June 4, 1968 R. L. BESSETTE 3,386,760

CLOSURE LATCH

Filed July 18, 1966 2 Sheets-Sheet 1

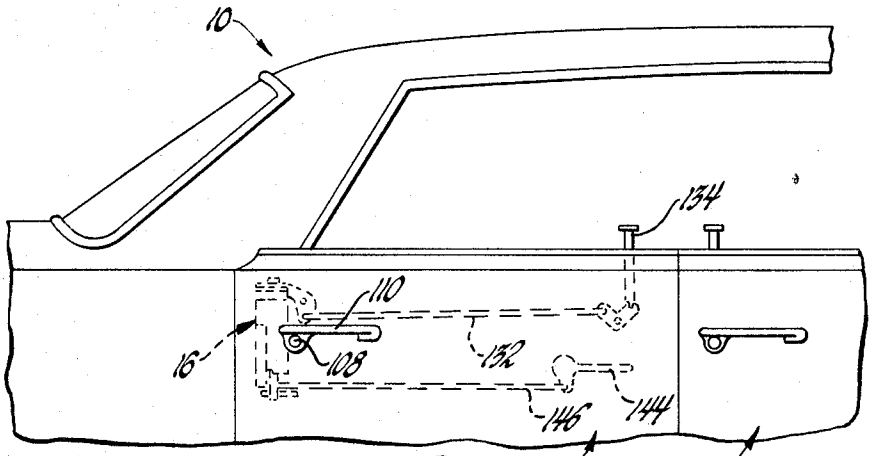


Fig. 1

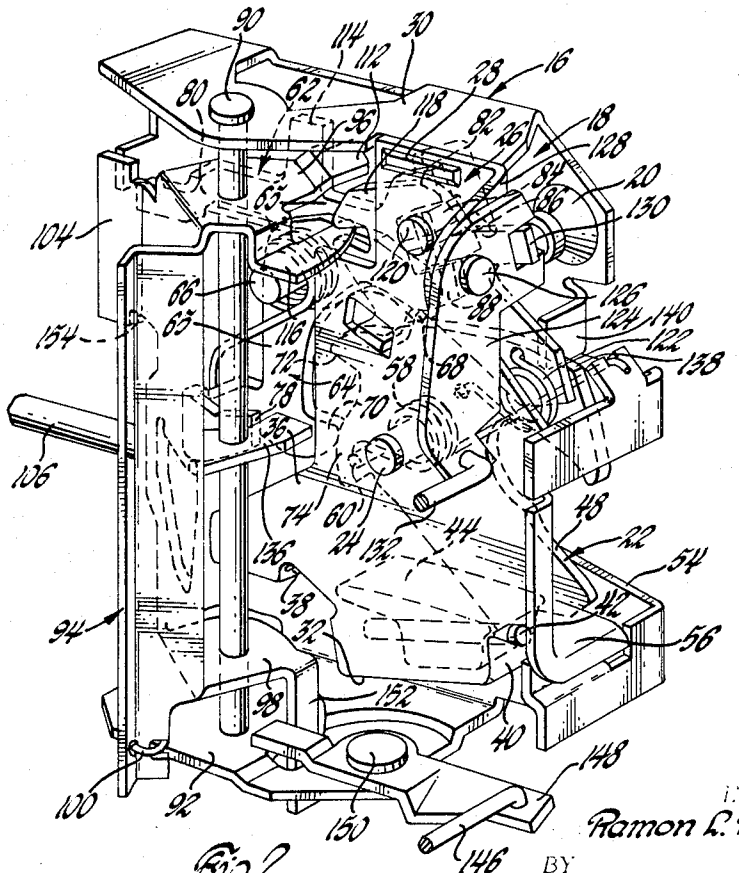


Fig. 2

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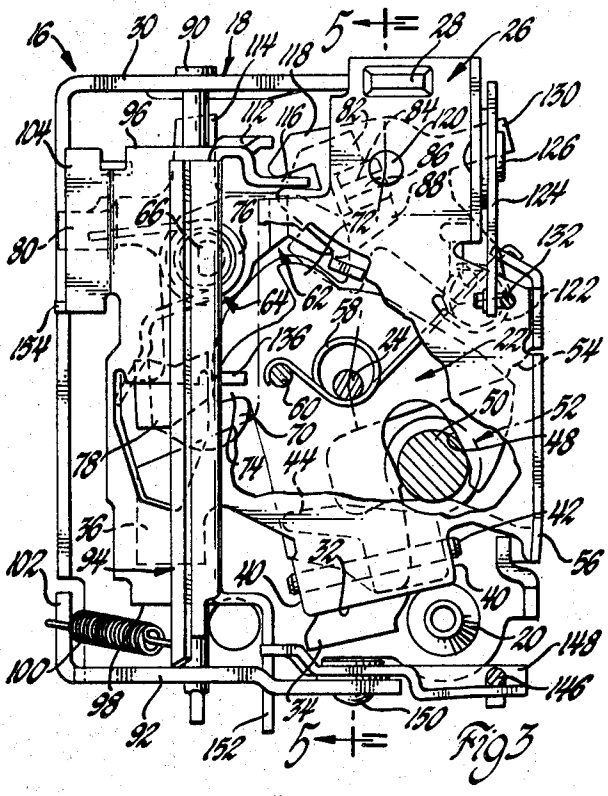


