April 26, 1955 G. WARTIAN 2,707,124

LATCH MECHANISM

Filed Nov. 21, 1951

Fig. 1.

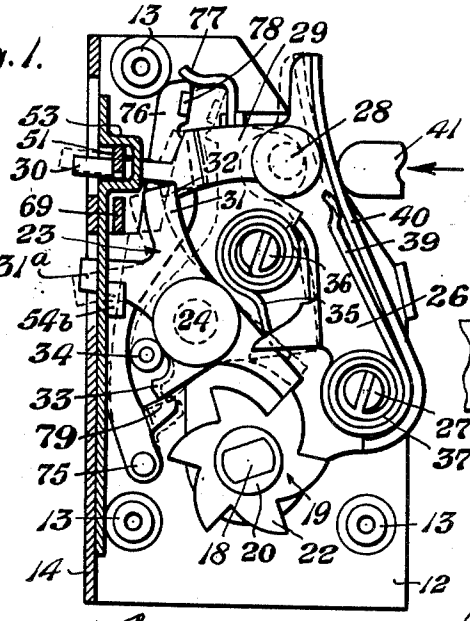


Fig. 4.

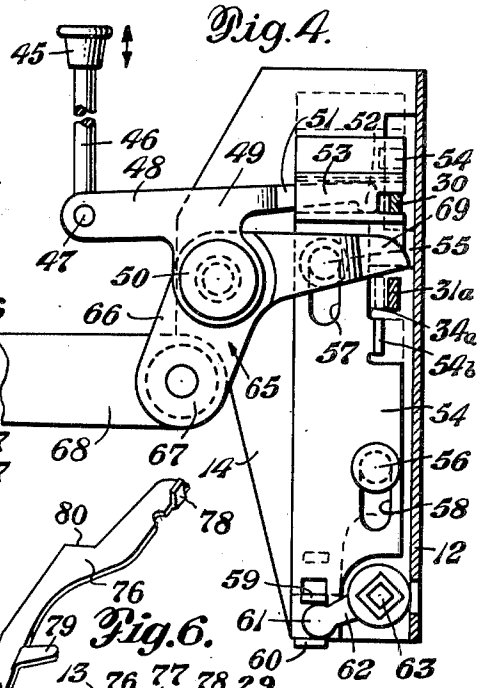


Fig. 6.

Fig. 2.

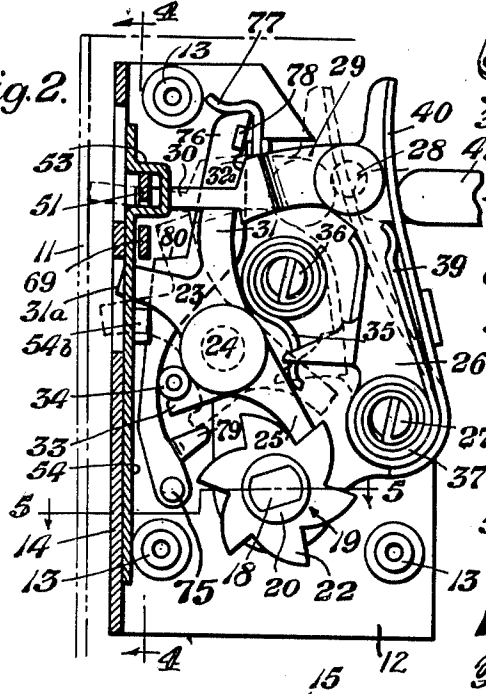


Fig. 3.

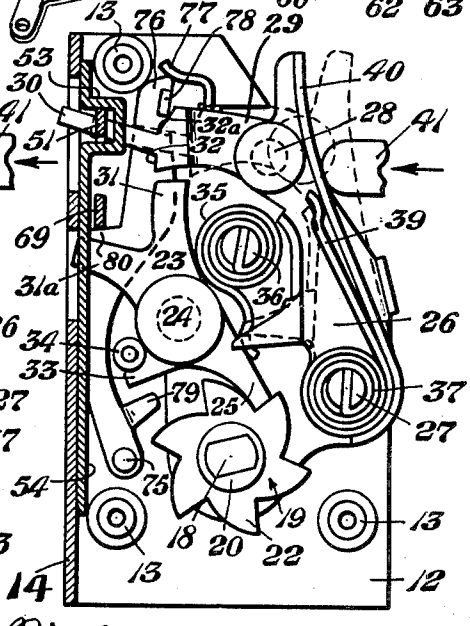
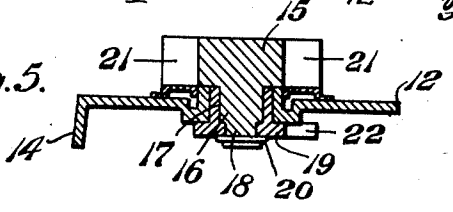


Fig. 5.



