

Aug. 19, 1958

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2,848,263

SILENT DOOR LATCH

Filed Sept. 30, 1954

2 Sheets-Sheet 1

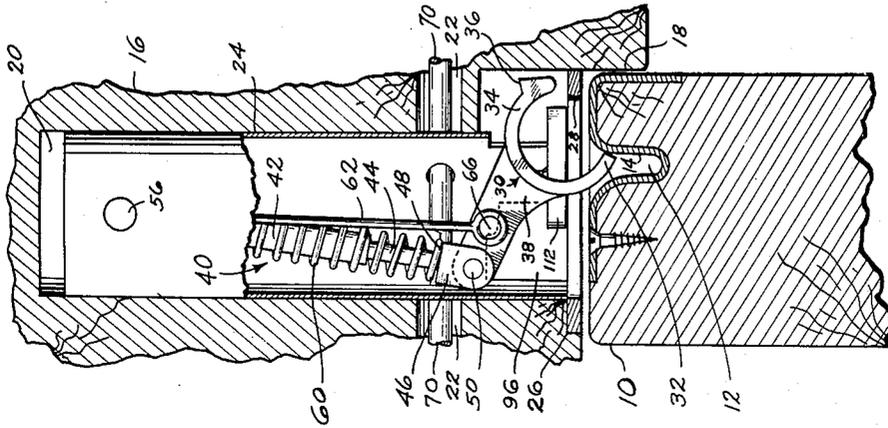


Fig. 3.

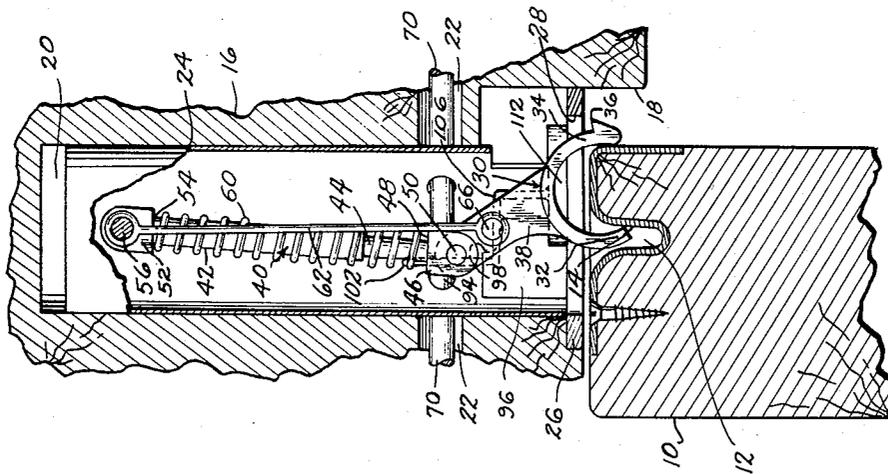


Fig. 2.

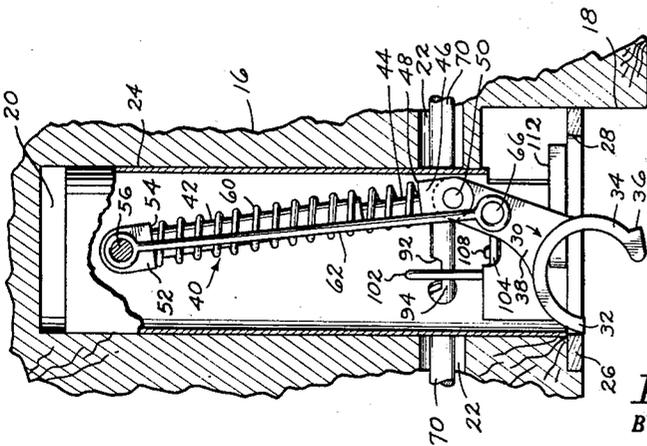


Fig. 1.

