Oct. 4, 1932. M. TIBBETTS 1,880,585

MOTOR VEHICLE LATCH

Filed Nov. 28, 1930 2 Sheets-Sheet 1

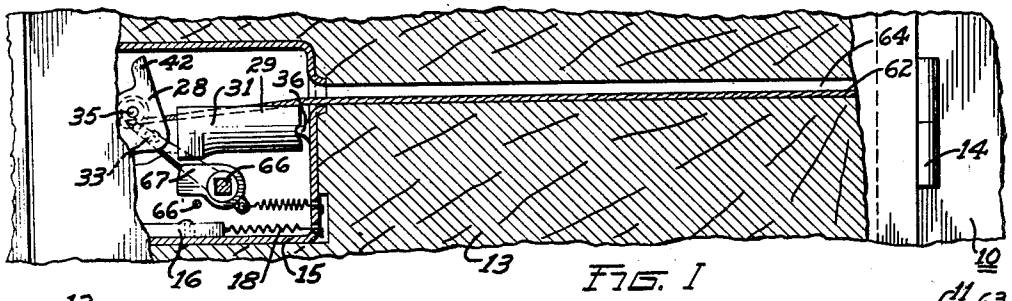


FIG. 1

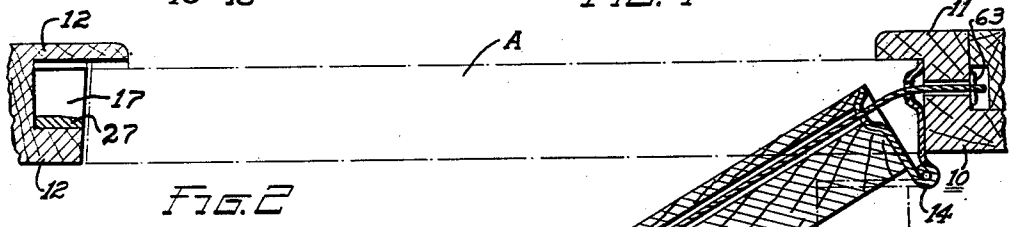


FIG. 2

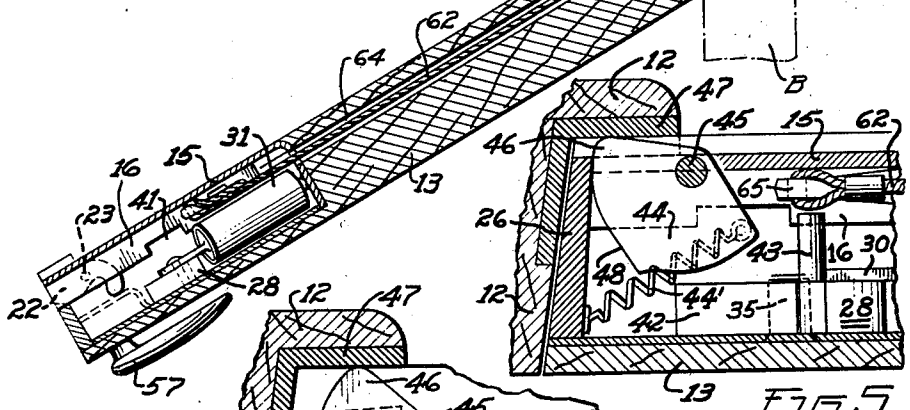


FIG. 5

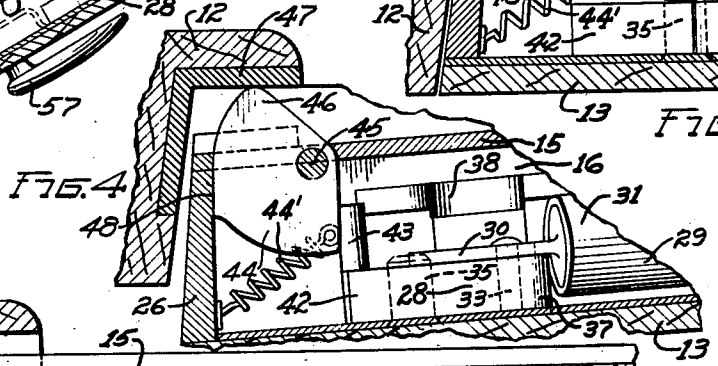


FIG. 4

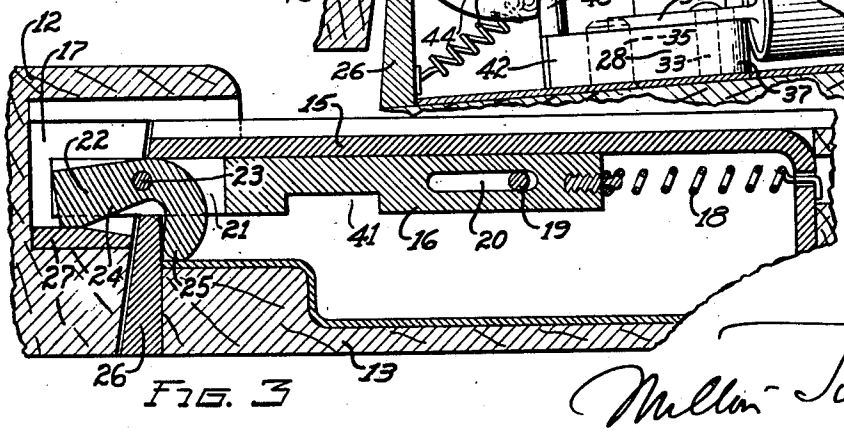


FIG. 3

Inventor

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Oct. 4, 1932. M. TIBBETTS 1,880,585