Fig. 3

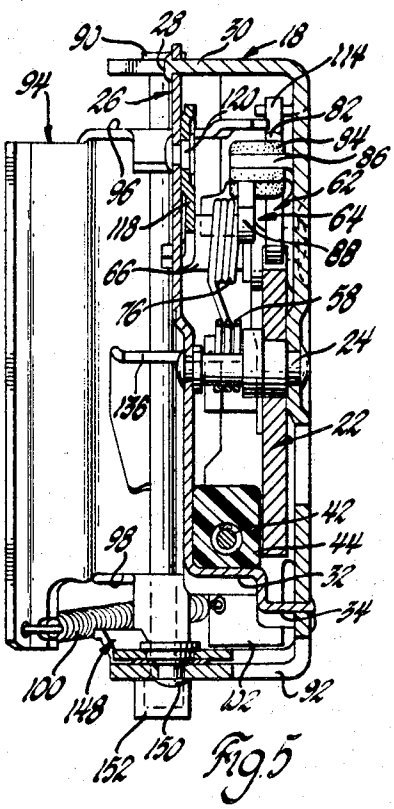


Fig. 5

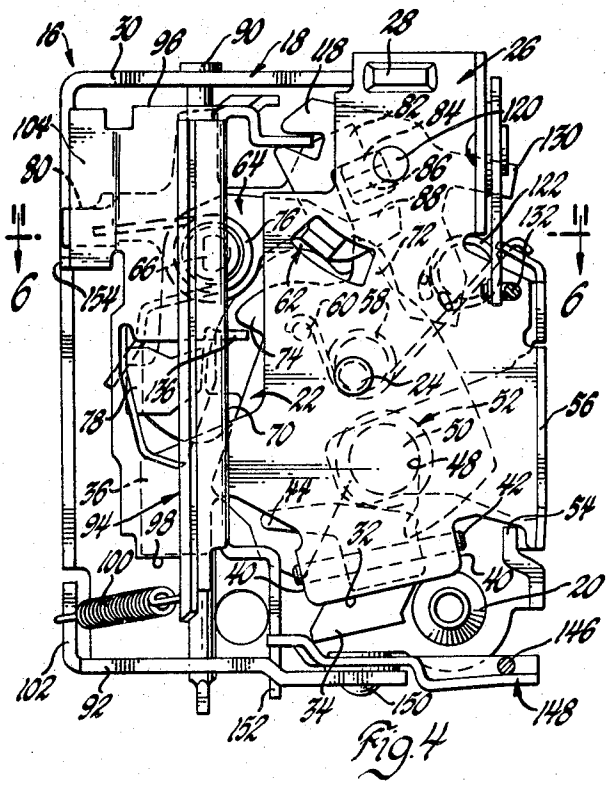


Fig. 4

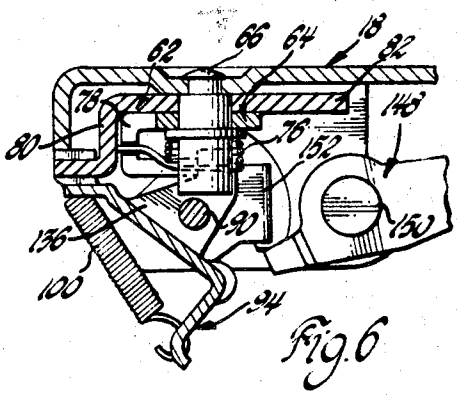


Fig. 6

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United States Patent Office 3,386,760 Patented June 4, 1968

