

Nov. 25, 1958

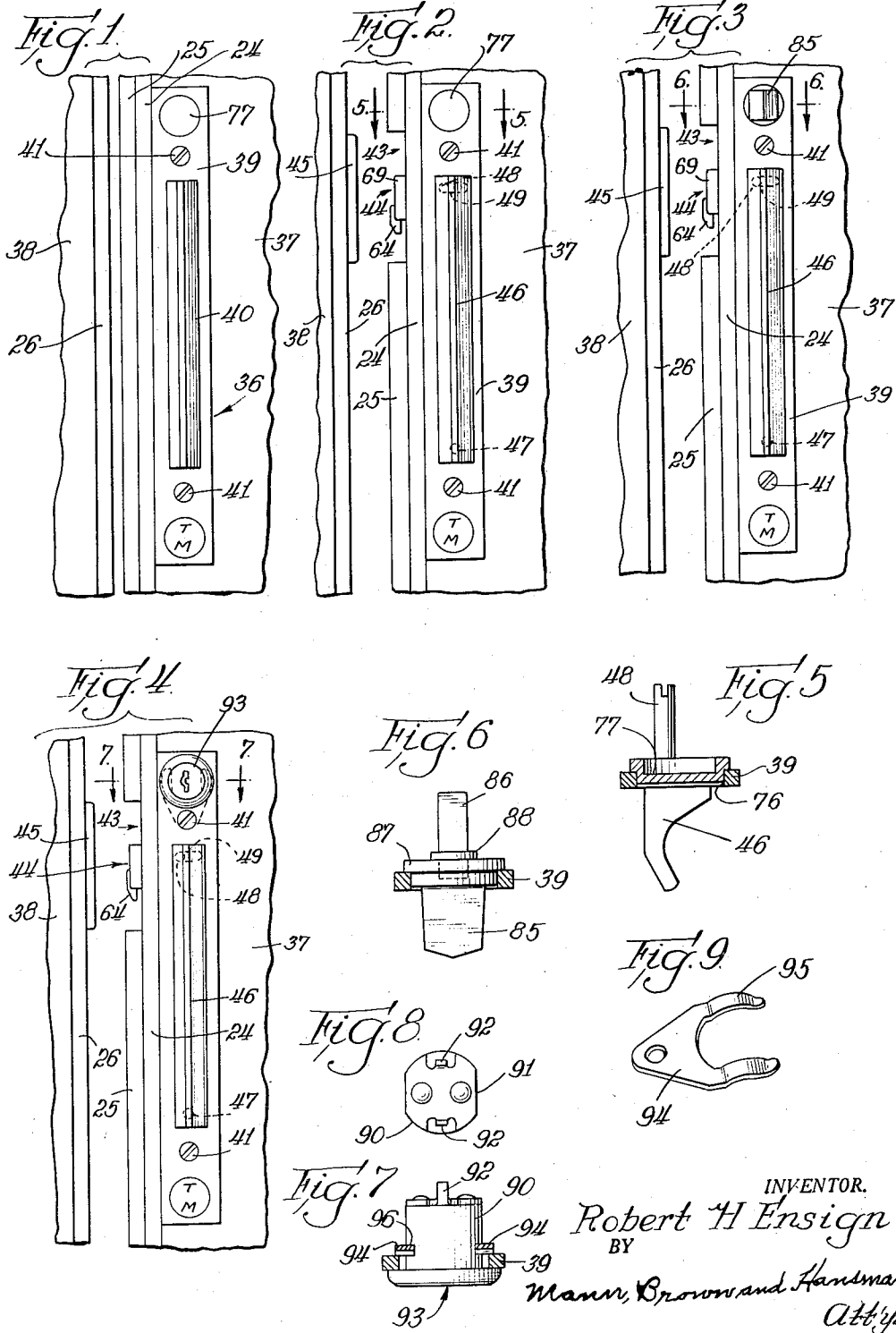
R. H. ENSIGN

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LATCH CONSTRUCTION FOR SLIDING DOORS

