Nov. 19, 1929. S. F. WREAD 1,735,914

DOOR LATCH OPERATING MEANS

Original Filed Feb. 19, 1927 2 Sheets-Sheet 1

Fig. 1.

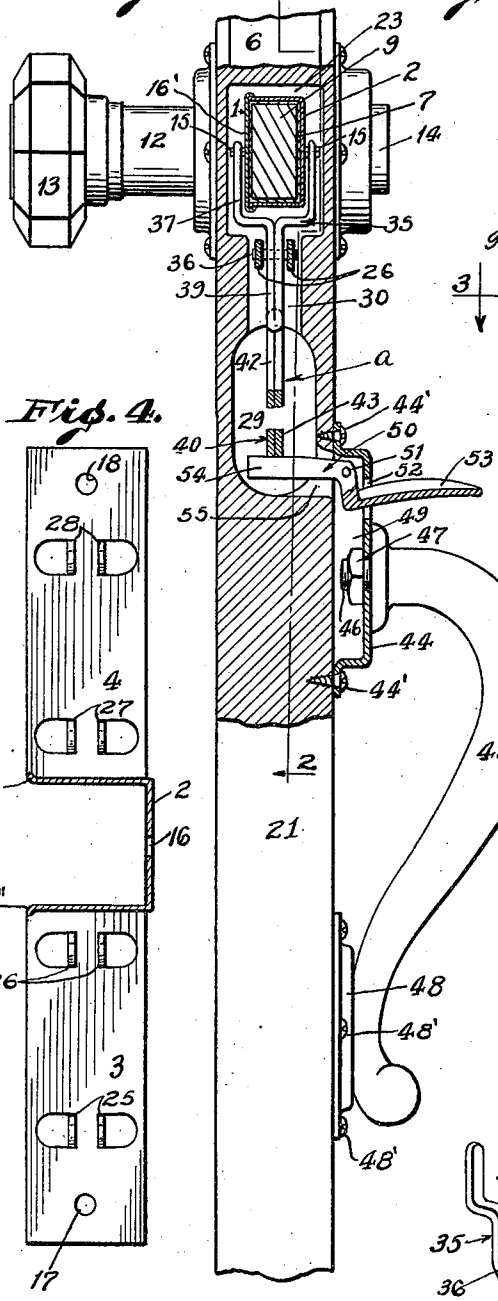


Fig. 2.

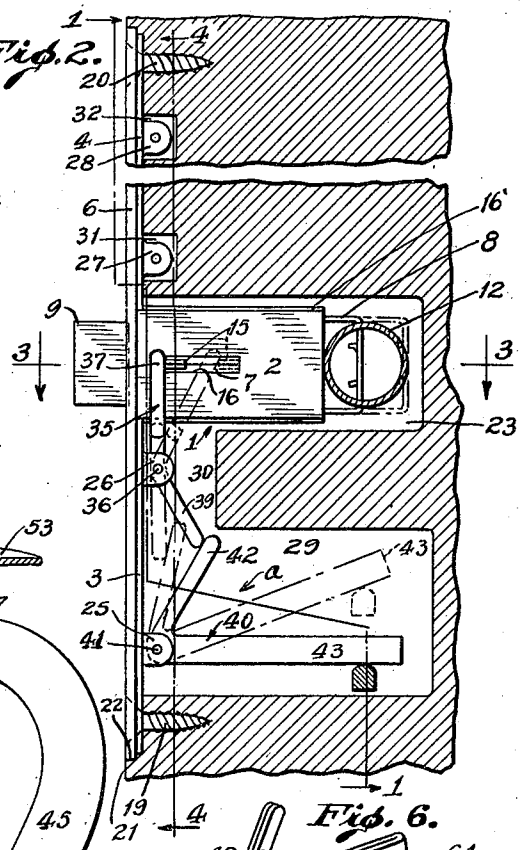


Fig. 4.

Fig. 6.

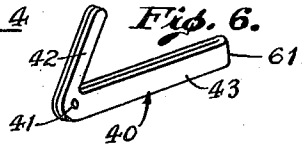


Fig. 3.

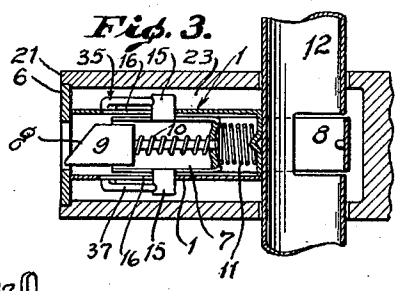


Fig. 5.

