May 21, 1968 C. A. SCHIELE 3,384,405

CLOSURE LATCH

Filed Aug. 22, 1966 2 Sheets-Sheet 1

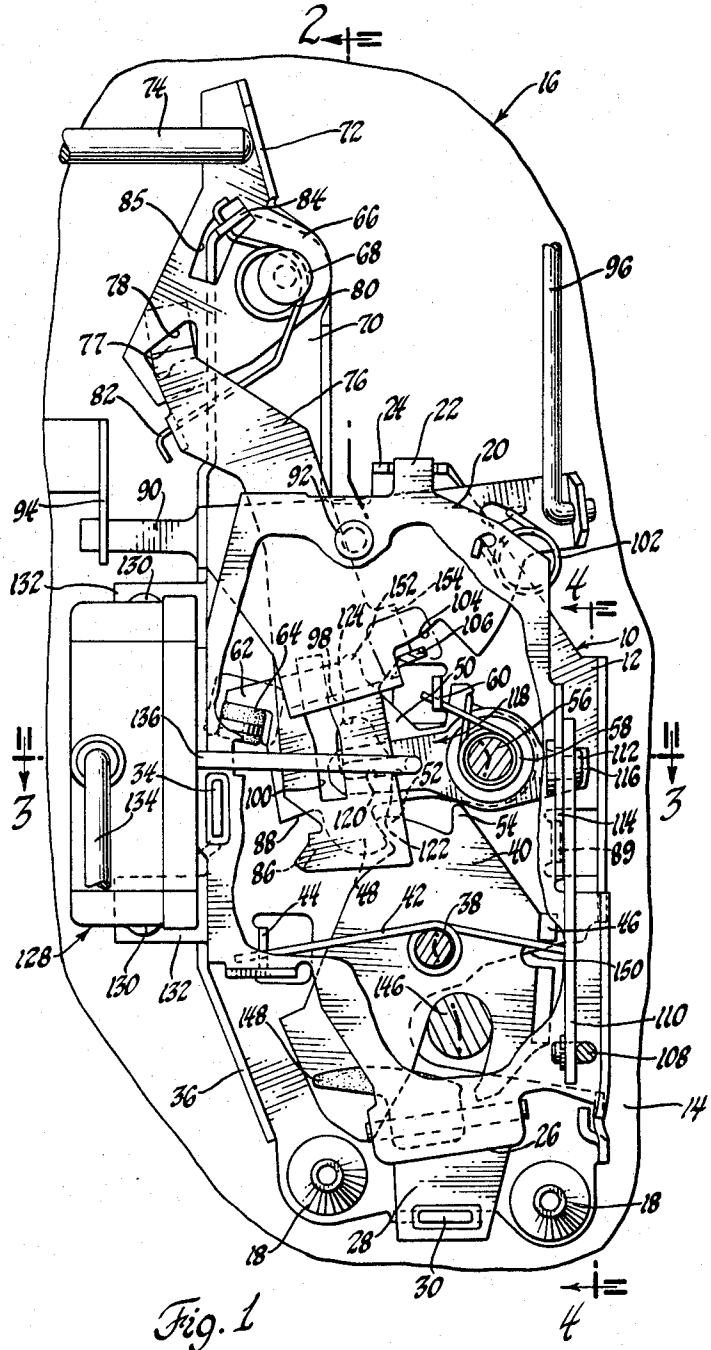


Fig. 1

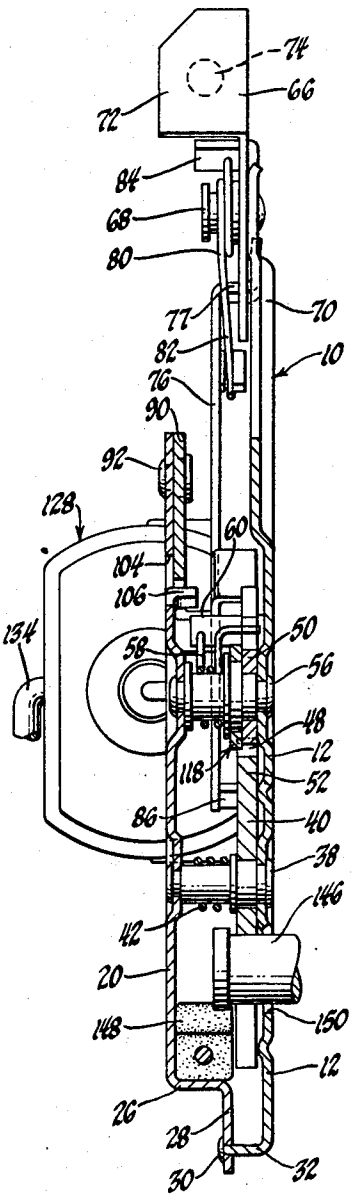


Fig. 2

INVENTOR.
Carl A. Schiele
BY
Herbert Furman
ATTORNEY

May 21, 1968 C. A. SCHIELE 3,384,405

CLOSURE LATCH

Filed Aug. 22, 1966 2 Sheets-Sheet 1

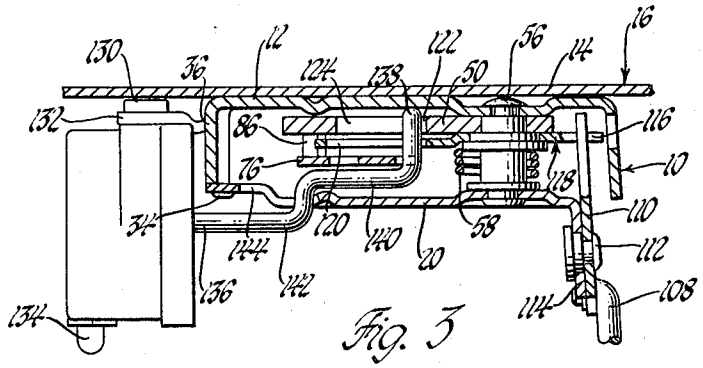


Fig. 3

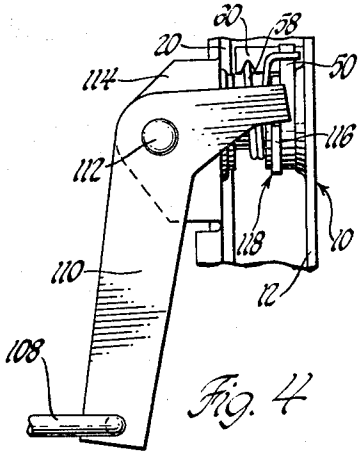


Fig. 4

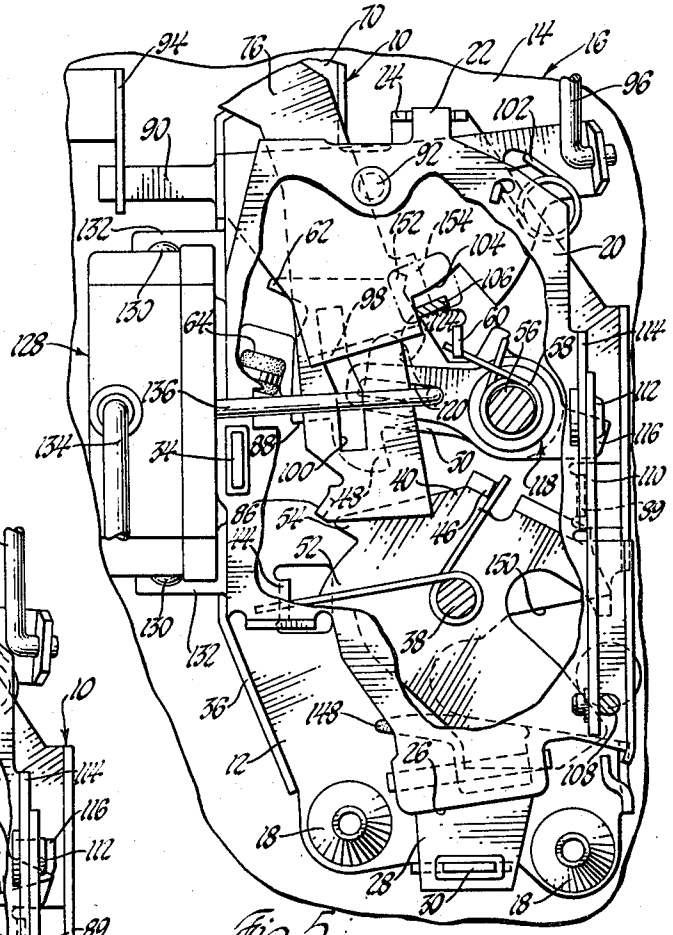


Fig. 5

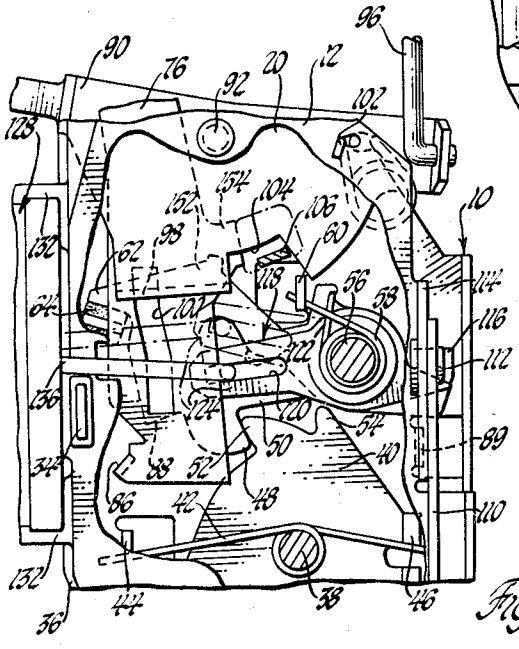


Fig. 6

INVENTOR.
Carl A. Schiele
BY
Herbert Furman
ATTORNEY

United States Patent Office 3,384,405 Patented May 21, 1968

3,384,405

CLOSURE LATCH

Carl A. Schiele, Geneva, N.Y., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Filed Aug. 22, 1966, Ser. No. 573,977
4 Claims. (Cl. 292—216)

ABSTRACT OF THE DISCLOSURE

A door lock includes a rotatable bolt and a pivoted detent which is spring biased into engagement with the bolt. A detent operating lever is coaxially mounted with the detent and is freely rotatable. The detent includes an L-shaped slot and a detent operating lever includes an elongated slot corresponding in size to one leg of the L-shaped slot. A