MOTOR VEHICLE LATCH

Filed Nov. 28, 1930 2 Sheets-Sheet 2

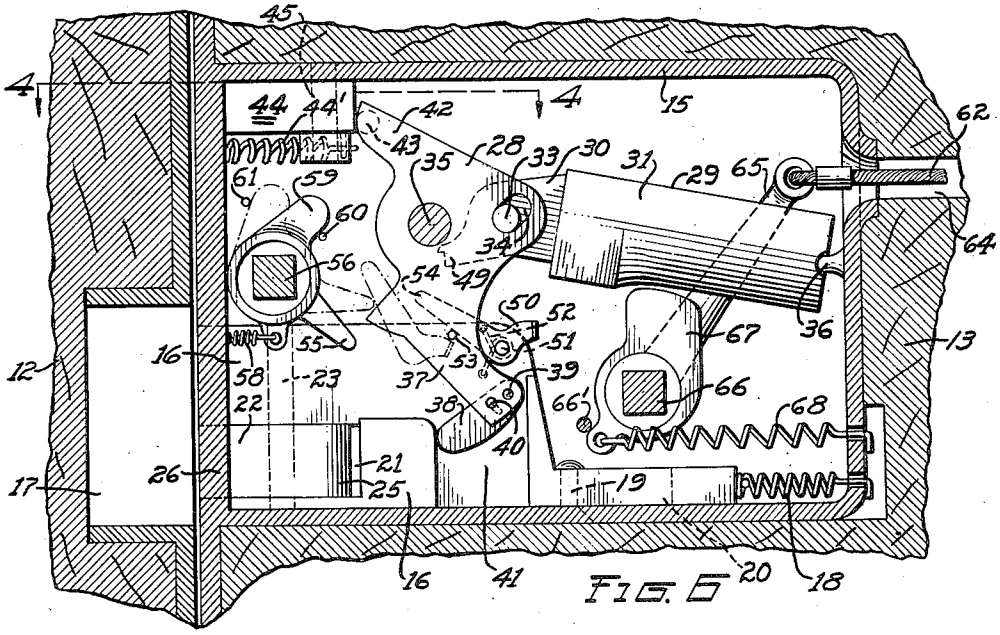


FIG. 6

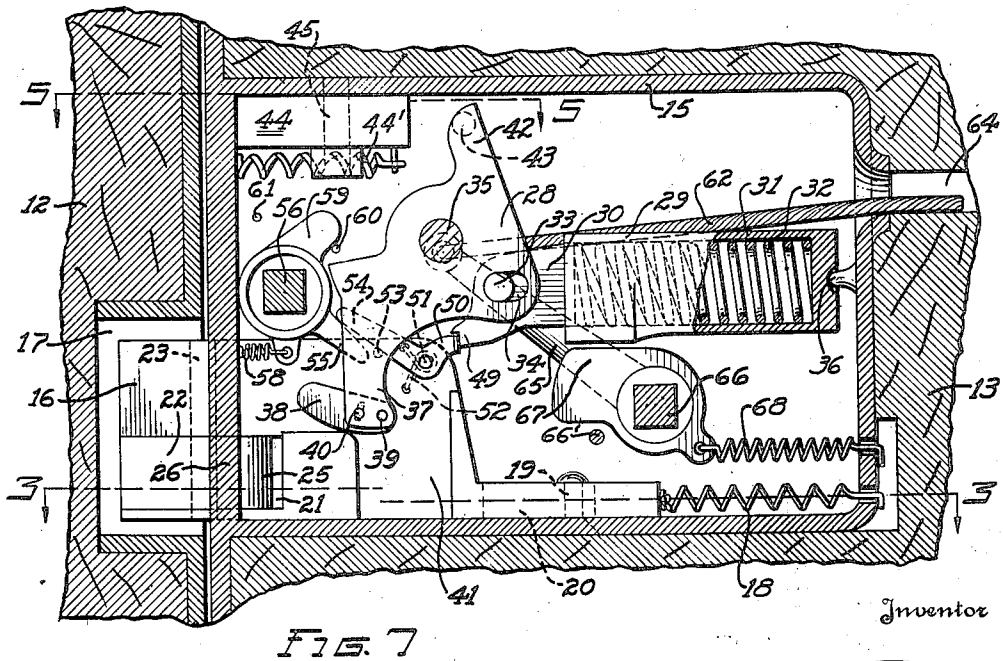


FIG. 7

Inventor

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Patented Oct. 4, 1932

1,880,585

UNITED STATES PATENT OFFICE

MILTON TIBBETTS, OF DETROIT, MICHIGAN, ASSIGNOR TO PACKARD MOTOR CAR COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN

MOTOR VEHICLE LATCH

Application filed November 28, 1930. Serial No. 498,614.

This invention relates to motor vehicles or to doors or door frames generally, and particularly to latch or lock mechanism for doors.

The invention is particularly designed for automobile doors and its salient object is to provide a latch mechanism that will hold the door closely against the door jamb without at the same time requiring undue strength to release the locking bolt.

Stated in another way, an object of the invention is to provide tight closing means for a motor vehicle door while at the same time permitting the door to be opened without too much expenditure of effort.

Another object of the invention is to provide a spring device to retain the door bolt in its fully closed position, with means for retracting the spring device by the opening movement of the door.

Another object of the invention is to provide a heavy spring device which will be retracted by the opening movement of the door, tripped by the closing movement of the door to shoot the locking bolt to fully locked position, and disconnected from the bolt by a simple manual device so that the lock may be retracted without retracting the spring, the heavy spring device being reset by the following opening movement of the door.

