March 10, 1959 H. THORNE 2,877,044

LATCHES OR LOCKS FOR DOORS

Filed Nov. 18, 1955 4 Sheets-Sheet 1

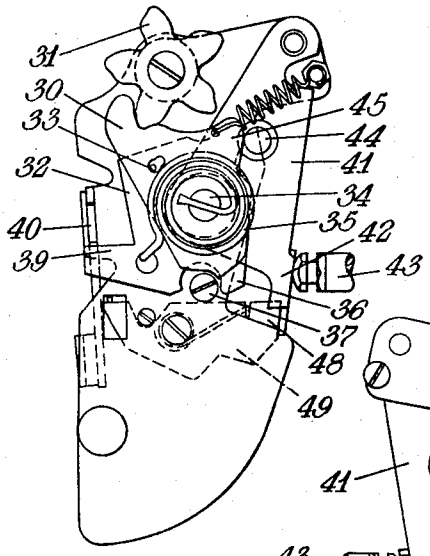


Fig. 1

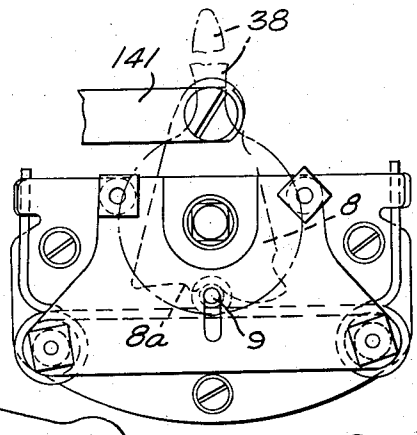


Fig. 8

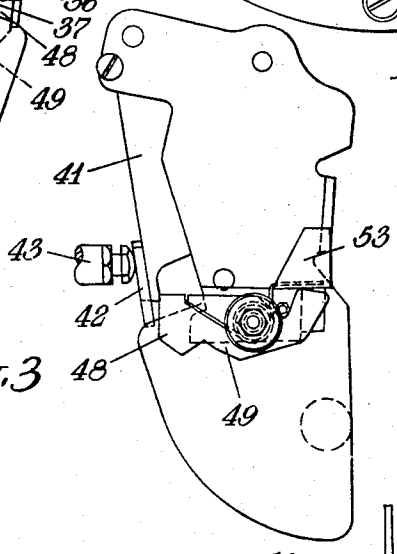


Fig. 3

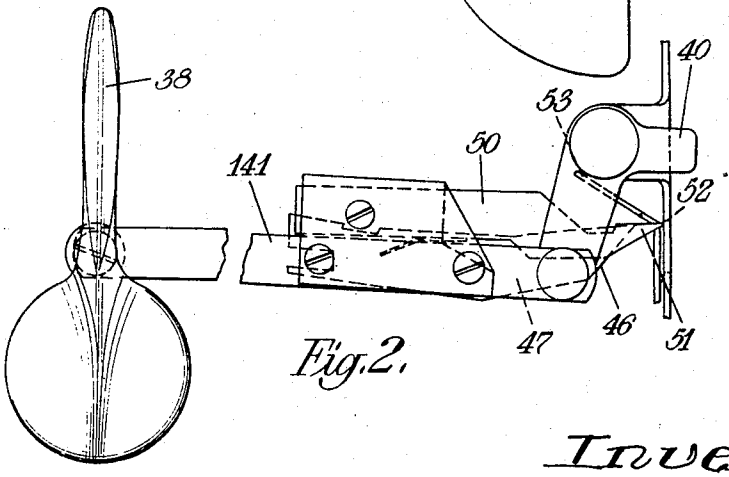


Fig. 2.

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LATCHES OR LOCKS FOR DOORS

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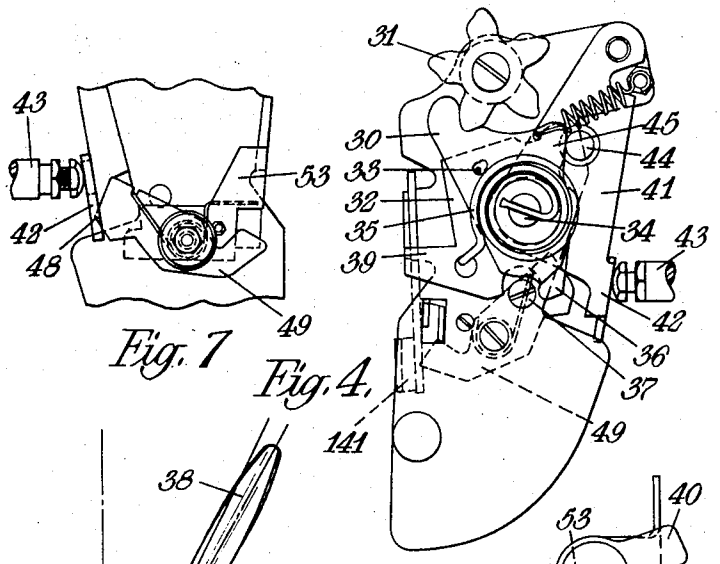


Fig. 7

Fig. 4.

