Sept. 9, 1924. 1,507,631

B. E. TAYLOR

VEHICLE DOOR LOCK

Filed June 14, 1920. 3 Sheets-Sheet 1

Fig. 1

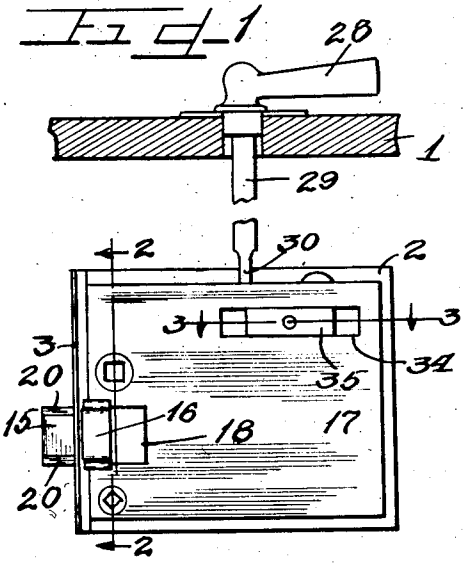


Fig. 2

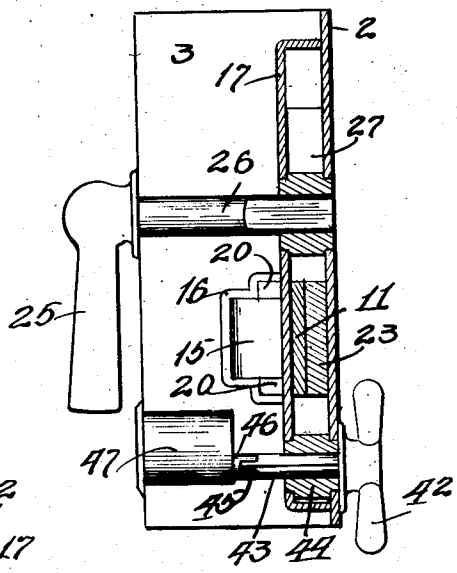


Fig. 3

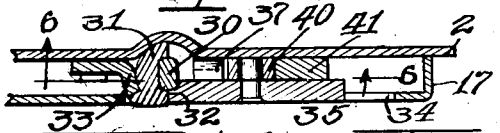


Fig. 6

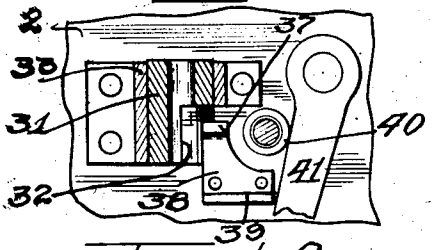


Fig. 7

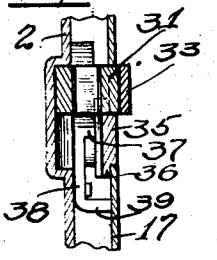


Fig. 9

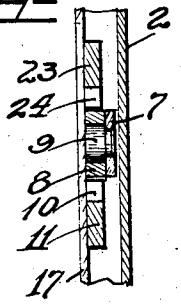
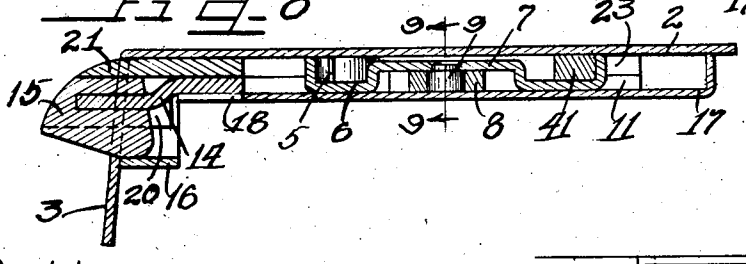


Fig. 8



Witnesses

J. W. Angell

Fred E. Lasher

Inventor

Bayard E. Taylor

by Charles W. Hill Atty.

