Nov. 8, 1955 T. C. DINGMAN ET AL 2,723,146

DOOR LOCK

Filed Dec. 9, 1952

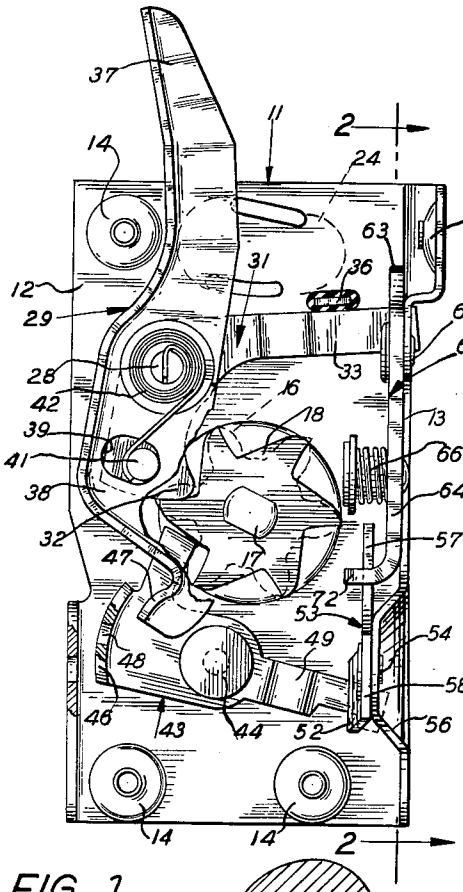


FIG. 1

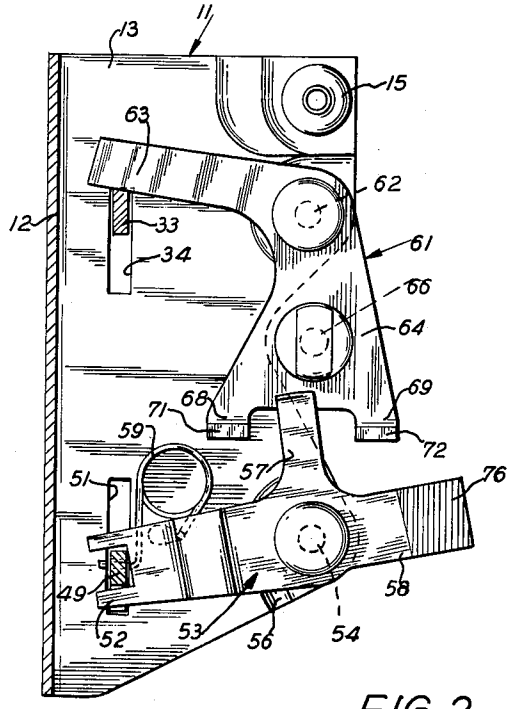


FIG. 2

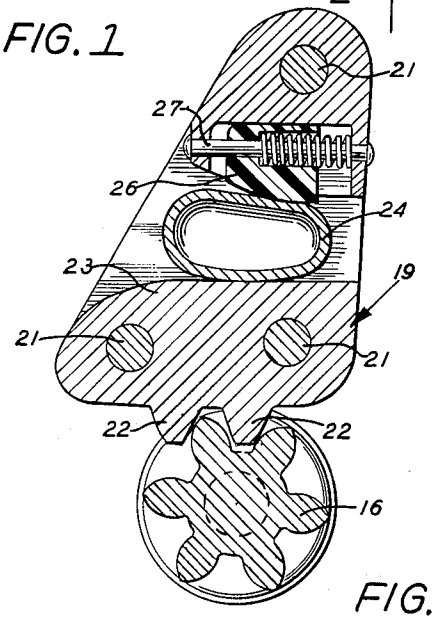


FIG. 3

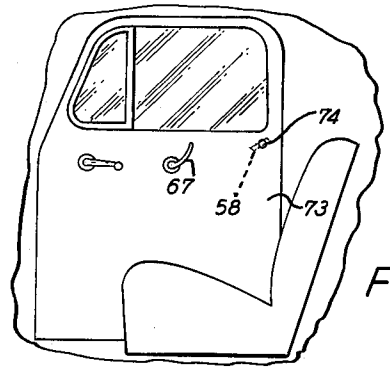


FIG. 4

T. C. DINGMAN
J. W. JAMIESON
INVENTORS

BY E. C. McRae
J. R. Faulkner
D. H. Oster
ATTORNEYS

United States Patent Office 2,723,146 Patented Nov. 8, 1955

2,723,146

DOOR LOCK

Thomas C. Dingman and John Werner Jamieson, Dearborn, Mich., assignors to Ford Motor Company, Dearborn, Mich., a corporation of Delaware

