March 16, 1937. W. G. THURBER 2,074,244

BOLT ACTUATING MECHANISM

Filed July 18, 1936

Fig. 1.

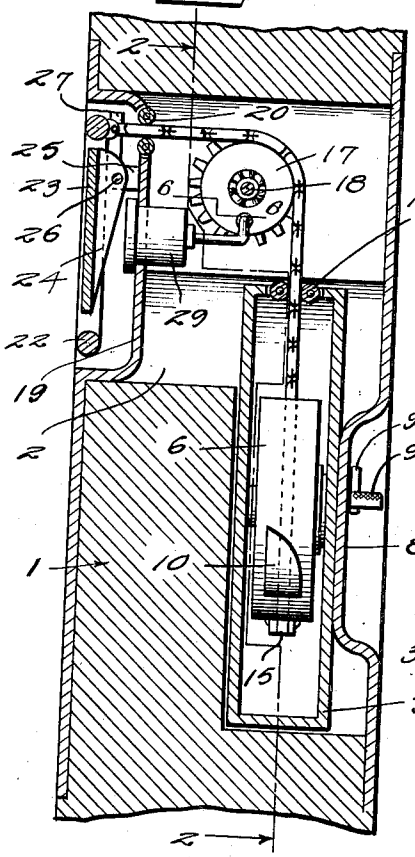


Fig. 2.

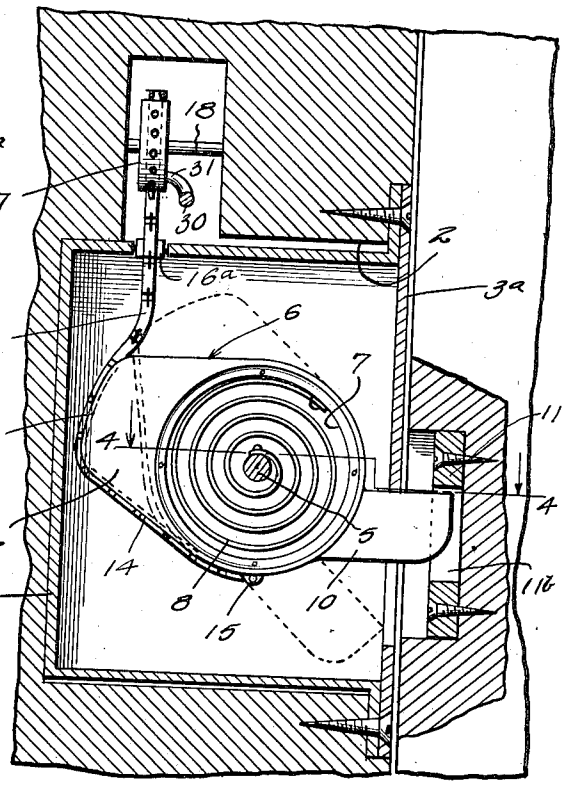


Fig. 3.

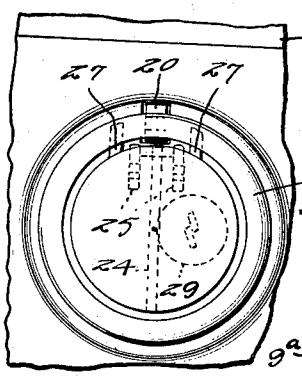


Fig. 4.

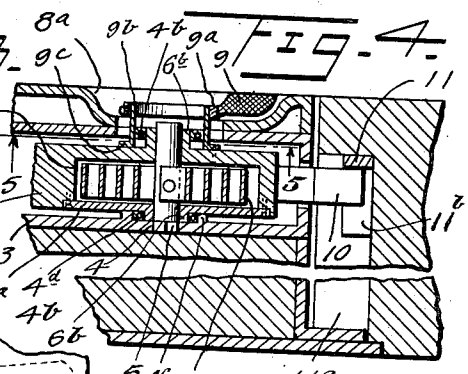


Fig. 5.

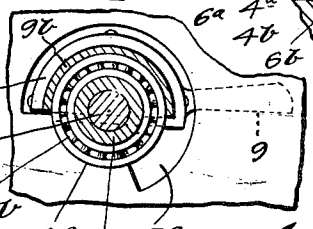
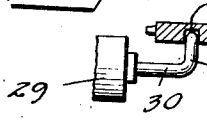


Fig. 6.



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BOLT ACTUATING MECHANISM

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Application July 18, 1936, Serial No. 91,376

11 Claims. (Cl. 70—153)

This invention relates to improvements in latch actuating mechanisms and pertains particularly to such a mechanism designed for use in association with motor vehicle doors.

