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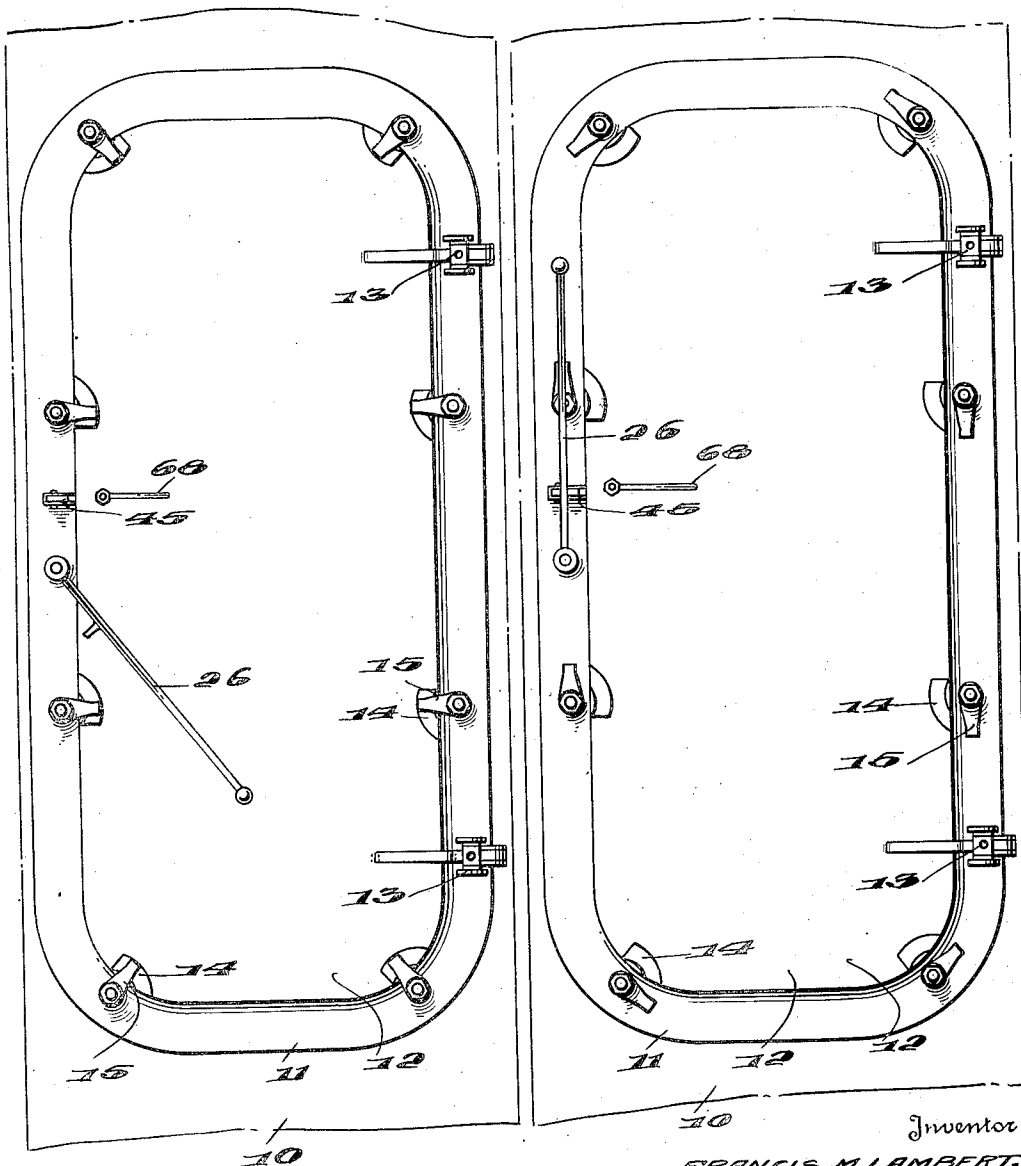
HANDLE RETAINING STRUCTURE FOR DOORS

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Fig. 1.