Sept. 9, 1924. 1,507,631

B. E. TAYLOR

VEHICLE DOOR LOCK

Filed June 14, 1920 3 Sheets-Sheet 2

Fig. 4

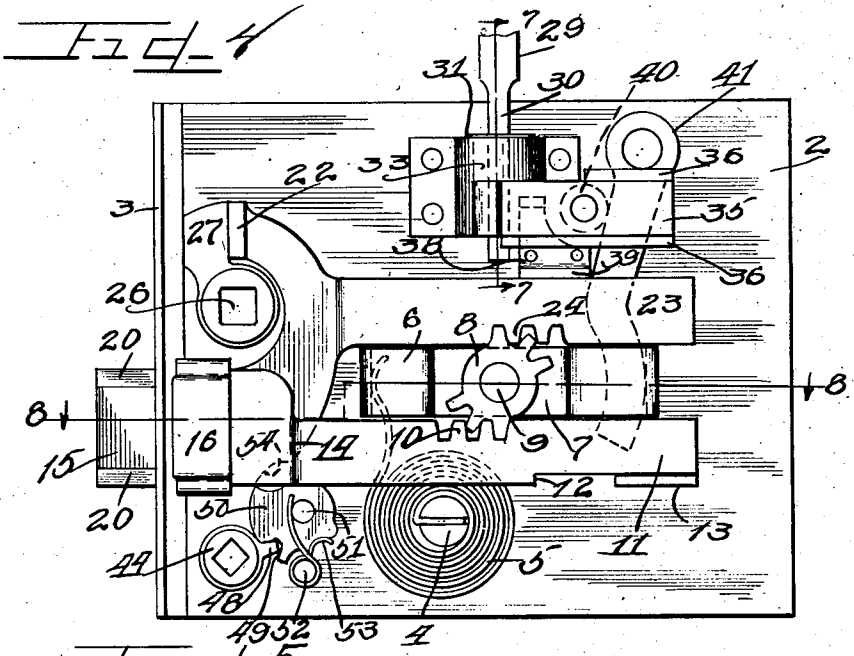
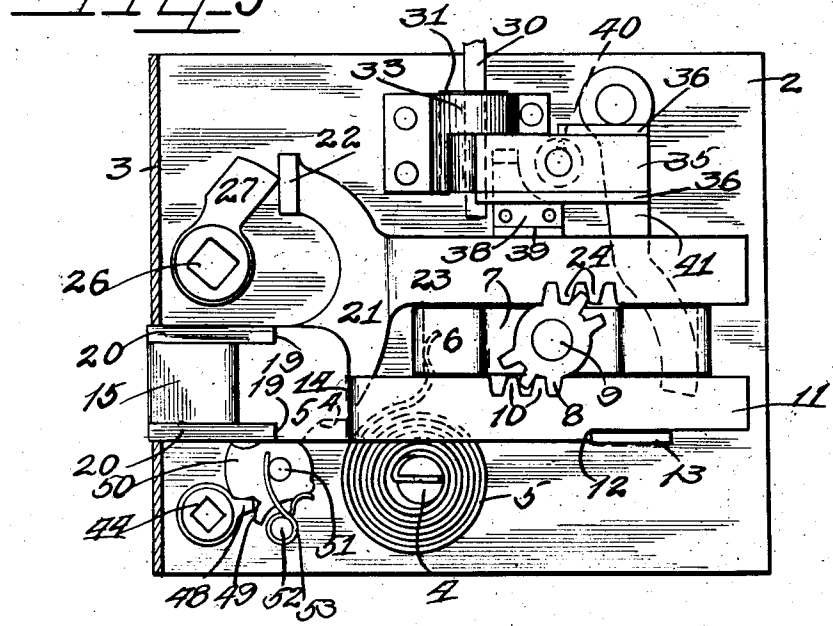


Fig. 5



Witnesses

J. W. Angell

Fred E. Paesler

Inventor

Bayard E. Taylor.

by Charles W. Fick

Atty.

