Nov. 23, 1954 F. J. McCONNELL 2,694,916

DOOR LOCK

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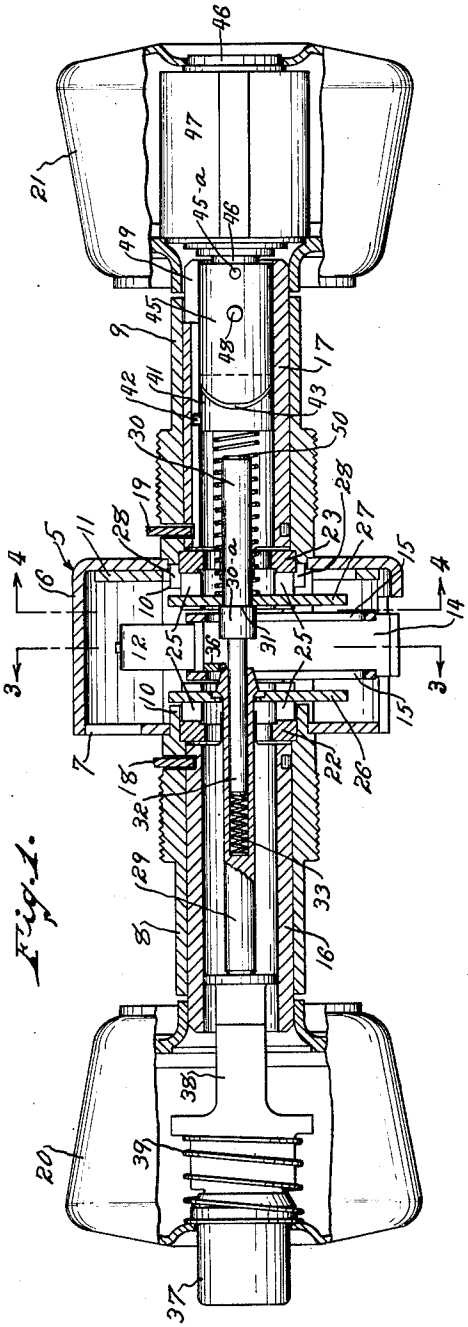


Fig. 1.

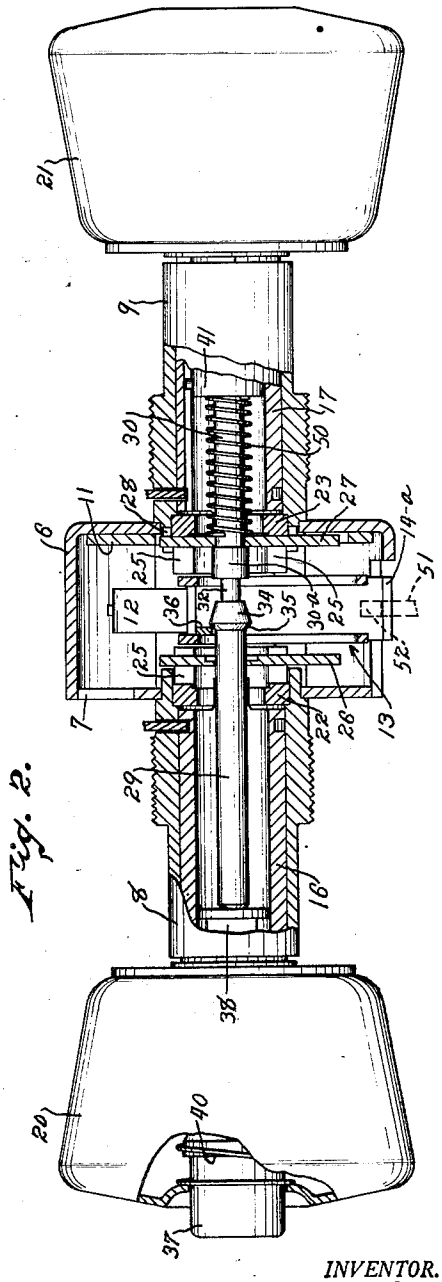


Fig. 2.

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Fig. 8.

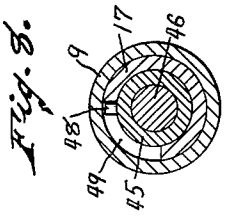


Fig. 4.

