

Sept. 20, 1971

W. S. ZAYDEL

3,606,426

CLOSURE LATCH

Filed Jan. 19, 1970

2 Sheets-Sheet 1

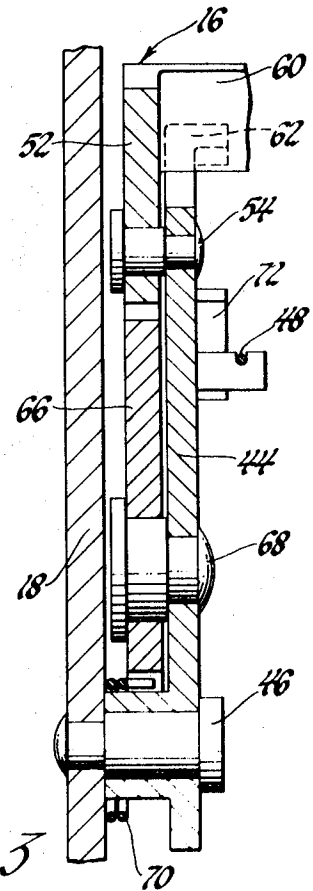
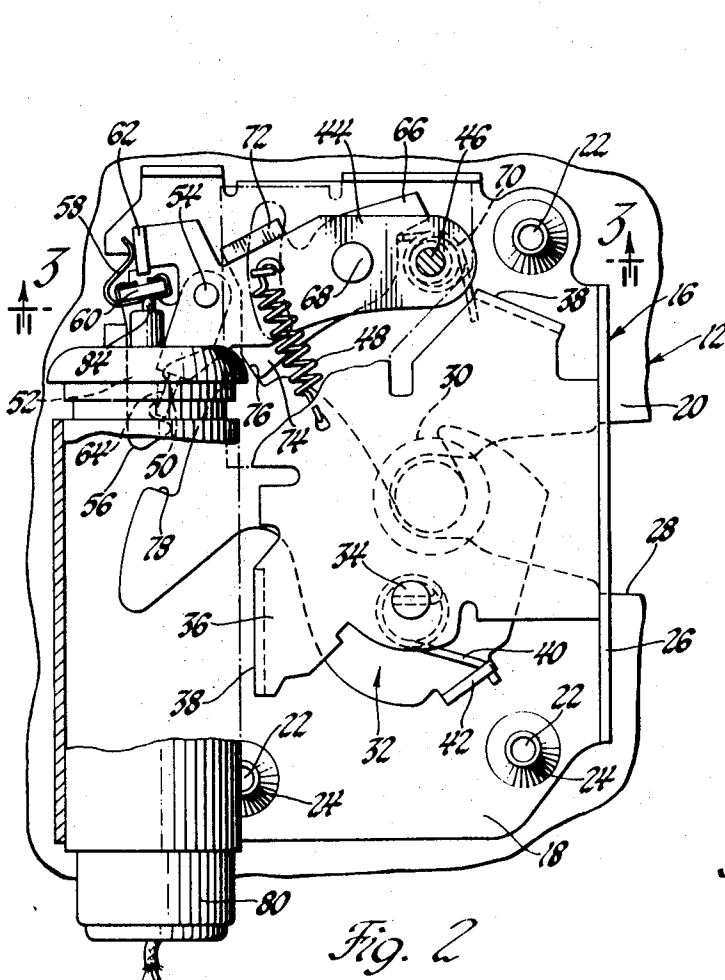
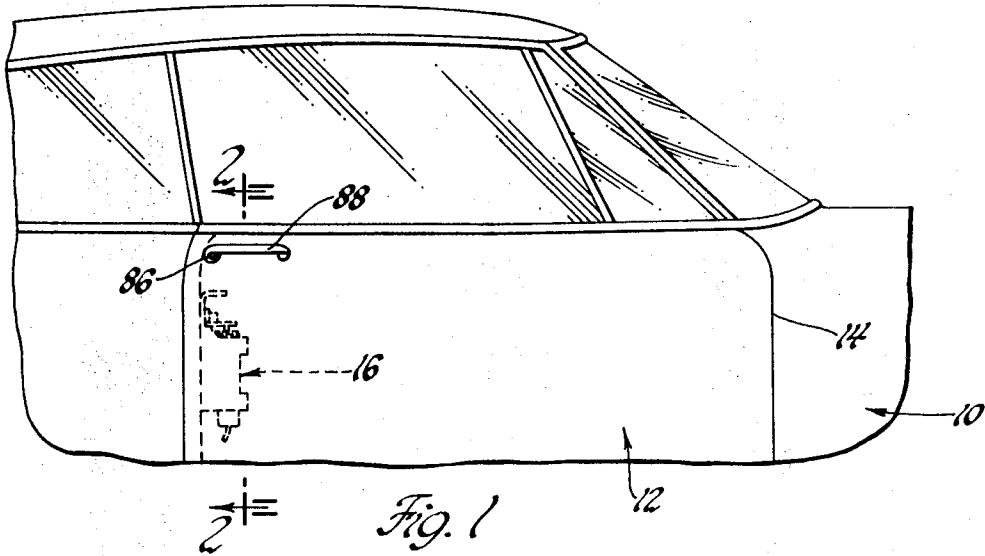