Application December 9, 1952, Serial No. 324,956

2 Claims. (Cl. 292—280)

This invention relates generally to latch mechanisms for doors and particularly to latch mechanisms of the rotatable bolt type for motor vehicle doors. This application is a continuation in part of applicants' copending application Serial No. 169,568.

An object of the invention is to provide an improved door latch mechanism of the type having a rotatable bolt and a rotatable ratchet controlled by means of a pivotally mounted pawl, the latter being engaged by a suitable actuating member to release the bolt from the associated keeper. A further object is to provide, in a door latch of this type, an inside remote control handle so connected to a lever associated with the latch mechanism that when operated in one direction the lever engages the pawl to release the latch and when operated in the opposite direction operates a locking lever to move the latter into blocking relationship with the actuating member to lock the latch mechanism.

A further object of the invention is to provide a lock of this type in whch simple and inexpensive means are provided to indicate to the driver of the vehicle the position of a locking lever so that he can readily ascertain at a glance whether or not the vehicle door is locked.

Other objects and advantages of this invention will be made more apparent as this description proceeds, particularly when considered in connection with the accompanying drawings, wherein:

Figure 1 is an elevational view looking toward the flange of the door lock case adapted to be mounted upon the door jamb.

Figure 2 is a sectional view taken on the plane indicated on the line 2—2 of Figure 1, and showing the lock mechanism as viewed from the exterior of the door.

Figure 3 is a cross sectional view taken through the keeper and the rotor and dovetail of the lock mechanism.

Figure 4 is an inside elevational view of a vehicle door incorporating the lock of the present invention.

The lock illustrated in the drawing is designed for the right front door of a motor vehicle. The left front door lock is identical except for being reversed. The lock mechanism is mounted upon an L-shaped mounting plate 11 having flanges 12 and 13 extending substantially at right angles to each other. The plate 12 is provided with 3 screw bosses 14 by means of which the mounting plate may be secured to the inner side of the jamb face of the door. The flange 13 of the plate extends along the inner side of the inner door panel, and is provided with a single screw boss 15 for attachment to the inner door panel.

The lock is provided with a rotatable toothed latch or rotor 16 having an integral shank 17 extending through the flange 12 of the mounting plate and supporting a rotatable toothed ratchet 18 for rotation with the rotor as a unit.

The rotor 16 is adapted to be engaged by a keeper 19 rigidly mounted uopn the adjacent door pillar by bolts 21. The lower edge of the keeper 19 is formed with teeth 22 adapted to mesh with the teeth of the rotor 16 to hold the vehicle door in either a locked or a safety position. The keeper is also formed with an inclined face 23 engaged by a sheet metal dovetail 24 riveted to the flange 12 of the mounting plate. A wedge 26 is slidably mounted upon a pin 27 carried by the keeper and engages the opposite side of the dovetail 24.

Referring now to Figure 1, a shoulder rivet 28 is

mounted upon the flange 12 of the mounting plate and forms a pivotal mounting for a release lever 29 and a pawl 31. The pawl 31 is formed with two generally radially extending arms 32 and 33. The downwardly depending arm 32 is engageable with the teeth of the ratchet 18 to hold the ratchet and rotor locked against rotation in a clockwise direction as viewed in Figure 1.

Arm 33 of the pawl extends generally horizontally and protrudes through a vertical slot 34, Figure 2, formed in the side flange 13 of the mounting plate 11. This arm is adapted to be engaged by means to be described hereinafter to permit the lock to be released by the operation of a handle located inside the door. A stop 36 is mounted upon the flange 12 of the mounting plate to limit the counterclockwise rotation of the pawl.

The upper end 37 of the release lever is adapted to be engaged by a conventional push button operator or by a suitable turn or pull type door handle (not shown). The lower end 38 of the release lever is formed with an elongated slot 39 through which extends a pin 41 carried by the lower arm 32 of the pawl 31.

