob, I release the spindle and outside knob for rotation, while continued rotation of the inside knob rotates the outside knob and spindle to retract the latch bolt.

More in detail, my invention utilizes as an important part thereof an unusual type of knob in which the hand operated portion is capable of rotation relatively to the remainder of the knob. For the purposes of this specification, I shall describe my knob as comprising a manually operated grip portion and a shank portion. The grip portion is adapted to rotate relatively to the shank portion, preferably for a limited distance, and against the resistance of certain spring means.

A push button, which I mount preferably in the shank portion of my knob, is adapted to control locking means which lock the spindle and outside knob against rotation. In the preferred form of my invention, this is done by locking the spindle and the outside knob to a fixed part, such as the inside rose. The push button is so arranged relatively to the inside knob that rotation of the grip portion for the limited distance previously described, will act to move the push button and therefore the locking means back to their initial or non-locking position. In some respects, this last action is similar to that disclosed in many prior art patents, such as the Huffman Reissue Patent No. 17,084.

Because of the fact that I use a knob formed of two portions rotatable relatively to one another, I am able, and prefer, to use a solid spindle to which is secured the outside knob and also one of the portions of the inside knob, in my preferred modification, this being the shank. In this way, the inside knob retracts the latch bolt through the same spindle as the outside knob. In the prior art constructions, when rotation of the inside knob is utilized to release the outside knob, it is necessary to use a separate spindle whereby the inside knob may retract the latch bolt.

As an additional feature of my invention, the spindle is made hollow, and in alignment there-

with is an opening provided in the outside knob so that the release of the push button and its locking means may be accomplished by a tool inserted through the said opening in the outside knob and through the hollow spindle.

In describing my invention, I shall refer to, and shall show a conventional form of knob, but it is obvious that my invention is equally applicable to various forms of handles having manual grip portions and shanks. Also, I have shown and shall describe my invention as related to a mortise type of lock, but it is obvious that my invention is applicable to any form of lock utilizing a spindle, and is therefore particularly applicable to the tubular type of lock well known in this art.

For a description of my invention, I shall now refer to the drawings wherein Fig. 1 is a partial vertical section and elevation through a lock and door, showing the mounting of my lock combination relatively to the door. Fig. 2 is a view of certain of the parts of Fig. 1 showing certain additional parts not shown in Fig. 1. Figs. 3, 4 and 5 are sections taken respectively along lines 3—3, 4—4 and 5—5 of Fig. 1. Fig. 6 is an exploded view of certain of the parts of Figs. 1 and 2 shown in perspective, while Fig. 7 is a further exploded view of certain of the parts, also in perspective.

Referring more particularly to the drawings, reference numeral 10 represents a door in which is mounted a mortise lock 11, a hollow spindle 12 traversing the mortise lock and being adapted to operate the usual latch or bolt thereof in a conventional manner well understood in this art. A rose 13 is mounted on the outside of the door in a suitable manner, and supports an outside knob 14 of conventional construction which is secured by a screw 15 to the spindle 12. The outside knob 14 has an opening 16 therein which is in alignment with the opening through the hollow spindle for a purpose to be described presently.

On the inside of the lock, there is secured in position a rose 17. That portion of the rose shown in section in lines 3—3 is equipped with a serrated internal surface 18, used for a purpose to be described presently. In order that this surface 18 may be formed economically, the rose is formed in two parts, its end portion being separate therefrom and designated by the reference numeral 19, and held in place by three screws 20, probably best shown in Fig. 5. The disk 19 is made of sheet metal and has struck therefrom pointed lugs 21 which are adapted to bite into the wood of the door 10 so as to prevent

the rose from turning once the rose is secured in place to the door.

For securing the rose in place to the door, I utilize a construction shown in the Moller Patent No. 2,027,608, comprising a pair of cooperative threaded sleeves 22 and 23, these sleeves cooperating with the disk 19 as will be quite apparent to those skilled in the art.