Filed Oct. 19, 1955

3 Sheets-Sheet 1



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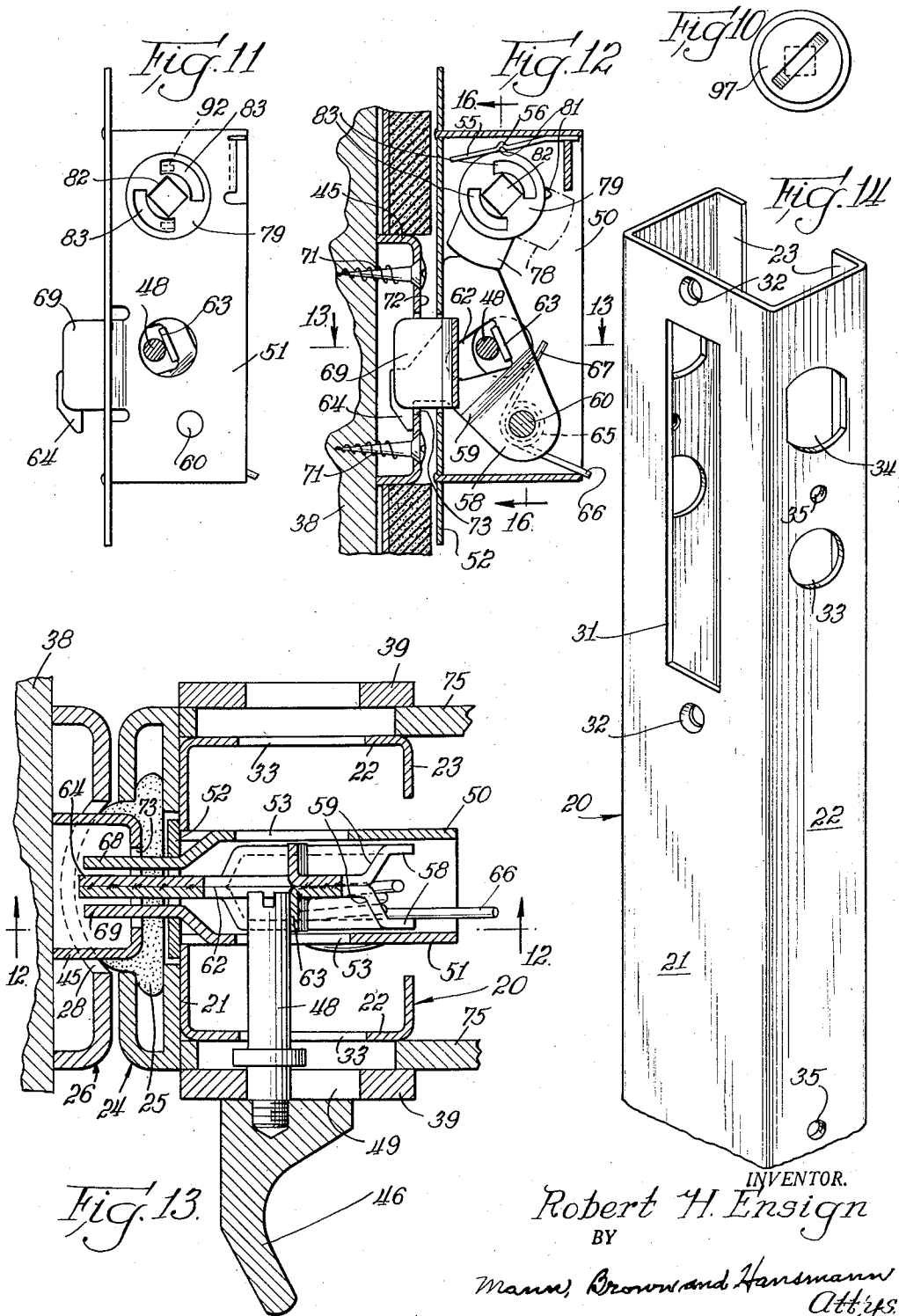
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3 Sheets-Sheet 2



