June 4, 1946. M. FALK 2,401,559

DOOR LATCH OPERATING MECHANISM

Filed Nov. 1, 1943

Fig. 1.

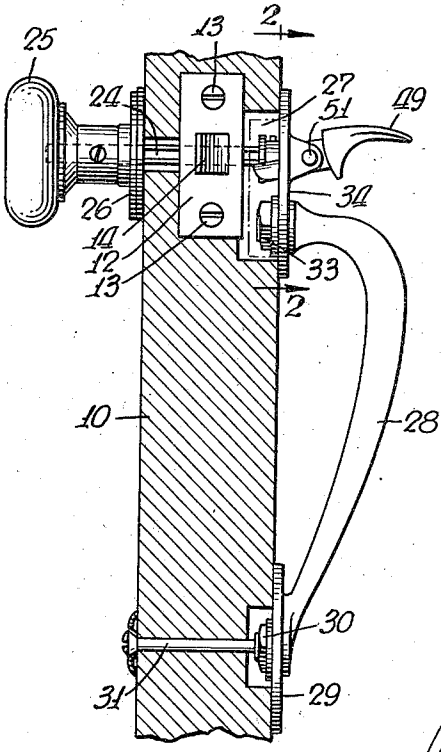


Fig. 2.

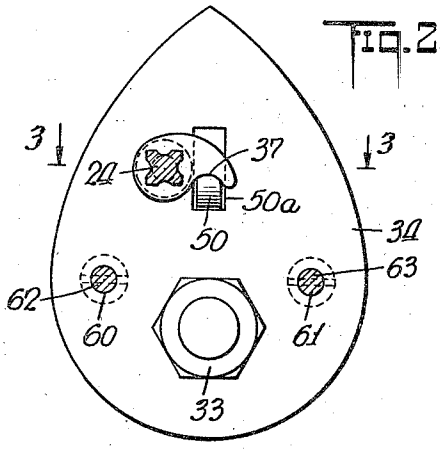


Fig. 3.

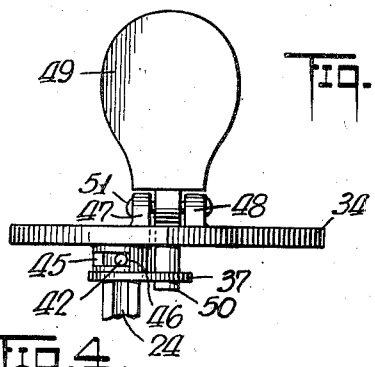


Fig. 4.

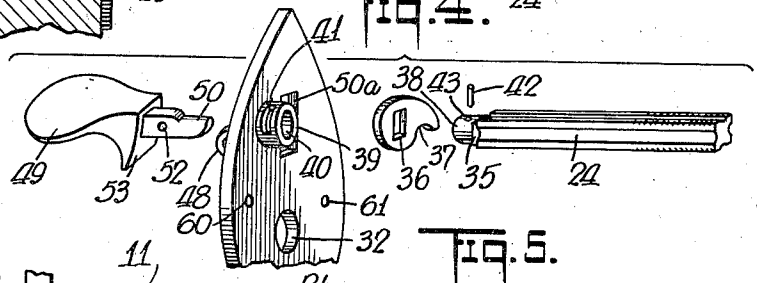
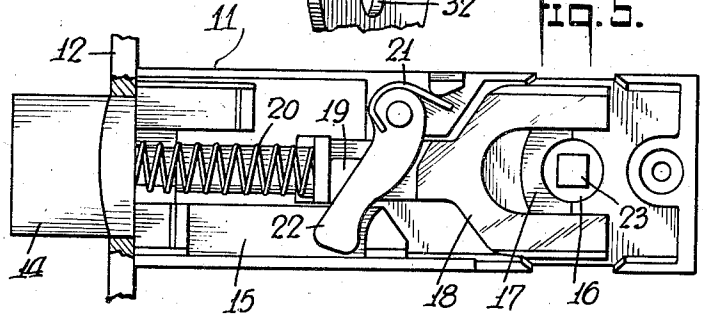


Fig. 5.