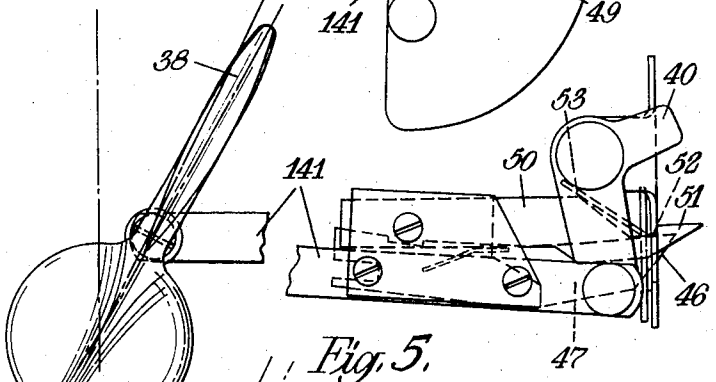


Fig. 5.

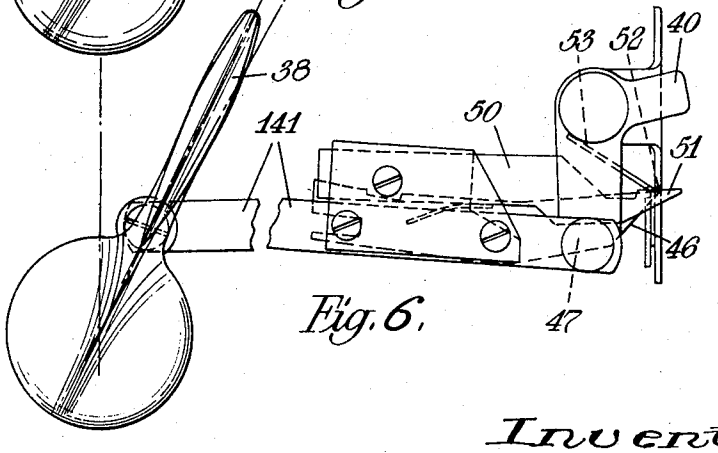


Fig. 6.

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LATCHES OR LOCKS FOR DOORS

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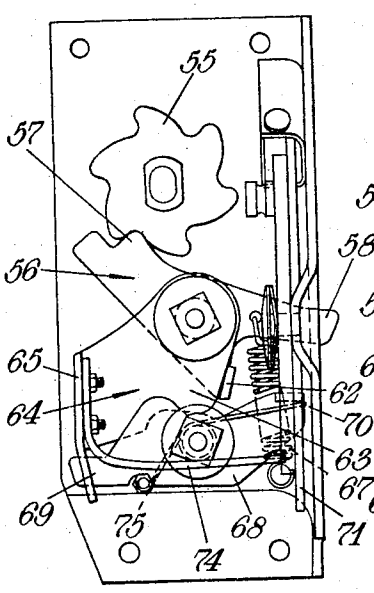


Fig. 9

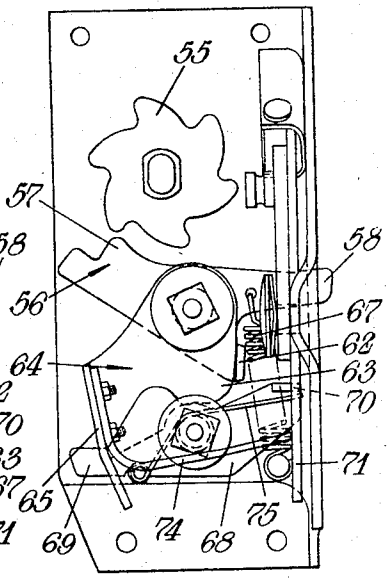


Fig. 10

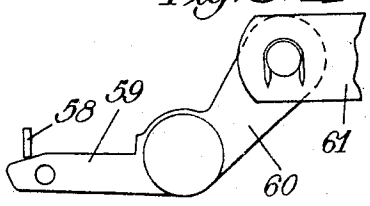


Fig. 11.

