June 15, 1926. 1,588,899

C. S. McCARTHY

DOOR LATCH

Filed Feb. 5, 1925 2 Sheets-Sheet 1

Fig. 1.

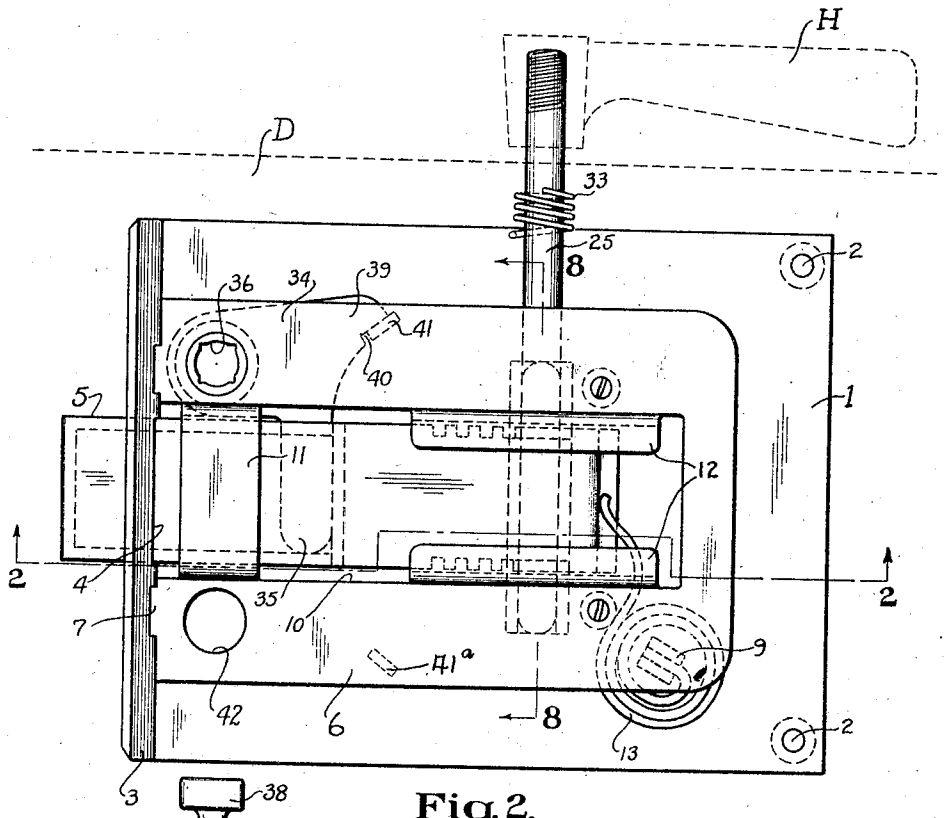


Fig. 2.

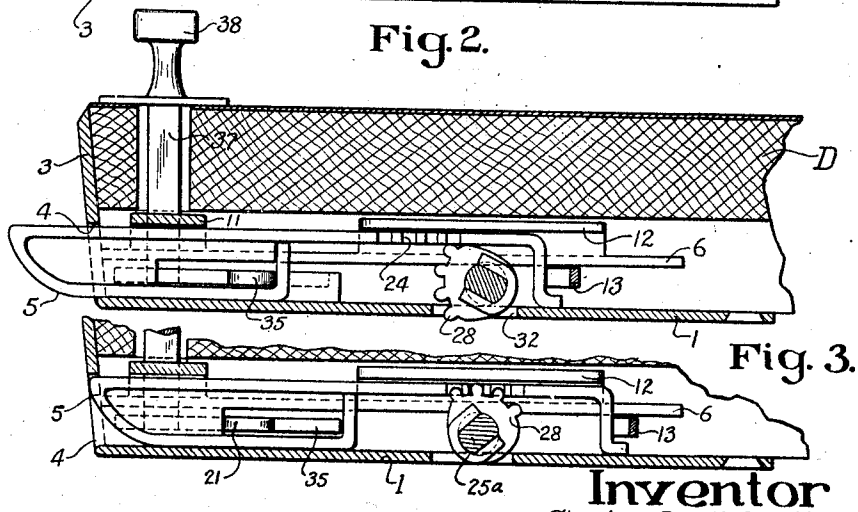


Fig. 3.

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2 Sheets-Sheet 2

Fig. 4.

