

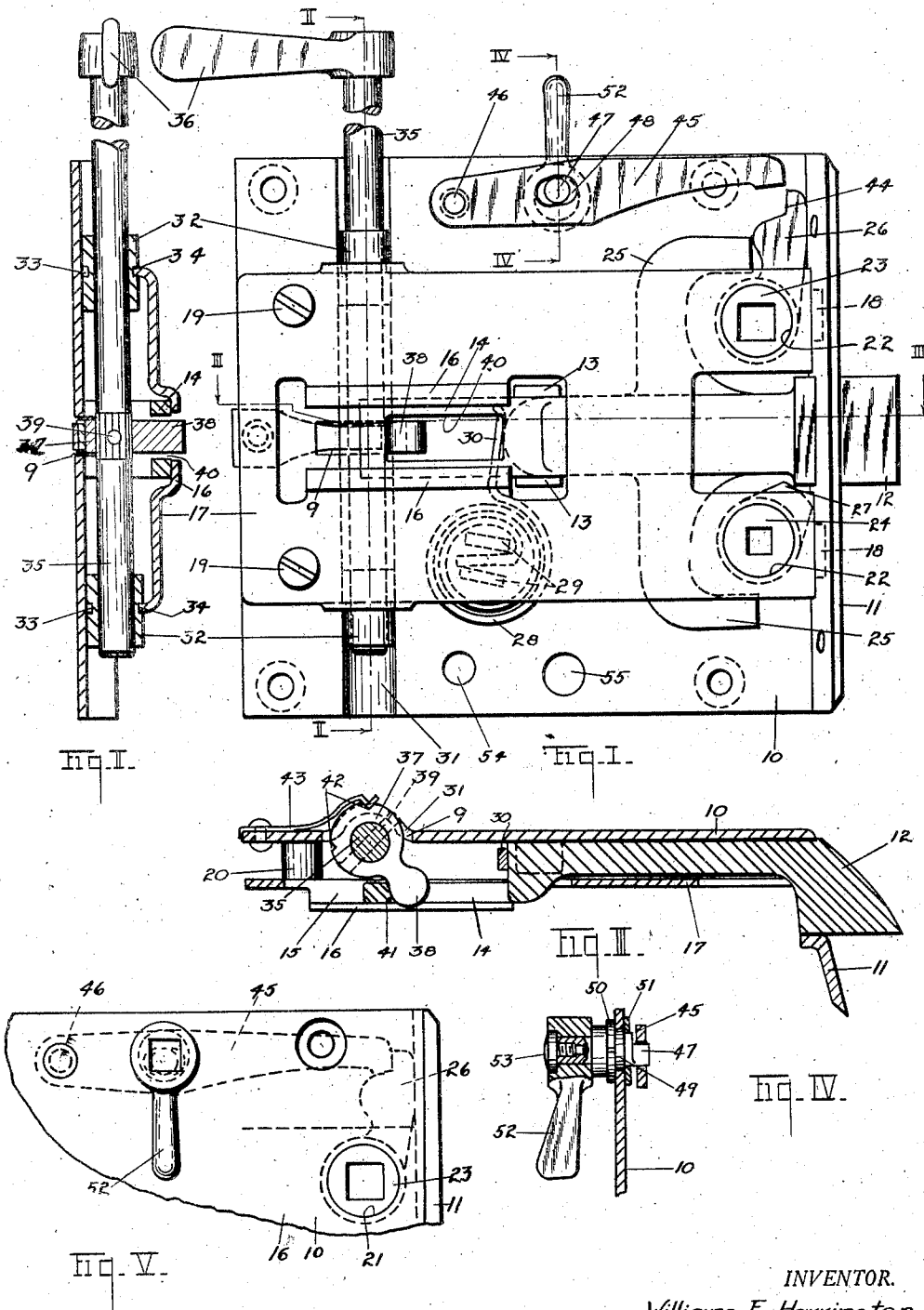
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COMBINED LATCH AND LOCK FOR DOORS

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COMBINED LATCH AND LOCK FOR DOORS.

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To all whom it may concern:

Be it known that I, WILLIAM F. HARRINGTON, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Combined Latches and Locks for Doors, of which I declare the following to be a full, clear, and exact description.

