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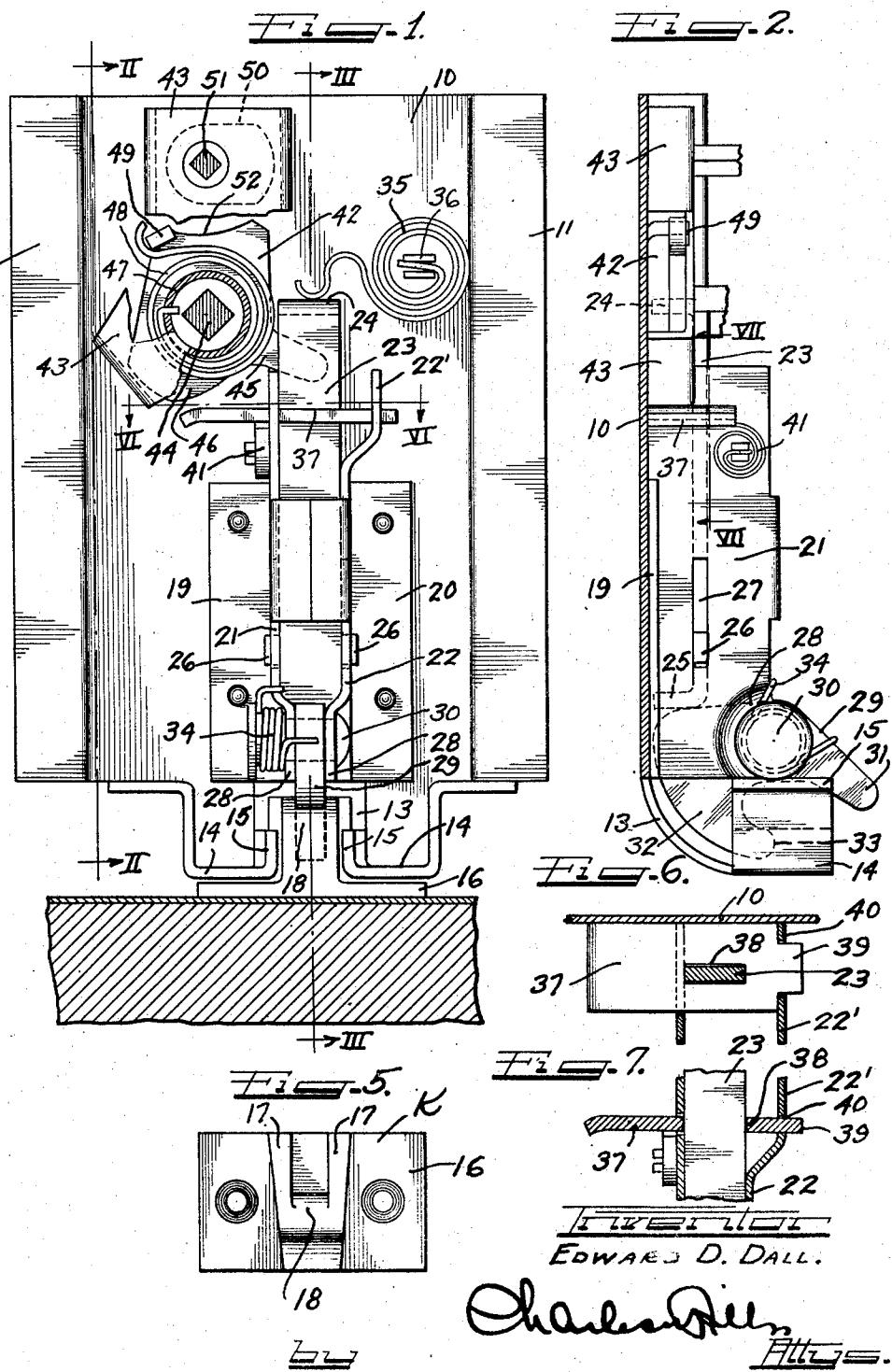
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DOOR LATCHING STRUCTURE