Another object of the invention is to provide a combination door limit strap and door latch retractor.

Other objects of the invention will appear from the following description taken in connection with the drawings, which form a part of this specification, and in which:

Fig. 1 is a side elevation and vertical section through a portion of a door mechanism;

Fig. 2 is a horizontal section through Fig. 1 but with the door in partly open position;

Fig. 3 is an enlarged detail sectional view showing the bolt or latch in its fully locked position, the section being substantially on the line 3—3 of Fig. 7;

Figs. 4 and 5 are enlarged detail views showing the trip device for tripping the spring means as the door closes, Fig. 4 showing the door nearly closed and the trip about to be operated and Fig. 5 showing the door fully closed, sections of these figures being substantially on the lines 4—4 of Fig. 6 and 5—5 of Fig. 7 respectively;

Fig. 6 is an enlarged vertical section through the lock mechanism of the door showing the bolt and spring means in their retracted or unlocked position, and

Fig. 7 is a view similar to Fig. 6 with the bolt in fully locked position.

Referring to the drawings, and particularly Figs. 1 and 2, a door frame 10 is shown, which door frame may be that of an automobile body, and may comprise a door pillar or post 11, a door jamb 12 and other necessary parts to complete the frame which are not shown on the drawings.

Hinged to the door post 11 is a door 13, shown in full lines in partly opened position and in dotted lines in fully closed and fully opened position, the fully opened position indicating a definite range of movement of approximately ninety degrees. One of the hinges 14 is shown in Figs. 1 and 2.