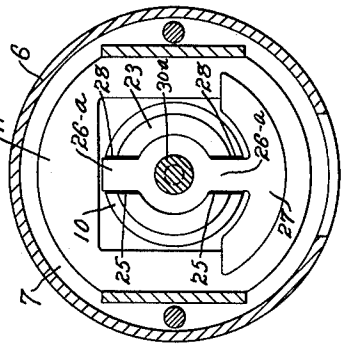


Fig. 5.

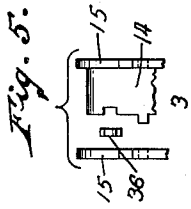


Fig. 6.

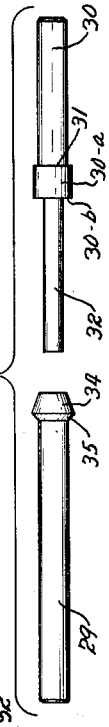


Fig. 3.

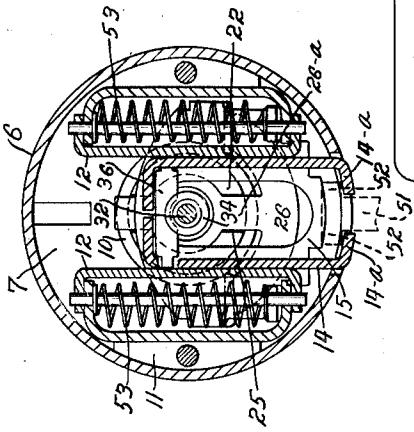
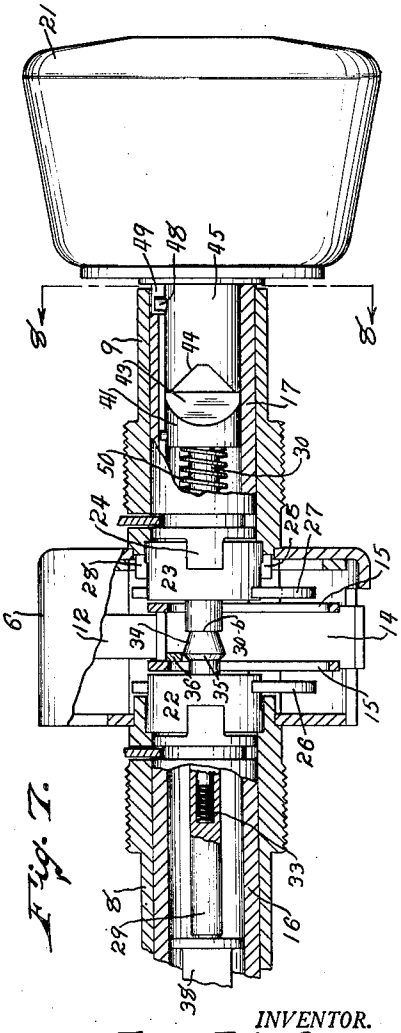


Fig. 7.



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2,694,916

DOOR LOCK

Frank J. McConnell, New Britain, Conn., assignor to The American Hardware Corporation, New Britain, Conn., a corporation of Connecticut

Application May 19, 1951, Serial No. 227,140

11 Claims. (Cl. 70—146)

This invention relates to door lock and more particularly to locks of the cylindrical type such as shown and described in my co-pending application, Serial No. 221,646, filed April 18, 1951.

An object of the present invention is to provide a cylindrical lock which is particularly adapted to function as a lock for the outer doors of offices or other rooms and which may also be used for the outer doors of buildings.

A further object of the invention is the provision of such a lock having improved means for manually conditioning the lock from the inside of the door to render it inoperable from the outside thereof.

A further object of this invention is to provide improved means whereby the lock may be manually locked from the inside of the door, but will require key operation from the outside of the door to unlock it.

A still further object of the invention is to provide a mechanism for such a lock which is easily operable, highly efficient and economical to produce.

Further objects and advantages of this invention will be more clearly understood from the following description and from the accompanying drawings in which:

Fig. 1 is a plan view of my improved cylindrical lock, partly in central horizontal section, illustrating the construction thereof and showing my improved mechanism in unlocked condition.

