

Nov. 11, 1969

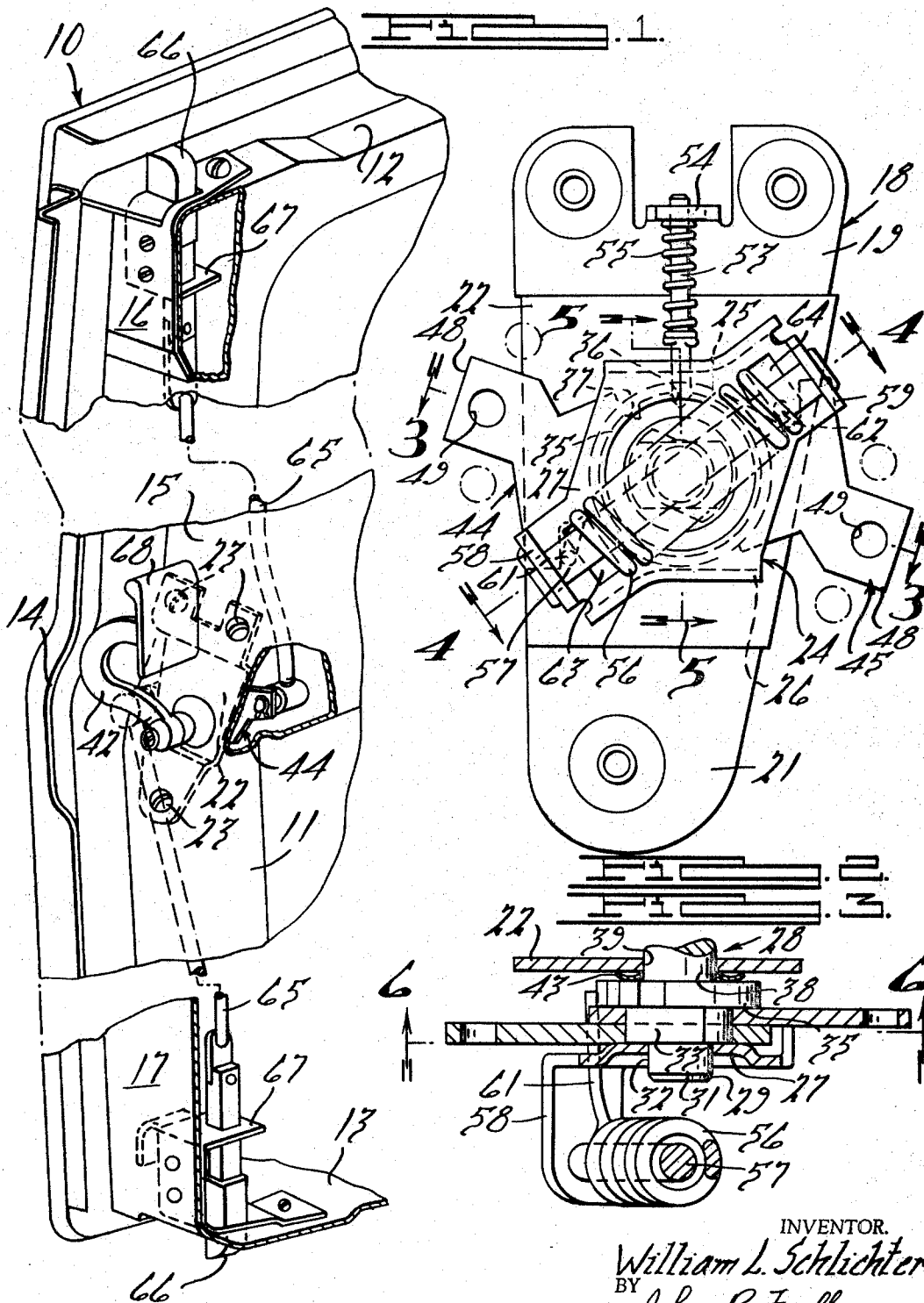
W. L. SCHLICHTER

3,477,753

LATCH MECHANISM

Filed April 13, 1967

2 Sheets-Sheet 1



INVENTOR.
William L. Schlichter
BY John R. Faulkner
John J. Roethel
ATTORNEYS

Nov. 11, 1969

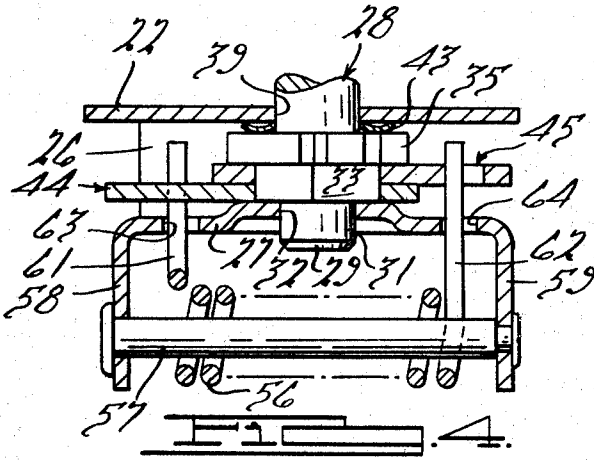
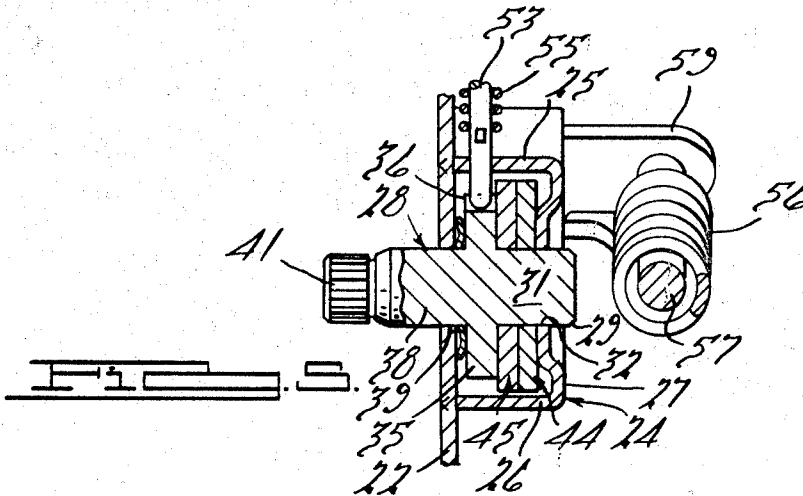
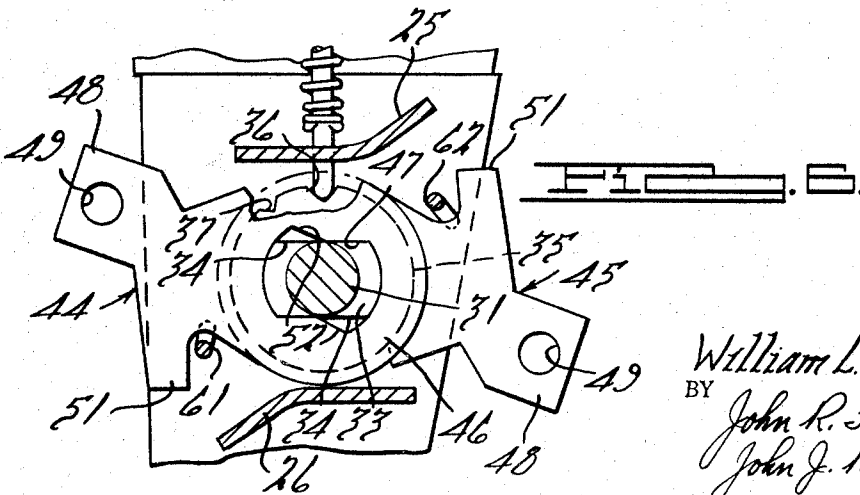
W. L. SCHLICHTER

3,477,753

LATCH MECHANISM

Filed April 13, 1967

2 Sheets-Sheet 2



INVENTOR.
William L. Schlachter
BY *John R. Faulkner*
John J. Roethel
ATTORNEYS.

1

3,477,753

LATCH MECHANISM

William L. Schlichter, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich., a corporation of Delaware

Filed Apr. 13, 1967, Ser. No. 630,669

Int. Cl. E05c 9/16, 1/12

U.S. Cl. 292—36

6 Claims

ABSTRACT OF THE DISCLOSURE

A latch mechanism for a vehicle body closure having a pivotally mounted retractor means coupled to a vertically extending bolt means. The bolt means normally projects beyond an edge wall of the door and the retractor means is movable in either of two directions. When the retractor means is moved in one direction, the bolt means is moved to a retracted or door unlatched position. When the retractor means is moved in the opposite direction, the bolt means is driven beyond its normal latched position into a deeper keeper device engaging position.