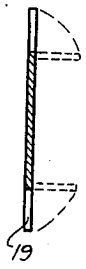


Fig. 3 a

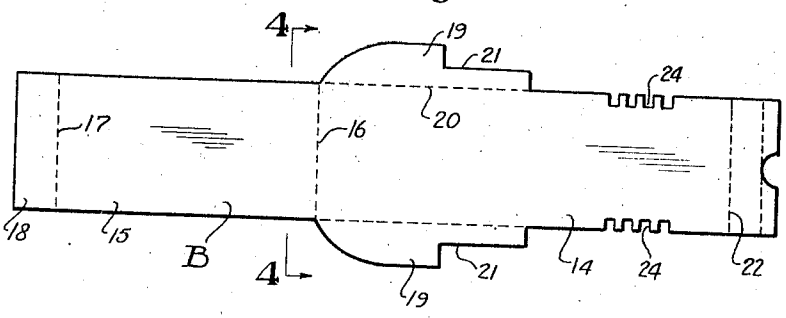


Fig. 5.

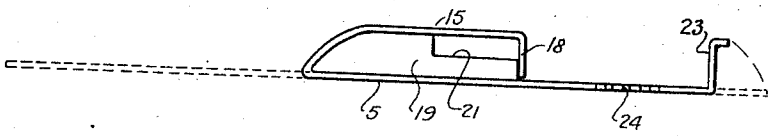


Fig. 6.

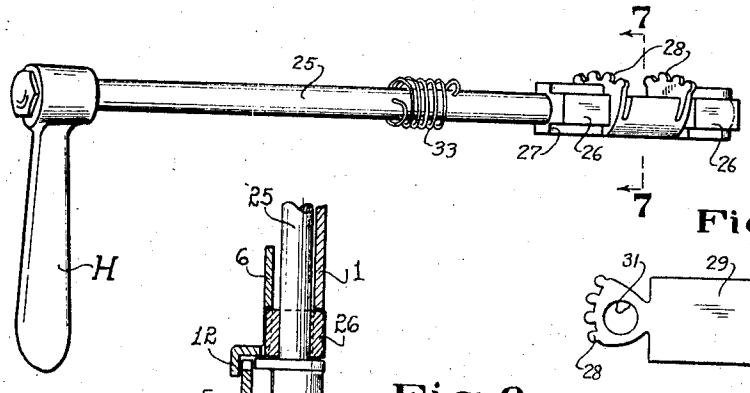


Fig. 7.

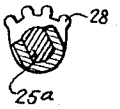


Fig. 9.

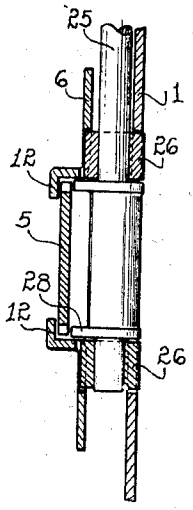


Fig. 8.

Inventor

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Patented June 15, 1926. 1,588,899

UNITED STATES PATENT OFFICE.

CHARLES S. McCARTHY, OF TOLEDO, OHIO, ASSIGNOR TO AMERICAN SWISS MAGNETO COMPANY, OF TOLEDO, OHIO, A CORPORATION OF OHIO.

DOOR LATCH.

Application filed February 5, 1925. Serial No. 6,938.

This invention relates to latch mechanisms of the type particularly adapted for use in automobile doors.

An object of the invention is the provision of a light, simple and inexpensive mechanism of the class described, which is capable of having its parts easily and quickly assembled, and is strong and durable in its construction.

Other objects of the invention reside in the construction of the bolt and latch member; the manner of connecting the inside control means with the bolt, and the manner of forming and mounting the pinion of the latch control means on the shaft.

The invention is shown by way of illustration in the accompanying drawings, in which:—

Figure 1 is a side elevation of the latch mechanism;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a view similar to Fig. 2 showing the operation of the mechanism;

Fig. 3ª is a plan view of the blank from which the latch is formed;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is an edge view of the latch showing the manner of forming;

Fig. 6 is a perspective of the operating shaft and associated mechanism for retracting the latch;

Fig. 7 is a section on the line 7—7 of Fig. 6;

Fig. 8 is a section on the line 8—8 of Fig. 1, and

Fig. 9 is a plan view of the blank from which the toothed sectors are formed.

The preferred embodiment of the invention illustrated comprises a substantially rectangular metal supporting plate 1 secured to the door D by screws 2 and provided at one end of the plate is an upwardly and outwardly inclined flange 3 which fits over the end of the door. The flange 3 is provided adjacent the supporting plate 1 with a rectangular opening 4 through which a latch bolt 5 may project for releasably securing the door in closed position, as will readily be understood. Mounted upon the supporting plate 1 is a guide plate 6 having tongues 7 which are arranged to project into slots formed in the flange 3 on opposite sides of the opening 4. The opposite end portion of the plate rests on lugs 9 and also on the bearing blocks 26 by which it is held in spaced relation to the plate 1, the guide plate 6 being secured to the plate 1 by screws 9ª.

