Sept. 1, 1931. R. CALPIN 1,821,879

LATCH

Filed March 4, 1927

Fig. 1.

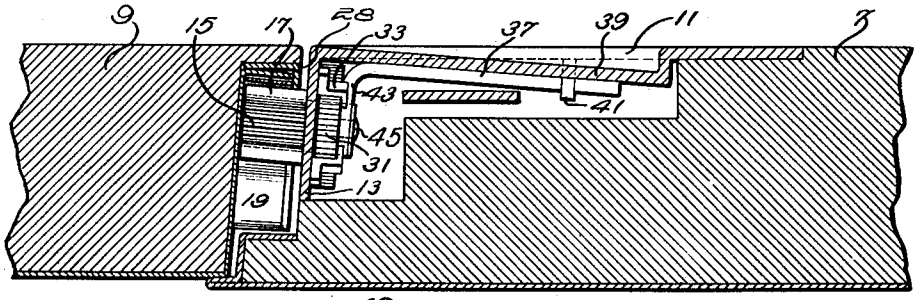


Fig. 2.

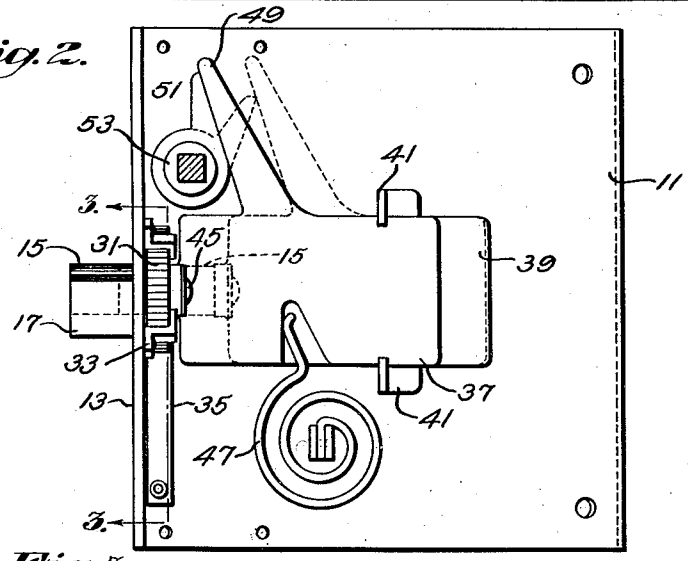


Fig. 3.

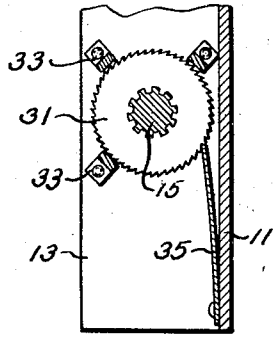


Fig. 4.

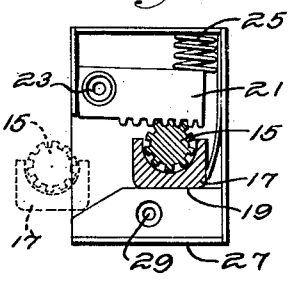
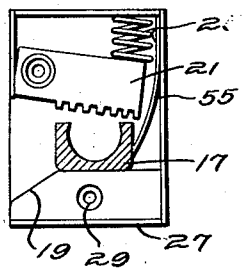


Fig. 5.



Inventor:
Raymond Calpin,
by Emery, Booth, Janney & Varney
Attys.

Patented Sept. 1, 1931

1,821,879

UNITED STATES PATENT OFFICE

RAYMOND CALPIN, OF EVERETT, MASSACHUSETTS, ASSIGNOR TO A. S. CAMPBELL COMPANY, OF EAST BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

LATCH

Application filed March 4, 1927. Serial No. 172,812.

This invention relates to latching devices for doors and the like and the object is to provide mechanism of this type which will readily catch and firmly hold the door but which may be easily unlatched. Although not limited thereto, the construction finds particular application to the doors of automobiles.

My invention will be readily understood by reference to the following description of an illustrative embodiment thereof taken in connection with the accompanying drawings, wherein:

Fig. 1 is a horizontal section through the lock side of an automobile door and its cooperating jamb, showing the latch mechanism in section at substantially the plane of the bolt;

Fig. 2 is an elevation of the latch casing detached disclosing the interior mechanism;

Fig. 3 is a section on the line 3—3 of Fig. 2; and

Figs. 4 and 5 are sections at the crack of the door and looking toward the jamb showing the jamb fitting or keeper in elevation, the cover plate being omitted, and illustrating respectively the latching position of the parts and the position at the moment of unlatching.