Fig. 2.



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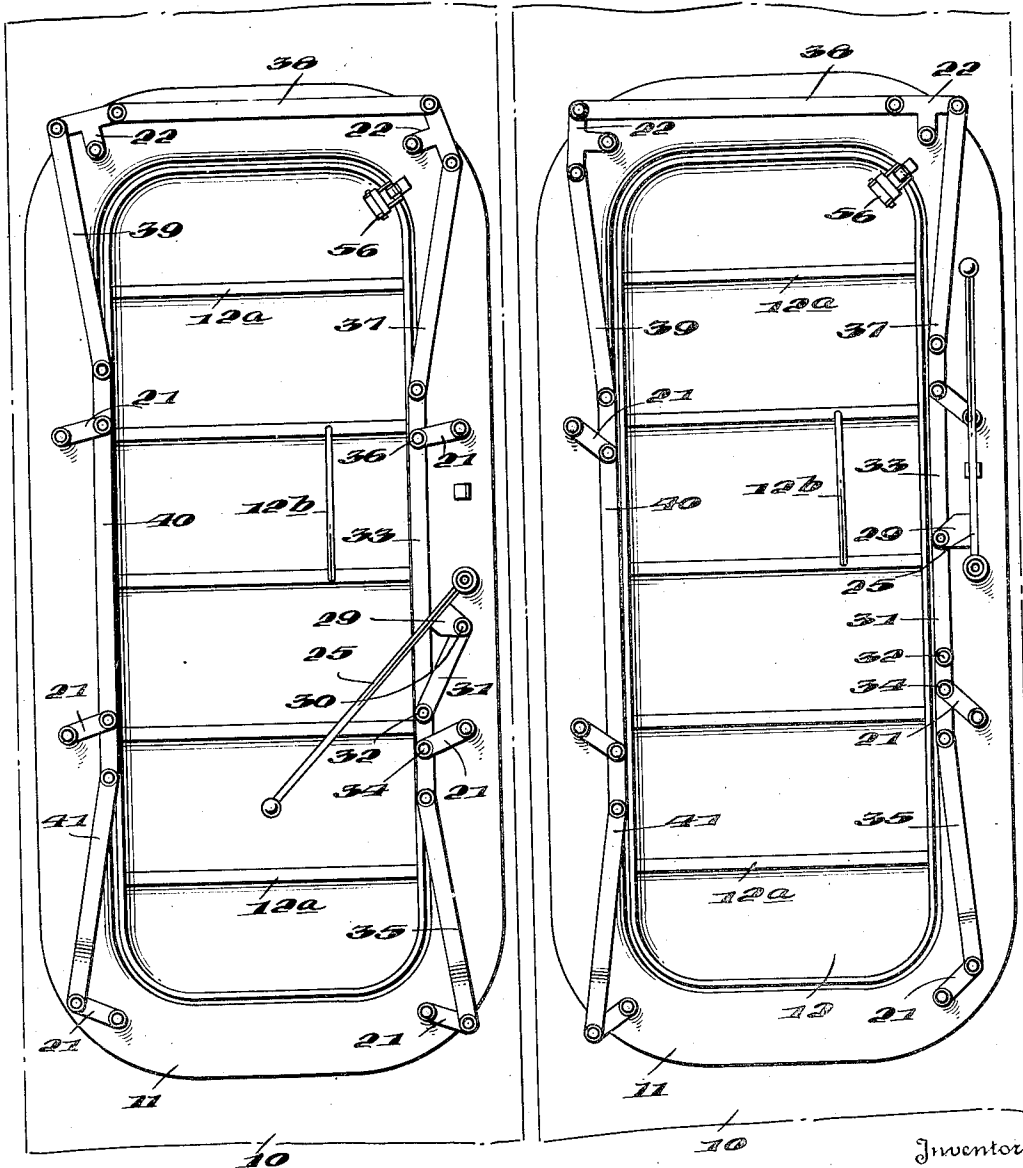
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Fig. 3.