piston rod of a vacuum motor has a bent end received in the slot of the operating member to couple the operating lever and the detent lever when the bent end is located in the one leg of the L slot in the detent lever and to uncouple the detent lever and the operating lever when it is received in the other leg of the L slot in the detent lever. A bellcrank is connected to the inside release means and has a leg overlying an arm of the operating lever to release the detent when the operating lever is coupled to the detent. The outside release means include a shiftable intermittent member which is located in one position in the path of the detent to release the detent. The bellcrank and the intermittent member are located to opposite sides of the pivot of the detent and the operating lever so that the detent and the operating lever move away from one when the other is actuated. The bent end of the piston rod locates the operating lever about the pivot.

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

One feature of this invention is that it provides a vehicle body door lock having a bolt held against movement toward unlatched position by detent means, inside operating means for releasing the detent means, a detent operating member operatively connected at all times to the operating means, and means selectively coupling the member to the detent means. Another feature of this invention is that the coupling means includes a member movable between a first position within slot portions of generally the same size provided in the detent means and the detent operating member and member and a second position within slot portions of dissimilar size provided in the detent means and the detent operating member to selectively and alternately couple and uncouple the detent member and the operating member.

A further feature of this invention is that the detent means is pivotally mounted on the lock frame and the detent operating member is coaxially mounted intermediate the ends thereof with the detent means, with the detent operating member being located about the pivot thereof by the movable member of the coupling means and by a movable member of the inside operating means. Yet another feature of this invention is that the movable member of the coupling means moves with the detent operating member upon movement thereof by the movable member of the inside operating means.