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Fig. 15a

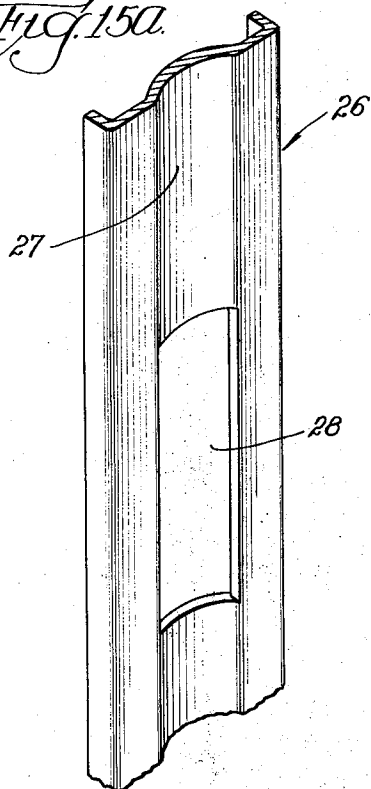


Fig. 15

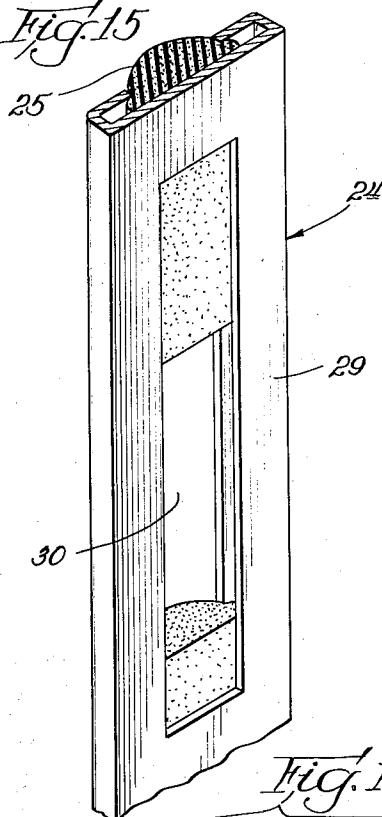


Fig. 16

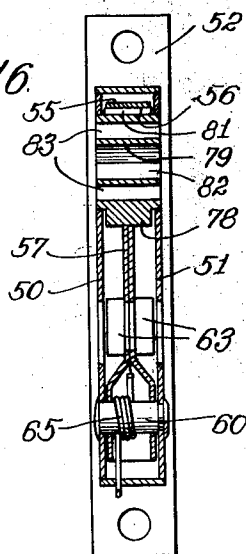
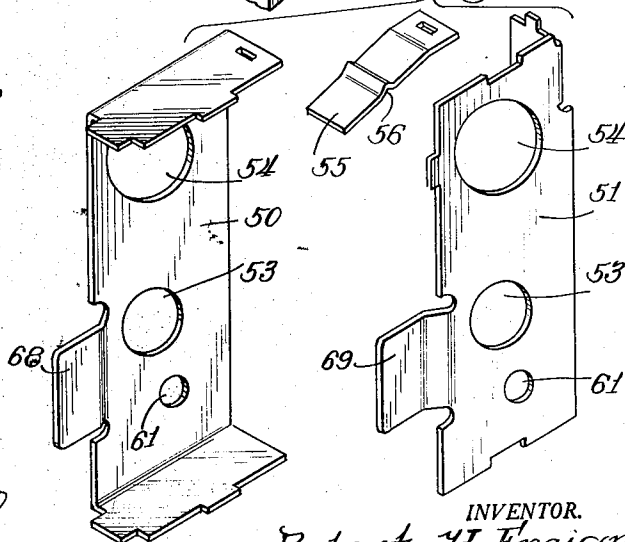


Fig. 17



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LATCH CONSTRUCTION FOR SLIDING DOORS

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Application October 19, 1955, Serial No. 541,420

11 Claims. (Cl. 189—46)

This invention relates to a latching mechanism for use with sliding doors and finds particular application in the case of the familiar folding or accordion type doors.

Accordion type doors are now employed in a great many applications that require various latching combinations for the door, and in the past it has usually been necessary to individually design each door and latching arrangement to accommodate the needs of the particular type of installation.

It is the principal object of the present invention to provide a door and latch arrangement wherein a single construction may alternatively receive a wide variety of latching and locking schemes without alteration. It is proposed to provide a simplified latching arrangement that may be operated from either or both sides of the door and also that may be locked in its latching position by locking facilities applied to either or both sides of the door.

In accordance with the present invention it is further proposed to provide a latching and handle arrangement therefor wherein the releasing action applied to the handle for the purpose of disengaging the latch is also effective to urge the door toward its open position. Finally it is proposed to provide flanking abutment means for the latch to block the latch against undesired lateral and/or vertical movement relative to its keeper. In addition, the latch and abutment means are located relative to their associated bumper so as to prevent the possibility of snagging or catching the clothing of a person walking through the door.