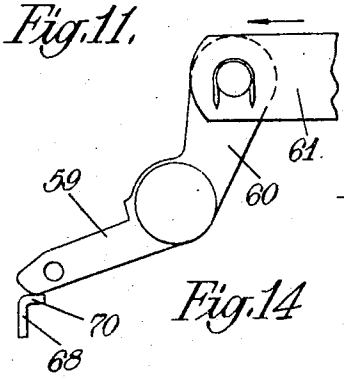


Fig. 14

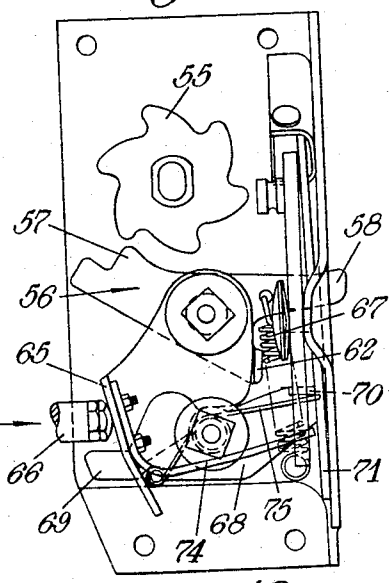


Fig. 12

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LATCHES OR LOCKS FOR DOORS

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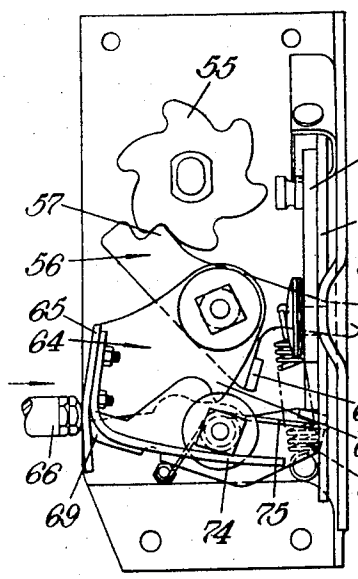


Fig.13

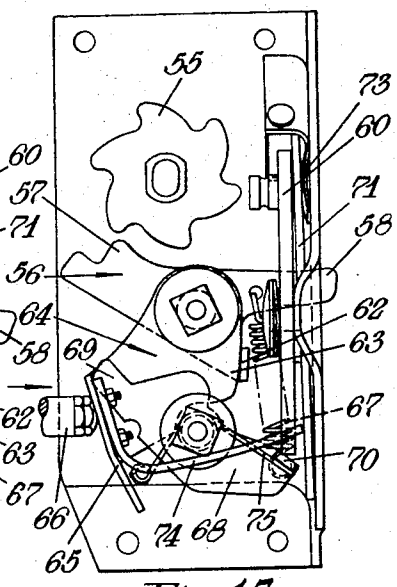


Fig.15

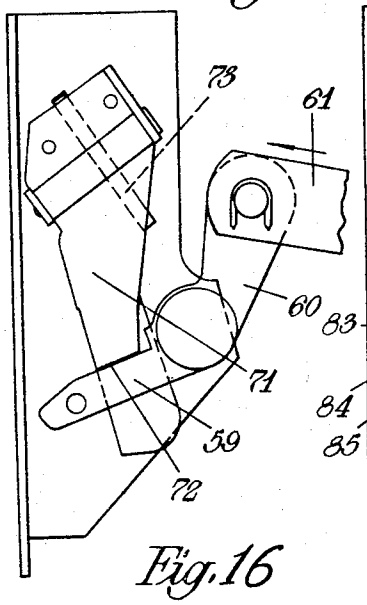


Fig.16

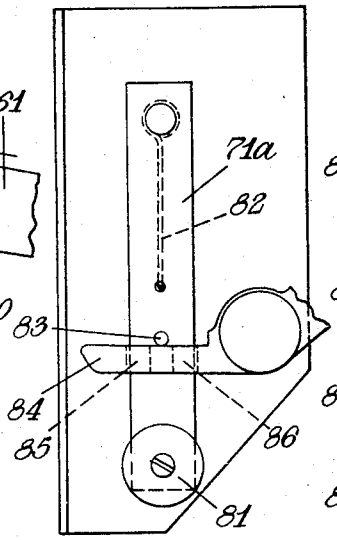


Fig.17

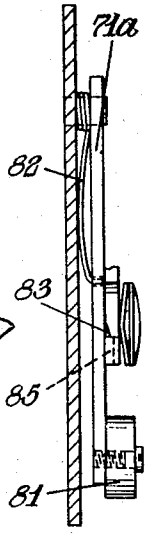


Fig.18

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United States Patent Office 2,877,044 Patented Mar. 10, 1959