BACKGROUND OF THE INVENTION

One type of panel delivery truck currently being manufactured is provided with a pair of doors on the rear end, each one of the doors being suitably hinged to the rear body pillars at opposite sides of the body. No center pillar is provided against which the doors are latched since it is desirable that the widest possible opening be available for the loading and unloading of the cargo carried in the vehicle.

When the cargo doors are opened, they must be closed in the proper sequence since the free edge wall of one of the doors in effect provides the pillar against which the free edge wall of the other of the doors is latched.

In the current design, the door that must be closed first is provided with two vertically extending bolts one of which projects through the upper edge of the door structure and the other of which projects through the lower edge of the door structure for engagement with respective upper and lower keeper devices. The vertically projecting bolts are moved from retracted position into keeper engagement by actuation of a remote control handle located on the inner panel of the door, the remote control handle operating bell crank levers coupled to the bolts. The vehicle operator therefore must reach inside the vehicle and operate the remote control handle to drive the bolts into engagement with their respective keepers before the door can be held in its closed position. After the one door is secured to the body, then the second door may be slammed shut. The second door is provided with a spring loaded latch element extending from the free edge wall of the door into engagement with a keeper carried on the free edge wall of the first door. Because the latch element is spring loaded, the door will remain latched merely upon being slammed into closed position. The second door also is provided with vertically extending latch elements or bolts extending from the upper and lower edges of the door and driven into engagement with the keeper devices carried above and below the door by actuation of a latch mechanism including a handle accessible from the outside of the door and rotatable to drive the latch bolts into latching engagement with their keeper devices.

The fact that the first door does not have a slam latching feature has been found to be a matter of some inconvenience. The driver may want to close the cargo doors while he is making a delivery. If his arms are full, however, he must put down his load in order to

2

free one hand for the purpose of driving the bolts of the first door into latching engagement with the respective keeper devices before he can slam the second door into latching engagement with the first door.

It is an object of the present invention to provide a simple latch mechanism which will enable the first door to be slammed shut and retained in latched position without manipulation of the inside door handle.

SUMMARY OF THE INVENTION

The present invention relates to a latch mechanism for a closure swingably mounted on a vehicle body for movement between opened and closed positions. The latch mechanism comprises a support plate mounted on the closure and having at least one substantially vertically extending bolt means. This bolt means normally extends a predetermined distance beyond an edge wall of the closure into keeper device engaging position to hold said closure in closed position. A retractor means is pivotally mounted on the support plate for movement in either of two directions. The retractor means is coupled to the bolt means for causing retraction of the latter to a closure unlatched position upon pivotal movement of the retractor means in one direction. Upon release of the retractor means, the bolt means returns to its position to project beyond the edge wall of the closure. If the door is swung shut, the end of the bolt means will override the keeper device and drop into latching position so that the door will remain closed. If the retractor means is moved from its normal at rest position in a direction opposite to the direction for causing retraction of the bolt, the retractor then drives the bolt further beyond the edge of the door structure from which it normally projects into a deeper keeper device engaging position, thus making it more difficult for anyone to jimmy the door open by inserting a tool between the end of the bolt and the end wall of the keeper recess in which the latter is received.

The restoration of the bolt means and the retractor to their normal position in which the bolt means projects a predetermined distance beyond the door edge is preferably accomplished by means of a restoring spring which is placed under a load any time the retractor means is actuated to move the bolt means to unlatched position.

DESCRIPTION OF THE DRAWING

Other objects, advantages and features of the present invention will be made more apparent as this description proceeds, reference being had to the accompanying drawings, wherein:

FIG. 1 is a fragmentary perspective view, with some parts cut away, of a cargo door for a panel type delivery van having a latch mechanism embodying the principles of the present invention;

FIG. 2 is a plan view of the latch mechanism as it appears looking towards the free edge wall of the door from inside the door structure;

FIG. 3 is a sectional view taken substantially on the line 3—3 of FIG. 2;

FIG. 4 is a sectional view taken substantially on the line 4—4 of FIG. 2;

FIG. 5 is a sectional view taken substantially on the line 5—5 of FIG. 2; and

FIG. 6 is a sectional view taken substantially on the line 6—6 of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings there is illustrated, by way of example, a preferred embodiment of the present invention as applied to the cargo door 10 of a panel delivery truck or similar type vehicle. The cargo door 10 has a rather wide free edge

wall flange 11 and upper and lower edges 12 and 13, respectively. The flange 11 is inwardly offset from the perimetrical edge 14 of the door in the vertical center area 15 to a somewhat greater extent than it is at the top and bottom sections 16 and 17, for a reason to become apparent.