Referring to the drawings, the latching mechanism comprises as usual a part carried by the door 7 and a cooperating fitting or keeper which is attached to the cooperating door jamb 9. The former may be organized on a suitable latch plate or casing having a portion 11 overlying the inner face of the door and a flange portion 13 extending over the edge thereof. Through the flange 13 projects the bolt which herein takes the form of a pinion 15 and in the embodiment of the invention shown this pinion is cradled in a rigid lug 17 projecting from the plate 13 in which it rotates under suitable control, as hereinafter to be described. The jamb fitting, shown in detail in Figs. 4 and 5, is open toward the outer side of the door to receive the lug and the projecting pinion as the door swings toward closed position and is herein shown as embodying a rigid surface 19 adapted to underride and support the lug 17 and an overhanging rack 21 herein shown as pivoted at 23 at its forward end and spring-pressed downwardly by spring 25 into the path of the pinion 15 so that as the door swings closed and the pinion moves from the dotted line position of Fig. 4 to the full line position it rolls into engagement with the rack, compressing spring 25 and swinging the rack from the position of Fig. 5 to that of Fig. 4. In this action the surface 19 underrides the lug 17, raising the door somewhat as indicated in Fig. 4 if the door sags, and rigidly supports the latched door in such position, the latch thus serving the function of the so-called dovetail commonly installed on automobile doors. The pinion 15 is in this manner brought to proper elevation accurately to engage the rack 21. The mechanism of the jamb fitting or keeper may be enclosed in a suitable case 27 and the interior mechanism shown in Figs. 4 and 5 is enclosed by a suitable cover plate 28 not shown in those figures but appearing in Fig. 1 attached by means of a suitable screw tapping into the opening 29.

The pinion is permitted to roll freely in a counter-clockwise direction, viewing Fig. 4, and suitable means are provided to prevent, at least normally, reverse rotation of the pinion such as would be required to permit it to roll out of engagement with the rack from the position of Fig. 4. I have herein shown (see Fig. 3) a ratchet wheel 31 located at the inner side of the plate 13, being secured thereagainst by the lugs 33. The wheel 31 may be broached out to receive the teeth of the pinion 15 so that it is supported on the latter as on a shaft and with a splined connection thereto, by which term I mean to include such a connection as will cause two members to rotate one with the other while permitting sliding movement, this sliding movement taking place axially of the pinion for a purpose which will hereinafter appear. Cooperating with the ratchet wheel 31 is a suitable pawl which herein takes the form of a spring 35 secured to the plate 11. As the door closes and the pinion rolls into the rack, the teeth of the ratchet click over the

pawl. A position of the pinion is provided for each tooth on the ratchet wheel, and it will be seen that if the teeth of the pinion and those of the rack are once engaged, the door is latched even if not pushed to its full closed position. The arrangement, therefore, provides for holding the door latched in a multiplicity of closed positions as distinguished from the customary bolt which provides ordinarily a single closed position or only two relatively widely spaced positions in those cases where a stepped keeper is provided.

To unlatch the door after it is latched in the positions of Fig. 1 and Fig. 4 the pinion and rack may be separated by a relative movement thereof axially of the pinion without disturbing the locking of the ratchet wheel 31 and herein the pinion 15 is retracted through the wheel 31. I have herein shown a slide 37 mounted on an embossed portion 39 of the plate 11 and sliding under the gibs or lugs 41 parallel to the axial line of the pinion, the slide being provided with an angularly extending arm 43 riveted at 45 to the inner end of the pinion bolt. The slide may be normally pressed toward the left, viewing Figs. 1 and 2, by means of a suitable spring 47 to project the pinion to the full line position of Fig. 2 and any suitable means may be provided to draw the slide to the right to retract the same to the dotted line position and I have herein shown by way of example an arm 49 projecting upwardly from the slide and adapted to cooperate with a roll-back 51 on the handle spindle 53. The door being closed and the parts in the position of Fig. 4, if the slide 37 is then operated, the pinion 15 is withdrawn from the rack and the door may be freely opened. The position of the parts in the jamb fitting is then as shown in Fig. 5.

In Figs. 4 and 5 I have illustrated a suitable kick-out spring 55 secured to the back of the jamb fitting casing 27 and adapted to be engaged by the lug 17 and compressed by the same as it moves to the full line position of Fig. 4. When the pinion is retracted, as shown in Fig. 5, the lug 17 remains in contact with the spring 55, the latter expands and, acting against the lug, tends to open the door and to carry the lug out to the dotted line position of Fig. 4 where the retracted pinion, if allowed again to project, will not come into engagement with the rack.