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,

Fig. 1 is a fragmentary side elevational view of the meeting edges of a sliding door and its associated door jamb, the door being provided with a rigid handle;

Fig. 2 is a similar view with a pivoted handle for operating a latching mechanism carried by the sliding door for cooperation with a keeper plate secured to the door jamb;

Figs. 3 and 4 illustrate similar latching mechanisms including, respectively, a manually rotatable knob and a key actuated tumbler for locking the latching mechanism;

Fig. 5 is a fragmentary sectional plan view taken on the line 5—5 of Fig. 2;

Fig. 6 is a fragmentary sectional plan view taken on the line 6—6 of Fig. 3;

Fig. 7 is a fragmentary sectional plan view taken on the line 7—7 of Fig. 4;

Fig. 8 is a rear view of the mechanism of Fig. 7;

Fig. 9 is a view of a mounting clip employed in connection with the tumbler of Fig. 7;

Fig. 10 is an end view of a tumbler having a coin slot;

Fig. 11 is a side elevational view of the latch housing;

Fig. 12 is a side sectional view taken through the latch housing on the line 12—12 of Fig. 13 and illustrating the cooperation between the latch and its keeper plate;

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Fig. 13 is a sectional plan view taken along the line 13—13 of Fig. 12;

Fig. 14 is a perspective view of a prefabricated channel shaped vertical post adapted to receive a latch mechanism and a pair of handles;

Fig. 15 is a perspective view of a bumper mount that is applied to the channel shaped post of Fig. 14;

Fig. 15A is a perspective view of a centering strip that is applied to the door jamb;

Fig. 16 is a sectional view taken on the line 16—16 of Fig. 12; and

Fig. 17 is a perspective view of the parts of the latch housing.

It will be seen that the present disclosure relates specifically to accordion type folding doors, and while in certain respects it is most advantageously applied thereto, the invention is not to be restricted by virtue of this specific disclosure.

In the case of accordion type doors, the leading edge of the door generally consists of a vertical post 20 of channel shape shown in Fig. 14. The post is formed with a front face 21, side faces 22, and rear strips 23, and the front face fixedly receives a bumper mount 24, such as is shown in Fig. 15. The bumper mount may be of any convenient channel shape suitable for the reception of a rubber bumper 25. The rubber bumper 25 cooperates with a centering strip 26, shown in Fig. 15A which is secured to the door jamb and provided with a vertically extending recessed portion 27 that, when the door is in its fully closed position, receives the projecting portion of the rubber bumper 25. The relationship of these basic structural members is shown in the sectional plan view of Fig. 13.

In the present description it is assumed that a single door closes against a jamb, however, the device is equally applicable to the case of a pair of doors wherein the second door receives the centering strip. Wherever the term "jamb" is used it should be understood to mean not only the conventional jamb but also the second door of a pair of doors.

According to the present invention it is proposed to prefabricate the vertical post 20, the bumper mount 24, and the centering strip 26 substantially as shown in Figs. 14, 15 and 15A, and this arrangement in cooperation with the novel handle and latch mechanism of the present invention enables the latching facilities to be varied without the necessity of modifying the related portions of the supporting structure. This simple arrangement is capable of receiving any of a wide variety of latching and locking schemes.

Accordingly, the vertically extending recess 27 formed in the centering strip 26 is slotted as at 28 to facilitate the mounting of a keeper or striker plate on the door jamb. In those instances in which no latching facilities are provided and hence no keeper plate is required, it is preferred to utilize a continuous center strip alternatively, however, it is possible to pre-punch the center strip and furnish a shield for covering the aperture 28 and protecting it against dust accumulations. Similarly, the rear wall 29 of the channel shaped bumper mount is provided with a vertically extending slot 30 adapted to receive a latching mechanism therein. It is proposed to seal off this slot against dirt and dust and the like by employing a continuous rubber bumper 25, and should it be desired to accommodate a latching mechanism, a suitable portion of the rubber bumper 25 may be removed so that access may be had for mounting the latch housing. Likewise the centering strip may be punched at the time that it is desired to convert to a latching mechanism. The front face 21 of the vertical post 20 is provided with a similar vertically extending slot 31 flanked at its top and bottom by a pair of screw

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holes 32 adapted to receive the mounting and retaining screws of a latch housing. Each of the side faces 22 of the vertical post is provided with a pair of apertures 33 and 34 adapted to receive various actuating means for the latch device.

Some of the forms which the latching facilities may take are illustrated in Figs. 1 to 4 and it should be understood that either side of the door may be provided with any one of the latching facilities described herein, each of which may readily be interchanged with any other to provide a variety of different locking combinations in accordance with the different use requirements.