10 This invention relates to improvements in combined latches and locks for doors, particularly vehicle doors.

One object of the invention is the provision of a simple form of rotating lever for retracting the latch.

Another object is the provision of a latch with locking means, in which the parts are all interchangeable for right or left hand opening doors.

20 A further object is the provision of means for holding the rotatable lever still while the latch bolt is being actuated by the door handle.

Still another object is the provision of an internal crank actuated lock, which shall require movement through a large angle in order to effect the locking or unlocking operation, and also one in which the locking is effected long before the crank reaches its limit of motion, thus reducing the chance of failure to lock the door even when carelessly operated.

Other objects, and objects relating to details of construction and economies of manufacture, will appear as I proceed with the description of that embodiment of the invention, which, for the purposes of the present application, I have illustrated in the accompanying drawing, in which

40 Figure I represents a side elevational view of a combined latch and lock embodying my invention.

Fig. II is a vertical, sectional view, taken substantially on the line II—II of Fig. I.

45 Fig. III is a horizontal, sectional view, taken substantially on the line III—III of Fig. I.

Fig. IV is a fragmentary, sectional view, taken substantially on the line IV—IV of

Fig. I, but with the actuating crank moved 50 into locking position, and

Fig. V is a fragmentary, elevational view of the internal lock from the side opposite that shown in Fig. I.

Similar reference characters refer to like 55 parts throughout the several views.

In the drawing, 10 represents the main casing plate or base plate. At one vertical edge, it is bent at a suitable angle to form the front or face plate 11, in which is 60 formed an opening in order that the latch bolt 12 may protrude therethrough. The latter slides upon the face of the plate 10, being guided by the walls of the opening in the face plate 11 and between lips 13 struck 65 up out of the base plate 10. At the rear end of the bolt, there is an offset portion 14 which slides in upper and lower tracks 15 having vertical flanges 16. These tracks and flanges are bent up out of a second smaller 70 casing plate 17, which is fastened to the plate 10 by suitable means, preferably by tongues 18 set into slots in the face plate 11, and by screws 19 extending through spacers 20 and threaded into holes in the base 75 plate 10.

The plates 10 and 17 are preferably sheet metal stampings, and are symmetrically formed so as to be capable of assembly for use either upon right hand opening doors, 80 or left hand opening doors. To this end, both plates have circular openings, 21 in 10 and 22 in 17, similarly located upon opposite sides of the bolt 12. Corresponding openings 21 and 22 upon each side of the 85 bolt form a bearing of dimensions equal to that formed by the similar openings upon the other side. Either of these bearings is adapted to receive the journal 23 of a latch bolt actuator, or the journal 24 of an ex- 90 ternal lock. These journals are formed as shown, with square openings to receive the squared shank of a door handle, or the squared end of a lock barrel respectively, all of well known construction, and there- 95 fore not illustrated herein.

The latch bolt 12 is provided with oppositely extending wings 25. On the jour-

nal 23 there is integrally formed an arm 26 having a cam surface adapted to bear against the end of the adjacent wing 25, and to move the same to the left as viewed in Fig. I, when the door handle is rotated in the proper direction, thus retracting the latch bolt 12. Obviously, when the journal 23 is mounted in the other bearing, it may be operated to act against the other wing 25 with the same effect. The journal 24 has integral therewith, a projection 27 which may be rotated into the path of movement of a shoulder on the forward portion of the latch bolt, as shown in Fig. I, and thus prevent the retracting of the same. Obviously, the journal 24 may be mounted in the other bearing, and similarly operated to produce the same effect.

The latch bolt 12 is normally urged toward operative position by a coil spring 28, the inner end of which is mounted between two lugs 29 struck up from the base plate 10, and the outer end of which has a straight portion 30 bearing against the curved inner end of the main portion of the bolt. A groove or trough 31 is formed in the plate 10 open towards the plate 17 and running at right angles to the bolt 12. This trough extends entirely through the plate 10 from one edge to the other, except that it is cut away at the center to form a slot 9, as clearly shown in Figs. II and III. In this trough 31 are laid a pair of bushings 32 both provided with external slots or grooves 33 which may extend entirely around the bushings, if desired. Projections 34 on the plate 17 extend into the grooves 33, and in combination with the trough, serve to hold the bushings properly positioned without any other means of fastening. This construction forms a sufficiently rigid mounting for the bushing, while at the same time it permits of the slight motion necessary to automatically bring the bushings into accurate alignment when the shaft or rod 35 is passed through them.