Fig. 4.



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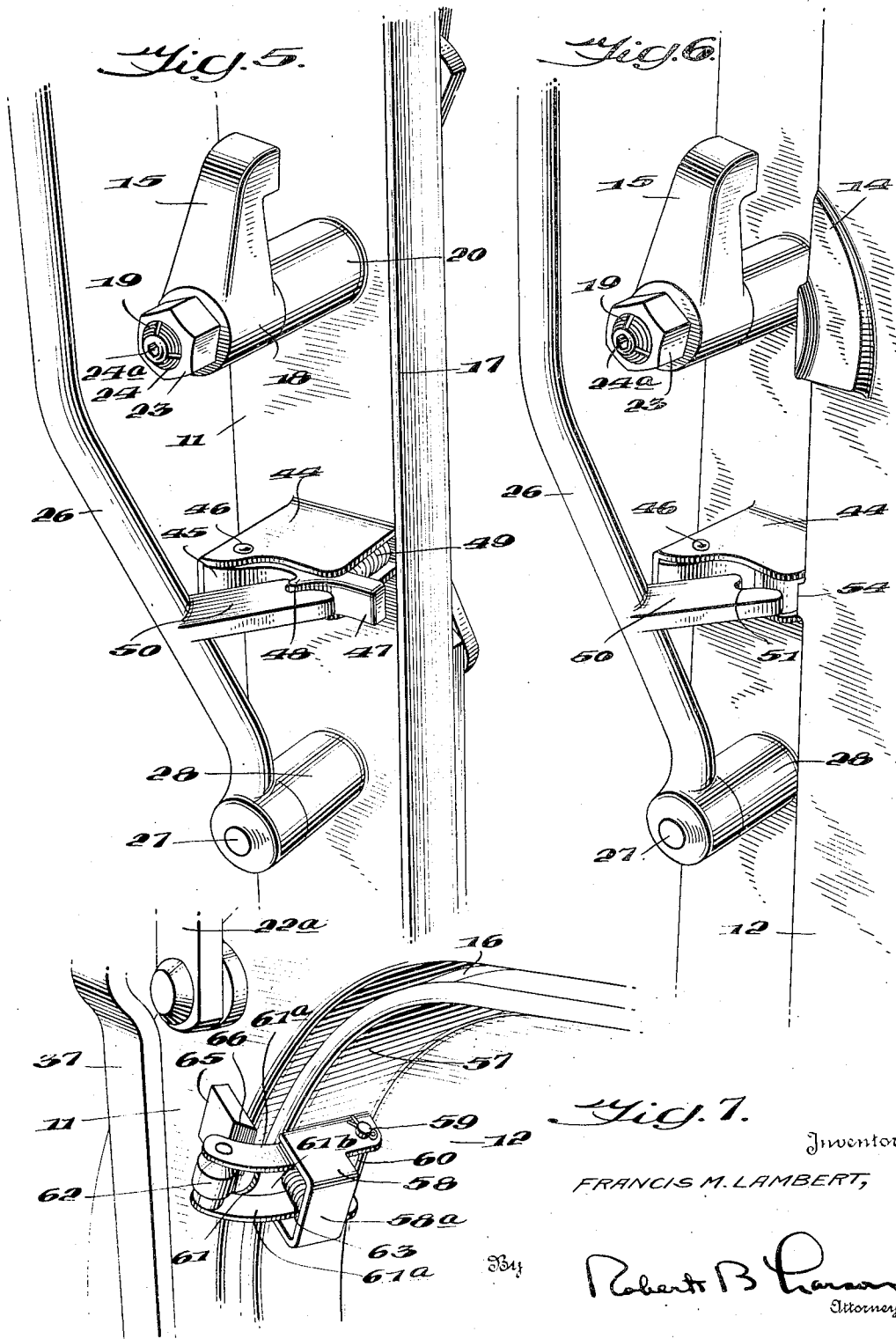
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HANDLE RETAINING STRUCTURE FOR DOORS

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HANDLE RETAINING STRUCTURE FOR DOORS

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Application December 4, 1946, Serial No. 713,975

1 Claim. (Cl. 292-48)

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This invention relates to door structures of the type in which a door is urged tightly against a door frame by means of a plurality of dogs, and more particularly to an arrangement whereby the dogs and their operating linkage are maintained in their undogged positions completely clear of the passageway through the door frame when the door is in other than its closed position.

