

Aug. 28, 1945.

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2,383,576

DOOR LATCH CONSTRUCTION

Filed Oct. 2, 1941

3 Sheets-Sheet 1

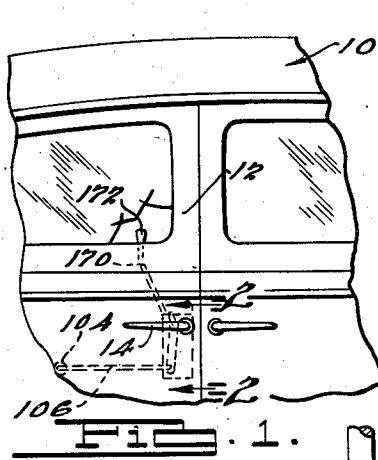


FIG. 1.

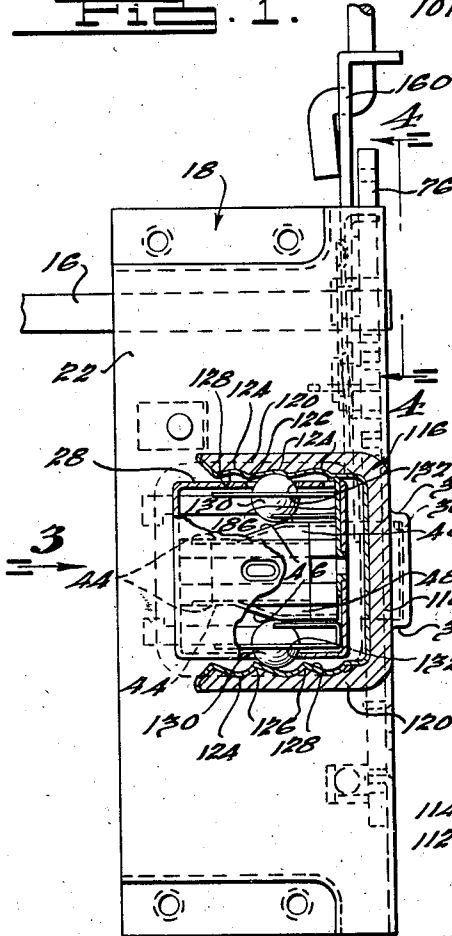


FIG. 2.

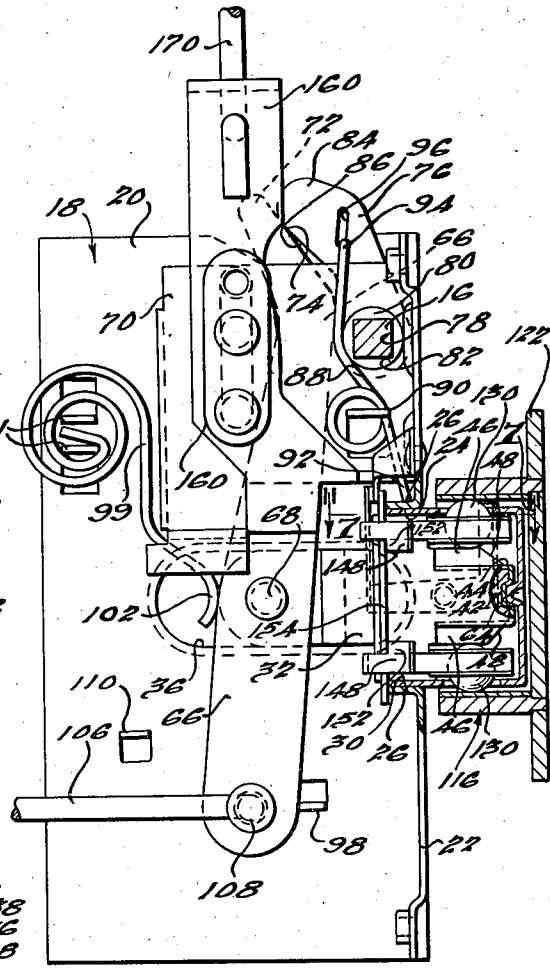


FIG. 3.

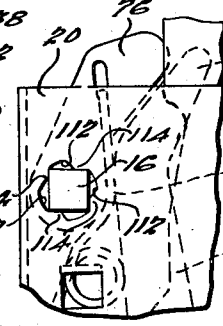


FIG. 4.

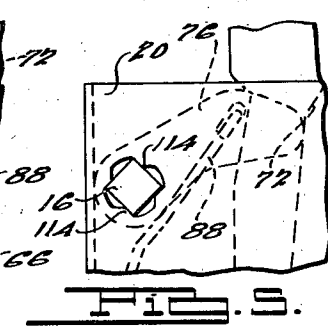


FIG. 5.