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LATCH MECHANISM

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6 Claims. (Cl. 292—280)

This invention relates to latch mechanisms for hinged doors, particularly automobile doors.

It is well known that automobile doors as at present made in the United States are locked from the outside by a key lock and are latched by a spring latch which is released by turning a handle or pressing a button on the outside. On the inside, these doors are usually locked by pushing a button or turning a handle. These locks for inside operation can invariably be released manually, which permits children to unlock the doors while the car is in motion, sometimes causing accidents. Also, a sudden stop of an automobile may pitch a passenger forward and in his helpless movement such a passenger may hit a door handle, thus opening the door and falling out of the car.

The principal object of my invention is to provide a safety attachment which will make it impossible to unlock from the inside a locked automobile door, while permitting release of the door from the outside by pushing a button or other operating element.

Other objects are to provide a safety attachment of the character indicated which is inexpensive to manufacture, easy to install, requires no substantial change in the conventional lock to which it is attached, is positive in operation, and will have a life as long as the lock itself.

The above and other objects are attained by the mechanism which is shown in the accompanying drawings as illustrative of numerous mechanisms embodying the invention.

In said drawings:

Fig. 1 is a fragmentary elevation of an automobile door lock, showing in dotted lines another position of certain parts;

Fig. 2 is a similar view showing the safety attachment in inactive position, also showing in dotted lines another position of certain parts;

Fig. 3 is a view like Fig. 2 but showing the safety attachment in active position;

Fig. 4 is a section on line 4—4 of Fig. 2;

Fig. 5 is a section on line 5—5 of Fig. 2; and

Fig. 6 is a detail in perspective of the safety latch element which is added to the lock.

Referring particularly to the drawings, I have shown a well known type of door lock particularly illustrated in the J. H. Roethel Patent No. 2,538,913, issued January 23, 1951, and only such parts as are necessary to an understanding of this invention are shown in the present drawings.

On the inner door panel **11**, which is partially shown in phantom, a case plate **12** is secured by screw bosses **13**. The case plate **12** terminates at its inner edge in a flange **14** facing the inner door panel **11**. The latch device further includes a rotatable toothed latch or bolt **15** positioned at the outer face of the case plate **12** and having an integral projecting shaft or shank **16** extending through an aperture in the case plate and having a bearing in the annular flanged edge **17** defining this aperture, while the inner end of shank **16** is flattened as at **18** and extends through a correspondingly shaped aperture in a rotatable toothed detent engaging member or ratchet member **19**. The bolt **15** and the ratchet member **19** are rigidly secured as by a lock washer **20** so as to turn together. The rotatable bolt **15** is formed with a number of radially projecting equally spaced teeth **21** so as to provide a gear type latch. The ratchet member **19** is also formed

with a number of teeth **22** which correspond in number to the teeth **21**. A four-armed detent **23** is pivotally mounted on a shoulder rivet **24** secured to the case plate **12**. Detent **23** includes a downwardly extending arm **25** which cooperates with the teeth **22** of the ratchet member **19** to hold the ratchet member and hence the bolt **15** locked against rotation in door releasing direction. Associated with the detent **23** is a detent-actuating lever **26** which is pivoted at its lower end upon a shoulder rivet **27** secured to the case plate **12**. Pivoted at **28** to lever **26** near the upper end thereof is a detent-operating link **29** having an extension **30** overlying and normally slidably engageable with the upper end of an upwardly extending arm **31** of detent **23**. Link **29** is formed on its lower edge with an abutment or shoulder **32** adapted to engage the upper end of the detent arm **31** when the link **29** is shifted inwardly by swinging lever **26** inwardly or to the left as the parts are viewed in Figs. 2 and 3.

Detent **23** further includes an arm **33** which engages a rubber bumper or stop **34** so as to silence impact of the detent arm **25** against the sides of the teeth **22** when the ratchet member **19** is rotated in a clockwise direction, as viewed in Figs. 2 and 3, during closing of the door. A coil spring **35** anchored to a stud **36** (which is secured to the case plate **12**) urges the detent arm **25** against teeth **22**. Lever **26** is urged toward its normal position, shown in Fig. 2, by means of a coil spring **37** anchored to shoulder rivet **27** and having an arm **39** pressing against flange **40** which is integral with lever **26**. A plunger **41** is actuated by any suitable manually operable means, such as a push button or handle, not shown, located on the outside of the door, and the inner end of plunger **41** engages flange **40** on the opposite side thereof from coil spring arm **39**, thereby permitting swinging of lever **26** and associated parts against the resistance of spring **37**.

