

Sept. 14, 1943.

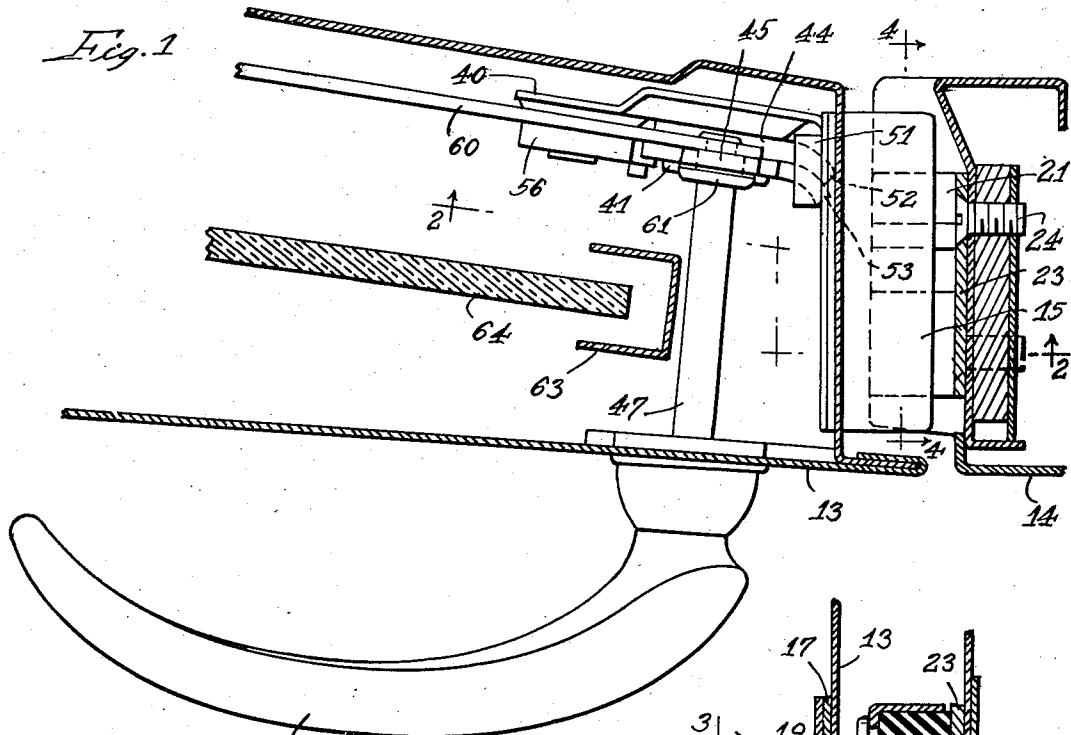
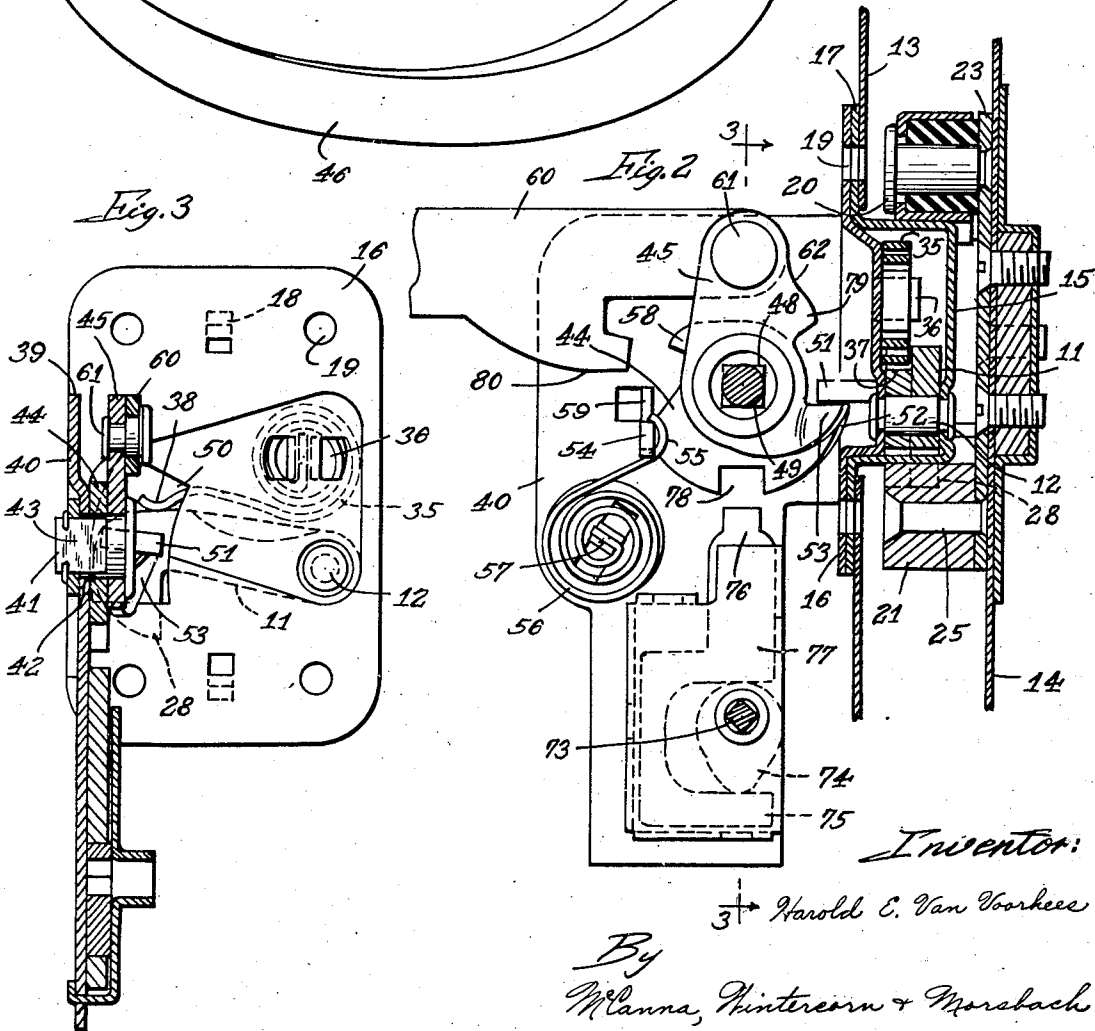