Formed in the guide plate 6 and extending a substantial distance therein is an elongated opening or slot 10 within which the latch bolt 5 is slidable, and for maintaining the latch in proper position within the opening 10 a bridge 11 is fixed to the guide plate 6 extending across the opening 10, and outwardly and inwardly projecting guide flanges 12 extend over the opening 10 adjacent the rear end thereof. The latch bolt 5 is normally held in advanced position within the guide opening 10, and for this purpose a coil spring 13 bears at one end against the inner end of the latch bolt and the opposite end is fixedly secured in any suitable manner to the lugs 9.

For simplicity and cheapness in manufacture and to provide a sturdy and rugged construction the latch bolt 5 is formed from a single blank B of relatively strong sheet metal. As indicated in Fig. 3ª, the blank B may be said to comprise a long plate 14 and a short plate 15 which are integrally connected. In forming the latch bolt the short plate 15 is folded on the dotted line 16 in such a manner as to extend substantially parallel with the plate 14, the short arm curving upwardly and inwardly from its connection with the plate 14. The outer end portion of the plate 15 is bent substantially along the dotted line 17 toward the plate 14 at approximately right angles to form a tab 18. Integral with the side margins of the plate 14 are flaps 19, which are bent substantially along the dotted line 20 at approximately right angles to the plate 14, thereby to support and reinforce the plate 15, each flap 19 being notched so that when the parts are bent after the manner described an elongate longitudinal slot 21 is formed for a purpose hereinafter described. The outer end portion of the plate 14 is bent substantially along the dotted line 22 at approximately right angles thereto to provide an upright bearing portion 23 for one end of the coil spring 13. Formed in the side edges of the plate 14 are teeth 24 which constitute a rack, which may be engaged for retracting the latch. From the above it

will be observed that a latch bolt constructed in the manner described can be manufactured at a relatively low cost in large quantities without sacrificing features of reliability or sturdiness in construction.

For retracting the latch bolt 5 from the advanced position normally maintained by the action of the coiled spring 13 so that the door D may be opened by occupants within the vehicle, a vertically disposed operating rod or shaft 25 extends transversely of the supporting plate 1 and the outer end thereof projects above the door to which a handle H may be attached in any suitable or preferred manner. Mounted on the end portion of the rod 25 is a pair of journal blocks 26 which fit between and serve to space the plates 1 and 6 and have opposed projecting surfaces 27, which are shaped to extend into openings formed in the supporting plate 1 and guide plate 6, respectively, for holding the journals in properly assembled relation.

Secured to the rod 25 is a pair of toothed sectors 28, which are arranged to engage the rack 24 for retracting the latch bolt 5 from its advance position. Conveniently the toothed sectors 28 are formed from a blank as indicated in Fig. 9 having a body portion 29, the sectors having openings 31 for receiving the shaft 25. In applying the blank to the operating shaft the toothed sectors are first folded toward each other to extend at substantially right angles to the body portion 29 and thereafter the body portion may be bent around a squared shaft portion 25^a and securely held in place by friction or in any other suitable manner. As indicated in Figs. 2 and 3, the toothed sectors 28 are movable in slots 32 formed in the supporting plate 1 and normally the sectors are held in the position indicated in Fig. 2 in which the sectors are out of engagement with the rack 24 for a purpose hereinafter described. For yieldingly holding the sectors in this position a coiled spring 33 encircles the operating rod 25, one end of the spring being fixed to the rod and the opposite end fixed to the supporting plate 1.

As is customary in latch mechanisms of this character, a member is provided extending at substantially right angles to the operating rod 25 for retracting the latch bolt 5, such means usually extending outside the door D so that persons outside the vehicle may readily unlatch the door. For this purpose a lever 34 is pivoted to the supporting plate 1 and is provided with an arm 35 extending into the longitudinally elongate slot 21 of the bolt. The pivot of the lever 34 is formed with a substantially rectangular opening 36 to receive a similarly shaped rod 37, which extends outside the door D and is provided with an operating handle or knob 38. It will be apparent that by turning the knob 38 in a counter-clockwise direction (Fig. 2) the arm 35 will abut against the end of the slot 21 and further movement thereof will retract the latch bolt 5 from the advanced position.

