July 24, 1962 R. S. LARSON 3,045,465

REFRIGERATOR LATCH

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Fig. 1.

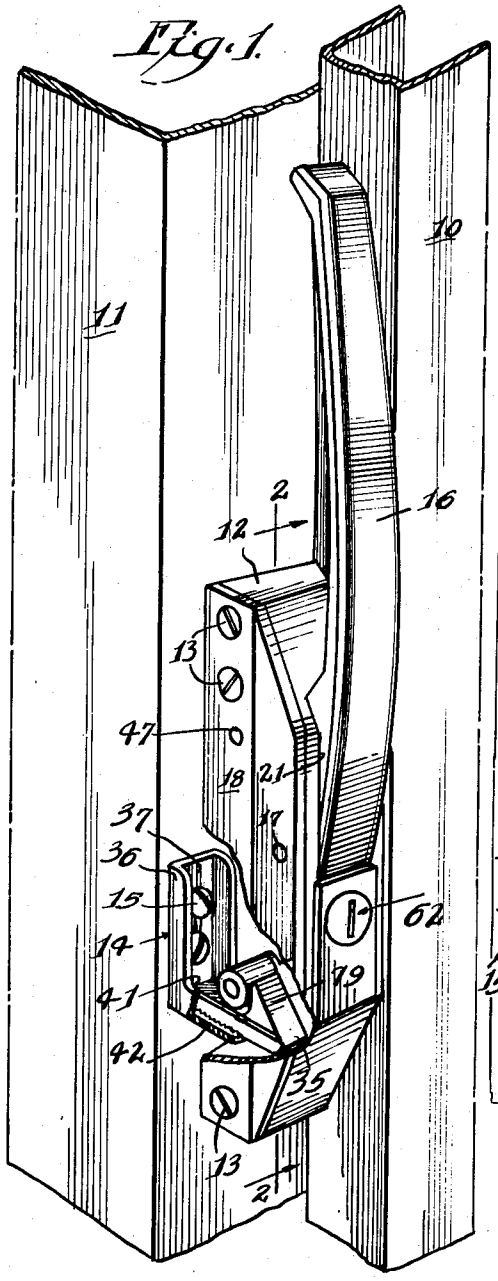
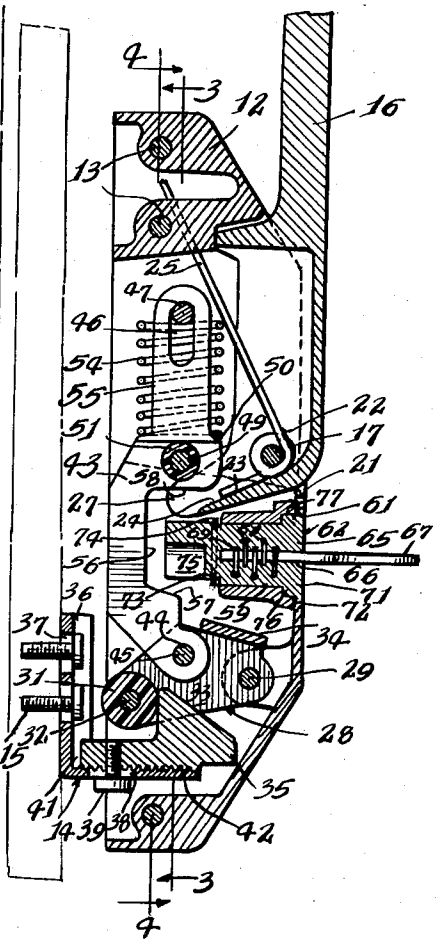


Fig. 2.



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Fig. 3.

