Nov. 5, 1935. E. N. JACOBI 2,019,817

LOCKING DEVICE FOR VEHICLE DOORS

Filed March 12, 1934 2 Sheets-Sheet 1

Fig. 2.

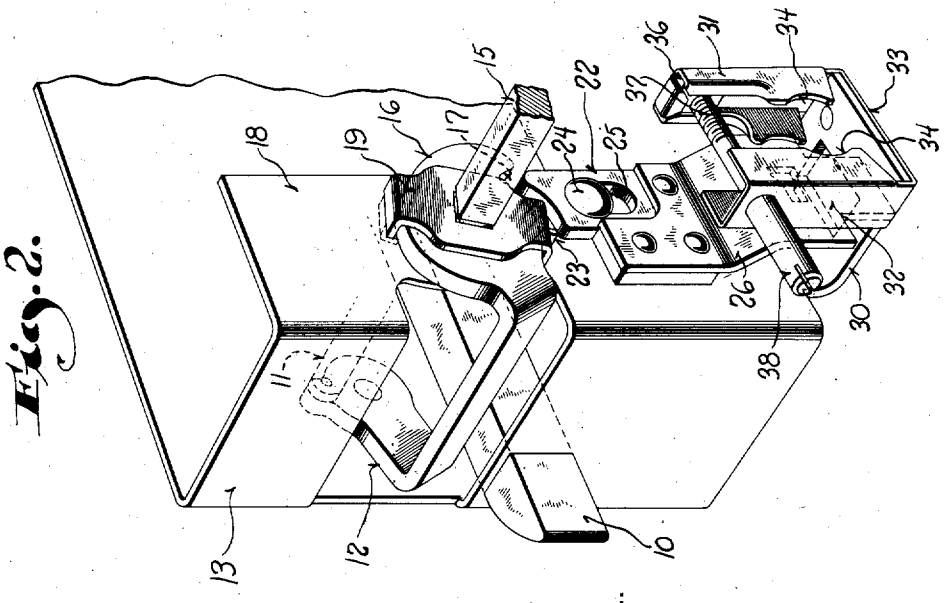
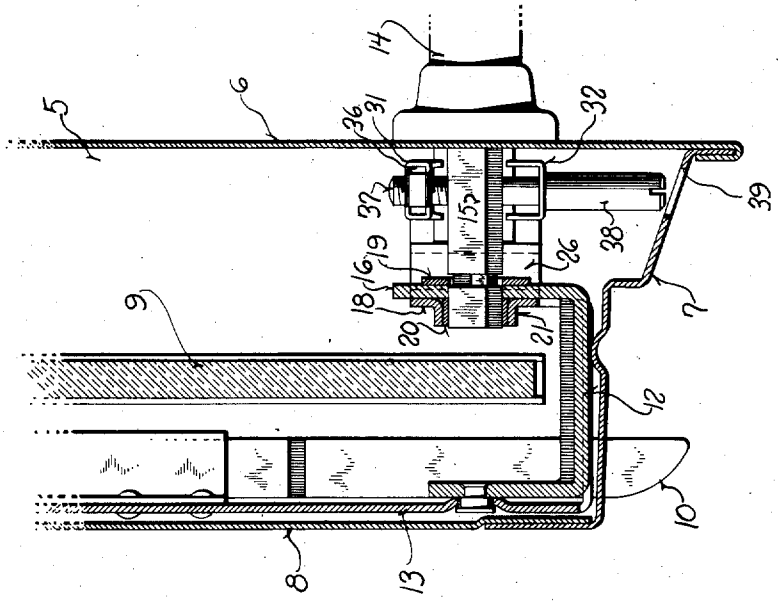


Fig. 1.



