Feb. 23, 1943. C. OLSON 2,311,686

DOOR LATCH

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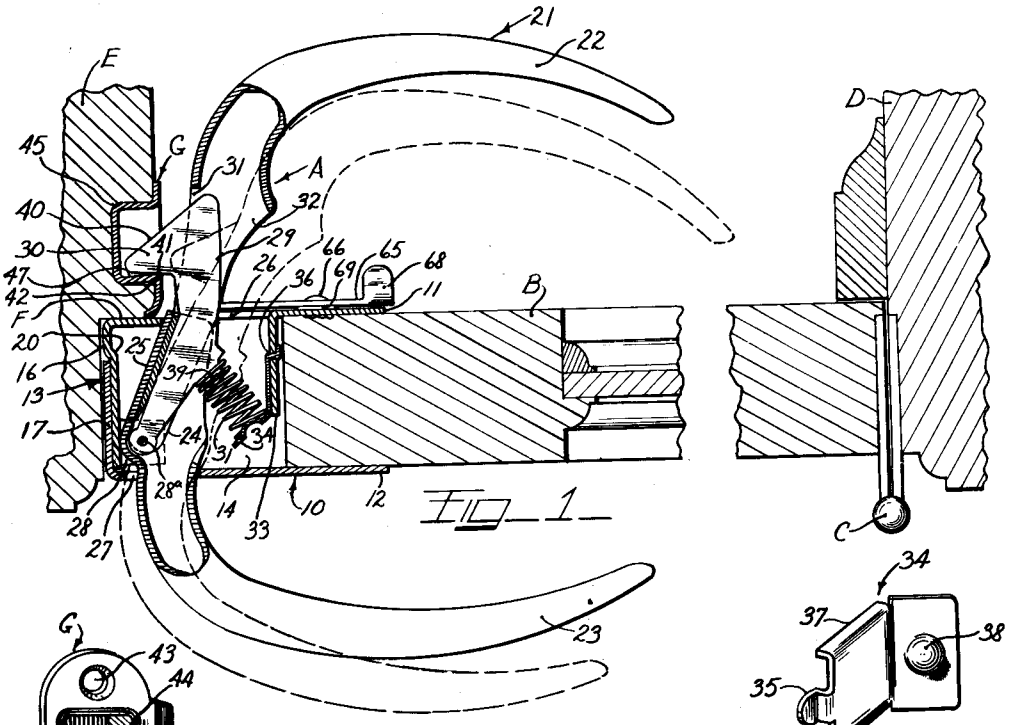