In order to limit the advance of the latch bolt 5 under the action of the coil spring 13 the lever 34 is formed with an arm 39 having a notch 40, which is arranged to abut against a stop 41 formed on the supporting plate 1. In this manner movement of the lever 34 in a clockwise direction (Fig. 1) occasioned by the advance of the latch bolt 5 will move the arm 39 against the stop 41 and check further advance. In order to adapt the mechanism for attachment to doors having different swinging movements the lever 34 may be readily disengaged and mounted in the opening 42 on the opposite side of the guide opening or slot 10, a stop 41^a being provided on the plate 1 for a purpose similar to the stop 41. The operation of the lever in this position will be readily apparent and further description thereof is deemed unnecessary.

An outstanding characteristic of this invention consists in the unique construction of the latch bolt which may be constructed from a single piece of metal bent into the desired shape as has been pointed out. A further feature resides in the actuating mechanism in which a plurality of toothed members cooperate to enable the latch to be readily and conveniently retracted, thus insuring positive retraction and at the same time providing a construction which may be manufactured at a minimum cost. The latch has proved to operate satisfactorily and efficiently and is a marked improvement over similar mechanisms at present in use owing to its marked simplicity, easy assembly, low manufacturing cost and ruggedness of construction. Owing to the unique operation of the parts a thinner construction is permitted than similar latches heretofore in use.

Although I have shown and described a latch mechanism which at the present time is the best form known to me, it is to be understood that numerous changes in details of construction and arrangement may be effected without departing from the spirit of the invention especially as defined in the appended claims.

What I claim is:—

1. In a device of the character described, a one piece latch comprising a pair of substantially parallel elongate plates of unequal length, said plates being integrally connected at one end and one of said plates curving away from said connection, side flaps integral with the longitudinal margins of said longer plate and extending against said shorter plate, said flaps having cut-out portions thereby to form parallel elongate slots, an integral end tab on said shorter plate extending at substantially right angles toward

the longer plate, and an integral end tab on the longer plate extending at substantially right angles therefrom.

2. In a device of the character described, a one piece latch comprising a pair of substantially parallel elongate plates of unequal length, said plates being integrally connected at one end and one of said plates curving away from said connection, side flaps integral with the longitudinal margins of said longer plate and extending against said shorter plate, said flaps having cut-out portions thereby to form parallel elongate slots, an integral end tab on the longer plate extending at substantially right angle therefrom, and teeth in the side margins of the longer plate extending a portion of the length thereof.

3. In a device of the character described, a latch operating shaft, a toothed element fixed to said shaft adjacent one end thereof, and journals loosely mounted on said shaft on opposite sides of said element.

4. In a device of the character described, a latch operating shaft having a pair of toothed sectors on said shaft adjacent one end thereof, said sectors being spaced from each other and extending in the same direction.

5. In a device of the character described, a latch operating shaft, a member fixed to said shaft having a pair of toothed sectors spaced longitudinally of said shaft, and journals loosely mounted on said shaft on opposite sides of said member.

6. In a device of the character described, a support, a latch carried by said support, a shaft for operating said latch, and means comprising a rack and toothed element on said latch and shaft respectively for actuating said latch, said rack and toothed element being so constructed and arranged that the toothed element may be moved to a position to disengage the rack thereby permitting the latch to move freely in both directions.

7. In a device of the character described, a support, a latch carried by said support, a shaft for operating said latch, means comprising a rack and toothed element on said latch and shaft respectively for actuating said latch, said rack and toothed element being so constructed and arranged that the toothed element may be moved to a position to disengage the rack thereby permitting the latch to move freely in both directions, and means for yieldingly holding said toothed element in disengaging position.

8. In a device of the character described, a support, a latch on said support having an elongate longitudinal slot, yielding means for holding said latch normally in advanced position, an actuating lever pivoted to said support and having an arm extending loosely into said slot whereby actuation of said lever in one direction retracts said latch, said latch being removably connected to said support and constructed in such a manner as to be mounted on either side of said latch according to the position assumed by the latch mechanism.

9. In a device of the character described, a support, a latch on said support, a rod, yielding means for holding said latch in advanced position, means comprising a rack and toothed element on said latch, said rack and toothed element being so constructed and arranged that the toothed element may be moved to a position to disengage the rack, yielding means for normally holding said toothed element in disengaging position, said latch having an elongate longitudinal slot, an actuating lever having an arm extending loosely into said slot whereby actuation of said arm in one direction retracts said latch, and a stop on said support cooperating with said lever for limiting the advancing movement of said latch.

10. In a device of the character described, a support, a latch on said support, means for yieldingly holding said latch in advanced position, means for retracting said latch including a rack and toothed element, means for normally holding said toothed element in inoperative position relative to said rack, and means operating independently of said retracting means for also retracting said latch.

In testimony whereof, I have hereunto signed my name to this specification.

CHARLES S. McCARTHY.