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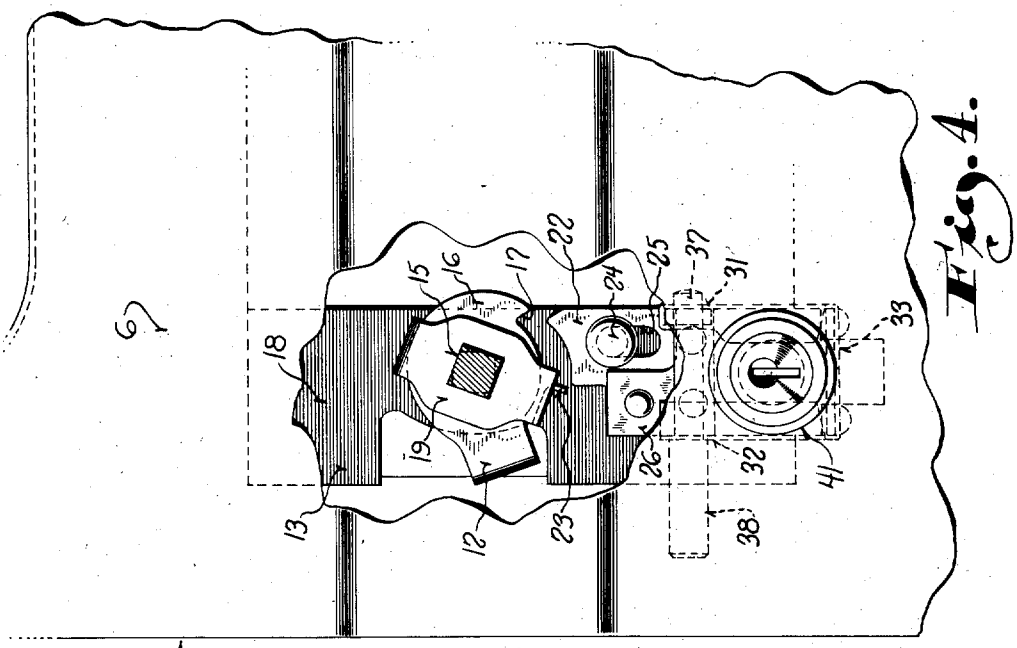


Fig. 4.

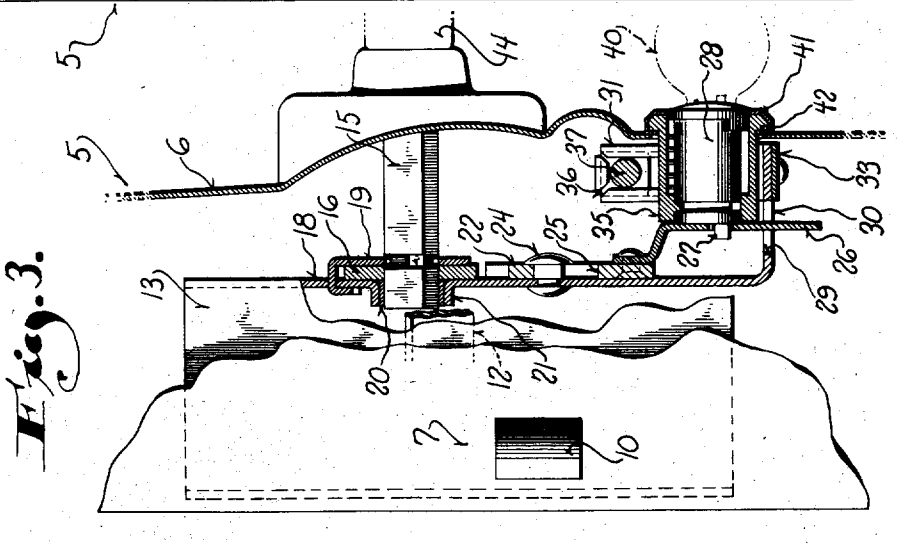


Fig. 3.

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2,019,817

LOCKING DEVICE FOR VEHICLE DOORS

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Application March 12, 1934, Serial No. 715,121

9 Claims. (Cl. 70—29)

This invention relates to improvements in locking devices for vehicle doors and has as a general object to simplify and reduce the cost of such locking devices.

Another object of this invention is to provide a locking device so constructed as to readily accommodate variations in the thickness of the doors and compensate for inaccuracies and misalignment between the hole in the door through which the lock cylinder is inserted, and the other locking mechanism.

And a further object of this invention is to provide a locking device of the character described in which a cam formed integrally on or carried by the inner end of the regular lock cylinder slides a locking bolt into and out of engagement with shoulders on a part operable directly by the handle, to secure this part against actuation.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawings, I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a horizontal section view through a conventional vehicle door illustrating the application of this invention thereto;

Figure 2 is a perspective view of the locking mechanism per se shown detached from the door;

Figure 3 is an end view of the door with parts broken away and in section showing the position of the locking mechanism therein; and

Figure 4 is a front edge view of the portion of the door adjacent the lock mechanism with parts broken away and in section to illustrate structural details.

