June 26, 1951 W. O. BURKE 2,558,233

LATCH

Filed Sept. 25, 1946 3 Sheets-Sheet 1

Fig. 1.

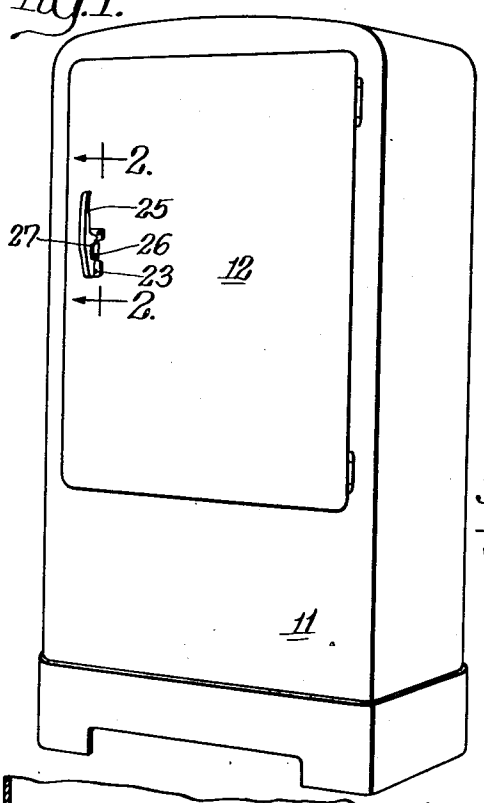


Fig. 2.

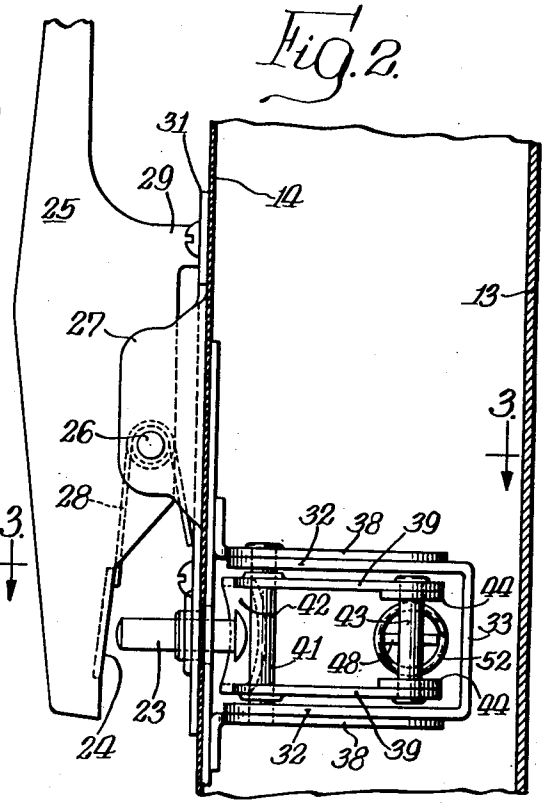


Fig. 3.