3,386,760

CLOSURE LATCH

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Filed July 18, 1966, Ser. No. 566,128
7 Claims. (Cl. 292—216)

ABSTRACT OF THE DISCLOSURE

A door lock includes a fork bolt mounted on a frame for movement between an unlatched position and intermediate and fully latched positions which are defined by the shoulders of the bolt. A pair of detents are coaxially mounted on the frame for movement oppositely of each other between detented and undetented positions with respect to one of the bolt shoulders. A torsion spring mounted on the detent pivot biases the detents oppositely of each other to detented position. The detent arm for the primary latched position includes a lateral arm engageable with one side of a common stop on the frame and the detent arm for the secondary latched position also includes a lateral arm engageable with the other side of the common stop means and extending generally in the same direction as the detent arm of the first detent to locate the detents against the action of the torsion spring. Each detent further includes a third arm which lie in the path of lateral tabs of an operating member and picked up by the operating member when it is rotated so as to move the detent to release position. The operating member is shiftable to a position wherein it will not pick up either detent and one of the detents includes a fourth arm for returning the operating member to its first position upon movement of the bolt relative to the one detent.

This invention relates to closure latches and more particularly to vehicle body door locks.

One feature of this invention is that it provides an improved vehicle body door lock including a latch bolt, and a plurality of detent members, each having an arm for holding the bolt in one latched position, the detent members being resiliently biased toward bolt holding position and each including a second arm engageable with a common stop to locate the detent members in holding position against the action of the biasing means. Another feature of this invention is that the detent members are coaxially mounted. A further feature of this invention is that a first arm of one detent member extends in the same general direction from the pivot axis of the detent members as the second arm of another detent member. Yet another feature of this invention is that each of the detent members includes a third arm extending laterally of the first arm and engageable by common operating means to move the detent members to released position. Yet a further feature of this invention is that one of the detent members include a fourth arm cooperable with the operating means to locate the operating means relative to the detent members under certain conditions.

These and other features of the door lock of this invention will be readily apparent from the following specification and drawings wherein:

FIGURE 1 is a partial side elevational view of a vehicle body embodying a door lock according to this invention;

FIGURE 2 is a perspective view of the lock in unlatched position;

FIGURE 3 is a view of the lock in intermediate latched position;

FIGURE 4 is a view similar to FIGURE 3 showing the lock in fully latched position;

FIGURE 5 is a sectional view taken generally along the plane indicated by line 5—5 of FIGURE 3; and

FIGURE 6 is a sectional view taken generally along the plane indicated by line 6—6 of FIGURE 4.

Referring now particularly to FIGURE 1 of the drawings, a vehicle body **10** includes a front door **12** and a rear door **14**, each of which is swingably mounted in a suitable manner adjacent its forward edge portion on the body **10** for movement between a closed position, as shown, and an open position, not shown. Door **12** is held in its closed position by a door lock, such as that shown and described in Patent 3,190,682, Closure Latch, Robert M. Fox and Edwin H. Klove, Jr. Door **14** is held in closed position by a door lock **16** according to this invention.

Referring now particularly to FIGURES 2 through 6 of the drawings, the lock **16** includes a main frame or plate **18** adapted to abut the end or jamb wall of door **14** and to be secured thereto in a suitable manner such as by bolts extending through the door wall into tapped embossments **20** of the plate **18**. A fork type bolt **22** is pivotally mounted on a shouldered stud **24** extending between the main plate **18** and an auxiliary plate **26**. Plate **26** is staked at **28** adjacent its upper edge portion to a lateral flange **30** of plate **18** and includes a lower laterally extending flange **32** which terminates in an offset flange **34** staked to the plate **18**. The plate **28** further includes an extension **36** which terminates in a lateral flange **38** staked to the plate **18**. A pair of lateral flanges **40** are located to either side and laterally of the flange **32** and fixedly support a stud or pin **42**. A wedge shaped nylon shoe **44** is slidably mounted on the pin **42** and is biased outwardly of the lock or to the right, as viewed in FIGURES 2 through 4, by a coil compression spring surrounding pin **42** and seating against the left-hand flange **40** and the shoe **44**.