Fig. 2 is a similar view, but showing the lock mechanism in locked condition.

Fig. 3 is an end view in section on line 3—3 of Fig. 1.

Fig. 4 is a similar view on line 4—4 of Fig. 1.

Fig. 5 is a side view of a portion of the retractor showing parts thereof separated to more clearly illustrate its construction.

Fig. 6 is a side view showing the spindle members separated.

Fig. 7 is a plan view partly in central horizontal section, illustrating the manner in which my improved lock mechanism is unlocked by the key controlled means.

Fig. 8 is a sectional end view on line 8—8 of Fig. 7.

In the embodiment of my invention illustrated in the drawings, the numeral 5 generally indicates the case of a cylindrical lock which includes a cup-shaped member 6 and a cover 7. The said cover 7 has a tubular inner sleeve 8 extending therefrom and the cup-shaped member 6 carries a similar outer sleeve 9 which extends from the bottom wall thereof. Each of said sleeves has a portion 10 which extends into the case as illustrated in Fig. 1.

The case 5 contains a sub-frame 11 which carries guide members 12—12 that slidably support a retractor 13 which is preferably constructed of a U-shaped member 14 and side plates 15—15 that are secured to the opposite sides of said U-shaped member and which straddle the guide members 12—12 to slidably guide the retractor thereon as described in the co-pending application of Ernest L. Teich at al., Serial No. 211,940.

The sleeves 8 and 9 rotatably support inner and outer knob shanks 16 and 17, respectively, which are retained within the sleeves by locking members 18 and 19 as clearly described in the co-pending application of Ernest L. Teich et al., Serial No. 211,939. The shanks 16 and 17 have inner and outer operating knobs 20 and 21, respectively, which are secured thereto in the manner fully described in the co-pending application of Nicholas A. Welch et al., Serial No. 208,743, now Patent No. 2,675,692, dated April 20, 1954.

The sleeves 8 and 9 have enlarged bores at their inner ends which rotatably contain annular connectors 22 and

23, respectively, that is each operatively connected to its respective knob shank 16 and 17 by a tongue and slot connection as shown at 24. The walls of the said connectors preferably contain diametrically opposed notches 25—25 in which are disposed the straight portions 26–*a* of the rollbacks 26 and 27 that operatively engage the retractor 13 as fully described in the co-pending application of Ernest L. Teich et al., Serial No. 211,940. The portion 10 of the sleeve 9 is provided with diametrically opposed notches 28—28 which receive the straight portion 26–*a* of the rollback 27 for the purpose to be hereinafter described.

Rotation of either of the operating knobs 20 or 21 will cause rotation of its respective rollback and this will in turn operate the retractor and cause it to withdraw the latch bolt as well understood by those skilled in the art.

In order to perform the functions for which the above described lock is intended, it is required that the outer knob 21 may be locked against rotation so as to prevent the operation of the lock mechanism by an unauthorized person. This is done by moving the rollback 27 in the notches 25—25, of its respective connector 23, until the straight portion 26–*a* of the said rollback is positioned within the notches 28—28 in the portion 10 of the sleeve 9 as shown in Fig. 2. When the rollback 27 is in this position, it will dog the outer knob 21 against rotation through the engagement of the said straight portion 26–*a* with the sides of the notches 28—28 and thereby prevent operation of the retractor 13 by the said outer knob so that the door in which the lock is installed will consequently be locked.

The present invention is particularly directed to improvements in the portion of the mechanism which is employed for moving the rollback 27 into and out of dogging position. This portion of the mechanism includes a spindle unit which comprises telescoping members 29 and 30 that are co-axial with respect to the knob shanks and extend through the rollbacks 26 and 27 and through openings in the side plates 15—15 of the retractor as clearly illustrated in the drawings.

The spindle member 30 has an enlargement 30–*a* which provides an annular shoulder 31 that engages the inner side of the rollback 27. The said member 30 also has an extension 32 which slidably projects into an axial hole in the spindle member 29. A spring 33 is provided at the bottom of said hole for urging the spindle member 30 in a direction away from the member 29.