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2 Sheets-Sheet 1



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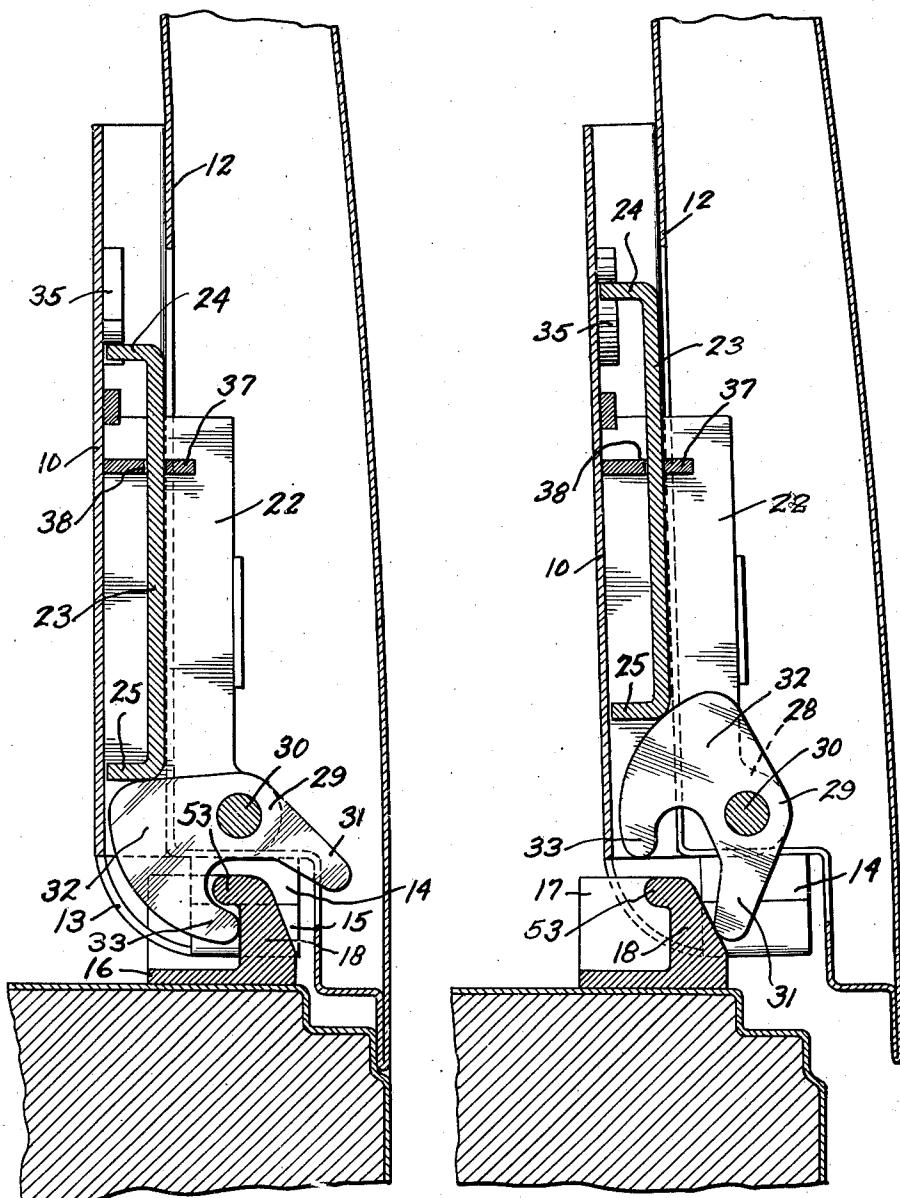
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UNITED STATES PATENT OFFICE

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DOOR LATCHING STRUCTURE

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6 Claims. (Cl. 292—198)

This invention relates to a latching structure adapted particularly for the latching or locking of doors on automobiles. The invention concerns particularly that type of latching assembly comprising a latching bolt for cooperation with a keeper, and holding means spring pressed for engagement with the latch bolt to hold it either in its latching position or its unlatching or cocked position and which, when in engagement with the latch bolt when in latching position continuously effects pressure against the bolt for forcing it in latching direction so as to take up any lost motion or play of the door and hold it securely closed against rattling.