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2 Sheets-Sheet 2

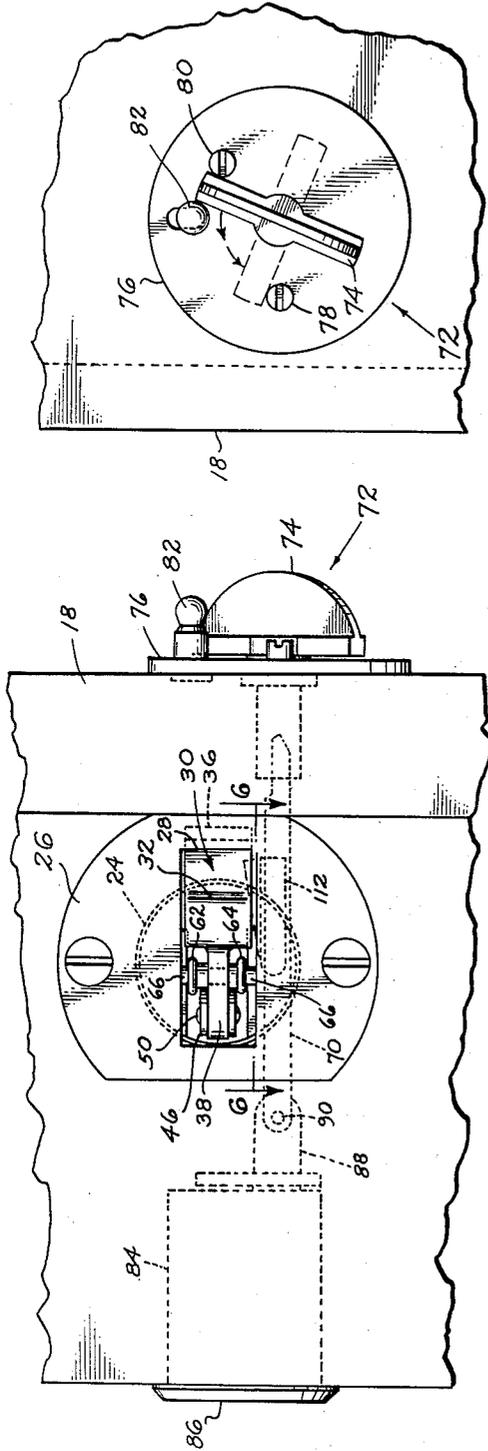


Fig. 4.

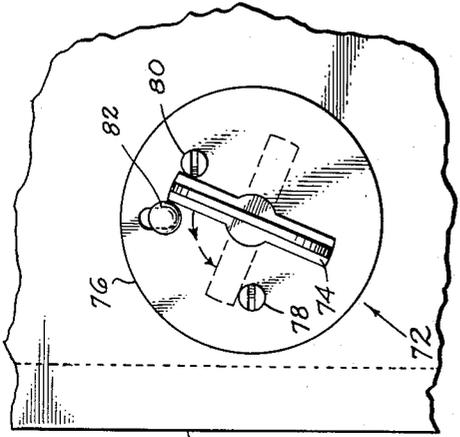


Fig. 5.

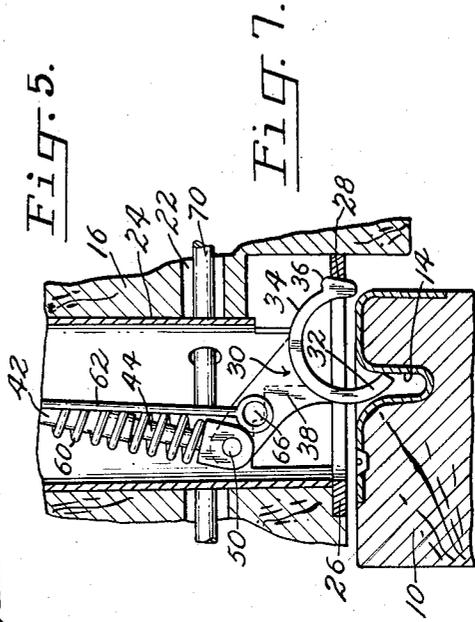


Fig. 6.

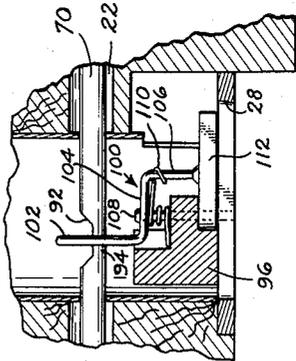


Fig. 7.