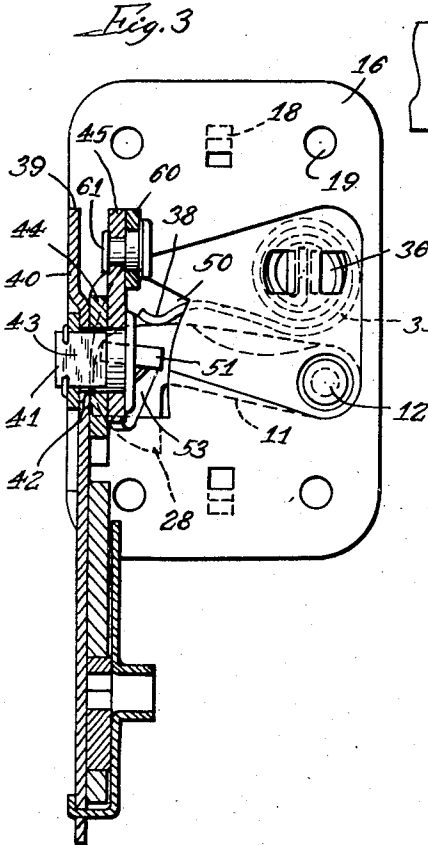
H. E. VAN VOORHEES