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DOOR LATCH OPERATING MEANS

Original Filed Feb. 19, 1927 2 Sheets-Sheet 2

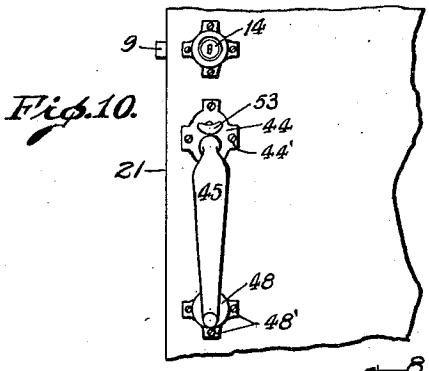


Fig. 10.

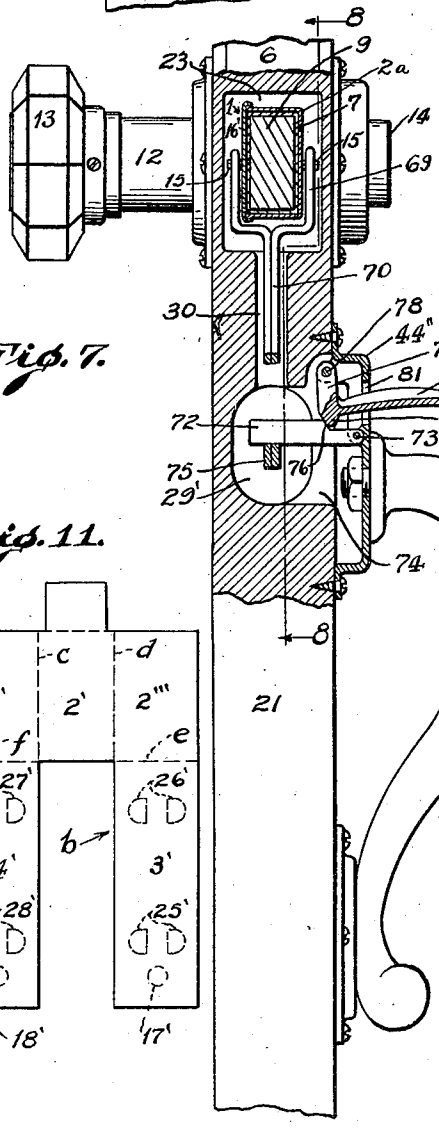


Fig. 7.

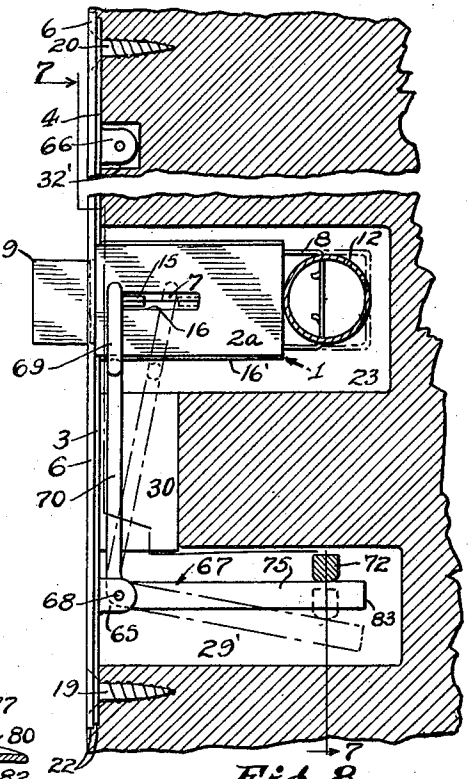


Fig. 8.

Fig. 11.

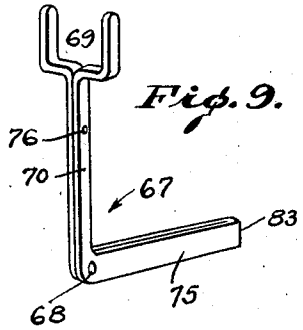


Fig. 9.

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UNITED STATES PATENT OFFICE

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DOOR-LATCH-OPERATING MEANS

Application filed February 19, 1927, Serial No. 169,484. Renewed April 8, 1929.

This invention relates to door latch operating means, and more particularly to means for operating the latch of a front door.

An object of my invention is to provide a simple and inexpensive operating means particularly useful for withdrawing the latch bolt of the latch shown in my copending application executed February 1, 1927, Serial No. 166,431, filed February 7, 1927.