Fig. 1 illustrates an arrangement in which the door is merely provided with a handle assembly 36, there being no latching facilities. The door is represented at 37 and receives a bumper mount 24 and rubber bumper 25 in the usual manner for cooperation with a centering strip 26 that is fixedly secured to the jamb 38. The handle assembly 36 comprises an escutcheon plate 39 having a handle 40 rigidly secured thereto and is adapted to be secured to the vertical post 20 by a pair of screws 41 that threadedly engage the spaced holes 35 formed in the side faces of the prefabricated vertical post. This is the simplest conceivable arrangement and since certain of the apertures in the prefabricated supporting structure serve no useful function, they are merely covered over. It may be seen in Fig. 1 that both the rubber strip 25 and the centering strip 26 are continuous. Thus the rubber strip effectively seals off the front face of the vertical post and the escutcheon plates effectively seal off the side faces of the vertical post.

In Fig. 2 a portion of the rubber bumper, as at 43, has been removed to accommodate a latch mechanism, generally indicated as 44, and the continuous strip 26 is suitably punched to accommodate a keeper plate 45. The handle 46 of Fig. 2 is mounted for limited pivotal movement relative to the escutcheon plate 39. The handle 46 pivots about a screw 47 which is passed through the reverse side of the escutcheon plate and is provided with an inward projection 48 adjacent its upper end that reciprocates in a slot 49 formed in the escutcheon plate. The projection 48 passes through the circular opening 33 in one of the side faces 22 of the vertical post.

The latch mechanism is shown in Figs. 11, 12, 13, 16, and 17 and includes housing portions 50 and 51 that are adapted to be joined together, as illustrated in Fig. 17, and are adapted to receive a mounting plate 52. The housing portions 50 and 51 are apertured as at 53 and 54 to correspond with the openings 33 and 34 formed in the side faces 22 of the vertical post. When the housing members are joined together, a leaf spring 55 having a suitable recess 56 is attached therebetween adjacent the top ends thereof for a purpose to be described hereinafter. The mounting plate 52 may be secured to the outside surface of the front face 21 of the vertical post so that the main body of the latch mechanism projects inwardly thereof. The latch itself consists of a pair of irregularly shaped plates 57 each having three corners. Corresponding corner portions 58 of each plate are offset laterally as at 59 and are pivotally mounted on a pin 60 that is secured between the housing portions 50 and 51. The openings 61 shown in Fig. 17 accommodate the pin 60.

Substantially centrally thereof, each of the plates 57 is formed with a suitable opening 62 bounded by outwardly projecting shoulder portions 63 that are adapted for engagement with the handle projection 48. The hook portion of the latch is shown at 64 and forms one of the corners of the plates 57. The latch is biased to the position in which it is shown in Figs. 11, 12, and 13 by means of a spring 65 that is wound about the pin 60 and arranged with its opposite ends 66 and 67 acting, respectively, against the latch housing and the juncture of the laterally offset portions 59 of the plates. The latch housing portions 50 and 51 are correspondingly formed

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with outwardly projecting flange portions 68 and 69, respectively, and these parts flank the latch hook 64, as shown in Figs. 11, 12, and 13. It will be observed that the keeper plate 45 that is shown secured to the door jamb 38 by means of a pair of screws 71 is provided in its front face 72 with a substantially rectangular opening 73 corresponding in height to the height of the flanges 68 and 69 and corresponding in width to the spacing of these flanges. Thus the single opening 73 receives both the hook latch and the projecting flanges and while the hook latch cooperates with the face portion of the keeper plate immediately underlying the opening 73 to prevent relative outward sliding movement, the flanges 68 and 69 cooperate with the peripheral walls of the opening 73 to prevent relative vertical and/or lateral movement between the door and the door jamb.

The escutcheon plates 39 are mounted on the side faces of the vertical post and are spaced therefrom by interposing a suitably apertured covering 75 for the door. With the handles mounted on the side faces, the handle projection 48 extends through the opening 53 and into the latch housing to engage one of the shoulders 63 of the adjacent latch plate (see Fig. 13). As the handle is pivoted about its mounting screw 47, the projection 48 moves from left to right in the slot 49 and, as viewed in Fig. 12, urges the latch clockwise about its pivot 60. The latch hook 64 thus clears the striker plate and permits the closure members to separate. This mode of operation offers the advantage that the releasing action applied to the handle is also effective to urge the door to the direction of opening.