The inner end of the spindle member 29 has an enlarged head portion which is provided with an inwardly tapered annular cam surface 34 and a similar oppositely tapered cam surface 35 which is at a steeper angle than the said surface 34 and also acts as a detent for the purpose to be hereinafter described.

The retractor 13 is provided with a retainer 36 which is preferably constructed in the form of a bar that extends across the U-shaped member 14 of the retractor and is perferably secured thereto as illustrated in Figs. 3 and 5.

The spindle is operated from its inner end by means of a push button 37 which projects through the inner knob 20 and has a shank 38 that abuts the end of the spindle member 29. A spring 39 is provided for urging the shank and button inwardly to thereby retain the end of the shank in engagement with the inner end of the said spindle member 29. The push button 37 is provided with a shoulder 40 which limits the outward movement thereof and also acts as a stop to limit the outward movement of the spindle member 29.

The spindle is operated from its outer end by means of a cam member 41 which is longitudinally slidable in the shank 17 and is provided with a projection 42 which extends into a longitudinal slot in said shank for preventing rotational movement of the cam member. The said cam member has a V-shaped end portion 43 that extends into a V-shaped cam notch 44 in a cam member 45 that is rotatable within the said shank 17 and is secured to the key plug 46 of a conventional cylinder lock by means of a pin 45–*a*. The said cylinder lock includes a casing 47 which is suitably mounted within the knob 21. The rotatable cam member 45 has a stop pin 48 which en-

gages the side walls of a notch **49** in the shank **17** and limits the rotational movement of the said cam member **45**.

A compression spring **50** surrounds the outer end of the outer spindle member **30** and abuts the rollback **27** and the slidable cam member **41** to normally retain the said rollback against the shoulder **31** of the spindle and the cam member in engagement with the V-shaped cam notch **44**. The spring **50** is stiffer than the spring **39** so that it will normally urge the spindle inwardly against the tension of said spring **39**. The spring **33** is stiffer than the spring **50** so that it will normally urge the spindle member **30** outwardly from the member **29** against the tension of the said spring **50**.

The latch bolt, usually provided with the type of mechanism above described, has a stem, indicated at **51**, which is provided with shoulders **52—52** that are engaged by the hooked portions **14–*a*—14–*a*** of the U-shaped retractor member **14**. When the lock mechanism is in the condition shown in Fig. 1, either of the knobs **20** or **21** may be rotated to thereby rotate their respective rollbacks **26** or **27** and retract the retractor **13** so that it will withdraw the latch bolt from the strike in the manner well known by those skilled in the art.

Assuming that the lock mechanism is in the condition illustrated in Fig. 1, wherein it is in unlocked condition, and that it is desired to lock the mechanism so that it cannot be operated by the outer knob **21**, and thereby lock the door to which the lock is attached, the operation is as follows:

The push button **37** is pushed inwardly with respect to the knob **20** and this will push the spindle member **29** and, through the spring **33**, will also push the spindle member **30** outwardly so that the rollback **27** will be moved into the notches **28—28** and thereby dog the outer knob **21** against rotation and render the lock inoperative from the outside of the door.

As the spindle is pushed outwardly to bring the rollback **27** into dogging position, the cam surface **34** will engage the retainer **36** and force the retractor **13** inwardly against the tension of the retractor springs **53**. This will permit the retainer **36** to ride up on the said cam surface **34** and then be forced downwardly by said springs in back of the cam surface **35** of the detent and engage said surface to retain the spindle in the position illustrated in Fig. 2, so that the rollback **27** is retained in its dogging position against the tension of the spring **50**.

It will be noted that further movement of the spindle member **30** is stopped when the rollback **27** reaches its dogging position and strikes the bottoms of the notches **25—25**. However, the spindle member **29** may still be moved a little further since the spring **33** will yield and permit the cam surface **35** to be brought into proper engagement with the retainer **36**.