2,329,232

AUTOMOBILE DOOR LATCH MECHANISM

Filed Aug. 3, 1940

2 Sheets-Sheet 1



Inventor:

Harold E. Van Voorhees

By
McLanna, Hintereorn & Morabach
Attys.

Sept. 14, 1943.

H. E. VAN VOORHEES

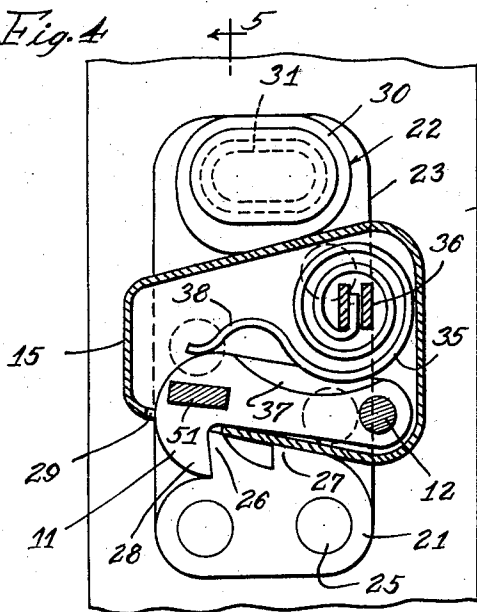
2,329,232

AUTOMOBILE DOOR LATCH MECHANISM

Filed Aug. 3, 1940

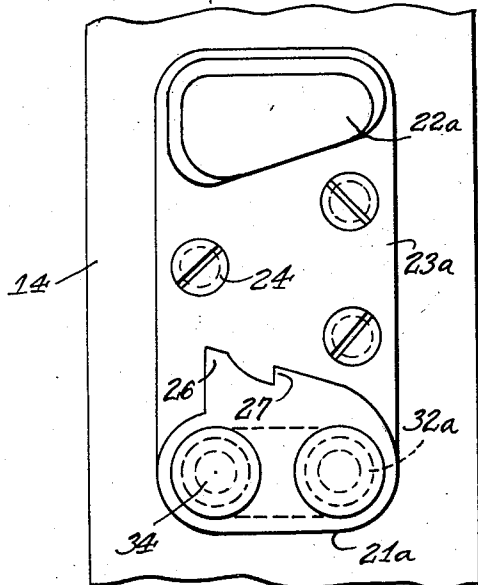
2 Sheets-Sheet 2

Fig. 4



5
7

Fig. 6



7

Fig. 5

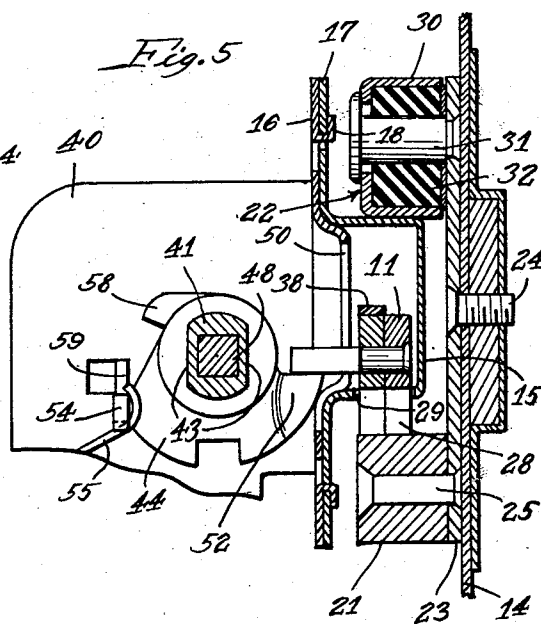
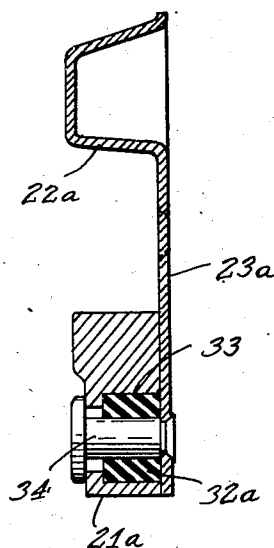


Fig. 7



Inventor:

Harold E. Van Voorhees

By

McLanna, Winterborn & Horebach

Attys.

UNITED STATES PATENT OFFICE

2,329,232

AUTOMOBILE DOOR LATCH MECHANISM

Harold E. Van Voorhees, Detroit, Mich., assignor to The Atwood Vacuum Machine Company, Rockford, Ill., a co-partnership composed of Seth B. Atwood and James T. Atwood

Application August 3, 1940, Serial No. 350,322

4 Claims. (Cl. 292-223)

This invention relates to a new and improved automobile door latch mechanism.

In my Patent 2,143,965, issued January 17, 1939, I disclosed a rotary type latch bolt arranged to operate in a substantially vertical plane between the edge of the door and the pillar, such operation having certain specified advantages over a horizontally operated bolt, among which may be mentioned that of providing ample travel for the bolt in locking and unlocking without interference with the adjacent channel for the glass run, another important advantage being that the opening up of the joint between the door and pillar, due to body distortion, does not affect the operation of this type of latch, whereas it presents serious difficulties where the bolt works horizontally. This previously patented door latch mechanism contemplated use thereof in connection with separate dovetails for insuring accurate location of the door within a small range measured vertically so that very little bolt travel is sufficient to latch the door properly. In the structure of my present invention door latching and dovetailing means are consolidated in a more compact structure, the latch mechanism of my invention being embodied in the dovetail.