An important feature of the present invention resides in the specific mounting relationship between the rubber bumper 25 and the latch hook 64 and flanking flange plates 68 and 69. This latch projection is retained within the major extension of the rubber bumper 25 and this arrangement eliminates any possibility of snagging or catching clothing and the like when walking through the doorway and brushing up against the door. This arrangement is accommodated in part by the fact that the keeper plate projects a short distance forward of its mounting strip and this is permissible since the keeper plate is of a rounded nature (having smoothly contoured edges and corners) and therefore is not a snagging media.

Provision is made for locking the latch plates against the releasing action of the handle; however, the locking facilities for the latch are not required in the arrangements of Figs. 1 and 2. Normally, access to these locking facilities is had through opening 34 in the side face of the vertical post, and the escutcheon plates 39 of Figs. 1 and 2 are appropriately apertured as at 76 for registry therewith. As is best seen in Fig. 5, the aperture 76 may be sealed by a shouldered plug insert 77. Should it be desirable to subsequently provide actuating means for the locking facilities, the inserts 77 may be replaced by any suitable lock control device.

Returning now to Figs. 11, 12, and 16, it may be seen that the latch is locked in position by the engagement of a locking cam lever 78 that extends radially outwardly from a cylinder 79 that is mounted in the opposed openings 54 of the latch housing for rotation relative thereto. As is best shown in Figs. 16, the camming lever 78 is of reduced thickness and fits snugly between the inner surfaces of the housing portions 50 and 51. In Fig. 12 the locking lever 78 is shown in its locking position wherein it engages the upper corners of the latch plates 57 and maintains the latch hook 64 in latching engagement with the keeper plate. As mentioned previously, the locking facilities are not utilized in the applications illustrated in Figs. 1 and 2, and in such cases the locking cylinder may be rotated to its dotted line position in Fig. 12. The surface of the cylinder is provided with spaced nibs 81 for engagement with the recess 56 formed in the leaf spring 55. This arrangement maintains the locking facilities in their selected locations and is particularly im-

portant in that it eliminates the possibility of accidental jolts or shocks from causing inopportune locking engagement.

In order to facilitate the positioning of the locking cylinder 79, it is provided centrally thereof with a square bore 82 that extends completely through the cylinder 79 and on each end is flanked by a pair of arcuate recesses 83. Each of the arcuate recesses subtends an angle of slightly more than 90 degrees.

Figs. 3 and 6 illustrate a manually rotatable knob 85. The knob is provided with a square bore that is adapted to receive one end of an operating rod 86 that is also of square cross sectional configuration. The knob is mounted on the escutcheon plate 39 and for this purpose is formed with an enlarged collar 87 that acts against the inner surface of the escutcheon plate 39 for limiting outward movement of the knob. The rod 86 is shouldered medially thereof, as indicated at 88, and engages the inner surface of the knob 85 and limits the inward movement of the knob. Thus the inner end of the square rod 86 engages the square bore 82 of the locking cylinder 79, and the entire assembly, comprising the knob 85 and the rod 86, turns in unison.

Figs. 4, 7, 8, and 9 illustrate an arrangement wherein a key actuated tumbler is employed for locking the latch. The tumbler has a cylindrical body 90, portions of opposed side faces of which are flattened, as at 91, and is provided with a pair of inwardly projecting fingers 92 that are carried by a key actuated rotatable element 93. The tumbler is applied to the escutcheon plate by means of a pronged mounting clip 94, the fingers 95 of which are deformed to create a spring-like action and are adapted to fit within opposed notches 96 in the cylinder 90. Thus the mounting clip 94 urges the tumbler inwardly and secures it in position on the escutcheon plate 39.

It will be noted that when the keyhole is in its usual position, as shown in Fig. 4, the fingers 92 carried by the rotatable element 93 are in vertical superposed relationship. The arcuate slots 83 are arranged to span an angle of slightly greater than 90 degrees in order that after the key has been inserted for the purpose of rotating the element 93 and thereby positioning the locking cylinder 79, the rotatable element 93 may be returned to its normal position without affecting the position of the locking cylinder 79. With this backlash arrangement the keyhole when unoccupied is oriented at all times in the position in which it is shown in Fig. 4. This arrangement gives the locking mechanism a more pleasing and uniform appearance and permits removal of the key from the locking cylinder 79 irrespective of the position of the locking cylinder.