Sept. 9, 1924. 1,507,631

B. E. TAYLOR

VEHICLE DOOR LOCK

Filed June 14, 1920 3 Sheets-Sheet 3

Fig. 12

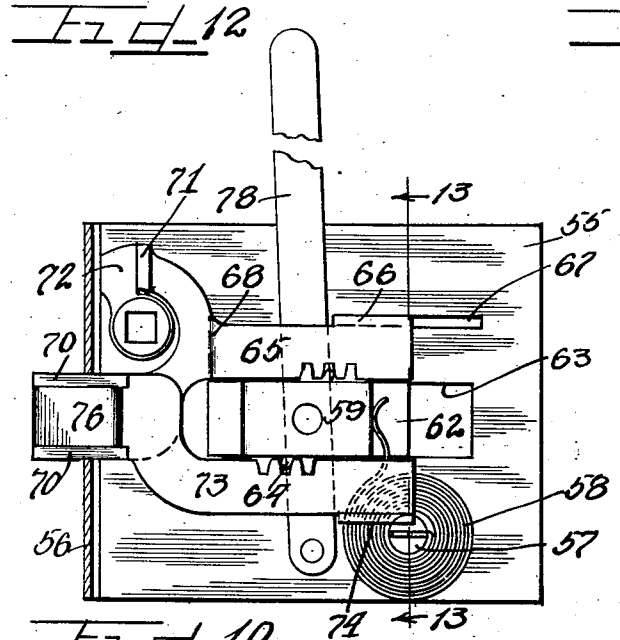


Fig. 11

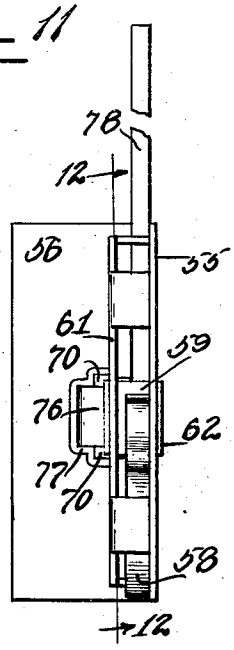


Fig. 10

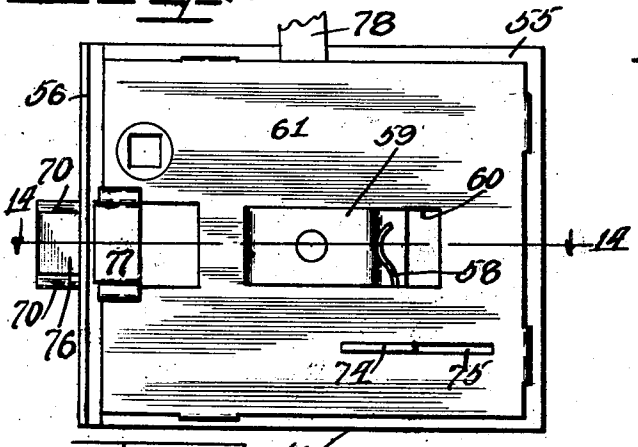


Fig. 13

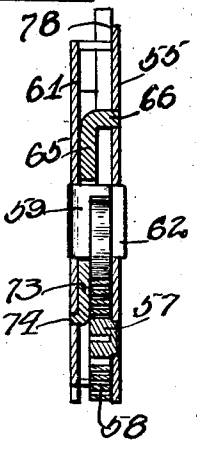
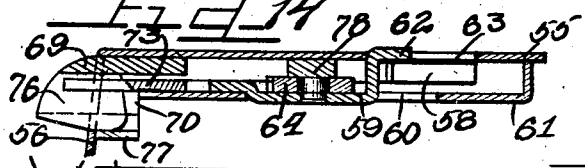


Fig. 14



Witnesses

J. W. Angell

Fred E. Sausler

Inventor

Bayard E. Taylor.

by Charles O. Niles

Atty.

Patented Sept. 9, 1924. 1,507,631

UNITED STATES PATENT OFFICE.

BAYARD E. TAYLOR, OF OAK PARK, ILLINOIS.