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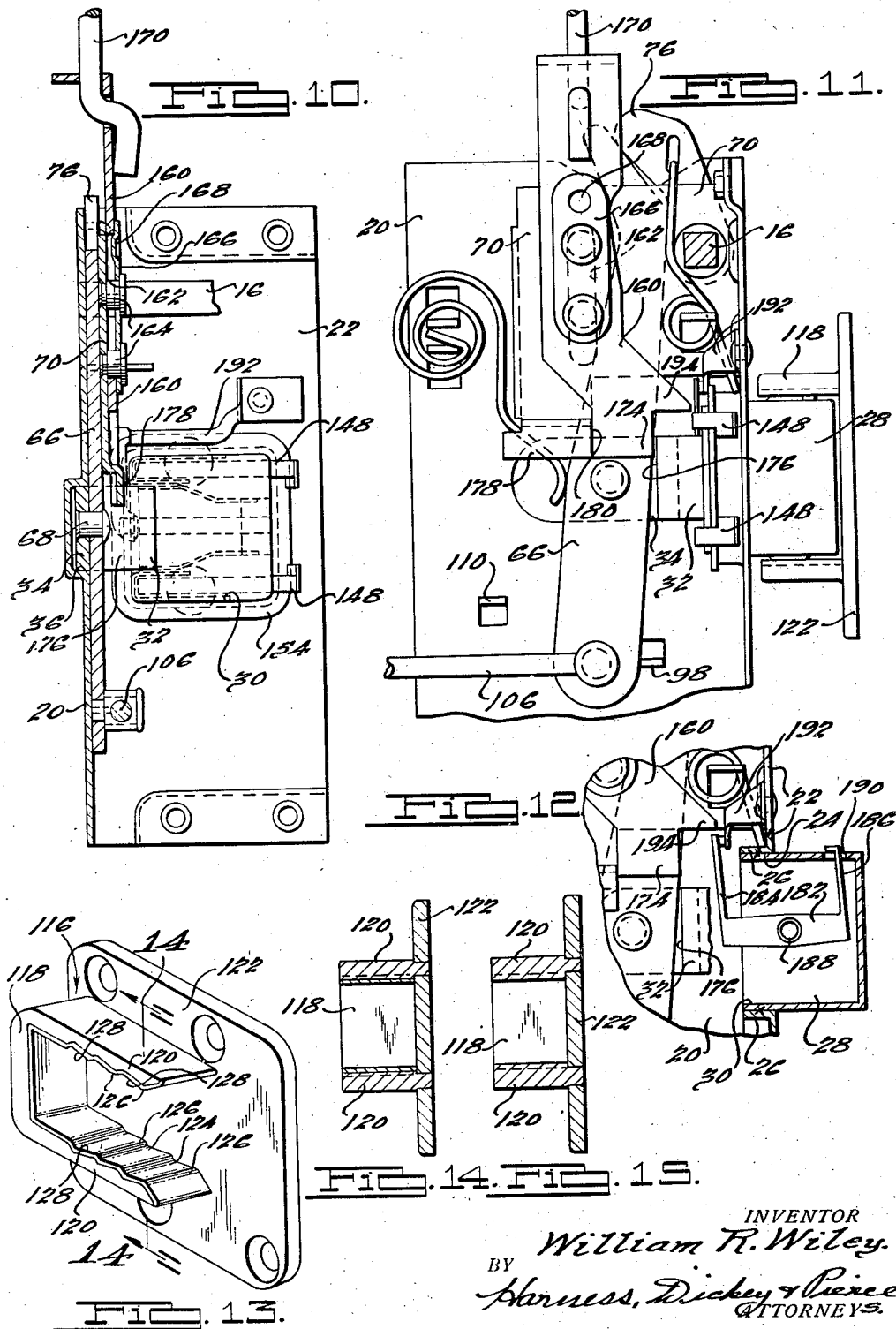
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3 Sheets-Sheet 3



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DOOR LATCH CONSTRUCTION

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11 Claims. (Cl. 292—252)

The present invention relates to improvements in door latch constructions and particularly to such constructions adapted for use on automobile doors.

One of the primary objects of the invention is to provide a simplified construction of the type mentioned which is absolutely positive in its latching action and yet which is more economical to manufacture than prior constructions.

Another object of the invention is to provide an improved construction of the type mentioned in which the door may be closed and positively latched with very little effort and by the application of very little force.

A primary object of the invention is to provide a latch construction designed and intended for use principally in connection with the doors of automotive vehicles in which the latch will serve to retain the door positively restrained against opening movements and yet at the same time permit relatively free, limited, longitudinal movement of the latch with respect to the keeper in order to compensate for variations in the relative position of the latching keeper due to flexing of the vehicle body.

A further object of the invention is to provide improved door latching constructions of the type mentioned in which the door is positively latched against opening at any one of a plurality of positions, but in which the door may be easily closed to its inner position from one of its outer latched positions.

A further object of the invention is the provision of an improved latching mechanism including a retractible plunger, ball members and a keeper in which these elements are so constructed and are in such a relationship to each other, particularly in the relationship of the surfaces of the keeper and plunger engaged by the balls, that there is positive interference against opening of the door while there is also adjustability in the closing of the door.