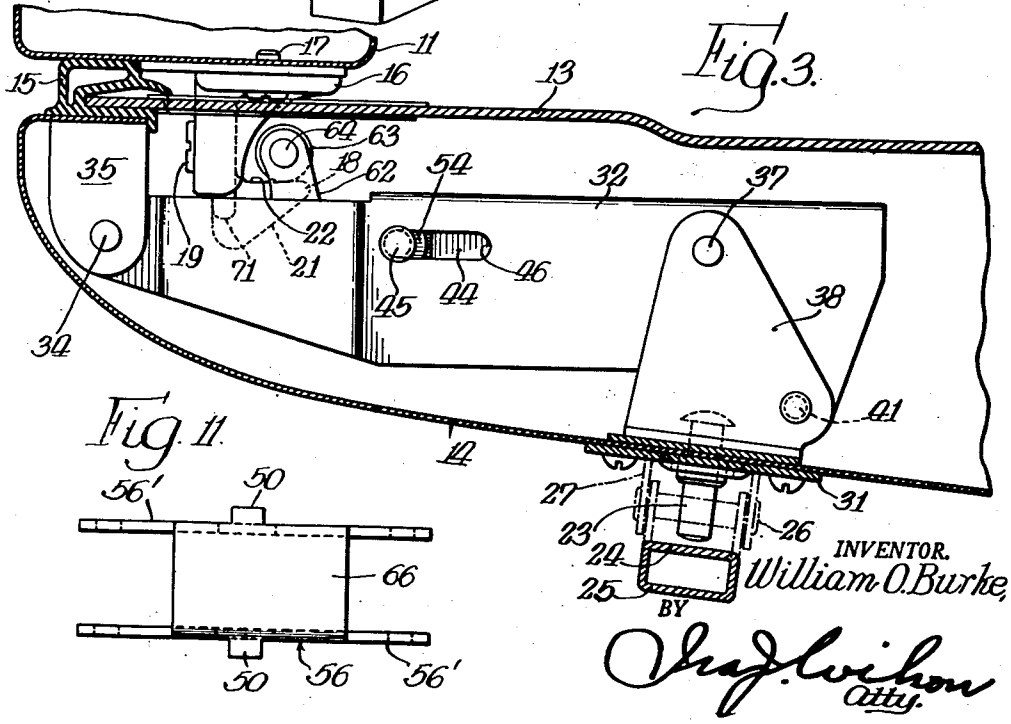


Fig. 11.

INVENTOR.
William O. Burke,
BY
Atty.

June 26, 1951 W. O. BURKE 2,558,233

LATCH

Filed Sept. 25, 1946 3 Sheets-Sheet 2

Fig. 4.

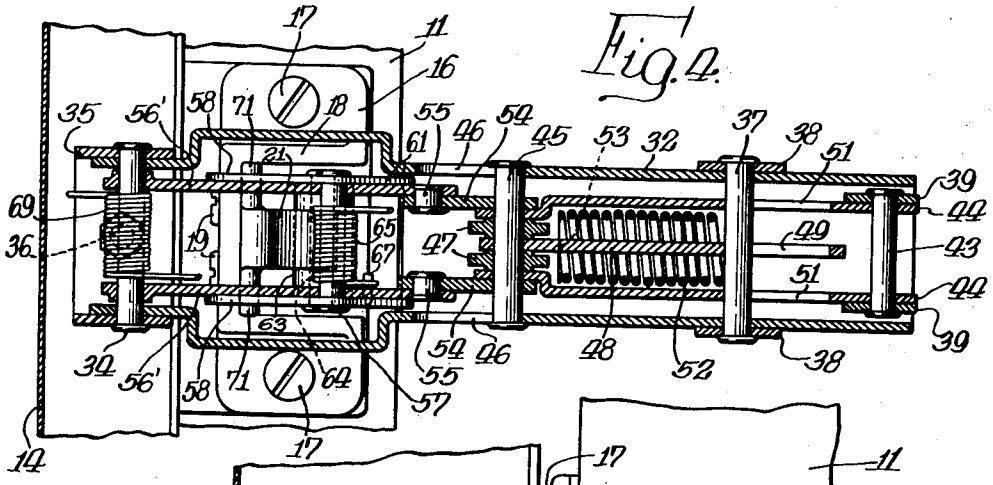


Fig. 5.

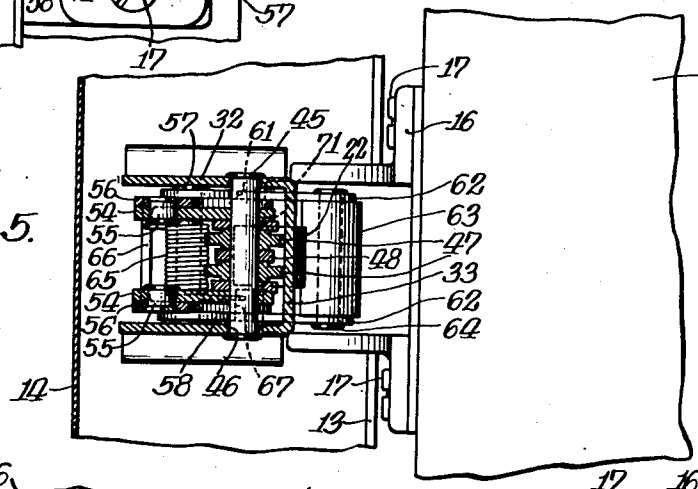


Fig. 6.