FIG. 1

FIG. 4

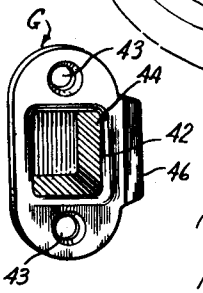


FIG. 3

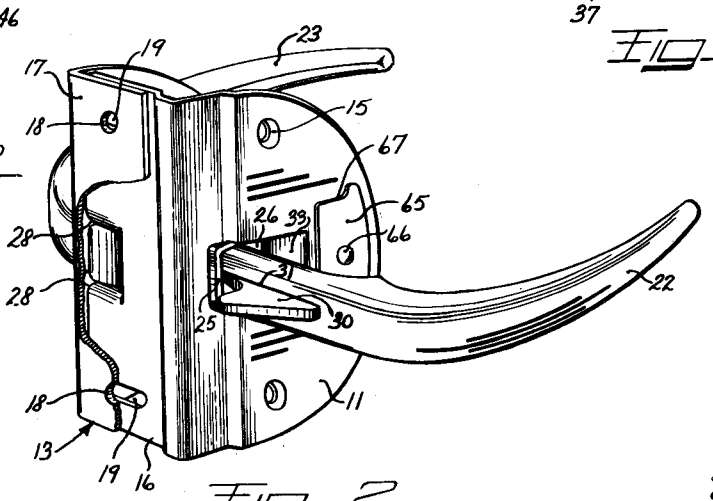


FIG. 2

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FIG. 5

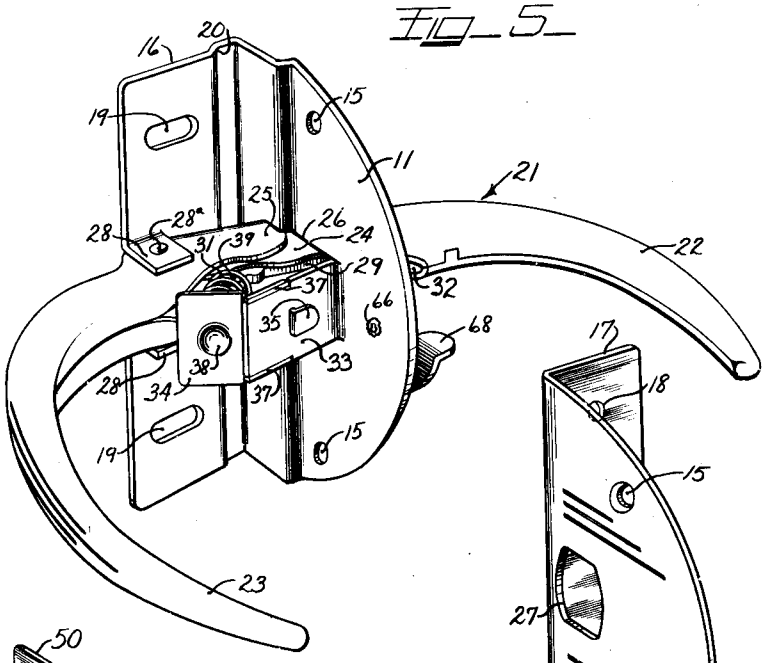


FIG. 6

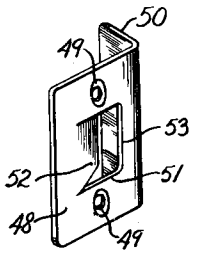


FIG. 7

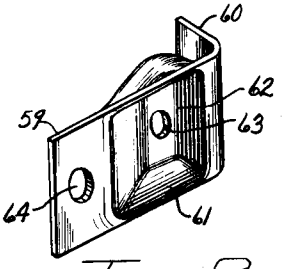


FIG. 9

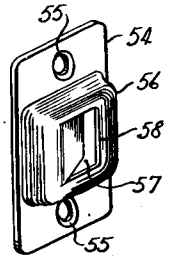


FIG. 8

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2,311,686

DOOR LATCH

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Application January 21, 1941, Serial No. 375,130

3 Claims. (Cl. 292—126)

My invention relates generally to improvements in door latches, particularly useful for screen and storm doors, but useful also on any types of swinging closures.

The invention has particular reference to door latches of that type in which the normal actions of pushing on the door from the inside or pulling on it from the outside may be used to unlatch the door and cause it to open and the latch accordingly has handles pivotally mounted through the door and movable about said pivot in proper directions to cause the aforesaid actions.

The primary object of my invention is to provide a latch of this type in an extremely simple and effective form, and which includes as the mounting member a channel which may be adjusted to accommodate doors of any thickness ordinarily met with. The invention further contemplates the mounting of all working parts of the latch one one adjustable part of the channel in order that such thickness adjustments will in no way interfere with the proper operation of the latch. The latter feature also contributes greatly to ease in mounting the latch on the door as there are no loose parts to become lost and to require precise alignment with each other upon the door.

Another and important object is to provide a latch of this type and a keeper having cooperating features which contribute to the effective latching of the door and also to the aforesaid convenient mounting.

Another object is to provide improvements in my latch as described in my copending application Serial No. 318,545, filed February 12, 1940, and various details of construction and assembly which simplify the manufacturing process.

These and other more detailed and specific objects will be disclosed in the course of the following specification, reference being had to the accompanying drawings in which—

Fig. 1 is a horizontal cross section through a door and adjacent portions of a door frame showing my improved latch in place thereon, and with the greater part of the latch shown in cross section to better disclose the construction.

Fig. 2 is a perspective view of the latch alone looking at the inner side thereof and showing fragments broken away to disclose interior construction.

Fig. 3 is a perspective view of the keeper shown in Fig. 1.

Fig. 4 is an enlarged perspective view of the bracket plate used in mounting the latch operating spring.

Fig. 5 is a perspective view showing the main inner side section of the mounting channel or bracket with all operating parts of the latch in place thereon.

