Feb. 9, 1943. J. H. ROETHEL 2,310,550

DOOR LATCH

Filed Jan. 22, 1940

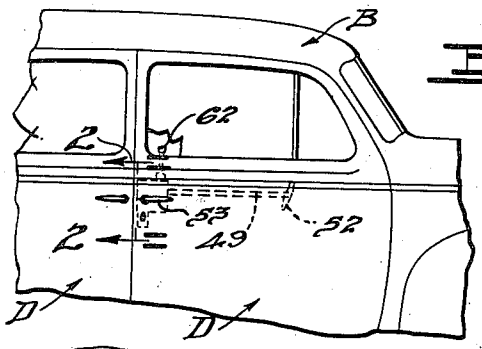


FIG. 1.

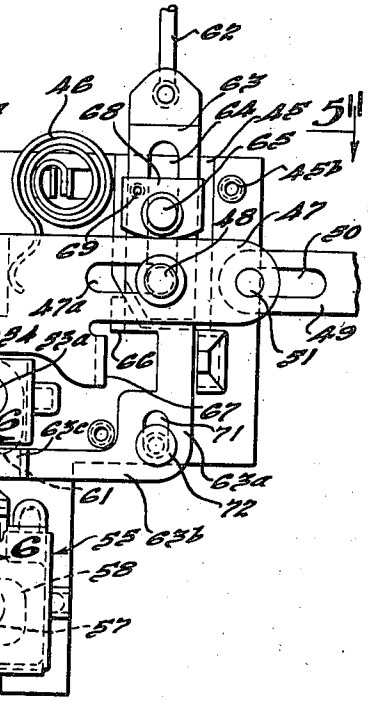


FIG. 4.

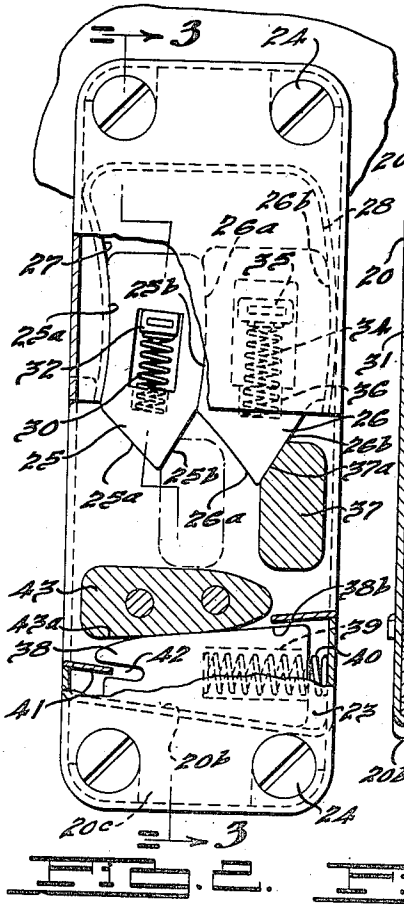


FIG. 2.

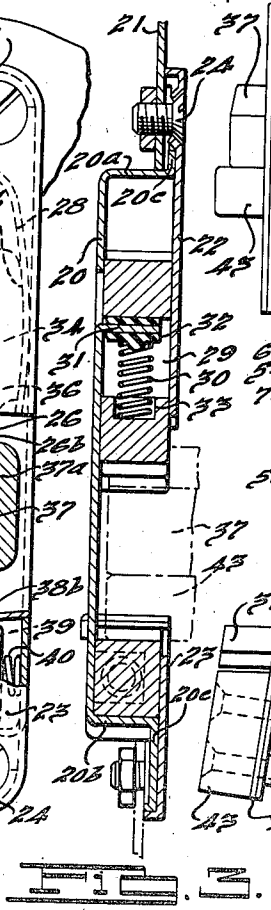


FIG. 3.

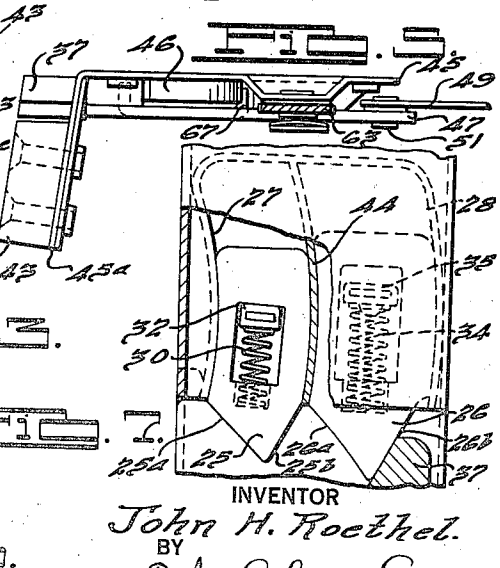


FIG. 7.