At one end of the rod 35 is an operating handle 36, while a crank arm 37 with a cam end 38 is secured to the rod near its opposite end, preferably by a pin 39 extending through aligning holes in the rod and crank arm. The hub of this crank arm extends through the slot 9 in the trough 31, and by engaging the walls of the slot, properly positions the rod and prevents motion of the same longitudinally. The cam end 38 of the crank arm extends into a slot 40 in the offset portion 14 of the latch bolt 12. The end wall of this slot is preferably rounded, as shown at 41 in Fig. III. As the rod 35 is oscillated by means of the handle 36, the cam end 38 of the crank arm bears against the surface 41, and retracts the bolt.

In the hub of the crank arm 37 are cut two notches 42. A flat spring 43 secured

to the back of the base plate 10, has an angular extremity adapted to catch in one of the notches 42 when the rod is in its normal inoperative position. When the parts are assembled with the rod extending into the casing from the opposite direction, the end of the spring 43 will engage the other notch.

Provision is made for locking the door from the inside by the following means. The bolt actuating arm 26 is notched out at the top, as indicated at 44. A locking pawl 45 is pivoted at 46 to the base plate 10, and the opposite or free end is adapted to engage the notch 44 so as to prevent motion of the arm 26, and consequently to prevent the retraction of the latch bolt by the door handle. In Fig. I, the locking pawl is shown at the upward limit of its motion where it clears the notch 44 by only a small distance, and where it still lies entirely below the upper edge of the plate 10. The pawl is rocked upon its pivot by means of a small eccentric 47 extending into a slot 48 in the pawl. This eccentric is on the end of a small rock shaft 49, having a bearing in the plate 10, and prevented from having longitudinal movement by any suitable means, such as a shoulder 50 on one side of the plate, and a pin 51 projected through a hole in the shaft on the other side of the plate. On the outer squared end of the shaft 49 is mounted a crank 52 held on to the shaft by suitable means, such as a set-screw 53.

The parts are shown in the drawing assembled for use upon a right hand opening door, as viewed from the outside. When a lock is to be assembled for use upon a left hand opening door, the latch bolt actuator 23, 26, and the external lock 24, 27, are interchanged, and the rod 35 is inserted from the opposite end of the trough 31. At the same time, the locking pawl 45 and its eccentric actuator, are mounted in the holes 54, 55, which are properly positioned for the purpose. In fact, both plates 10 and 17 are absolutely symmetrical with respect to a plane normal to their surfaces, and including the axis of the latch bolt, except for the lugs 29. A second set of these lugs is unnecessary, because it is immaterial whether the spring 28 be located above or below the sliding bolt.

The operation of the device will be obvious from the above description of its parts. Before the bolt 12 can be retracted so as to permit the opening of the door, the projection 27 constituting part of the external lock, must be revolved from the position in which it is shown in Fig. I so as not to engage the shoulder on the bolt. Then the bolt may be retracted by the actuator 23, 26, or by the oscillatable rod 35. If the actuator 23, 26 is employed, the oscillatable rod 35 remains stationary, being held in the position shown in the drawing by means of

the flat spring 43, with its extremity in the notch 42, as shown in Fig. III. When the rod 35 is moved from its inoperative position shown in the drawing, by means of rotational effort applied to the handle 36, the end of the spring 43 is disengaged from the notch 42 and the crank arm 37, 38 acts to retract the bolt 12 by applying pressure to the vertical curved surface 41 on the offset portion of the bolt. During the first part of this motion, the crank tends to force the offset portion away from plate 10, as well as to slide it to the left. This tendency is counteracted, however, by the vertical flanges 16 on the tracks 15. In order to lock the door from the inside, it is only necessary to move the small crank 52 from the position shown in Fig. I to substantially the position shown in Figs. IV and V, after which it is impossible to turn the door handle (not shown) mounted in the journal 23 and extending outside the vehicle. When locking from the outside of the vehicle is desired, a key operated locking barrel (not shown) is actuated to turn the journal 24 so as to bring the projection 27 into the position shown in Fig. I.

