Feb. 7, 1939. E. P. SONNHALTER 2,145,998

FASTENING MEANS FOR CLOSURES OF AUTOMOBILES, AIRPLANES, OR THE LIKE

Filed March 10, 1936 3 Sheets-Sheet 1

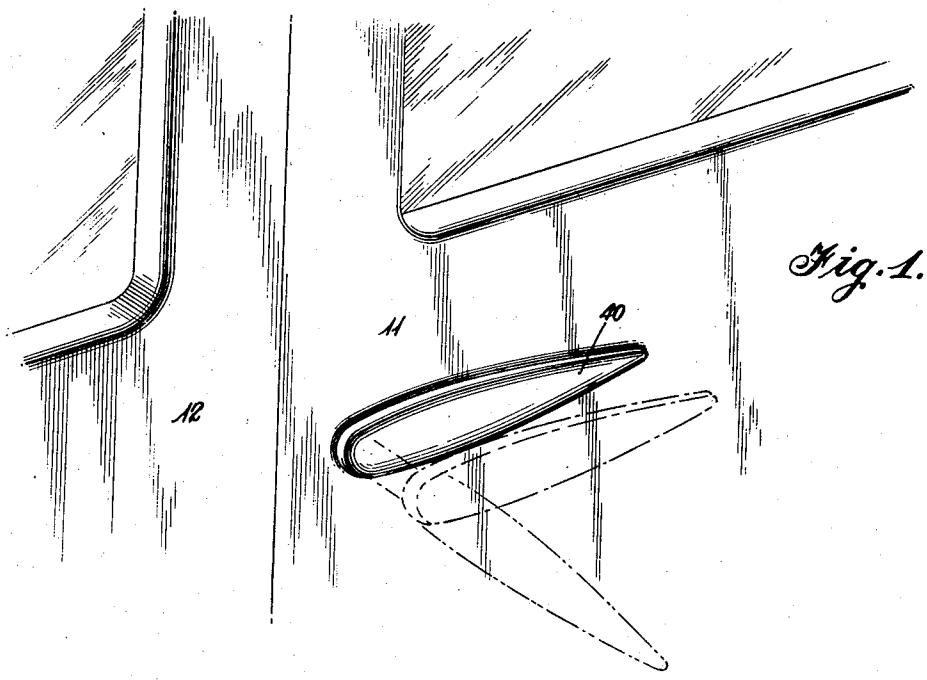
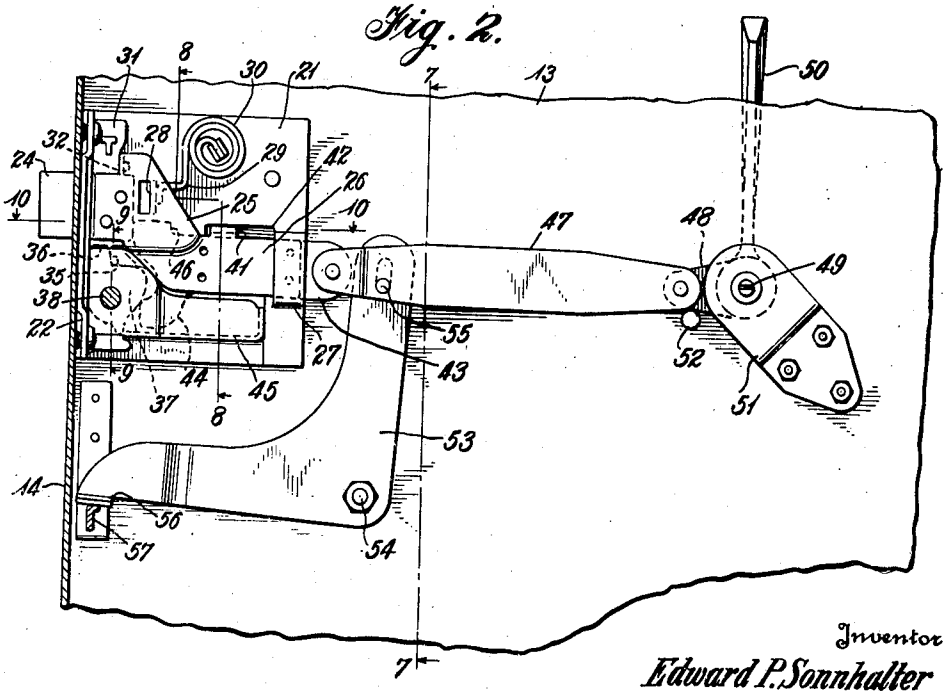


Fig. 1.