The inside knob of my invention is designated generally by the reference numeral 24, and is formed of a shank portion 25, best shown in Fig. 6, and a grip portion 26, best shown in Figs. 1 and 2. The grip portion 26 is mounted for rotation about the shank portion 25 through the intermediary of a bushing 27 which is secured to the grip 26 in some suitable manner, known in the art. A sleeve member 28 threaded at 29 about the shank 25 confines the grip 26 to its position illustrated in Figs. 1 and 2, and with the surface 30 of the grip abutting the flange 31 of the shank 25. The bushing 27 and the shank 25 are formed so that a spring 32 may be housed therebetween, this spring operating in a chamber 33 formed between the bushing 27 and the shank 25, as is probably best illustrated in Fig. 4. It is the purpose of this spring to maintain the grip portion 26 properly centered relatively to the shank 25, and to resist the rotation of the grip relatively to the shank. It will be obvious, of course, that the grip is capable of being rotated to compress the spring 32 and then rotate the shank thereafter.

As is probably best shown in Figs. 1 and 2, the shank 25 has secured thereto through pin 34 the spindle 12, so that rotation of the shank rotates the spindle and operates the locking mechanism within the lock 11, all as will be quite apparent.

For cooperation with the serrated surfaces 18 of the rose 17, I mount within suitable slots 25a in the shank 25 a pair of locking dogs 35 slotted as at 36 for cooperation with the coil spring 37, it being the function of the coil spring to maintain the dogs in their position of Fig. 3 relatively to the shank 25 and the serrated surface 18.

Mounted also within the shank 25 is a push button 38, shown in perspective in Fig. 7. This push button 38 has fixed thereto a pin 39 which cooperates with a peculiarly shaped cam slot 40 formed within the shank 25 for limiting the movement of the push button 38. A spring 41 operates between the push button 38 and a shoulder of the shank 25 for urging the push button outwardly from its position of Fig. 2 to its position of Fig. 1. It will be understood that in the position of Fig. 1, the pin 39 will have reached the end 40a of the slot 40, thus limiting the further movement of the push button.

A post portion of the push button 38 is designated by reference numeral 42, and is formed with a cam surface 43 for moving the dogs 35 against the pressure of the spring 37 from the position of Figs. 1 and 3 to the position of Fig. 2. It is obvious that in the position of Fig. 2, the dogs will be locked against the serrated surfaces 18 of the rose 17, thus locking the shank 25 and the spindle 12 to the rose and against any rotation whatsoever. Because the spindle 12 is locked against rotation, it is obvious that the outside knob 14 will also be locked against rotation. The post portion 42 of the push button 38 is slotted as at 44 for a purpose to be described presently.

In order to retain the push button 38 in its locking position of Fig. 2 against the force of its spring 41 tending to return it to its unlocked position of Fig. 1, I utilize a detent 45, probably

best shown in Fig. 6. An upper pin portion of this detent is mounted in a bore of the bushing 27 of the grip 26, so that the detent is rotatable at all times with the grip 26. The lower portion 45a of the detent operates in a slot 46 in the shank 25, so that when the grip rotates relatively to the shank, it will be possible to rotate the detent 45 relatively to the shank at the same time.

The push button 38 is grooved at 47, as best shown in Fig. 7, and it is the function of the detent 45 to move into the groove 47 under the pressure of detent spring 48 whenever the push button is moved from its position of Fig. 1 to its position of Fig. 2. It is obvious that once the detent 45 is within the groove 47, it will be impossible for the push button to move back from its position of Fig. 2 to its position of Fig. 1, so that the spindle and outside knob will remain locked by the dogs 35 cooperating with the serrated surfaces 18 of the rose 17.

Should someone on the inside of the lock now wish to release the outside knob, it is only necessary to rotate the grip portion 26. Rotation of the grip portion 26 will rotate detent 45 until it is entirely out of the groove 47 of the push button 38. The push button 38 will now be released for movement until the pressure of its spring 41 from the position of Fig. 2 to the position of Fig. 1. This releases the dogs 35 so that they may move under the influence of their spring 37 to the release position of Figs. 1 and 3, thus releasing the spindle 12 and the outside knob 14 for rotation.

The lock shown by me is intended mainly for inside doors, such as bathroom doors, where the occupant wishes to prevent entry from the outside. I provide means whereby in case of emergency, the spindle 12 may be released from the outside. I shall describe such means below. I do wish to point out, however, that my lock is capable of being employed for outside use, and if so employed, the outside knob 14 will carry a cylinder lock of usual construction which may operate in the same way as does the simple tool described below.