The latch mechanism for the door is enclosed in a suitable sheet metal casing 15 set into the body of the door adjacent its free edge, this casing being of sufficient size and shape to accommodate the various parts of the latch mechanism and being formed in the usual manner of castings or stampings suitably joined together in a well known manner.

In the casing 15 is a bolt or latch 16 which is adapted to slide in the casing and to project from one end thereof into a recess 17 in the door jamb 12. The bolt 16 is yieldingly retained in its retracted position by a relatively light spring 18, and a stop 19 operating in the slot 20 in the bolt limits the inward movement of the bolt.

At its outer end the bolt 16 is formed with a cut-away portion 21 within which is pivoted a lever 22, the pivot pin being indicated at 23. The lever 22 is of somewhat L-shape having an arm 24 and a toe 25, the latter adapted to strike against an abutment 26 on the door as the bolt is forced to its extreme outward or locked position. As the toe 25 thus strikes the abutment 26 and the bolt is pushed farther outwardly, the arm 24 operates against a plate 27 in the recess 17 and tends to push the

door to a more tightly closed relationship with the door frame. Thus the bolt in its movement towards locking position not only retains the door against being opened but also forces the door to a tightly closed position so that it is prevented from rattling.

Movement of the bolt 16 to its locking position is effected by a heavy spring means which is adapted to move the bolt with considerable force so that the lever 22 will operate to the best advantage in tightly closing the door.

This heavy spring means is shown as comprising a toggle mechanism which includes a lever 28 and a lever 29, the latter comprising a plunger 30 operating in a cylinder 31 against a heavy spring 32. A pin 33 on the plunger 30 operates in a slot 34 in the lever 28. Said lever 28 is pivoted to the latch casing 15 at 35 and the end of the cylinder or barrel 31 abuts against a spherical trunnion 36 so that it may swing freely. The lever 28 also has an arm 37 upon which a shoe 38 is pivoted as at 39, said shoe having a limited movement determined by the pin and slot connection 40. The shoe 38 operates in a recess 41 in the bolt 16, particularly shown in Fig. 6. There is also an arm 42 on the lever 28, and a pin 43 at the end of the arm 42 contacts with one arm of a bell crank lever 44 which is pivoted to the casing as at 45. A spring 44' yieldingly retains the lever 44 in the position shown in Fig. 4. The other arm of the bell crank lever, indicated at 46, extends through the casing 15 near the top thereof and is adapted to abut against a plate 47 on the jamb 12 of the door frame, as shown particularly in Figs. 4 and 5. This lever 41 may be termed a trip device and its operation will be described later.

In Figs. 6 and 7 it will be seen that relationship of the lever 28, its pivot 35, the cylinder 31 and its pivot 36, and the pivotal connection 33, is such that, with the parts in the position shown in Fig. 6 the spring plunger 30 is urging the arm 42 of the lever 28 against the lever 44 and thereby yieldingly retaining the latter in the position in which it is shown in Fig. 4. A flat portion 48 of the lever 44 rests against a portion of the casing 15 and prevents further outward movement of the lever 44, thus forming a stop for retaining the parts in the position as shown in Fig. 6, as long as the door is in open position. However, when the door is pushed to its closed position as shown in Fig. 5, the lever 44 abuts against the portion 47 of the door jamb and the lever 44 rocks on its axis and likewise rocks the lever 28, and this movement is just sufficient to push the pin 33 over dead center, that is, across the line between the points 35 and 36, so that the spring 32 acts to rock the lever 28 further on its pivot in the direction in which it was started by the lever 44. As the lever 28 is thus rocked its arm 37 moves the bolt 16 into the recess 17. At about the time the toe 25 of the lever 22 strikes the abutment 26 an arm 49 on the plunger 30 contacts with a lever 50 pivotally supported at 51 on the bolt 16. Also at about this point in the travel of the bolt 16 the shoe 38 slides out of the recess 41 in the bolt and the bolt thereafter is pushed directly by the heavy spring 32 acting against the plunger 30. This spring tends to push the bolt 16 further into the recess and in consequence the lever 22 is rocked on its axis and the door is more tightly drawn into contact with the door jamb.

The lever 50 above referred to is spring pressed by a spring 52 against a stop 53, and an arm 54 on the lever 50 is adapted to be actuated by an arm 55 on a rock shaft 56, which latter is arranged for manual operation as by a handle 57 on the outside of the door, as shown in Fig. 2. A spring 58 retains the shaft 56 in normal position with an arm 59 thereof against a stop 60. Another stop 61 retards the movement of the shaft 56 in the other direction.