Fig. 10 illustrates another possible arrangement wherein a coin slot plug 97 may be employed in the same manner as the manually rotatable knob 85 of Fig. 6. It is contemplated that the coin slot plug may accommodate a rectangular operating bar of the same general type as is shown at 86 in Fig. 6. The coin slot type of plug is generally used in conjunction with a manually rotatable knob and provides an emergency release for the locking facilities while simultaneously affording normal privacy security. Such arrangements are frequently desired in the case of bathroom applications and the like.

The prefabricated supporting structure shown in Figs. 14, 15, and 15A has been shown to be capable of accommodating any of the latching schemes shown in Figs. 1 to 4. Referring now to Fig. 13 it may be seen that the vertical post 20 is constructed to receive a latch housing, such as is shown in Figs. 11, 12, and 16, centrally thereof so that access may be had to the various elements of the latch mechanism from either side of the post. Furthermore, the arrangement is such that access may be had simultaneously from either side of the post without creating any conflict between the operating mechanisms. In this connection it will be noted that projection 48, which is carried by the handle 46, extends just short

of the center of the chamber formed in the vertical post. Obviously a similar type handle carrying an identical projection may be applied on the opposite side of the vertical post, and since the handle projections are not rigidly secured to the latch plates but merely abut against them, each handle operates freely and independently of the other.

Similarly, any locking combination can be accommodated in that the operating mechanism for the locking cylinder 79 at no time projects more than half-way into the chamber of the vertical post. Of course, the locking mechanisms cannot act independently of one another. The invention offers the advantage that the device may be converted from one type of locking mechanism to another and the simplicity of these conversions is best understood by comparing the arrangements of Figs. 6 to 9. It should be apparent that any combination of latching and locking mechanism may be applied on opposite sides of the door with equal ease. The versatility and flexibility offered by the present invention greatly simplifies the supply and inventory problems in a field which has heretofore been plagued by a wide variety of slightly different mechanisms.

In addition, the arrangement of the parts of the latch housing offers the advantages of economy and ease of assembly and these advantages arise from its extremely simplified construction. The latch plate itself operates as a second order lever, it being pivoted at one end, acted upon substantially centrally thereof, and blocked at its other end by the locking cam lever 78. The outwardly directed shoulders 63 formed in the latch plates insure that adequate contact may be had by the handle projection without the necessity of extending this projection beyond the midway point of the chamber of the vertical post. Finally, the flanges 68 and 69 that are arranged in closed spaced relationship and flank the latch hook 64 cooperate with the opening 73 in the keeper plate to prevent the lock from being accidentally or surreptitiously disengaged. From the above, it may be seen that the objects of the present invention have been accomplished.

I claim:

1. A convertible structure comprising relatively collinearly slidable jamb and closure members having abutting faces adapted for collinear opening and closing movement, said closure member having a channel shaped post forming one of said abutting faces, a cushioning strip mounted along the abutting face of said post with a portion of said post that is normally masked by a portion of said strip having an opening to accommodate, upon the removal of said strip portion, a latching mechanism, said post having side faces formed with registering openings, one of which accommodates an actuating rod for the latch mechanism and another of which is adapted for anchoring escutcheon plates located along said side faces, with the abutting face of the jamb member having an opening to accommodate a keeper plate for cooperation with said latch mechanism.

2. A latching mechanism for attachment to the abutting faces of a pair of closure members adapted for relative collinear opening and closing movement and comprising a keeper plate having a central aperture and secured to one of said abutting faces, a movable latch located between a pair of laterally spaced flanges with the flanges defining a cross-sectional area that conforms to the size and shape of the central aperture, said latch and flanges being carried forwardly of the other of said abutting faces to project into the central aperture in the keeper plate, resilient means yieldably urging said latch into position for engagement with said keeper plate to secure said members against relative collinear opening movement, and a handle movably secured to a movable one of said movable members and having means undergoing substantially translational movement in response to a movement of said handle in the opening direction

of said movable member to move said latch out of engagement with said keeper plate and simultaneously to separate said members.

3. In a latching mechanism for mounting on one of a pair of closure members that undergo relative collinear opening and closing movement in a given direction, said mechanism cooperating with a keeper on the other of said members; a latch housing carried with said one member, a latch mounted in said housing for pivotal movement about a horizontal axis substantially normal to said given direction and yieldably urged to a keeper-engaging position, said latch having an abutment surface facing in a direction generally transverse of said axis, a locking member pivotally mounted within said latch housing and movable between a first position wherein said locking member blocks movement of the latch away from the keeper-engaging position and a second position wherein said locking member accommodates such latch movement, a handle carried on said one closure member and movable relative to said housing in the opening direction of said one closure member, and means projecting through said housing and movable relative thereto in a direction transverse of said axis, said means establishing driving engagement between said handle and said surface to respond to movement of said handle in the opening direction of said closure member and simultaneously swing said abutment surface about said axis for moving said latch out of its keeper-engaging position.

