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2,325,225

REFRIGERATOR LATCH

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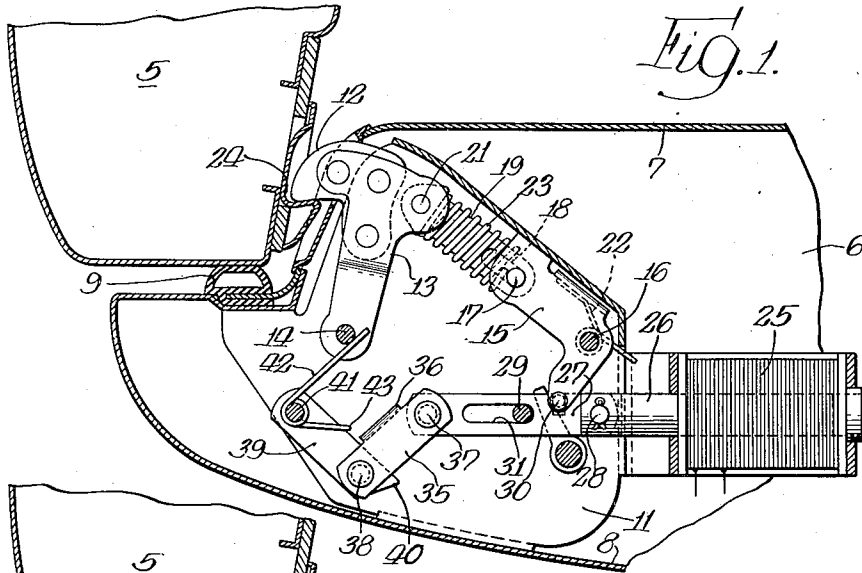


Fig. 1.

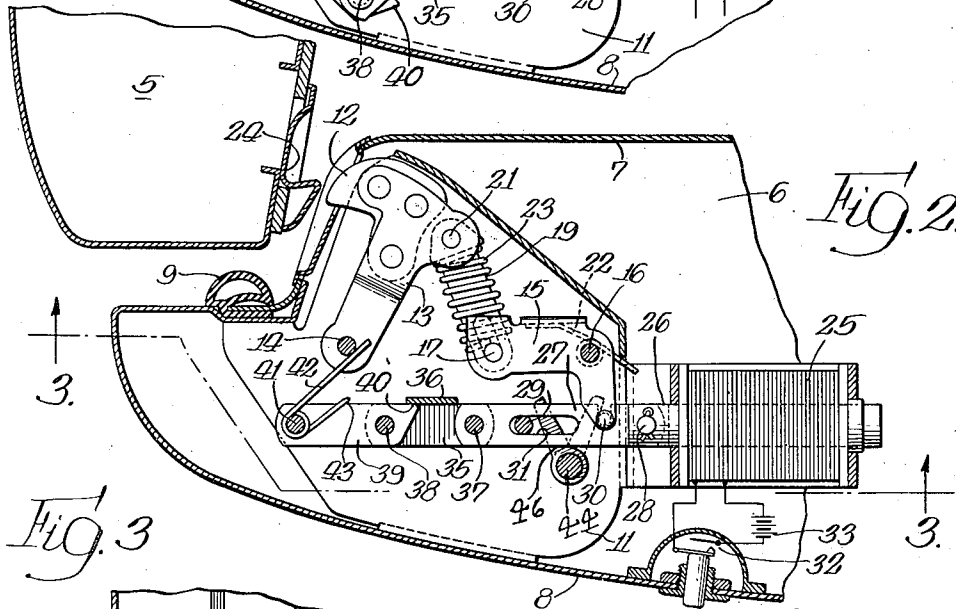


Fig. 2.

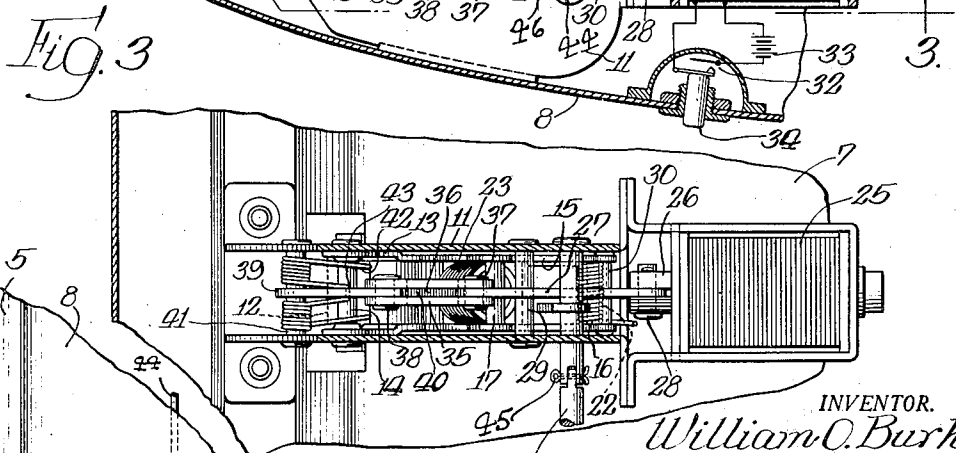


Fig. 3.