In my previous patent, I also disclosed a pull type handle for operating the rotary latch bolt. However, rotary handles are in popular demand, and it is therefore the principal object of my invention to provide a simple and practical door latch mechanism of the kind mentioned arranged to be operated by means of a rotary type handle, the mechanism being so designed as to afford ample operating clearance relative to the adjacent channel for the glass run.

A salient feature is the compact mounting of two rotary plates on a mounting plate so as to afford ample clearance with respect to the channel for the glass run while at the same time simplifying the construction generally by enabling direct operation of the latch bolt by either of these parts, one of which is arranged to be turned by means of the rotary door handle and the other of which is arranged to be operated by the roll back link.

The invention is illustrated in the accompanying drawings, in which—

Fig. 1 is a horizontal section through a portion of an automobile door and pillar showing a latch and dovetail combination made in accordance with my invention;

Fig. 2 is a vertical cross-section on the broken line 2—2 of Fig. 1;

Fig. 3 is a vertical section in a transverse plane on the line 3—3 of Fig. 2;

Fig. 4 is a vertical sectional detail on the line 4—4 of Fig. 1;

Fig. 5 is a section in a plane parallel to Fig. 2 taken on the broken line 5—5 of Fig. 4, and

Figs. 6 and 7 are views of a modified or alternative construction of that portion of the dovetail applied to the door pillar, Fig. 7 being a sectional detail on the line 7—7 of Fig. 6.

Similar reference numerals are applied to corresponding parts throughout the views

Referring first to Figs. 1 to 5, the reference numeral 11 designates the spring-pressed rotary latch bolt pivotally mounted as at 12 on a horizontal axis for swinging movement in a vertical plane between the edge of the door 13 and the pillar 14. The stud providing the pivot 12 has upset ends serving to secure the dovetail shaped housing 15 to the back plate 16. The housing 15 is also secured to the plate 16 by its flange portion 17 through which lugs 18 on the plate 16 are entered and bent over, as indicated in Figs. 3 and 5. The two parts thus secured together are adapted to be riveted or otherwise suitably secured to the edge wall of the door 13, the holes 19 being provided for that purpose. The dovetail shaped housing 15 projects through the opening 20 in the edge wall of the door and is arranged to have wedging engagement between a striker plate 21 and a bumper 22 carried on a mounting plate 23 suitably secured, as indicated at 24, to the door pillar 14. The striker plate 21 is rigidly secured to the mounting plate 23 by rivets 25 and has two teeth 26 and 27 for cooperation with the tooth 28 of the latch bolt 11, that projects through an opening 29 provided in the bottom wall of the dovetail shaped housing 15. When the door is closed properly, the tooth 28 is engaged under spring pressure behind the tooth 26; the tooth 27 is merely a safety catch, such provision being well known in this art. The bumper 22 consists of a sheet metal wedge-shaped housing 30 fastened by means of rivets 31 to the mounting plate 23 with freedom for limited up and down as well as in and out movement parallel to the plate 13, under the restraint, however, of a rubber block 32 with which the housing 30 is filled, the block having a tight fit in the housing and around the stud 31. It is obvious, therefore, that when the door 13 is closed, the dovetail shaped housing 15, entering between the striker plate 21 and bumper 22, after the manner of the conventional dovetails of automobile doors, will accu-

ately locate the rotary latch bolt 11 with respect to the striker plate 21 and therefore insure proper latching of the door. The wedging action obtained, particularly with the yielding action of the rubber block 32 in the bumper 22, eliminates likelihood of the door rattling when the car is in motion, and also insures keeping the tooth 28 of the rotary latch bolt 11 properly engaged with the tooth 26 and the striker plate 21 at all times. Incidentally, the rubber block 32 has a tendency to silence the door closing operation considerably. It should also be clear from the description that regardless of the usual amount of body distortion and consequent opening of the gap between the door and pillar, the tooth 28 always maintains the same length of engagement in a vertical direction with the tooth 26 on the striker plate 21 and there is, therefore, no danger of accidental opening of the door like there is where the bolt is operated in a horizontal direction and the amount of engagement between the bolt and the striker plate varies according to the size of the gap between the door and pillar. The fact that the latching is done directly in the dovetailed portions on the door and pillar obviously further insures uniformly better results than could possibly be obtained otherwise, and it goes without saying that an appreciable saving in cost is realized by the embodiment of the latch mechanism in the dovetail since that makes the provision of a separate dovetail unnecessary.