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43-241

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DOOR LATCH OPERATING MECHANISM

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Application November 1, 1943, Serial No. 508,454

10 Claims. (Cl. 292—165)

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This invention relates to door latches, and more particularly to latches operable by a thumb depressible lever.

Known to me is the provision of latches for doors in which operation of the latch bolt is effected on one side of the door by a thumb operated lever which is grasped by the fingers of the hand in holding the door handle, so that the same motion of grasping the handle conveniently locates a pivotal thumb operated lever whereby the depression of this lever actuates the latch bolt to withdraw it from engagement with the door strike. In such a mechanism room must be made in the door frame to mount and support linkage levers which occupy substantial space, all of which require considerable morticing operations in order to fit this mechanism into position on the door frame.

Recently I have developed a door latch which fits within a substantially tubular casing and which may be fitted on the door edge by simple boring operations. This form of latch, claimed in my Patent No. 2,293,645 granted August 18, 1942, is actuated by a spindle wherein a relatively small arcuate turning of the operating spindle serves to move the latch bolt for a multiple distance of the linkage actuated by the retractor to which the spindle is connected. This form of latch has heretofore been operated by door knobs extending to either face of the door and connected to the latch bolt operating spindle.

In accordance with my invention it is contemplated by me to provide a latch bolt operating mechanism wherein movement of the latch bolt is effected by a thumb operable lever which transmits the movement of the lever to the rotatable spindle to retract the latch bolt.

It is a further object of my invention to provide a door latch in which the latch bolt is retracted by a thumb operated lever to transmit the pivotal movement of the thumb operated lever to the rotatable spindle for actuating the latch bolt and to provide mounting means for the same substantially in the same plane as the spindle which operates the latch bolt.

A still further object of my invention resides in the provision of a latch bolt in which the latch bolt is manipulated on one side of the door by a thumb operable pivotal lever and which carries forward simplicity of construction and compactness of parts, requiring the minimum of fitting operations such as in morticing the door, while still providing efficient actuation and a compact and neat assembly.

To attain these objects as may appear herein

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or be hereinafter pointed out, I make reference to the accompanying drawing forming a part hereof, in which

Figure 1 is a fragmentary longitudinal sectional view showing my latch operating mechanism;

Figure 2 is a section taken on the line 2—2 of Figure 1;

Figure 3 is a fragmentary plan view taken in the direction of the line 3—3 of Figure 2;

Figure 4 is an exploded perspective view of the essential elements entering into the latch operating mechanism;

Figure 5 is a longitudinal view of the latch bolt casing with one cover removed to expose the operating parts.

Making reference to the drawing, there is shown a fragmentary portion of a door 10 viewed edgewise in which is mounted a latch casing 11 held in position by a plate 12 employing screws 13 which engage the door edge. From an orifice in the plate a latch bolt 14 projects as part of the shank 15 and which is arranged to be retracted by the hub 16 carrying the retractor 17 actuating the link 18 for slidable movement. The link 18 is formed with a camming portion 19 engaging the pivoted lever which has on one end a leaf spring 21 and on the other end a finger 22 adapted to engage the shank 15. A spring 20 normally projects the latch bolt 14 outwardly. Rotation of the hub 16 draws with it the link 18 to pivot the finger 22 and withdraw the latch bolt for a multiple distance of movement of the link 18. This construction is more particularly described and claimed in my prior patent aforementioned.

The hub 16 is provided with a keying orifice 23 through which a spindle 24 passes and is operated by the inner door knob 25 to one side of the escutcheon plate 26. The opposite end of the spindle 26 is arranged to project within a morticed opening 27 formed on the outer door surface. It is contemplated by me to have my mechanism include a door handle 28, the lower edge of which terminates on the plate 29, being held by the nut 30 and affixed against displacement by the headed bolt 31. The handle 28 has its upper end portion passing through the orifice 32 and bolted at 33 to the plate 34 in which the orifice 32 is formed. The plate 34 serves as an escutcheon covering the morticed opening 27 previously described.