An object is to provide a novel latch operating means which may be easily and quickly reversed so as to adapt the latch and operating means, without removing or reversing any of the enclosed working parts of the latch, to be applied to doors that are hinged to swing in different directions.

Another object is to provide a novel latch operating means of the character stated which may be produced by sheet metal stampings and used in connection with standard front door handles and thumb levers or latches.

An object is to provide a latch and novel handle and thumb latch operating means therefor which may be assembled in doors of a narrower thickness than has heretofore been used for door latches having handle and thumb latch operating means.

A feature of the invention is that by the addition, of a few inexpensive parts, to a standard night latch a handle and thumb latch operating means which is standard for front doors may be easily, quickly and cheaply provided.

A further feature of the invention resides in the provision of novel means whereby handle and thumb latch operating means may be used to retract the latch bolt, without or independent of, knob spindles.

Features of invention reside in the parts and combinations of parts more specifically hereinafter referred to.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detail description and the appended claims.

The accompanying drawings illustrate the invention in the forms I at present deem preferable.

Figure 1 is a fragmental edge view of a front door with a latch and operating means constructed in accordance with my invention. Parts are broken away to show interior construction along a plane indicated by irregular line 1—1, Fig. 2.

Fig. 2 is a vertical section taken on irregular line 2—2, Fig. 1, showing in dotted lines the position of the parts when the latch bolt is retracted by the thumb latch operated mechanism.

Fig. 3 is a horizontal section taken on line 3—3, Fig. 2, with the usual door rosettes removed.

Fig. 4 is a detail end view of the outer housing, showing the inner side of the latch operating means supporting flanges.

Fig. 5 is a perspective detail view of the latch engaging lever shown in Figs. 1 and 2.

Fig. 6 is a perspective detail view of the bell crank lever shown in Fig. 2.

Fig. 7 is a fragmentary edge view partly in section of a door with a latch and operating means embodying a modified form of my invention.

Fig. 8 is a vertical section taken on irregular line 8—8, Fig. 7, showing in dotted lines the position of the parts when the latch bolt is retracted by the thumb latch operating mechanism.

Fig. 9 is a perspective detail view of the latch engaging lever shown in Figs. 7 and 8.

Fig. 10 is a fragmentary outside view on a reduced scale of a door equipped with a latch operating mechanism constructed in accordance with my invention.

Fig. 11 is a view of the blank from which the outer or guide housing and the latch operating means supporting flanges are formed.

In the drawings I have shown a latch 1 which is constructed in accordance with the latch described and claimed in my copending application for combination latch holder and guide executed February 1, 1927, Serial No. 166,431, filed February 7, 1927, and which latch for the sake of brevity will not be herein described in detail, but which includes generally a plate 2 formed with an outer or guide housing 2^a, a lower plate member 3 depending from the lower forward edge of the housing and an upper plate member 4 upstand-

ing from the upper forward edge of the housing; edge plate 6; inner sleeve housing 7 formed with a rearwardly extending yoke 8, latch bolt 9; latch easement spring 10; bolt spring 11; door knob spindle 12 and when the latch is used on a front door a single inside door knob 13 is used as will be more particularly described in my copending application, Serial No. 173,860, filed March 9, 1927. The spindle extends through the yoke 8 and serves to retract the inner housing and latch bolt. An outside door lock 14 is preferably used in the combination, and lugs 15 project outwardly from said inner sleeve housing through longitudinal slots 16 in opposite side walls of the outer housing and cover plate 16′ that is received on the upset edges 1′, 1″.

The flanges 3, 4 are respectively provided with screw holes 17 and 18 which respectively register with screw holes in the edge plate 6 to receive screws 19 and 20 for holding the edge plate 6 and plate members 3, 4 and the latch outer or guide housing 2^a in position in the door. The edge of the door 21 has a countersink 22 cut therein to receive the plate members 3, 4 and the edge plate 6, and the door is mortised as at 23 to receive the latch 1.

Two pairs of lugs 25, 26 are struck up from the plate member 3 and two pairs of lugs 27, 28 are also struck up from the plate member 4. All of said lugs extend inwardly from the plate members 3, 4. The lugs 25 are located the same distance from the central horizontal axis of the latch 1 as the lugs 28 and the lugs 26 are located the same distance from said axis as are the lugs 27. The door is mortised at 29 and 30 below the latch mortise 23 to receive the lugs 25, 26 and the thumb lever or latch operating means *a*, and the door is mortised above the latch mortise 23 as at 31, 32 to receive the lugs 27 and 28.