Doors of the type to which the invention is applicable are found particularly useful for use on ships to provide water-tight closures for passageways through bulkheads. In such applications it is particularly desirable that the dogging mechanism be retained in undogged position except when the door is shut in order to assure that the dogging mechanism does not become, for any reason, moved to its dogging position. Such movement of the dogging mechanism is to be avoided due to the fact that in the dogged position the passageway through the door is blocked partly by the dog mechanism. Another and even more important reason for retaining the dog mechanism in undogged position when the door is not closed is that in case the dogging mechanism should be moved to the dogged position while the door is open and it then becomes necessary to close the water-tight door in a great hurry, as, for example, in the case of damage to the ship, valuable seconds will be lost in moving the dogs clear of the doorway so that the door can be closed. With the mechanism which I have provided, it is assured that the dogging mechanism will always be in position to permit the door to be closed without delay.

An object of my invention is to provide a mechanism for use with door dogging arrangements which will assure that the dogging arrangement remains in the undogged position when the door is not shut.

Another object of the invention is to provide a door dogging mechanism retaining device which cooperates with an operating handle of the mechanism to prevent movement of the handle to the dogging position when the door is open.

A further object of the invention is to provide a retaining mechanism as referred to above which is particularly applicable to door constructions of the type in which all of the dogs and interconnecting linkage are mounted on the door frame and are operable from a single point by handles located on the outside and inside of the door frame.

Still another object of the invention is to provide a mechanism of the type referred to

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above which includes a resiliently mounted piece cooperating with an operating handle for the dog controlling linkage and normally urged to a retaining position. The piece is movable by contact with the door itself to a door handle releasing position when the door is shut. Because of the fact that the resilient means which operates the detent tends to reopen the door unless it is dogged shut immediately after it is closed, a resilient temporary latch is provided for overcoming this tendency on the part of the resilient means which operates the retainer. The temporary latch obviates the necessity for holding the door shut by hand after the door is closed but before the dogs are swung to their dogging positions.

These and other objects of the invention will be apparent from the following specification of the accompanying drawings, in which:

Figure 1 is an outside view of a door construction of the multi-dog type provided with the retaining means of the invention and showing the dogs in their dogged positions;

Figure 2 is a view similar to Figure 1 but showing the dogs in their undogged positions;

Figure 3 is a view similar to Figure 1 but taken from the inside of the door;

Figure 4 is a view similar to Figure 2 but taken from the inside of the door;

Figure 5 is a detail perspective view of the mechanism for holding a dog operating handle, and thereby the dogs, in their undogged positions, the door being open in the figure;

Figure 6 is a view similar to Figure 5 but showing the door shut and the operating handle and dogs still in their undogged positions; and

Figure 7 is a detail perspective view of a temporary latch for use with doors of the type shown in the preceding figures and operable to overcome the tendency of the resilient means which operates the retaining piece to move the door to an open position after the door is closed but before the dogs are swung to their dogging positions.

While the preferred embodiment of the invention shown in the drawings and described herein refers to use of the invention on shipboard, it should be pointed out that the invention is not limited to such use but has application to other embodiments such as refrigerator doors and other closures.

In the drawings there is shown a bulkhead in which is mounted a door frame 11 which carries a door 12 by means of hinges 13. Door 12 has on its inside surface a plurality of spaced horizontal reinforcing ribs 12a and a handle 12b

which permits pulling the door shut from the inside. Hinges 13 may be of any suitable type but as shown herein are of the type described in my co-pending application, Serial No. 614,841, filed September 7, 1946, now Patent No. 2,482,983 dated September 27, 1949, as such hinges are particularly useful in constructions of this type.