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 partially broken away side elevational view of a door lock according to this invention mounted in a swingable door of a vehicle body;

FIGURE 2 is a sectional view taken generally along the plane indicated by line 2—2 of FIGURE 1;

FIGURE 3 is a sectional view taken generally along the plane indicated by line 3—3 of FIGURE 1;

FIGURE 4 is a view taken generally along the plane indicated by line 4—4 of FIGURE 1;

FIGURE 5 is a partial view similar to FIGURE 1; and

FIGURE 6 is a view of a portion of FIGURE 1.

Referring now particularly to FIGURE 1 of the drawings, a door lock designated generally **10** according to this invention includes a main plate or frame **12** which is adapted to abut the inner surface of a lock pillar or jamb wall **14** of a swingable vehicle door **16** and to be secured thereto by a number of bolts extending through the wall **14** into tapped embossments **18** of the frame. An auxiliary plate or frame **20** is located in spaced relationship to the plate **12**. The plate **20** includes a tab **22** which fits within a notched lateral tab **24** of the plate **12**. The plate **20** further includes a lateral flange **26** which merges into another lateral flange **28** which is staked at **30** to a lateral flange **32** of the plate **12**. The plate **20** is also staked at **34** to a lateral flange **36** of the plate **12**.

A shouldered stud **38** extends between the plates **12** and **20** and rotatably mounts a fork type bolt **40**. Bolt **40** is movable between a fully latched position as shown in FIGURE 1 and an unlatched position as shown in FIGURE 5 through an intermediate latched position by a coil torsion spring **42** which is mounted on the stud **38** and has one end thereof engaging a notched lateral tab **44** of plate **12** and the other end thereof engaging a lateral tab **46** of the bolt **40**. Bolt **40** is held in either its latched position of FIGURE 1 or its intermediate latched position, not shown, by engagement of a foot **48** of a detent member **50** with either a shoulder **52** of the bolt or a shoulder **54** thereof. The detent **50** is rotatably mounted on a shouldered stud **56** which extends between the plates **12** and **20**. A coil torsion spring **58** is mounted on the stud **56** and has one lateral end thereof engaging a notched tab of the detent **50** and the other end thereof engaging a notched lateral tab **60** of plate **12** to continuously bias the detent member **50** counterclockwise of the stud **56** and toward the bolt **40**. The detent member **50** is located against the action of spring **58** by engagement of a tab **62** thereof with a rubber bumper **64** mounted on a tab of plate **12**. The detent member **50** may be released from engagement with either the shoulder **52** or **54** either from the inside of the body or from the outside of the body.

The outside operating means include an operating lever or member **66** pivotally mounted on a headed stud **68** secured to a flanged extension **70** of the plate **12**. The member **66** includes a flange or tab **72** which is engageable by the push rod **74** of a conventional outside handle push button means to swing the member **66** clockwise of the pivot **68**. An intermittent member **76** has its upper offset flanged end **77** fitted within an aperture **78** of the member **66** for shifting movement with the member **66** and pivotal movement relative thereto. A coil torsion spring **80** surrounds the stud **68** and has one end **82** thereof engaging a lateral tab of the member **76** and the other end thereof engaging a lateral tab **84** of extension **70**. The spring **80** biases the member **76** downwardly to in turn bias the member **66** counterclockwise of pivot **68** and hold the upper edge of an opening **85** in the member **66** in engagement with the tab **84**.

The lower end of the member **76** includes a lateral tab **86** which normally underlies a shoulder or foot **88** of the detent member **50**. Thus, upon clockwise swinging movement of the member **66**, the member **76** will be shifted upwardly and the engagement of the tab **86** with shoulder **88** swings the detent member **50** clockwise about the stud **56** and against the action of the spring **58** to in turn permit the spring **42** to move the bolt **40** from its latched position, as shown in FIGURE 1, to its unlatched posi-

tion as shown in FIGURE 5. Should the bolt be in its intermediate latched position, wherein the detent foot 48 engages the shoulder 54, the same operation of member 66 will result in the same movement of the bolt 40 to its unlatched position. Bolt 40 is located in unlatched position by engagement of the outboard leg thereof with a tab 89 of plate 12.