VEHICLE DOOR LOCK.

Application filed June 14, 1920. Serial No. 388,733.

To all whom it may concern:

Be it known that I, BAYARD E. TAYLOR, a citizen of the United States, and a resident of the village of Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Vehicle Door Lock; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates more particularly to an improved type of door lock adapted primarily for use on automobile doors and having a spring-controlled latch bolt adapted to automatically engage in the frame strike plate with an auxiliary wedge member adapted to co-act with the latch bolt and strike plate to hold the door against rattling, said lock having a plurality of manually operable devices whereby the latch bolt may be retracted from the interior or exterior of the automobile to permit opening of the door.

It is an object of this invention to provide a vehicle door lock wherein the locking bolt and wedge are adapted to be retracted into release position by any one of a plurality of handle operated mechanisms which are operable independently of one another.

It is also an object of the invention to provide a vehicle door lock wherein a movable spring-controlled member having a gear mounted thereon for the purpose of retracting a locking bolt either by means of a handle operated rack bar or by means of a handle actuated arm.

Another object of the invention is the construction of a vehicle door lock wherein a rack locking bolt is adapted to be released by a key actuated mechanism to permit opening by either of a plurality of handle operated devices.

It is a very important object of this invention to provide an exceedingly thin lock to avoid the necessity of cutting away the door pillar unduly, thereby avoiding material impairment of the strength of the door construction.

Other and further important objects of this invention will be apparent from the disclosures in the specification and drawings.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a front elevation of a door lock embodying the principles of this invention and showing one of the door handles for actuating the lock mechanisms.

Figure 2 is an enlarged transverse section taken on the line 2—2 of Figure 1 and showing the outer door handle and the key lock in elevation.

Figure 3 is an enlarged fragmentary detail section taken on the line 3—3 of Figure 1.

Figure 4 is an enlarged front elevation of the lock mechanisms with the cover removed and with the locking bolt in locking position.

Figure 5 is a similar view showing the locking bolt held in retracted position by one of the handle operated retractors.

Figure 6 is a fragmentary detail view partly in section and taken on line 6—6 of Figure 3.

Figure 7 is a fragmentary detail section taken on line 7—7 of Figure 4.

Figure 8 is a longitudinal section taken on line 8—8 of Figure 4.

Figure 9 is a detail section taken on line 9—9 of Figure 8.

Figure 10 is a front elevation of a modified form of lock.

Figure 11 is an end view thereof.

Figure 12 is an elevational view taken on line 12—12 of Figure 11.

Figure 13 is a section taken on line 13—13 of Figure 12.

Figure 14 is a section taken on line 14—14 of Figure 10.

As shown on the drawings:

The reference numeral 1 indicates a vehicle door having mounted in a recess thereof a door lock embodying the principles of this invention. The lock comprises a casing plate or mounting plate 2 one end of which is bent forwardly at an angle to afford a flange 3 having an opening therein to permit the latching members to project therethrough. Secured in a stud 4 projecting from the plate

2 is the inner end of a coiled spring 5, the outer end of which projects upwardly and is engaged in one end of a float member 6. The middle portion of the float member 6 is depressed at 7 to afford a pocket within which a multilated gear or pinion 8 is disposed to rotate on a pin 9 secured to the depressed portion 7 of the float member, as shown in Figure 8. The teeth of the gear 8 are disposed at two opposite portions of the gear only with the lower teeth in mesh with the teeth 10 of a slidable rack bar 11. The rack bar 11 is cut out at one corner to provide a shoulder 12 adapted to engage against a stop 13 formed on the plate 2 for the purpose of limiting the inward movement of the rack bar 11. The outer end of the rack bar 11 is deflected at 14 and has rigidly secured thereon a wedge 15, which is slidable through the opening in the flange 3 and which is furthermore adapted by rearward movement of the rack bar 11 to move in a channel strap 16 secured on the outer surface of a casing or box 17 attached over the lock mechanisms mounted on the plate 2. The casing 17 is provided with an opening 18 to permit retraction of the wedge 15. The deflected portion 14 of the rack bar 11 is cut away at the sides thereof to afford shoulders 19 adapted to contact flanges 20 integrally formed on opposite margins of a latch bolt 21 forming the lower arm of a yoke. The upper arm of the yoke is provided with a head 22. The yoke is integrally formed at one end of a second or upper rack bar 23 having teeth 24 in mesh with the upper teeth of the gear 8.