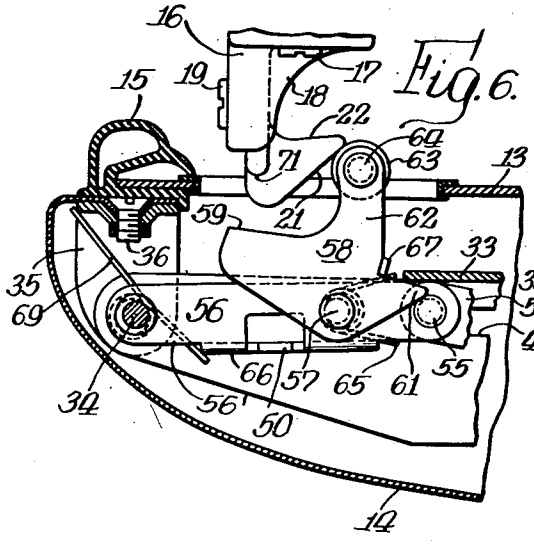
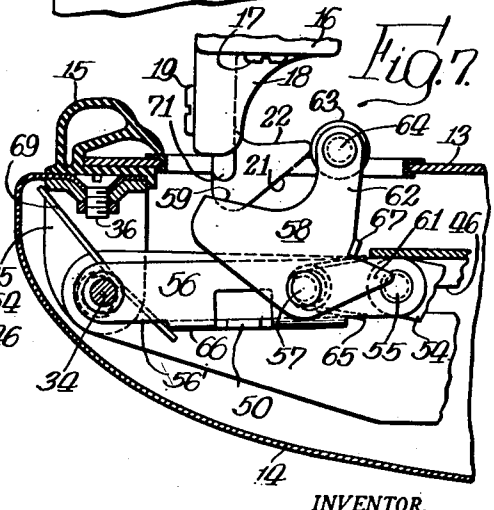


Fig. 7.



INVENTOR.
William O. Burke,
BY
Atty.

June 26, 1951 W. O. BURKE 2,558,233

LATCH

Filed Sept. 25, 1946 3 Sheets-Sheet 3

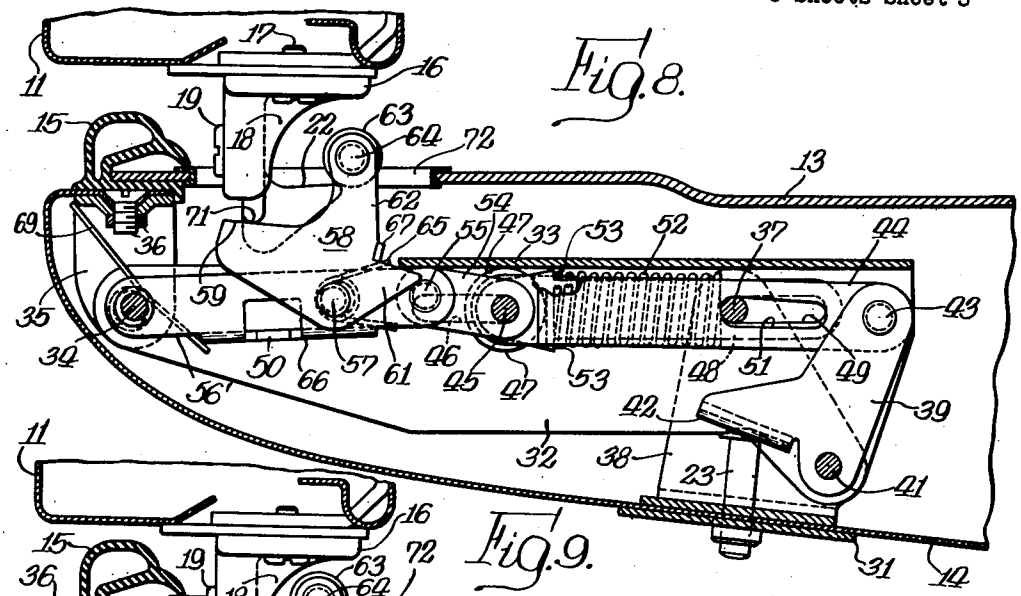


Fig. 8.

