

Nov. 26, 1940.

G. H. SCRAGG

2,223,050

DOOR OPERATING MEANS

Original Filed Oct. 5, 1935

2 Sheets-Sheet 1

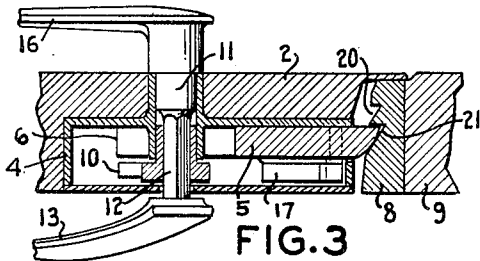


FIG. 3

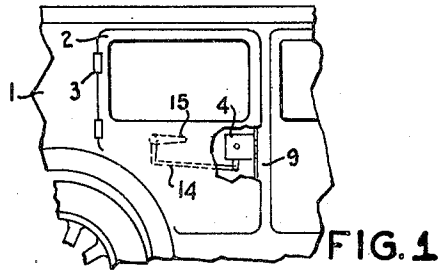


FIG. 1

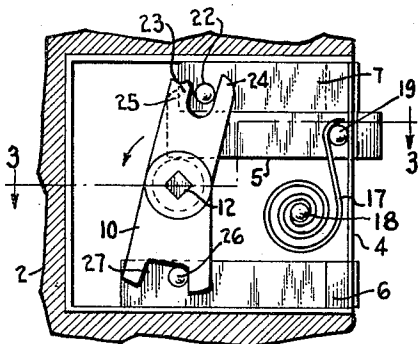


FIG. 2

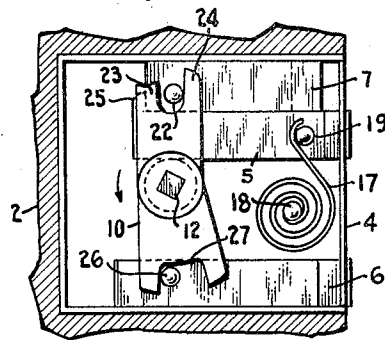


FIG. 4

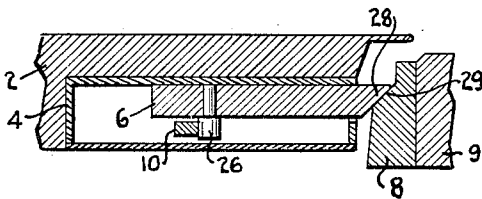


FIG. 6

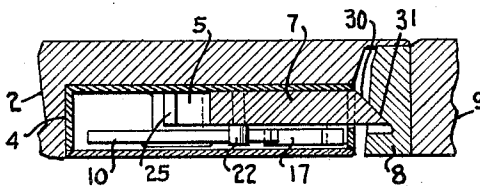


FIG. 8

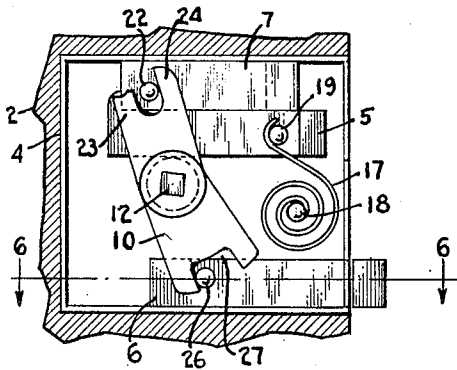


FIG. 5

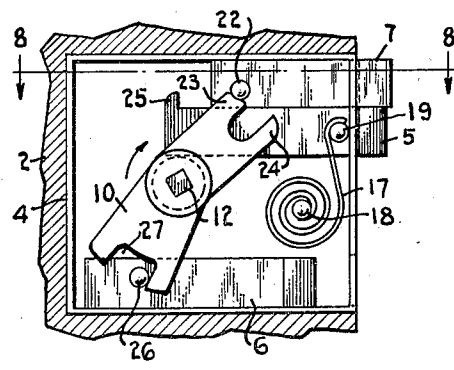


FIG. 7

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DOOR OPERATING MEANS

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2 Sheets-Sheet 2

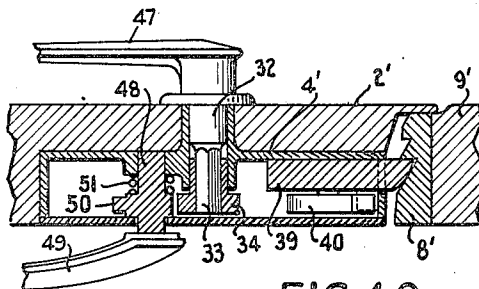


FIG. 10

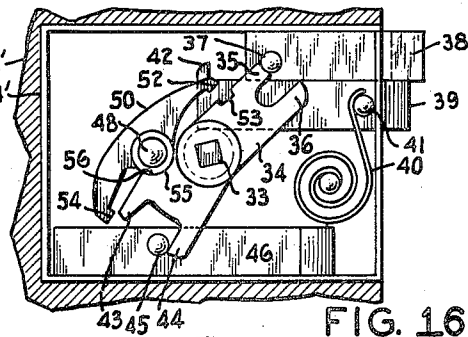


FIG. 16

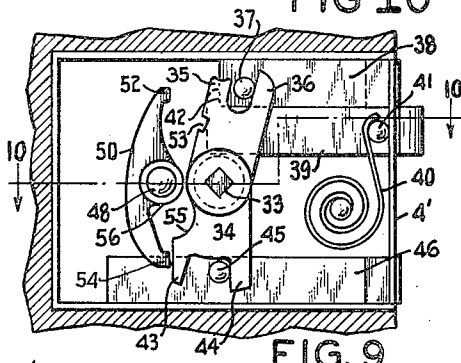


FIG. 9

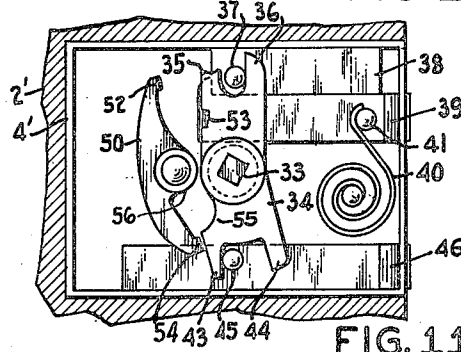


FIG. 11

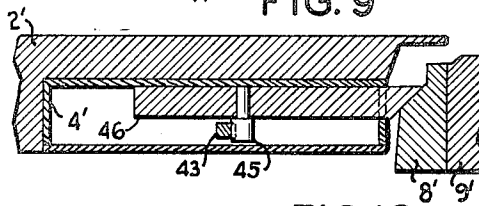


FIG. 13

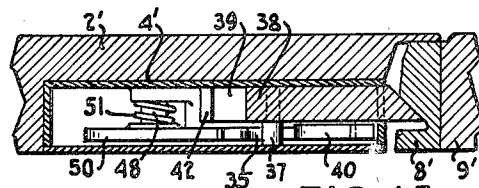


FIG. 15

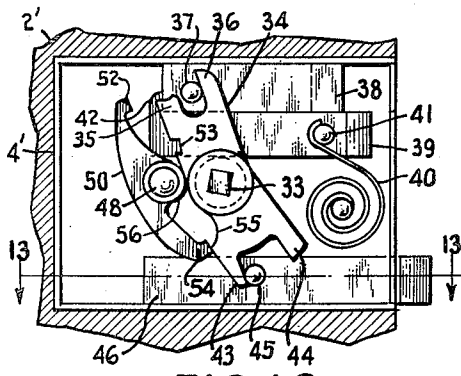


FIG. 12

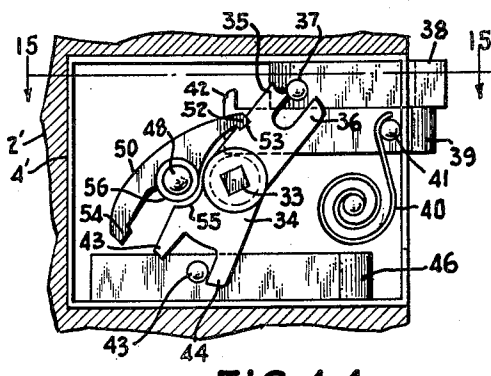


FIG. 14

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UNITED STATES PATENT OFFICE

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DOOR OPERATING MEANS

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Application October 5, 1935, Serial No. 43,663

Renewed March 27, 1940

13 Claims. (Cl. 292—173)

This invention relates to means whereby doors, especially of automobiles, may be secured and their operation facilitated.

The main object of the invention is to provide improved means as indicated which shall be efficient in operation and simple in construction and by which the means for effecting the several operations shall be properly correlated.