Fig. 2.



Inventor
Edward P. Sonnhalter

By James P. Burns

Attorney

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Fig. 3.

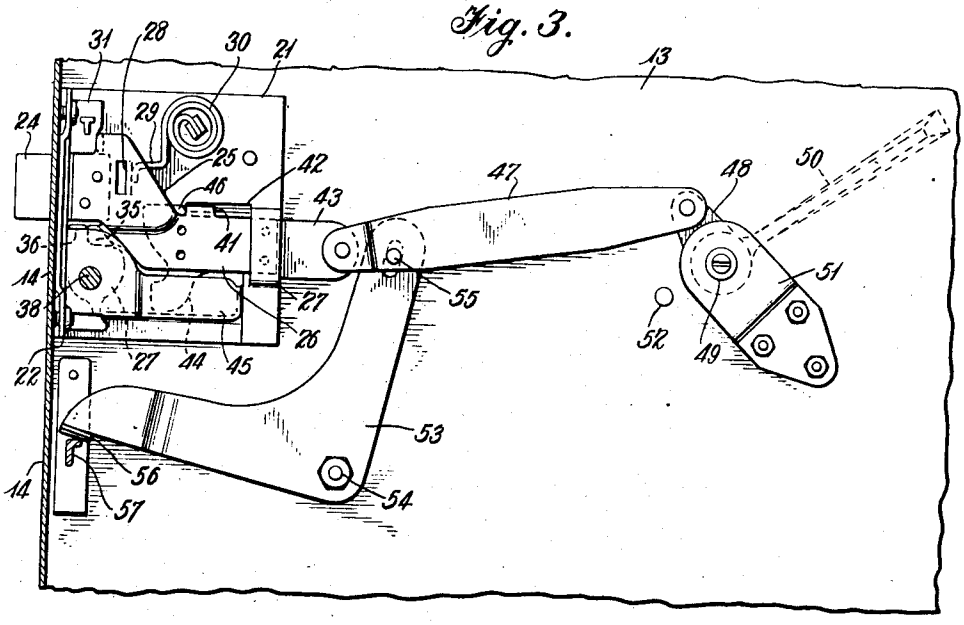


Fig. 4.

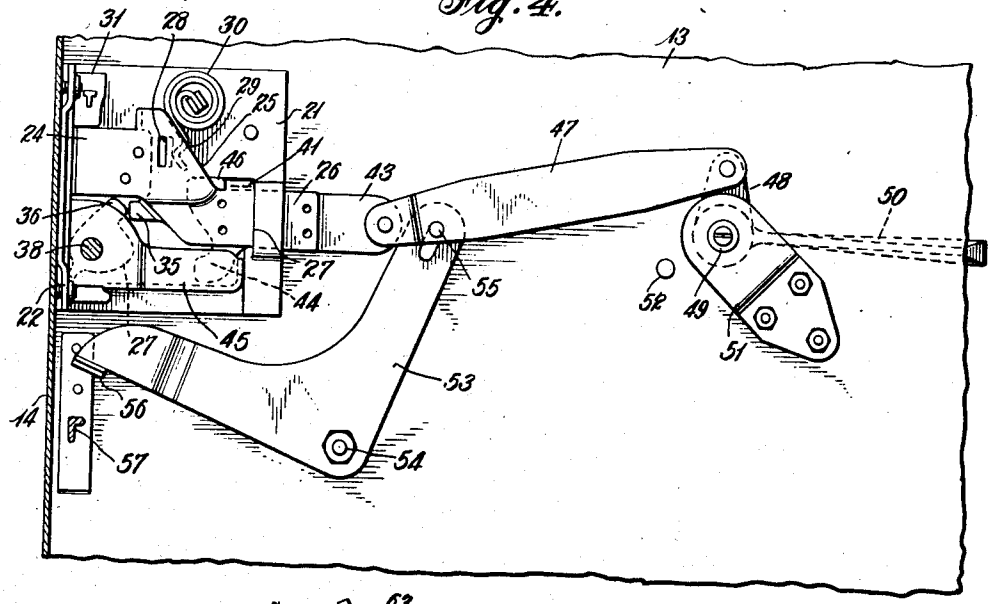
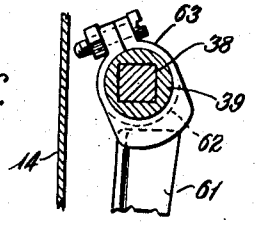


Fig. 6.