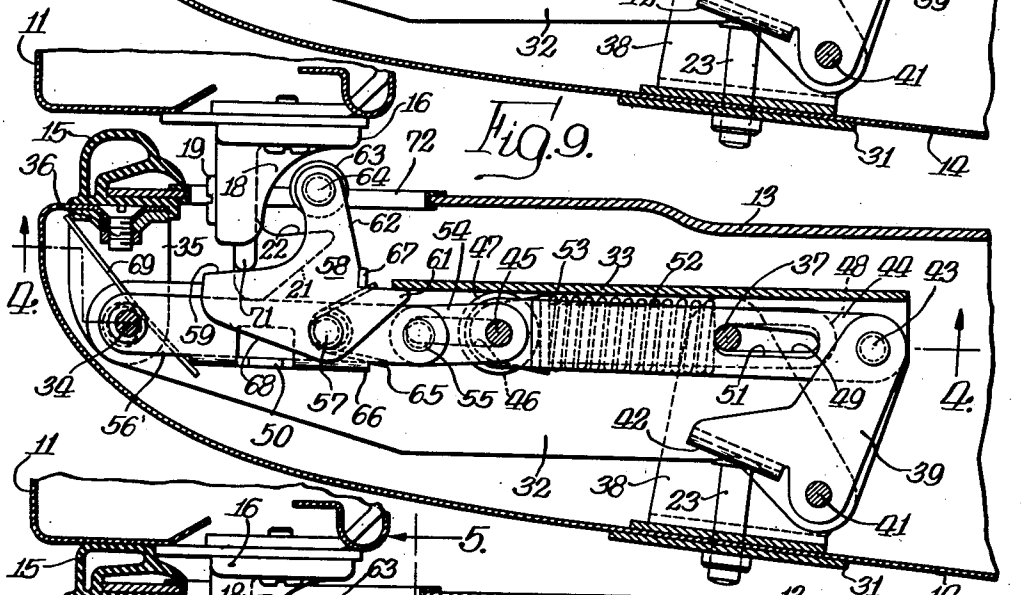


Fig. 9.

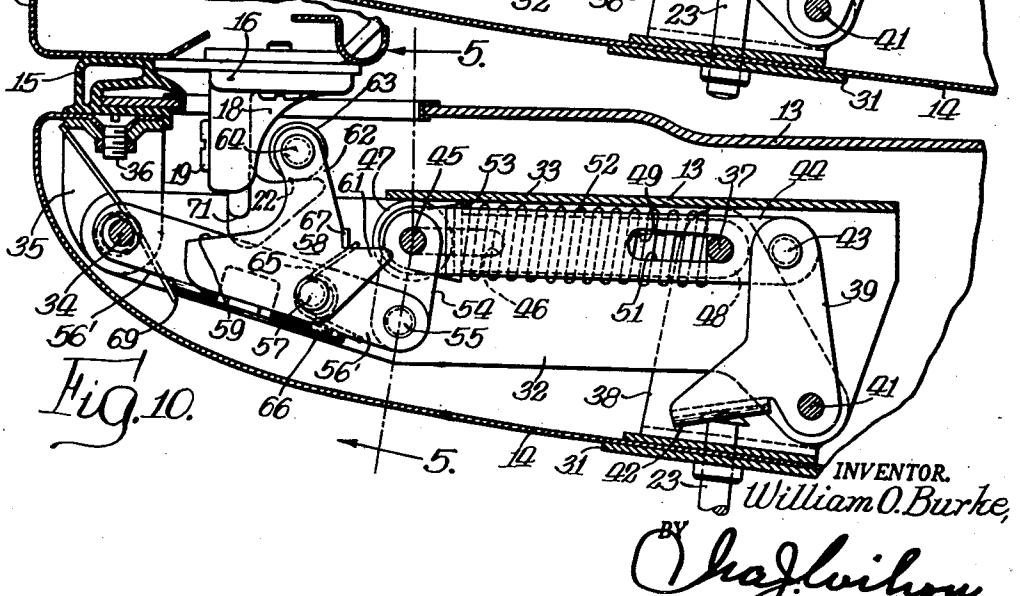


Fig. 10.

INVENTOR.
William O. Burke,
BY
Thos. J. Wilson
Atty.