Fig. 6 is a similar view of the outer side section of the mounting bracket which serves mainly as a cover plate for the latch.

Figs. 7, 8, 9 are perspective views of several different types of keepers having features cooperating with my particular type of latch.

Referring now more particularly and by reference characters to the drawing, A represents generally my improved latch shown in Fig. 1 as mounted upon a conventional door B which is hinged at C to one side D of the door frame to swing at its opposite edge toward and away from the other side E of the frame. This frame side E conventionally has the vertically extended shoulder or stop F against which the door will close, and inward of said shoulder the keeper G is mounted.

The latch A has a mounting bracket or channel designated generally at 10 having spaced inner and outer sides 11 and 12 and a base or back portion 13, the channel being thus substantially U-shaped as viewed from the upper or lower end. This part is thus adapted to fit over the edge and adjacent side portion of the door B, and within that area of the door covered by the channel there is provided a recess 14 cut into the edge to accommodate working parts of the latch. The sides 11 and 12 are provided with an opening 15 for screws by which they may be mounted to the sides of the door, and as clearly shown throughout the drawings these sides are of curvilinear shape both to improve their appearance and to provide for strengthening the door around the recess 14 cut therein.

The terms "inner" and "outer" is herein used are with reference to inner and outer sides of the door B and are used only for convenience in description.

As is well known, doors are made in many thicknesses, and to accommodate my latch to such doors I make the mounting member or channel 10 in two separate parts. The inner part, including side 11, constitutes the main section of the bracket and from the vertical outer edge of this side there is extended at right angles an end plate 16. The outer section, including the side 12, serves in effect as a cover plate for the latch, and from the vertical outer edge of side 12 there is extended at right angles the end 17. In the assembled relation of the sections upon the door these end plates 16 and 17 are overlapped

as best seen in Figs. 1 and 2, to thus provide the base or back portion 13 hereinbefore described. The end 17 is disposed to the outer side and has, adjacent upper and lower extremities, the openings 18 through which screws may be placed to fasten bight 13 to the door. The inner end 16 is provided with registering slots 19 to pass the said screws and, these slots, being elongated transversely with respect to the door edge, permit the ends 16 and 17 to be secured together and to the door in adjustable overlapping relation as should be readily evident. Obviously, this adjustment may be readily carried out to any fineness required to accommodate the bracket to the thickness of the particular door in hand. It will be noted that the inner plate 16 is inset over the greater part of its width, as designated at 20, in order to provide a substantially plane surface across the end of the bracket.

The latch handle, designated generally at 21, is substantially U-shaped or horseshoe-shaped as clearly shown, and comprises inner and outer curved handles or levers 22 and 23. Mainly for convenience in fabrication the handles are made in two inner and outer parts of which the levers 22 and 23 constitute the main portions, and meeting ends of the levers are extended in the form of telescoping shanks 24 and 25. The sides 11 and 12 have openings, designated at 26 and 27 respectively, through which inner and outer ends of the handles are loosely extended, with the assembled shanks 24 and 25 arranged through and within the bracket member 10.

From the extremities of the inner end plate 16 at substantially a mid point of the vertical edge thereof I punch the ears or lugs 28 which are turned inward with respect to the edge of the door and are vertically spaced to receive therebetween the assembled shanks 24 and 25 and a pivot pin 28*a* is then mounted through these ears 28 and the shanks 24 and 25 to not only hold the shanks in assembled relation but also to pivotally support, and mount the handle as a whole, permitting the levers 22 and 23 to swing in horizontal planes with respect to the door. The openings 26 and 27 are, of course, obviously elongated in the horizontal plane to permit such swinging movements of the handle.

Mounted within the inner section of the handle is a latch member designated generally at 29, which at one end pivots upon the pin 28*a* and which extends inwardly and lengthwise within the inner handle lever 22 and shank 24 to a point well inwardly of the door.