It will be understood that, in the mechanism above described, only the outer knob may be dogged and that the door may be locked only from the inside. It will also be understood that the inner knob is operative at all times to open the door. In addition, when the lock is in the condition illustrated in Fig. 2, and the retractor **13** is retracted by the knob **20** to withdraw the latch bolt, the retainer **36** will be carried away from the detent **35** and thereby release the spindle member **29** and permit the spring **50** to force the rollback **27** out of dogging position and the spindle members into normal position as illustrated in Fig. 1. It will be understood that the push button **37** may be operated to force the rollback **27** into dogging position before the door is closed and that, as the door closes, and the latch bolt engages the strike and is moved rearwardly thereby, the latch bolt stem **51** will also be moved rearwardly and the shoulders **52—52** will merely move away from the hook portions **14–*a*** without moving the retractor. This will prevent the releasing of the spindle **29** when in dogging position so that the lock will remain in locked condition after the door is fully closed.

When the lock mechanism is in locked condition, as illustrated in Fig. 2, and an authorized person having the proper key desires to unlock the door from the outside, the key is inserted into the key plug **46** and the said plug is rotated thereby for 90 degrees. Further rotation of the key plug is limited by the engagement of the stop pin **48** on the cam member **45** with the side of the notch **49**. Rotation of the key plug will rotate the cam member **45** towards the position shown in Fig. 7 and thereby cause the V-shaped cam notch of said member to cooperate with the cam portion **43** of the slidable cam member **41** and push said member inwardly. Such movement of the said member **41** will move the spindle member **30** inwardly relatively to the spindle member **29** and against the tension of the spring **33** and carry the rollback **27** out of dogging engagement. Further inward movement of the cam member **41** will bring the inner shoulder **30–*b*** of the enlarged portion **30–*a*** on the spindle member **30** into engagement with the outer end of the spindle member **29**, as illustrated in Fig. 7, and thrust said member rearwardly. The retractor **13** will be moved rearwardly against its springs **53** due to the camming action of the surface **35** on the spindle member **29** against the retainer **36** which is secured to said retractor. When the outer peripheral edge of the surface **35** passes under the retainer **36**, the spring **33** will force the spindle member **29** away from the member **30** and into normal position to thereby permit the return of the retractor to its normal position under the tension of its springs **53**. Rotation of the key in the opposite direction will return the cam member **45** to its normal position and permit the spring member **50** to return the cam member **41** to the position illustrated in Fig. 1 wherein the locking mechanism will be in unlocked condition and the door in which the lock is contained may be then opened from the outside.

I claim:

1. A door lock comprising a mechanism having a retractor, a rollback, a member for operating said rollback, a dogging member for dogging said operating member to render it inoperable, a spindle for moving said dogging member into dogging position, a retainer on said retractor; the said spindle including a first member having a shoulder thereon adapted to engage the dogging member and move it into dogging position, a second spindle member having a cam-shaped detent engageable with the retainer for retaining the dogging member in dogging position and being releasable from said retainer upon the application of a releasing pressure against said spindle to permit undogging of the operating member, and a spring between said first and second spindle members.

2. A door lock comprising a mechanism having a retractor, a rollback, a member for operating said rollback to retract the retractor, dogging means including said rollback for dogging the said operating member to prevent retraction of the retractor, a spindle for moving the rollback into dogging position; the said spindle being co-axial with the rollback and including a first member having a shoulder thereon adapted to engage the rollback for moving it into dogging position, and a second spindle member having a cam shaped annular detent and an annular cam portion leading to said detent, a retainer on the retractor engageable with the detent to retain the rollback in dogging position, and a spring member between the said first and second spindle members; the said detent being releasable from the retainer upon the application of force against the spindle to cause undogging of the operating member.

3. A door lock comprising a mechanism including a retractor, spring means normally urging said retractor towards extended position, a rollback for retracting the retractor, an operating member connected to the rollback for rotating it to retract the retractor, an abutment engageable by the rollback for dogging the operating member to prevent operation of the lock mechanism thereby, a spindle co-axial with the rollback and extending therethrough and through the retractor, a shoulder on the spindle engageable with the rollback for moving it into dogging position, a retainer on the retractor, an annular cam-shaped detent on said spindle concentric therewith and engageable with the retainer to retain the rollback in dogging position, and an annular cam surface on said spindle leading to the detent and adapted to engage the retainer and move it and the retractor against the tension of the retractor spring means and thereby cause said retainer to be brought into engagement with the detent; the said detent being disengageable from the retainer by the application of a disengaging force upon the spindle to thereby permit the rollback to be moved into undogging position.