Fig. 3

Fig. 2

INVENTOR:
Wieslaw S. Zaydel
BY
Herbert Furman
ATTORNEY

Sept. 20, 1971

W. S. ZAYDEL

3,606,426

CLOSURE LATCH

Filed Jan. 19, 1970

2 Sheets-Sheet 2

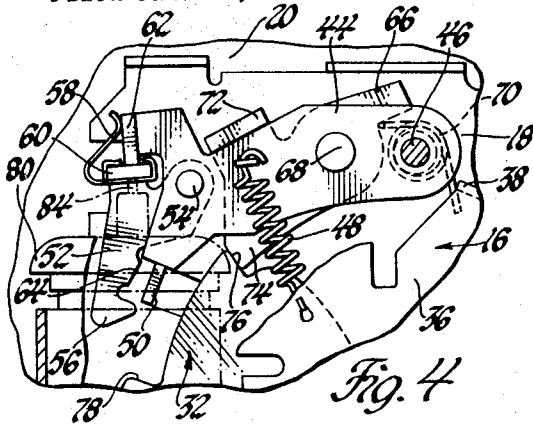


Fig. 4

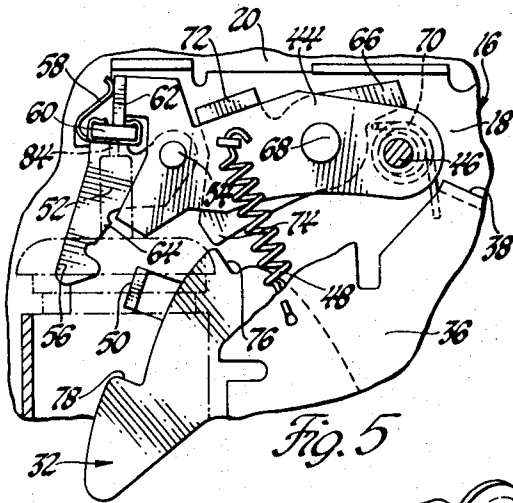


Fig. 5