Normally the spring 5 acts to hold the latch bolt 21 in its projected position to engage in a strike plate secured in place upon the door frame or jamb to receive the latch bolt when the door is in closed position. To retract the latch bolt 21 to permit opening of the door from the exterior of a vehicle an outer door handle 25 is provided having a stem 26, the inner squared end of which projects into a squared opening formed in one end of a dog or roll back 27 supported between the plate 2 and the casing 17. The free end of the roll back 27 is in contact with the head 22 so that when the handle 25 is turned the roll back 27 forces the latch bolt 21 and the rack bar 23 inwardly, thereby causing the gear 8 to retract the rack bar 11 and the wedge 15, as shown in Figure 5.

For the purpose of opening the door from the interior of the vehicle a second handle 28 is provided with the stem 29 thereof projecting downwardly through the upper ledge of the door, as shown in Figure 1, to permit the flattened end 30 of the stem to project through an opening in the upper part of the casing 17 and engage in an opening of a collar or barrel 31. The lower half of one side of the barrel 31 is cut away to afford a contact face 32. The barrel 31 is rotatably supported in a bracket or housing 33 secured to the mounting plate 2. Slidably engaged in a slot 34 of the casing 17 is a bar or block 35 having guide flanges 36. The block 35 is held in the slot 34 by the upper flange 37 of a bracket plate 38. A lower flange 39 is formed on the bracket plate 38 and affords a guide for the rack bar 23. Rotatable on the inner surface of the slidable block 35 is a roller 40 in engagement with an edge of a hanging arm 41. The upper end of the arm 41 is pivotally secured to the plate 2, while the lower curved end of said arm 41 engages in the float member 6.

A locking device is provided to permit the latch bolt 21 to be locked in its projected position to prevent actuation of the handle 25. For this purpose a third handle 42 is provided on the inner side of the door. The handle 42 has a squared stem 43, which projects through a squared opening in a collar 44 disposed between the casing 17 and the plate 2. The end of the stem 43 is provided with a tenon 45 adapted to engage in a slot formed in a projection 46 secured to the barrel of a pin lock 47. The lock 47 is mounted in the door 1 and is adapted to be released from locking position by means of a key. To permit the handle 42 to be operated from the inner side of the door when the lock 47 is unlocked, the stem tenon 45 is pulled out of engagement with the projection 46. The stem 43 may then be turned by the handle 42 to actuate the collar 44. A projection or lug 48 is provided on the collar 44 and is engaged in a notch 49 provided in a dog or cam 50. The cam 50 is pivotally mounted on a pin 51 secured to the mounting plate 2. A pin 52 is also secured on the mounting plate 2 and has a spring 53 engaged therearound. The ends of the spring 53 cross each other to permit one end to contact the pin 51 and the other end to engage the edge of the cam 50. The latch bolt 21 is provided with a notch 54 shown in dotted lines in Figures 4 and 5 for the purpose of receiving the cam 50 when the latch bolt is in its projected position, as shown in Figure 4.