If desired, a reverse arrangement of the striker plate and bumper may be provided, that is to say, I may have a striker plate yieldably mounted as shown at 21a in Figs. 6 and 7, whereas the bumper 22a is rigid, the same being in this case an integral projection from the mounting plate 23a. A recess 33 in the striker plate 21a provides space for the rubber block 32a, as shown in Fig. 7, the block fitting tightly within the striker plate and around the stud 34. As indicated in Fig. 6, there are two studs 34 in longitudinally spaced relation relative to the striker plate, and, of course, two rubber blocks 32a cooperating therewith. With this arrangement, the results are substantially the same as with the arrangement previously described.

The latch bolt 11 is urged toward engagement with the striker plate 21 by means of a spiral spring 35, the inner end of which is carried on a stud 36, the latch being cut away intermediate its ends, as at 37, to afford operating clearance for the spring, and the spring having its active outer end portion 38 bearing on top of the outer end of the latch bolt 11, as clearly appears in Figs. 3 and 4. The back plate 16 is bent at right angles, as at 39, to provide a flange extension 40 adjacent one end of the dovetail-shaped housing 15. A bushing 41 is rotatably mounted in an opening 42 in the extension 40 and has flats 43 milled thereon to provide an operating connection with a plate 44, whereas another plate 45 is freely rotatable on the bushing. A handle 46 rigidly secured to the outer end of a stem 47 has a square inner end portion 48 fitting in the square bore 49 of the bushing 41 so as to provide an operating connection between the handle 46 and the bushing 41, permitting rotation of the bushing as required in opening the door. A slot 50 is provided in the back plate 16, and a lug 51 projects laterally from the outer end of the latch bolt 11 through the slot for operation either by the tooth 52 on the plate 44 or the tooth 53 on the plate 45. The plate 44 has a lug 54 projecting therefrom against

which the active outer end 55 of a spiral spring 56 engages, said spring being mounted by its inner end on a post 57 carried on the extension 40. Another lug 58 is provided on the plate 44 in circumferentially spaced relation to the lug 54, and there is a lug 59 struck from the extension 40 alongside the plate 44 arranged to serve as a stop for engagement by the lug 54, the same engaging the lug 59 normally under spring pressure so as to hold the handle 46 approximately horizontal while the door is closed. The handle 46 in opening the door is operated so as to turn the plate 44 in a counterclockwise direction, as viewed in Figs. 2 and 5, whereby to raise the latch bolt 11, the opening movement of the handle being limited by engagement of the lug 51 on the latch bolt 11 with the upper end of the slot 50. The latch bolt 11 may also be operated from the inside of the door 13 by means of the usual handle (not shown), said handle having means for communicating reciprocatory movement to the link 60 that is pivotally connected at 61 to the arm 62 formed on the plate 45. It is obvious that when the link 60 is moved to the left in Fig. 2, the plate 45 is given a counterclockwise motion causing the tooth 53 to raise the latch bolt 11 by engagement with its lug 51, the plate 45 in this operation turning freely on the bushing 41 and accordingly not disturbing the plate 44 and the handle 46 connected therewith. It should be clear from this description that the present latch mechanism takes up very little room in the door and does not interfere with the channel 63 of the glass run, which is usually located quite close to the edge of the door, as indicated clearly in Fig. 1. The present design with the plates 44 and 45 operating in a plane parallel to the glass 64 and to the inner wall of the door requires only sufficient space between the channel 63 and the edge of the door for extension of the stem 47 from the handle 46 to the latch operating mechanism.

The door may be locked from the outside or the inside. At 73 is indicated a square shank rotatable with a key from the outside of the door when the proper key is entered in the lock (not shown). The shank 73 turns a cam 74 working in a yoke 75 of a bolt 76 slidably mounted in a casing 77. The bolt 76 is movable into and out of engagement in the notch 78 provided in the plate 44, whereby to prevent rotary movement of the part 44 by means of the related handle 46 and thus prevent opening of the door.