A further object of the invention is the provision of latching mechanism of the type mentioned in which an improved and simplified structure for releasing the balls from their latching position is provided.

Another object of the invention is the provision of improved constructions including lining soft surfaces with hard materials, in such parts as the plunger and the keeper, thereby effecting considerable economy in manufacture and assuring long life in the latch.

Still further, an important object of the invention consists in the provision of a keeper having

a pair of series of inclined cam surfaces, each of which is adapted to engage the latch mechanism and urge the door toward closed position when the latch is engaged and in which the cam surfaces of one series are offset from the cam surfaces of the other series in order that at least one cam surface will at all times be constantly tending to urge the door toward closed position.

Another object of the invention is the provision of an improved manner of mounting the handle shaft with respect to one of the cams of the structure through an opening in the casing of a particular shape, thereby providing stops and preventing rattling of the handle shaft and cam.

A further object of the invention is the provision of improved and simplified control means preventing latching from the inside of the automobile unless premeditated through a positive action by the operator.

A more specific object of the invention is the provision of improved ball spring retainers.

Another object of the invention is the provision of an improved construction and arrangement between the plunger and the casing within which the plunger projects so that the plunger is positively aligned and guided in its movement from its retracted to its outward position within the housing.

Other objects of the invention will become apparent from the following specification, the drawings relating thereto and from the claims hereinafter set forth.

In the drawings in which like numerals are used to designate like parts in the several views throughout:

Figure 1 is a fragmentary, side elevational view of an automotive vehicle having a latching mechanism according to the present invention associated therewith;

Fig. 2 is an enlarged elevational and cross-sectional view taken substantially along the line 2—2 of Fig. 1;

Fig. 3 is a side elevational view with parts in cross-section taken in the direction of the arrow 3 on Fig. 2 showing the elements in latching position;

Fig. 4 is a fragmentary elevational view taken substantially along the line 4—4 of Fig. 2;

Fig. 5 is a view similar to Fig. 4, showing the parts in a different position;

Fig. 6 is a view similar to Fig. 3 illustrating the parts in unlatched position;

Fig. 7 is a cross-sectional view taken substantially along the line 7—7 of Fig. 3;

Fig. 8 is a cross-sectional view taken substantially along the line 8—8 of Fig. 7;

Fig. 9 is an exploded perspective view of a portion of the plunger, the liner therefor, and the balls and ball spring retainers;

Fig. 10 is a view similar to Fig. 2, showing parts in cross-section, and taken from the opposite side of the latching mechanism;

Fig. 11 is a partial elevational view similar to Figs. 3 and 6, illustrating the parts in a different position in which the latch is locked by mechanism operated from the inside of the car;

Fig. 12 is a partial view of a portion of the mechanism illustrated in Fig. 11 with parts in cross section illustrating certain details of the operating mechanism;

Fig. 13 is a perspective view of one form of keeper according to the present invention;

Fig. 14 is a cross-sectional view taken substantially along the line 14—14 of Fig. 13; and

Fig. 15 is a view similar to Fig. 14 illustrating another form of keeper according to the present invention.

Referring to the drawings, in Fig. 1 a portion of the side of an automobile, generally indicated at 10, is shown from the exterior having a latching means according to the present invention associated therewith. One of the usual pivoted doors is indicated at 12 having the usual door handle 14 located adjacent one of the upright frame pillars of the vehicle. The door handle 14 has a square handle shaft 16 connected thereto so that as the handle 14 is turned the shaft 16 is correspondingly turned to unlatch the door so that it may be swung open.

According to the present invention, a latching means generally indicated at 18 is provided which includes a supporting means mounted on the door 12 adjacent that edge of the door beside the pillar. The supporting means comprises a plate 20 having another plate 22 integral with one edge of the plate 20 and at a right angle thereto. The support is adapted to be fixed to the door in suitable fashion as by bolting the plate 22 to the edge of the door in the proper location. A rectangular opening 24 is provided through the plate 22, substantially midway between the top and bottom edge thereof and the edges of such opening are flanged inwardly as indicated at 26. A housing 28, rectangular in cross section, is disposed within the opening 24, has one end thereof open as indicated at 30, and is suitably fixed to the flange 26 such as by welding.

A plunger 32 is slidably or reciprocally mounted on the plate 20 of the support. The plunger 32 has an offset portion 34 at the inner end thereof which lies substantially in the plane of the plate member 20 and is slidably received within an elongated, substantially horizontal guideway 36 formed in the plate member 20. The guideway has a width substantially equal to the width or depth of the projecting portion 34 of the plunger. The guideway may be formed by stamping a projection of proper shape in the plate 20 forming guiding ledges 38 (Fig. 2) upon which the plunger is reciprocally mounted through the sliding engagement of the portion 34 therewith. The inner face of the guideway is closed. The guideway is also of such a length as to permit reciprocal movement of the plunger within predetermined limits.

The plunger 32 has another portion 40 at the outer end, which portion is complementary in shape to the shape of the opening 30 and of the housing 28. Such end 40 terminates in a reduced

portion 42 having a shape which will be described in detail hereinafter and which is adapted to project within the housing 28 when the plunger is in its outer or projected position.