An important object of the invention is to provide improved means, in the form of gripping means, which will permit the holding means to be freely moved by the spring means for pressure engagement with the latch bolt but which will intergrip with the holding means to securely lock it against release movement from any position to which it has been set by the spring pressure means.

A further object is to provide simple releasing means operable to first release the gripping means from the holding means and then withdraw the holding means from the latch bolt so that the latch bolt may move to unlatching position for opening of the door.

The various features of improvement of my invention are incorporated in the structure shown on the drawings, in which drawings—

Figure 1 is a front side view of the latching assembly and the keeper structure;

Figure 2 is a section on plane II—II of Fig. 1;

Figure 3 is a section on plane III—III of Fig. 1 and a section of part of a door on which the latch structure is mounted;

Figure 4 is a section similar to Fig. 3 but showing the door being swung to closed position;

Figure 5 is a side view of the keeper structure;

Figure 6 is a section on plane VI—VI of Fig. 1; and

Figure 7 is a section on plane VII—VII of Fig. 2.

The operating parts of the latch assembly on the door are contained within a rectangular housing 10 having the side flanges 11 by which the housing is seated against and secured to the inner wall 12 of the door, as by spot welding. The housing is preferably formed integral from sheet metal and at its outer end the metal is cut away to leave the passageway 13 for the keeper element K, and the metal adjacent to

5 the sides of the passageway is bent to form U-shaped guides 14 whose ends are deflected to form guide tongues 15 along the sides of the passageway 13.

10 The keeper element K comprises a base 16 from which extend the walls 17 between the front ends of which extends the keeper head 18. The keeper element may be formed of sheet metal, or may be an integral casting, and it is secured to the frame surrounding the door for reception of its walls 17 between the guide tongues 15 on the housing 10 when the door is swung to closed position. Preferably the outer sides of the walls 17 are inclined and the tongues 15 are correspondingly inclined so that when the door is swung to its closed position the tongues will intimately receive the keeper walls to guide the closing movement of the door and to hold the closed door against side displacement or rattling.

15 Secured against the inside of the housing 10 inwardly of and adjacent to the sides of the passageway 13 are the walls 19 and 20 having forwardly extending walls or flanges 21 and 22, respectively, at their inner edges to form a guideway for the holding member 23. This holding element is in the form of a bar deflected rearwardly at its upper and lower ends to form a head 24 and a foot 25 respectively. Near its lower end the bar has guide tongues 26 extending 20 into guide slots 27 provided in the guide walls 21 and 22 so that the holding member is guided for longitudinal movement.

25 The lower portions 28 of the guide walls 21 and 22 are extended forwardly and deflected toward each other to receive between them the latch bolt 29 which, intermediate its ends, is fulcrumed on a pin 30 extending through the portions 28, as clearly shown on Fig. 1. The latch bolt has the setting arm 31 and the latching arm 32 which terminates opposite the arm 31 in a latch hook 33, the outer edge of the arm 32 being concentric with the fulcrum pin 30. A spring 34 coiled around one end of the fulcrum pin 30 has one end engaging the side wall 21 and its other end engaging the setting arm 31 of the latch bolt, this spring tending to hold the latch bolt in its unlatched or cocked position shown on Fig. 4. A coiled spring 35 anchored on a post 36 extending from the housing 10 has its end in engagement with the head 24 of the holding member 23 and tends at all times to shift this holding member outwardly for engagement with the latch bolt. When the latch bolt is in its unlatching or cocked post-

tion shown on Fig. 4, the holding member is held against the end edge of the arm 32 of the bolt, the point of engagement being at one side of the fulcrum pin 30 so that the pressure of the holding member against the bolt tends to hold it in its unlatching or cocked position. When the latch bolt is in its latching position, shown on Fig. 3, the holding member is held against the back edge of the arm 32 of the latch bolt and tends to hold the latch bolt in such position.