It will be seen that in the preferred embodiment of the invention shown the mechanism which prevents reverse rotation of the pinion is constantly in action. That is, the pawl 35 is always in engagement with ratchet wheel 31 and it thus may be made strong and durable. The retraction of the bolt out of engagement with the rack permits the door to be opened easily and readily without any difficulty such as might be caused by a binding of the parts due to some disalignment or inaccuracy in installation. Such disalignment would not be material in the closing movement of the door because the door is swung to and is moving with considerable momentum but might offer difficulties in starting the door open from the closed position. At the same time an easy engagement of the door in latched position in provided for without the necessity of any snap action as in the ordinary sliding spring projecting bolt, and after the teeth of the pinion have once engaged the rack the door is held against opening and may be so held in a practically unlimited series of closed positions. There is practically no danger of swinging the door to without its being caught and held.

I have thus described in detail the particular embodiment of my invention shown by way of example in the accompanying drawings. It will be understood that the particularity of this description has had for its object making clear the construction and operation of the particular form of my invention here shown and that the principles exemplified thereby are by no means limited in their embodiment to what has been illustrated. What I claim as new and desire to secure by Letters Patent I shall express in the following claims.

1. In a latch a bolt adapted to project from the edge of the door, a keeper constructed to engage the projected bolt and to interlock therewith by rotation of the latter consequent on such engagement, means to prevent reverse rotation of the projected bolt and means to retract substantially in the direction of the axis of rotation the bolt to free it from said keeper.

2. In a latch mechanism a latch member having a rigid lug projecting therefrom, a bolt supported on and slidable on the lug, a jamb fitting having a surface to underride and rigidly support the lug and a part overhanging the projecting bolt, means permitting free relative movement of the projecting bolt and said part in the closing movement of the door but preventing such movement in the opposite direction, and means slidably to retract the bolt to free it from the fitting.

3. In a latch mechanism a latch member having a rigid lug projecting therefrom, a bolt supported on and slidable on the lug, a jamb fitting having a surface to underride and rigidly support the lug and a part overhanging the projecting bolt, means permitting free relative movement of the projecting bolt and said part in the closing movement of the door but preventing such movement in the opposite direction, means slidably to retract the bolt to free it from the fit-

ting, and a kick-out spring carried by the fitting and co-operating with said lug.

4. In mechanism for latching together two members a rack on one member and a pinion on the other member and adapted to roll into engagement on approach of the members, means to prevent the reverse rotation of the pinion in one direction and providing for latching together of the members in a multiplicity of positions of closed adjustment, and means for separating the rack and pinion subsantially axially of the latter to unlatch the members.

5. In a mechanism for latching together two members a bolt which provides a pinion projecting from one member, a rack on the other member into which the pinion may roll, a member having splined connection with said bolt, means cooperating with said last named member to permit its rotation in one direction only, and means to retract the bolt by sliding movement thereof through said member to withdraw said pinion laterally from the rack.

6. In a latch mechanism for doors a plate at the door edge having a lug projecting therefrom, a pinion cradled in the lug and extending through the plate, a member at the inner side of the plate slidably fitting the teeth of the pinion, means controlling the rotation of said member and means slidably to retract the pinion, and a cooperating jamb fitting comprising a surface to underride and support the lug and an overhanging toothed member to mesh with the pinion in its projected position.

7. In a latch mechanism a latch member having a rigid lug projecting therefrom, a rotatable bolt sliding on said lug, a jamb fitting having a surface to underride and rigidly support the lug and a part overhanging the projected bolt and adapted to interengage therewith by rotation thereof consequent on closing movement, means to prevent reverse rotation of the bolt, and means slidably to retract the bolt to free it from its fitting.

8. In a latch for a door and its case a bolt which provides a rotatable pinion, the axis of which is positioned to project axially from the edge of one of the members to which the latch is applied to cross the joint between them, a cooperating rack into which the pinion may roll when the door closes, means to prevent reverse rotation of the pinion and means effective while the door remains closed to move the pinion bodily out of mesh with the rack to release the latch.

9. In a mechanism for latching together two members a bolt which affords a pinion projecting from one member, a rack on the other member into which the pinion may roll, a part associated with said first member through which the pinion extends, the teeth of the latter providing a sliding tongue and groove connection of the bolt with said part, means cooperating with said last-named part to permit its rotation in one direction only, and means to retract the bolt by sliding movement thereof through said part to withdraw said pinion laterally from the rack.

In testimony whereof, I have signed my name to this specification.

RAYMOND CALPIN.