The present invention has for its primary object to provide a latch operating mechanism which is designed so that all of the exterior parts may be conveniently housed in shallow countersunk areas in the faces of the door so that there will be no projections against which a person's clothing or body may contact to cause damage or injury in the event they are brought into close contact with the side of the vehicle while the latter is moving.

Another object of the invention is to provide a mechanism of the above described character which is of simple design and may be conveniently installed in a motor vehicle door of any type, while being efficient in operation and conveniently operable from the interior or the exterior of the vehicle, as desired.

A further object of the invention is to provide in association with an operating mechanism of the above described character, a convenient means of locking the mechanism so that the door securing bolt controlled by the mechanism cannot be shifted.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawing but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:

Figure 1 is a view in vertical section through a portion of a door structure showing the latch operating mechanism embodying the present invention installed in the door.

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a view in elevation of the present device as seen from the outside.

Fig. 4 is a section on the line 4—4 of Fig. 2.

Fig. 5 is a section on the line 5—5 of Fig. 4.

Fig. 6 is a sectional view on the line 6—6 of Fig. 1.

Referring now more particularly to the drawing wherein like numerals of reference designate corresponding parts throughout the several views, the numeral 1 designates a portion of a conventionally illustrated vehicle door body. This may represent the body of a door of any design in which a suitable recess or opening 2 is formed to receive the operating parts of the latch bolt actuating mechanism.

The numeral 3 indicates a housing which is set into the front edge of the door and is retained in place by the face plate 3a which may be secured by screws or in any other suitable manner. The housing extends into the recess or chamber 2 of the door and has the two side walls provided with openings 4 and 4a and in the opening 4a a bearing unit 4b is secured. The opening 4 is of polygonal outline, preferably square. Surrounding the opening 4 on the inner side of the outer wall of the casing, is a collar 4c in which a bearing 4d is mounted. The opening 4a is of greater diameter than the bearing through a portion of the bearing circumference, as illustrated in Figure 5 so that the bearing is secured throughout a portion of its circumference to an edge of the opening and is encircled throughout the major part of its circumference by the larger area of the opening which forms a partial encircling recess which is indicated by the numeral 5a.

Disposed within the lock casing or housing 3 is an oscillatory body 6 which has a chamber 7 formed therein, one side of the body being removable, as indicated at 6a to facilitate the placing of a flat coil spring 8 within the chamber to be secured in a manner hereinafter described. The opposite side walls of the body 6 are provided with the cylindrical hubs 6b and each of these hubs extends through and is secured to the inner element of a bearing unit 4b in the manner illustrated in Fig. 4.

Secured in the opening 4 which is squared or of other suitable outline as previously stated, is the similarly formed end of a fixed shaft or axle 5 which passes through the hubs 6b of the body 6, and through the chamber 7. This axle 5 has the inner end of the flat coil spring 8 secured thereto while the other end of the spring is secured to the inner surface of the chamber 7 so that when the body 6 is oscillated in one direction the spring will be wound up and placed under tension so that when the body is released the spring will return it to its normal previously occupied position.

Upon the inner side of the door body there is formed a depression or inset area 8a in which is disposed an operating handle 9. This handle is secured in any suitable manner, as by a collar 9a to a half sleeve or cylinder 9b which is secured at one end to a plate 9c which in turn is fastened

to the inner side of the body 6 so that the half sleeve or cylinder projects inwardly from the body 6 through the slot 5a into the area 8a where it receives the portion 9a of the handle. With this construction the pressing downward of the handle 9 will rotate the body 6 in a clockwise direction so that the spring 8 will be placed under tension and when the handle is released the body will be returned by the spring to its former position.

In the face of the jamb of the opening in which the door body 1 normally positions is a recess 11a in which is secured a keeper 11. This recess 11a is directed outwardly in the usual manner of constructing this portion of a motor vehicle door unit so that the bolt body 10 which forms an integral part of the oscillatory body 6 may be moved in toward the keeper when the door is closed and engaged in the keeper slot which is here indicated by the numeral 11b. The upper surface of the bolt 10 may be beveled in a suitable manner to facilitate its easy passage into the keeper slot 11b.