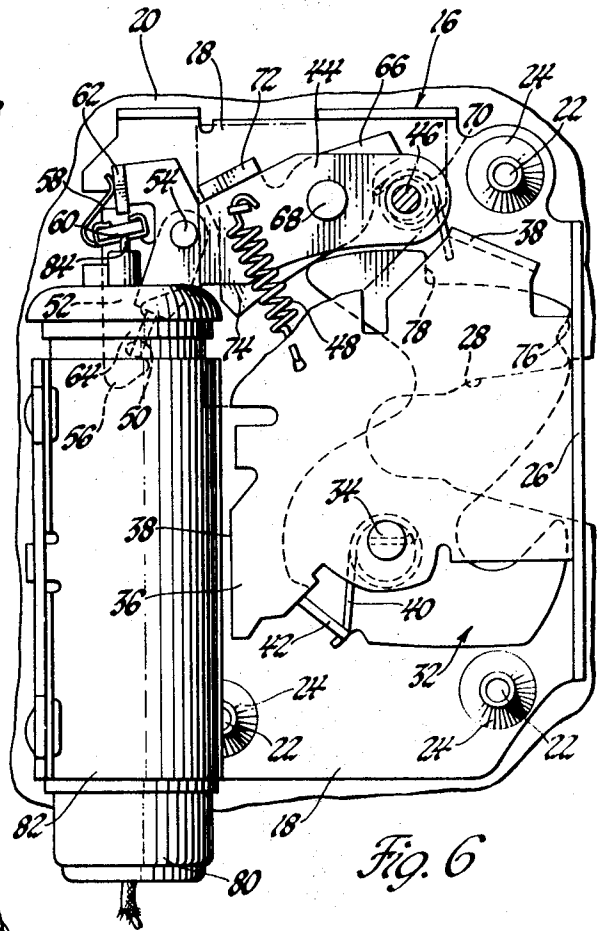


Fig. 6

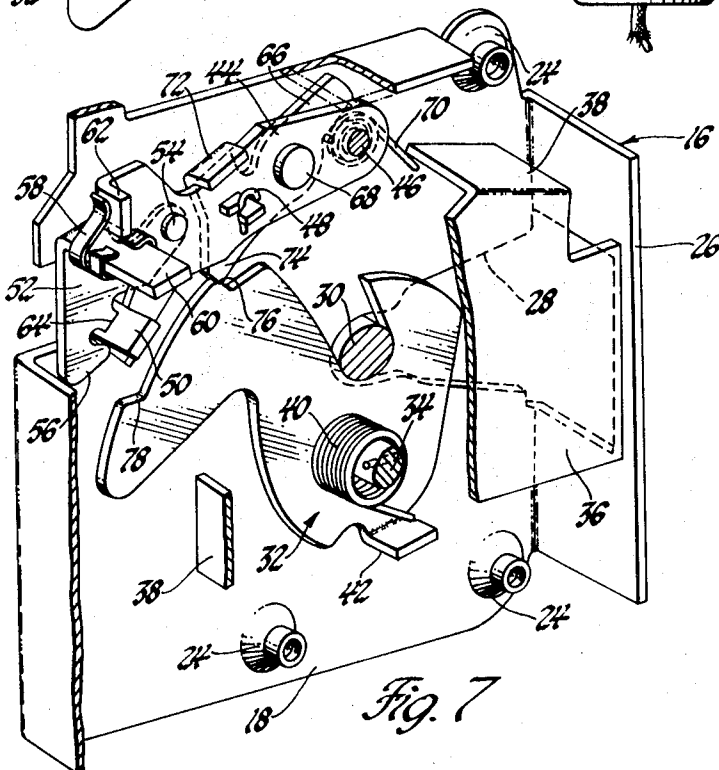


Fig. 7

INVENTOR.
Wieslaw S. Zaydel
BY
Herbert Furman
ATTORNEY

1

3,606,426

CLOSURE LATCH

Wieslaw S. Zaydel, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Jan. 19, 1970, Ser. No. 3,813
Int. Cl. E05c 3/26

