Dec. 13, 1955 B. A. QUINN 2,726,533

DOOR LATCH

Filed May 25, 1953 3 Sheets-Sheet 1

Fig. 1

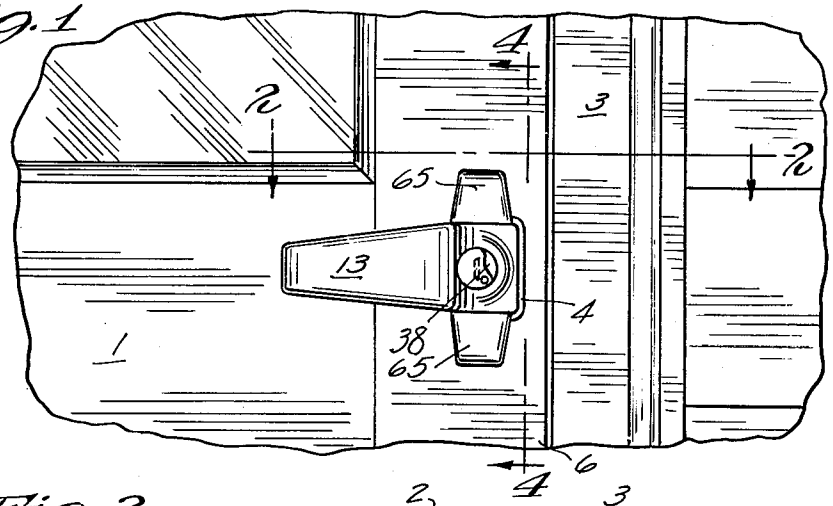


Fig. 2

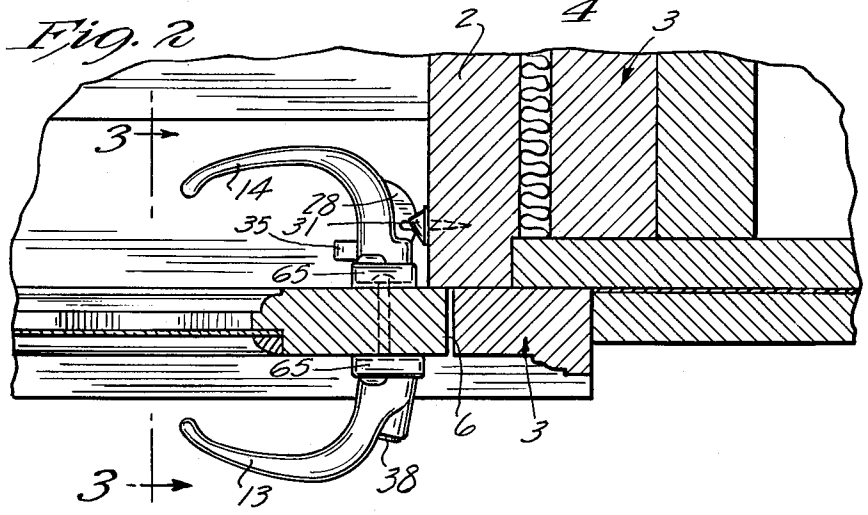
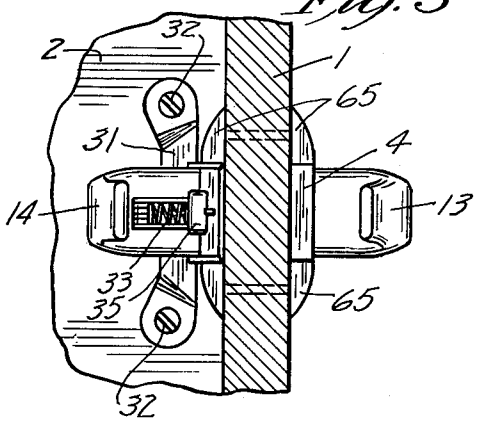