Referring now more particularly to the accompanying drawings in which like numerals indicate like parts throughout the several views, the numeral 5 designates a hollow vehicle door of any conventional construction embodying an outer front wall 6, an end wall 7, and an inside wall 8. As is customary, the door is provided with a window opening closed by a glass 9 arranged to travel vertically within the hollow of the door.

A latch bolt 10 is also mounted in the door as is customary, to project from the end wall 7 for engagement with a keeper recess (not shown). The mechanism for yieldably projecting the latch bolt 10 to its operative position is not illustrated, but may be of any suitable construction. To retract the bolt, other mechanism (also not shown) is operable by a link 11 (see Figure 2) connected to a U-shaped actuator 12 mounted on the frame 13 of the latch mechanism. The actuator turns about a fixed axis and is driven by a handle 14, whose square shaft 15 projects into the door for connection with the actuator.

The front arm 16 of the U-shaped actuator 12 is enlarged and notched to provide a locking shoulder 17 on its lower periphery. As shown, this front arm 16 of the actuator directly overlies the adjacent front wall 18 of the frame 13, where it is retained by a strap 19 riveted to the wall 18. The adjacent inner end of the square handle shaft extends through openings in the strap 19 and the front arm 16 and into a bushing 20, freely rotatably mounted in a bearing 21 formed as part of the wall 18. The engagement of the shaft 15 with the arm 16 is non-rotatable so that rotation may be imparted to the actuator from the handle shaft.

Beneath the actuator and engageable with the abutment or shoulder 17 is a slidable locking bolt 22. As best illustrated in Figure 4, the lower portion of the strap 19 has a bent lip 23 to guide the locking end of the bolt 22 into locking engagement with the shoulder 17. Besides guiding the bolt 22 into proper engagement with the shoulder 17, the lip 23 affords a solid support for the locking bolt to preclude forced turning of the handle when the mechanism is set in its locked position.

The locking bolt 22 is slidably mounted on the adjacent front wall 18 of the frame by a rivet 24 fixed to the front wall and received in an elongated slot 25 in the bolt, so that the bolt may be readily slid into and out of engagement with the shoulder 17. At its lower end, the bolt has a spring tail piece 26 riveted thereto, which provides a cam follower to engage a cam 27 on the inner end of a lock cylinder 28 mounted in a manner to be later described, so that upon rotation of the cylinder, the locking bolt is slid into and out of operative engagement with the abutment 17. The normal free position of the spring tail piece is sufficiently close to the outer wall 6 of the door to be engaged and placed in

tension upon insertion of the lock cylinder into its holder. Hence, regardless of variations in the location of the inner end of the lock cylinder with respect to the locking bolt arising from variations in the thickness of the door, proper engagement between the lock cylinder and the bolt will be assured.

At its lowermost end, the tail piece **26** is reduced in width to project through an opening **29** in a forward extension or shelf **30** formed as an integral part of the front wall **18** of the frame, to cooperate with the rivet **24** in guiding the bolt for straight line movement.

Carried by the forward extension or shelf **30** are two upwardly projecting arms **31** and **32**. These arms are preferably integrally connected and provided by the arms of the U-shaped member, the closed end **33** of which is riveted or otherwise secured to the underside of the shelf **30**. Both arms are channel-shaped in cross section and have arcuate recesses **34** in their inner edges to embrace the casing **35** of the lock cylinder.

At its uppermost end, the arm **31** carries a nut **36** into which a screw **37** is threaded, the screw **37** projecting through the arm **32** and having an enlarged head **38** bearing against the arm **32** so that upon threading the screw into the nut, the upright arms will be drawn together to securely grip the casing of the lock cylinder. As clearly shown in Figure 1, the outer end **38** of the screw is disposed just inwardly of the end wall **7** of the door, where it is readily accessible through an opening **39** in the wall **7**.

The lock cylinder **28** and its casing **35** are of any conventional construction, the cylinder being equipped with the usual locking tumblers to secure the cylinder against rotation and retractible by a key **40** to free the cylinder for rotation. The outer end of the casing is provided with an enlarged head or flange **41**, which overlies the peripheral portion of the opening **42** in the outer wall **6** of the door.