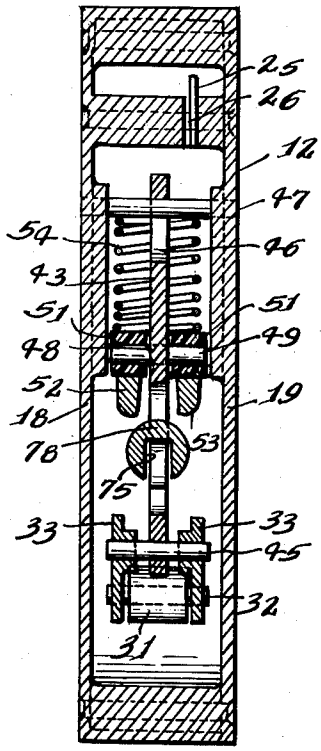
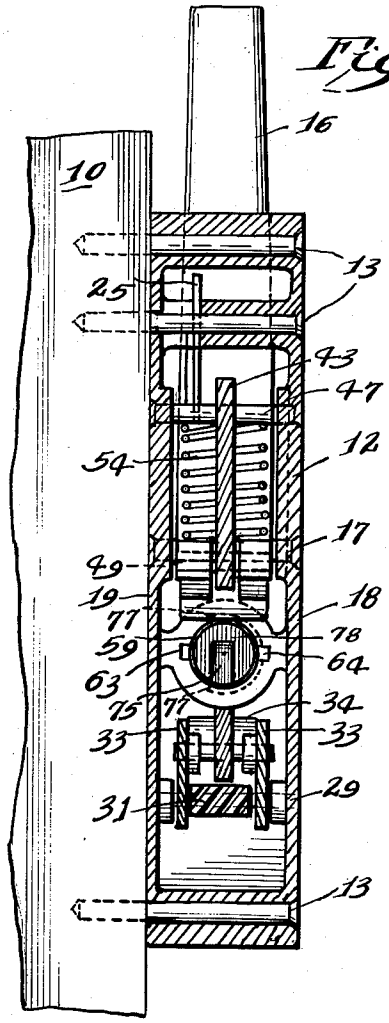


Fig. 4.



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REFRIGERATOR LATCH

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The present invention relates to a novel latch assembly and more particularly to a novel latch for use on refrigerator doors to effectively maintain the door in tight sealing engagement with the cabinet, and having a positive locking means to prevent unauthorized or undesired entry into the cabinet.

By providing the latch assembly with a positive locking arrangement, locking the latch with the door closed denies access to the interior of the refrigerator to all who do not have the requisite key so as to prevent unauthorized entry. Such locking also prevents a child from being trapped within the interior whether the refrigerator is used or unused, thus providing an important safety feature. Furthermore, assuming the refrigerator door is intended to remain open, this may be assured by turning the key to locked position which prevents closing and latching of the door.

Among the objects of the present invention is the provision of a refrigerator door latch with a novel tumbler locking means to block opening movement of the operating handle or lever for the latch bolt assembly and thus lock the latch to prevent opening of the door. The lock is key operated and is capable of being turned through an arc of approximately 180° between a locked and an unlocked position. In the disclosed embodiment, the tumbler lock includes an extension on its rotatable plug body having an open notch or keyway in one side thereof extending to the end thereof for entrance of a shoulder of a reciprocable spring retainer plate connected to the latch bolt assembly during unlatching movement when the tumbler lock is in its unlocked position.

The present invention further comprehends a novel refrigerator latch and tumbler lock assembly providing a positive locking means for retaining the latch in locked position whereby to control in a novel manner the latching and unlatching of the closure of a refrigerator cabinet.

The present invention further comprehends a novel reciprocable spring retainer plate having a cut-out portion and a shoulder which cooperates with the plug of the tumbler lock to limit movement of the latch bolt assembly, said plate and latch bolt assembly being operatively connected.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

In the drawings:

FIGURE 1 is a perspective view of the latch and lock assembly and the keeper attached to the door and cabinet of a refrigerator, a portion of the latch housing being broken away.

FIG. 2 is a fragmentary vertical cross-sectional view of the latch, lock and keeper assembly taken on the line 2—2 of FIG. 1 and viewed in the direction of the arrows.

FIG. 3 is a vertical cross-sectional view of the assembly taken on the line 3—3 of FIG. 2 and viewed in the direction of the arrows.

FIG. 4 is a vertical cross-sectional view of the assembly taken on the line 4—4 of FIG. 2 and viewed in the direction of the arrows.

Referring more particularly to the disclosure in the drawings in which is disclosed an illustrative embodiment of the present invention, the novel latch and lock assembly is shown as mounted on the edge of a door or closure 10 for a refrigerator or other cabinet 11. The

latch and lock assembly includes a housing or casting 12 secured to the edge of the door 10 by suitable securing means such as bolts 13. A keeper assembly 14 is secured to the cabinet 11 by bolts or suitable securing means 15 and extends into the interior of the housing 12 when the door 10 is moved to its closed position. A handle or operating lever 16 has its lower or actuating end pivotally mounted in the housing 12 by means of a transverse pivot pin 17 bridging the spaced sides 18 and 19 of the housing and extending through an opening 21 in the housing with the handle extending upwardly to be grasped by the operator when the door is to be opened.