Fig. 3



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Fig. 5

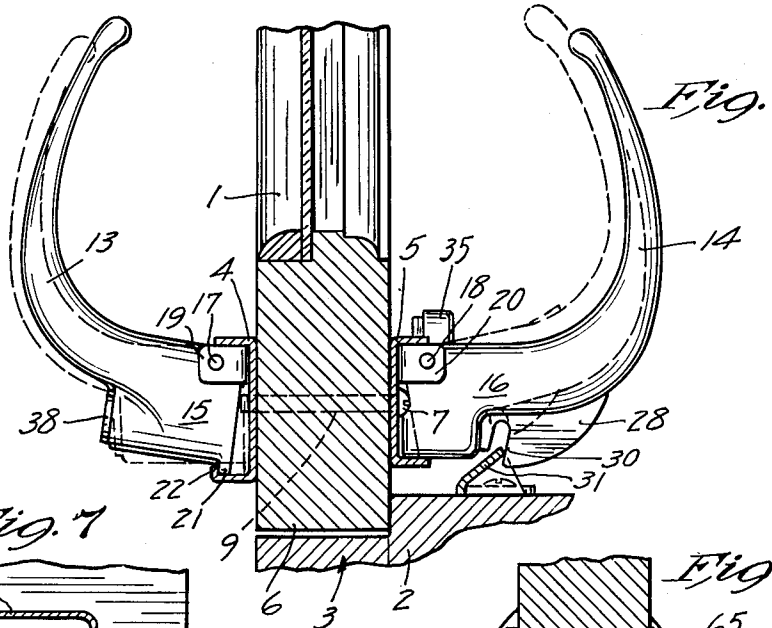


Fig. 7

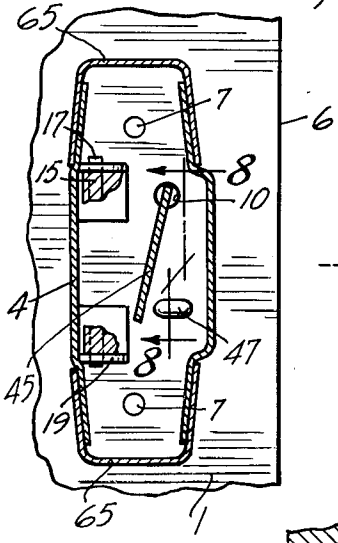


Fig. 4

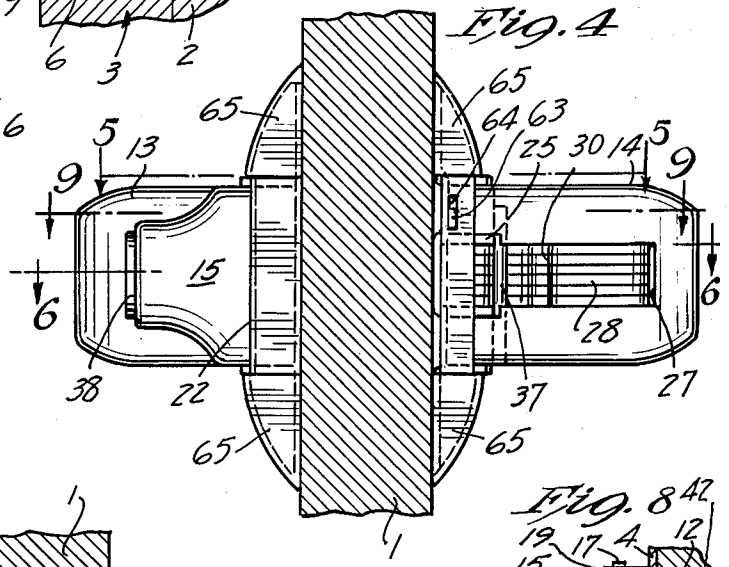


Fig. 8

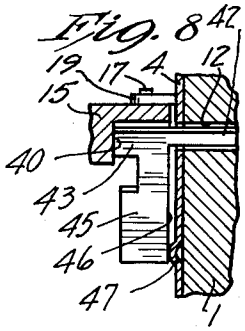
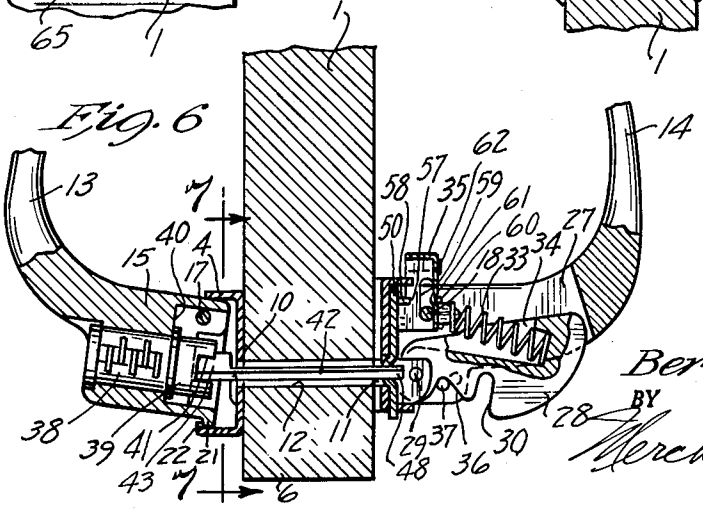