The latch mechanism embodying the present invention is generally designated 18 and comprises a substantially triangular plate 19 except that its apex end 21 is rounded off. The plate 19 has an offset center section 22 and is adapted to be mounted on the inside of the door flange 11 with the offset center section 22 raised from the inner face of the flange 11. The latch plate is adapted to be secured to the door flange 11 by bolts 23.

There is mounted on the offset center section 22 of the plate 19 an irregularly shaped housing 24. The housing 24, as viewed in FIGS. 2 and 5, has flanges 25 and 26 and a plate portion 27. The flanges 25 and 26 are staked or welded to the section 22 of the main plate 19 and the plate portion 27 is in substantially parallel relationship to the plate section 22.

Between the parallel plate sections 22 and 27, there is journaled a shaft 28. The shaft 28 is a multi-purpose member having at one end 29 a cylindrical bearing portion 31 rotatably received in an aperture 32 in the housing plate section 27. Inwardly of the bearing portion 31 the shaft 28 has an elongated shoulder 33 having parallel flats 34 thereon. Inwardly of the flatted shoulder 33 the shaft 28 has a still greater diameter flange portion 35 having a pair of spaced V-shaped indentations 36 and 37, for a purpose to be explained. Outboard of the flange portion 35, the shaft 28 has a further bearing portion 38 journaled in an aperture 39 in the plate section 22 and terminating at its outboard end in serrations 41 adapted to receive an operating handle 42 (see FIG. 1). A Belleville spring 43 is inserted between the shaft flange 35 and the plate section 22 to take up any end play in the shaft 28.

Interposed between the flange 35 on the shaft 28 and the plate portion 27 of the housing are a pair of symmetrical levers 44 and 45. The details of the levers are best seen in FIG. 6.

Each lever 44, 45 has a circular plate portion 46 with a centrally located aperture 47 adapted to fit over the flatted shoulder portion 33 of the shaft 28. Each lever also has a radial extension 48 apertured at 49 and a lateral appendage 51. The apertures 47 in the circular plate portions 46 are in part complementary to the flatted shoulder portion 33 of the shaft 28 but are provided with diametrically laterally offset edge portions 52 so that the levers 44, 45 can move independently of the shaft 28 under certain conditions.

The indentations 36 and 37 in the periphery of the flange 35 on the shaft 28 are adapted to be engaged by a detent pin 53. The pin 53 extends between a tab 54 at the upper end of the latch mechanism plate 19 through an aperture in a flange 25 of the housing 24 into peripheral contact with the flange 35. The pin 53 is spring loaded by a compression spring 55, the spring 55 urging the pin in the direction of the peripheral surface of the flange 35. When the lower end of the pin 53 is positioned in either of the notches 36 or 37, it acts as a detent holding the shaft 28 against rotation until sufficient torque is applied to the shaft to overcome the resistance of the spring 55.

The latch mechanism 18 includes a second spring 56 which is supported on an elongated pin 57 that extends between two upwardly projecting tabs or flanges 58 and 59 which form an integral part of the housing 24. The spring 56 terminates at one end in an elongated leg portion 61 and at the other end in an elongated leg portion 62. The elongated end 61 projects through a slot 63 in the plate portion 27 of the housing 24 and the leg 62 projects through a slot 64 in the plate portion 27 of the housing 24. Each spring leg portion 61 and 62, respectively, is adapted to lie in abutting relation to an edge of the levers 44 and 45, respectively, as shown in FIG. 6.

Each lever 44, 45 is coupled by a rod or link 65 to 75

a substantially vertically extending slide bolt 66. As seen in FIG. 1, the upper bolt 66 projects through the upper flange 12 of the door 10 and the lower bolt 66 projects through the lower flange 13 of the door 66, each of the bolts being guided in suitable guide brackets 67 supported within the door frame structure.

As was described above, the latch mechanism is mounted on the inner side of the vertical free edge wall 11 of the door 10 with the serrated end of the shaft 28 projecting through the panel 11 to receive the handle 42. The handle 42 thus is located outside of the free edge wall 11 of the door 10, but because the panel 11 is set back from the peripheral edge 14 of the door the handle does not overhang the edge of the door.