Integral with the body 6 and projecting from it oppositely from the bolt 10, is an ear 12 having the rounded outer end 13 and the long inclined under edge 14 terminating at the point 15. The faces of the edge portions 13 and 14 are grooved to receive a link roller chain 16 which has its lower end secured at point 15 and passes upwardly from the upper end of edge 13 thru an opening in the housing 3 to the sprocket pulley 17 which is mounted in the upper part of the chamber 2 on the shaft 18. This shaft is disposed transversely of the chamber and is supported in suitable roller bearings whereby it will turn substantially without friction.

The opening in the top of the housing 3 is preferably provided with rollers or some suitable anti-friction elements, as indicated at 16a so as to make the movement of the chain through the opening as free of frictional resistance as may be possible.

Adjacent the pulley 17 the outer face of the door has a recess or depression formed therein, as indicated at 19, and at the top of this depression is an opening 20 through which passes the other end of the chain 16.

Oscillatably carried upon the other end of the chain 16 is a finger ring 22 which is formed to rest in the recess 19.

Lying in the center of the ring 22 is a disc 23 which has a vertical rib 24 on its back which is coupled with a forwardly projecting post 25 by the horizontal pivot pin 26. This pin 26 is near the top of the disc and carried by the disc to project above the top of and across the ring 22 upon either side of the pin 21 are ears 27 which, when the disc is oscillated rearwardly, press forward against the ring and cause it to swing out at the bottom so that it may be easily grasped.

From the foregoing it will be apparent that when the ring is grasped and pulled outwardly the chain 16 will pull against the ear 12 and effect the oscillation of the body 6 against the tension of spring 8 and the simultaneous retraction of the bolt 10 from the keeper 11. By oscillating the lever 9 downwardly it will be apparent that the same turning movement will be obtained upon the body 6 to move the bolt 10 in the same manner.

In order that the actuating mechanism for the bolt may be conveniently locked, the sprocket wheel or gear 17 is provided in one face with a recess or opening 28, and a key-operated lock unit of standard design is secured in a suitable aperture in the wall of the recess 19 and is indicated by the numeral 29. At the inner end of the rotatable barrel portion of this lock is an extension 30 which extends across one side of the gear 17 and has a terminal laterally extending curved finger 31 which when oscillated with the lock barrel has its end extended into the opening 28 to hold the gear from turning. As shown in Fig. 3 the disc 23 covers and hides the lock 29.

From the foregoing it will be readily apparent that the mechanism embodying the present invention will form a desirable part of a streamlined motor vehicle, as it provides mechanism for conveniently actuating the vehicle door securing bolt without having the usual handles which project beyond the side face of the vehicle. It is well known that numerous serious accidents occur as a result of a person's body being hooked by the present projecting handle of a motor car when the latter passes the person, and with the bolt actuating mechanism embodying the present invention this cannot occur, as there are no projecting parts to cause this trouble.

I claim:

1. In a door having inner, outer, and front edge surfaces and a chamber, the said front edge surface having an opening leading into the chamber, a bolt rockably mounted in the chamber and projecting through said opening, the bolt when rocked being retracted into the chamber, a recess formed in the outer surface of the door, a finger element normally lying within the recess but removable therefrom, flexible means coupling said finger element with the bolt whereby removal of the finger element from the recess will effect the actuation of the bolt, and means for locking said finger element against movement.

2. In a door having inner, outer, and front edge surfaces and a chamber formed therein and communicating with the exterior through an opening in the edge surface, a recess formed in the outer surface of the door, a finger ring removably disposed in said recess, a bolt in the chamber and normally extending through said opening, means operatively connecting said ring with the bolt whereby removal of the ring from the recess will effect retraction of the bolt into the chamber, and means oscillatably positioned within the finger ring, which when oscillated will effect the outward swinging of the ring.

3. In a door having inner, outer, and front edge surfaces and a chamber formed therein and communicating with the exterior through an opening in the edge surface, a recess formed in the outer surface of the door, a finger ring removably disposed in said recess, a bolt in the chamber and normally extending through said opening, means operatively connecting said ring with the bolt whereby removal of the ring from the recess will effect retraction of the bolt into the chamber, a disc member oscillatably mounted in said recess and disposed within and concentric with the ring, and means whereby the oscillation of the disc member will effect the projection of the ring from the recess.

4. In a door having inner, outer, and front edge surfaces and a chamber opening through an aperture in the front edge surface, a body oscillatably mounted in the chamber, a bolt formed integral with the body and projecting through said aperture, spring means normally retaining the said body in bolt-projected position, a flexible element connected with said body and extending upwardly therefrom in the chamber, said

body having an extension across which said flexible element passes, said outer door surface having an opening therethrough, a rotatable element over which the flexible element passes to and through said last opening, and means connected with the outer end of the flexible element and countersunk in the outer surface of the door whereby the flexible element may be actuated to cause the oscillation of the bolt carrying body.