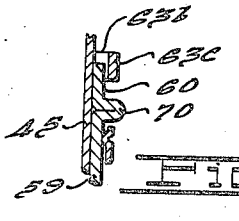


FIG. 8.

INVENTOR

John H. Roethel.

BY

Dike, Calver & Grey

ATTORNEYS.

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DOOR LATCH

John H. Roethel, Detroit, Mich.

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11 Claims. (Cl. 292—340)

This invention relates generally to door latches and particularly, although not exclusively, to latch devices adapted for use in connection with the doors of automobiles and other vehicles. The invention contemplates the provision of an improved device of this class including lock mechanism adapted to be installed upon the swinging door of the automobile or vehicle body, an improved striker mechanism cooperable with the latch bolt and adapted to be installed on the door post or pillar, and improved means associated with the latch bolt and striker mechanism for holding the door firmly in position against transverse and vertical movements during operation of the vehicle. An object of the invention is to provide an improved device of the above class or type which is relatively simple and compact in construction, economical to manufacture, durable and efficient in use and which in operation is also capable of providing an easy and relatively quiet closing door, a particularly important objective in connection with the steel doors of automobiles.

A further object of the invention is to provide an improved latch bolt and striker device which in efficient and simple manner combines the functions heretofore accomplished in separate striker device and dovetail units and which in addition permits simplification of the latch bolt mechanism mounted upon the door.

Another object of the invention is to provide an improved striker unit adapted to be mounted upon the body pillar or post and having a spring pressed striker member adapted normally to extend downwardly into the path of a longitudinally extending normally non-retractible latch bolt and adapted to be depressed or forced upwardly by the bolt, when the door is closed, thereby permitting the bolt to pass the striker and engage an inclined or tapered face thereof, firm and tight engagement of the bolt with the final locking step of the striker member being ensured under all conditions by means of yieldable wedging means whereby the door is held rigidly against chattering or vibratory motion during operation of the vehicle.

A further object of the invention is to provide an improved latch bolt and striker device embodying a normally non-retractible latch bolt, a vertically movable striker member adapted to project downwardly into the transverse path of movement of the bolt, and yieldable wedge means associated therewith and cooperable with the latch bolt and striker member to hold the door against vertical and transverse movements during operation of the vehicle, the improved construction being such as to provide a simple, compact and inexpensive mechanism producing an easy and quiet closing door which will be held firmly and positively under operating conditions of the vehicle.

Another object of the invention is to provide a striker assembly adapted to be mounted on the body post or pillar and embodying a plurality of relatively movable spring pressed striker members mounted to extend generally vertically into the path of a normally stationary longitudinally extending latch bolt, said striker member providing successive safety and final locking portions or steps effective to hold the latch bolt in successive positions when the door is closed.

Another object of the invention is to provide an improved striker assembly in which the yieldable striker member or members are adapted to slide vertically in the casing when engaged by the latch bolt during closing movement of the door, the striker member or members moving in an arcuate path or paths, the improved construction being such that the striker members will be held firmly in latching position against retraction under any pressure exerted thereagainst by the bolt while at the same time the arrangement and mounting of the striker members is such as to provide a very compact unit occupying a minimum of space.

Still a further object of the invention is to provide an improved assembly or device of the foregoing character in which the door may be closed without slamming and with a minimum of effort and quietness, making it unnecessary to cause the bolt to retract by engagement with the striker when closing the door and permitting the door to be readily opened by turning the handle to retract the bolt sufficiently to clear the striker member or members, thereby enabling the end of the latch bolt to pass by the striker members as the door is pulled open.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawing forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is a fragmentary side elevation of a portion of an automobile body in which the present invention is incorporated in connection with a front door thereof.

Fig. 2 is an enlarged vertical section taken substantially through lines 2—2 of Fig. 1 looking in the direction of the arrows.

Fig. 3 is a section taken substantially through lines 3—3 of Fig. 2 looking in the direction of the arrows.

Fig. 4 is an inner face view, in elevation, illustrating a latch bolt unit.

Fig. 5 is a section taken substantially through lines 5—5 of Fig. 4 looking in the direction of the arrows.

Fig. 6 is a detail section taken substantially through lines 6—6 of Fig. 4 looking in the direction of the arrows.

Fig. 7 is a fragmentary view similar to Fig. 2 but illustrating certain modifications in the striker assembly.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawing, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention claimed herein beyond the requirements of the prior art.