4. A door lock comprising a case having an inner wall, an outer wall, an inner and an outer sleeve extending respectively from said inner and outer walls,

an inner and an outer operating member each having a shank rotatable respectively in said inner and outer sleeves, a retractor in said case, a roll back connected to each of said shanks for retracting the retractor; the outer sleeve having a portion extending into the case with notches therein adapted to receive the outer rollback for dogging the shank of the outer operating member, a spindle extending through said rollbacks and retractor, the said spindle being co-axial with said shanks and rollbacks and having a shoulder engageable with said outer rollback, manually operable means in the inner operating member for moving said spindle longitudinally to force the outer rollback into dogging position to thereby prevent operation of the lock by the outer operating member, a retainer upon the retractor, a cam-shaped annular detent upon the spindle engageable with said retainer for retaining the outer rollback in dogging position, spring means normally urging the retractor towards extended position and adapted to resist the cam action of said detent upon the retainer to thereby retain the outer rollback in dogging position; the said cam-shaped detent being adapted to overcome the said resistance upon the application of a releasing pressure against the outer end of the spindle to thereby cause the release of the said detent from the retainer and permit the movement of the outer rollback into undogged position, and manually operable means in the outer operating member for applying said releasing pressure to the spindle.

5. A door lock comprising a case having an inner and an outer wall, an inner and an outer sleeve extending respectively from said inner and outer walls, an inner and an outer operating knob each having a shank rotatable in its respective sleeve, a retractor within said case, spring means normally urging the retractor towards extended position, an inner and an outer rollback connected to its respective shank and operable by the respective operating knob to retract the retractor against the tension of the said spring means; the outer sleeve having a portion extending into the case with notches therein adapted to receive the outer rollback to dog the shank of the outer operating knob against rotation and thereby prevent retraction of the retractor by said outer operating knob, a spindle co-axial with said shank and extending through said rollback and retractor; the said spindle including an outer member having a shoulder thereon engaging the outer rollback, an inner member telescoping within the outer member, a spring between said spindle members, an annular detent on said inner spindle member having a cam-shaped surface, a retainer on the retractor engageable with the said detent under the tension of the retractor spring means, an annular cam surface on said inner spindle member leading to the detent and adapted to force the retainer rearwardly and cause it to engage the detent under the tension of the retractor spring means, a spring normally urging the outer rollback toward undogged position; the said retractor spring means having sufficient tension to resist the cam action of the detent upon the retainer under the tension of the said spring means, and manually operable means in the outer knob for forcing said spindle inwardly to cause the cam surface of the detent to overcome the tension of the retractor spring means and thereby permit disengagement of the detent from the retainer and permit the rollback to be moved into undogged position by the said spring member.

6. A door lock comprising a case, a retractor within said case, spring means urging the retractor towards extended position, a rollback for retracting the retractor against the tension of said spring means, an operating member for actuating said rollback, dogging means including said roll back for dogging the operating member to prevent operation of the lock thereby, a spindle for moving said rollback into dogging position, a detent on said spindle having a cam-shaped surface, a retainer on the retractor engageable with said surface for retaining the rollback in dogging position, and a spring member normally urging the rollback towards undogged position; the spring means for the retractor being of sufficient tension to retain the retainer in engagement with the detent against the tension of the said spring member and the said cam surface of the detent being adapted to overcome the resistance of the retractor spring means upon the application of a releasing pressure against the spindle and thereby cause disengagement of the detent from the retainer.