A suitable spring 22 is coiled around the pivot pin 17 with a short end 23 bearing against the internal surface 24 of the handle 16 and a long end 25 bearing against a shoulder in a recess 26 in the housing 10, the spring 22 biasing the handle 16 to its upright inoperative position. The lower portion of the handle 16 terminates in a bifurcated end 27 (FIG. 2) projecting into the housing through the opening 21.

A rocking latch bolt 28 is pivotally mounted on a fixed pin 29 within the housing 12, and provided with a roller 31 rotatably mounted on a transverse pin 32 secured to and bridging the spaced parallel arms 33 of the latch bolt 28. A connecting wall portion 34 connects the arms 33 adjacent to the pivot pin 29. The roller 31 is mounted to engage the keeper 35 of the keeper assembly 14 which further includes a channelled bracket 36 adjustably mounted on the cabinet 11 by bolts or securing means 15 passing through elongated openings 37. A slot 38 allows passage of an adjustment screw 39 received in a tapped opening in the keeper 35. The keeper is shown mounted in a channel 41, with engaging surfaces of the keeper and the channel having complementary serrations 42 to hold the keeper locked in adjusted position once the adjustment screw 39 has been tightened.

Means for operating the bolt, as shown in FIGS. 2, 3 and 4, includes a reciprocating spring retainer plate 43. An opening 44 at the forward or lower end of the plate loosely receives a pivot pin 45 secured to and extending between the arms 33 of the latch bolt assembly 28. The opposite end of the plate contains an elongated, longitudinally extending slot 46 which loosely receives or accommodates a pin 47 secured to and extending between the spaced sides 18 and 19 of the housing 12. A third opening 48 in the plate 43 is disposed on a line between the openings 44 and 46 and through which projects a retainer roller pin 49 the ends of which extend beyond the sides of the plate 43 with these ends each carrying a roller 51, said rollers 51, 51 disposed in contacting relation with the bifurcations 52 and 53 of the end 27 of the handle 16.

A coil or compression spring 54 is mounted on and encompasses the slotted upper or rear arm 55 of the spring retainer plate 43 and bears against the pin 47 and a shoulder 50. The slot 46 allows a limited amount of reciprocal movement by the spring retainer plate, the spring 54 constantly urging the plate to its forward or latching position. The plate 43 between the openings 44 and 48 has a relatively deep recess 56 between spaced shoulders 57 and 58 with the shoulder 57 coacting with the tumbler lock to be described later, and the shoulder 58 being disposed between the bifurcations 52 and 53 of the handle 16 throughout the pivotal movement of said handle.

An opening 59 is bored through the housing 12 directly below the opening 21 for the handle 16, and counterbored to provide a retaining shoulder 61 for the tumbler lock assembly 62. Opposing slots 63 and 64 are formed in opposite sides of the opening 59 to accommodate movement of the tumblers of the lock assembly 62.

The lock assembly 62 includes a plug member 65

having an internal slot 66 to accommodate a key 67 and slots 68 for the tumblers 69. Springs normally bias the tumblers 69 to extend beyond the plug member 65 into one of the two slots 63 or 64 in the housing 12. The plug member 65 is enlarged at its outer end 71 to provide an external flange 72 abutting the shoulder 61 in the counterbore to properly locate the assembly 62 in the housing 12. An annular groove 73 is formed in the plug member 65 intermediate its ends to receive a spring retaining ring 74 to hold the assembly 62 in the housing 12. The inner end of the plug 65 extending into the housing 12 and beyond the groove 73 has a longitudinal, open-end slot or keyway 75 formed in one side thereof to conformably receive therein the shoulder 57 of the spring retainer plate 43 when aligned therewith by turning of the key and tumbler to unlocked position. A lug 76 on the circumference of the plug member 65 and aligned with the slot or keyway 75 is adapted to engage a stop at 77 and limit rotation of the plug member to an arc of approximately 180°.

When the proper key 67 is withdrawn from the lock assembly 62, the tumblers 69 will be extended beyond the circumference of the plug 65 into the slots 63 and 64 to prevent rotation of the lock assembly 62 and, since the slot 75 and shoulder 57 are out of alignment, the closure remains locked. When the proper key 67 is inserted into the slot 66, the contour of the key will retract the tumblers 69 until they are totally within the slots 68 and confines of the plug 65, whereupon the plug 65 and key 67 can be rotated through an arc of approximately 180°. The length of the arc of rotation of the plug 65 is limited by engagement of the lug 76 with a shoulder on the stops 77 formed in the opening 59.