The spindle 24 has a free end which extends into the morticed opening 27, formed with a squared keying shoulder 35 arranged to fit into the correspondingly shaped opening 36 of the laterally projecting finger plate 37. The extreme

free end of the spindle 24 is formed with a cylindrical section 38 arranged to rotatably move within the boss 39 extending from the rear surface of the plate 34 and within the bearing orifice 40 formed therein. Assembly is effected by mounting the finger plate 37 to fit upon the shoulder portion 35; thereupon the cylindrical section 38 is directed into the bearing 40 of the stud 39. In this position the cross pin 42 is projected through the arcuate slot 41 to engage the transverse orifice 43 formed through the cylindrical portion 38 of the spindle 24. The pin 42 is permitted to project into the slot 41. The slot 41 has stops 45 and 46 to limit the rotational movement of the spindle 24 in a manner which will be readily understood.

The front face of the plate 34 is formed with ears 47 and 48 for mounting the thumb operable lever 49, which is formed with a finger 50 passing through the opening 50*a* formed in close adjacency to the stud 39. The cross pin 51, passing through the hole 52 and the ears 47 and 48, serves to mount the thumb operable lever 49 upon the plate 34. An extension tongue 53 formed on the lever 49 is arranged to abut the front face of the plate 34, thereby to limit the pivotal movement of the thumb operable lever upon the plate in a manner readily understood. The finger 50 in projecting through the orifice 50*a* engages the laterally projecting extension finger 37 carried by the spindle 24 in its bearing 40.

Normally the springs 20 and 21 serve to project the latch bolt 14 and act upon the camming member 19 to draw the slidable link 18 forwardly. These act against the retractor 17 to hold the hub 16 in the normal position resiliently. Thus the hub, by reason of the resilient pressure exerted against the retractor 17, tends to return to its normal position shown in Figure 5.

Depression of the thumb operable lever 49 when the hand grasps the handle 28 tilts the finger 50 upwardly, engaging the laterally extending finger 37 to rotate through this medium the spindle 24 and in turn to rotate the hub 16 through which the spindle 24 passes in its engagement with the keying orifice 23. This, in effect, will cause retraction of the latch bolt 14 in a manner readily understood by reference to my patent previously mentioned. Release of the thumb operable lever 49 puts into play the projection springs 20 and 21 previously mentioned and upon the link 18 to restore the retractor 17 to its normal position.

The relative location of the stud 39 and the bearing 40 which it provides for the cylindrical section 38 of the spindle 24 makes for a compact arrangement of the door latch operating mechanism, all fitting readily within the morticed opening formed in the door, and locates the pivot between the ears 47 and 48 substantially in the horizontal plane of the spindle 24.

The tongue 53 and the pin 42 which is disposed to project within the slot 41 cooperates with the stops 45 and 46 to limit the pivotal movement of the thumb operable lever 49, assuring against operable displacement of the parts in relation to each other.

By the construction described I have shown a latch operating mechanism wherein the retraction of the latch bolt is effected by a thumb operable lever providing an inexpensive and compact assembly, wherein the thumb operable lever and the mechanism carried thereby is disposed in close adjacency to the latch bolt operating spindle projecting through the latch casing. It will be observed that while I have described and illustrated my invention in a specific form, the scope of my invention is to be measured by the appended claims forming a part hereof.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. A latch construction for doors comprising a casing, a latch bolt reciprocably mounted therein, a handle adapted to be mounted on the outside of the door and having a supporting plate at one end thereof, a latch lever pivotally mounted on said plate, a spindle having one end rotatably carried by the plate and projecting into the casing, means operatively connecting said spindle to the latch bolt, and means operatively connecting said latch lever to the spindle whereby pivotal movement of the former effects rotation of the latter, the pivot of said latch lever lying substantially in the same horizontal plane as the axis of the spindle, and said last-named connecting means being disposed between the plate and the latch casing.

2. A latch construction for doors comprising a casing, a latch bolt reciprocably mounted therein, a handle adapted to be mounted on the outside of the door and having a supporting plate at one end thereof, a latch lever pivotally mounted on said plate, a spindle having one end rotatably carried by the plate and projecting into the casing, and means operatively connecting said spindle to the latch bolt, said latch lever having a rearwardly projecting portion adjacent the spindle and the latter having a laterally projecting part engaged with such portion for operation thereby, and said part being disposed between the plate and the latch casing.