Patented June 26, 1951

2,558,233

UNITED STATES PATENT OFFICE

2,558,233

LATCH

William O. Burke, Rockford, Ill., assignor to National Lock Co., Rockford, Ill., a corporation of Delaware

Application September 25, 1946, Serial No. 699,331

12 Claims. (Cl. 292—332)

1

This invention pertains to latches, and while the principles thereof are capable of embodiment in latches for holding various types of closures in closed position, the embodiment here disclosed was designed particularly for use on refrigerator doors.

In order to obviate air leakage and consequent heat losses, latches for refrigerator use are required to be of a type which will hold the gasket in compressed condition to form an airtight seal around the margins of the door. Latches for this purpose most commonly used are one of two types, i. e., spring latches and snap action latches.

In spring latches the latching member or bolt is continuously urged toward locking position, consequently the closing of the door requires the exertion of sufficient force to cause the retraction of the latch member against the force of the springs by the incline of the strike up which the latch member rides. A weak spring requiring only slight closing force to overcome it in closing will fail to hold the door snugly in sealed position, while a strong spring adapted to snugly hold the door requires an objectionably vigorous slamming of the door in order to force the latch bolt up the incline of the strike against the action of the spring.

These disadvantages of the spring pressed latch are not inherent in the snap action type of latch characterized by the employment of a type of bolt and latch mechanism which, when the bolt is withdrawn from latching position upon opening of the door, will be retained in that position commonly known as the "cocked" position, thus holding the action of the spring in abeyance until the latch is released or uncocked by engagement of a release element or trigger with a fixed abutment on the door jamb as the door reaches substantially closed position.

In the normal operation of the snap action type of latch, the retracted or cocked position of the latch bolt is such that no retraction of the bolt is caused by the incline of the strike during closing movement of the door. Therefore, the closing force required to be exerted in swinging the door to closed position is very materially reduced over that required to close a door equipped with a spring pressed type of latch. Furthermore, since the entire compression of the main spring is effected by the action of the handle in the unlatching of the door and since the leverage afforded by the latching mechanism for thus retracting and compressing the spring enables this movement to be accomplished with exertion of little force, a stronger spring affording a more

2

snug closing and a more secure holding of the door may be employed.

While the snap action type of latch enjoys a number of operational advantages over the spring pressed type, the snap action type has heretofore been subject to the criticism that unless a positional relation of the highest accuracy between the latch and the strike is secured at the time of mounting and is maintained during the useful life of the latch, inconvenience and great dissatisfaction to the housewife or other user of the refrigerator inevitably ensues. For instance, if, as the result of inaccurately mounting or of the sagging of the door or of the frame during the life of the refrigerator, the position of the strike with respect to the latch bolt is a tiny fraction of an inch removed in one direction from its perfect position, the door will not be held sufficiently snugly closed to adequately compress the gasket. Under this condition air and heat losses will occur. On the other hand, if the strike be a fraction of an inch out of position in the opposite direction the bolt will be released from the strike by a pull upon the handle and the door will be opened without cocking the latch. The latch then operates as an ordinary spring pressed latch, but with a very heavy spring which requires an extremely vigorous slamming of the door in order to bring it to closed position.

One of the primary purposes of my present invention is to provide a latch of the snap action type which will overcome the disadvantages heretofore inherent in latches of this type by so constructing it that a substantial variation in the relative positions of the latch and strike may occur without adversely affecting the normal operation of the latch. In other words, a snug and secure retention of the door in closed position and a positive cocking of the latch upon opening of the door are both attained by my latch, even though the strike or the latch, or both, may be substantially displaced from their normal operating position.

Another purpose of my invention is to provide a latch of the character indicated, which will offer no substantial resistance to the closing of the door while the latching member traverses the incline of the strike and then only a slight resistance occasioned by the tripping or releasing of the latch trigger. As a consequence of this construction the door, even though of a large and heavy type, may be swung to closed position with a minimum of effort.

Another object of the invention is to provide a latch which, when the trigger is released upon

closing movement of the door, will thereupon automatically and forcibly pull the door into its final closed position and retain it in that position with the gasket under substantial compression sufficient to prevent air leakage.