For purposes of definition, the shaft 28 and the levers 44 and 45 mounted thereon may be defined as the "tractor means" of the latch mechanism embodying the present invention. It will be noted in FIG. 1 that when the latch mechanism is installed on the panel 11 the longitudinal axis of the levers 44, 45, which may be considered a line overlying the line 3-3 of FIG. 2, is substantially horizontal. The inclination of the latch mechanism on the panel 11 is not significant. The configuration of the door for which the latch mechanism embodying the present invention was specifically designed and some of the accessories installed therein required the particular angular relationship shown.

OPERATION

The operation of the latch mechanism 18 embodying the present invention will be described particularly with reference to FIG. 2 which illustrates the parts of the latch mechanism in what might be considered a normal door latched position. That is, each of the bolts 66 project a predetermined distance above the upper and lower edges of the door as defined by the flanges 12 and 13. This position of the latch bolts 66 can be obtained whether the cargo door is in an opened or closed position.

If it is assumed that the cargo door is in an opened position, and the cargo door is then forcibly moved or slammed to a closed position, the following interaction occurs:

The bolts 66 will engage keeper devices carried on the door frame members defining the body opening in which the door fits. The bolts 66 then will be forcibly retracted into the door. The upper bolt 66 will be forced downwardly and this downward movement will be transmitted through the rod 65 to the lever 44 causing the latter to be swung in a counterclockwise direction as viewed in FIG. 2. Simultaneously, the lower bolt 66 will be forced upwardly and this upward movement will be transmitted through the rod 65 to the lever 45 causing it to be swung in a counterclockwise direction as viewed in FIG. 2. Because of the offset 52 in the lever apertures 47, movement of the levers will not be transmitted to the shaft 28. The levers 44 and 45 will, however, abut the respective extensions 61 and 62 of the spring 56 causing the spring to be wound up. As soon as the bolts 66 are in alignment with the respective apertures in the coacting keeper devices (not shown), the spring 56 through its extensions 61 and 62 will drive the levers 44 and 45 in a clockwise direction and this clockwise movement of the levers will be transmitted through the rods 65 to the respective bolts 66 forcing the latter outwardly from the door flanges 12 and 13. The cargo door thus may be slammed shut and the spring loading of the bolts 66 will result in the door being held in a latched position.

If the vehicle operator now wants to make certain that the door is even more securely latched, he may by pushing on the paddle 68 of the handle 42 cause the shaft 28 to be rotated in a clockwise direction as viewed in FIGS. 2 and 6 against the resistance of the detent pin 53 until the lower end of the detent is shifted from the notch 36 to the notch 37. Movement of the shaft 28 in a clockwise direction also results in movement of the levers 44 and 45 in a clockwise direction as viewed in FIGS. 2 and 6.

5

This movement of the levers results in the rod 65 urging the bolts 66 outwardly from the end walls 12 and 13 of the door into deeper keeper engaging position. It will be noted that the levers 44 and 45 are moving away from the ends 61 and 62, respectively, of the spring 56. The ends 61 and 62 of the springs cannot follow the levers because they are held by abutment with the edges of the slots 63 and 64, respectively, in the housing 24. This intentional overtravel of bolts 66 into engagement with their respective keeper devices ensures that the cargo door will remain latched even under the most severe deflections that the door frame members might incur when the vehicle is traveling over extremely rough roads. It also makes it more difficult for a tool to be inserted under the ends of the bolts to force them in an opening direction.

To unlatch the cargo door from the condition in which the latch bolts 66 are in their deepest keeper engaging position, i.e., a position corresponding to the detent pin 53 being in engagement with the recess 37 in the periphery of the flange 35 of the shaft 28, it is only necessary for the vehicle operator to grasp the paddle 68 of the handle 52 and pull it inwardly so as to cause the shaft 28 to rotate in a counterclockwise direction as viewed in FIGS. 2 and 5. Sufficient force must be exerted on the handle to overcome the resistance of the spring 55 holding the detent pin 53 in the recess 37. The force exerted does not have to overcome any resistance resulting from the spring 56 since ends 61 and 62 of the latter are out of engagement with the respective levers 44 and 45. As the shaft 28 is rotated to cause the detent pin 53 to move out of engagement with the recess into engagement with the recess 36, the bolts will be partially retracted from their deepest keeper engaging device position. Continued movement of the shaft 28 in a counterclockwise direction, as viewed in FIGS. 2 and 5, results in the levers 44 and 45 continuing their counterclockwise movement but they now will pick up the ends of the spring 56, forcing these ends 61 and 62, respectively, to move in a direction to cause the spring 56 to be wound tighter about its supporting pin 57. As the levers 44 and 45 move under the urging of the handle 42 against the resistance of the spring 56, the bolts 66 will be retracted to a position in which they are disengaged from the keeper devices and the cargo door may be swung open. As soon as the vehicle operator feels the door being released, the natural tendency will be to stop pulling on the paddle 68 of the handle 42. As soon as the handle 42 is released, the energy stored in the spring 56 as a result of it being wound tighter will be transferred through its end portion 61 and 62 to the respective levers 44 and 45 urging the latter in a clockwise direction, as viewed in FIGS. 2 and 5. The detent pin 53 will drop into the recess 36 and the bolts will be in their normal extended position relative to the end walls 12 and 13 of the door in position to act as slam latches the next time the door is slammed shut.