7. A lock comprising a case having an inner wall, an outer wall, an inner sleeve and an outer sleeve extending respectively from each of said walls, a retractor in said case, spring means normally urging said retractor towards extended position, an inner and an outer rollback at opposite sides of said retractor, an inner operating member having a shank rotatable in the inner sleeve and in engagement with the inner rollback, an outer operating member having a shank rotatable in the outer sleeve; said outer rollback being slidable relatively to the said shank, and the outer sleeve having a portion extending into the case with opposed notches therein adapted to receive the outer rollback for dogging the outer operating member against rotation to thereby prevent operation of the lock by the outer operating member, a spindle extending co-axially with said shanks and through said rollbacks and retractor, the said spindle including an outer member having a shoulder thereon abutting the inner side of the outer rollback for moving it into dogging position, a spring member surrounding the said outer spindle member and urging the outer rollback and the spindle towards normal position, an inner spindle member telescoping with the outer spindle member, a spring between said inner and outer spindle members, the inner spindle member having a head at the outer end portion thereof providing a detent with an annular cam-shaped surface, a retainer on the retractor adapted to engage the said detent under the tension of the retractor spring means to thereby retain the outer rollback in dogging position, the said head having an annular cam surface for moving the retainer against the tension of the retractor spring means to cause engagement thereof with the detent, a pushbutton operable through the inner knob for moving the spindle longitudinally to cause dogging of the outer knob and engagement of the detent with the retainer, a slidable cam member in the outer shank for moving the spindle inwardly, a rotatable cam member in said outer shank for moving said slidable cam member, key operated means in the outer knob for rotating said rotatable cam member and a spring member between the outer rollback and the said slidable cam member normally urging the rollback and spindle towards undogged position and the slidable cam member into engagement with the rotatable cam member, the spring means for the retractor having sufficient tension to retain the retainer in engagement with the detent against the action of the cam surface thereof upon the retainer under the tension of the said spring member, and the said detent being adapted to cam the retainer out of engagement therewith upon the application of pressure to the outer end of the spindle by the said sliding cam member.

8. A door lock comprising a mechanism including a retractor, spring means normally urging said retractor towards extended position, an inner and an outer rollback for retracting the retractor, an inner operating member and an outer operating member respectively connected to said rollbacks, dogging means including the outer rollback for dogging the outer operating member to prevent operation of the lock thereby, an outer spring member normally urging said outer rollback towards undogged position, a spindle for moving said outer rollback into dogging position against the tension of the said outer spring, a detent on said spindle having a cam surface, a retainer on the retractor engageable with the said cam surface, a manually operable push member extending through the inner operating member for pushing said spindle outwardly to thereby dog the outer operating member, a positioning spring for urging said push member against the inner end of the spindle, stop means for limiting the inward movement of the spindle, and means extending through the outer operating member for pushing the spindle inwardly to disengage the detent from the retainer; the said outer spring being of greater tension than the positioning spring to thereby normally retain the spindle in engagement with said stop means; the said spring means for the retractor being of sufficient tension to resist the action of the cam surface of the detent under the tension of the said outer spring and being adapted to yield under the said cam action when a releasing pressure is applied against the outer end of the spindle.

9. In a door lock comprising a mechanism having a retractor, a rollback, a member for operating said rollback, a dogging member for dogging said operating mem-

ber against operation, and retaining means on said retractor; a spindle carrying said dogging member, means at the inner side of the lock for moving said spindle into dogging position, a cam-shaped detent on said spindle engageable with said retaining means to hold said spindle in dogging position, means at the outer side of the lock for moving said spindle and means on said spindle for urging said retaining means out of retaining position upon the application of a force against the outer end of the spindle to thereby permit movement of the spindle and the dogging member carried thereby out of dogging position.

10. In a door lock comprising a mechanism having a retractor, a rollback, a member for operating said rollback, a dogging member for dogging said operating member against operation, and a retainer on said retractor; a spindle carrying said dogging member, an annular cam-shaped detent on said spindle and an annular cam portion leading to said detent, means at the inner side of the lock for moving said spindle whereby said cam portion urges the retainer into position to engage said detent to hold the spindle and the dogging member in dogging position, means at the outer side of the lock for moving said spindle to cause said cam-shaped detent to urge the retainer out of retaining position to thereby permit movement of the spindle and the dogging member to undogging position.

11. In a door lock comprising a mechanism having a retractor, a rollback, a member for operating said rollback, a dogging member for dogging said operating member against operation and a retainer on said retractor; a spindle carrying said dogging member, an annular cam-shaped detent on said spindle and an annular cam portion leading to said detent, means at the inner side of the lock for moving said spindle whereby said retainer is displaced as said cam portion passes thereunder until said detent is in a position to be engaged by said retainer, means for urging said retainer into engagement with said detent, means at the outer side of the lock for moving said spindle to cause said detent to cam the retainer out of retaining position to permit movement of the spindle and the dogging member into undogging position.

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