Another feature of my invention resides in the fact that during the initial actuation of the handle to release and open the door the latch bolt remains stationary behind the head of the strike and resists all movement of the door until the trigger mechanism is actuated, which produces instantaneous and almost simultaneous cocking of the latch and release of the door. The construction is such that release of the door cannot occur without the cocking of the latch being performed. This insures against failure to cock the latch with the resultant necessity for violently slamming the door in order to close it against the action of the strong spring.

Other desirable features and many of the inherent advantages of my invention will be readily appreciated as the same becomes better understood by references to the following description when considered in connection with the accompanying drawings.

Referring to the drawings,

Fig. 1 is an exterior perspective view of a refrigerator equipped with the latch embodying my invention;

Fig. 2 is an enlarged view through the door looking at the latch along the line 2—2 of Fig. 1;

Fig. 3 is a horizontal fragmentary view taken on the line 3—3 of Fig. 2;

Fig. 4 is a longitudinal sectional view taken on the line 4—4 of Fig. 9;

Fig. 5 is a transverse sectional view taken on the line 5—5 of Fig. 10;

Fig. 6, 7, 8, 9 and 10 are horizontal sectional views showing successive positions assumed by the elements of the latch mechanism during the final closing movements of the door; and

Fig. 11 is a bottom plan view of a link element utilized in the latch mechanism.

Referring to the drawings more in detail, reference character 11 indicates generally a refrigerator or other cabinet having a swinging door 12 equipped with a latch embodying my invention. The door, as will be apparent from the drawings, is of hollow construction, comprising an inner wall 13 and an outer wall 14. My improved latch, as will be later apparent, is adapted to be mounted in the space between these walls. The door is equipped along the margins of its inner face with a gasket 15 of rubber or other yieldable material adapted to be compressed between the door and the opposed face of the cabinet surrounding the door opening to provide an air-tight seal around the door opening.

Projecting from the face of the cabinet adjacent the side of the door opening remote from the door hinges is a strike or keeper which may be of integral construction, but in the present instance is illustrated as being of the adjustable type comprising the mounting bracket 16 secured by screws or bolts 17 to the face of the cabinet and a hook 18 adjustably mounted on the bracket and secured in adjusted position by one or more bolts or screws 19. The strike or keeper hook 18 is so shaped as to provide an inclined surface 21 directed outwardly and toward the door of the refrigerator cabinet, and an inclined locking or holding surface 22 facing inwardly or away from the door and plane of closure between the door and cabinet, the inclination being such that the surface 22 at the outer end of the hook is closer

to the cabinet than is such surface at places closer to the hook carrying bracket or support 16. The preferred inclination of the surface 22 is approximately 5° although a slightly greater or lesser angle will be satisfactory. The purpose of this inclination of surface 22 will be pointed out hereinafter.

The latch proper, disposed within the hollow door and which will be later described, is adapted to be actuated by a pin or plunger 23 extending through the outer wall 14 of the door with its inner end positioned in operative relation to the latch and its outer end in position to be engaged by an abutment or wall 24 formed near one end of the handle 25 which is fulcrumed upon pintle 26 mounted in the U-shaped bracket 27 attached to the outer face of the door. The handle is biased into the position shown in Figs. 1 and 2 by a coiled spring 28 surrounding the pintle 26, movement of the handle under the influence of the spring being limited by engagement of leg 29 with abutment plate 31.

The latch, which is disposed within the door between the inner wall 13 and the outer wall 14 thereof, comprises a sheet metal housing 32 of U-shape in cross-section throughout a portion of its length which includes the inner wall or bottom 33 of the U. The outer end of the housing is anchored by a pin 34 to a U-shaped bracket 35 which in turn is securely attached to the marginal portion of the inner wall of the door by a bolt and nut connection 36 or other suitable securing means.

The inner end of the housing 32 is supported upon a pin 37 extending through the housing and through the spaced apart legs of a U-shaped bracket 38 secured by rivets, spot welding or other method of attachment to the inner face of the outer wall 14 of the door. The housing 32 of the latch mechanism is in this manner securely attached near each end to the door structure, so as to be immovably mounted therein.

A bell crank lever 39 of yoke form is pivotally mounted upon a pintle 41 within the inner end of the housing 32, to position one arm constituting an abutment plate or surface 42, in the path of the operating pin or member 23, so that, when said pin is projected inwardly through the outer wall of the door by the handle 25, the bell crank lever 39 will be moved from the position shown in Fig. 10 to that shown in Fig. 9.

