June 13, 1939. P. C. JOHNSON ET AL 2,162,673

DOOR LATCH

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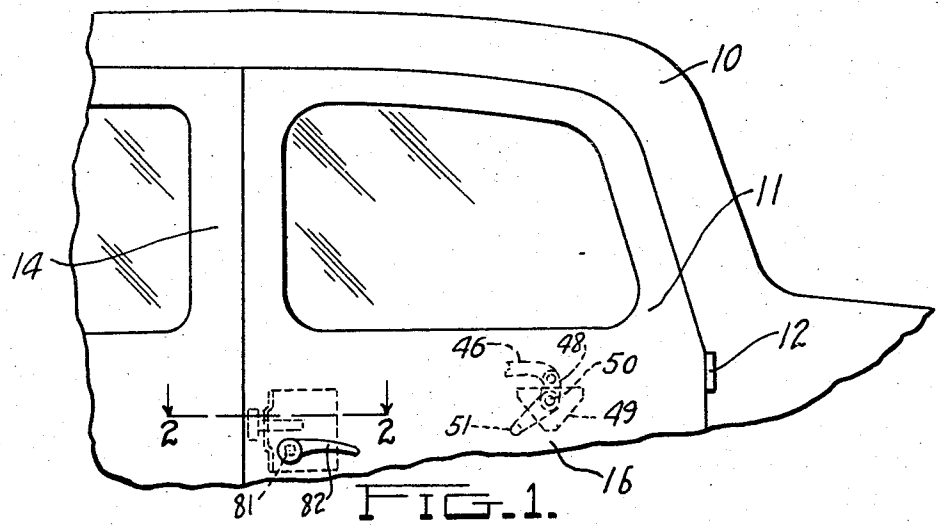


FIG. 1.

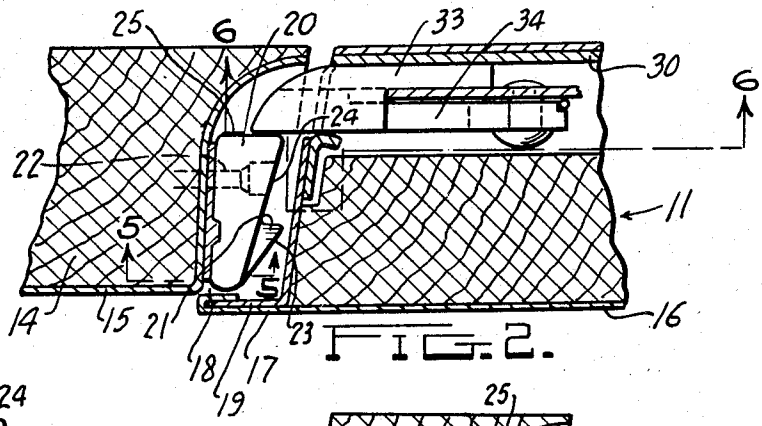


FIG. 2.

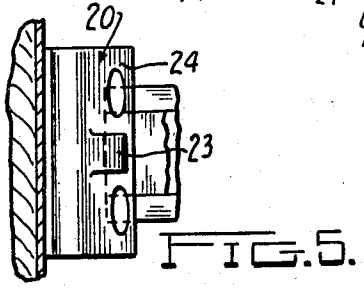


FIG. 5.

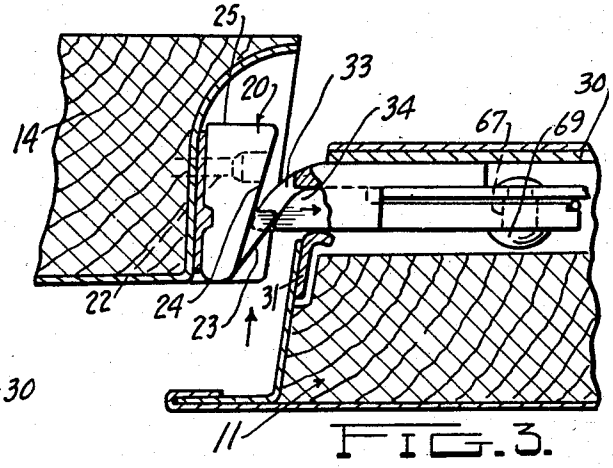


FIG. 3.