By rocking the shaft 56 in anti-clockwise direction, as shown in Figs. 6 and 7, the lever 50 may be rocked on its axis to disconnect the bolt 16 from the plunger 30 and as this is accomplished the spring 18 will immediately withdraw the bolt from the recess 17 and thereby release the door. The door may then be swung open by the operator, and because of the leverage between the shaft 56 and the lever 50 the tripping of the latter is easily accomplished.

In order to relatch the door the spring 32 must be retracted and for this purpose a means is provided for retracting the spring during the initial opening movement of the door. This means is connected to the door frame and is operated as the door is opened. It comprises a cable 62 having one end secured to the door frame as at 63 and extending through a suitable passage 64 formed in the door. The other end of the cable 62 extends into the casing 15 and is connected to a lever 65 on a shaft 66 having an arm or cam 67 which is adapted to contact with the cylinder 31 and push it upwardly, thereby compressing the spring 32 until the plunger passes over dead center and assumes the position shown in Fig. 6. The spring 68 tends to restore the shaft 66 to the position shown in Fig. 7.

With this construction it will be seen that as the door is opened from the position shown at A in dotted lines in Fig. 2, to the position shown in full lines in Fig. 2, the cable 62, by reason of its connection with the door frame, will move the lever 65 and consequently rock the shaft 66. This will move the cylinder 31 which will pass over dead center at about the time the door reaches the position shown in full lines in Fig. 2. Full movement of the door to dotted lines shown at B in Fig. 2 will merely rock the

shaft 66 without further affecting the position of the cylinder 31, and the cable 62 will act as a limit strap as the shaft 66 is stopped by the pin 66'. Thus the heavy spring 32 has been retracted and it is ready to be tripped by the lever 44 as the door closes to again shoot the bolt 16 to its position in the recess 17 of the door jamb.

From the above description it will be seen that the bolt 16 will be normally held in retracted or unlatched position, as in Fig. 6, by its spring 18, and, assuming that the heavy spring means has been set to the position shown in Fig. 6, the closing movement of the door will cause the lever 44 to abut against the plate 47 and thereby trip the spring means and cause the latter to shoot the bolt into the recess 17. Thus the heavy spring 32 operates to push the bolt well into the recess and the lever 22 forces the door and jamb into very close relation. As the operator turns the handle 57 the lever 50 is rocked to release the bolt 16 from the heavy spring means and the bolt is then retracted by its spring 18, thus releasing the door. As the door is then opened the cable 62, connected as it is with the frame 10, operates the lever 65, thereby resetting the spring 32 so that the heavy spring means is ready for the next operation and, of course, it is again operated to throw the bolt as the door is closed and the trip lever 44 operates against the lever 28 to throw the heavy spring means over dead center.

While I have herein described in some detail a specific embodiment of my invention, which I deem to be new and advantageous and may specifically claim, I do not desire it to be understood that my invention is limited to the exact details of the construction, as it will be apparent that changes may be made therein without departing from the spirit or scope of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a door mechanism, a door, a door post, lock means associated with the door for holding it in closed position against the post, manually operated means associated with the lock means to control disengagement thereof, spring means associated with the lock means to control engagement thereof, and door limit means connecting the door post and said spring means, said door limit means being operated by initial opening of the door to load the spring means.

2. In a door mechanism, a door, a door post, lock means for holding the door in closed position, manually operated means associated with the lock means to control disengagement thereof, spring means associated with the lock means to control engagement thereof, and strap means connecting the door post and said spring means, said strap means being operated by initial opening of the door to load the spring means.

3. In a door mechanism, a door, a door frame, a lock bolt associated with the door and a door frame for holding the door in closed position, manually operated means associated with the lock bolt to cause retraction thereof, spring means associated with the door and the lock bolt to cause engagement of said lock bolt with the door frame, and door limit means connecting the door frame and the spring means, said door limit means serving to load said spring means upon initial opening movement of said door and thereafter serve as a door limit strap, the resistance of said door limit means to opening movement of the door being automatically reduced after loading of said spring means.

In testimony whereof I affix my signature.

MILTON TIBBETTS.