When the door is swung toward closing position, the latch hook end 33 of the latch bolt is inwardly of the keeper and the setting arm 31 encounters the front side of the keeper which is inclined as shown, and as the closing of the door continues, the latch bolt will be rocked around the keeper for engagement of its hooked end against the inner side of the latch head 18. As the latch bolt is thus rocked, the holding member 23 does not move as the end edge of the arm 32 is concentric with the pin 30 but as the latch bolt rocks around the keeper, the holding member comes into engagement with the back edge of the arm 32 and the spring pressed holding member continues to urge the latch bolt in latching direction with its hook end against the keeper so that the door is forced toward closing position to be securely held in such position. The latch bolt is thus forced to take up any slack or loose motion to keep the door securely closed at all times against rattling.

In order to securely lock and hold the setting member in any position to which it has been shifted by the pressure of the spring 35, I preferably provide a gripper member 37. This member is in the form of a plate extending transversely of the holding member 23 and having a rectangular opening 38 therethrough for receiving the holding member which is of rectangular cross section. The plate 37 is of reduced width at one end to form a fulcrum tongue 39 engaging in the fulcrum opening 40 in the inner portion 22' of the guide wall 22, which portion is deflected laterally away from the holding member 23. At its opposite end the plate 37 is engaged by the end of a coil spring 41 anchored below the plate to the guide wall 21, this spring exerting inward pressure against the plate. The rectangular opening 40 through the plate 37 is of such length that when the plate is at a certain angular position relative to the holding member, the holding member may freely slide in the opening, but when the plate is swung to another angle relative to the holding member, the edges or corners of the plate at the opposite ends of the opening 38 will engage with the edges of the holding member for gripping engagement therewith, the spring 41 tending to hold the plate to maintain this gripping engagement. In the arrangement shown, such gripping engagement will lock the holding member against inward movement after an outward movement thereof by the spring 35, but upon outward swing of the plate 37 it will release the holding member for inward shift.

Simple releasing means are provided for first releasing the gripper member 37 from the holding member and then shifting the released holding member inwardly for withdrawal thereof from the latch bolt. This releasing means comprises a plate 42 disposed between the back of the housing 10 and a cover plate 43 secured to the housing, the plate 42 receiving the spindle 44 which terminates at its outer end in a door handle (not shown) for turning of the spindle

and of the releasing member 42. The releasing plate 42 has the releasing arm 45 extending below the head 24 of the holding member 23, and a cam arm 46 on the plate 42 is above the free end of the gripping plate 37. An annular wall 47 extending from the cover plate 43 is surrounded by a coil spring 48 whose inner end is anchored to the wall 47 and whose outer end engages a projection 49 on the plate 42, this spring tending to hold the releasing member 42 with its arms 45 and 46 normally displaced from the holding member 23 and the gripping member 37 respectively. When the handle and spindle 46 are turned, the cam arm 46 will first engage with the gripping member 37 to swing it for releasing the holding member 23 and then the arm 45 engages with the head 24 of the holding member to raise the holding member away from the latch bolt.

The releasing member 42 may be locked against releasing movement thereof by the door handle. As shown a locking bar 50 is mounted on a spindle 51 which, at its outer end, may terminate in a key-operable lock (not shown). Normally the locking bar is in release position, but when the spindle 51 is turned the arcuate end of the bar will be brought opposite the arcuate surface 52 on the releasing member 42 and this releasing member will then be locked against operation so that the door cannot be unlatched by operation of the outside handle.

When the door is swung for closure thereof, the engagement of the side tongues 15 with the keeper structure K will guide the door for alignment of the hook end 33 of the latch bolt for entry between the walls 17 of the keeper and when the door is fully closed it will then be held against swinging displacement and lateral displacement. At its outer end the head 18 of the keeper has the projection or keeper lip 53 behind which the latch bolt hook end 33 will engage when the door is closed, and the door will then be held against displacement thereof away from the frame on which the keeper is mounted so that the door cannot be unlawfully opened by forcing it toward its hinged end with the intention of withdrawing the latch bolt from the keeper.