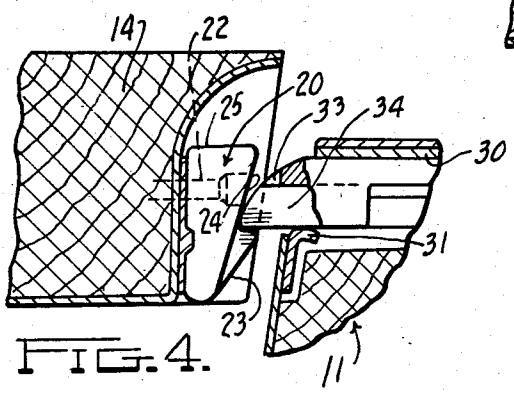


FIG. 4.

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DOOR LATCH

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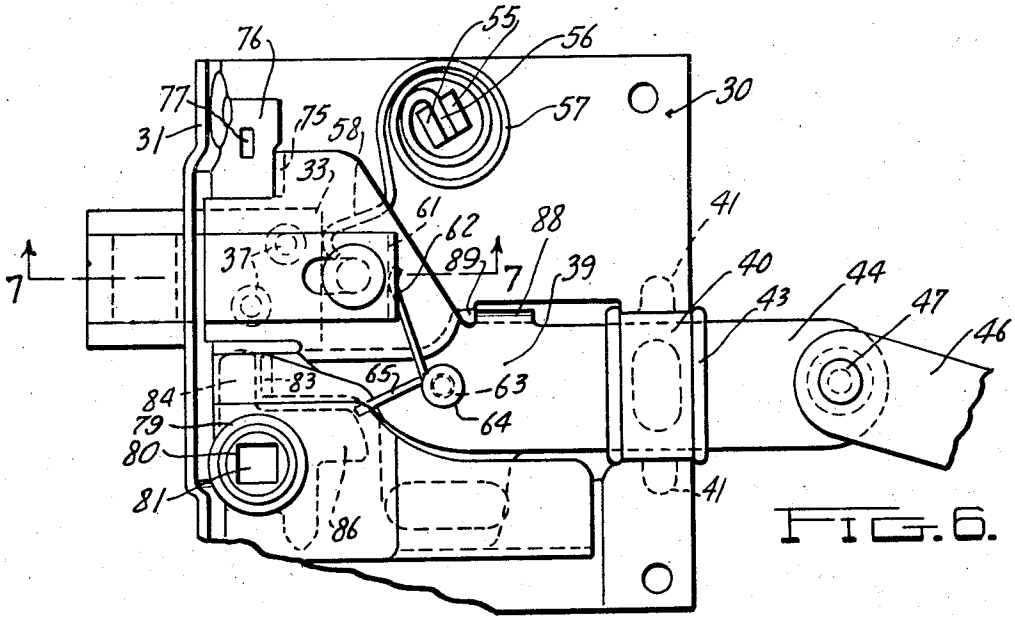


FIG. 6.

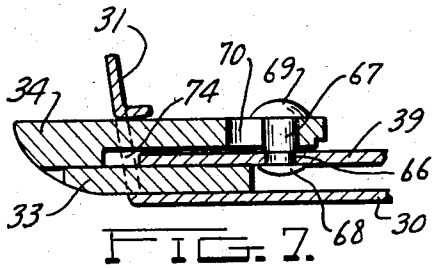


FIG. 7.

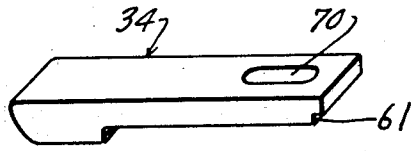


FIG. 10.

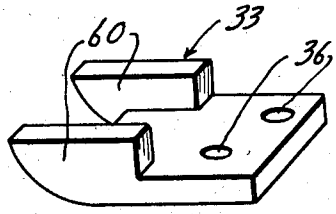


FIG. 9.