Fig. 6



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Fig. 9

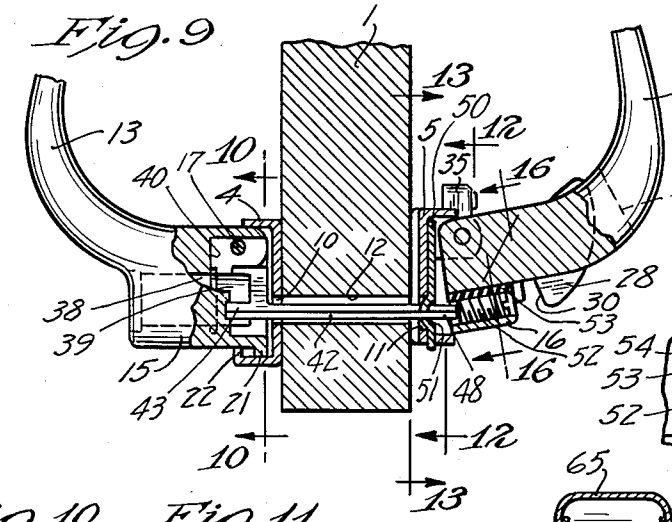


Fig. 16

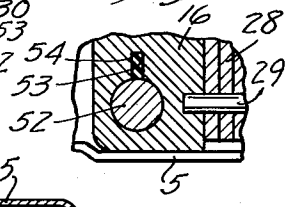


Fig. 10

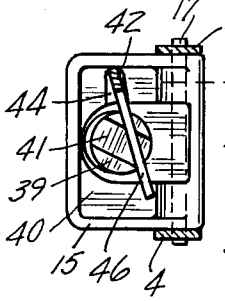


Fig. 11

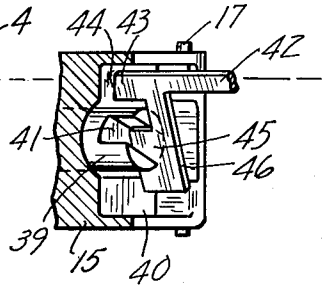


Fig. 12

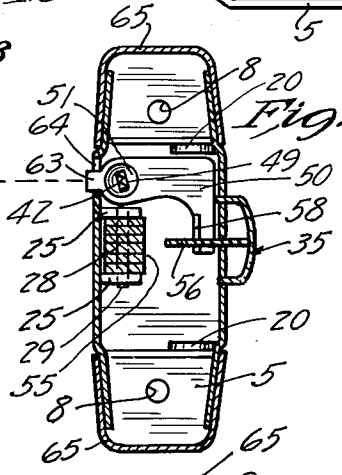


Fig. 14

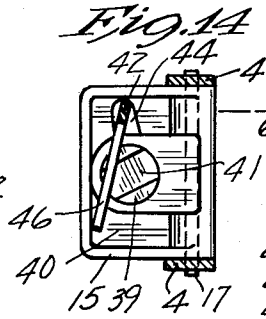


Fig. 15

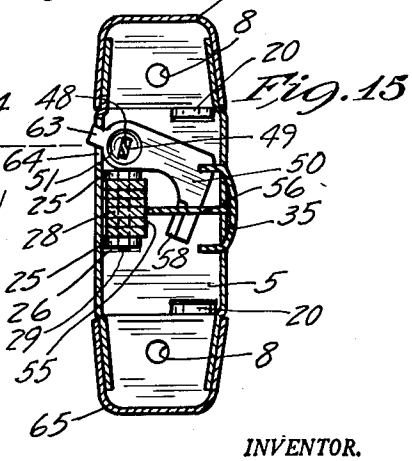
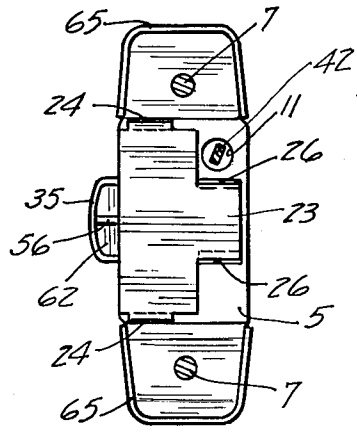


Fig. 13



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DOOR LATCH

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Application May 25, 1953, Serial No. 357,277

10 Claims. (Cl. 70—153)

My invention relates to door latch construction and more particularly to latches of the push-pull type utilizing handle members that swing generally in the direction of opening and closing movements of the door.