A further and more specific object of the invention is to provide a latch and means for forcing the door closed with a common operating means.

A further object of the invention is to provide a means for forcing the door closed and a means for forcing the door open with a common operating means.

A further object of the invention is to provide means for forcing the door tightly shut.

A further object of the invention is to provide a latch, a means for forcing the door open, a means for forcing the door closed and a common operating means for the latch, door-opening means and door-closing means.

A further object of the invention is to provide a latch and a lock for the door with a common operating means for the latch and lock.

A further object of the invention is to provide a latch for the door, means for forcing the door open and a lock for the door with a common operating means for the latch, door-opening means and lock.

A further object of the invention is to provide a door with locking means and door-opening means with a common operating means for the door-opening means and the lock.

A further object of the invention is to provide a door with a latch and means for forcing the door tightly closed.

A further object of the invention is to provide means for locking the door which can be unlocked from the exterior only.

A further object of the invention is to provide means whereby the door may be locked or the locking means may be set so that it may be unlocked from the interior or exterior only as may be desired.

Other and ancillary objects of the invention will appear hereinafter.

In the accompanying drawings which illustrate the invention—

Fig. 1 is a side elevation, partly broken away, of an automobile with the invention applied to a door thereof;

Fig. 2 is a side elevation, on an enlarged scale, of the latching and opening mechanism, the

parts being shown with the latch in latching position and with the opening and closing wedges in retracted position;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a view similar to Fig. 2 but showing the parts in position where the opening and closing wedges are in retracted position so that the door is free to be opened;

Fig. 5 is a view similar to Fig. 2 but showing the parts in position where the opener is thrust forward forcing the door open, the closing wedge and latch being withdrawn;

Fig. 6 is a section on the line 6—6 of Fig. 5;

Fig. 7 is a view similar to Fig. 2 but with the opener withdrawn, the latch in latching position and the closing wedge in closing position;

Fig. 8 is a section on the line 8—8 of Fig. 7;

Fig. 9 is a view similar to Fig. 2, of a modified construction of latch, door opener and door closer, with the parts in position where the latch is in extended or engaging position and both the opener and closer are in retracted or inoperative position;

Fig. 10 is a section on the line 10—10 of Fig. 9;

Fig. 11 is a view similar to Fig. 9 but with the latch in retracted position;

Fig. 12 is a view similar to Fig. 9 but with the latch and closer in inoperative positions and the opener in extended position;

Fig. 13 is a section on the line 13—13 of Fig. 12;

Fig. 14 is a view similar to Fig. 9 but with the closer and latch in extended positions and the opener retracted;

Fig. 15 is a section on the line 15—15 of Fig. 14; and

Fig. 16 is a view similar to Fig. 14, with the parts in position such that the door cannot be unlocked except from the outside of the door.