2,877,044

LATCHES OR LOCKS FOR DOORS

Harold Thorne, London, England

Application November 18, 1955, Serial No. 547,620

Claims priority, application Great Britain November 26, 1954

6 Claims. (Cl. 292—280)

This invention relates to latches or locks for doors, and particularly for the doors of motor road vehicles, of the type in which the outer handle is fixed and the latch is actuated by means of a push-button incorporated in said handle, the latch from the inside of the vehicle being actuated by a lever handle.

The invention further relates to the type of latch which incorporates a rotary toothed catch which is released to permit the door to open by the operation of either the inner lever handle or the push-button of the outer handle.

An object of the present invention is to provide improvements in the latch mechanism whereby the latch may be deadlocked by the actuation of either the inner or the outer handle, release being effected by the outer or inner handle respectively.

A further object of the invention is to provide improvements whereby under actuation of the inner handle a "child-safety" deadlocking of the latch is effected which can only be released by actuation of the outer handle or push-button thereof.

Preferably the inner handle is coupled to the latch by link means giving a remote control of the latch by the inner handle.

The invention consists in a door latch, such as a latch for a road vehicle door and operable by an inner lever handle and an exterior push button, comprising a casing, rotary bolt means mounted on the casing, said bolt means having a concentric series of teeth, a pivoted spring biassed pawl plate engageable with said teeth to hold the bolt means in the locked condition, a displaceable member operatively connected to said pawl plate, operative coupling means between said displaceable member and the inner lever handle, a second displaceable member operatively connected to said pawl plate, operative coupling means between said second displaceable member and the push button, "child-safety" bolt deadlocking means, and operative coupling between said deadlocking means and said inner lever handle, the arrangement being such that the said deadlocking means are moved to the deadlocking position by a movement of the inner lever handle in a direction reverse to normal, release of said deadlocking means being effected only by the outer push button.

In the accompanying drawings:

Figure 1 is a view of a latch having a "child-safety" feature with the parts in the neutral position.

Figure 2 is a view showing the inner handle lever with associated parts for effecting a normal deadlock and a "child-safety" condition.

Figure 3 is a view of the latch from the opposite side to Figure 1.

Figure 4 is a view showing a "child-safety" deadlock operated from the inner handle.

Figure 5 is a view showing the inner handle and associated parts in position corresponding to Figure 4.

Figure 6 is a view of the inner handle and associated parts in the position for normal "deadlock."

Figure 7 is a partial view showing the deadlocking detent in position corresponding to Figure 6.

Figure 8 is a view of spring cam means for holding the inner lever handle in set positions and returning the handle when released.

Figure 9 is a view of a modified latch incorporating the "child-safety" feature, the parts being in the neutral position.

Figure 10 is a view showing the parts in position for release from the interior handle.

Figure 11 shows a part of the inner handle mechanism corresponding to Figure 10.

Figure 12 shows the parts in position for release by the outer press-button.

Figure 13 is a view showing the parts deadlocked by actuation of the inside handle.

Figure 14 being a part view of the inside handle means.

Figure 15 is a view showing the parts in position for release of the "child-safety" by the outside handle.

Figure 16 is a view showing the "child-safety" means.

Figures 17 and 18 are views of a modified form of the "child-safety" means.

Referring now to Figures 1–7, a pivotally mounted pawl plate 30 cooperates with the rotary catch 31. This plate is coupled to a second plate 32 by a pin 33, the plate 32 being mounted upon the pivot 34 and having a returning spring 35. The second plate 32 is provided with a projection 36 which engages a stop pin 37 when the parts are in their normal position.

The second plate 32 forms the operative member for normal release of the rotary catch member 31 when the inner lever handle 38 is actuated. For this purpose the plate 32 is provided with an arm 39 adapted to be moved downwardly by the arm 40 of a bellcrank lever which is connected to the link 141 coupling the bellcrank with the lever handle cam.

On the downward movement of the arm 40, the plate 32 is rotated and through the pin 33 causes a pivotal movement of the pawl plate 30 to release the rotary catch.