By making the opening **42** large enough to permit a degree of motion in all directions on the part of the casing therein, and by mounting the lock cylinder from the supporting frame of the latch mechanism rather than from some part of the door, inaccuracies in location of the hole **42** through which the lock cylinder projects, with respect to the latch mechanism are compensated for in an extremely simple manner. Also, the provision of the spring tail piece for the locking bolt being yieldingly urged toward the lock cylinder accommodates variations in the distance between the end of the lock cylinder and locking bolt arising from variations in the width of the door.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art, that this invention affords a simple inexpensive lock mechanism for vehicle doors, so constructed that inaccuracies in the location of the cylinder holes in the door and variations in the thickness of the door are readily compensated.

What I claim as my invention is:

1. In a door lock of the character described including a yieldably projected latch bolt and a rotatable handle to retract the latch bolt, a supporting frame mounted at a distance from one wall of the door, an actuator rotatably mounted on said frame and connected with the latch bolt and the handle for transmitting motion from the handle to the latch bolt, a lock cylinder projecting through a hole in said wall of the door, means carried by said supporting frame to rotatably mount the lock cylinder with its face at said wall of the door and with its inner end adjacent said supporting frame, a driving cam on the inner end of the cylinder, a sliding locking bolt carried by the supporting frame and movable by rotation of the lock cylinder into and out of engagement with an actuator part to restrain the actuator against motion necessary for retraction of the latch bolt, and a connection between the sliding locking bolt and the driving cam on the inner end of the cylinder, said connection having its part which engages the cylinder cam yieldingly urged toward the cylinder to compensate for variations in the distance between the supporting frame and said wall of the door.

2. In a door lock of the character described, including a yieldably projected latch bolt and a rotatable handle for retracting the latch bolt, a supporting frame mounted within the door, an actuator rotatably mounted on said supporting frame and connected with the latch bolt and the handle to retract the latch bolt upon rotation of the handle, a rotatable lock cylinder, a casing for the lock cylinder, the assembled casing and cylinder passing through a hole in the outer wall of the door with their outer ends in fixed relation to the outer wall of the door and the inner end of the cylinder spaced from the frame a distance predetermined by the thickness of the door, means carried by the supporting frame to grip the casing along its length, a locking bolt slidably mounted on a part of said frame for locking engagement with part of the actuator, and cooperating means carried by the lock cylinder and said bolt for drivingly connecting the cylinder and the bore so the rotation of the cylinder shifts the bolt to and from locking engagement with the actuator part to restrain rotation of the actuator necessary for retraction of the latch bolt, and said cooperating means being automatically adjustable to compensate for variations in the distance between said outer wall of the door and the supporting frame.

3. In a locking mechanism for hollow vehicle doors, a supporting frame disposed within the door and having a front wall spaced from the front wall of the door, a rotatable actuator mounted on the supporting frame and operable by a rotatable handle on the exterior of the door, a sliding locking bolt mounted on said front wall of the supporting frame for sliding movement into and out of locking engagement with said actuator, a forward projection on said front wall of the supporting frame, a lock casing mounted on said forward projection with its outer end received in a hole in the outer wall of the door, a rotatable lock cylinder within the casing, and cooperating means carried by the cylinder and said sliding locking bolt whereby rotation of the cylinder moves the locking bolt into and out of engagement with said actuator part.

4. In a door locking mechanism for hollow vehicle doors, a supporting frame disposed within the door and provided with a front wall spaced from the front wall of the door, a rotatable actuator carried by the supporting frame and operable by a rotatable handle on the exterior of the door, a locking bolt slidably mounted on said front wall of the frame for engagement with an actuator part, a shelf carried by said front wall of the frame and projecting forwardly from said frame toward the front wall of the door adjacent a hole in said front wall of the door, a lock casing inserted through the hole in the front wall of the

door, means on said shelf to readily detachably grip the lock casing and hold the same firmly with respect to the supporting frame, a lock cylinder rotatable in said casing, and cooperating means carried by the cylinder and said sliding locking bolt whereby rotation of the cylinder moves the locking bolt into and out of engagement with said actuator part.