A latch engaging lever 35 is pivoted at 36 between lugs 26 and is formed with a fork 37 at its upper end to straddle the outer guide housing 2 so that the fork will engage the forward edges of the latch lugs 15 that extend from opposite sides respectively of said housing 2. The lower end 39 of lever 35 extends downwardly and rearwardly at a slight angle in order to engage one end of an intermediate bell crank lever 40 which is pivoted at 41 between the lugs 25.

One arm 42 of lever 40 extends upwardly and inwardly from the inwardly and horizontally extending arm 43 of lever 40.

A handle plate 44 is secured on the outside of door 21 by means of screws 44′ and to which plate 44 the upper end of a door handle 45 is secured by a stud 46 and nut 47. The lower end of handle 45 is connected to a plate 48 that is secured to the door by screws 48′. The plate 44 is formed with a pocket 49 which receives the stud 46 and nut 47 and in the upper end of said pocket a thumb latch or operating lever 50 is pivoted as at 51 above the upper end of handle 45 and which lever 50 comprises a thumb engaging piece 53 formed on the outer end of the crank lever engaging member 54. The thumb piece member 53 extends through an opening 52 provided in plate 44 and member 54 extends into the door through an opening 55 and into the mortise 29 underneath the rear end of the horizontal arm 43 of the intermediate bell crank lever 40. The lever 50 being pivoted to the plate 44 is detachably connected to, and may be removed from, the door when plate 44 is removed therefrom.

In operation of the device shown in Figs. 1–3, a person upon gripping the door handle 45 will place his thumb on thumb piece 53 and with his thumb exert a pressure against, and depress member 53, thereby operating lever 50, so that the rear arm 54 of lever 50 will be swung upward and engage arm 43 of lever 40 swinging said lever 40 counterclockwise which movement will cause arm 42 to engage arm 39 and swing lever 35 clockwise, whereupon the fork 37 of lever 35 will engage and move the lugs 15 and the inner housing rearward into the door and retract the latch bolt 9 which is connected to said inner housing. Upon releasing the pressure on member 53, the latch spring 11 will restore the parts to the normal position shown in full lines Fig. 2 and the latch bolt 9 will be projected from the edge of the door.

An important feature of the invention is that the parts may be produced from sheet metal stampings. The outer or guide housing 2 with its upstanding and depending flanges 3, 4 and lugs 25, 26, 27 and 28 may be formed from a single blank *b*, Fig. 11, that comprises a body portion from which the side wall 2′ of the housing and the top wall 2″ and bottom wall 2‴ of the housing are formed by bending the blank on lines *c* and *d*. The flanges 3′ and 4′ are formed by bending the extensions at the side edges of the blank on lines *e* and *f*. The dotted lines 25′, 26′ 27′ and 28′ indicate the manner and relative positions of the lugs 25, 26, 27 and 28 and the holes 17′ and 18′ receive the screws 19 and 20, respectively. The lever 35 may be stamped from a single piece of sheet material and bent upon itself at its lower end 60 so that the face ends of the material will form the fork 37. The lever 40 may also be formed of a single piece of sheet material bent upon itself at the end 61 of the arm 43.

To reverse the latch for a door swinging in the opposite direction the screws 19 and 20 are removed from the door and then the edge plate 6 and latch 1 with its plate members 3, 4 and the levers 35, 40 pivoted to one of said flanges are removed from the door. The levers 35, 40 are then removed from the lugs 26, 25 and pivoted between the lugs 27 and 28. The latch unit is then reversed or inverted

and replaced in the mortise 23 in the door, thus changing the usual beveled edge *g* of the latch bolt 9 with respect to the door facings. The latch unit is then secured to the door by the screws 19, 20.

In the form of my invention shown in Figs. 7–9 only a single pair of lugs 65 or 66 are struck inwardly from each of the flanges 3, 4, respectively. The lugs 65 fit in the mortise 29′ while the lugs 66 fit in a mortise 32′ in the edge of the door. A right angle bell crank lever 67 is pivoted at 68 to the lugs 65 and comprises a fork 69 formed on the upper end of its vertical arm 70 and said fork straddles the outer housing 2 and engages the lugs 15 of the latch. A cam actuated lever 72 is pivoted at 73 to the inside of a handle plate 44″ and extends through an opening 74 in the door into the mortise 29′ and rests upon the horizontal arm 75 of the bell crank lever 67. The lever 72 is formed with a cam engaging surface 76 which is engaged by a cam 82 formed on a thumb operated lever 77 that is pivoted at 78 to the inside of plate 44″ and is formed with a thumb piece 80 which extends through an opening 81 in plate 44″ over the upper end of the handle 45′.