In the drawing there is illustrated, by way of example, certain embodiments of the present invention as applied to an autmobile body B having swinging doors D hinged at their remote edges so as to swing together against a common door post or body pillar in accordance with conventional practice, the mechanism of the present invention comprising a latch bolt device mounted upon the door and a striker device mounted upon the body pillar or door post at the jamb face of the door opening.

Referring particularly to Figs. 2 and 3, the striker device, which is mounted upon the fixed pillar or post of the body, comprises a backing plate 20 offset centrally to extend through an opening in the pillar jamb 21, the offset portion providing upper and lower walls 20*a* and 20*b*, respectively, and the backing plate having upper and lower attaching flanges 20*c* lying against the outer face of the pillar jamb 21. The striker device also comprises outer upper and lower face plate portions 22 and 23 which are spaced apart for the passage therebetween of the latch bolt and wedge member extending from the edge of the swinging door. The face plate portions 22 and 23 have countersunk holes for the reception of fastening screws 24 by which the striker or keeper assembly is attached to the jamb 21.

Within the upper casing formed by the members 22 and 20 are cooperating striker or keeper members 25 and 26 which are slidingly mounted within the casing. The striker or keeper member 25 is provided with curved or arcuate inner and outer upright edges 25*a* and 25*b*, and the adjacent striker member 26 is provided with correspondingly curved or arcuate inner and outer upright edges 26*a* and 26*b*. The edge 25*a* of striker 25 engages and slides upon the correspondingly curved wall 27 formed from the backing plate 20. The remote edge 26*b* of striker 26 correspondingly engages and slides upon a similarly curved or arcuate wall 28 formed also from the backing plate 20. Moreover, in the embodiment of Figs. 2 and 3, the adjacent striker or keeper members 25 and 26 bear against each other through contact of their adjacent curved edges 25*b* and 26*a*. It will be understood that the curved walls 27 and 28 of the casing and the curved edges of the striker members have the same radius and all extend in parallelism. Hence, the striker members may slide up and down within the casing, one independently of the other, in curved paths corresponding to the curvature of the casing walls. As shown in Fig. 3, the striker member 25 is provided with an opening or slot 29 within which is housed a compression spring 30. The backing plate 20 has a tongue 31 struck out from the metal thereof and carrying upper and lower rubber bumpers 32. The spring 30 is interposed between the fixed tongue or lug 31 of the casing and the bottom of a recess 33 in the striker member. Thus, upward movement of the striker member is opposed by the spring 30 which continuously urges the striker member toward its down position shown in Fig. 2. The striker member 26 is correspondingly yieldingly mounted through the medium of a compression spring 34 which is interposed between a struck-in lug or tongue or the backing plate, carrying rubber bumpers 35, and the bottom of a recess 36 in the striker member. The spring and bumper arrangements, and the mountings thereof, for the striker members 25 and 26 are identical with the exception that the spring 30 is preferably lighter than the spring 34.

The striker member 25 forms the safety step and the striker member 26 forms the final locking step for the latch bolt 37. The safety step 25 has a tapered or inclined edge 25*c* facing outwardly and an inner tapered locking face 25*d*. Correspondingly the final locking step 26 has tapered faces 26*c* and 26*d*. Thus, the lower projecting end of each striker member is wedge shaped, the clearance space between the adjacent faces 25*d* and 26*c* being sufficient to prevent engagement of the striker member 26 with the upper edge of the bolt as shown in Fig. 2. The bolt 37 is adapted, as the door is closed, to engage the edge or face 25*a* and elevate the striker member 25 against the effort of the spring 30, and when the bolt passes the step 25 its inclined face 37*a* smoothly engages the correspondingly inclined face 25*b* of the locking step. As the bolt moves further inward it leaves the step 25 and engages the inclined face 26*a* of the step 26, elevating the latter against the effort of its spring 34, and when the bolt passes this final locking step its inclined face 37*a* firmly and smoothly engages with a full bearing the correspondingly inclined final locking face 26*b* of the step 26. It will be seen that each striker member moves in an up and down path closely approximately a line perpendicular to the horizontal plane or path of movement of the bolt, but that the virtue of the curved walls the striker members are locked against being cammed upwardly by the bolt resulting from outward pressure thereof when the door is in closed position. By this construction a smooth easy action of the striker members is possible while at the same time they may be nested or arranged adjacently so as to occupy a minimum of space while providing a very simple and inexpensive construction.