I have shown a practical and efficient embodiment of the features of my invention but I do not desire to be limited to the exact construction, arrangement and operation shown and described as changes and modifications may be made without departing from the scope of the invention.

I claim as follows:

1. Latching structure for a hinged door comprising a lock housing on the door, a latch bolt fulcrumed on said housing for engagement with a keeper on the door frame to be rocked thereby into latch engagement therewith when the door is swung to closed position, a holding member, spring means tending to keep said holding member in engagement with said bolt for holding of said bolt in its latching engagement with the keeper to hold the door closed, gripping means for frictionally engaging said holding member after setting thereof by said spring means whereby to lock said holding member against release from said latch bolt, and releasing means operable to first release said gripping means from said holding member and then to shift said holding member for release of said latch bolt so that the door may be unlatched and opened.

2. Latching structure for a hinged door comprising a lock housing on the door, a latch bolt fulcrumed on said housing for engagement with a keeper on the door frame to be rocked into latching engagement therewith when the door is swung to closed position, a slideable holding member on said housing, spring means at all times urging said holding member into engagement with said latch bolt and for exerting pressure against said latch bolt during interlatching engagement thereof with the keeper for holding the latch bolt in latching position, a gripper member operable to permit said spring means to slide said holding member into engagement with the bolt and after such sliding movement being operable to grip and lock the holding member against release movement away from said bolt, and releasing means on the door operable to first effect ungripping movement of said gripping member to release said holding member and then to shift said holding member away from the bolt so that said bolt is free for unlatching movement for opening of the door.

3. Latching structure for a hinged door comprising a lock housing on the door, a latch bolt movable in said housing for interlatching engagement with a keeper on the door frame when the door is moved to closed position, a holding member in said housing and spring means urging it into engagement with the latch bolt to hold the latch bolt in its latching position, releasable gripper means in said housing adapted for intergripping connection with said holding member to lock said holding member against release from said latch bolt whereby to positively lock said latch bolt in latching position to hold the door closed, and releasing means on the door operable to first break the intergripping connection for release of the holding member and then effect withdrawal of the holding member from the latch bolt so that the latch bolt may move to unlatching position for opening of the door.

4. Locking structure for a hinged door comprising a latch bolt on the door movable into interlatching engagement with a keeper on the door frame when the door is swung to closed position, a holding bar on the door, spring means urging said holding bar into engagement with said latch bolt to hold the latch bolt in latching engagement with the keeper when the door

is closed, a gripper plate fulcrumed on the door and receiving said holding bar, spring means tending to hold said gripper plate in gripping engagement with said holding bar, and releasing means on the door operable to move said gripper plate to release said holding bar and to then withdraw said bar from said latch bolt to free the latch bolt for unlatching movement.

5. Locking structure for a hinged door comprising a latch bolt on the door for interlatching engagement with a keeper on the door frame when the door is moved to closed position, a holding bar slideable on the door, a spring urging said holding bar for engagement thereof with the latch bolt to hold the latch bolt in latching position when the door is closed, a gripper plate fulcrumed on the door and having a passageway receiving said holding bar, spring means engaging said gripper plate and yieldable for swing of said plate by the holding bar to permit the holding bar to move into holding engagement with said latch bolt but effective to swing said plate into gripping engagement with the bar to prevent release movement thereof from said bolt, and releasing means on the door operable to first swing said gripper plate to release said bar and then to release said bar from said bolt.

6. Latching structure for a hinged door comprising a lock housing on the door, a latch bolt fulcrumed on the housing for engagement with a keeper on the door frame to be moved into latching engagement therewith when the door is swung to closed position, a holding member on said housing, spring means tending to keep said holding member in engagement with said bolt and to exert pressure against the bolt for urging it into interlatching engagement with the keeper, a gripper member surrounding said holding member and operable to permit said spring means to move said holding member for engagement with the bolt but being operable to grip and lock the holding member against release movement from any position to which it has been moved by said spring means whereby said bolt will be positively held against unlatching movement, and releasing means on the door for effecting ungripping movement of said gripper member whereby to release said holding member for movement to release the latch bolt.

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