To permit manual control of the lock from inside the door, a knob **45** is fixed to the upper end of a vertically shiftable rod or plunger **46** which extends upwardly through the garnish molding (not shown) inside the glass panel of the door, also not shown. The lower end of rod or plunger **46** is pivotally connected at **47** with an arm **48** of a lever **49** which is pivotally mounted on a shoulder rivet **50** fixed to flange **14**. Lever **49** has an arm **51** terminating in a rounded or enlarged end **52** lying within a channel-shaped projection **53** of a slide **54**. This slide is guided in its sliding movements on flange **14** by means of upper and lower headed guide studs **55**, **56** extending through vertical guide slots **57**, **58**, respectively, in the slide. The fourth arm **31a** of detent **23** extends through a slot **34a** provided in one edge of slide **54** and hence arm **31a** may swing with the detent without moving slide **54**. Obviously pushing down on knob **45** will swing lever **49** counterclockwise, as the parts are viewed in Fig. 4, which will move slide **54** upwardly, while pulling up on the knob will force the slide downwardly. Where a key is used to lock the door from the outside, the slide **54** will have spaced lugs **59**, **60** at its lower end pivotally receiving the rounded end **61** of a crank arm **62** which is fixed to the square portion **63** of a key-actuated shaft, said shaft being connected to the cylinder of any conventional cylinder lock (not shown) controlled by turning a key. By inserting the key in the lock and turning the key, crank arm **62** is swung to shift the slide **54** vertically in one direction or the other, thereby shifting the detent-operating link **29** into and out of engagement with detent arm **31**.

Also pivotally mounted on shoulder rivet **50** is a bell crank lever **65** (Fig. 4) one arm **66** of which extends downwardly to a pivotal connection **67** with a generally horizontal operating link **68**. As more fully disclosed in said Roethel patent, link **68** is moved back and forth by manipulation of a button or handle (not shown) on the inside of the door. Bell crank lever **65** also has an arm **69** whose outer end is engaged on the underside by a safety latch element to be described. Arm **69** will engage a lug **54b** projecting outwardly at right angles to slide **54** to move the slide **54** downwardly, when the slide is in its uppermost position (Fig. 3

and dotted lines in Fig. 4) and when the bell crank lever **65** is swung clockwise as the parts are viewed in Fig. 4.

Without attempting to show or describe other elements of the known type of lock identified above, the added parts which make up the safety attachment will now be described.

Pivoted as at **75** upon the case plate **12** is a latch lever **76**, which may thus swing in a vertical plane between the left hand position (Fig. 3) and the right hand position shown in Fig. 2. Latch lever **76** is generally speaking a flat sheet metal part, and it fits between the case plate **12** and detent **23**. An L-shaped spring **77**, fixed at one end to the case plate, has its free end resiliently and frictionally engaging the upper extremity of latch lever **76** at all times, and in the position of Fig. 2 acts as a stop and holder for the latch lever, which is received within the acute angle of the L-shaped spring. Flange **14** serves as a stop to limit swinging of the latch lever in the opposite direction. Near its upper end latch lever **76** has an outwardly projecting lug or arm **78** which is in position to be engaged by a shoulder **32a** on detent-operating link **29**. See Fig. 3. Near its lower, pivoted end, latch lever **76** has an extension arm **79** adapted to be engaged by the arm **33** of the detent, as will be understood from Fig. 1.

To operate the safety attachment, one should push down on knob **45**, which moves slide **54** upwardly to the position of Fig. 3, then push the button or operate the handle which moves plunger **41** inwardly. Detent-operating link **29** will then engage lug **78** and will swing the latch lever **76** to the left or to the position of Fig. 3. In this position a shoulder **80** (which is an integral part of the latch lever) will engage directly under arm **69** of bell crank lever **65** and said bell crank lever cannot be swung by the inside button or handle operating through link **68**. Therefore, so far as the door-releasing parts on the inside of the car are concerned, the door is locked and cannot be unlocked, either accidentally or deliberately.

To disengage the safety lock, button **45** should be pulled up, which moves slide **54** down, and then the operating element on the outside of the car door is moved to cause plunger **41** to move inwardly or from the full line position of Fig. 2 to the dotted line position. Shoulder **32** on link **29** will then engage detent arm **31** as indicated in Fig. 1, swinging detent **23** counterclockwise, which causes detent arm **33** to engage arm **79** of latch lever **76**, thus swinging the latch lever into the position of Fig. 2, where it remains because of the retaining spring **77**. The conventional door locks or latches my then be operated in the usual manner.

From the foregoing description it will be clear that the safety attachment is very simple, is easily made and installed, and in no way interferes with the conventional lock nor does it require changes therein except for the installation of the attachment. Use of the attachment will obviate accidents and injuries to passengers.