Inventor
Edward P. Sonnhalter
By James P. Burns
Attorney

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Fig. 5.

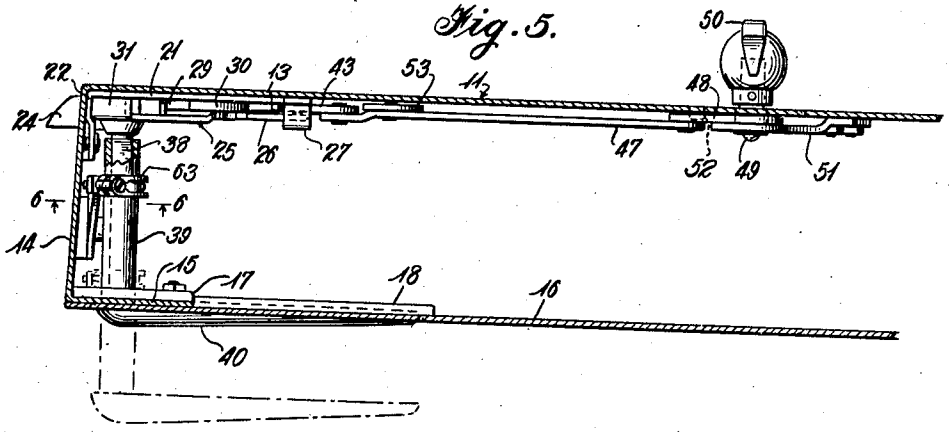


Fig. 8.

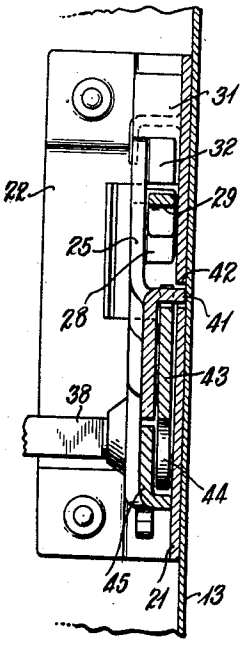


Fig. 7.

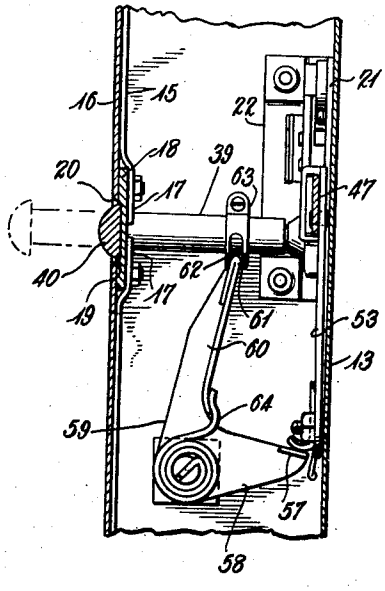


Fig. 9.

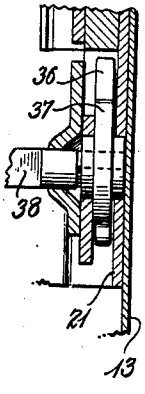
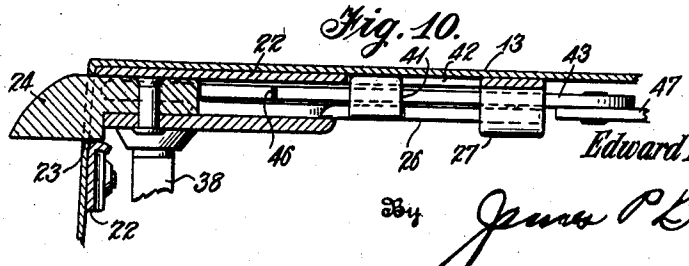


Fig. 10.



Inventor

Edward P. Sonnhalter

By James P. Burns

Attorney

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UNITED STATES PATENT OFFICE

2,145,998

FASTENING MEANS FOR CLOSURES OF AUTOMOBILES, AIRPLANES, OR THE LIKE

Edward P. Sonnhalter, Cleveland, Ohio, assignor of forty-nine per cent to William H. Reed, Lakewood, and Albert M. Moran, Cleveland, Ohio

Application March 10, 1936, Serial No. 68,117

4 Claims. (Cl. 292—1)

This invention relates to new and useful improvements in fastening means for closures of automobiles, airplanes, or the like.