When the bolt **22** is either in intermediate or fully latched position, as shown in FIGURES 3 and 4, respectively, the throat **48** of the bolt receives the shank **50** of a headed striker pin **52** which is secured in a suitable manner to the body lock pillar. The head of the striker pin engages the shoe **44** so that the pin is effectively trapped between the bolt **22** and the shoe **44**. The main frame **18** is cut away at **54** and the end wall and inner panel of the door **14** are also cut away to permit the entry of the striker pin into the lock. Reference may be had to Gergoe et al. 3,149,866 for a more detailed showing of this structure. A lateral flange **56** of plate **26** provides a lead-in ramp to the shoe **44**. Bolt **22** is normally biased toward unlatched position, as shown in FIGURE 2, or counterclockwise from the intermediate and fully latched positions shown in FIGURES 3 and 4, respectively, by a coil torsion spring **58** which surrounds the stud **24** and has one end thereof hooked to a pin **60** secured to the bolt and the other end thereof hooked to a lateral notched tab of plate **18**, FIGURE 2.

Primary and secondary detents or detent members **62** and **64**, respectively, are coaxially mounted on a shouldered stud **66** secured to the main plate **18**. Each detent includes a first arm **65** having a respective foot **68** and **70** selectively and alternately engageable with respective shoulders or abutments **72** and **74** of the bolt **22** to hold the bolt in either fully latched position, as shown in FIGURE 4, or intermediate latched position, as shown in FIGURE 3.

A coil torsion spring **76** surrounds the stud **66** and has one end thereof engaging one side of a lateral flange of an offset arm **78** of detent **64** and the other end thereof engaging a lateral flange of an offset arm **80** of the detent **62** to bias the detents oppositely of each other and toward the bolt **22**. An arm **82** of the detent **62** engages a rubber bumper **84** mounted on a lateral tab **86** of plate **18** to lo-

cate the detent 62 against the action of the spring 76. The detent 64 is located against the action of spring 76 by engagement of an arm 88 thereof with the rubber bumper 84 oppositely of the arm 82.

A shaft or pivot pin 90 extends the full length of the plate 18 between the upper flange 30 thereof and a lower flange 92 thereof and provides both a pivotal axis and a shifting axis for an outside operating means or member 94. Member 94 includes upper and lower apertured lateral flanges 96 and 98 which pivotally and slidably receive the shaft 90 to mount member 94 thereon. A tension spring 100 interconnects the member 94 and a flange 102 of plate 18 to continually bias the member 94 in a clockwise direction, as viewed in FIGURE 2. The member 94 is located against the action of the spring 100 in its inoperative or non-operating position as shown by engagement of a flange 104 thereof with the arm 80 of detent 62.

Member 94 is adapted to be engaged at any one of a plurality of places thereon by a push rod 106, FIGURE 2, which is operated by conventional push button means 108, FIGURE 1, incorporated in an outside handle 110 secured to the outer panel of the door 14. Since the member 94 is elongated vertically and extends substantially the full depth of the lock 16, the handle 110 may be positioned at various vertical places on the outer panel of the door 14 without requiring repositioning of the lock 16.

The flange 96 of the member 94 includes an upwardly offset foot 112 which is adapted to selectively engage an upwardly extending foot or arm 114 of the detent 62, and a downwardly offset foot 116 which is received between the legs of a forked inside locking lever 118 pivotally mounted at 120 on the plate 28. The locking lever 118 is movable between an unlocked position, as shown in FIGURES 2 and 3, and a locked position, as shown in FIGURE 4, and is selectively and alternately held in either position by an overcenter type coil torsion spring 122 hooked between the plate 28 and the locking lever. The locking lever is moved between these positions by a forked inside operating lever 124 which is pivoted at 126 to a lateral flange 128 of plate 28 and straddles a foot or leg 130 of the locking lever. The lever 124 is connected by a conventional shiftable rod and lever arrangement 132, FIGURES 1 and 2, with a conventional garnish button 134, FIGURE 1.