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SILENT DOOR LATCH

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7 Claims. (Cl. 292-78)

This invention relates to a latch for releasably interlocking two relatively swingable members, particularly a door and its frame.

It is a primary object of this invention to provide a door latch which is silent in operation, eliminating the possibility of slamming the door.

It is another object of this invention to provide a door latch which holds the door securely from rattling.

It is another object of this invention to provide a door latch which is easy to install, since it does not require a special mortising operation.

It is another object of this invention to provide a door latch which has a positive grip and large throw.

Another object of this invention is to provide a door latch which holds the door securely against the weatherstripping.

Still another object of this invention is to provide a door latch which may be opened and shut without the necessity of turning a knob.

The manner in which the foregoing and other objects of this invention are accomplished will be apparent from the accompanying specification and claims, considered together with the drawings, wherein:

Figure 1 is a longitudinal sectional view of the presently described door latch in the position assumed when the door is open;

Figure 2 is a view similar to Figure 1, illustrating an intermediate position of the latch after contact by the door;

Figure 3 is a view similar to that of Figures 1 and 2, but illustrating the latch in its closed position;

Figure 4 is an end elevation of the presently described latch and its associated locking assembly;

Figure 5 is a detail view in end elevation of a lock control positioned inside of the building in which the latch is used;

Figure 6 is a detail view taken along the line 6-6 of Figure 4, of a locking means which may be used in conjunction with the presently described latch; and

Figure 7 is a fragmentary view similar to Figure 1 and illustrating the position of the latch intermediate the positions shown in Figures 2 and 3.

The latch of the present invention is designed for use in releasably holding together a pair of relatively swingable members, for example a door and its casing. Thus, as is illustrated particularly in Figures 1 to 3, the latch may be employed with a door 10, the forward edge of which is provided with a recess 12 preferably defined by a wear plate 14. Such a plate is easily installed and eliminates the cumbersome latch mechanism normally required by the conventional door. In most installations, however, a knob, not illustrated, should be provided on the outside surface of the door.

The door hangs in a casing or frame 16 of conventional construction which includes the stop strip 18. The latch is installed in the casing by making a longitudinal opening 20 substantially opposite recess 12 on the door edge, and a transverse opening 22 which inter-

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cepts the lower portion of opening 20. Opening 20 is dimensioned for the reception of the latch mechanism, and opening 22 for the reception of the locking mechanism. Both openings obviously may be made by simple boring operations.

The latch mechanism comprises a housing or casing 24 which preferably is cylindrical and to the outer end of which is connected the perforated face plate 26. An edge 28 of the perforation in the face plate is inwardly bevelled for reasons which will appear hereinafter.

A yoke shaped latch member, indicated generally at 30, is mounted for movement within casing 24. The legs 32, 34 of the yoke are extendable out of the perforation in face plate 26, leg 32 being dimensioned for insertion in recess 12 in the door, with the end of the leg abutting against a sidewall of the recess as is particularly apparent from Figure 3. Leg 34 of the yoke carries a projection 36 which is engageable with the edge surface of face plate 26 defined in part by bevelled surface 28 of the perforation therein, the edge surface acting as a stop means for temporarily interrupting the movement of the latch.

Suitable means are employed for securing the oscillation of latch member 30 between unlatched and latched positions. In the illustrated embodiment toggle means are employed for this purpose. The toggle unit includes the arm 38 which is rigidly attached to the central portion of latch member 30. The other toggle arm 40 is extendable and comprises two telescoping sections, i. e. the outer cylindrical section 42 and the inner rod shaped section 44.

Section 44 of toggle arm 40 is provided with a head 46 of enlarged cross section to provide the shoulder 48. It is pivotally connected to arm 38 by means of a pivot pin 50. Cylindrical section 42 of toggle arm 40 is formed with the base portion 52 of enlarged cross section, thereby forming the shoulder 54.

To permit proper oscillation of latch member 30, the toggle assembly is pivotally mounted on the casing, such mounting being achieved by means of pin 56 penetrating the sidewall of the casing 24 and base 52.