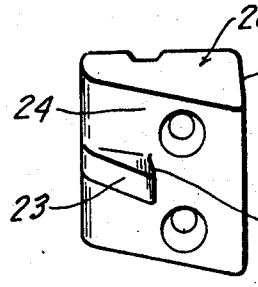


FIG. 11.

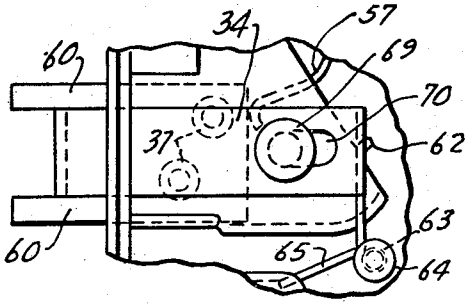


FIG. 8.

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DOOR LATCH

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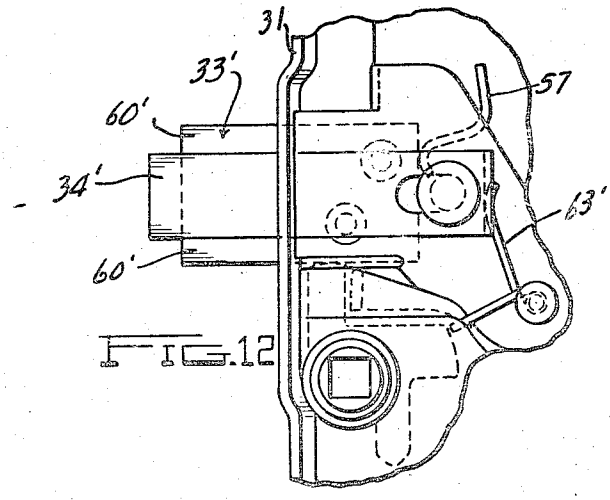


FIG. 12

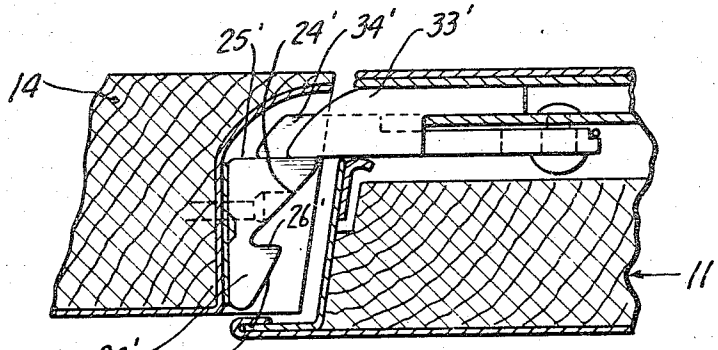


FIG. 13.

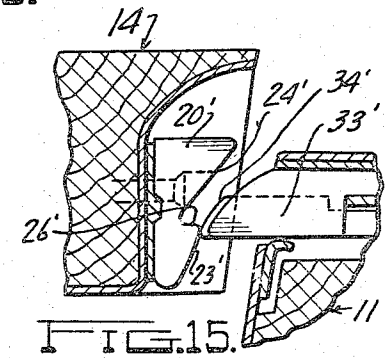


FIG. 15.

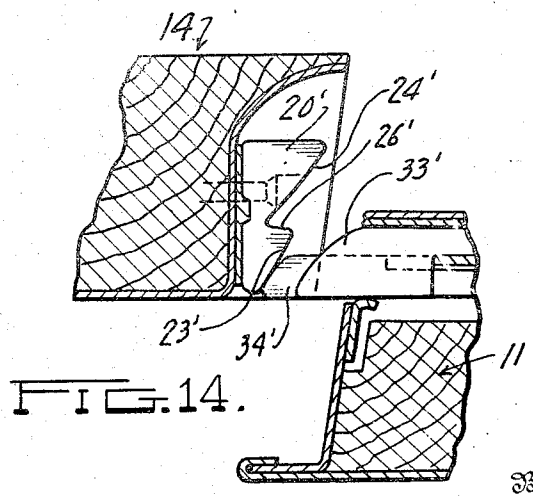


FIG. 14.