U.S. Cl. 292—216

5 Claims

ABSTRACT OF THE DISCLOSURE

A vehicle body door lock includes a bolt pivotally mounted on a frame for movement between latched and unlatched positions and a detent carrier pivoted on the frame and carrying a pivoted locking member which is normally spring biased into engagement with a frame tab to lock the carrier against movement. A detent is pivoted to the carrier for unitary movement therewith and movement independently thereof. When the carrier is in locked position, a detent shoulder is normally located in the path of movement of a bolt shoulder to hold the bolt in latched position. A solenoid is operable to extend the armature thereof and engage the locking member to sequentially first release the locking member from engagement with the frame tab and then engage the locking member with the carrier to swing the carrier relative to the frame. The carrier moves the detent to a position wherein the shoulder thereof is out of the path of movement of the bolt shoulder to permit the bolt to move to unlatched position. When the solenoid is deenergized, a tension spring between the carrier and frame returns the carrier to its initial position and the locking member again engages the latch frame. The bolt shoulder ratchets past and into engagement with the detent shoulder when the bolt moves from unlatched to latched position. The detent moves independently of the carrier during such movement of the bolt, and the carrier remains locked to the frame.

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

One feature of the door lock of this invention is that it includes a detent movably mounted on a movable detent carrier which is normally locked to the latch frame to locate the detent in a first position in the path of the bolt and maintain the bolt in latched position, with the carrier being movable relative to the frame, after being unlocked therefrom, to locate the detent in a second position out of the path of the bolt to release the bolt for movement to unlatched position, and with the detent being movable independently of the carrier by the bolt to permit the bolt to ratchet past the detent as the bolt moves from unlatched position to latched position. Another feature is that the carrier mounts a locking member engageable with cooperating means on the frame to normally lock the carrier to the frame, and operating means for moving the carrier is sequentially operable to first move the locking member to an unlocked position and then move the carrier relative to the frame. A further feature is that the detent is pivoted to the carrier, and cooperating means on the detent and carrier normally locate the detent with respect to the carrier for unitary movement therewith and resist movement of the detent independently of the carrier. Yet another feature is that the carrier is normally biased to a position wherein the locking member is automatically engageable with the cooperating means on the latch frame and movement of the carrier after release of the locking member is resisted by this bias so that the carrier returns to its locked position when the operating means is released.

These and other features of the door lock of this inven-

2

tion will be readily apparent from the following specification and drawings wherein:

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

FIG. 2 is a partially broken away view taken generally along the plane indicated by line 2—2 of FIG. 1 and showing the bolt in latched position;

FIG. 3 is an enlarged sectional view taken generally along the plane indicated by line 3—3 of FIG. 2;

FIG. 4 is a partial view similar to FIG. 2 and showing the locking member released from the frame;

FIG. 5 is a partial view similar to FIG. 2 and showing the carrier moved relative to the frame after the locking member has been released;

FIG. 6 is a view similar to FIG. 2 showing the bolt in unlatched position; and

FIG. 7 is a partial perspective view.

Referring now particularly to FIG. 1 of the drawings, a vehicle body designated generally 10 includes a front door 12 which is conventionally hinged at its forward edge 14 to the body 10 for movement between a closed position, as shown, and an open position, not shown. The door 12 is latched to the body 10 in closed position by a vehicle body door lock 16 according to this invention.

As shown in FIG. 2, the lock includes a main frame 18 which bears against the inner surface of the rear or lock pillar wall 20 of door 12 and is conventionally secured thereto by a number of bolts 22 extending into tapped embossments 24 of the frame. The wall 20, the frame 18 and a side flange 26 thereof are cut out at 28 to allow passage of a conventional headed striker pin 30 into the door and main frame for engagement of the pin shank with the bolt in the latched position thereof. The striker pin 30 is conventionally mounted on the body lock pillar wall.

The bolt 32 is pivoted at 34 to the main frame 18 and to an auxiliary frame 36 which is located in spaced relationship to the main frame 18 by a number of lateral flanges or tabs 38 thereof staked within openings in the main frame. A coil torsion spring 40, FIG. 7, surrounds and has one end anchored to the pivot 34. The other end of the spring engages a notched lateral flange 42 of the bolt to continually bias the bolt clockwise from the latched position shown in FIGS. 2 and 7 to the unlatched position shown in FIG. 6.