Resilient means are applied to the toggle unit for maintaining it normally in its angled position. This, in turn, maintains the yoke shaped member 30 normally in its operative latched or unlatched positions. In the illustrated embodiment, the resilient toggle means comprises a compression spring 60 encircling toggle arm 40 and pressing against shoulders 48, 54. This tends to extend telescoping section 44 which, in turn, acts as a piston, angling the toggle joint.

Further to control the action of the toggle and accordingly of latch member 30, substantially rigid link members 62, 64 are provided. The outer ends of these are pivotally mounted centrally of toggle arm 38 by means of pin 66. Their inner ends are pivotally attached to a frame member, conveniently by means of pin 56 which mounts section 42 of toggle arm 40.

Lock means are also provided for locking the assembly in latched position. The illustrated lock means comprises a shaft 70 extending through opening 22 in the door framing members and through registering openings in casing 24 of the latch assembly. Shaft 70 is connected at its inner end to a handle assembly 72 including the handle 74 and face plate 76 (Figure 4). Mounted on the face plate are the stops 78, 80 and the slidable lock button 82 (Figure 5).

At its outer end shaft 70 is connected to a tumbler or other lock assembly 84, provided with the face plate 86 and the arm 88 which is connected to shaft 70 through pin 90. Arm 88 is connected to the mechanism of the lock in such a manner that when a key is inserted into

the same, rotation of the key rotates arm 88 and hence shaft 70.

Arm 70 is notched at 92 to provide a cam surface 94. This, in turn, is used to actuate the member by which the latch is locked in place.

As is particularly apparent from Figure 6, there is mounted on the inner side of face plate 26 a block 96 having an angular shoulder 98. A lever arm or crank 100 formed in three sections 102, 104, 106, is pivotally mounted on a pin 108 which extends through block 96 and into the face plate 26. A grasshopper spring 110, or other suitable resilient means, is mounted on this crank assembly for maintaining inner section 102 of the crank normally bearing against the cam surface 94.

The outer section 106 of crank 100 bears against the under side of a locking finger 112 (Figure 6) which is mounted pivotally at its inner end on pin 108. The outer end of the locking finger is adapted to be pivoted between a depressed position below the path of travel of arm 34 and an elevated position in which it intercepts the path of travel of arm 34. Thus it will be seen that when section 102 of crank 100 rests within notch 92 of shaft 70, locking finger 112 will be rotated by crank 100 to elevated position and will engage arm 34 of the latch member and prevent movement of the latch to its unlatched position. However, with rotation of shaft 70 until cam surface 94 elevates section 102 of crank 100, correspondingly depressing section 106 thereof, lock finger 112 will be rotated by gravity to its depressed position at which latch member 30 will clear it readily, thereby permitting movement of the latch member to its unlatched position.

The manner of operation of the presently described latch will be apparent from a consideration of Figures 1, 2 and 3. In Figure 1 the latch is shown in its open position ready for engagement by the door. During normal closing, the door pivots the latch 30 about pivot pin 66 until pin 50 moves over center from the side shown in Figure 1, whereupon spring 60 causes latch 30 to snap quickly to the position shown in Figure 3, wherein leg 32 abuts firmly against the wear plate 14 and holds the door securely against the stop strip 18.

On the other hand, when the door is slammed shut it carries the latch 30 and pivot pin 66 laterally toward the stop strip 18 sufficiently to cause the projection 36 to engage the edge 28 of face plate 26, as shown in Figure 2, whereby temporarily to interrupt the closing of the door and to prevent slamming of the latter against the stop strip 18. Spring 60 then urges further counterclockwise rotation of the pin 50 about pin 66 (Figure 2) whereupon the projection 36 slides past the edge 28 (Figure 7) by a slight opening movement of the door, and leg 32 then firmly engages wear plate 14 to effect final closing of the door.