A further catch releasing plate 41 is pivotally mounted and has a flange 42 for engagment by the pin 43 of the outer handle press-button. This plate 41 is provided with a pin 44 engaging a projection 45 on the pawl plate so that on normal operation of the push-button, the plate 41 is pivoted and through the pin 44 actuates the pawl plate to release the rotary catch.

A spring biased detent 49 is pivotally mounted beneath the pawl plate and is adapted to be engaged by the inclined surface 46 on a finger 47 mounted on the link 141 whereby the detent is turned to a position in which the part 48 is moved to a position in front of the flange 42 on the plate 41 whereby movement of the latter by operation of the push-button to release the latch is prevented. This provides the normal deadlocking of the latch by the inner handle.

The link 141 also carries a pivotally mounted latch 50 which is spring biased to its latching position in which a tooth 51 engages a surface 52 on the lock casing.

The movement of the latch 50 to its operative position is effected by a turning of the inner handle lever to a "child-safety" lock position somewhat beyond the normal safety lock position. Such movement causes the end of the tooth 51 to ride down a guide plate 53 and pass through an aperture in the lock casing until the tooth engages the surface 52, whereupon further actuation of the inner handle lever is prevented. Such movement of the link 141 causes the inclined surface 46 on the finger 47 to provide a further rotation of the detent 49 so that it will now occupy a position in which the part 48 will be released by a further rotation when the press-button

is actuated to release the "child-safety" lock (see Figure 4.)

Release from the "child-safety" lock is effected by a pivotal movement of plate **41**, which, through the pin **44**, rotates the pawl plate **30**, which through pin **33** causes a rotation of plate **32** and a downward movement of the arm **39** thereof onto the tooth **51**, which is thus released from the shoulder **52**. At the same time, the flange **42** on plate **41** rotates the detent **49** whch returns to the normal deadlock position from which it is released when the inner handle is moved to its normal position.

The inner lever handle **38**, see Figure 8, is coupled to a rotary cam **8** which is connected by a remote control link **141** to the latch releasing member, the cam being provided with positioning depression **8***a* engageable by a spring biassed roller **9**.

According to a modification of the "child-safety" lock, see Figures 9–16, the rotary tooth latch **55** is controlled by a pivoted pawl **56** having latch engaging tooth **57** and an arm **58** adapted to be engaged by the arm **59** of a pivoted bellcrank lever **59**, **60**, connected by the link **61** to the inner handle whereby the pawl is pivoted to release the latch.

The pawl **56** is also provided with a bent-up projection **62** which is engaged by an arm **63** on the pivoted plate **64**. The plate **64** and pawl **56** are pivoted on the same axis. The plate **64** is provided with a part **65** at right-angles to the plate which forms a surface for engagement by the pin **66** of the outer press-button handle. On pressing said button the plate **64** is pivoted, and through the arm **63** and projection **62** the pawl **56** is pivoted to release the latch **55**.

A returning spring **67** brings the pawl **56** and plate **64** to their normal positions on returning the inner handle to the latching position or releasing the press button.

A release detent **68** is pivotally mounted below the pawl **56** and plate **64**. This detent has an arm **69** and a bent-over projection **70**. The projection **70** lies in the path of the arm **59** of the bell crank lever **59**, **60**.

When the inner handle is moved in the reverse direction to provide the normal deadlock condition, the arm **59** moves downwardly, see Figure 14, and engaging the projection **70** pivots the detent **68** to bring the arm **69** upwardly in the path of the part **65** of the plate **64**, see Figure 13, so that operation of the outer push-button to pivot the pawl and release the pinion is prevented.

It may be noted that the part **65** is cut away to accommodate the arm **69** for normal operation of the push-button.

A pivotally mounted locking plate **71** is mounted to lie in a plane at right-angles to the plane of the bellcrank lever **59**, **60**. This plate **71** is provided with a locking shoulder **72** which when the arm **59** is moved downwardly to the position shown in Figure 16, engages the arm and prevents its return movement. This locking engagement is effected by a movement of the plate **71** under the action of a spring **73**.

During the movement of the arm **59** to the "child-safety" lock position the detent **68** is pivoted to the position shown in Figure 15.

The movement of the arm **59** to bring in the "child-safety" deadlocking condition is effected by an additional reverse movement of the inner handle beyond the normal locking position, and when the handle is in the "child-safety" lock position it cannot be released except by actuating the outer push-button.

On the part **65** of the plate **64** a "child-safety" lock release arm **74** is mounted and extends across the lock to a position in which its free end may be brought into engagement with the locking plate **71**.