This inner end of the latch has a nose or hook 30 which may extend loosely in a lateral direction through an opening 31 formed in the side of the handle lever 22, which faces toward the free edge of the door. This hook 30 is thus adapted to enter and engage the keeper G as shown in Fig. 1. The opposite side of the handle lever 22, facing away from the free edge of the door, is open from a point well inwardly of the door to the end of the shank 24, as shown at 32, to thus permit the latch member 29 to swing independently of the handle in a direction away from the keeper G. This action of the latch member is yieldably opposed by an expansion coil spring 31 which is placed against what might be termed the back side of the latch member. In forming the inner opening 26 the material punched from the side 11 is turned substantially at right angles from the side to enter the recess 14 in the form of a mounting ear 33. A spring mounting plate 34, as best shown in Figs 1 and 4, is engaged with this ear 33, and for this purpose the plate has at one end an angularly formed lug 35 which may be engaged with an opening 36 in ear 33. Opposite sides of the plate 34 are then turned at right angles in the form of flanges 37 which will engage corresponding sides of the ear 33. The extended portion of the plate 34 is bent at an angle and provided with a boss 38, against which one end of the spring 31 is seated. The other end of the spring is engaged with a similar boss or projection 39 on the latch member 29. It will be noted that the aforesaid construction permits the plate 34 to be preformed to the desired shape and assembled upon the ear 33 without the use of any tools and the tension of spring 31 will serve to hold the plate firmly in place.

The latch 29 bears against the outer lateral wall of the shank 24 and by the outward pressure of the spring 31 against the latch member the shanks 24 and 25 are held against relative movement as will be understood.

In operation it will be readily evident that by pushing upon the inner handle lever 22 the entire handle as a unit will oscillate about the pivot 28*a* as shown in dotted lines in Fig. 1 and this movement by engagement of the shank 24 with the latch member 29 will withdraw the nose or hook 30 from the keeper G, the normal or natural movement of pushing upon the handle to open the door from the inside thus releasing the latch and swinging open the door. Conversely, a pull upon the outer lever 23 will both release the latch and open the door in the same manner, it being evident that in both operations the latch and handle move as a unit. In closing the door, however, the inclined edge or cam surface 40 of the latch member 29 may strike the keeper G and urge the latch member inwardly with respect to the frame E, so that the hook 30 may clear the keeper until the door is completely closed, this independent swinging movement about the pivot pin 28*a* being made possible by the opening 32.

It will be noted and clearly evident from the foregoing that all locking parts of the latch are supported and carried upon the main inner section of the mounting bracket constituted by the side 11 and end 16, and that therefore in assembling the latch upon the door this bracket section may be first put in place and all parts properly mounted with the greatest of convenience. The outer section including side 12 and end 17 may then be put in place and will serve mainly as a covering plate to conceal the recess 14 and interior parts.

The adjustment of the bracket 10 to doors of different thicknesses will require no adjustment whatever of the handle or latch members since the pivot 28*a* for these parts remains at all times at a fixed spacing with respect to the side 11. Thus the handle levers need not be adjustably connected as was required in the structure disclosed in my copending application, hereinbefore identified.

Attention is directed to the fact that the inner opening 26 is spaced a considerably greater distance from the edge of the door than is the outer opening 27, and that as a result that portion of the handle 21 extending through the door, and wherein the latch member 29 is mounted, will stand at an angle with respect to the vertical face of the frame E and for the same purpose, the pivot pin 28*a* for both the handle and latch, is

located as far as possible toward the outer edge of the door and in fact is located outwardly of the point, designated at 41, at which the latch hook 30 engages the keeper G. As a result of this arrangement an outward pull upon the door will have a tendency to keep the latch in the keeper and thus prevent the door from being opened accidentally or without operating the handle 21.

In this action the keeper G plays an important and cooperative part in that the edge engaged by the hook of the latch 29 is made as sharp as possible as designated at 42. The actual contact area between the latch hook 30 and keeper edge 42 is thus reduced and the outer or latching movement of the hook 30 across the edge 42 in response to the angular lines of force set up by the angular position of the latch itself will be facilitated.

The keeper G of the type shown in Figs. 1 and 3 is mounted to the frame E by screws passed through the openings 43 and between the said openings the keeper has the cup-shaped portion 44 pressed outward to enter a recess 45 cut in the frame E. This portion 44 thus provides a socket for the reception of the latch hook 30 and the edge 46 of the keeper is rounded at the point where it meets the shoulder F to act as a strike for the cam surface 40 of the latch member. In addition to the sharpness of the edge 42 engaged by the latch member as above described the adjacent wall 47 of the pressed out portion 44 is angularly disposed in order to stand away from the operating or latching surface of the hook 30 as clearly shown in Fig. 1.