Referring to the drawings and first to Figs. 1 to 8 inclusive, the automobile body 1 has a usual or suitable door 2 swinging on vertical hinges 3. Mounted in the door is a suitable casing 4 within which is mounted a latch bolt 5, an opening bolt 6 and a closing bolt 7 which slide in suitable orifices in the casing 4 and engage with the striker plate 8 mounted upon the door jamb 9. The latch bolt and opening and closing bolts are operated by an arm 10 mounted upon a shaft 11 journaled in the casing and having a square section 12 which engages in a square hole in the arm 10 to prevent relative turning. The arm 10 extends on both sides of the shaft and forms in effect two angularly displaced arms. To the inside end of

the shaft 11 is fixed the arm 13 by which the shaft 11 may be turned. The arm 13 may be connected by suitable linkage 14 with a handle 15 so as to be operated from a distance at a more convenient location. The outer end of the shaft 11 has fixed to it the handle 16 for turning the shaft from the exterior of the door. The latching bolt 5 tends to be forced into extended position by reason of a coiled spring 17 having one end secured to the pin 18 fixed in the casing 4 and the other end of the spring engaging with a pin 19 fixed on the latch bolt 5. The outward movement of the latch bolt under the influence of the spring is limited by the pin 19 coming against the casing 4.

In its extended position the nose of the latch bolt engages in the notches 20 and 21 in the striker plate 8, the notch 20 being adapted to receive the nose of the latch bolt and hold the door when the last has not been completely closed, while the latch bolt nose engages in the notch 21 when the door has been approximately completely closed. As is usual with latch bolts the outer face of the nose of the latch bolt is flat and adapted to be opposed by abrupt shoulders on the striking plate to prevent opening of the door without retracting the latch bolt, while the rear face of the latch bolt and nose is beveled and there are corresponding beveled faces on the striker plate to cause the latch bolt to be automatically retracted and snap into the notches of the striker plate as the door is closed.

The latch bolt 5 is retracted against the spring 17 by the arm 10 operating on it through the closing bolt 7. The closing bolt 7 has fixed upon it a pin 22 which is embraced within the fork formed by the projections 23 and 24 at the upper end of the arm 10. The turning of this arm in the direction as indicated by the arrow (Fig. 2) will cause the bolt 7 to be retracted and bear against the upstanding projection 25 upon the latch bolt 5 whereby the latch bolt will be retracted along with the bolt 7 until its full retractive position is reached as shown in Fig. 4.

The opening bolt 6 is retracted and extended by means of the pin 26 fixed in the bolt and extending into the recess 27 in the end of the arm 10. In the position as shown in Fig. 2 the opening bolt is in retracted position as is also the closing bolt, while the latch bolt is in extended or securing position. In the position as shown in Fig. 4 the movement of the arm in the direction of the arrow has withdrawn the latch bolt to its retracted position but the width of the recess 27 has permitted this to be done without moving the opening bolt 6. In the position as shown in Fig. 4, however, the arm has come against the pin 26 and further movement of the arm in the same direction, and into the position as shown in Fig. 5, results in the extension of the opening bolt 6 which causes its diagonal outer end face 28 to wedge against a corresponding diagonal face 29 on the striker plate 8 and wedge the door slightly open as shown in Fig. 6. From this position the door is readily opened to the desired extent, any initial sticking or jamming of the door being overcome by the wedging action of the opening bolt 6.

When the operating force is removed from the handle, the spring 17 will throw the parts into the position as shown in Fig. 2, so that the door will automatically latch in the usual manner when pushed toward closing position.