The door is provided at eight spaced points about its periphery with arcuate cams 14 which are engaged by dogs 15 pivotally mounted on the door frame 11 for urging the door 12 tightly against the door frame. In doors of this type it is conventional for the door to be slightly larger in dimensions than the opening through the door frame so as to overlap slightly the inner edge of the frame. The overlapping edge portion of the door is conventionally provided with a gasket 16 (Figure 7) which engages a flange 17 around the inner edge of the door frame 11 to provide a water-tight seal when the door is closed tightly.

Each dog 15 comprises an arm which extends radially from a hub 18 keyed to a spindle 19 which is journaled in a suitable water-tight manner within a spindle carrying cylinder 20 welded to, and extending on both sides of door frame 11. On the inner side of the door frame 11 as shown in Figures 3 and 4, dog operating lever arms 21 and 22 are welded to the ends of the spindles, the arms 21 being merely straight bars, while the arms 22 are T-shaped bars and are used in conjunction with two upper corner dogs. A suitable nut 23 positioned on the outer end of spindle 19 retains the dog 15 in place against the outer end of cylinder 20. Suitable means for retaining the nut 23 from becoming unscrewed from the spindle are provided, these means taking the form of radial slots 24 in the extreme end portion of spindle 19. Radial slots 24 meet centrally at a tapered axial opening into which is screwed a tapered and threaded bronze pipe plug 24a. Such a slot and plug arrangement is shown in my copending application Ser. No. 652,613, filed March 7, 1946.

The arms 21 and 22 welded to the ends of spindles 19 which extend beyond the inner surface of the door frame are interconnected by means of a linkage system shown in Figures 3 and 4 for operation by operating handles 25 and 26 located on the inside and outside of the door frame, respectively. The two handles 25 and 26 are fixed to the opposite ends of a spindle 27 which is journaled in and extends through a cylinder 28 which is fixed to and extends through the door frame on that portion of the frame which is adjacent to the swinging edge of the door.

The linkage arrangement shown is described and claimed in my copending application, Serial No. 713,974, filed Dec. 4, 1946.

The linkage arrangement comprises a short arm 29 welded or otherwise fixed to operating handle 25 near its point of attachment to spindle 27 and projecting transversely from handle 25. The short arm 29 is pivoted at 30 to a short linkage bar 31 which is pivoted at its lower end 32 to an elongated linkage member 33. The pivot point 32 is spaced a short distance above the lower end of member 33 and the arm 21 of the dog immediately below the pivot point of the two operating handles 25, 26 is pivoted at a point 34 to member 33, the pivot point 34 being located between pivot 32 and the lower end of the bar 33. Bar 33 is pivoted at its extreme lower end to the upper end of a somewhat shorter linkage bar 35 which is pivoted at its lower end to the end of

arm 21 of the lower right hand dog as viewed in Figure 3.

Near its upper end, bar 33 is pivoted at 36 to the arm 21 of the dog immediately above spindle 27 and is pivoted at its extreme upper end to a bar 37. Bar 37 is pivoted at its upper end to one end of the cross arm of T-shaped member 22 which operates the upper right hand dog, the other end of the cross arm 22 being pivoted to a horizontal link 38. Link 38 is pivoted at its other end to one end of the cross arm of the member 22 located at the upper left hand corner of the door frame and the other end of the cross arm is pivoted to a downwardly extending link 39. Link 39 is pivoted at its lower end to a vertically extending link 40 which is similar to link 33, and link 40 is pivoted at its lower end to the upper end of a link 41 which in turn is pivoted to, and operates the arm 21 of the lower left hand dog. The two intermediate dogs on the left side of the door frame are operated by the pivotal attachment of their two arms 21 to link 40 near its upper and lower ends.