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UNITED STATES PATENT OFFICE

2,162,673

DOOR LATCH

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Application June 27, 1938, Serial No. 215,980

7 Claims. (Cl. 292—32)

This invention relates to door fastening devices, and more particularly to latch or lock means especially adapted for retaining vehicle doors in closed position.

The invention comprehends the provision of door fastening means which is simple and positive in its operation, yet one which permits the door to be easily closed without the use of excessive force.

The invention embraces the provision of a door latch or fastening means of a character especially for use on doors of automotive vehicles wherein there is provided multiple latch bolts so arranged as to facilitate the door closing operation with a minimum amount of effort and one which provides a secondary safety latch arrangement.

The invention has for an object the provision of multiple resiliently actuated latch bolt arrangement for door structures which is adapted for cooperation with a striker plate having different angular surfaces to substantially reduce to a minimum the effort required to close the door and yet provide a satisfactory safety latch.

Further objects and advantages are within the scope of this invention such as relate to the arrangement, operation and function of the related elements of the structure, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification and drawings of a form of the invention, which may be preferred, in which:

Figure 1 is an elevational view of a portion of a vehicle body and door structure illustrating a door fastening means of our invention;

Figure 2 is an enlarged horizontal sectional view showing one form of arrangement of latching means in the door structure, the latter being illustrated in closed position;

Figure 3 is a sectional view similar to Figure 2 showing the position of the latching means with the door in partial open position;

Figure 4 is a view similar to Figure 3 showing the latch or lock arrangement in "safety catch" position;

Figure 5 is a sectional view taken substantially on the line 5—5 of Figure 2;

Figure 6 is a side elevational view of latch structure of our invention;

Figure 7 is a horizontal sectional view taken substantially on the line 7—7 of Figure 6;

Figure 8 is a fragmentary side elevational view of a portion of the latch structure showing the secondary latch bolt retracted by engagement with the striker plate;

Figure 9 is an isometric view showing the primary latch bolt of the structure;

Figure 10 is an isometric view showing the secondary latch bolt forming a part of the latch structure.

Figure 11 is an isometric view of a striker plate forming a part of the invention;

Figure 12 is a side elevational view of a portion of a latch structure showing a modified form of our invention;

Figure 13 is a view similar to Figure 2 showing the form of latch structure of Figure 12 with the vehicle door in closed position;

Figure 14 is a view showing the arrangement of latch structure with the door in latch disengaging position;

Figure 15 is a view showing the door in partially closed position showing the secondary latch bolt in engagement with the striker plate.

While we have illustrated the arrangement of our invention as particularly adapted for use with vehicle doors, it is to be understood that we contemplate the utilization of the invention with any closure structure with which it may be found to have utility.

Referring to the drawings in detail, there is illustrated, and particularly in Figure 1, a vehicle body construction 10 with which is fitted a door 11 arranged for pivotal movement about hinges 12. The door in closed position is matched with or engages a pillar post 14 which is preferably covered with a sheet metal facing 15. The door structure 11 is also inclusive of a sheet metal panel 16 which has a vertical flange portion 17 in engagement with a vertically positioned panel portion 19 as particularly shown in Figures 2 and 3. The stationary pillar post 14 of the vehicle body is recessed as at 18 and accommodates a striker plate 20 held to the pillar post by means of screws 22 or other suitable securing means. The striker plate is provided with a raised portion or abutment 21 having an inclined striking surface 23, a second striking surface 24 of lesser angularity than the surface 23, and a latch engaging abutment surface 25.