The top and bottom surfaces of the reduced end 42 of the plunger are provided with similar cam surfaces, respectively. Each of such surfaces moves outwardly from a plane datum surface 44 to provide cam surfaces indicated at 46 and 48. The cam surfaces 46 and 48 terminate in flat, substantially horizontal surfaces 50. As stated above, the top and bottom surfaces of the plunger are similar in shape.

In order to provide for long life, the projecting end having the cam surfaces thereon may be covered with a cover or sheath member indicated at 52 (Fig. 9) which is adapted to be secured over the reduced end of the plunger. Such cover 52 is preferably formed of a hard spring steel with the top and bottom portions having shapes corresponding to the shapes of the top and bottom surfaces of the plunger above described and being indicated by primed numerals to indicate the corresponding surfaces. In order to retain the member 52 in position, recesses 54 are formed in the top and bottom surfaces of the plunger and are adapted to receive therein tabs or projections 56 formed in the member 52.

For purposes of simplicity in description, the same numerals used above to indicate the cam surfaces on the plunger are also used to indicate the same cam surfaces on the cover 52 since these surfaces may be considered as the same in so far as the present invention is concerned.

The outer face of the reduced end 42 of the plunger is provided with a transversely extending recess 58 extending thereacross, and the overlying end face 60 of the cover 52 has provided thereon a punched-in portion 62, the sides of which taper inwardly and converge with respect to each other. Such sides serve as a guide for the plunger as it is reciprocated with respect to the housing 28, through the cooperation of such sides with an in-struck tab 64 (Figs. 3 and 6) formed in the outer wall of the housing 28 substantially centrally thereof. It will thus be appreciated that as the plunger moves from its retracted position shown in Fig. 6 to its projected position shown in Fig. 3, as the plunger approaches the end of its travel the tab 64 will cooperate with the sides of portion 62 in providing aligning means so that the plunger is properly aligned with respect to the housing.

Means are provided for withdrawing the plunger 32 from its projected position through the turning of the door handle 14 and also by turning the inside door handle. Such means includes an upstanding lever member 66 pivotally connected at 68 to the offset end 34 of the plunger 32. The upper end of the lever 66 is disposed between a cover member 70 and the inner face of the plate member 20. The cover member 70 is mounted on the plate member 20 in spaced relation thereto along its vertical sides, leaving openings at the top and bottom thereof. The lever 66 thus projects above the top of the casing member 70 terminating in an offset upper end 72 which provides a cam bearing surface 74.

An upwardly extending lever member 76 is fixedly mounted on the square shaft 16 through a square opening 78 therein. A circular hub portion 80 surrounds the square opening 78 and is received within a circular bearing opening 82 formed in the casing member 70. The shaft 16 is thus rotatably mounted with respect to the

casing 70 and the support 20. The member 76 has an offset upper end 84 provided with a bearing surface 86 on the under edge thereof, which is adapted to slidably bear against the cam surface 74 of the lever 66.

The member 76, together with the shaft 16 is constantly and resiliently urged to turn in a clockwise direction, viewing Figs. 3, 6 and 11, through the action of a spring element 88. The spring element 88 is mounted to the casing 70 by means of connection with a struck-out tab 90. The lower end 92 of the spring bears against the plate member 22, and the upper end 94 is hooked and connected to the member 76 through an elongated slot 96, above the shaft 16.

By turning the handle so that the shaft is turned in a counter-clockwise direction, viewing the above-mentioned figures, against the action of spring 88, it will be evident that the bearing edge 86 bears against the cam edge 74 of the lever 66 tending to turn such lever in a counter-clockwise direction about the pivot 68. The lower end of the lever 66 abuts against a stop 98 formed by striking in a tab in plate 20. Since the lower end of lever 66 is thus limited in its counter-clockwise movement it will be appreciated that the pivot point 68 is caused to move toward the left of the above-mentioned figures, thus causing the plunger 32 to also move to the left, retracting the plunger from its projected position.

Means are provided by which the plunger is constantly and resiliently urged toward its projected positions. Such means include a spring element 99 having one end thereof anchored between struck-in tabs 101 formed in plate member 20. The other end 102 of the spring 99 depends to a position behind and against lever 66 at a point in substantially horizontal alignment with the pivot 68. It will thus be seen that the spring 99 resiliently and constantly urges the plunger toward the right of the above-mentioned figures, or to its projected position.

In order to retract the plunger 32 from its projected position from the inside of the car the usual inside operating handle 104 is provided which is connected through an operating link 106 to the lower end of lever 66. The link 106 is pivotally connected to the lever 66 at pivot 108. When the inside handle 104 is turned the link 106 is pulled toward the left, viewing Figs. 3, 6 and 11, thereby tending to turn the lever 66 in a clockwise direction about the pivot 68. The upper end 72 of lever 66 is thus moved into bearing engagement with bearing surface 86 of the member 76. Since the turning of member 76 is thus limited in a clockwise direction, the lever 66 will fulcrum about the point of engagement between the upper end 72 and member 76 so that the pivot point 68 moves toward the left of the above-mentioned figures and thereby retracts or moves the plunger toward the left. The movement of the lower end of the lever 66 in this direction is limited by means of a stop 110 formed by striking in a tab in member 20 so that such stop lies in the path of movement of the lower end of the lever 66.