A locking lever 90 is pivotally mounted at 92 to the plate 20. The outer end of the locking lever 90 is connected to a conventional key cylinder operated lever 94 and the inner end thereof is connected to a conventional garnish button operated rod 96. A tab 98 of the lever 90 is received within an elongated slot 100 of intermittent member 76. When the locking lever is in its unlocked position as shown in FIGURES 1 and 5, an overcenter type coil torsion spring 102 biases the lever counterclockwise of the pivot 92 to hold the left-hand edge of a notch 104 in the lever in engagement with a lateral tab 106 of plate 20. In this position of the locking lever, the tab 86 of the intermittent member 76 underlies the shoulder 88 of the detent member. When the locking member is in its locked position, as shown in FIGURE 6, the right-hand edge of the notch 104 engages the tab 106 and the tab 86 of the intermittent member 76 lies to the left of the shoulder 88 so that movement of the member 66 by the push button rod 74 will not result in any movement of the detent member 50 out of engagement with either the shoulder 52 or 54 of the bolt 40. Thus, the outside operating means may be selectively coupled and uncoupled from the detent member 50. Either the outside key cylinder or the inside garnish button may be selectively and alternately operated to move the locking member 90 between its locked and unlocked positions.

The inside operating means include the conventional remote handle which actuates a shiftable rod 108. This rod is connected to one leg of the inside remote lever 110 which is pivoted at 112 to a flange 114 of the plate 20. The other leg of the lever 110 overlies a leg 116 of a detent operating member 118. Member 118 is coaxially mounted with the detent member 50 on the stud 56 but is not operatively connected to the member 50 or the spring 58. The other leg of the member 118 includes an elongated slot 120. The right-hand portion of this slot 120 overlies or is aligned with a similar elongated slot portion 122 in the detent member 50, while the left-hand portion of the slot 120 overlies a vertically enlarged slot portion 124 of the member 50, which merges into slot portion 122.

A conventional vacuum operated motor designated generally 128 is bolted at 130 to lateral tabs 132 of plate 12. The motor 128 is connected to a suitable source of vacuum, such as the intake manifold of the power plant, by a conduit 134. The piston or actuating rod 136 of the motor is normally located as shown in FIGURES 1, 3 and 5. The rod 136 includes a laterally projecting end 138, FIGURE 3, which fits within the right-hand portion of the slot 120 and the slot portion 122. The lateral end 138 is connected to the main portion of the rod by lateral portions 140 and 142, the latter of which is movable within an aperture 144 provided in the plate 20.

When the motor 128 is not actuated, the end 138 of the rod 136 operatively connects or couples the operating member 118 and the detent member 50 since it is located within the right-hand portion of the slot 120 and the slot portion 122, both of which are of the same general size. Operation of the inside remote handle and swinging movement of the lever 110 will therefore swing the member 118 clockwise about the pivot 56. The detent member 50 will also simultaneously swing in the same direction with the member 118, FIGURE 5, so as to be released from engagement with the bolt 40 and permit the bolt 40 to move to unlatched position. Rod 136 pivots relative to the motor 128 during this movement.

When the motor 128 is actuated, the rod 136 is shifted to the left and, as shown in FIGURE 6, the end 138 of the rod will thereupon be located in the left-hand portion of the slot 120 as well as the enlarged slot portion 126. If the remote lever 110 is then actuated by the inside remote handle, the member 118 will swing clockwise about the pivot 56 as shown in FIGURE 6. However, since the rod end 138 is in the enlarged slot portion 126 in detent member 50, the detent member will remain in engagement with the bolt 40 so that the bolt remains in fully latched position. Thus, the inside operating means may be selectively coupled and uncoupled from the detent member.

The motor 128 may be energized in various manners, such as by a manual operating switch or by being connected to the transmission selector switch or ignition switch of the vehicle.

When the bolt 40 is in latched position, it cooperates with a headed striker pin 146 which is conventionally mounted on the body pillar to hold the door closed. The head of the striker pin rides on a conventional wedge or shoe 148 which is mounted on the plate 12. The pin enters the frame 12 through an opening 150 therein.

The subject lock also includes the features of automatic undogging and keyless locking.