I claim as my invention:

1. In a lock for vehicle doors, a pair of casing plates arranged in spaced parallel relation, one of said plates being shaped to form a trough open towards the second plate, a bushing fitting said trough, interengaging means between the bushing and the second plate for holding said bushing against movement in the trough, and a rod mounted within said bushing.

2. In a lock for vehicle doors, a pair of casing plates arranged in spaced parallel relation, one of said plates having a trough therein open towards the second plate, a bushing fitting said trough, said bushing having a small groove in its exterior surface at right angles to the trough, a projection upon said second plate taking into the groove to prevent the movement of the bushing bodily in said groove, and a rod mounted for movement in said bushing.

3. In a lock for vehicle doors, a pair of casing plates arranged in spaced parallel relation, a one-piece cylindrical bushing located between the plates, interengaging means between the bushing and one of the plates to prevent movement of the bushing in the direction of its axis, means upon the other plate to prevent movement of the bushing in a direction at right angles to its axis, and a rod mounted for movement in said bushing.

4. In combination, a vehicle door latch bolt, means tending to throw said bolt to operative position, a bolt retracting means, a pawl for preventing the operation of said retracting means, said pawl being pivoted at one end, and a pawl actuator located in-

termediate the ends of the pawl and operable through a large angle to move the free end of said pawl through a small angle.

5. In combination, a vehicle door latch bolt, means tending to throw said bolt to operative position, a bolt retracting means, a pawl for preventing the operation of said retracting means, a pivot for said pawl, and a pawl actuator located to one side of said pivot, said actuator being arranged to require a large movement in order to produce a small movement of the free end of the pawl.

6. In a lock for vehicle doors, a casing plate formed with a trough therein, a bushing fitting said trough, an external groove in the bushing at right angles to the trough, a bushing retainer attached to said plate and taking into said groove, and a rod mounted for movement within said bushing.

7. In a lock for vehicle doors, a casing plate formed with a trough therein, a pair of bushings fitting said trough and arranged therein in spaced relation, each of said bushings having a groove in its periphery at right angles to the axis of the trough, a bushing retaining means attached to said plate and having portions adapted to take into said grooves, said last named means permitting slight motion of the bushings whereby they may automatically align themselves when a rod or shaft is mounted within them.

8. In a lock for vehicle doors, a casing, a latch bolt mounted to slide in said casing, bearings of equal dimensions arranged upon opposite sides of said bolt, said bolt having portions extending into proximity with both of said bearings, and a bolt lock and a bolt actuator having journals of equal dimensions adapted to fit in either of said bearings.

9. In a lock for vehicle doors, a casing plate, a bolt mounted to slide horizontally thereon, said plate being shaped to form a trough extending vertically therethrough from edge to edge, a bolt actuating rod having a handle at one end, means for oscillatably mounting the rod in said trough with the handle end extending beyond either edge of the plate, a spring for releasably holding the rod in inoperative position, and means upon the rod for co-operating with said spring in either arrangement of the rod within the trough.

10. In a lock for vehicle doors, a casing, a latch bolt mounted to slide in said casing, bearings of equal dimensions arranged upon opposite sides of said bolt, said bolt having portions extending into proximity with both of said bearings, and a bolt lock adapted to fit in either of said bearings.

11. In a lock for vehicle doors, a casing, a latch bolt mounted to slide in said casing, bearings of equal dimensions arranged upon

opposite sides of said bolt, said bolt having portions extending into proximity with both of said bearings, and a bolt actuator adapted to be journaled in either of said bearings.

5 12. In a lock for vehicle doors, a casing, a latch bolt mounted to slide in said casing, bearings of equal dimensions arranged upon opposite sides of said bolt, said bolt having

portions extending into proximity with both of said bearings, a bolt actuator adapted to be journaled in either of said bearings, a locking pawl for said actuator, and means for mounting said pawl upon said casing near either one of said two bearings.

In testimony whereof, I affix my signature.

WILLIAM F. HARRINGTON.