Heretofore, in the installing of door latches of the type herein disclosed, it has been necessary to cut out or mortise a fairly large notch in one edge of a door or to bore a relatively large hole through the door for the reception of the door latch. In the case of storm or screen doors, such notching or boring substantially weakens the door. This is particularly true where such latches are applied to metal doors such as aluminum, where the sections are relatively narrow and the metal is of light weight or thickness. An important object of my invention is therefore the provision of a door latch structure which requires the use of but a very small opening through the door for operating connections between the handles on opposite sides of the door.

Another object of my invention is the provision of a latch structure which may be locked from the inside but which will prevent the user from being accidentally locked outside of a dwelling. To this end I provide means, whereby when the latch mechanism is locked while the door is open, closing movements of the door will cause the latch mechanism to become unlocked.

Another object of my invention is the provision of novel link means connecting the inner and outer door handles and of novel mechanism for setting the link to lock the latch mechanism against movement.

Still another object of my invention is the provision of novel locking which may be unlocked from the inside of the door simply by pressure applied to the inner door handle member in one direction.

A still further object of my invention is the provision of latch mechanism as set forth which requires the use of but a single spring for biasing the handles toward a predetermined position, the latch element toward a latch projected position and an inside locking member in a direction to hold the same in desired set positions.

Another object of my invention is the provision of door latch construction as set forth which is relatively simple and inexpensive to produce and install, which is highly efficient in operation, and which is rugged in construction and durable in use.

The above and still further highly important objects and advantages of my invention will become apparent from the following detailed specification, appended claims and attached drawings.

Referring to the drawings, which illustrate the invention, and in which like characters indicate like parts throughout the several views:

Fig. 1 is a fragmentary view in elevation of a door and door casing showing my novel latch mounted on the door;

Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1;

Fig. 3 is a view partly in elevation and partly in vertical section taken substantially on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged fragmentary view partly in elevation and partly in vertical section taken substantially on the line 4—4 of Fig. 1;

Fig. 5 is a horizontal section taken substantially on the line 5—5 of Fig. 4, some parts being removed;

Fig. 6 is a horizontal section taken substantially on the line 6—6 of Fig. 4;

Fig. 7 is a vertical section taken on the line 7—7 of Fig. 6, some parts being broken away;

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

Fig. 9 is a fragmentary horizontal section taken substantially on the line 9—9 of Fig. 4;

Fig. 10 is a fragmentary vertical section taken substantially on the line 10—10 of Fig. 9;

Fig. 11 is a fragmentary view in perspective of the parts shown in Fig. 10;

Fig. 12 is a vertical section taken substantially on the line 12—12 of Fig. 9;

Fig. 13 is a view partly in elevation and partly in section taken on the line 13—13 of Fig. 9;

Fig. 14 is a view corresponding to Fig. 10 but showing a different position of some of the parts;

Fig. 15 is a view corresponding to Fig. 12 but showing a different position of some of the parts; and

Fig. 16 is an enlarged fragmentary section taken substantially on the line 16—16 of Fig. 9.

In the preferred embodiment of my invention illustrated, a door 1 is mounted for opening and closing swinging movements, by conventional hinges not shown, in a door frame 2 that forms a portion of a door casing 3. Preferably the door 1 swings to a closed position against one edge portion of the frame 2 which provides a stop therefor.