If now the arm 10 is moved from this posi-

tion by rotating it by means of one of the handles in the direction of the arrow of Fig. 7 (the opposite to that in Fig. 2), the projection 23 will bear against the pin 22 and move the closing bolt 7 into extended position as shown in Fig. 7, the diagonal outer end face 30 of the bolt coming against the corresponding diagonal face 31 on the striker plate and operating to wedge or cam the door inwardly thereby taking up any possible looseness between the door and its frame, occasioned by wear or otherwise. This wedging of the door against the frame will securely hold it tightly closed and prevent rattling. The closing bolt is held in its position of wedging the door shut by reason of the fact that the projection 23 of the arm 10 is provided with a recess at its end in which the pin 22 lodges (see Fig. 7) when the closing bolt is fully extended and holds it in that position. On reversal of the rotation of the shaft 11, from the position as shown in Fig. 7, and its movement to the position as shown in Fig. 2 will withdraw the closing bolt, further movement will withdraw the latch bolt and further movement will extend the opening bolt to initially open the door. On the closing of the door the latch bolt will automatically snap into engagement with the striker plate as stated, and when the door has been closed a turning of the shaft 11 into the position as shown in Fig. 7 will result in the wedging of the door tightly against its frame and prevent rattling.

Referring now to Figs. 9 to 16 of the drawings, the casing 4' is mounted in the door 2', the striker plate 8' being mounted on the jamb 9'. The apparatus comprises, like the device of the foregoing Figures 1 to 8, a rotatable shaft 32 having a square section 33 entering within a square hole in the arm 34, whereby the arm is turned with the shaft. One end of the arm has the fork formed by the projections 35 and 36 within which is embraced the pin 37 fixed on the sliding bolt 38 adapted to cooperate with the striking plate to wedge the door closed (see Fig. 15), the sliding latch bolt 39 tends to be extended by the spring 40 and is limited in its extended movement by the pin 41 thereon coming against the casing 4', the latch bolt 39 having an upstanding projection 42 at its rear end adapted to be engaged by the rear end of the bolt 38 as the last is moved to the left in Fig. 9, to retract the latch bolt. The other end of the arm 34 has a fork formed by the projections 43 and 44 within which is embraced the pin 45 on the door-opening bolt 46, the recess between the projections 43 and 44 being of such a width as to permit movement of the arm 34 without movement of the bolt 46. It will be noted that the projection 35 has a curved recess in its extremity which engages with the pin 37 in the position as shown in Fig. 16.

The apparatus of Figs. 9 to 16 is similar to and operates in a similar manner to the similar parts of the apparatus of Figs. 1 to 8; instead, however, of operating handles or levers upon both ends of the shaft 32, there is an operating handle 47 at the outer (outside the door) end of the shaft only, and by means of the handle 47 the parts referred to are operated in the same manner as the similar parts are operated from the handle 16 of Fig. 3.

To operate the parts from the inner side of the door a separate operating shaft 48 is journaled in the casing 4' and is operated by a handle 49 fixed upon the shaft. Also fixed upon the shaft is the dog 50 which operates the parts as

the shaft 48 is turned and also serves to effect locking of the parts as will appear from the following:

The dog 50 is held against accidental displacement, but remains in any position to which it may be moved, by means of a coiled spring 51 having one end bearing against the casing 4' and the other against the dog 50. If, from the position of parts as shown in Fig. 9, the handle 49 and its connected shaft 48 and dog 50 are turned in a counterclockwise direction as viewed in that figure, the lower end of the dog will come against the lower end of the arm 34 and move it into the position as shown in Fig. 11 wherein the latch bolt 39 has been retracted. The further movement of the handle and dog in this same direction causes the dog to move the arm 35 into the position as shown in Fig. 12 wherein the door-opening bolt 46 is forced against the striker plate 9', as shown in Fig. 13, and the door is forced open.