In Fig. 2, I show a tool 50 formed with an end 51 similar to a screw driver, and adapted to enter the slot 44 in the post 42 of my push button 38. The tool 50, when it has engaged the push button 38 in Fig. 2, will rotate the push button to an extent sufficient to move its groove 47 away from the detent 45, this rotation being allowed by the relation of the pin 39 to the slot 40 in the shank 25. Once this is done, the spring 41 will press the push button 38 outwardly to its position of Fig. 1. During its outward movement under the influence of spring 41, the cam surface of the slot 40 in the shank 25 will rotate the push button 38 back into its proper relation to the detent 45 shown in Fig. 1, so that the push button may thereafter once again be used to lock up the spindle and outside knob as already described.

For the sake of clarity, I shall go through one complete operation of my locking structure. With the parts in the position of Fig. 1, if the push button 38 is depressed, it moves to the position of Fig. 2 moving the locking dogs 35 from their position of Figs. 1 and 3 to their locking position of Fig. 2, that is, in locking contact with the serrated surface 18 of the rose 17. This locks the spindle 12 against rotation. If now the grip 26 is rotated relatively to the shank 25 against the pressure of spring 32, the detent 45 will be carried with the grip 26 out of the groove 47 in the push button 38, releasing the push button 38 so that

it may be pressed outwardly by spring 41 from the position of Fig. 2 back to the position of Fig. 1.

If with the parts in the position of Fig. 2 it is desired to release the spindle from the outside, it is merely necessary to insert the tool 50 into slot 44 of post 43 and rotate the push button 38 withdrawing its groove 47 from contact with the detent 45. The spring 41 will then move the push button 38 outwardly, and will through slot 40 rotate the same back to its initial position of Fig. 1, in which position it will be ready for locking manipulation once again.

I now claim:

1. A knob having a shank portion for actuating a spindle, a grip portion rotatable on said shank, means limiting the rotation of said grip portion relatively to said shank, and a spring for resisting rotation of said grip portion relatively to said shank.

2. A knob having a shank portion for actuating a spindle, a grip portion rotatable on said shank, and a spring for resisting rotation of said grip relatively to said shank, said grip rotating said shank after compressing said spring a predetermined degree.

3. A knob having a shank portion for actuating a spindle, a grip portion rotatable relatively to said shank, a push button mounted in one of said portions, said push button being movable axially on said portion from one position to another, locking means operated by said push button when it is moved axially in one direction, and means for moving said push button in a reverse direction when said grip portion rotates relatively to said shank.

4. In a lock, a spindle, a knob having a shank portion for rotating said spindle, a grip portion rotatable relatively to said shank a limited degree, means whereby it is rotatable thereafter with said shank to rotate the spindle, a push button, locking means for locking said spindle against rotation, means whereby said locking means are moved to locking position by the depression of said push button, and means for effecting the movement of said push button from its depressed position and said locking means from locking position when said knob grip portion rotates relatively to said shank portion.

5. In a lock, a spindle for retracting said latch bolt, a latch bolt, a knob having a shank portion for rotating said spindle, a grip portion rotatable on said shank, a push button mounted on said shank and spring pressed outwardly therefrom, locking means for said spindle moved into locked position when said push button is depressed into said shank and means whereby said grip when rotated relatively to said shank effects the movement of said push button outwardly of said shank and said locking member out of locking position.

6. In a lock, lock operating means, an outside knob for actuating said lock operating means, an inside knob having a shank portion, a grip portion rotatable on said shank, a push button mounted in one of said portions, locking means for rendering said outside knob ineffective to actuate said lock operating means movable into locking position by the depression of said push button into said portion, and means whereby said grip when rotated relatively to said shank effects the outward movement of said push button from said portion and the release of said outside knob from said locking means.

7. In a lock, latch retracting means, an inside knob having a shank portion for operating said latch retracting means, a grip portion rotatable

on said shank, means whereby after some rotation of said grip portion relatively to said shank said grip and shank rotate together, a push button mounted in one of said portions, locking means for locking said latch retracting means against operation moved into locking position by depression of said push button, and means whereby said grip when rotated relatively to said shank first effects the outward movement of said push button from said portion and the release of said latch retracting means from said locking means, while continued rotation of said grip portion moves said shank portion to operate said latch retracting means.

8. A knob having a shank portion and a grip portion rotatable on said shank portion, locking means carried on one of said portions, and means whereby said locking means are controlled by rotation of said grip relatively to said shank.

9. A knob having a shank portion and a grip portion rotatable on said shank portion, a spring for resisting rotation of said grip relatively to said shank, a push button mounted for sliding inwardly and outwardly relatively to said shank, and means whereby the movement of said push button outwardly of said shank is effected by rotation of said grip relatively to said shank.