The other or divided arm of the bell crank lever is connected by a pin 43 with a pair of links 44 extending longitudinally of the housing. These links are connected at the opposite end by a pin 45 extending transversely of the housing and movable longitudinally of slots 46 formed in the housing walls. This pin 45 carries a pair of rollers 47 adapted to travel along the wall 33 of the housing and between the rollers a bar 48 is mounted at one end on the pin and projects parallel with and between the links 44. The headed pin 37 extends through a slot 49 in the bar 48 and slots 51 in the links 44 and serves to guide this bar and these links in their reciprocatory movements and to limit the extent of such movement. A coiled expansion spring 52 surrounding the bar 48 is compressed between the pin 37 and the shoulders 53 formed on the bar 48. This spring urges the links 44 and bar 48 to the left into the locking or holding position of the parts illustrated in Fig. 10.

Each of a pair of short links 54 is also pivoted at one end upon the pin 45 while their opposite ends are pivotally connected by a pivot pin 55 to a

link member 56 at one end of each of its link arms 56'. See Fig. 11. At their opposite ends the link arms 56' are pivotally mounted upon the transversely extending pin 34. Link member 56, which is of U-shape with an integral cross piece 66 joining the arms 56', may be made as a stamping and such manufacture facilitates the formation of oppositely directed lugs 50 which are struck outwardly from and substantially at right angles to the arms 56' at places intermediate of the pivots 34 and 55. These lugs 50 form stops for the latch bolt mechanism and serve another purpose which will be explained hereinafter. The three pairs of links 44, 54 and 56' extending between the pin 43 of the bell crank lever 39 and the pin 34 of the stationary bracket 35 act as a toggle joint mechanism in cocking and releasing the latch in a manner which will be later described.

Upon a pintle 57 extending transversely between the link arms 56' of link member 56 there is pivoted a trigger and bolt carrier unit designated generally by 58, the trigger and bolt carrier unit or latch element comprising a pair of spaced apart side members straddling the link arms 56' and shaped to provide a release arm 59, a tail 61 and a bolt arm 62. A roller 63 is mounted upon a pintle 64 extending between the arms 62. The roller and the bolt arm 62 form in effect the locking bolt of the mechanism and, as will be apparent, the bolt and the trigger are in this instance combined into a unit pivotally mounted on the link arms 56'.

A coiled spring 65 surrounding the pintle 57 and interposed between an abutment provided by an edge of cross-piece 66 between link arms 56' and an abutment 67 on the trigger bolt unit, urges the unit in a counter-clockwise direction into the position shown in Fig. 10, wherein the edges 68 of the element 58 are engaged with the stop lugs 50.

A second coil spring 69 is mounted on the pin 34 with one end engaging the abutment 66 of a link 56 and the other end engaging the base of the bracket 35. This spring tends to swing the links 56 counter-clockwise about the pin 34 so as to bias the toggle links into the cocked position shown in Figs. 6 to 8, inclusive.

My novel latch is designed to operate in the following manner. Assume that the outward pull upon the handle to open the door has disposed the toggle links in the position shown in Fig. 8, from which it will be observed that the pin 55 is disposed slightly inwardly of a line extending between the axis of pins 34 and 45, it will be obvious that the thrust of the spring 52 will be resisted by the off-center position of the links 54, which cannot move clockwise about pin 45 because of engagement with wall 33 of the housing and cannot move in the opposite direction so long as they are not otherwise moved from their off-center position. The trigger-bolt unit 58 is urged in a counter-clockwise direction by the spring 65 so far as engagement of the tail 61 with the wall 33 will permit. This position of the parts is illustrated in Fig. 6. Upon closing movement of the door, the roller 63 will ride up the incline 21 of the strike until the point of the strike hook is reached, as illustrated in Fig. 7, but it will be observed that the only resistance to the movement of the door offered by engagement of the roller 63 with the strike 21 is the resistance necessary to overcome the force of the light spring 65 and swing the trigger bolt unit 58 from the position shown in Fig. 6 to that shown in Fig. 7.