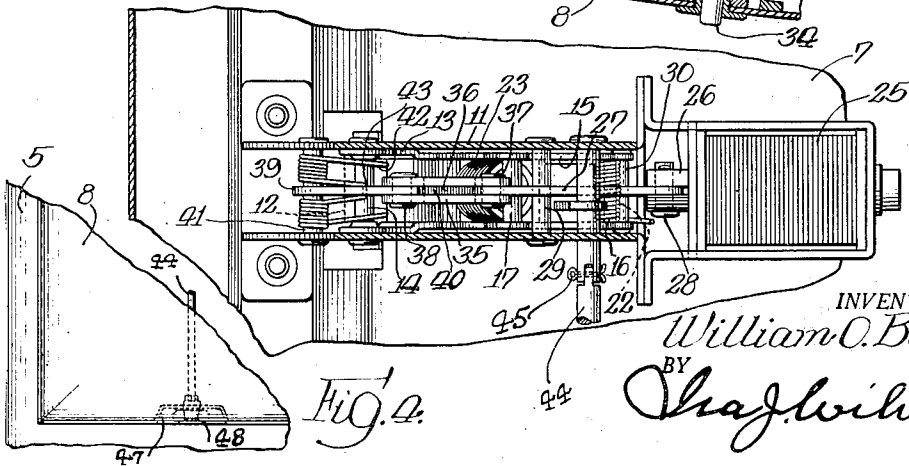


Fig. 4.

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REFRIGERATOR LATCH

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6 Claims. (Cl. 292—123)

This invention relates in general to latches, and the embodiment here disclosed is designed particularly for installation on the door of a refrigerator cabinet for latching the door in closed position.

One of the purposes of the invention is to provide an operating means for the latch bolt which can be operated by the mere closing of an electric switch for retracting the latch bolt to release the door.

Another purpose is to provide a latch of this character which will be free from mechanically induced noises and, therefore, silent in its operation.

A further purpose is to provide an emergency latch release for use in the event of electric current failure.

For the purpose of facilitating an understanding of my invention, I have illustrated on the accompanying drawing a preferred embodiment thereof.

Referring to the drawing,

Fig. 1 is a fragmentary transverse sectional view through a refrigerator door equipped with a latch embodying my invention;

Fig. 2 is a similar view showing the position of the parts when the latch bolt is in retracted position;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2, and

Fig. 4 is a fragmentary elevation of a corner of the door showing the manually operable releasing rod.

Referring to the drawing more in detail, reference character 5 indicates generally a door jamb of a refrigerator cabinet against which the door 6 comprising the inner wall 7 and the outer wall 8 is adapted to close. Air leakage around the door is prevented by the usual sealing strip 9.

The latch proper, which is mounted within the confines of the door walls, includes a frame or housing 11 in which the latch bolt, comprising the nose 12 and the body 13, is pivotally mounted on a fixed pintle 14 extending between the housing walls.

A bell-crank lever 15 pivoted upon a similar stationary pintle 16 is provided near one end with a pin 17 extending through a slot 18 formed in the link 19 which is pivoted at 21 to the latch bolt. A coil spring 22 surrounding the pintle 16 and having one end engaged with the bell-crank lever and its other end engaged with the housing, as shown in Figs. 1 and 2, urges the bell-crank lever into the position shown in Fig. 1. An expansion spring 23 surrounding the link 19 and

interposed between the latch bolt and the pin 17 normally urges the bolt into the projected position shown in Fig. 1 to cause the latch bolt nose to latchingly engage with the keeper 24 mounted on the door jamb.

For the purpose of actuating the bell-crank lever to retract the bolt from the latching position of Fig. 1 to the released position of Fig. 2, my invention contemplates the employment of an electromagnet 25 comprising a reciprocatory core 26. To the outer end of this core a bar 27 is connected by means of a pin 28, and the bar is guided in its reciprocatory movements with the core by a guide pin 29 extending through a slot 31 in the bar. The bar is connected to the bell-crank lever 15 by a pin 30 carried by the bell-crank and engaged in a notch or recess formed in one edge of the bar.

The electromagnet is energized to retract the latch bolt from the position of Fig. 1 to that of Fig. 2 by the closing of a switch 32 in an electric circuit which includes the solenoid of the electromagnet and a source of electric current 33. The switch may be actuated to close the circuit and thereby energize the electromagnet by simply pressing inwardly a push button 34 which may be mounted so as to be accessible in any convenient location on the outer face of the door, or upon the door jamb or any other convenient location.

Upon the closing of the switch 32 by manipulation of the push button, the electromagnet forcibly actuates the magnet core 26 from the position of Fig. 1 to that of Fig. 2, thereby retracting the bolt. To obviate noisiness, such as would result from the forcible impact of slot 31 against the pin 29 by which the movement of the magnet core would be limited were no other provision made, I have provided means for limiting the movement of the core, which in itself is noiseless and serves to eliminate the noises which would otherwise be produced.