In unlocked position (FIG. 3), the slot 75 is aligned with the shoulder 57 on the spring retainer plate 43 and said shoulder enters the slot 75 during reciprocating movement of the plate 43 and the latch bolt assembly 28 by pivotal movement of the handle when pulled outwardly. In any other position, the shoulder 57 is blocked from moving by engagement with inner edge 78 of the plug 65. Thus in the unlocked position, the spring retainer plate 43 may be reciprocated by pivotal movement of the handle 16 which causes movement of the plate 43 through the rollers 51, 51 and the bifurcated end 27 of the handle, or by engagement of the roller 31 with the inclined surface 79 of the keeper 35 during closing movement of the refrigerator door 10. In the locked position, opening movement of the handle 16, the spring retainer plate 43 and the latch bolt assembly 28 is prevented by engagement of the shoulder 57 with the inner edge 78 of plug 65.

The rollers 51, 51 and 31 are preferably of nylon having wear resistant and lubricating properties to assure long life in contact with the cooperating metal parts.

While there is shown a preferred embodiment, it is understood that the same is susceptible of modification and change, and comprehends such equivalents inherent in this disclosure and the claims.

Having thus disclosed the invention, I claim:

1. A latch mechanism of the type disclosed having a keeper, comprising a latch housing, a pivoted latch bolt in said housing and adapted to engage said keeper, said latch bolt including spaced sides connected by an intermediate wall portion, keeper engaging means secured between said spaced sides adjacent one end of the bolt, means adjacent the opposite end of the bolt pivotally mounting said bolt in the latch housing, a vertically reciprocable plate in said housing and pivotally mounted at one end to the latch bolt intermediate the ends thereof, said plate having a recessed portion adjacent said pivotal mounting forming a shoulder, an elongated slot remote from said pivotal mounting and an opening intermediate its length, a pin projecting through said intermediate

opening with each end carrying a roller, an operating handle having one end abutting said rollers for lifting and reciprocating said plate, a mounting pin projecting through said slot and secured to said housing, spring means biasing the plate and latch bolt into their latched position, and a rotatable tumbler lock having a cylindrical plug movable between a locked and an unlocked position, said plug having a part on its inner end projecting into the recessed portion of said plate and having a slot movable to a position aligned with and receiving said shoulder on the reciprocable plate to release the handle, plate and latch bolt for unlatching, and when the slot in said part is moved out of alignment with said shoulder, said plug prevents unlatching movement of said plate.

2. A latch mechanism of the type disclosed having an adjustable latch keeper, comprising a latch housing, a latch bolt in said housing and including spaced sides connected by an intermediate wall portion, keeper engaging means secured between said spaced sides adjacent one end of the bolt, means adjacent the opposite end of the bolt pivotally mounting said bolt in said housing, a vertically movable plate in said housing and pivotally mounted adjacent one end of the latch bolt intermediate the ends thereof, said plate provided with a recessed portion adjacent said latch bolt having a locking shoulder and an elongated slot at its opposite end, a mounting pin projecting through said slot, a pin carried by and projecting through said plate intermediate its ends, rollers mounted on each end of said last mentioned pin, spring means biasing said plate and latch bolt to their latching position, an operating lever pivotally mounted in said housing and adapted to vertically move said plate against the force exerted by said spring means, said lever having a handle at one end and projections at the other engaging said rollers for actuating said latch bolt, said housing having an opening below said handle, a tumbler lock housing in said opening, a plug on said lock provided with an inner extension having an open-ended slot therein, said plug and its inner extension adapted to receive the locking shoulder of the vertically movable plate when said slot is aligned with the shoulder to permit release of the latch bolt from the keeper and when said slot is out of alignment with said shoulder the shoulder abuts the extension on said plug and prevents release of the latch bolt, and means to limit the arc of rotation of the plug of the tumbler lock.

3. A latch mechanism of the type disclosed having a keeper, comprising a latch housing, a latch bolt pivotally mounted in said housing and having keeper engaging means, a vertically reciprocable plate in said housing pivotally connected at its lower end to the latch bolt and at its upper end provided with a slot, said plate having an opening and an elongated recess spaced therefrom and defining a shoulder at its lower end, a pin projecting through said opening with each end carrying a roller, an operating handle having one end abutting said rollers for lifting and reciprocating said plate, a mounting pin projecting through said slot and secured to said housing, spring means biasing the plate and latch bolt into their latched position, and a rotatable tumbler lock having a cylindrical plug provided with an extension projecting into the recess of said plate, said extension having a slot for receiving said shoulder when said plate is elevated with said tumbler lock in one position, and said extension providing an abutment against elevating said plate when said tumbler lock is in another position with the slot of said extension being out of alignment with said shoulder.

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