If the door is in an open position and either the garnish buttton or the outside key is operated, the locking lever 90 will be shifted from its unlocked position of FIGURE 1 to its locked position of FIGURE 6. If the door is thereafter closed, as the foot 48 of the detent member 50 moves over and into engagement with the shoulder 54, the detent member 50 will be swung clockwise and then counterclockwise. As the detent member swings clockwise, a shoulder 152 thereof will engage a lateral tab 154 of the member 76 to swing the member 76 counterclockwise relative to its connection to the member 66. This in turn will shift the locking lever 90 back to its unlocked positon.

Keyless locking is accomplished in the same manner except that the push button means is operated as the door is closed so as to shift the rod 74 inwardly and in turn shift the member 76 upwardly so that the tab 154 is out of the path of movement of the shoulder 152 as the detent member 50 swings clockwise.

It can be seen from the foregoing description that automatic undogging and keyless locking can be accomplished regardless whether the members 50 and 118 are coupled or uncoupled. If the members are coupled no movement of the lever 110 will result since the leg 116 of the member 118 will swing downwardly relative to the upper leg of the member 110.

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

I claim:

1. A closure latch comprising, in combination, a support, a latch bolt mounted on the support for movement between latched and unlatched positions, a detent lever pivotally mounted on the support for holding the bolt against movement to unlatched position and including a slot therein, a detent-operating lever coaxially mounted on the support with the detent lever and including a slot therein, each of said slots having first portions of generally similar size and second portions of dissimilar size, a movable coupling member of a size similar to the size of said first slot portions and being movable between a first position wherein said coupling member is located within said first slot portions to couple said operating member and said detent lever, and a second position wherein said coupling member is located within said second slot portions to uncouple said operating lever and said detent lever, a first release lever mounted on the support and movable into engagement with said operating lever to one side of the pivot thereof and of said detent lever for rotating said operating lever and releasing said detent lever when said movable coupling member is in said first position, and a second release lever mounted on the support and movable into engagement with said detent lever to the other side of the pivot thereof for releasing

said detent lever, said detent-operating lever, when said movable coupling member is in said first position, moving with said detent lever.

2. The combination recited in claim 1 including means for selectively moving said second release lever to a position out of the path of the detent to uncouple said second release lever and detent lever.

3. The combination recited in claim 1 wherein the first and second portions of the slot in the detent-operating lever are of generally the same size, the detent-operating lever being freely rotatable with respect to the detent lever and being located against rotational movement by the movable coupling member.

4. A closure latch comprising, in combination, a support, a latch bolt mounted on the support for movement between latched and unlatched positions, a detent lever pivotally mounted on the support for holding the bolt against movement to unlatched position and including a generally L-shaped slot therein to one side of the pivot thereof, resilient means biasing the detent lever to holding position, a detent-operating lever freely coaxially mounted on the support with the detent lever and including a slot therein of a size corresponding to the size of one leg of the detent lever slot and located to the one side of the pivot thereof, a movable coupling member of a size similar to the size of the operating lever slot and being movable between a first position wherein the coupling member is located within the operating member slot and the one leg of the detent lever slot to couple the operating member and the detent lever, and a second position wherein the coupling member is located within the operating member slot and the other leg of the detent lever slot to uncouple the operating lever and said detent lever, the detent operating lever being located about the pivot thereof by the movable coupling member, a first release lever mounted on the support and movable in one direction into engagement with the operating lever to the other side of the pivot thereof for rotating the operating lever and releasing the detent lever when the movable member is in the first position, and a second release lever mounted on the support and movable in a direction opposite the one direction into engagement with the detent lever to the one side of the pivot thereof for releasing the detent lever, the detent lever and the operating lever, when the movable member is in the first position, moving in a direction opposite the one direction with respect to the first release lever.

References Cited

UNITED STATES PATENTS

2,768,853	10/1956	Davies	292—201 X
2,782,062	2/1957	Smith	292—216
2,916,318	12/1959	Van Voorhees	292—280
3,140,888	7/1964	Di Salvo	292—216 X

FOREIGN PATENTS

931,308	7/1963	Great Britain.

RICHARD E. MOORE, *Primary Examiner.*