In operation upon depressing the operating lever 77 the cam 82 engaging the cam surface 76 will depress lever 72 which in turn depresses the arm 75 and swings the lever 67 clockwise, whereupon the fork 69 of lever 67 engages the lugs 15 and retracts the bolt latch 9 as indicated in dotted lines, Fig. 8. Upon releasing the lever 77 the latch spring 11 restores the parts to normal position.

The lever 67 may be stamped out of a single piece of sheet metal and bent upon itself at the end 83 of the lever arm 75 and the ends of the material bent to form the fork 69. A rivet 76 passes through the arm 70 and secures together the pieces forming said arm.

The latch shown in Figs. 7–9 may be reversed to adapt the latch to a door that swings in the opposite direction from that shown, by removing the latch and pivoting the lever 67 to lug 66 instead of lug 65 and then replacing the latch with the lever 67 in the mortise 29′.

The outer or guide housing 2ª shown in Fig. 8 is made from a blank analogous to that shown in Fig. 11 except that only a single pair of lugs is struck up from each flange 3′, 4′ instead of two pairs of lugs.

In the event the latch bolt 9, inner housing 7 and yoke 8 were made in one piece or immovably fixed to each other such parts would be a latch bolt.

I claim:

1. In a door latch comprising a plate formed with an outer housing an upper plate member and a lower plate member; lugs extending inwardly from said plate members; a latch engaging lever pivoted to the lugs on one of said plate members; and means for operating said latch lever to retract the latch.

2. In a door latch comprising a plate formed with plate members extending upward and downward respectively; lugs extending from said plate members; a latch engaging lever pivoted to the lugs on one of said plate members; and means for swinging said latch engaging lever to retract said latch.

3. In a door latch comprising a latch bolt; a plate, lugs extending from said plate; a latch engaging lever pivoted to said plate and adapted to engage said latch bolt; and means for operating said latch engaging lever to retract said latch bolt.

4. In a door latch having a latch bolt, a thumb operated lever; a latch engaging lever engaging said latch bolt; and means interposed between said thumb operated lever and said latch engaging lever for operating the latch engaging lever when said thumb operated lever is depressed to retract said latch bolt.

5. In a door latch, a thumb lever adapted to be depressed by the operator's thumb; a cam on said thumb lever; a cam actuated lever formed with a cam surface to be engaged by the cam on said thumb lever; and means actuated by said cam-actuated lever for retracting the latch.

6. In a door latch having a latch bolt provided with lugs projecting from opposite sides of said latch bolt; a lever formed with a fork straddling the latch and engaging said lugs on opposite sides of the latch; a thumb lever; and means interposed between said thumb lever and said first mentioned lever for causing said first mentioned lever to retract the latch bolt when the thumb lever is depressed.

7. In a door latch having a latch bolt provided with lugs projecting from opposite sides of the latch bolt; a lever formed with a fork straddling the latch and engaging said lugs on opposite sides of the latch; a thumb lever; and means interposed between said thumb lever and said first mentioned lever for causing said first mentioned lever to retract the latch bolt when the thumb lever is depressed, said first mentioned lever being formed of a single piece of sheet metal bent upon itself at one end with the ends of the material bent to form said fork.

8. In combination with a latch having a latch bolt; a plate adapted to be secured to the edge of a door; a latch engaging lever pivoted to said plate; and means to operate said lever to retract said latch bolt.

9. In a door latch having a latch bolt; a plate adapted to be secured to the edge of a door; a bell crank lever pivoted to said plate, and means to operate said bell crank to retract said latch bolt.

10. In a door latch having a latch bolt; a housing for said latch bolt; a plate extending

from said housing and adapted to be secured to the edge of a door; a bell crank lever engaging said latch bolt; and means to operate said bell crank lever to retract said latch bolt.

11. In a door latch having a latch bolt; a plate formed with members extending respectively above and below said latch bolt; pairs of lugs on each of said plate members, each pair of lugs being spaced from the horizontal axis of said latch bolt the same distance as its corresponding pair on an opposite plate.

12. In a door latch having a latch bolt and a housing in which said latch slides; said housing being formed of a sheet metal stamping comprising a body portion adapted to be bent to form a side, top and bottom wall of said housing; and extensions at the side edges of body portion adapted to be bent to form plates upstanding and depending from the top and bottom walls of said housing.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 12th day of February, 1927.

SPENCER F. WREAD.