It will be understood that this 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.

I claim:

1. In a vehicle body having a closure swingably mounted thereon for movement between opened and closed positions,
 - a latch means comprising a support plate mounted on said closure and having at least one substantially vertically extending bolt means,
 - said bolt means normally extending a predetermined distance beyond an edge wall of the closure into a keeper device engaging position to hold said closure in closed position,
 - retractor means pivotally mounted on said support plate for movement in either of two directions,
 - said retractor means being coupled to the bolt means for causing retraction of the latter to a closure unlatched position upon pivotal movement of the retractor means in one direction,

6

said retractor means upon being pivotally moved in the opposite direction causing said bolt means to project further beyond said edge wall into a deeper keeper device engaging position,

spring means extending over said support plate having an end thereof projecting into the path of a part of said retractor means,

said spring means being engageable by said retractor means part upon pivotal actuation of the retractor means in latched bolt means retracting direction,

said spring means when engaged by said retractor means part being placed under load and being operative upon release of the retractor means to restore the latter and the latch bolt means to positions in which the latch bolt means extends its normal distance beyond the free edge wall of the door,

and stop means holding said spring means end out of engagement with said retractor means when the latter is pivotally actuated in the opposite direction to move said bolt means into deeper keeper device engaging position.

2. A latch mechanism for a closure swingably mounted on a vehicle body for movement between opened and closed positions,

the latch mechanism comprising a support plate mounted on the closure and having a pair of oppositely extending bolt means substantially paralleling a free edge wall of the closure,

said bolt means normally extending a predetermined distance beyond upper and lower edge walls of the closure normal to the free edge wall of the latter into keeper device engaging position to hold said closure in closed position,

retractor means pivotally mounted on said support plate for movement in either of two directions,

said retractor means comprises a pair of oppositely extending independently movable levers each of which is coupled to a respective bolt means for causing retraction of the latter to closure unlatched position upon pivotal movement of the retractor means in one direction,

said retractor means upon being pivotally moved in the opposite direction causing said bolt means to project further beyond said edge walls into deeper keeper device engaging positions, and

spring means extending across said support plate having each end thereof positioned to abut one of said levers upon movement of the retractor means in closure unlatching direction,

said spring means ends when abutted by said levers being loaded and operative upon release of the retractor means to restore the levers and the respective bolt means attached thereto to positions in which each latch bolt means extends its normal distance beyond the edge wall of the door through which it projects.

3. A latch mechanism according to claim 2, in which: a detent means is coupled to said retractor means to hold the latter either in nonretracted position of the bolt means or in the position in which said bolt means are caused to project deeper into keeper device engaging positions.

4. A latch mechanism according to claim 2, in which: the bolt means when extended normally beyond the edge wall of the door through which each projects with the door in opened position, and the door is then swung to a closed position in which the latch bolt means engage the respective keeper devices, being effective to drive the respective levers into engagement with the spring means,

said spring means upon alignment of the bolt means with the respective keeper devices being operative to restore the respective levers and bolt means to normal keeper engaging positions.

5. A latch mechanism according to claim 2, in which:

7

the spring means comprises a coil spring having at each end an extension projecting toward the support plate into position to be engaged by a respective one of the said levers,

said coil spring being supported on a bracket mounted on a support plate and a pin supported at each end on said bracket,

said pin projecting through the center of said spring.

6. A latch mechanism according to claim 5, in which: the projecting ends of said spring project through said slots in the bracket which permit engagement of the spring ends with the retractor means levers only

8

when the retractor means is actuated in door unlatching direction.

References Cited

UNITED STATES PATENTS

3,104,902	9/1963	Jaster	-----	292—36
3,362,740	1/1968	Burns	-----	292—34

MARVIN A. CHAMPION, Primary Examiner

ROBERT L. WOLFE, Assistant Examiner