With particular reference to Figures 6 through 10 inclusive, the lock or door latching mechanism of our invention is inclusive of a supporting plate 30 having a laterally projecting flange 31 which is provided with an opening to accommodate a primary latch bolt 33 and a secondary latch bolt 34, the latch bolts being shown per se in Figures 9 and 10 respectively. The primary or main

latch bolt 33 is provided with openings 36 to receive rivets 37 securing the latch bolt to a horizontally slidable member 39, the rear extremity of which is contained within a bracket or guide member 40, the latter being provided with ears 41 for projection through openings in the support or plate 30 and are clinched or bent over to secure the bracket 40 to the supporting plate. Interposed between the bracket 40 and the horizontally slidable member 39 is a tension plate or spring member 43 serving to hold the parts under tension to prevent vibration and rattling of the parts. Positioned adjacent to and also slidably mounted in the guide formed by the bracket 40 and supporting plate 30 is a second horizontally slidable member 44 to which is pivotally connected an arm 46 (shown in Figures 1 and 6) by means of a pintle or rivet 47, the arm being connected to a bell crank 48 carried by a supporting plate 49, the bell crank being fixed to an operating shaft 50. Secured to the operating shaft is a latch operating handle 51 positioned interiorly of the vehicle at the forward portion of the door to facilitate the manipulation of the latch structure from a point remote from the latch.

Struck up from the supporting plate 30 is a pair of ears 55 which serve to position the inner end 56 of an expansive coil spring 57, the other end of the spring being bent as at 58 and contacts with the rear end of the primary latch bolt 33 as shown in Figure 6. The spring 57 exerts substantial force against the large bolt to urge the latter at all times to projected or door latching position.

The primary latch bolt is formed with a pair of laterally projecting portions 60 as particularly shown in Figure 9, which function as guide means to accommodate the secondary latch bolt 34 shown in Figure 10, the latter being slidably mounted between the projections 60 of the primary latch bolt 33. The latch bolt 34 is formed with a notch 61 in its rear face into which projects the end 62 of a coil spring 63, the latter being coiled about a pin 64 carried by the supporting plate 30 and projecting laterally therefrom, the other end of the spring being bent as at 65 and projects through an opening in the plate 30 so as to maintain a constant pressure upon the secondary latch bolt tending at all times to urge it toward projected or latching position.

Secured to the horizontally slidable member 39 is a tenon portion 66 of a cylindrical member 67, the tenon 66 being held into plate 39 by means of riveting or swaging as shown at 68, the member 67 having an enlarged head portion 69 as particularly illustrated in Figure 7. The secondary latch bolt is provided with an elongated slot 70 through which the member 67 projects so as to permit limited relative slidable movement between the primary and secondary latch bolts. It will be noted from an examination of Figure 7 that the secondary latch bolt is cut away or recessed as at 74 so as to accommodate the horizontally slidable member 39.

The horizontally slidable member 39 is provided adjacent its upper edge with a transversely extending ear portion 75 which is adapted when the latch bolts are in full extended or door latching position to engage a rubber bumper 76 mounted upon an ear portion 77 struck up from the supporting plate 30. This bumper arrangement limits the outward movement of the latch bolts and at the same time tends to deaden the sound of the bolts as they are moved to door locking position.

Positioned immediately beneath the latch bolts is a latch bolt actuator 79 provided with a squared opening 80 to receive a shaft 81 to which is secured an actuating handle 82 (illustrated in Figure 1). The horizontally slidable member 39 is provided with a laterally projecting ear 83 arranged in the path of an upwardly projecting portion 84 of the actuator 79 so that when it is desired to open the door, that is, move the latch bolts laterally by movement of handle 82, member 79 is rotated and portion 84 thereof engages the ear 83, thus moving member 39 laterally carrying with it the latch bolts 33 and 34.

It is to be noted that member 39 is provided with a laterally projecting ear 88 and that member 44 is provided with a projection 89 so that when member 44 is moved toward the right as viewed in Figure 6, projection 89 of the member 44 will engage projection 88 of member 39 and retract both latch bolts by further movement of member 44 toward the right hand position against the tension or expansive force of both of the springs 57 and 63.

It is to be noted that the raised portion 23 of the striker plate is considerably narrower than the dimension between the projections 60 of the primary latch bolt so that when the latch bolts are brought into engagement with the striker plate, the primary latch bolt does not engage portion 23 of the striker plate. The abutment or surface 26 of projection 23 serves as a safety catch so that in the event the projections 60 of the primary latch bolt failed for any reason to engage or "take over" on the surface 25 of the striker plate, and the door tends to swing toward open position, the surface 26 of projection 23 is engaged by the secondary latch bolt 34 to prevent the door from swinging open, thus providing a safety catch means.