A detent carrier 44 has a flanged end, FIG. 3, pivoted at 46 to the main frame 18. A tension spring 48 interconnects a lateral tab of the carrier and an opening in the frame 36 to continually bias the carrier 44 counterclockwise. The engagement of a foot of the carrier with a tab 50 of frame 18 locates the carrier against the action of spring 48. A locking member 52 is pivoted at 54 to the carrier 44 and includes a hook-shaped terminal 56 which is engageable with the lateral tab 50 of the frame 18 to lock the carrier 44 to the frame. A leaf spring 58 mounted on a lateral tab 60 of the locking member slidably engages a lateral tab 62 of the carrier to normally bias the locking member counterclockwise and engage terminal 56 with tab 50. The extent of engagement of the terminal 56 of the locking member with the tab 50 is controlled by the engagement of a lug or foot 64 of the locking member with the tab.

A detent 66 is pivoted at 68 to the carrier 44 and a coil torsion spring 70, surrounding the flanged end of the carrier, FIG. 3, has one leg thereof engaging an arm of the detent and the other leg thereof engaging a flange 38 of frame 36 to continually bias the detent counterclockwise of the carrier and resist clockwise movement of the detent independently of the carrier. The engagement of a lateral flange 72 of the detent with the upper edge of the carrier locates the detent with respect to the carrier.

3

The detent includes a foot or shoulder 74 which is engageable with either a shoulder 76 or a shoulder 78 of the bolt 32 to thereby respectively hold the bolt in either a fully latched position, as shown in FIGS. 2 and 7, wherein shoulder 74 engages shoulder 76, or an intermediate latched position, not shown, wherein shoulder 74 engages shoulder 78.

A conventional solenoid 80 is mounted on the frame 18 by means of a bracket 82. The armature 84 of the solenoid normally engages the undersurface of tab 60 of the locking member 52 when this member is in locked position, as shown in FIGS. 2, 6, and 7.

Although not shown, it will be understood that the solenoid 80 is connected in parallel across a source of power with conventional switch means located in the push button assembly 86 of a conventional outside door handle assembly 88, FIG. 1, and also with conventional manual or other switch means, not shown, located on the interior of door 12 and also on the interior of the opposite or left-hand door of the vehicle.

When it is desired to release the bolt 32 for movement from the latched position, shown in FIGS. 2 and 7, to the unlatched position, shown in FIG. 6, to permit movement of the door 12 to open position, the solenoid 80 is energized to extend the armature 84. When the armature is initially extended, it swings the locking member 52 slightly clockwise of the pivot 54 from its position shown in FIGS. 2 and 7 to its position shown in FIG. 4, against the action of spring 58. This releases the hook-shaped terminal 56 from the tab 50 and engages the tab 60 of the locking member with the tab 62 of the carrier 44. Upon further extension of the armature 84, the engagement of tabs 60 and 62 swings the carrier 44 clockwise of the pivot 46 against the action of the tension spring 48 and moves the detent 66 as a unit with the carrier from its position shown in FIGS. 2 and 7 to its position shown in FIG. 5, wherein the shoulder 74 is moved out of engagement with the bolt and out of the path of movement thereof. The spring 40 thereupon moves the bolt 32 to unlatched position shown in FIG. 6 as the door 12 moves to open position. Upon deenergization of the solenoid 80, spring 48 immediately returns the carrier 44 to its position shown in FIG. 6 wherein the locking member 52 is again locked to tab 50 by spring 58. The detent 66 moves counterclockwise with carrier 44.

Upon closing movement of the door 12, the engagement of the shank of the striker pin 30 with the leading edge of the bolt throat swings the bolt counterclockwise of the pivot 34. Since the detent 66 is mounted on the carrier 44 for movement independently of the carrier, the detent shoulder 74 will successively ratchet past the detent shoulder 78 and ratchet into engagement with shoulder 76 as the bolt moves from its unlatched position of FIG. 6 to its latched position of FIGS. 2 and 7. The bolt may likewise engage shoulder 78, as previously mentioned.