One of the features of the present invention relates to the details of construction through which the turning of the shaft 16 in a counter-clockwise direction, viewing Fig. 3, is limited and through which rattling of the door handle is prevented. This is best brought out in Figs. 4 and 5 in which it will be seen that the end of

the shaft 16 projects through an opening formed in the plate member 20. Such opening is of irregular shape having alternate recesses 112 and projections 114. Adjacent sides of the projections 114 are substantially straight so that alternate ones of said sides form portions of a square while the other alternate ones form portions of another square with the intermediate portions of the opening more or less curved to permit freedom of movement of the corners of the square shaft 16.

It will thus be seen that when the shaft 16 is in the position shown in Fig. 4 certain of the sides of the corners of the shaft bear against the adjacent straight sides of projections 114 so that viewing this figure such sides form a stop against movement of the shaft 16 in a counterclockwise direction. The shaft is, however, free to be turned in a clockwise direction from the position shown in Fig. 4 to that shown in Fig. 5 for a limited distance when the opposite sides adjacent the corners abut against the next adjacent sides of the projections 114, thus forming stops against further turning of the shaft in this direction.

The plunger is in its withdrawn or retracted position when the elements are in the position shown in Fig. 5 and is in its normal or projected position when the elements are in the position shown in Fig. 4. It will thus be seen that when the elements are in the position shown in Fig. 4 that the spring 88 urges the member 76 to turn in a counter-clockwise direction and the corners of the shaft 16 are thus resiliently urged against the adjacent sides of the projections 114 as illustrated. This therefore prevents rattling of these elements.

As the plunger 32 is reciprocated with respect to the support 20 and with respect to the housing 28, the plunger actuates latching means which are adapted to latchingly engage and be released from a keeper generally indicated at 116. The keeper 116 includes a U-shaped keeper 118, having sides 120, which is fixedly secured to a mounting plate 122. The keeper is mounted on the pillar of the vehicle through the plate 122 in such a position that the open end of the U-shaped keeper is disposed outwardly of the vehicle in the path of movement of the housing 28 as the door is swung from open to closed position, so that the housing 28 passes through the open end of the U-shaped keeper 118 between the sides 120 thereof.

The facing surfaces of the sides 120 are each provided with a plurality of alternate troughs 124 and crests 126 which extend transversely of the sides, thus providing cam surfaces 128. It should be emphasized at this point that the cam surfaces 128 on the lower side of the keeper are slightly staggered or offset from the cam surfaces 128 on the upper side of the keeper and that these cam surfaces or troughs run longitudinally with respect to the vehicle in order that the device will function in the manner hereinafter described throughout a relatively wide range of clearances or relative positions of the door and door opening.

The cam surfaces 128 and the cam surfaces 46 are at such an angle with respect to the horizontal that there is about seven degrees difference between such surfaces so that a wedging action will take place through engagement of these surfaces by cooperating movable latching means. The inner surfaces of the U-shaped keeper 118 may be lined with a suitable liner of a hard spring material, such as that shown in

Figs. 13 and 14, or such liner may be dispensed with as shown in Fig. 15. Either one of such constructions may be used within the scope of the present invention.

In order to provide the latching action between the housing 28, mounted on the door, and the keeper 118, mounted on the pillar, latching means in the form of balls 130 are provided. Such balls are movably disposed within the housing 28, one of such balls being provided on each of the top and bottom sides of the reduced end of the plunger 32.

It will be noted that these balls are arranged in substantial vertical alignment and that these balls cooperate with the cam surfaces 128 which, as explained above, are arranged in staggered relation or out of vertical alignment. It will be apparent that as a result of this construction, the balls in their engagement with the cam surfaces never arrive at a dead center position but at all times are arranged in such a way that either one ball or the other is directly engaged with one of the cam surfaces. The advantage of this construction resides in the fact that inasmuch as one of these balls is always engaged with one of the cam surfaces, there is present in the structure a force which at all times tends to move the door toward closed position.

Aligned openings 132 are provided through the top and bottom walls of the housing 28 and such openings are of such size that portions of the balls 130 may project therethrough.

It will be noted that these openings 132 are preferably of a size considerably larger than the portions of the balls which project therethrough. Consequently, the balls may be permitted to roll upon the cam surfaces 128 thereby allowing for changes or variations in the space between the jamb face of the door and the jamb face of the door opening. This is regarded as a particularly important feature of the present invention inasmuch as in automotive vehicle bodies considerable variation and change takes place in this spacing due to flexing of the body during its use.