My novel door latch includes a pair of outer and inner plate-like mounting brackets 4 and 5 respectively that are rigidly secured to opposite sides of the door 1 adjacent the free edge portion 6 thereof by means of machine screws or the like 7 extending through openings 8 in the inner mounting bracket 5, similar openings 9 in the door 1 and screw threaded into suitable threaded holes in the outer mounting bracket 4. The mounting brackets 4 and 5 are provided with aligned openings 10 and 11 respectively that are axially aligned with an aperture 12 extending transversely through the door 1. The openings 10 and 11, as well as the aperture 12 in the door, are of relatively small diameter, being but slightly larger than the diameter of the holes through which the mounting screws 7 extend. The purpose of the aligned openings 11 and 12 will hereinafter become apparent. A pair of opposed outer and inner handle members 13 and 14 respectively have opposed inner end portions 15 and 16 respectively that are pivotally secured to their respective mounting brackets 4 and 5 by means of pivot pins 17 and 18 extending vertically through the inner end portions of the handles and having their ends mounted in spaced ears or lugs 19 and 20 extending laterally outwardly from their respective mounting brackets 4 and 5. It will be noted that the pivot or hinge pins 17 and 18 are disposed at one side of their respective handle end portions and in parallel relationship. The inner end portion 15 of the outer handle member 13 is formed to provide a lug 21 which engages an inturned lip 22 on the bracket 4 to positively limit swinging movement of the outer handle member 13 in one direction.

With reference particularly to Figs. 12, 13 and 15 it will be seen that the ears 20 of the inner mounting bracket 5 are integrally formed with a plate-like member 23 contained between the bracket 5 and the adjacent surface of the door 1, said ears extending outwardly through vertically spaced openings 24 in the mounting bracket 5. A second pair of ears 25 integrally formed with the plate 23 projects laterally outwardly through spaced

openings 26 in the mounting bracket 5 into a lateral opening 27 extending through the inner end portion of the inner handle member 14. A latch element 28 is mounted for pivotal projecting and retracting movements through the opening 27 by means of a hinge pin 29 extending transversely through the inner end of the latch element 28 and the spaced ears 25. The latch element 28 is formed to provide a latch hook 30 which is adapted to engage a strike 31 anchored to the door frame 2 by suitable means such as screws or the like 32. The hinge pin 29 is preferably disposed in parallel relationship to the hinge pins 17 and 18 whereby the latch element 28 will move in the same plane as the handle members 13 and 14. The latch element is yieldingly urged in a projecting direction toward the strike 31 by a coil compression spring 33 one end portion of which is contained in a laterally outwardly opening recess 34 in the latch element 28 and the other end of which bears against one end of an actuator 35, the purpose of which will hereinafter be described. The latch element 28 is provided with a notch or recess 36 that receives a retracting pin 37 anchored at its opposite ends in the inner end portion 16 of the handle member 14 and extending vertically through the passage thereof. The swinging movement of the handle element 14 toward the adjacent inner surface of the door 1 causes the retracting pin 37 to impart retracting movement to the latch element 28 against bias of the spring 33. When the handle member 14 is released, the spring 33 will cause the latch element 28 to move in a latch projecting direction toward the strike 31, engagement of the pin 37 by the notch 36 causing the inner handle member 14 to be also swung from its dotted line position of Fig. 5 to the full line position thereof.

Mounted in the inner end portion 15 of the outer handle member 13 is a conventional cylinder-type lock 38 which is provided with a rotary plug-like extension member 39 located in an inwardly opening cavity 40. The end of the plug 39 is formed to provide a notch 41. An elongated rigid link 42 extends through the aligned openings 10 and 11 in the mounting brackets 4 and 5 respectively and the aperture 12 therebetween. The outer end 43 of the link 42 abuts a surface portion 44 of the cavity 40, and is provided with a depending leg 45 which, as shown in Figs. 6, 10 and 11 is contained within the notch 41 of the plug extension member 39. With further reference to Figs. 10, 11 and 14, it will be seen that rotation of the plug extension member alternately in opposite directions will cause opposite side wall portions of the notch 41 to engage alternately opposite side surface portions of the leg 45 to impart partial rotation to the link 42 alternately in opposite directions. Rotation of the link 42 in one direction will cause the inner edge portion 46 of the leg 45 to ride upon a stop means in the nature of a boss or the like 47 integrally formed with the outer mounting bracket 4, whereby to prevent longitudinal reciprocatory movement of the link 42 in the direction of the inner handle member 14.