The operation of the above arrangement of our invention is as follows:

Assuming the vehicle door is open and it is desired to close the same, the closing movement of the door as is illustrated in Figure 3 brings the primary latch bolt 33 into engagement with inclined surface 24 of the striker plate and the extremity of the secondary latch bolt 34 engages with the angular or inclined surface 23 of the striker plate whereby both primary and secondary bolts are moved inwardly or toward retracted position by the inward movement of the door and through the medium of the angular surfaces 23 and 24 of the striker plate. It is to be noted that the surface 24 extends substantially full width of the striker plate providing a surface whose angularity is not severe in its retracting effect upon the primary latch bolt so that the effort required in closing the door to move the primary latch bolt 33 towards retracted position is considerably lessened over prior devices as the inclined surface being of full width of the striker plate provides a long distance for the surface to effect a retraction of the main latch bolt. The surface 23 of the striker plate is of greater angularity than surface 24 and is of lesser width, but as this surface is engaged only by the secondary latch bolt 34, the latter being urged outwardly under the influence of a comparatively light spring, it is readily retracted with very little effort. Thus, it is possible within the arrangement of our invention to close the door through the striker plate and multiple latch bolt arrangement with much less effort than has been heretofore required.

After the secondary latch bolt 34 has over-rid-

den the projection 23 of the striker plate as indicated in Figure 4, it is automatically projected against the surface 24 of the striker plate under the influence of the spring 63 so that for the remaining inward movement of the door, both latch bolts are retracted by the face 24 of the striker plate until the bolts are beyond the surface 24 and are automatically projected under the influence of the springs 57 and 63 to full door latch position as illustrated in Figure 2 with both latch bolts in engagement with the latching surface 25 of the striker plate. In event that through vibratory action of the vehicle or other forces which may inadvertently cause the latch bolts to become disengaged from surface 25 so that the door becomes unlatched and is thereby permitted to swing toward open position, the secondary latch bolt 34 being always urged toward projected position, as the door swings open engages the latch face 26 of the projection or abutment 23 which acts as a safety catch to prevent the door from being inadvertently swung to an open position.

With the door in any position, both primary and secondary latch bolts may be manually moved to retracted or unlatching position by rotating the handle 62 which rotates the shaft 61 and brings projection 64 into engagement with projection 63 on member 39 to retract both latch bolts, the secondary bolt being retracted by reason of pin 67 engaging the rear wall of slot 70 which establishes a connection between member 39 and the secondary latch bolt. The latch bolts may also be retracted from the interior of the vehicle by manipulating handle 51 which rotates the shaft 50, bell crank 48 and through the medium of the bar 46 connected to member 39 actuates the latch bolts.

Figures 12 through 15 inclusive illustrate a modified form of our invention wherein there is illustrated a latching means having the primary latch bolt 33' and secondary latch bolt 34', the latter occupying the space between the projections 60' of the primary latch bolt. The latch bolt actuating means in this form of the invention is identical with that hereinbefore described in connection with the other form of our invention, particularly as exemplified in Figure 6 of the drawings.