Inasmuch as this variation is bound to be present, the present latch construction affords an arrangement which permits this relative movement to take place virtually without resistance without at the same time impairing the functioning of the latch mechanism. It will be seen that longitudinal movement of the balls 130 in the troughs 128 can take place throughout an appreciable distance without altering the latching action of the mechanism.

The balls are disposed within the housing and one of such balls is positioned above the top surface of the reduced end 42 of the plunger 32 while the other ball is disposed under the bottom surface thereof. Each of such balls is movable with respect to the surfaces 44, 46, and 48 on that side of the plunger to which the ball is disposed. The action of the balls 130 with respect to the adjacent cam surfaces, adjacent openings through the housing openings, and the latching portions of the U-shaped keeper 118 is the same for each of the balls so that a description for one will suffice for both.

Each ball 130 is mounted within the housing and is resiliently urged toward its cam surface 46 by means of a resilient mounting means. Such resilient mounting means comprises a resilient sheet metal strip having a plate-like portion 134 provided with a circular aperture 136 therethrough, the aperture 136 being of a smaller diameter than the maximum diameter of the ball

130. Another plate-like portion 138 is integrally formed with the plate-like portion 134 and serves to keep the ball 130 from dropping entirely out of the opening 136, particularly when such ball is being mounted within the housing. The plate portion 138 has, therefore, a recess 140 providing a pair of fingers 142 which are adapted to project to such a position behind ball 130 that such ball may drop within the recess 140 but will be engaged by fingers 142 and thereby prevented from dropping entirely out of the opening 136. A resilient attaching portion in the form of an elongated strip 144 is formed integral with the plate-like portions 134 and 138 and is bent with a substantially straight, side portion 146 terminating in a hooked end 148. In mounting the resilient mounting means within the housing 28 portions 150 of the plunger are removed so that the side portions 146 extend along this one side of the plunger with the hooked end 148 snapped around the inner open edge of the housing 28. Each of the hooked ends 148 has an in-struck tab portion 152 which is adapted to be snapped behind a flange 154 formed around the inner open edge of the housing 28.

When the balls 130 are disposed within the housing 28 by the mounting means above described, it will be evident that such ball members are resiliently urged to a predetermined position within the housing. When the plunger 32 is in its projected or outward position, the ball members 130 are resiliently urged against their respective cam surfaces 46 so that such ball members are urged outwardly, by the action of such cam surfaces, through openings 132 in the housing.

The above described mounting of the ball members, as is clearly seen in Fig. 9, is sufficiently resilient to permit the above mentioned longitudinal movement of the balls in the troughs 128 to take care of variations in spacing between the jamb face of the door and the jamb face of the door frame.

When the door is moved from open to closed position, with the plunger projected, it will be evident that the housing enters the U-shaped keeper 118 through the open end thereof. The balls 130 abut against the interior surfaces of the keeper 118, and such balls are free to move inwardly of openings 132, since the crests will cause the balls to ride down cam surfaces 46 against the action of the spring mounting means. Since the balls are resiliently urged outwardly, as such balls pass each of the troughs 124, they will be urged toward the bottom of said troughs; and, depending on how far the door is pushed closed, will seat in one of such troughs.

When seated within any of the troughs, the door is positively latched against opening, unless the plunger 32 is withdrawn by turning the door handle. This is due to the wedging relationship on the balls between the cam surfaces 46 and 128. Any force applied to pull the door open, without retracting the plunger, will merely cause the balls 130 to be urged farther outwardly of the openings 132 by cam surfaces 46 into tight latching or wedging relationship with surfaces 128.

If the balls have stopped inside the first crests, the door cannot be opened, but is free to be further shut since the balls will drop away from openings 132 as they pass over the crests 126, but will be wedged against the cam surfaces 128 upon any attempt to force the door open without retracting the plunger.

To open the door, it is merely necessary to turn one of the operating handles, as described above,

so that the plunger 32 is retracted. When the plunger is thus retracted, the spring mounting means for the balls, which resiliently urges such balls to a predetermined position within the housing, will dispose such balls over cam surfaces 48. As the plunger is retracted, such balls are then free to ride inwardly of the cam surfaces 43, so that they are free to drop away from openings 132 and the wedging action against cam surfaces 128 is relieved. The door is then free to be pulled open.

It will be evident from the above description that while the door cannot be forced open while the plunger is in its projected position, the balls are, however, free to move transversely of the cam surfaces 128. A small clearance is provided between the end of housing 28 and the adjacent face of plate member 122, so that this transverse movement of the balls, with respect to the grooves or cam surfaces of the U-shaped keeper, may take place. This will permit movement between the door and door pillar in a direction in the plane of the door, which is important in compensating for such contingencies as body vibration.

The latching action of the construction above described is positive, while the effort required to close the door is slight.

Also, according to the structure of the present invention, means are provided by which the latching mechanism may be locked either from the inside or the outside of the car. In locking the latching mechanism from the outside of the car, the structure is such that a conscious operation must be performed by the vehicle operator so as to reduce the possibility of such operator locking himself out of his car.