The inner end 48 of the rigid link 42 extends through a slot 49 in an angular crank element 50 that is formed to provide a bearing boss or the like 51 journalled in the opening 11 in the inner mounting bracket 5 for common rotary movement with the link 42. Said inner end 48 has abutting engagement with an adjustment element in the nature of a screw 52 that is screw threaded into the inner end portion 16 of the inner handle member 14. Means for preventing accidental rotation of the screw 52 comprises a friction bar or the like 53 contained in a slot 54, said friction bar 53 engaging the threaded portion of said screw 52 at one side thereof, see Figs. 9 and 16. The bar 53 is preferably made from rubber-like material which does not prevent intentional turning of the adjustment screw 52. The adjustment element 52 is utilized to compensate for inaccuracies in the cutting of the link 42 when the latch is installed in a door, and enables the handle elements 13 and 14 to be properly positioned at the time of installation of the latch.

The actuator 35 is generally rectangular in form and is slidably carried by the inner mounting bracket 5 for movements toward and away from an adjacent surface portion 55 of the latch element 28. The actuator 35 is provided with a central leg 56 that is formed to provide a notch 57 which receives an outturned ear 58 on the angular crank member 50, see Figs. 6, 12 and 15. Movement imparted manually to the actuator 35 toward the latch member 28 causes rotation of the crank element 50 and the link 42 in a direction to move the edge portion 46 into engagement with the stop lug 47. Simultaneously, the free end of the leg 56 moves into abutting engagement with the surface portion 55 of the latch member 28 as shown in Fig. 15. By this means, the door 1 may be locked from the inside and may be opened from the outside only by insertion of the proper key into the cylinder lock 38. The link 42 may be rotated to its operative unlocked position from the inside of the door 1 merely by swinging the inner handle member 14 toward the door 1 or from its full line position of Fig. 5 to the dotted line position thereof. This swinging movement will cause the pin 37 to engage the bottom of the notch 36 of the latch 28 with sufficient pressure to cause the actuator 35 to be moved outwardly to its unlocking position, causing the crank element 50 to be rotated in a direction to move the leg 45 of the link 42 out of engagement with the stop lug 47. The actuator 35 is guided for sliding movements with respect to the inner mounting bracket 5 by the hinge pin 18 extending through aligned slots 59, one of which is shown, in the sides of the actuator 35 and in the leg 56 thereof. Detent means for holding the actuator 35 against accidental movement either toward a locking position against the surface 55 of the latch element 28 or in the opposite direction, comprises a pin 60 extending vertically through the lateral opening 27 in the handle member 14 and anchored at its opposite ends in said handle, and a notch or recess 61 in an adjacent wall surface 62 of the actuator 35. Mounting of the hinge pin 18 in the slots 59 of the actuator 35 serves also to hold the crank element 50 in its proper relationship with the mounting bracket 5. Other mounting means for the element 50 includes a laterally projected lug or ear 63 integrally formed with the crank element 50 and a slot 64 in the mounting bracket 5 through which said ear 63 extends. The slot 64 is sufficiently long to permit oscillatory movements of the ear therein during the necessary rotation of the crank element 50 to move the link 42 between its operative and inoperative positions. I further provide cup-like escutcheons 65 at the upper and lower ends of the inner and outer mounting brackets 4 and 5 to protect the mechanisms against tampering and to provide a decorative effect. The escutcheons 65 may be secured to their respective mounting brackets in any suitable manner. Preferably those on the inner mounting bracket 5 are displaced for the purpose of installation of the latch. In use, when it is desired to open the door 1 from the outside, assuming that the latch is unlocked, the handle member 13 is simply pulled in generally a door opening direction. This movement of the outer handle member 13 imparts longitudinal movement to be imparted to the link 42 and result in swinging movement of the inner handle member 14 and retracting movement of the latch element 28. Obviously, when the door is to be opened from the inside, it is merely necessary to push the inner handle member 14 generally in the direction of opening movement of the door 1. To lock the door from the inside it is merely necessary to move the actuator 35 from its released position of Figs. 5, 6 and 12 to its locking position of Fig. 15 by relatively light pressure thereon with the finger. The door can then be unlocked from the outside only with the aid

of the proper key inserted into the cylinder lock 38. As above stated, the door may be unlocked from the inside merely by moving the handle member 14 toward the door. If by accident the actuator 35 is positioned inwardly to lock the latch when the door is open, closing movements of the door will cause the latch element 28 to be moved by the strike 31 in a retracting direction upon which the actuator 35 will be moved to its latch unlocked position. Thus the occupant cannot be accidentally locked out-of-doors from this cause.