When it is desired to dog the door shut, either of the operating handles 25, 26 is moved to the downwardly extending position shown in Figure 3 causing downward movement of the various linkage members on the right side of the door frame as viewed in Figure 3, causing movement to the right of the transverse linkage bar 38, and causing upward movement of the linkage members on the left-hand side of the door frame. This movement of the linkage arrangement pivots the various spindles 19 which in turn move the dogs 15 to their dogged positions as shown in Figure 1. The degree of tightness with which the door is dogged shut may be increased by increased pressure on the operating arms 25, 26 to move the dogs onto the higher portions of cams 14.

Movement of either of the operating handles 25, 26 to the upwardly extending position shown in Figures 2 and 4 causes a reverse movement of the linkage members, that is the members on the right-hand side of the door frame as viewed in Figure 4 are moved upwardly, transverse member 38 is moved to the left, and the members on the left-hand side of the door frame are moved downwardly. This causes pivotal movement of spindles 19 and moves the dogs out of contact with cams 14 to their undogged positions clear of the door 12 as shown in Figure 2.

Because of the fact that unless some safety means is provided, one of the operating handles 25 and 26 may be swung downwardly when the door is open causing the handles and the dogs to interfere with movement through the opening in the door frame, it is necessary to provide some means for retaining the dogs and the operating handles in their undogged positions at all times except when the door is shut. The provision of such retaining means is of considerable importance in the case of doors used on ship-board as it may become necessary to close the door in the shortest possible time as in the case where damage to a portion of the ship makes it essential to seal off a portion of the ship in the shortest possible time. Without safety means to retain the dogs and operating handles in their undogged positions, valuable seconds would be wasted moving the mechanism to the undogged position in case it should be in the dogged position, and this delay in closing the door might spell the difference between life and death.

As shown in detail in Figures 5 and 6, I have

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provided means cooperating with the outside operating handle 26 for assuring that the handle and thereby the dogs cannot be moved out of their undogged positions except when the door is closed. It will be apparent that because of the linkage system, the retention of one of the operating handles 25, 26 in a given position assures the retention of the other handle and all of the interconnected linkage members and dogs in their corresponding positions.

In the preferred embodiment of this retaining means as shown in Figures 5 and 6, there is provided on the outside surface of the door frame 11 a short distance above the pivot point of the two operating arms 25, 26, an outwardly extending box-like supporting bracket 44 opens along the edge which faces the opening through the door frame, and open on the end remote from and more or less parallel to the outer surface of the door frame 11. The last-mentioned open end of box-like bracket 44 is closed by a detent member 45 pivoted at 46 to the upper and lower walls of bracket 44 and having an end portion 47 which extends beyond the flange 17 of door frame 11 so as to extend a short distance into the path of movement of the door. The outside or front surface of member 45 as viewed in Figures 5 and 6 is formed with a projection 48, the surface of which slopes at an angle away from the opening through the door frame. A spring 49 is positioned between the rear surface of latch 45 and the front or outer surface of door frame 11 so as to urge latch 45 toward its latching position in which it is shown in Figure 5, but to permit pivotal movement of latch 45 about pivot 46 to the depressed position in which it is shown in Figure 6.

Operating handle 25 is provided near its point of attachment to spindle 27 with a latch-engaging arm 50 which extends at an acute angle to the surface of door frame 11 toward the opening within the door frame. Arm 50 cooperates at its end portion with projection 48 on pivoted latch 45, there being an indentation 51 in the end of arm 50 substantially complementary in configuration with the projection 48 on latch 45 so that arm 26 will be latched in its upwardly extending position when latch 45 and arm 50 are engaged as shown in Figure 5. The sloping surface of projection 48 and the angular disposition of arm 50 permit arm 50 to slide over the projection 48 on latch 45 meanwhile depressing latch 45 by a cam-like action when handle 26 is moved to its upright undogged position as shown in Figure 5, the cam-like action causing latch 45 to pivot inwardly against the pressure of spring 49 until the engagement of projection 48 with indentation 51 permits latch 45 to be returned to its latching position by spring 49. This cam action would be useful in returning the handle to its vertical position in case the operating handle should be moved to the dogged position with the door open by manually depressing latch 45 to release the handle.