When the locking lever 118 is in its unlocked position as shown in FIGURES 2 and 3, the foot 112 of lever 94 is located in the path of the arm 114 of detent 62, and when the locking lever 118 is in its locked position, as shown in FIGURE 4, the foot 112 of lever 94 is located above the arm 114 of the detent 62. The lever 94 further includes a lanced lateral apertured tab 136 which is located in the path of the arm 78 of the detent 64 when the locking lever is in unlocked position, as shown in FIGURES 2 and 3, and is located above or out of the path of the arm 78 when the locking lever is in locked position, as shown in FIGURE 4.

When the bolt 22 is in fully latched position and the locking lever is in unlocked position, depression of the push button means 108 will shift rod 106 inwardly of door 14 and swing the lever 94 counterclockwise, as viewed in FIGURE 2. The foot 112 will engage the arm 114 of the detent 62 to swing the detent 62 counterclockwise, as viewed in FIGURE 4, to move the foot 68 thereof out of engagement with the shoulder 72 of the bolt 22. The tab 136 of the lever 94 will simultaneously engage the arm 78 of the detent 64 to swing the detent 64 clockwise or opposite to the detent 62 to move the foot 70 of the detent 64 out of the path of movement of the shoulder 74 of the bolt 22. Thus, the spring 58 can move the bolt to unlatched position. The bolt is located in this position by engagement of the outboard leg 138 thereof with a lateral tab 140 of the plate 18.

Counterclockwise swinging movement of the detent 62 is limited by the engagement of the arm 114 of the detent with a lanced lateral tab 142 of plate 18. Movement of the detent 64 and movement of the member 94 is limited by the detent 62.

Should the bolt 22 be in intermediate latched position as shown in FIGURE 3 and the locking lever in unlocked position, swinging movement of the lever 94 will release the foot 70 of the detent 64 from engagement with the shoulder 74 to permit the spring 58 to move the bolt to unlatched position.

When the locking lever 118 is in locked position, swinging movement of the member 94 will result in the foot 112 swinging above and past the arm 114 of the detent 62 without engagement therewith. The tab 136 of member 94 will swing above and past the arm 78. The bolt will thus remain in either intermediate or fully latched position.

The inside operating means includes a conventional remote handle 144, FIGURE 1, which operates a shiftable rod 146 interconnecting the handle and an inside operating lever 148 pivoted at 150 to the flange 92 of plate 18. Lever 148 is engageable with a depending foot 152 of member 94 to swing the member 94 when the handle 144 is operated. The remote handle 144 is effective to release the detents 62 and 64 only when the member 94 is in its unlocked position of FIGURES 2 and 3.

The bolt 22 is moved from unlatched position to intermediate and fully latched positions by engagement of the inboard leg of the bolt with the shank 50 of pin 52. Upon movement of the bolt 22 from unlatched position, as shown in FIGURE 2, to intermediate latched position, as shown in FIGURE 3, the foot 70 of the detent 64 will ride up and over and into engagement with the shoulder 74 to retain the bolt in intermediate latched position. The detent 64 will be located with the tip of the foot 70 thereof out of engagement with the edge of the bolt 22 by engagement of the arm 88 of the detent with the rubber bumper 84. The detent 62 remains stationary since the bumper 84 maintains the foot 68 out of engagement with the edge of bolt 22 and the foot 68 does not engage the shoulder 72. Upon further movement of the bolt 22 from intermediate latched position to fully latched position, as shown in FIGURE 4, detent 64 will remain stationary in its position shown in FIGURE 3, while the foot 68 of the detent 62 will ride up and over and into engagement with the shoulder 72 to retain the bolt in fully latched position.