Among the advantages of my latch above described is the fact that the single spring 33 serves to urge the latch element 28 in a direction to engage the strike 31, and the handle members 13 and 14 toward one limit of their movement, and helps to maintain the actuator 35 in either of its operative or inoperative positions. The laterally outwardly opening recess 34 permits the spring 33 to be removed and replaced with ease and rapidity and without the necessity of dismantling the latch.

While I have shown and described a preferred embodiment of my novel latch mechanism, it will be understood that the same is capable of modification within the spirit and scope of the invention as defined in the claims.

What I claim is:

1. In a push-pull door latch, inner and outer mounting brackets adapted to be secured to opposite sides of a door adjacent one edge thereof, inner and outer handle members respectively pivotally secured to said inner and outer mounting brackets, a latch element mounted on said inner bracket in close association with the inner handle member for projecting and retracting movements, yielding means biasing said latch element in a latch projecting direction, a rigid link adapted to extend through openings in said mounting brackets and a suitable aperture in the door and mounted for limited rotary and reciprocatory movements therein, the opposite ends of said link being engaged with opposed portions of said handle members to be reciprocated thereby, whereby swinging movements of one of said handle members in a given direction will cause corresponding swinging movement of the other of said handle members in the same direction, and stop means engageable with said link upon rotation thereof in one direction to positively lock the same against reciprocatory movement in one direction.

2. The structure defined in claim 1 in which said stop means comprises a stop lug on one of said mounting brackets, said link having an offset portion engaging said lug upon rotation of the link in said one direction.

3. The structure defined in claim 2 in further combination with a cylinder lock mounted in the outer handle member and engaging said link to rotate the same between its operative reciprocatory position and its inoperative locked position.

4. The structure defined in claim 1 in further combination with means for imparting rotary movement to said link from its operative reciprocatory position to its inoperative locked position, said means comprising a crank element mounted on said inner bracket for common rotary movement with said link and a manually operated actuator member carried by said inner mounting bracket and having operative engagement with said crank element.

5. The structure defined in claim 4 in which said crank element is provided with a laterally outwardly projecting lug, and in which said actuator member is mounted for sliding movements in said inner mounting bracket toward and away from the latch element, said actuator member being provided with a notch for the reception of the lug on said crank element.

6. The structure defined in claim 5 in further combination with detent means normally maintaining said actuator member and crank element in a position to hold said link at one limit of rotary movement thereof, whereby to permit reciprocatory movements of said link.

7. The structure defined in claim 6 in which the yielding means biasing said latch element in a latch projecting direction comprises a spring having one end mounted on said actuator member and its other end bearing against said latch element.

8. In a push-pull door latch, opposed inner and outer handle members, means for mounting said handle members for swinging movements on the inner and outer sides of a door, a latch element adapted to be pivotally mounted on the door in close association with the inner handle member for projecting and retracting movements, yielding means biasing said latch element in a latch projecting direction, means on said inner handle member engaging said latch element to retract the same against the bias of said yielding means, and a rigid link adapted to extend through a suitable aperture in the door between the opposed handle members and having abutting engagement at its opposite ends with opposed portions of said handle members whereby swinging movement of one of said handle members in a given direction will cause corresponding swinging movement of the other of said handle members in the same direction, said portion of the inner handle member comprising an adjustment element movable toward and away from the adjacent end of said link to vary the positions of said handle members relative to each other.

9. The structure defined in claim 8 in which said adjustment element comprises a screw device mounted in said inner handle member, and in further combination with a friction element mounted in said handle members for engagement with said screw device to frictionally anchor the same against accidental movement.

10. In a push pull door latch, opposed inner and outer handle members, means for mounting said handle members for swinging movements on the inner and outer sides of a door, a latch element operatively associated with said inner handle and movable in latch-projecting and retracting directions, yielding means biasing said latch element and said inner handle member in a latch-projecting direction, a rigid link adapted to extend through a suitable aperture in the door and mounted for limited rotary and reciprocatory movements therein, the opposite ends of said link engaging opposed portions of said handle members to be reciprocated thereby, whereby swinging movement of one of said handle members in a given direction will cause corresponding swinging movement of the other of said handle members in the same direction, and a stop element engaging said link upon rotation thereof in one direction to positively lock the same against reciprocatory movement in one direction.

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