Such means includes a stop which is movable to a position behind the plunger, so that such plunger is held in its projected or outward position. Another stop is provided which normally prevents the first mentioned stop from being moved to a position behind the plunger when the door is open, without performing an independent, conscious operation.

The above means comprises a vertically reciprocable stop member 160, which is slidably mounted on the outer face of casing 70. To provide for such movement, an elongated aperture 162 is provided in the stop member 160 and is slidably mounted to casing 70 by a pair of spaced rivet members 164 which are fixed to casing 70 and have shank portions bearing against the sides of aperture 162 with enlarged headed portions. A spring element 166 bears against the outer surface of member 160 and is fixed to the rivets 164.

The upper end of such spring element 166 is provided with an inward projection or bubble 168, so that the member 160 is resiliently urged against the casing 70. When the locking member 160 is in its upper or unlocked position, the depression 168 projects into the upper end of aperture 162, so that such member is normally held in this upper position. It may be forced down to its locking or stop position against the action of spring member 166 by means of an operating rod 170, which is connected to the upper end of member 160. The rod 170 extends upwardly through the lower portion of the window frame and is connected to an operating button 172 in the usual way. It will thus be seen that by raising and lowering the button 172, the stop member 160 is correspondingly raised and lowered.

The locking action of the member 160 is best shown in Figs. 6, 11, and 12. In Fig. 6, the stop

member 160 is in its upper position, so that the plunger is free to be retracted. The lower end of the member 160 is provided with a projection 174 providing a stop shoulder which is adapted to be moved into the path of reciprocable movement of plunger 32 when the member 160 is lowered to the position shown in Fig. 11. Such stop shoulder moves behind the offset surface of the plunger, indicated at 176, in Figs. 9 and 11.

In order to reinforce or back up the stop member 160, the lower end of casing 70, behind the inner edge of projection 174, is offset, as indicated at 178 in Figs. 10 and 11, so that an edge 180 thereof bears against the adjacent edge of projection 174. It will thus be evident that any tendency of the lower end of stop member 160 to give when a retracting force is applied to plunger 32 will be reinforced by the edge 180 of casing 70.

Another stop means is provided which is adapted to be positioned in or out of the path of movement of the stop 160, so that when it is in the path of movement of stop 160, such stop cannot be moved to its locking position without moving the second stop out of the way. This second stop comprises a generally U-shaped member 182, having an upwardly disposed stop finger 184 and another upwardly disposed operating finger 186. The member 182 is pivotally connected at 188 to one of the side walls of the housing 28, with the operating finger 186 normally projecting through an opening 190 in the housing, so that a portion thereof projects above the top wall of the housing.

The stop finger 184 is normally urged inwardly by a spring member 192, which is fixedly mounted to the plate member 22 of the support. The spring 192 resiliently bears against the upper end of stop finger 184, so that the stop finger is urged to a position in the path of movement of a projection 194, formed as an integral part of the stop 160. At this time, the upper end of finger 186 projects above the top wall of casing 28.

When the door is closed, and when the casing 28 is therefore within the U-shaped keeper 118, the inner surface of the top side of the keeper 118 bears against the top edge of finger 186, thereby pivoting the stop 182 in a clockwise direction, viewed in Fig. 12, so that the stop finger 184 is moved out of the path of movement of projection 194 against the action of spring 192. Therefore, when the door is closed, the stop 160 may be moved downwardly to its stopping position by the button 172.

However, when the door is opened, the spring 192 urges the stop finger 184 into the path of downward movement of stop 160, under projection 194, and the upper end of finger 186 projects above the top of housing 28. The button 172 cannot then be operated to lock the plunger against movement to its retracted position. The stop finger 184 must first be moved out of the way of projection 194, which can only be accomplished through a conscious effort on the part of the operator. This may be simply done by depressing the finger 186 manually so that the upper end thereof is pressed against the top of casing 28, at which time the stop finger 184 is moved out of the way of the projection. While the finger 186 is so held, the button 172 may be depressed to move the stop 160 to its position behind the plunger 32. The door is free to be closed while the plunger is thus stopped against retractive movement.

Formal changes may be made in the specific

embodiments of the invention described without departing from the spirit and substance of the invention, the scope of which is commensurate with the appended claims.

What is claimed is:

1. A door latching mechanism comprising a supporting means, a housing on said supporting means having an opening through one wall thereof, a plunger slidably mounted on said supporting means and having one end thereof projecting into said housing, said projecting end being formed with a pair of adjacent flat cam portions on one surface thereof, a movable ball member disposed to engage said cam portions adjacent said opening, the construction and arrangement of said portions, said ball member and said opening with respect to each other being such that said ball may be projected through and permitted to withdraw from said opening through the disposition of the cam surfaces with respect to the ball member upon sliding movement of said plunger with respect to said housing.