Figures 10 to 14 inclusive illustrate a modified form of door lock embracing a mounting plate 55, one end of which is bent forwardly at an angle to afford a flange 56 having an opening therein to permit the latching members to be projected therethrough. Secured in a stud 57 on the plate 55 is the inner end of a coiled spring 58, the outer end of which projects upwardly and is engaged against the inner end of a slidable member 59. The slidable member 59 is slidably engaged in a slot or opening 60 provided longitudinally in a casing or housing 61 attached to the mounting plate 55 to enclose the operating mechanisms of the door lock. The front end of the slidable member 59 is deflected to engage behind the

inner surface of the front or outer plate of the casing 61. The inner end of the slidable member 59 is bent to form a flange 62, which is positioned to slide in a guide slot or opening 63 provided in the mounting plate 55. Rotatably mounted on the inner surface of the slidable member 59 is a gear or pinion 64 in mesh with the teeth of an upper slidable rack bar 65. The rack bar 65 is provided with a guide flange 66, which is adapted to slide in a slot 67 provided in the mounting plate 55. The end of the slot 67 limits the inward movement of the rack bar 65. The outer end of the rack bar 65 is deflected at 68 and has integrally formed thereon a yoke, the lower arm of which forms a latch bolt 69 having flanges 70 integrally formed on opposite margins thereof. The latch bolt 69 is adapted to slidably project through an opening in the flange 56 to engage in an opening of a strike plate secured in place upon the door frame or jamb to receive the latch bolt when the door is in closed position. The upper arm of the yoke has a head 71 integrally formed thereon.

Normally the spring 58 acts to hold the latch bolt 69 in its projected locking position. To retract the latch bolt 69 to permit opening of the door from the exterior of a vehicle, an outer door handle is provided similar to the handle 25. Secured on the inner end of the handle stem is a dog or roll back 72, the free end of which contacts the head 71 so that when the handle is turned the roll back 72 forces the latch bolt 69 and the rack bar 65 inwardly, thereby causing the gear 64 to simultaneously retract a slidable rack bar 73. The teeth of the rack bar 73 mesh with the gear 64. A flange 74 is integrally formed at one side of the rack bar 73 and is slidably engaged in a guide slot 75 formed in the casing 61. The outer end of the rack bar 73 is curved upwardly and then forwardly and has rigidly secured on the end thereof a wedge 76. The wedge 76 is slidable through the opening in the flange 56 to co-act with the latch bolt 69 to prevent rattling of the door when the door is in closed position. The wedge 76 in its inward and outward movements is adapted to slide through a channel strap 77 secured on the outer surface of the casing 61.

For the purpose of opening the door from the interior of the vehicle by retracting the latch bolt 69 and the wedge 76 a handle or lever 78 is provided. The lower end of the lever 78 is pivoted to the mounting plate 55 and projects upwardly in front of and in contact with the flange 66 of the rack bar 65.

The operation is as follows:

In the form of door lock illustrated in Figures 1 to 9 inclusive the spring 5 acts to hold the latch bolt 21 and the wedge 15 in their projected positions, as shown in Figures 4 and 8. With the door in closed position the latch bolt engages in the opening provided in the strike plate secured to the door jamb, and the wedge 15 wedges against the locking edges of the flange 3 and of the strike plate, thereby permitting the latch bolt and the wedge to hold the door rigidly in place eliminating rattling of the door. The wedge 15 follows the bolt in the wedging operation and is slidable with respect to the latch bolt 21. Under the impulse of the spring 5 the wedge is driven into the space between the flat surface of the latch bolt and the edge of the associated strike plate.

With the lock mechanisms in the positions shown in Figure 4, the closed door may be readily opened from the exterior of the vehicle by turning the outer handle 25, thereby causing the roll back 27 to press against the head 22 to force the rack bar 23 inwardly moving the gear 8 and the floating member 6 rearwardly therewith against the action of the spring 5. The gear 8 being in mesh with the rack bar 11, both the latch bolt 21 and the wedge 15 are simultaneously retracted as a unit, and the door may be swung into open position on its hinges. Release of the handle 25 permits the stressed spring 5 to again force the latch bolt 21 and the wedge 15 outwardly through the opening in the flange 3.

To open the door from the interior of the vehicle the second handle 28 is turned thereby causing the flattened end 30 of the stem 29 to partially rotate the barrel 31. This operation of the barrel 31 acts to force the slide bar 35 rearwardly in the casing slot 34, whereby the roller 40 acts against the pivoted arm 41 to swing the same rearwardly. The rearward movement of the arm 41 retracts the member 6 and the gear 8 mounted thereon. The gear being in engagement with both of the rack bars 11 and 23, said rack bars are simultaneously retracted and thereby cause withdrawal of the latch bolt 21 and the wedge 15 against the action of the spring 5. The door may now be swung into open position.