The inside operated lock comprises a tooth 79 on the plate 45 arranged in the rotary movement of said plate by means of its link 60 in the opposite direction from that used in opening the door to come into position over the lug 51 and thus provide a "kick-off" means which acts to automatically disengage the locking lug 80 from its locking position under lug 58. This eliminates the possibility of the driver leaving the key in the ignition lock and locking himself out of the car. To fully lock the car he has to operate shank 73 by key from the outside. Coincident with the movement of the tooth 79 into position over the lug 51 the locking lug 80 on the link 60 comes into position under the lug 58 and over the lug 59, whereby positively to prevent rotation of the plate 44 by means of the handle on the outside of the door and accordingly positively prevent opening of the door. The inside operated locking means is therefore equally as effective, if not more so, than the conventional outside locking means.

It is believed the foregoing description con-

veys a good understanding of the objects and advantages of my invention. The appended claims have been drawn to cover all legitimate modifications and adaptations.

I claim:

1. A door latch mechanism comprising a latching element, a spring tensioned retracting arm operatively associated directly with the latching element, an inside operated actuating lever also operatively associated directly with said latching element, said arm and lever being arranged in stacked relation, a common support for said arm and lever, a bushing pivotally mounted on said support to hold the arm and lever in stacked relation and pivotally mount the same on said support, said bushing having the arm non-rotatably fixed on the bushing and having the lever pivoted thereon, an inside operated link pivotally attached to said lever for operating the same, an outside operated member including a shank entered in said bushing to turn the same, and cooperating abutments on said arm and link to block movement of said member when said lever is turned in the reverse direction from that required to retract the latching element.

2. A door latch mechanism comprising a vertically oscillatable latching element spring pressed to move downwardly, a spring tensioned retracting arm operatively associated with the latching element for direct engagement therebeneath, an inside operated actuating lever also operatively associated with said latching element for direct engagement therebeneath, said arm and lever being arranged in stacked relation, a common support for said arm and lever, a bushing pivotally mounted on said support to hold the arm and lever in stacked relation and pivotally mount the same on said support, said bushing having the arm non-rotatably fixed on the bushing and having the lever pivoted thereon, an inside operated link pivotally attached to said lever for operating the same, an outside operated member including a shank entered in said bushing to turn the same, cooperating abutments on said arm and link to block movement of said member when said lever is turned in the reverse direction from that required to retract the latching element, and an extension on said lever movable into the path of movement of said latching element for direct engagement on the top thereof in the latter movement of said lever, whereby said latching element moves said lever out of blocking position when the door is slammed.

3. A door latch mechanism comprising a latching element, a spring tensioned retracting arm operatively associated directly with the latching

element, an inside operated actuating lever also operatively associated directly with said latching element, said arm and lever being arranged in stacked relation, a common support for said arm and lever, a bushing pivotally mounted on said support to hold the arm and lever in stacked relation and pivotally mount the same on said support, said bushing having the arm non-rotatably fixed on the bushing and having the lever pivoted thereon, an inside operated link pivotally attached to said lever for operating the same, an outside operated member including a shank entered in said bushing to turn the same, cooperating abutments on said arm and link to block movement of said member when said lever is turned in the reverse direction from that required to retract the latching element, and an abutment on said support for limiting the spring return of said retracting arm, said abutment being so disposed with respect to said lever and link to be engaged by the link when the lever is held in blocking position.

4. A door latch mechanism comprising a vertically oscillatable latching element spring pressed to move downwardly, a spring tensioned retracting arm operatively associated with the latching element for direct engagement therebeneath, an inside operated actuating lever also operatively associated with said latching element for direct engagement therebeneath, said arm and lever being arranged in stacked relation, a common support for said arm and lever, a bushing pivotally mounted on said support to hold the arm and lever in stacked relation and pivotally mount the same on said support, said bushing having the arm non-rotatably fixed on the bushing and having the lever pivoted thereon, an inside operated link pivotally attached to said lever for operating the same, an outside operated member including a shank entered in said bushing to turn the same, cooperating abutments on said arm and link to block movement of said member when said lever is turned in the reverse direction from that required to retract the latching element, an abutment on said support for limiting the spring return of said retracting arm, said abutment being so disposed with respect to said lever and link to be engaged by the link when the lever is held in blocking position, and an extension on said lever movable into the path of movement of said latching element for direct engagement on the top thereof in the latter movement of said lever, whereby said latching element moves said lever out of blocking position when the door is slammed.

HAROLD E. VAN VOORHEES.