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

I claim:

1. A closure latch comprising, in combination, a support, a bolt mounted on the support for movement between latched and unlatched positions, detent carrier means movably mounted on the support, locking means normally maintaining the carrier means in a locked immovable position relative to the support, detent means mounted on the carrier means for movement therewith and movement independently thereof, means normally locating the detent means in a predetermined first position in the path of movement of the bolt in the locked position of the carrier means, means on the bolt engageable with the detent means in the first position of the detent means and the latched position of the bolt to hold the bolt against movement to unlatched position,

4

operating means for sequentially releasing the locking means and moving the carrier means relative to the support to move the detent means therewith from the first position thereof to a second position thereof out of the path of movement of the bolt and release the bolt for movement to unlatched position, and means returning the carrier means to the locked position thereof upon movement of the bolt to unlatched position to move the detent means from the second position thereof to the first position thereof, the bolt means and detent means being engageable with each other in the first position of the detent means upon movement of the bolt from unlatched to latched position to move the detent means independently of the carrier means from the first position thereof toward the second position thereof and permit movement of the bolt to latched position.

2. A closure latch comprising, in combination, a support, a bolt mounted on the support for movement between latched and unlatched positions, detent carrier means movably mounted on the support, locking means on the carrier means engageable with the support to maintain the carrier means in a locked immovable position relative to the support, detent means mounted on the carrier means for movement therewith and movement independently thereof, means normally locating the detent means in a predetermined first position in the path of movement of the bolt in the locked position of the carrier means, means on the bolt engageable with the detent means in the first position of the detent means and the latched position of the bolt to hold the bolt against movement to unlatched position, operating means for sequentially disengaging the locking means and moving the carrier means relative to the support to move the detent means therewith from the first position thereof to a second position thereof out of the path of movement of the bolt and release the bolt for movement to unlatched position, and means returning the carrier means to the locked position thereof upon movement of the bolt to unlatched position to move the detent means from the second position thereof to the first position thereof, the bolt means and detent means being engageable with each other in the first position of the detent means upon movement of the bolt from unlatched to latched position to move the detent means independently of the carrier means from the first position thereof toward the second position thereof and permit movement of the bolt to latched position.

3. A closure latch comprising, in combination, a support, a bolt mounted on the support for movement between latched and unlatched position, a detent carrier pivoted on the support, a locking member mounted on the carrier and engageable with the support to normally maintain the carrier in a locked immovable position relative to the support, a detent pivoted on the carrier for movement therewith and movement independently thereof, means normally locating the detent in a predetermined first position in the path of movement of the bolt in the locked position of the carrier, means on the bolt engageable with the detent in the first position of the detent and the latched position of the bolt to hold the bolt against movement to unlatched position, operating means for sequentially disengaging the locking member from the support and moving the carrier relative to the support to move the detent therewith from the first position thereof to a second position thereof out of the path of movement of the bolt and release the bolt for movement to unlatched position, and means returning the carrier to the locked position thereof upon movement of the bolt to unlatched position to move the detent from the second position thereof to the first position thereof, the bolt means and detent being engageable with each other in the first position of the detent upon movement of the bolt from unlatched to latched position to move the detent independently of the car-

5

rier from the first position thereof toward the second position thereof and permit movement of the bolt to latched position.

4. A closure latch as recited in claim 3 wherein resilient means rotatably bias the carrier in one direction relative to the support and into engagement with stop means mounted on the support, the locking member being engageable with the stop means to lock the carrier to the support against movement in an opposite direction relative thereto.

5. The combination recited in claim 3 wherein the locking member includes means engageable by the operating means for moving the locking member out of

6

engagement with the support, and the carrier includes means engageable by the locking member means upon disengagement of the locking member from the support to move the carrier relative to the support.

References Cited

UNITED STATES PATENTS

3,065,013	11/1962	Pickles	292—280
3,380,771	4/1968	Rogers, Jr.	292—201
3,386,761	6/1968	Johnstone et al.	292—201

RICHARD E. MOORE, Primary Examiner