From Figure 6 it will be noted that the edge of door 12 is provided with a projection 54 which is adapted to cooperate with the end portion 47 of pivoted latch 45. With the latching arrangement in the latched position of Figure 5, the swinging of the door 12 to its closed position as shown in Figure 6 causes the projection 54 to engage end portion 47 of latch 45 to depress the latch and free operating arm 26 for movement to the dogging position. Projection 54 and latch 45 are so dimensioned that this contact does not interfere with the tight closure of the door against the door frame. It will be apparent that after the handle

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26 is swung to its upright undogged position and the door is pulled open, latch 45 will immediately spring to its latching position as shown in Figure 5 and will thereby retain the handle 26 and the dogs operated thereby in their undogged positions.

Due to the fact that the spring 49 which operates latch 45 tends to urge the door from its closed position, it would ordinarily be necessary to hold the door closed by hand for a brief period until one of the operating handles 25, 26 is swung to the dogging position to dog the door shut. To obviate this inconvenience, I have provided the spring latch generally denoted by the numeral 56 in Figures 3 and 4 and shown in detail in Figure 7 as applied to a door construction similar to that described above but hinged at the right edge of the door when viewed from the inside instead of from the left as in the other figures of the drawings.

As shown in Figure 7, the door 12 is provided with an inwardly extending flange 57 about its periphery adapted to lie within and spaced a short distance from flange 17 of the door frame when the door is closed. The inside surface of flange 57 at any suitable point, such as at the upper swinging corner of the door is provided with an open housing 58 including a central web portion 58a providing a pivotal mounting at 59 by means of a rod 60 for a latch comprising a sled-shaped member 61 having side arms 61a and a connecting web portion 61b. The web 61b terminates short of the free ends of arms 61a which support a roller 62 positioned between the ends of the two arms 61a.

A coil spring 63 bears against central web portion 58a of housing 58 and against web 61b of the latch so as to urge the latch and thereby the roller 62 toward the door frame.

On the inner surface of the door frame there is provided a small plate 65 welded to the inner surface of the door frame 11 and having a beveled end portion 66 which extends beyond the inner edge of the door frame into the opening there-through so as to be engaged by roller 62 when the door is in its closed position.

When the door is swung shut, the engagement of roller 62 with the inner edge 66 of plate 65 causes the latch to be pivoted inwardly against the tension of spring 63 so as to permit roller 62 to ride over the end 66 of plate 65 and to assume its latching position as shown in Figure 7 under the influence of spring 63 as soon as the door is completely closed.

The latch shown in Figure 7 is not intended to hold the door shut under substantial pressure but is only intended to hold it shut against the tension of spring 49 until the dogs can be swung to their dogging positions. When the dogs are in their undogged positions, a light pull on handle 68 on the outside of the door (Figures 1 and 2) or a push on the door from the inside will overcome the spring 63 and will permit the door to swing open moving roller 62 over the beveled end portion 66 of plate 65.

I wish it to be understood that I have shown and described only a preferred embodiment of the invention in accordance with the patent statutes and I fully realize that the invention is susceptible of numerous modifications without departing from the inventive concept. The invention is not to be limited to the preferred embodiment but is intended to cover all modifications of the invention falling within the scope of the appended claim.

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I claim:

A handle detent mechanism for a door operating handle mounted on a door frame and movable between latching and unlatching positions, said mechanism comprising a box-like bracket on the door frame extending toward said handle, said bracket being open on the side facing the doorway and on the side facing the handle, a detent arm pivotally mounted in the open side facing the handle and having an end portion extending a short distance into the path of movement of the door, a short arm carried by said handle and extending toward said detent arm when said handle is in the unlatching position, said short arm having a recess therein, a projection on said detent arm complementary in shape to said recess and extending at an angle away from the doorway, and a spring within said box-like bracket urging said detent arm toward engagement with said short arm to hold the handle in the unlatching position but operable

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to permit movement of said detent arm to a handle releasing position upon engagement of the door with the end portion of the detent arm as the door moves to closed position.

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