5. In a door having inner, outer, and front edge surfaces and a chamber, the front edge surface having a bolt opening leading into the chamber, a body rockably mounted within the chamber, a bolt formed integral with the body and normally extending through said opening, spring means normally retaining said rockable body in bolt-extended position, said body having an integral inwardly extending arm, a sprocket wheel rotatably mounted in the upper part of said chamber, said outer surface having a recess therein adjacent the sprocket wheel and an opening passing through the wall of the recess, a flexible element secured at one end to the underside of said body and passing around said arm and upwardly from the top of the body to said sprocket, the flexible element passing over the sprocket and outwardly through the opening in the wall of the recess, and a finger ring connected to the outer end of the flexible element and normally disposed within said recess.

6. In a door having inner, outer and front edge surfaces and a chamber, the front edge surface having a bolt opening leading into the chamber, a shaft extending across and fixed against rotation in said chamber, a bolt carrying body having said shaft passing therethru, bearing supporting means for said body permitting the same to oscillate about and independently of the shaft, said bolt normally being extended through said opening, a spring housed in said body and having one end secured thereto and the other end secured to the fixed shaft, and means for oscillating the body to retract the bolt through said opening.

7. In a door having inner, outer, and front edge surfaces and a chamber, the front edge surface having a bolt opening leading into the chamber, a shaft extending across and fixed against rotation in said chamber, a bolt carrying body having said shaft passing therethru, bearing supporting means for said body permitting the same to oscillate about and independently of the shaft, said bolt normally being extended through said opening, a flat coiled spring housed in the body and having one end secured to the shaft and the other end secured to the body, a member secured to the inner side of the body and extending to the inside of the door, and a handle on said member facilitating the turning of the body about the shaft to tension said spring and retract the bolt through the opening.

8. In a lock, a casing having an edge wall provided with a bolt opening, a shaft secured at one end in a side wall of the casing and extending transversely through the casing, the opposite side wall having an opening of materially greater diameter than the shaft and through which the other end of said shaft extends, an annular bearing encircling each end of the shaft but spaced therefrom, said bearings each comprising two concentrically related annuli, one bearing being carried by the first mentioned side wall, the other of said bearings being mounted in the second mentioned opening and being spaced from the edge of the opening through more than half its circumference, a body disposed in the casing and having said shaft passing therethrough, said body having side hubs each supported in a bearing, a bolt carried by the body and projecting through said bolt opening, resilient means coupling the body with the shaft and maintaining the bolt, through the body, in projected position, and handle means secured to the body on the side nearest to the said second mentioned opening and projecting through the opening and designed to facilitate rotation of the body to retract the bolt through the opening.

9. In a lock, a casing having two side walls and a front edge wall, the latter wall having a bolt opening therein, a shaft fixed in the casing and extending transversely thereof, a body in the casing and having the shaft extending therethrough, the body being supported to oscillate about the shaft, a bolt carried by the body and normally projecting through said bolt opening, spring means coupling the shaft and body together and normally maintaining the bolt projected through the opening, and means connected with the body and operable from the exterior of the casing to effect the oscillation of the body for the retraction of the bolt through the opening.

10. In a lock, a casing having two side walls and a front edge wall, the latter wall having a bolt opening therein, a shaft fixed in the casing and extending transversely thereof, a body in the casing and having the shaft extending therethrough, the body being supported to oscillate about the shaft, a bolt carried by the body and normally projecting through said bolt opening, spring means coupling the shaft and body together and normally maintaining the bolt projected through the opening, said casing having an opening through one of the side walls, a member secured to the side of the bolt carrying body nearest said last mentioned opening and projecting through the last mentioned opening to the outside of the casing, and a handle connected with said member by which the oscillation of the member and the body is effected for the retraction of the bolt through the bolt opening.

11. In a lock structure for a door having a side wall and including a flexible lock actuating element and a wheel over which the element passes, means for securing the lock actuating element against movement comprising a locking unit mounted in said door wall and having a rotatable key operated element, said locking unit being disposed adjacent a side of said wheel and said wheel having an opening in the said side thereof, an arm extending longitudinally from an end of the rotatable element of the locking unit and a laterally extending finger disposed at the end of said arm and directed toward said wheel and positioned, when oscillated in one direction with the rotary element of the locking unit, to engage in the aperture of said wheel to retain the latter against rotation.

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