A coil spring 42 is anchored at its inner end to the shoulder rivet 28 and at its outer end engages the pin 41 carried by the pawl to urge the latter in a counterclockwise direction against the stop 36. It will be apparent that clockwise movement of the release lever 29 against the action of coil spring 42 is effective to simultaneously rotate the pawl 31 in a clockwise direction to release the lower arm 32 of the pawl from engagement with the ratchet 18.

The latch mechanism is provided with a locking lever 43 pivotally mounted upon the flange 12 of the mounting plate by means of a pivot stud 44. The outer end of the locking lever 43 is formed with a generally vertical flange 46 adapted to interlock with the lower end of a flange 47 formed on the release lever 29. In the position shown in Figure 1, the flange 46 of the locking lever overlaps the flange 47 of the release lever and effectively prevents clockwise rotation of the latter under the actuation of the push button or outside door handle, thus holding the latch mechanism in its locked position.

The flange 46 of the locking lever is formed with an opening 48 to receive the usual crank arm provided at the inner end of an outside key actuated lock cylinder (not shown) to enable the locking lever to be swung in a counterclockwise direction to a position in which the flange 46 is beneath the flange 47 of the release lever so that the latter may be operated.

The locking lever 43 is formed with an inwardly extending arm 49 projecting through a vertical slot 51 formed in the flange 13 of the mounting plate 11. The arm 49 of the locking lever is arranged to be engaged by the bifurcated end 52 of an intermediate lever 53 pivotally mounted by means of a pivot pin 54 to a boss 56 formed on the flange 13 of the mounting plate. The intermediate lever 53 is also formed with arms 57 and 58 extending radially from the pivotal mounting for the lever. An over center spring 59 is mounted between the arm 49 of the locking lever and the flange 13 of the mounting plate to hold the locking lever 43 and the intermediate lever 53 in either their locked or unlocked positions.

A bell crank lever 61 is pivotally mounted upon the flange 13 of the mounting plate by means of a pivot pin 62. The upper arm 63 of the bell crank lever is adapted to engage the inwardly extending arm 33 of the pawl 31. The downwardly depending arm 64 of the bell crank lever 61 supports a stud 66 adapted to be conventionally connected by means of a link (not shown) to an inside remote control handle 67, Figure 4. It will be apparent that counterclockwise rotation of the bell crank lever 61 about its pivot pin 62, as viewed in Figure 2, is effective to engage the arm 63 of the bell crank lever with the arm 33

of the pawl 31 to move the latter out of locking engagement with the ratchet 18 and consequently to release the latch mechanism.

The lower end of the arm 64 of the bell crank lever 61 is bifurcated to form spaced flanges 68 and 69, the ends of which are bent at right angles to provide marginal tabs 71 and 72 respectively. It will be apparent that the aforesaid counterclockwise rotation of the bell crank lever 61 under the actuation of the inside door handle 67 engages the tab 71 with the upwardly extending arm 57 of the intermediate lever 53 to swing the latter in a clockwise direction from its locked position as shown in Figure 2 to an unlocked position. Simultaneously the locking lever 43 is swung from its locked position as shown in Figure 1 to an unlocked position in which the end flange 46 is moved out of locking position with respect to the flange 47 of the release lever 29. In the event the locking lever 43 and the intermediate lever 53 are already in their unlocked positions, the aforesaid operation of the bell crank lever 61 has no effect upon the positions of the locking and intermediate levers since the tab 71 on the bell crank lever will not in that case engage the upwardly extending arm 57 of the intermediate lever.

The tabs 71 and 72 formed at the lower end of the downwardly depending arm 64 of the bell crank lever 61 are spaced apart far enough to permit the intermediate lever 53 to be moved between its locked and unlocked positions without bringing the upwardly extending arm 57 thereof into engagement with either of the tabs until the bell crank lever 61 is moved in one direction or the other from its neutral position by means of the inside handle 67.

Operation of the bell crank lever 61 in the opposite or clockwise direction by means of the inner remote control handle 67 is effective to lock the latch mechanism. This is accomplished by engagement of the tab 72 of the flange 69 of the bell crank lever with the upwardly extending arm 57 of the intermediate lever to swing it in a counterclockwise direction as viewed in Figure 2 from its unlocked to its locked position. By reason of the interlocking engagement between the bifurcated end 52 of the intermediate lever and the inner arm 49 of the locking lever it will be seen that the locking lever 43 is simultaneously swung in a clockwise direction as viewed in Figure 1 to the locked position shown in that view. In the event the locking lever and intermediate lever are already in their locked positions this movement of the bell crank lever 61 will not alter their positions since the tab 72 will not in that case engage the arm 57 of the intermediate lever 53.