The foregoing step-by-step movement of bolt 22 will occur if the door is slowly closed. If the door is closed at a faster rate or slammed, the bolt 22 will be rotated a sufficient number of degrees so that the foot 68 of the detent 62 will ride up and over and into engagement with the shoulder 72 to retain the bolt in fully latched position. Thus, the bolt will rotate directly from unlatched to fully latched positions. During this movement of the bolt, the foot 70 will ride up and over the shoulder 74, as this shoulder moves relative to the foot, and be located as shown in FIGURES 3 and 4. The arm 88 and rubber bumper 84 will prevent the tip of the foot 70 from engaging the edge of the bolt until the bolt has moved to substantially fully latched position, at which position the foot 70 engages the bolt edge to rotate detent 64 slightly clockwise to its position shown in FIGURE 4.

Further, should the door be slammed with enough force to rotate the bolt 22 a sufficient number of degrees so that the foot 68 will ride up the shoulder 72 but not over this shoulder, the foot 70 of the detent 64 will, of course, be in a position to engage the shoulder 74 upon reverse rotation of the bolt toward unlatched position. Thus at all times, in any latched position of the bolt, whether intermediate latched, fully latched or a temporary position between these latched positions, the foot 70 of the detent 64 is in a position to engage the shoulder 74.

Automatic undogging is accomplished by depressing the garnish button 134 when the door is in an open position to move the member 94 from its unlocked position, as shown in FIGURE 3, to its locked position, shown in FIG-

URE 4, and thereafter moving the door **14** toward closed position. As the door moves to closed position and the bolt **22** moves from unlatched position to fully latched position or substantially fully latched position, this causes the foot **68** of the detent **62** to ride up, and then either down or over the shoulder **72**, to rotate the detent **62** counterclockwise of its position shown in FIGURES 2 and 3. As the detent **62** rotates counterclockwise, the arm **80** of the detent will engage an angular tab **154** of flange **104** to shift the member **94** from its position of FIGURE 4 to its position of FIGURE 3 and move the locking lever **118** from its locked position of FIGURE 4 to its unlocked position of FIGURE 3. Automatic undogging cannot occur when the bolt **22** moves to intermediate latched position or is rotated an insufficient distance to cause arm **80** to engage the tab **154**.

Keyless locking is accomplished in the same manner except that the push button means **108** is depressed and held during closing movement of the door to move the tab **154** of the member **94** from underneath the arm **80** of detent **62**. When the latter rotates counterclockwise, there is no engagement between the arm **80** and the tab **154**.

Thus, this invention provides an improved vehicle body door lock.

I claim:

1. A closure latch comprising, in combination, support means, bolt means mounted on the support means for movement between intermediate latched position and fully latched position, a detent member for each latched position, means coaxially mounting said detent members on said support means for rotational movement in directions opposite to each other between holding and released positions with respect to the bolt means, each member including a first arm engageable with the bolt means to hold the bolt means in the latched position respective to the one detent member, resilient means biasing said detent members to holding position, each member including a second arm extending from the first arm and engageable on opposite sides of a common stop means mounted on the support means to locate the detent members in said holding position against the action of the biasing means.

2. The combination recited in claim **1** wherein the first arm of one member extends in the same general direction from the pivot axis as the second arm of the other member.

3. The combination recited in claim **2** wherein the first arm of the one member holds the bolt means in fully latched position.

4. The combination recited in claim **1** wherein each of the detent members includes a third arm extending laterally of the first arm and engageable by operating means to move the detent members to released position.

5. The combination recited in claim **4** wherein the operating means includes a common operating member having portions thereof engageable with the third arms of the detent members.

6. The combination recited in claim **5** wherein the operating member is movable between a first position wherein the portions thereof lie in the path of the third arms of the detent members and a second position wherein the portions thereof are located out of the path of the third arms of the detent members.

7. The combination recited in claim **6** wherein one of the detent members includes an additional arm engageable with the operating member in the second position thereof to move the operating member to the first position thereof upon movement of the bolt means relative to the one detent member to move the operating member to the first position.

References Cited

UNITED STATES PATENTS

2,625,420	1/1953	Endter	292—198
2,922,672	1/1960	Van Voorhees.	
3,149,866	9/1964	Gergoe et al.	292—216
3,299,466	1/1967	Werner	74—530 X
3,334,935	8/1967	Eddy	292—216

RICHARD E. MOORE, *Primary Examiner.*