2. A door latching mechanism comprising a supporting means, a housing on said supporting means having aligned openings in the top and bottom walls thereof, a plunger slidably mounted on said supporting means and having one end thereof projecting into said housing, said projecting end being formed with a pair of adjacent flat cam portions on the top and bottom surfaces thereof, movable ball members disposed to engage the cam portions of said surfaces adjacent said openings, the construction and arrangement of said portions, said ball members and said openings with respect to each other being such that said balls may be projected through their respective openings and permitted to withdraw therefrom through the disposition of the cam surfaces with respect to the ball members upon sliding movement of said plunger with respect to said housing.

3. A door latching mechanism comprising a supporting means, a housing on said supporting means having openings in opposite walls thereof, a plunger slidably mounted on said supporting means and having one end thereof projecting into said housing, said projecting end being formed with cam portions on opposite surfaces thereof which face said openings, respectively, said cam portions sloping toward said openings, respectively, ball members disposed on said cam portions for sliding movement thereover, resilient means engaging said ball members normally urging said ball members to a predetermined position within said housing, the construction and arrangement of said cam portions, said ball members, and said openings being such that when said plunger is in one position said ball members are resiliently urged against said cam portions and outwardly through said openings and when said plunger is in another position said ball members are free to move away from said openings.

4. A door latch mechanism comprising a supporting means, a housing on said supporting means having aligned openings in opposite walls thereof, a plunger reciprocally mounted on said supporting means for reciprocable movement with respect to said housing and having one end thereof projecting into said housing, said projecting end being formed with a pair of adjacent flat cam portions on each opposite surface thereof facing said openings, means disposed to be engaged by said cam portions for sliding movement with respect thereto, the construction and arrangement of said portions, said last named

means and said openings with respect to each other being such that said means may be projected through their respective openings and permitted to withdraw with respect thereto through the disposition of the cam portions with respect to said last named means upon reciprocable movement of said plunger with respect to said housing, and guide means engaging said plunger as it approaches it outwardly projected position.

5. A door latching mechanism comprising a supporting means, a housing on said supporting means having aligned openings in opposite walls thereof, a plunger reciprocally mounted on said supporting means for reciprocable movement with respect to said housing and having one end thereof projecting into said housing, said projecting end being formed with cam portions on opposite sides thereof facing said openings, respectively, ball members disposed within said housing on said cam portions for sliding movement with respect thereto, resilient means engaging said housing and engaging said ball members, positioning such ball members to a normal position with respect to said housing, the construction and arrangement of said resilient means with respect to said cam portions and said openings being such that said ball members are urged outwardly through said openings by said cam portions when said plunger is in its outer projected position and said ball members are free to move away from said openings when said plunger is in its retracted position.

6. In a door latching mechanism, a housing having an opening in one wall thereof, a ball member disposed within said housing adjacent said opening, and resilient means mounting said ball member within said housing, said resilient means having a portion substantially parallel to said one wall of said housing and having an opening in said portion adjacent the opening in said housing through which said ball member may project, said resilient means also including a spring portion engaging said housing and normally urging said ball member to a predetermined position within said housing.

7. In a latching mechanism, a resilient, ball mounting element comprising a sheet metal strip having a plate-like portion provided with an aperture through which a portion of said ball is adapted to project, and a resilient attaching portion connected to said plate-like portion.

8. In a latching mechanism, a resilient, ball mounting element comprising a sheet metal strip having a plate-like portion provided with an aperture through which a portion of said ball is adapted to project, means on said element keeping said ball in alignment with said aperture but permitting freedom of movement of said ball with respect to said aperture, and a resilient attaching portion connected to said plate-like portion.

9. In a latching mechanism, a resilient, ball mounting element comprising a sheet metal strip having a plate-like portion provided with an aperture through which a portion of said ball is adapted to project, another plate-like portion spaced from said first named plate-like portion and substantially parallel thereto, said another plate-like portion having means adapted to engage said ball to keep said ball in alignment with said aperture but permitting freedom of movement of said ball with respect to said aperture, and a resilient attaching portion connected to said plate-like portion.

10. In a latching mechanism, a resilient, ball

mounting element comprising a sheet metal strip having a plate-like portion provided with an aperture through which a portion of said ball is adapted to project, another plate-like portion integral with said first named plate-like portion and disposed in substantially parallel spaced relation with respect thereto, said another plate-like portion having means thereon adapted to engage said ball to keep said ball in alignment with said aperture but permitting freedom of movement of said ball with respect to said aperture, and an elongated, resilient attaching portion integral with both of said plate-like portions.

11. In a door latching mechanism, a housing having an opening in one wall thereof, a ball member disposed within said housing adjacent said opening, and a resilient ball mounting ele-

ment mounting said ball member within said housing, said element comprising a sheet metal strip having a plate-like portion provided with an aperture through which a portion of said ball is adapted to project, said plate-like portion being substantially parallel to one wall of said housing and said aperture being adjacent the opening in said housing, means integral with said element to keep said ball in alignment with said aperture but to permit freedom of movement of said ball with respect to said aperture, and an elongated resilient attaching portion integral with said plate-like portion and having an attaching portion engaging said housing, whereby said ball member is urged to a predetermined position within said housing.

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