If, from the position as shown in Fig. 9, the handle 49 and dog 50 are turned in a clockwise direction, the upper end of the dog 50 will come against the upper portion of the arm 34 and force the same into the position as shown in Fig. 14, at which point the bolt 38 for wedging the door shut will be extended so as to wedge against the striker plate as shown in Fig. 15, and the detent 52 at the upper end of the dog 50 will enter the notch 53 in the arm 34, which will prevent movement of the arm in a counterclockwise direction. Under this condition it will be seen that the bolt 39 engages with the striker plate to lock the door shut, and it can be unlocked only from the interior of the car (by the handle 49) and cannot be unlocked from the exterior of the car (by the handle 47). It will be seen that the bolt 38 is held in extended and locking position by means of the projection 35, and that therefore the latch bolt 39 cannot be retracted from its locking position. Any attempt by means of the handle 47 to move the arm 34 in the counterclockwise direction from the position as shown in Fig. 14 will be resisted by the dog 50. The bolt 38 will thus be securely held in locking position by the bearing of the pin 37 against the arm 34 which is in turn locked by the dog 50 as referred to. However, the turning of the shaft 48 in a counterclockwise direction from the position as shown in Fig. 15 will result in turning of the dog 50, withdrawal of the detent 52 from the notch 53 and the movement of the arm 34 in such direction as to retract the bolt 38 out of locking position as shown, for instance in Fig. 9, and further turning of the shaft 48 in the direction as stated will result in the retraction of the latch bolt 39 into unlocked position as shown in Fig. 11. It is therefore clear that in the manner just described the door may be locked so that it may be unlocked from the inside only.

It may be desirable, as for instance where children are in the car and might accidentally open the door and fall out, to lock the door so that it cannot be unlocked from the inside. To accomplish this result the arm 34 may be turned by the shaft 32 in a clockwise direction (Fig. 16) into the position of Fig. 16 where the pin 37 will lodge in the concave seat upon the end of the projection 35 whereupon the locking bolt 38 will be securely held in locking position by the arm 34 forming a strut between the pin 37 and the shaft 32, upward movement of the bolt 39 being prevented by the top of the casing 4' in proximity to which it is. Any turning of the

shaft 48 in a counterclockwise direction in an attempt to move the arm 34 out of restraining position would simply result in the lug 54 at the lower end of the dog 50 being brought against the end of the projection 43 on the arm 34, whereupon the dog and arm would be jammed between their two centers, and the movement arrested. Further movement of the arm 34 in a clockwise direction is prevented by the concave portion 55 of the arm coming against the hub 56 of the dog 50. Movement of the arm 34 in the counterclockwise direction (Fig. 16) to remove the pin from the concave seat could readily be effected by turning the shaft 32 by the handle 47. The continued turning of the arm would cause the locking bolt 38 to be retracted by the projection 36 coming against the pin 37 until the bolt is fully retracted and the door unlocked.

In most of the positions in which the dog 50 may be located, the movement of the locking bolt to unlocking position by the continuous turning of the arm 34 is as referred to, as in the majority of cases the detent 52 would not come into registry with the notch 53 to arrest such movement. In some cases, however, as for instance if the arm 34 is moved into the locking position of Fig. 16 from the position of parts of Fig. 14, the detent 52 will enter the notch 53 on counterclockwise movement and the movement will be arrested. It will then be necessary to turn the shaft 48 from the inside to release the arm and permit the completion of the unlocking operation.

While the invention has been illustrated in what are considered its best applications it may have other embodiments without departing from its spirit and is not therefore limited to the structures shown in the drawings.

What I claim is:

1. In door-operating apparatus, the combination of rectilinearly moving, wedging, door-opening means, rectilinearly moving, wedging, door-closing means and a common operating means for said door-opening means and said door-closing means.
2. In door-operating apparatus, the combination of a rectilinearly moving latch bolt, rectilinearly moving, wedging means for forcing the door closed, means for forcing the door open and a common operating means for said latch bolt, said door-opening means and said door-closing means.
3. In door-operating apparatus, the combination of a rotary shaft, an arm on said shaft, a movable door-closing member engaging said arm to be moved thereby as said shaft is rotated and a latch bolt engaging with said movable member to be moved thereby.
4. In door-operating apparatus, the combination of a rotary shaft, arms extending from said shaft and angularly displaced about the same, door-opening means operated by one of said arms and door-closing means operated by another of said arms.
5. In door-operating apparatus, the combination of a rotary shaft, arms extending from said shaft and angularly displaced about the same, a latch bolt and door-closing means operated by one of said arms and door-opening means operated by another of said arms.
6. In apparatus of the character described, the combination of a latch bolt for a door, door-wedging means and means for locking said door-wedging means in door-locking position and

operable to unlock the door from the outside of the door only.

7. In apparatus of the character described, the combination with a latch bolt for a door and means for locking the door settable to be operable to unlock the door from the outside of the door only or from the inside of the door only.

8. In apparatus of the character described, the combination, of wedging locking means for a door, a rotatable shaft operable from the inside of the door for operating said locking means, a second rotatable shaft operable from the outside of the door for operating said locking means, and means operable by the second mentioned shaft for locking the door against unlocking by the first mentioned shaft.

9. In apparatus of the character described, the combination, of wedging locking means for a door, a rotatable shaft operable from the inside of the door for operating said locking means, a second rotatable shaft operable from the outside of the door for operating said locking means, means operable by the first mentioned shaft for locking the door against unlocking by the second mentioned shaft and means operable by the second mentioned shaft for locking the door against unlocking by the first mentioned shaft.

10. In door-operating apparatus, the combination with a rotatable shaft, of a rectilinearly moving door-opening bolt having a pin, an arm on said shaft having a fork at one end embracing said pin, a rectilinearly movable spring-pressed latch bolt, a second arm on said shaft, a reciprocating member operatively engaging said latch bolt and a pin on said member, said second arm having a forked end engaging said pin on said member for operatively connecting said second arm with said latch bolt whereby said latch bolt may be retracted, the width of the recess in said first mentioned fork being greater than the diameter of its embraced pin to permit retraction of said latch bolt without moving said door-opening bolt.

11. In door-operating apparatus, the combination with a rotatable shaft, of an arm on said shaft, a rectilinearly moving spring-pressed

latch bolt, means for operatively connecting said arm with said latch bolt, a rectilinearly moving door-opening bolt, a second arm on said shaft, means for operatively relating said second arm to said door-opening bolt a second rotatable shaft and a dog carried by said second shaft, said dog being adapted to be moved into and out of engagement with an arm on the first mentioned shaft to lock said first mentioned shaft from operation to retract said latch bolt.

12. In door-operating apparatus, the combination with a rotatable shaft, of an arm on said shaft, a rectilinearly moving spring-pressed latch bolt, means for operatively connecting said arm with said latch bolt, a rectilinearly moving door-opening bolt, a second arm on said shaft, means for operatively relating said second arm to said door-opening bolt, a second rotatable shaft and a dog carried by said second shaft, said dog being adapted to be moved into and out of engagement with an arm on the first mentioned shaft to lock said first mentioned shaft from operation to retract said latch bolt and means carried by said second shaft adapted to engage one of said arms on said first mentioned shaft to operate it to retract said latch bolt.

13. In door-operating apparatus, the combination with a rotatable shaft, of an arm on said shaft, a rectilinearly moving spring-pressed latch bolt, means for operatively connecting said arm with said latch bolt, a rectilinearly moving door-opening bolt, a second arm on said shaft, means for operatively relating said second arm to said door-opening bolt, a second rotatable shaft and a dog carried by said second shaft, said dog being adapted to be moved into and out of engagement with an arm on the first mentioned shaft to lock said first mentioned shaft from operation to retract said latch bolt and means carried by said second shaft adapted to engage one of said arms on said first mentioned shaft to operate it to retract said latch bolt, said first mentioned shaft being movable into position where it is inoperable by said second shaft to retract said latch bolt.

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