With this end in view, a link 35 consisting of two legs connected by an integral cross-piece 36 straddles the outer end of bar 27 and is pivoted thereto by a pin 37. The other end of this link is connected by a pin 38 with a link 39 which in turn is pivoted upon a fixed pintle 41 disposed substantially in line with the core of the magnet. A spring 42, mounted upon the pintle 41 with a central loop 43 engaging the link 39 and its ends anchored beneath the pin 14, normally urges the links into the position shown in Fig. 1 with the magnet core extended and the latch bolt in latching position. Upon retraction

of the magnet core from the position of Fig. 1 to that of Fig. 2 by energization of the magnet to thereby retract the latch bolt, the links 35 and 39 are drawn into a straight line position and serve as a limiting stop to noiselessly limit the retractive movement of the magnet core. To insure against accidental overthrow of the pivotally connected links past dead center position, the link 39 is provided with an extension or nose 40 positioned to engage with the cross-piece member 36, as shown in Fig. 2, whereby movement of the link past dead center position is prohibited.

For emergency use in the event of electric current failure, I have provided manually operable mechanical means for releasing the latch to permit opening of the door. This means comprises a rotatable rod 44 extending vertically within the door structure and jointed at 45 to facilitate assembly. An arm 46 is fixed on the rod in position to engage the pin 30 of the bell-crank lever and swing said lever to latch releasing position upon rotation of the rod in a clockwise direction from full to dotted line position, as illustrated in Fig. 2.

Rotation of the rod to release the latch bolt may be effected by grasping and turning the wing-nut shaped handle 48 (Fig. 4) fixed on the lower end of the rod and located in an open bottomed recess 47 provided in the bottom of the door.

It will be apparent from the foregoing that I have provided an electrically operated latch in which the latch bolt is retracted to release the door upon the simple manipulation of an electric push button or other preferred type of switch. The movements of the parts are cushioned and limited by the toggle joint action which affords a positive stop without the production of mechanical noises. The latch includes a mechanical operating mechanism for emergency use. The entire assembly is simple in construction and economical to manufacture, and is reliable and durable in operation.

The structural details illustrated may obviously be considerably varied without exceeding the scope of the invention as defined in the following claims.

I claim:

1. In a refrigerator latch, the combination of a pivotally mounted latch bolt, an electromagnet having a movable core, an operative connection including a bell crank lever and a link between said bolt and the core of said magnet whereby said bolt is retracted upon energization of said magnet, and means including a pair of pivotally connected links connected respectively to a fixed pivot and to said core for limiting the operative movement of said magnetic core.

2. In a refrigerator latch, the combination of a latch bolt, an electromagnet having a movable core, a connection through which said bolt is

retracted by movement of the magnet core upon energization of said magnet, a pair of pivotally connected links pivoted respectively to a fixed pivot and to said core for limiting the retractive movements of said core and a spring biasing said links away from a straight line position.

3. In a refrigerator latch, the combination of a pivotally mounted latch bolt, an electromagnet comprising a solenoid and a movable core, a bell-crank lever having one arm connected with the core of said magnet, a link connecting the other arm of said lever with said bolt, a pair of pivotally connected links, one of said links being pivotally mounted on a fixed pintle and the other of said links being pivotally connected with the magnet core, a spring for urging the pivotal connection between said links in one direction, and means for limiting the movement of said pivotal connection in the opposite direction.

4. In a refrigerator latch, the combination of a latch bolt, a bell-crank lever, a link connecting said bolt with one arm of said lever, an electromagnet including a reciprocable core connected with the other arm of said lever, a link pivotally connected to said core, a second link mounted on a fixed pintle, a pivotal connection between said links, a spring for urging the pivotal connection between said links in one direction, and cooperative abutments carried by the respective links for limiting the movement of said pivotal connection in the opposite direction.

5. In a refrigerator latch, the combination of a pivotally mounted latch bolt, a bell-crank lever, a link pivoted to the bolt and slidably connected to the lever, a spring surrounding said link between said bolt and said lever, an electromagnet having a reciprocable core, a bar forming an extension of the magnet core, said bar being pivotally connected with said bell-crank lever, a guide for said bar, a pair of pivotally connected links, one of said links being pivotally connected with said bar and the other of said links being mounted on a fixed pintle, and an abutment carried by one of said links in position to be engaged by the other link to limit the movement of the pivotal connection between said links in one direction.

6. A latch adapted to be mounted in a refrigerator door, comprising a latch bolt, a bell-crank lever, a link connecting said lever and bolt, an electromagnet having a movable core connected to actuate said bell-crank lever, and manual means for actuating said bell-crank lever including an operating rod extending vertically within the confines of the door, a handle fixed on said rod within a recess in the door in position to be accessible from beneath the door, and an arm carried by said rod in position to actuate said bell-crank lever upon rotative movement of said rod.

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