Upon actuating the press-button to release the "child-safety" lock the plate **64** is pivoted to the position shown in Figure 15 so that the end of the arm **74** pivots the locking plate **71** moving the shoulder **72** away from the arm **59** so that the inner handle is free to be moved to its normal position. During this pivotal movement of the plate **64** the detent **68** will pivot and move out of the way and on the push-button being released the detent **68** will be spring returned by spring **75** to its normal position.

According to a modification of the "child-safety" lock by which the lock may be automatically released upon impact of the car occurring so as to avoid the occupants being locked in the car, the locking plate **71***a* see Figures 17, 18 is constructed and mounted upon a pivot so that it may pivot sideways upon impact occurring by the car contacting an object or a following vehicle running into the back of the car. In either case the plate **71***a* will pivot by the inertia in the plate which is increased by the weight **81**.

The plate **71***a* is provided with a wire spring **82** which returns the plate back to its central position after pivotal movement in either direction. The spring is bowed so that it also returns the plate **71***a* after normal release by operation of the outer press button.

The plate **71***a* is provided with a bevelled locking pin **83** which allows the arm **84** of the bell crank to ride over the pin when moved to the "child-safety" position as shown.

The arm **84** is recessed at **85** and **86** so that the arm will clear the pin **83** upon impact occurring and move upwardly to the normal lock position by the action of the spring associated with the inner handle, whereupon the inner handle may be moved to the normal lock release position.

What is claimed is:

1. A door latch for a road vehicle of the type operable by an inner lever handle and by an exterior push button with the inner lever handle being spring biased to the latching position, comprising a casing, rotary bolt means mounted on the casing, a concentric series of teeth on the rotary bolt means, a pivoted spring biased pawl plate engageable with the teeth to hold the rotary bolt means in a locked condition, a first displaceable member operatively connected to the pawl plate, operative coupling means between the first displaceable member and the inner lever handle, a second displaceable member operatively connected to the pawl plate, operative coupling means between the second displaceable member and the push button, a pivoted detent, means associated with the inner handle and the detent for moving the detent to a position preventing the operation of the push button when the inner handle is moved to a thiefproof position, child safety inner handle locking means, operative coupling means between the inner handle and the inner handle locking means, with the inner handle locking means being moved to the locking position by the inner handle when the handle is moved to a position beyond the thiefproof position, said movement of the handle also moving the detent to a position allowing the actuation of the push button, and an operative coupling means between the push button and the inner handle locking means to release said locking means and permit the inner handle to return to the thiefproof position under spring action.

2. A door latch as claimed in claim 1 wherein the operative coupling means between the inner lever handle and the first displaceable member includes link means and the child safety inner handle locking means includes a latching element pivotally mounted on the link means, a spring biased tooth on the latching element, a surface on the door latch casing engageable by said tooth to lock the inner handle, and a part on the second displaceable member engageable with said tooth to release the tooth from said surface by operation of the push button.

3. A door latch as claimed in claim 2 wherein said casing is formed with a slot into which the tooth of the pivoted latching element projects, said slot having the surface for locking engagement by the tooth.

4. A door latch for a road vehicle of the type operated by an inner lever handle and by an exterior push button

with the inner lever handle being spring biased to the latching position, comprising a casing, rotary bolt means mounted on the casing, a concentric series of teeth on the rotary bolt means, a pivoted spring biased pawl plate engageable with the teeth to hold the rotary bolt means in a locked condition, a bell crank lever, link means coupling the inner handle with the bell crank lever, a part on the pawl plate engageable by an arm of the bell crank lever to pivot the pawl plate and release the bolt means, a pivoted plate operable by the push button, a projection on the pivoted plate engageable with the pawl plate for releasing the bolt means by operation of the push button, a pivoted spring biased latching plate, a shoulder on the latching plate engageable with an arm on the bell crank lever to effect a lock for the inner handle when the handle has been moved to a position beyond a thief proof position and an arm on the pivoted plate operable by the push button engageable with the latching plate to release the bell crank lever upon operation of the push button to permit the inner handle to return by spring action to a thief proof position.

5. A door latch as claimed in claim 4 wherein the latching plate is mounted on a pivot located at right angles to plane of the bell crank lever so that upon impact of the vehicle occurring, the latch plate may pivot to move the projection out of engagement with the bell crank and provide an automatic release of the inner handle.

6. A door latch as claimed in claim 5 wherein the latching plate carries a locking pin having an inclined surface over which the bell crank arm passes when the same moves to the inner handle lock position, and the spring means biasing the latching plate to return the plate to its locking position relative to the bell crank arm.

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