The bottom casing formed between members 23 and 20 partially houses a wedge shaped slide block 38 which has a limited sliding movement upon the bottom inclined wall 20*b* of this casing. The rear end of the block has a hole or bore 39 within which is mounted a compression spring 40 which is interposed between the block and the back wall of the casing. The block is held within the casing and limited as to its outward movement through the medium of a tongue or flange 41 on the casing which extends into a

notch or recess 42 in the block. The upper wall 38b of the wedge block is exposed for engagement by a wedge member 43 secured to the edge of the door at a point below but outwardly of the bolt 37. The dovetail wedge 43 has an inclined lower face 43a which rides upon the upper inclined face 38b of the slide block, and as the door is closed the wedge member 43 will, as it passes into the space between the upper and lower casings, force the block 38 inwardly against the action of the spring 40, thus tending to lift the door and, through the cooperative action of the bolt 37 against the face 26b of the striker step 26, clamping the door rigidly between the block 38 and the striker member 26. Since the block 38 is continuously urged outwardly by its spring 40, thereby tending to raise the wedge member 43 by reason of the inclined wall 29b, any play between the bolt and striker face 26b when the latter is forced home to its lowermost position will be taken up by outward movement of wedge 38. Thus, any play between the bolt and striker, which will cause rattling or chattering when the door vibrates vertically, will immediately be taken up and the door held tightly against vertical movement by the wedge 38 moving outwardly under the influence of the spring.

The embodiment of Fig. 7 is identical with that in Figs. 2 and 3 with the exception that there is interposed between the adjacent edges 25b and 26a of the two striker members a bearing wall 44 extending from the backing plate 29. The wall 44 is parallel to the walls 27 and 28 and provides a common bearing for the adjacent edges of the two striker members 25 and 26.

Referring particularly to Figs. 4 to 6, inclusive, the latch bolt device in this instance comprises a case plate 45 terminating at its outer edge in a lateral flange 45a having an opening through which slidingly extends the bolt 37, the dovetail wedge 43 being secured by screws to the flange 45a at a point just below and outwardly of the bolt 37. The case plate 45 has suitable screw bosses 45b by which it may be secured by screws to the inner lock panel of the door in the usual manner. The rear end of the bolt 37 is engaged by one end of a spiral return spring 46, the opposite end of the spring being anchored to the case plate by struck-out lugs. Riveted to the inner end of the bolt is a slide plate 47 having a horizontal guide slot 47a slidingly receiving a guide stud 48 riveted to the case plate. The latch device of Fig. 4 is designed for a front door of an automobile body so that the door may be locked with a key from the outside. The bolt is remotely controlled from the inner side of the door through the medium of a link 49 having a lost motion slot 50 through which extends a stud 51 secured to the inner side of the slide 47. The end of the remote control link 49 is connected to the inner door handle 52 in the usual manner. The outer door handle 53 has its shaft entered within a square opening 53a in the hub of a roll back 54 which engages a turned flange on the slide plate 47 so that by turning the handle 53 the roll back is partially rotated to retract the latch bolt 37 independently of the inner door handle 52. The latter also may be turned to retract the slide 47 and the latch bolt 37 against the action of the return spring 46.

The latch has incorporated therein a unit 55 by which the roll back may be dogged or locked against rotation by key controlled means. The key may be turned in the lock from the outside of the door to partially rotate a shaft centered within a square opening 56 in the hub of an eccentric 57 which turns within an opening 58 in a slide 59. This slide at its upper end terminates in a dog 60 adapted to be raised into abutting engagement with a lug 61 on the roll back, thus preventing the bolt from being retracted by turning the outer door handle 53. It will be understood that when the eccentric is turned counter-clockwise from its position of Fig. 4 it will engage a wall of the recess 58 and raise the dog 60 to locking position.

The bolt 37 may be locked against retraction through operation of either of the handles by means of a push and pull device at the inner side of the door. This device comprises a plunger 62 having a knob at its upper end, the plunger extending through a hole in the garnish molding at the inner side of the window glass of the door and pivotally connected at its lower end to a slide 63. This slide has a guide slot 64 receiving a stud 65 riveted to the case plate, and also a similar guide slot for the stud 48. The slide 63 has a dogging portion 66 adapted to be forced downwardly, by pushing down on the plunger, into position to abut a flange portion 67 on the bolt slide plate 47, thus preventing the latter from being shifted to retract the bolt. The slide 63 may be yieldingly held in its up or down positions by a spring metal yolk 68 which has an embossed nib 69 adapted to engage in notches or depressions in the slide.