The primary object of the invention is to provide fastening means for closures of any description although the invention possesses the greatest amount of utility when applied to the closed body of a motor propelled vehicle, such as an automobile, an airplane, or the like.

A further important object of the invention is to provide fastening means for a closure in which there is employed one handle, or the like, which is operatively connected to lock mechanism for actuating the latter and is mounted for movement between a projected position where it is capable of actuating the lock mechanism and a retracted position wherein it occupies a recess or depression; the handle and the recess or depression being so shaped that the handle will not project beyond the face of the closure on which it is mounted with the result that a more perfect streamlining of the closure will be accomplished and the handle will be held against actuation to effect operation of the lock mechanism.

Another important object of the invention is to provide fastening means for a closure which includes a lock mechanism operating handle adapted to be retracted from a lock operation position to a position within a depression formed in one face of the closure and with the depression and the handle being shaped so as to prevent lock actuating movement of the handle and with means operable from a point remote to the said handle to effect movement of the latter between its projected and retracted positions.

Still another object of the invention is to provide a lock mechanism operating handle for a vehicle closure which may be retracted into a depression formed in the surface of the closure with the result that a collision between the vehicle and a pedestrian cannot possibly result in painful and permanent injuries to the pedestrian due to contacting with a projecting handle, as often occurs.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a fragmentary perspective view of a motor vehicle door with the invention applied thereto,

Figure 2 is an outside elevational view, with parts of the door structure removed, to fully illustrate the fastening means for the door with the mechanism for effecting movement of the handle disclosed in Fig. 1, between its projected and retracted positions and with the mechanism actuated to locate the handle in its retracted position,

Figure 3 is a similar view to Fig. 2, but discloses the actuating mechanism for the outside handle arranged in the condition assumed when the outside handle is projected,

Figure 4 is a similar view to Figs. 2 and 3, but discloses the mechanism employed for effecting movement of the outside handle between its two possible positions and with the said mechanism actuated to effect retraction of the bolt of the door locking mechanism,

Figure 5 is a horizontal sectional view taken through the door and the fastening mechanism incorporated therein,

Figure 6 is a detail vertical sectional view taken on line 6—6 of Fig. 5,

Figure 7 is a vertical sectional view taken on line 7—7 of Fig. 2,

Figure 8 is a vertical sectional view taken on lines 8—8 of Fig. 2,

Figure 9 is a vertical sectional view taken on line 9—9 of Fig. 2, and

Figure 10 is a horizontal sectional view taken on line 10—10 of Fig. 2.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of this invention, the reference character 11 in Fig. 1 designates in its entirety the door of a closed body of an automobile, an airplane, or the like which, in its closed position, is adapted to be locked or fastened to the wall portion 12 of the vehicle body. Figures 5 and 7 illustrate the door 11 as including an inside panel member 13 which, preferably, is made of sheet metal and is formed with a laterally bent portion 14 which functions as the free edge of the door. An inwardly bent flange 15 is carried by the outside edge of the portion 14 and has secured thereto the outside panel 16 of the door.

In the vicinity of the lock mechanism, the flange 15 is properly cut and shaped to form two offset bracket portions 17. Suitably secured to these bracket portions 17 is a plate 18 which extends horizontally of the door and is provided with a horizontally extending, elongated depression 19. In alinement with this depression 19, the outside panel 16 of the door is provided with an opening which is of similar shape to the depression 19 and registers accurately therewith.

Suitably secured to the inner panel 13 of the

door is a lock plate 21 having formed on one vertical edge a flange 22 secured in any desired manner to the edge portion 14 of the door. The flange 22 and the door portion 14 are formed with registering openings 23, see Fig. 10, through which projects a door locking bolt 24. This bolt includes a downwardly projecting shank portion 25 and a horizontally projecting shank portion 26. The horizontally projecting shank portion is received within a guide by an offset strap 27 fastened to the lock plate 21.

The downwardly projecting shank portion 25 of the bolt has struck inwardly therefrom a tongue 28 against which bears an end 29 of the spring 30. This spring functions to constantly urge the bolt 24 toward its door locking position. A cushioning member, such as a block of rubber 31, is fastened to the lock plate 21 above the bolt 24 to be engaged by a projection 32 carried by the bolt. This rubber block 31 cushions the movement of the bolt into its locking position under the influence of the spring 30.

A projection 35 is carried by the forward end of the horizontal shank portion 26 of the bolt and is engaged by the camming arm 36 of the bolt operating roll-back 37 which is carried by the shaft 38.