Attention is called to the fact that the latch bolt 21 and the wedge 15 may be simultaneously retracted by either one of the handles 25 or 28 independently of the other. The rearward movement of the rack bar 11 is limited by the stop 13 on the plate 2, while the rearward movement of the upper rack bar 23 is limited by the flanges 20 engaging against the shoulders 19 of the rack bar 11.

When it is desired to lock the latch bolt against retraction to prevent opening of the door by operation of the handles 25 or 28, a key is inserted in the pin lock 47 and the barrel of the lock 47 is turned causing the lug 48 to throw the dog 50 upwardly to engage in the notch 54 of the latch bolt 21.

The latch bolt 21 and the rack bar 23 are thus locked against sliding movement to prevent opening of the door. It will thus be seen that the outer and inner handles 25 and 28 cannot be operated. To permit retraction of the latch bolt and wedge so that the door may be opened, the key must be inserted into the pin lock 47 so that the lock barrel may be rotated to move the dog 50 back into the release position shown in Figure 4. The door may now be opened by operating either the handle 25 or the handle 28.

When the pin lock 47 is in unlocked condition the door may be locked from the interior of the vehicle by operating the third handle 42, whereby the dog 50 is moved into locking engagement with the latch bolt 21. It will thus be seen that all the doors of a vehicle except one may be locked from the inside of the vehicle when the pin locks 47 are in unlocked position by means of the handles 42, the last door permitting a person to leave the car to lock said last door by means of a key from the exterior of the vehicle. All of the doors may be unlocked by keys from the exterior of the vehicle or by means of the handles 42 from the interior of the vehicle when said handles are pulled inwardly an amount sufficient to disengage the tenons 45 from the barrel projections 46 thereby permitting the handles 42 to rotate the collars 44 to actuate the dogs 50.

In the modified form of door lock illustrated in Figures 10 to 14 inclusive, the operation is similar to that already described. The latch bolt 69 and the wedge 76 may be retracted from the exterior of a vehicle by actuating the roll back 72 by the outer handle. To retract the latch bolt 69 and the wedge 76 from the interior of the vehicle, the lever 78 is swung rearwardly, thereby causing the rack bar 65 to slide rearwardly together with the rack bar 73 and the slide member 59 against the action of the spring 58. Release of either of the handles permits the spring 58 to shoot the latch bolt 69 and the wedge 76 back into their normal projected positions.

It will be noted that the rack bars and gear are so arranged as to permit the latch bolt and the wedge to move together and differentially with respect to each other so that the wedge may move on the latch bolt to engage between the latch bolt and the edge of the strike plate opening to take up any play of the latch bolt and thereby prevent rattling of the door when in closed position.

The various parts comprising the door lock are adapted to be punched out of sheet metal instead of being cast, thereby obviating machining and permitting the parts to be assembled in operating relation to provide a very thin lock.

I am aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. A door lock comprising a latch bolt, a wedge, a mechanism for impelling said latch bolt and the wedge outwardly into a latching position, handle mechanisms operable independently of each other for retracting the latch bolt and wedge, and means locking the latch bolt against retraction by said handle mechanisms.

2. A vehicle door lock comprising a latch bolt, a wedge slidably mounted adjacent thereto, a mechanism for impelling said latch bolt and wedge outwardly into a latching position, an outer handle mechanism for retracting the latch bolt and wedge from the exterior of the vehicle to permit opening of the door, and an inner handle mechanism for retracting the latch bolt and wedge from the interior of the vehicle and independently of the outer handle mechanism to permit opening of the door.