4. The arrangement of claim 3 wherein the latch member constitutes a second-order lever which is pivotally mounted adjacent one end and which is engaged adjacent the end opposite said one end by said locking member with said abutting surface intermediate said ends and with said latch member carrying a latch projection for engaging the keeper.

5. In a latching mechanism for mounting within a chambered closure member for cooperation with a keeper carried by a cooperating closure member, said closure members being adapted to undergo relative collinear opening and closing movement, a housing secured within said chambered closure member, said housing and chambered closure member each having corresponding access openings in the opposite sides thereof, a latch having a pivot point secured within said housing with said latch yieldably engaging said keeper, and a pair of handles pivotally mounted in opposed relationship on opposite sides of the chambered closure member, said latch having portions spaced from the pivot point thereof and projecting towards the opposite sides of said housing and said handles having portions spaced from the pivot points thereof and projecting through said access openings to extend alongside said latch portions in loose side-wise abutting engagement therewith such that said latch may be actuated out of engagement with said keeper by either of said handles without affecting the other of said handles.

6. A latching mechanism for attachment to the abutting faces of relatively collinearly slidable jamb and closure members adapted for relative collinear opening and closing movement, one of said members supporting a latch means having a latch projecting through the abutting face thereof, the other of said members supporting a keeper plate for cooperation with said latch, said keeper plate having a smoothly contoured exterior and projecting outwardly from the abutting face of said other member, and a rubber bumper secured along the abutting face of said one member and interrupted in the region of said latch to accommodate said keeper plate

when said members are closed, said rubber bumper projecting beyond the maximum extension of said latch.

7. The arrangement of claim 6 wherein the abutting face of said one member has a centering strip secured therealong and projecting therefrom, with said centering strip having an elongated recess for accommodating said bumper when said members are closed, and being formed with an opening for receiving said keeper plate, said keeper plate being mounted in said last-mentioned opening and projecting beyond the maximum extension of said centering strip for engagement with the latch when said members are closed.

8. A doorpost structure for doors of the sliding type, said structure comprising a channel post having a leading edge formed with an opening for receiving a latch-mechanism and having side walls each formed with at least one opening adjacent said latch-mechanism opening, and a yieldable bumper mounted along the leading edge of said channel post to mask said latch-mechanism opening, said channel post optionally receiving door handles for mounting along said side walls to mask the openings therein, or, upon removal of the portion of the bumper masking said latch-mechanism opening, receiving a latch mechanism through said latch-mechanism opening and door handles for mounting along said side walls to mask the openings therein, at least one of said last-mentioned handles being movable on said post and carrying an actuator rod for projection into said channel post through one of said side-wall openings for actuating engagement with the latch mechanism.

9. The doorpost structure of claim 8 wherein a mounting strip member secures said bumper on said leading edge, said member having an opening registering with said latch-mechanism opening.

10. The doorpost structure of claim 8 wherein escutcheon plates are mounted on said side walls and have openings therein registering with the openings in said side walls.

11. A doorpost structure for doors of the sliding type, said structure comprising a channel post having a leading edge formed with an opening for receiving a latch-mechanism and having side walls formed with two sets of registering openings adjacent said latch-mechanism opening, a yieldable bumper mounted along the leading edge of said channel post, and an escutcheon plate mounted along each side wall and each having two openings therein registering with the openings in said side walls, said latch-mechanism opening optionally being masked by a portion of said bumper or receiving a latch mechanism that may include a latch-locking mechanism, each escutcheon plate optionally receiving either a door handle masking one of the openings therein or a door handle having an actuating rod for projection into said post for actuating the latch mechanism when used, and each escutcheon plate optionally receiving, in the other of the openings therein, either a plug or an actuator for the locking mechanism when used.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,861,660

November 25, 1958

Robert H. Ensign

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, lines 2 and 12, and in the heading to the printed specification, lines 3 and 4, name of assignee, for "Hough Shade Corporation", in each occurrence, read -- Hough Manufacturing Corporation --.

Signed and sealed this 3rd day of February 1959.

(SEAL)

Attest:

KARL H. AXLINE

Attesting Officer

ROBERT C. WATSON
Commissioner of Patents