Figures 5 and 6 illustrate the shaft 38 as being square in cross section and as having slidably telescoped thereon the hollow shank 39 of a handle 40. This handle 40 has its shank 39 extending in apertures formed in the flange 15, the door panel 16, and the plate 18 so that the said handle will be positioned exteriorly of the door 11. The handle is illustrated in Figs. 1, 5 and 7 as being of horizontally elongated formation corresponding with the formation of the opening 20 and depression 19 formed in the panel 16 and plate 18 respectively. It will be appreciated that the manner in which the tubular shank 39 and the shaft 38 are telescopically associated will permit the handle 40 to be moved longitudinally of the shaft 38 between a projected position illustrated in dot and dash lines in Figs. 1 and 5 and a retracted position illustrated in full lines in Figs. 1, 5 and 7. When in its retracted position, the handle will occupy the opening 20 formed in the panel 16, and the depression 19 formed in the plate 18. When in this retracted position, the handle will not project materially beyond the face of the panel 16. It will present a very neat appearance and will materially improve streamlining of the door. Should the vehicle equipped with this handle, and its associated door fastening mechanism, collide with a pedestrian, there will be no danger of the handle, when in its retracted position, inflicting painful and permanent injury to the pedestrian which would be possible if the handle were projected.

Due to the squared formations of the shaft 38 and the bore of the handle shank 39, rotation of the handle 40 will effect rotation of the shaft 38. This rotation of the handle 40, however, can only take place when the latter is in its projected position, as shown in Figs. 1 and 5. When in its retracted position, the handle 40 is retained against rotation by the opening 20 and aperture 19. Rotation of the shaft 38 will effect pivotal movement of the roll-back 37 with the result that the bolt 24 will be retracted, or moved into its unlocked position.

Figures 2 to 4 inclusive illustrate the horizontally extending shank portion 26 of the bolt as being provided with a laterally projecting lug 41 which rides within a slot 42 formed in the lock plate 21. Horizontally alined with the shank portion 26 of the bolt and underlying the same is a slide 43. This slide is guided by the strap 27, previously referred to as being carried by the lock plate 21 and by a finger 44 which depends from the slide 43 and is received within a guide or trackway 45 to further assist in guiding the slide and retaining the latter flush against the face of the lock plate 21. This slide is illustrated in Figs. 2, 3 and 4 as having an upwardly projecting finger 46 adapted to engage the lug 41 carried by the shank 26 of the bolt when the slide 43 is moved horizontally in a direction inwardly of the edge of the door 11. It will be appreciated, however, that this connection between the lug 46 and ear 41 of the slide and shank 43 and 26 respectively is a one-way connection which will permit the bolt to be moved inwardly by the handle operated roll-back 37 while the slide 43 remains stationary.

Pivotally connected to the outer end of the slide 43 is a link 47 which has its outer end pivotally connected to a lever arm 48 carried by the shaft 49 which is operatively connected to a second handle 50. Figures 2 to 5 inclusive disclose this second handle as being located on the inner side of the door 11. The shaft 49 for this handle is journaled in an aperture formed in the inner panel 13 of the door and in a bracket 51 secured to this panel. It will be appreciated that the lever arm 48 and the handle 50 cooperate to form a bell crank lever. It further will be appreciated that the link 47 and the lever arm 48 cooperate to produce a toggle joint which may be moved from the positions illustrated in Figs. 3 and 4, where the said toggle joint is arranged on one side of the center line between the shaft 49 and the point of pivotal connection between the slide 43 and the link 47, to a position slightly beyond dead center in the opposite direction, as illustrated in Fig. 2. A stop pin 52 is provided to limit movement of the toggle joint past dead center in this latter direction.

It will be appreciated that the handle 50 is illustrated in Fig. 3 in its normal position. By moving the handle 50 from the position shown in Fig. 3 to the position shown in Fig. 4, the lever arm 48 and link 47 will function to move the slide 43 in a direction to retract the bolt 24. Return movement of the handle 50 from the position of Fig. 4 to the position of Fig. 3, of course, will permit the spring 30 to again project the bolt 24.