5. In a locking mechanism for hollow vehicle doors, a supporting wall within the hollow of the door and spaced inwardly from the front wall of the door, an actuator having a part overlying said supporting wall and operable by a rotatable handle mounted on the outside of the door, a sliding locking bolt carried by said supporting wall and adapted to be slid into and out of engagement with said actuator part to restrain the same against actuation in one direction, a forwardly projecting shelf on said supporting wall adjacent a hole in the front wall of the door, a bored lock casing entering the interior of the door through said hole, means carried by said shelf to clamp and grip the lock casing and hold the same firmly with respect to the supporting wall, the hole in the front wall of the door being sufficiently large to accommodate a limited shifting of the casing as required by the position of the clamping means, a lock cylinder rotatable in the casing, and a cam on the cylinder engaging a part of the sliding locking bolt, whereby rotation of the cylinder slides the locking bolt to and from operative engagement with the actuator part.

6. In a locking mechanism for hollow vehicle doors, a supporting wall within the hollow of the door and spaced inwardly from the front wall of the door, an actuator having a part overlying said supporting wall and operable by a rotatable handle mounted on the outside of the door, a sliding locking bolt carried by said supporting wall and adapted to be slid into and out of engagement with said actuator part to restrain the same against actuation in one direction, a forwardly projecting shelf on said supporting wall adjacent a hole in the front wall of the door, a bored lock casing entering the interior of the door through said hole, means carried by said shelf to clamp and grip the lock casing and hold the same firmly with respect to the supporting wall, the hole in the front wall of the door being sufficiently large to accommodate a limited shifting of the casing as required by the position of the clamping means, a lock cylinder rotatable in the casing, a cam on the inner end of the lock cylinder, and a yieldable tail piece carried by the sliding locking bolt and engaging the cam whereby rotation of the cylinder imparts sliding movement to the locking bolt to move the same to and from operative engagement with said actuator part, and the yieldability of said tail piece accommodating variations in the thickness of the door.

7. In a locking mechanism for hollow vehicle doors, a supporting wall within the door spaced inwardly from the front wall of the door, an actuator having a part overlying said supporting wall and operable by a rotatable handle on the exterior of the door, a sliding locking bolt carried by the supporting wall for movement into and out of operative engagement with an actuator part to secure the same against actuation in one direction, a shelf carried by said supporting wall and projecting forwardly toward the front wall of the door, a pair of opposed upright gripping arms carried by said shelf, screw means to draw said gripping arms together, a bored lock casing having its outer end received in a hole in the front wall of the door gripped by said upright gripping arms and held thereby in proper relative position with respect to the locking bolt independently of the walls of the door, a lock cylinder rotatable within the casing, and cooperating means carried by the cylinder and the sliding locking bolt whereby rotation of the cylinder imparts movement to the bolt.

8. In a locking mechanism for hollow vehicle doors, a supporting wall within the door spaced inwardly from the front wall of the door, an actuator having a part overlying said supporting wall and operable by a rotatable handle on the exterior of the door, a sliding locking bolt carried by the supporting wall for movement into and out of operative engagement with an actuator part to secure the same against actuation in one direction, a shelf carried by said supporting wall and projecting forwardly toward the front wall of the door, a pair of opposed upright gripping arms carried by said shelf, screw means to draw said gripping arms together, a bored lock casing having its outer end received in a hole in the front wall of the door gripped by said upright gripping arms and held thereby in proper relative position with respect to the locking bolt independently of the walls of the door, a lock cylinder rotatable within the casing, and cooperating means carried by the cylinder and the sliding locking bolt whereby rotation of the cylinder imparts movement to the bolt, said screw means for drawing the gripping arms together being readily accessible through an opening in the end wall of the door whereby the assembled lock cylinder and casing is readily removable.

9. In a lock mechanism for hollow vehicle doors, a supporting wall within the hollow of the door and spaced inwardly from the front wall of the door, a latch actuator having a part adjacent said wall and operable by a rotatable handle mounted on the outside of the door, a sliding locking bolt carried by the supporting wall and adapted to engage said actuator part to restrain the actuator against movement in one direction, a key controlled lock including a rotatable cylinder projecting through a hole in the front wall of the door, means on said supporting wall for gripping the key controlled lock to hold the same in place, a driving cam on the inner end of the lock cylinder, and a yieldable tail piece carried by the sliding locking bolt and engaging the cam so that rotation of the cylinder imparts sliding movement to the locking bolt to move the same to and from operative engagement with said actuator part, the yieldability of said tail piece insuring driving engagement between the cam and the tail piece regardless of variations in the distance between said supporting wall and the inner end of the cylinder.

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