It will be noted that the intermediate lever 53 extends generally parallel to the flange 13 of the mounting plate 11 and consequently is also parallel to the inner panel 73 of the vehicle door. The flange 58 of the intermediate lever 53 extends beyond the flange 13 of the mounting plate so that there will be no obstructions between the flange 58 and the inner door panel 73, Figure 4.

Referring now to Figure 4, it will be noted that a small circular opening 74 is provided in the inner door panel 73 in alignment with the flange 58 of the intermediate lever 53 when the latter is in its locked position as shown in Figure 2. In this locked position, the flange 58 is thus visible through the opening 74 in the inner door panel and indicates to the vehicle operator that the latch mechanism is locked. When the intermediate lever 53 is swung to its unlocked position it will be apparent that the end 58 thereof will no longer be in alignment with the opening 74 in the inner door panel, and consequently will not be visible to the vehicle operator, thus indicating to him that the latch mechanism is unlocked.

To facilitate the observation of the flange 58 through the opening 74 in the door panel, the extreme end 76 of the flange of the intermediate lever is painted a bright and readily visible color. For example, it may be painted with a red fluorescent type paint so that the vehicle operator can by means of a quick glance tell whether the latch mechanism is locked or unlocked.

It will be understood that the invention is not to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of the invention, as defined in the appended claims.

What is claimed is:

1. In a latch mechanism for a vehicle door having an edge wall and an inner wall, a support having a first flange for disposition adjacent the edge wall and a second flange for disposition adjacent the inner wall of the door, a toothed rotor rotatably mounted upon said first flange at the outer side thereof, a toothed ratchet on the inner side of said first flange mounted for rotation with said rotor as a unit, a pawl pivotally mounted on the inner side of said first flange and having a downwardly depending arm engageable at its terminal end with said ratchet to hold said ratchet and rotor against rotation in one direction and a second arm extending at an angle to said first-mentioned arm, an outer manually operable lever pivotally mounted upon said first flange having a portion engaging the downwardly depending arm of said pawl, a locking lever pivotally mounted upon said first flange intermediate its ends and having a blocking portion at one end thereof selectively engageable with a part of said outer manually operable lever to block pivotal movement of the latter, an inner manually operable bell crank lever pivotally mounted upon said second flange and having an upper arm engageable with the second arm of said pawl to swing said pawl out of engagement with said ratchet upon rotation of said inner manually operable lever in one direction, said inner manually operable bell crank lever having a lower arm having laterally spaced projections at its lower end, and an intermediate lever pivotally mounted upon said second flange beneath said inner manually operable bell crank lever, said intermediate lever having a first arm projecting toward the other end portion of said locking lever and having a bifurcated end portion straddling said other end portion of the locking lever to compel simultaneous interrelated pivotal movement of said intermediate lever and said locking lever, said intermediate lever also having a second arm projecting upwardly therefrom between the laterally spaced projections on the lower arm of said inner manually operable bell crank lever to insure positioning of said locking lever in a location out of blocking engagement with said outer manually operable lever whenever said inner manually operable bell crank lever is operated to swing said pawl out of engagement with said ratchet.

2. The structure defined by claim 1 which is further characterized in that the first arm of said intermediate lever extends generally horizontally from the pivotal mounting of said lever, said intermediate lever also having a third arm projecting generally horizontally from the pivotal mounting of said intermediate lever in a direction opposite to said first arm, the end portion of said third arm of the intermediate lever being coated with a bright fluorescent coating, and the inner wall of the door being formed with an opening in alignment with said coated portion of the third arm of said intermediate lever when the interrelated intermediate and locking levers are in their locked positions so that said coated portion is visible through said opening to indicate that the latch mechanism is locked, said coated portion of the intermediate lever being spaced radially from the pivotal mounting of said intermediate lever so that said coated portion is moved out of alignment with said door opening when the intermediate and locking levers are moved to their unlocked positions.

References Cited in the file of this patent

UNITED STATES PATENTS

394,140	Spicer	Dec. 4, 1888
455,457	Beasley	July 7, 1891
2,646,300	Roethel	July 21, 1953