It has been found desirable to employ the handle 50, located on the inner side of the door 11 to effect retraction of the outside handle 40 into the opening 20 and depression 19 previously referred to. This is accomplished by a bell crank lever 53 which is pivoted at 54 to the door panel 13. The bell crank lever is provided with a pin and slot, lost motion connection 55 with the link 47. The remaining arm of the bell crank lever 53 is provided with a laterally projecting ear 56 which engages a flange 57, see Fig. 7, formed on the arm 58 of a second bell crank lever 59. The second arm 60 of this bell crank lever 59 has its extremity 61 received within the forked portion 62 of a split sleeve 63 which is fastened to the shank 39 of the handle 40. The split sleeve 63 is connected to the shank 39 in a manner to prevent rotation and axial movement of the sleeve relative to the shank. A spring 64 is provided to bear against the arm 60 of the bell crank lever 59 for normally biasing this bell crank

lever to urge the shank 39 in a direction to project the handle 40 out of its retracted position.

It will be appreciated that when the handle 50 is moved from its normal position, as shown in Fig. 3, to the position shown in Fig. 2, the toggle joint formed by the link 47 and lever arm 48 will be moved past dead center and into engagement with the stop pin 52. This pin will retain the toggle joint in this past dead center position. The longitudinal movement of the link 47 effects pivotal movement of the bell crank lever 53 and this pivotal movement in turn effects pivotal movement of the second bell crank lever 59 into the position illustrated in Fig. 7. Movement of the second bell crank lever 59 draws the shank 39 inwardly to retract the handle 40. When the inside handle 50 is returned to its normal position, of Fig. 3, from the position shown in Fig. 2, the spring 64 will function to return the bell-crank lever 59 to its normal position which projects the outside handle 40 out of its aperture and depression 20 and 19 respectively.

It now will be appreciated that the inside handle 50 constitutes a remotely controlled operating member for retracting the door securing bolt 24 from the inside of the vehicle and for retracting the handle 40 from its projected position. These two operations are accomplished by moving the handle 50 in opposite directions from its normal position.

It further will be appreciated that this entire assembly possesses greatest merit when applied to the closure of a vehicle designed for rapid travel, such as an automobile or an airplane. The assembly, however, possesses considerable utility when applied to many other objects, such as safes, cabinets, or any other object of whatsoever description on which a handle can be used for actuating fastening means for the retraction of the handle 40 into its depression preventing movement of this handle to effect actuation of the bolt 24 of the lock mechanism. It further will be appreciated that other forms of control than the second or inside handle 50 may be provided for effecting movement of the outside handle 40 between its two desired positions.

It is to be understood that the form of this invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described the invention, I claim:

1. In a lock mechanism for a door having a depression formed in one side face thereof, said lock mechanism comprising a handle operatively connected to the lock mechanism, said handle having a shank slidably projecting through an aperture in said door face to permit the handle to be moved between a projected position and a retracted position occupying said depression, a second handle movably mounted on the opposite side of the door, a train of mechanical elements interconnecting the second handle to the lock mechanism to effect operation of said mechanism by said handle, and a second train of mechanical elements interconnecting the first-mentioned handle and the first-mentioned train at a point intermediate the extremities of the later to effect movement of said first handle between said two positions by means of the second handle.

2. In a lock mechanism for a door having a depression formed in one side face thereof, said lock mechanism comprising a handle operatively connected to the lock mechanism, said handle having a shank slidably projecting through an aperture in said door face to permit the handle to be moved between a projected position and a retracted position occupying said depression, spring means for projecting the handle, a second handle rotatably mounted on the other side of the door, and a link and lever system including a toggle joint connecting said handles to cause rotation of the second handle to effect retraction of the first handle into the depression and to cause movement of the toggle joint past dead center in one direction to retain the handle in the depression.

3. In a lock mechanism for a door having a depression formed in one side face thereof, said lock mechanism comprising a handle operatively connected to the lock mechanism, said handle having a portion projecting through an aperture in said door face to permit the handle to be moved between a projected position and a retracted position occupying said depression, a second handle rotatably mounted on the other side of the door, and a link and lever system including a toggle joint connecting said handles to cause rotation of said second handle to effect retraction of said first handle into the depression and cause said toggle joint to assume a position to retain the handle in the depression.

4. In a lock mechanism for a door having a depression formed in one side face thereof, said lock mechanism comprising a handle operatively connected to the lock mechanism, said handle having a portion projecting through an aperture in said door face to permit the handle to be moved between a projected position and a retracted position occupying said depression, means for projecting the handle, and means controlled from a remote point located out of axial alignment with the handle for retracting the handle into said depression and retaining it therein, said last mentioned means embracing a link and lever system including a toggle joint adapted to assume a position, when said handle is retracted into said depression, to retain the said handle therein.

EDWARD P. SONNHALTER.