10. In a combination of the class described, a spindle, a knob secured to each end of said spindle, manually operated means carried by one of said knobs for locking said spindle against rotation, and additional means carried by said knob and movable relatively thereto for effecting the movement of said manually operated means to release said spindle.

11. In a combination of the class described, a spindle, an inside knob secured to one end of said spindle and an outside knob secured to the other end of said spindle, the said inside knob having a shank secured to the spindle and a grip rotatably mounted on said shank, a spring for resisting rotation of said grip relatively to said shank, means whereby said grip rotates said shank and said spindle after compressing said spring a predetermined amount through rotation relatively to said shank, locking means for locking said spindle against rotation, a push button mounted in said shank, means whereby said push button when depressed into said shank moves said spindle locking means into spindle locking position, and means whereby said grip when rotated relatively to said shank effects the movement of said push button outwardly and the release of said spindle from said locking means.

12. In a combination of the class described, a spindle, an inside knob secured to one end of said spindle and an outside knob secured to the other end of said spindle, the inside knob having a shank portion for actuating said spindle and a grip portion rotatable on said shank, means limiting said rotation to a predetermined degree, after which said grip and shank rotate together, and a spring for resisting rotation of said grip relatively to said shank said predetermined degree.

13. In a lock of the class described, a spindle, an inside knob and an outside knob secured to opposite ends of the spindle, said inside knob having a shank portion and a grip portion rotatable relatively to said shank portion for a limited distance and then rotatable therewith to rotate the spindle, a push button, a locking dog actuated by depression of said push button to lock said spindle against rotation, and means whereby said limited rotation of said grip portion thereafter relatively to the knob shank effects the movement of said

dog and said push button back to their initial position to release said spindle and knobs for rotation.

14. In a combination of the class described, a hollow spindle, a knob secured to each end of said spindle, manually operated means carried by one of said knobs for locking said spindle against rotation, means movable relatively to said one knob for actuating said manually operated means to release said spindle, an opening in the other of said knobs, and means on said manually operated means whereby a tool inserted through said opening and through said hollow spindle also actuates said manually operated means to release said spindle.

15. In a combination of the class described, a hollow spindle, an inside knob secured to one end of said spindle and an outside knob secured to the other end of said spindle and having an opening therein, means for locking said spindle against rotation, a push button carried by the inside knob for moving said locking means into locking position, manually operated means carried on said inside knob, means whereby movement of said manually operated means releases said spindle from said locking means and returns said push button to its release position, and means whereby a tool inserted through the opening in said outside knob and said hollow spindle also releases said spindle from said locking means and returns said push button to its release position.

16. In a lock, a rotatable latch bolt retracting spindle for retracting a latch bolt, an outside knob secured to said spindle so as to rotate integrally therewith, an inside knob, lost motion connecting means between said inside knob and said spindle whereby said inside knob rotates relatively to said spindle for a predetermined distance and then rotates said spindle and the outside knob to retract the latch bolt, a spring for resisting said ro-

tation of the inside knob relatively to said spindle and which spring is compressed by said rotation, a push button, locking means for locking said spindle against rotation operated by depression of said push button, means whereby said inside knob when rotated relatively to said spindle against the pressure of said spring first effects the movement of said push button out of its depressed position while compressing said spring and thereby releases said spindle from said locking means, continued rotation of said inside knob thereafter operating through said lost motion connecting means to rotate the spindle and retract the latch bolt.

17. In a lock, a housing, a rotatable latch bolt retracting spindle extending through said housing to retract a latch bolt, an outside knob secured to the outside end of said spindle at one side of said housing for rotating the spindle to retract the latch bolt, an inside knob, lost motion connecting means between said inside knob and the inside end of said spindle whereby said inside knob rotates relatively to said spindle for a predetermined distance and then rotates said spindle to retract said latch bolt, a spring for resisting said rotation of said inside knob relatively to said spindle and which spring is compressed by said rotation, a push button, locking means for locking said spindle against rotation operated by depression of said push button, means whereby said inside knob when rotated relatively to said spindle against the resistance of said spring first effects the movement of said push button out of its depressed position while compressing said spring, and thereby releases said spindle from said locking means, continued rotation of said inside knob thereafter operating through said lost motion connecting means to rotate the spindle and retract the latch bolt.

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