As shown in Figs. 7, 8, 9, I have provided other forms of keepers which are particularly adapted for use with my latch and which have features cooperating to provide the aforesaid desirable latch seating operation. The keeper shown in Fig. 7 comprises the plate 48 having openings 49 for the mounting screws by which it may be secured to the frame E, and having one edge 50 turned at right angles to fit over the shoulder F and act as as a strike for the latch member. An opening 51 is formed in the plate 48 by punching inwardly an ear 52 leaving a sharp raw edge 53 for engagement of the latch hook 30. Both of the aforesaid types of keepers require the forming of a recess in the frame E, and to obviate this work, I may use the keeper shown in Fig. 8 which has the plate 54 with openings 55 for the mounting screws, and which includes a large boss portion 56 punched outwardly to stand away from the frame E. An opening 57 is then formed in this boss portion 56 leaving the raw, exposed edge 58 for engagement with the latch in a fashion similar to the keeper shown in Fig. 7. As another type of keeper I show in Fig. 9 a plate 59 adapted to fit the frame E and with the end 60 turned to fit over the shoulder F as a strike for the latch. Punched inwardly from the plate 59 is a boss portion 61 forming a relatively sharp edge at 62 for engaging the latch, the recess formed by the boss section 61 thus accommodating the hook of the latch and the keeper is mounted by screws through the openings 63–64 formed, respectively, at the bottom of the socket and at the extremity of the plate 59.

A night latch or safety lock 65 is pivotally mounted by a rivet 66 upon the inner side 11 of the mounting bracket 10 and the end 67 is adapted to be swung around into position engaging the inner handle lever 22 and the "back" of the latch member 29. In this position the lock 65, of course, prevents either the handle or the latch from being swung away from the keeper G. For convenience in manipulation one end of the lock 65 has the inwardly turned finger member 68 and to prevent the lock from being accidentally moved into locking position a conventional spring washer 69 may be provided upon its mounting rivet.

It is understood that suitable modifications may be made in the structure as disclosed, provided such modifications come within the spirit and scope of the appended claims. Having now therefore fully illustrated and described my invention, what I claim to be new and desire to protect by Letters Patent is:

1. In a door latch, a handle member extending through the door for actuation at inner and outer sides thereof and having latch means at an inner end, a bracket plate secured to the inner side of the door and having an end turned outwardly over the edge of the door, the said bracket plate having an opening to pass the inner end of the handle, ears turned from the said end of the bracket plate in spaced relation to receive therebetween a medial part of the handle, a pivot pin mounted through the said ears and the handle and supporting the handle for swinging movements, a cover plate adapted to fit over the outer side of the door and having an end turned inwardly in overlapping relation with the end of the bracket plate and adjustably secured thereto, and the said cover plate having an opening to receive the outer end of the handle member.

2. In a door latch, a bracket plate adapted to be secured to the inner side of a door and having an end turned outwardly over the edge of the door, the said bracket plate having an opening spaced from the edge of the door and a mounting ear turned inward from one edge of said opening, a handle member mounted through the said opening and through the door for actuation at inner and outer sides of the door, means on the said end of the bracket plate pivotally supporting the handle at a medial portion thereof, spring means braced between the said mounting ear and the handle to normally swing the handle in one direction, and a safety lock on the said bracket plate adapted to engage the handle to lock the same against movement in the opposite direction.

3. In a door latch, a bracket plate adapted to be secured to the inner side of a door and having an end turned outwardly over the edge of the door, the said bracket plate having an opening spaced from the edge of the door and a mounting ear turned inwardly from one edge of said opening, a handle member mounted through the said opening and through the door for actuation at inner or outer sides of the door, means on the said end of the bracket plate for pivotally supporting the handle at a medial portion thereof, a spring mounting plate adapted for connection with the said mounting ear and having marginal flanges and a hook for releasably engaging said ear, and a spring braced between the said spring mounting plate and the handle to normally urge the handle in one direction and to releasably hold the spring mounting plate upon the said ear.

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