3. A door lock embracing a rack bar, a yoke formed at one end thereof, a latch bolt on one arm of the yoke, a head on the other arm of the yoke, a second rack bar, a wedge at one end thereof adapted for co-action with said latch bolt, a slidable member between said rack bars, a gear thereon in mesh with said rack bars for adjusting the latch bolt and wedge simultaneously and adapted to permit differential movement between the latch bolt wedge, and a coiled spring connected with said slidable member adapted to move the latch bolt and wedge into latching position, and means adapted to operate against said yoke head to cause retraction of said latch bolt and wedge.

4. A door lock embracing a rack bar, a yoke formed at one end thereof, a latch bolt on one arm of the yoke, a head on the other arm of the yoke, a second rack bar, a wedge on one end thereof for co-action with said latch bolt, a slidable member between said rack bars, a gear on said slidable member in mesh with said rack bars for adjusting the latch bolt and wedge simultaneously and adapted to permit differential movement between the latch bolt and wedge, a spring connected with said slidable member for moving the latch bolt and wedge into latching position, a handle operated means adapted to engage said yoke head to cause retraction of the latch bolt and wedge, and a second handle operated means adapted to actuate said slidable member to cause retraction of the latch bolt and wedge independently of said first mentioned handle operated means.

5. In a door lock the combination with a pair of slidable rack bars, a latch bolt on one of said rack bars, a wedge on the other

rack bar, said latch bolt rack bar having a notch therein, means for holding said latch bolt and wedge in latching position, and means adapted to be moved to engage in the notch of said latch bolt rack bar to hold the latch bolt locked against retraction.

6. In a door lock the combination with a pair of slidable rack bars, a latch bolt on one of said rack bars, a wedge on the other rack bar, said latch bolt rack bar having a notch therein, spring-controlled means for holding said latch bolt and wedge in latching position, a spring controlled pivoted dog, a member engaged therewith, a handle adapted to be operated from the inner side of the door to cause said member to move the dog into engagement with the notch in said latch bolt rack bar to hold the latch bar locked against retraction, and a key controlled device adapted to be operated by means of a key from the outer side of the door to permit retraction of the latch bolt and wedge.

7. In a vehicle door lock a pair of slidable rack bars, a latch bolt on one of said rack bars, a wedge on the other rack bar for co-action with said latch bolt, mechanisms for moving the latch bolt and wedge into projected latching position, a pivoted member, means operable by means of a key and handle for moving the pivoted member into engagement with one of the rack bars to hold the latch bolt locked against retraction to prevent opening of the door, said means adapted to be operated to cause release of the pivoted member to unlock the latch bolt, and handle-operated devices adapted to be operated independently of each other to retract the latch bolt and wedge to permit opening of the door.

8. A vehicle door lock comprising a pair of slidable rack bars, a latch bolt on one of said rack bars, a wedge on the other rack bar for co-action with the latch bolt, a spring controlled slidable member for moving the latch bolt and wedge into latching position, a gear thereon in mesh with said rack bars, a pivoted arm engaged with said slidable member, a slide bar, handle means for actuating the slide bar, and a roller on said slide bar adapted to engage the pivoted arm to swing the same to cause retraction of the latch bolt and wedge from latching position to permit opening of the door.

9. In a door lock the combination with latching means, of resilient means for normally holding the same in projected latching position, a rotatable notched locking device, a spring for holding the same in retracted and in locking position, and a rotatable toothed collar projecting into said notch adapted to be actuated from either side of the lock to rotate said device into locking engagement with said latching means to hold the same against retraction.

10. In a door lock the combination with a spring impelled latching means, of a locking device embracing a notched locking cam, a spring having both ends connected therewith for holding the same in an adjusted position, rotatable toothed means adapted to co-act with said cam, a rotatable handle member adapted to be operated from one side of the door lock to cause said rotatable means to move the cam into locking engagement with said latching means, and a key operated lock adapted to be operated from the opposite side of the door lock to move the cam out of locking engagement with said latching means to permit retraction thereof.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

BAYARD E. TAYLOR.

Witnesses:

CHARLES W. HILLS, Jr.,

FRED E. PAESLER.