Normally the door may be opened by the application of pressure on the inside, or by pulling from the outside. However, if it is desired to lock the door, handle 74 (Figure 4) is turned until arm 102 of crank 100 nests in recess 92 of shaft 70. In this position, locking finger 112 is elevated until it is in the path of travel of yoke section 34. This prevents movement of the yoke section to its unlatched position until shaft 70 has been rotated at least 90° whereupon cam surface 94 depresses finger 112 until the yoke section clears the same. Shaft 70 may be secured in its locked position from the inside by lock button 82 which bears against handle 74. Then upon release of lock button 82, the shaft may be rotated either by means of handle 74 from the inside, or by means of tumbler lock 84 on the outside of the door.

Hence, it will be apparent that by the present invention I have provided a latch which is silent in operation, since it prevents slamming of the door. In addition, it may be operated without turning a door knob. It may be installed easily without the usual mortising of the

door. Still further, it may be locked securely from the inside or from the outside when this is desired.

It is to be understood that the form of my invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A latch for releasably interlocking two relatively swingable members, one of which has a recess in one of its edge surfaces, the latch comprising: a yoke-shaped latch member dimensioned for entrance of one of its legs into said recess and movable laterally with respect to the other of said relatively swingable members, a toggle member connected at one end to the latch member and comprising a pair of pivotally interconnected arms, a substantially rigid link bar pivotally interconnecting the central portion of one of the toggle arms and the other of said relatively swingable members, pivot means for pivotally mounting the opposite end of the toggle member on the other of said relatively swingable members, and resilient means acting on the toggle member for maintaining the same normally in its angled position.

2. A latch releasably interlocking two relatively swingable members, one of which has a recess in one of its edge surfaces, the latch comprising: a yoke-shaped latch member dimensioned for entrance of one of its legs into said recess and movable laterally with respect to the other of said relatively swingable members, a first toggle arm connected at one end to the yoke member centrally thereof, a second toggle arm pivotally connected at one end to the first toggle arm and at the opposite end to the other of said relatively swingable members, the second toggle arm comprising a pair of telescoping members, a link arm pivotally connecting the central portion of the first toggle arm to the other of said relatively swingable members, and resilient means acting on the toggle members for maintaining the same normally in angled relation to each other.

3. The latch of claim 2 wherein the resilient means comprises a coil spring encircling one section of the telescoping second toggle arm and bearing against the other section thereof.

4. A latch releasably interlocking two relatively swingable members, one of which has a recess in one of its edge surfaces, the latch comprising: a yoke-shaped latch member dimensioned for entrance of one of its legs into said recess and movable laterally with respect to the other of said relatively swingable members, a first toggle arm connected at one end to the yoke member centrally thereof, a second toggle arm pivotally connected at one end to the first toggle arm and at the opposite end to the other of said relatively swingable members, the second toggle arm comprising a pair of telescoping members, a link arm pivotally connecting the central portion of the first toggle arm to the other of said relatively swingable members, resilient means acting on the toggle members for maintaining the same normally in angled relation to each other, and lock means for locking the latch in a predetermined position of the latch member.

5. The latch of claim 4 wherein the lock means comprises a finger positioned for releasable engagement with one of the legs of the latch member.

6. A latch for releasably interlocking two relatively swingable members, one of which has a recess in one of its edge surfaces, the latch comprising: link means of fixed length, pivot means positively interconnecting one end of the link means to the other of said relatively swingable members whereby to prevent longitudinal movement of the link means relative to said other swingable member and to permit movement of the opposite end of said link means laterally with respect to said other relatively swingable member, a yoke-shaped latch member dimensioned for entrance of one of its legs into

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said recess and mounted pivotally on said opposite end of the link means for lateral movement with the latter, and resilient means acting on the latch member for urging the latter to opposite sides of the longitudinal axis of the link means.

7. A latch for releasably interlocking two relatively swingable members, one of which has a recess in one of its edge surfaces, the latch comprising: link means of fixed length mounted pivotally at one end on the other of said relatively swingable members for movement of the opposite end of said link means laterally with respect to said other relatively swingable member, a yoke-shaped latch member dimensioned for entrance of one of its legs into said recess and mounted pivotally on said opposite end of the link means for lateral movement with the latter, resilient means acting on the latch member for urging

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the latter to opposite sides of the longitudinal axis of the link means, and stop means positioned for engaging the other leg of the latch member when the latch member is moved laterally upon engagement of the said one swingable member, temporarily interrupting the movement of the latch member.

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