In this form of the invention, however, the striker plate 20' illustrated in Figures 13 through 15 inclusive is provided with an abutment or projection having an inclined surface 23', a safety catch surface 26', and a second inclined surface 24'. The projection 23' extends only partially of the total width of the striker plate, while the surface 24' occupies the remaining width of the plate, particularly as illustrated in Figure 13. In this form of the invention the secondary latch bolt 34' normally extends beyond the extreme projected position of the primary latch bolt 33 so that during door closing position, as illustrated in Figure 14, the secondary latch bolt 34 strikes or engages only the inclined surface 23' and upon further closing movement of the door the primary latch bolt 33' engages only the face 24' of the striker plate so that this bolt is retracted only under the influence of the striker face 24'. When the door has been moved to closed position, both primary and secondary bolts engage the latch surface 25' of the striker plate to hold the door in latched position, the secondary bolt 34' projecting farther outwardly than the primary latch bolt 33'. Should the latch bolts be retracted inadvertently, the secondary latch bolt 34' being under the constant influence of spring 63' will be projected outwardly and will engage safety catch face 26' of the raised projection so as to prevent the door from being swung to full open position. It is to be noted as particularly illustrated in Figure 15, that in this form of the invention the primary latch bolt 33' never contacts or engages with the projection 23', but only strikes the inclined surface 24' of the striker plate. In this manner the amount of retraction of the primary latch bolt which is under the influence of a comparatively strong spring is greatly reduced so that the effort in closing a door with the latch arrangement of our invention is greatly reduced.

It is apparent that within the scope of the invention, modifications and different arrangements may be made other than is herein disclosed, and the present disclosure is illustrative merely, the invention comprehending all variations thereof.

What we claim is:

1. The combination of a vehicle door latch mechanism including a striker plate, said striker plate having a pair of inclined latch bolt retracting striker surfaces of different angularity; a latch structure including a support; a pair of latch bolts carried by said support, said latch bolts being independently slidable, one with respect to the other, one of said latch bolts being arranged to cooperate with one of the inclined surfaces upon said striker plate, the other of said bolts being adapted to cooperate with the other of said striker surfaces on said plate; abutment means on said striker plate adapted for cooperation with said secondary latch bolt to form safety catch means; and means for simultaneously retracting both of said bolts from projected position.

2. The combination of a vehicle door latch mechanism including a striker plate, said striker plate having a pair of inclined latch member retracting striker surfaces of different angularity a latch structure including a support; a pair of latch members carried by said support, said latch members being independently movable one with respect to the other, one of said latch member being arranged to cooperate with one of the inclined surfaces upon said striker plate, the other of said members being adapted to cooperate with the other of said striker faces on said plate abutment means on said striker plate adapted for cooperation with one of said latch members to form safety catch means; and means for retracting both of said members from projected position.

3. The combination with a door latch striker plate having an inclined latch bolt retracting surface; an abutment integrally formed on said plate and having a bolt retracting surface of angularity different from that of the first mentioned bolt retracting surface; latch means; said latch means including a pair of slidable bolts one of said bolts adapted for cooperation with one of the inclined bolt retracting surfaces on said striker plate, the other of said bolts being adapted for cooperation with the other inclined bolt retracting surface of said striker plate.

4. The combination with a door latch striker plate having an inclined latch bolt retracting striking surface; an abutment formed on said plate and having an inclined latch bolt retracting striking surface of angularity different from that of the first mentioned striking surface; latch means; said latch means including a pair of

latch bolts, one of said bolts adapted for cooperation with one of the inclined surfaces on said striker plate, the other of said bolts being adapted for cooperation with the other of said inclined surfaces.

5. The combination with a latch strike plate having an inclined striker surface; a raised portion integrally formed upon said plate providing a safety catch abutment, said raised portion having a striker face of different angularity than said first mentioned striker face; latching means including a main latch bolt adapted for cooperation with the first mentioned inclined surface on said striker plate, said main latch bolt having a U-shaped portion, and a secondary latch bolt slidably mounted in the U-shaped portion of said main latch bolt and adapted for cooperation with said abutment providing a safety catch.

6. The combination with a latch strike plate having an inclined striker surface; a raised portion integrally formed upon said plate providing a safety catch abutment, said raised portion having a striker face of different angularity than said first mentioned striker face; latching means including a main latch bolt adapted for cooperation with the first mentioned inclined surface on said striker plate, said latching means including a secondary independently movable latch bolt adapted for cooperation with said safety catch abutment.

7. In combination with a door latch plate having a plurality of latch bolt retracting surfaces of different angularities; latch means including a plurality of latch bolts, each of said bolts being adapted for respective cooperation with one of the bolt retracting surfaces on said plate whereby during door closing operation said bolts are retracted at different rates of speed by said bolt retracting surfaces.

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