3. A latch construction for doors comprising a casing, a latch bolt reciprocably mounted therein, a handle adapted to be mounted on the outside of the door and having a supporting plate at one end thereof, a latch lever pivotally mounted on said plate, a spindle endwisely connected thereto and rotatably carried by the plate and projecting into the casing, and means operatively connecting said spindle to the latch bolt, said latch lever having a contacting finger portion projecting rearwardly of the pivot closely beside the spindle and the latter having a laterally projecting member directly engaged by said contacting portion of the lever.

4. In combination with a door latch having a bolt, a door handle and mounting therefor including a plate at the upper end of the handle, a latch lever, means for pivotally mounting said lever on said plate with the pivot disposed to one side of the plate, a spindle operatively connected with the bolt and having one end rotatably carried by the plate, said mounting means comprising projecting flanges on a face of the plate between which said lever extends, and a bearing supporting said end of the spindle, an arm carried by the lever, and means on the spindle with which said arm is directly engaged to operate the spindle.

5. In combination with a door latch having a bolt, a door handle and mounting therefor including a plate at the upper end of the handle, a latch lever, means for pivotally mounting said lever on said plate with the pivot disposed to one side of the plate, a spindle operatively connected with the bolt and having one end rotatably carried by the plate, said mounting means comprising projecting flanges on a face of the plate which supports said spindle, an arm on the lever, and a laterally projecting extension on the spindle

engaged by said arm to effect rotation of the spindle upon pivotal movement of the lever.

6. In combination with a door latch having a casing and a bolt therein, a door handle and mounting therefor including a plate at the upper end of the handle, a latch lever, means for pivotally mounting said lever on said plate with the pivot disposed to one side of the plate, a spindle operatively connected with the bolt and having one end rotatably carried by the plate, and means, disposed exteriorly of the casing, operatively connecting the latch lever with the spindle, and the pivot of said lever lying in substantially the same plane as the axis of said spindle.

7. A latch construction for doors, comprising a casing, a latch bolt reciprocably mounted therein, a handle adapted to be mounted on the outside of the door and having a supporting plate at one end thereof, a spindle operatively connected with the latch bolt and projecting from the casing toward said plate, a latch lever pivoted to the plate in substantially horizontal alignment with said spindle, an arm on the lever, and means on the projecting end of the spindle with which said arm is engaged to effect rotation of the spindle upon pivotal movement of the lever, said arm extending beyond the end of the spindle and being disposed closely adjacent the side of the spindle.

8. In a spring projected latch bolt having a retractor, the combination therewith of a spindle assembly for actuating the retractor of said latch bolt comprising a plate, an extension providing a bearing on one side of said plate for receiving said spindle for rotatable mounting thereon and having means for connecting the spindle to said extension endwisely, a thumb operable lever having a finger portion arranged to lie substantially in parallelism with said spindle and projecting through said plate, and a lateral extension mounted on said spindle directly in the path of said finger portion whereby direct rotation may be transmitted to said spindle upon actuation of said lever.

9. In a spring projected latch bolt having a retractor, the combination therewith of a spindle for actuating the retractor having a cylindrical end portion, a plate having a bearing to receive said end portion and means for endwisely connecting the same thereto, a thumb operable lever on the front face of said plate having a finger entering said plate and extending substantially parallel to said spindle, an extension portion on said spindle for direct contacting engagement with said finger to rotate the spindle.

10. In a spring projected latch bolt having a retractor, the combination therewith of a spindle for actuating the retractor having a cylindrical end portion, a plate having a bearing to receive said end portion, a thumb operable lever on the front face of said plate having a finger entering said plate and extending substantially parallel to said spindle, an extension portion on said spindle for engagement with said finger to rotate the spindle, and means for limiting the rotational movement of said spindle to assure operative position of said finger and extension portion without displacement from each other.

MORRIS FALK.