What I claim is:

1. In an automobile door locking mechanism of the type which has a case plate, a bolt rotatably mounted on the case plate, a ratchet member fixed to the bolt, a plural-armed detent pivotally mounted on the case plate and having one of its arms engaging one of the teeth of the ratchet member, a spring mounted on the case plate and forcing said arm against said tooth, a slide mounted on the case plate for limited sliding movements in opposite directions, a manually operable mechanism for moving the slide in opposite directions, an inside door operating mechanism, an outside door operating mechanism including a plunger, a lever pivoted near one end to the case plate, a spring secured to the case plate and urging the lever to press against the end of the plunger, a detent-operating link pivoted to the lever near the area where the plunger engages the lever, said link having an extension overlying and normally slidably engageable with the upper end of a second arm of the plural-armed detent, said link also having a shoulder adapted to engage the upper end of said second detent arm when the link is shifted inwardly by swinging said lever through the intermediation of said plunger, the improvement which consists in the provision of a latch lever pivoted at one end upon the case plate, stop means for limiting the swinging of said latch lever in opposite directions, said latch lever having an arm and said link having a shoulder engageable with said latch lever arm, said link extension being so engaged by said slide that movement of the slide by said manually operable mechanism will swing said link on its pivot to be disengaged from said second detent arm and to engage the latch lever arm with said shoulder, said latch lever also having an extension arm engageable by a third arm of the plural-armed detent, said latch lever further having a shoulder engaging a part of the inside door operating mechanism to prevent movement of said part when the latch lever is in locking position.

2. The invention defined in claim 1, wherein the inside door operating mechanism includes a generally horizontal operating link having a pivotal connection at one end with one arm of a bell crank lever which is pivoted on the case plate, the other arm of said bell crank lever being engaged on the underside by said latch lever shoulder when the parts are locked, said slide having a lug also engageable by said other arm of said bell crank lever to permit moving said slide downwardly by rocking of said bell crank lever through said horizontal operating link.

3. The invention defined in claim 1, wherein the means for limiting the swinging of said latch lever in opposite directions include a flange integral with and at right angles to the main body of said case plate, said flange being contacted by one edge of said latch lever when the latch lever is in locking position, and an L-shaped spring fixed at one end to the case plate and having its free end resiliently and frictionally engaging the upper extremity of the latch lever at all times, the latch lever being received within the acute angle of the L-shaped spring and being held and stopped by said spring when the latch lever is in unlocking position.

4. The invention defined in claim 1, wherein the inside door operating mechanism includes a generally horizontal operating link having a pivotal connection at one end with one arm of a bell crank lever which is pivoted on the case plate, the other arm of said bell crank lever being engaged on the underside by said latch lever shoulder when the parts are locked, said slide having a lug also engageable by said other arm of said bell crank lever to permit moving said slide downwardly by rocking of said bell crank lever through said horizontal operating link; and the means for limiting the swinging of said latch lever in opposite directions include a flange integral with and at right angles to the main body of said case plate, said flange being contacted by one edge of said latch lever when the latch lever is in locking position, and an L-shaped spring fixed at one end to the case plate and having its free end resiliently and frictionally engaging the upper extremity of the latch lever at all times, the latch lever being received within the acute angle of the L-shaped spring and being held and stopped by said spring when the latch lever is in unlocking position.

5. In combination with an automobile door locking mechanism having an inside latch-operating mechanism including a bell crank lever, and an outside latch-operating mechanism including a plunger, a lever swung by the plunger, a spring pressing against said lever in opposition to the thrust of the plunger to return the lever and plunger after such swinging, and a plural-armed detent swung by the lever when the lever is swung by the plunger, a case plate on which the bell crank lever, the lever and the plural-armed detent are each pivotally mounted, a slide mounted to reciprocate on the case plate, operator-controlled means to reciprocate said slide, a latch lever pivoted at one end upon said case plate and lying between the case plate and the plural-armed detent and having an integral arm engageable by one of the arms of the detent, a detent-operating link pivotally connected to said lever and engaging another arm of the detent when the plunger moves said lever inwardly, said detent-operating link having an extension which has a sliding and pivotal connection with said slide, so that the slide when reciprocated will swing said detent-operating link, said latch lever having a projecting arm or lug engageable by said detent-operating link when moved in one direction by said plunger, said latch lever also having a shoulder which is directly engaged with an arm of said bell crank lever to prevent door-releasing movement thereof when the latch lever is in active or locking position, the detent arm which engages the latch lever moving it to inactive or unlocking position when said detent is rocked on its pivot axis by manipulation of said detent-operating link through said lever and plunger.

6. The invention defined in claim 5, wherein there is a spring secured to the case plate and said spring engages the free end of the latch lever at all times and holds said latch lever against movement after the latch lever has moved a certain distance in one direction, the support having means engaged by the latch lever to stop further movement of the latch lever after moving a certain distance in the opposite direction.

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