The dogging or locking slide 63 has an extension 63a below the locking dog 66, this extension in turn having a right angled extension 63b terminating adjacent the dog 60. As shown in Fig. 6, the terminal end of the extension 63b is bent out at 63c to overlap the dog 60. Below the latter the slide 59 is pressed or stamped to provide a projecting lug 70 underlying the end 63c of the slide 63. Thus, when the key is turned in the lock to turn the eccentric 57 and raise the dog 60 into locking position with respect to the roll back 54 the lug 70 on slide 59 will engage the end 63c of the slide 63 and raise this slide, thereby elevating the dog 66 out of the path of the abutment 67 on the bolt slide plate 47. The lower end of the extension 63a may, if desired, be additionally guided by means of a guide slot 71 through which extends a stud 72 on the case plate.

I claim:

1. A striker device for use in cooperation with a latch bolt and in association with a swinging door hinged at one edge to a frame structure, comprising a pair of members having bolt latching steps normally projecting into the path of the bolt and spaced apart in the direction of closing of the door, means for mounting said members for up and down movement relatively to the bolt and each member relatively to the other, spring means urging each striker member toward the bolt, and yieldable wedge means associated with the striker members and cooperable therewith to hold the door against vertical movement.

2. A striker device for use in cooperation with a latch bolt and in association with a swinging door hinged at one edge to a frame structure, comprising a pair of members having bolt latching steps normally projecting downwardly into the path of the bolt and spaced apart in the direction of closing of the door, means for mounting said members for up and down movement relatively to the bolt and each member relatively to the other, spring means urging each striker mem-

ber downwardly toward the bolt, wedge means on the frame structure movable in the direction of closing of the door under the influence of a projecting guide member on the door, and spring means urging said wedge means in the opposite direction to tighten the bolt against one or the other of said members.

3. A striker device for use in cooperation with a latch bolt and in association with a swinging door hinged at one edge to a frame structure, comprising a pair of spring pressed keeper members spaced in the direction of closing of the swinging edge of the door and projecting downwardly into the path of the bolt, said members being mounted for up and down movement each relatively to the other, and wedge means yieldable in the direction of closing of the door under the influence of a guide member on the door, said guide member and bolt adapted to pass between said wedge means and keeper members.

4. A striker device for use in cooperation with a latch bolt and in association with a swinging door hinged at one edge to a frame structure, comprising a casing, and a pair of striker members slidable each relatively to the other on the casing in an up and down curvilinear path and each having a bolt latching step normally projecting into the path of the bolt.

5. A striker device for use in cooperation with a latch bolt and in association with a swinging door hinged at one edge to a frame structure, comprising a casing, and a pair of striker members independently slidable in the casing in an up and down curvilinear path and each having a bolt latching step normally projecting into the path of the bolt and spaced in the direction of closing of the door, and means for tightening said bolt against one of said steps and offset with respect to said step in the direction of closing of the door.

6. A striker device for use in cooperation with a latch bolt and in association with a swinging door hinged at one edge to a frame structure, comprising a casing having spaced upwardly extending curved walls, and striker members having curved edges slidingly bearing upon said walls.

7. A striker device for use in cooperation with a latch bolt and in association with a swinging door hinged at one edge to a frame structure, comprising a casing, a pair of striker members slidable each relatively to the other on the casing in an up and down curvilinear path and each having a bolt latching step normally projecting into the path of the bolt, wedge means on the frame structure movable in the direction of closing of the door under the influence of a projecting guide member on the door, and spring means urging said wedge means in the opposite direction to tighten the bolt against one or the other of said members.

8. A striker device for use in cooperation with a latch bolt and in association with a swinging door hinged at one edge to a frame structure, comprising a pair of spring pressed keeper members spaced in the direction of closing of the swinging edge of the door and projecting downwardly into the path of the bolt, said members being mounted for up and down movement in correspondingly curvilinear paths each relatively to the other, and wedge means yieldable in the direction of closing of the door under the influence of a guide member on the door, said guide member and bolt adapted to pass between said wedge means and keeper members.

9. A striker assembly adapted to be mounted on a door frame for cooperation with a normally non-retractible latch bolt on a swinging door, comprising upper and lower casing portions, a pair of downwardly directed spring pressed striker members in the upper casing portion movable upwardly one at a time as the bolt passes between the casing portions, a wedge member in the lower casing portion adapted to be shifted in the direction of closing of the door by a member on the door located below and outwardly of the bolt, and spring means urging said wedge member in the opposite direction to tighten the bolt against a striker member.

10. A striker unit comprising a casing, a pair of independently slidable spring pressed striker members in the casing, each member having parallel curved edges, and means in the casing engageable with said edges for guiding said members in curved paths.

11. A striker device for use in cooperation with a latch bolt, comprising a casing, and a pair of striker members on the casing movable bodily each relatively to the other in an up and down path, at least one thereof movable in a curvilinear path and each having a bolt latching step normally projecting into position to engage the bolt.

JOHN H. ROETHEL.