Further closing movement of the door will carry

the roller 63 beyond the point of the strike hook and bring the abutment arm 59 of the unit 58 into engagement with an abutment 71 carried by the strike. There are, in fact, two of these abutments, one at each side of the strike head, each in position to be engaged by a corresponding release or trigger arm 59 of the trigger bolt unit or latch element. The contact of the arms 59 with the abutments 71 will, as the closing movement of the door continues, tend to swing the unit 58 in a counter-clockwise direction. Since, however, the swinging movement about the pin 57 is prevented by engagement of the tail 61 with the wall 33, further closing movement of the door will cause the unit 58 to move in a counter-clockwise direction about the point of contact between the tail 61 and the wall 33 as a fulcrum, thereby imparting to the toggle link member 56 a clockwise movement about the pin 34 to swing the pin 55 across the toggle joint or mechanism center line intersecting pins 34 and 45.

This movement to uncock or release the trigger bolt is illustrated in Fig. 9, from which, in comparison with Fig. 8, it will be observed that the counter-clockwise movement of the unit 58 not only moves the axis of pin 55 across the center line between pins 34 and 45, but also causes the roller 63 to assume a position considerably to the left (viewing these figures) of the point of the strike hook and some distance inwardly from and overlying the inclined holding face 22 of the hook 18.

This entire closing movement of the door thus far described, and which is illustrated in Figs. 6 to 9 inclusive, takes place before the gasket 15 engages the face of the cabinet. No force to compress such gasket has been applied nor has any force, other than a modicum, been required to compress main spring 52 been required. The only material resistance thus far to the closing of the door has been the slight resistance of the light spring 65 to the rotative movement of the unit 58. It should be observed that an opening in the inner wall 13 of the door is provided for the reception of the strike and the projection therethrough of the bolt arm and roller 65. This opening is preferably lined with a gasket of rubber or other suitable material indicated by reference character 72.

When the toggle link has been uncocked by movement of the axis of the pin 55 across or over or off-center with respect to the line extending between the axis of pins 34 and 45, the spring 52, which has been held in compressed position by the toggle links, will project or thrust the links 44 to the left, viewing the figures, from the position of Fig. 9 to that of Fig. 10, which movement will cause the pin 55 and the ends of link arm 56' attached thereto to move outwardly until they reach the outer limit or position at which time the lower edges 68 of arms 59 of the unit 58 engage with and are stopped by the lugs 50, thereby bringing the roller 63 into sharp engagement with the face 22 of the strike. The final movements of the parts into the position shown in Fig. 10 will cause a powerful pull to be exerted by the trigger bolt upon the strike, which will draw the door inwardly so as to compress the gasket between the door and the cabinet, as shown in Fig. 10, without the exertion of any manual force whatsoever in order to effect such compression of the gasket.

In the act of opening the door the latch is released from the keeper to free the door and the mechanism is moved into cocked position in the following manner.

An outward pull upon the handle **25** projects the plunger **23** inwardly to swing the bell crank **39** in a clockwise direction viewing the drawings to thereby straighten out or dispose in substantial alignment the three pairs of links constituting the toggle mechanism. During the movement of these links from the cocked position of Fig. 10 to the position of substantial alignment of Fig. 9, the roller **63** of the trigger latch bolt remains stationary in engagement with the inner face of the keeper hook to hold the door closed. As the link member **56** swings counter-clockwise from the position of Fig. 10 toward that of Fig. 9, the roller **63** will be held by the spring **65** in engagement with the keeper hook, thereby preventing any clockwise opening movement of the trigger and bolt carrier or unit about pin **57** upon which the latch bolt carrier is pivoted. The reaction of the roller **63** in resting against the inclined inner face **22** of the keeper under the influence of spring **65** together with the force exerted by spring **69** will cause the toggle to swing across center (off-center with respect to the line of axes of pins **34** and **45**) to its position shown in Figs. 6, 7 and 8 and to bring the tail **61** of unit **58** into engagement with the housing **33**.

When, however, the tail **61** of the bolt carrier or unit **58** is brought into engagement with the wall **33** of the housing, further swinging movement of the link member **56** in a counter-clockwise direction will cause the carrier or unit **58** to pivot in a clockwise direction about the pin **57** so as to swing the roller **63** clear of the keeper. This final movement of the link member **56**, after the pivot pins of the toggle links have been brought into alignment by the pull exerted upon the handle, will be effected by the spring **69** tending to move the links from the position of Fig. 9 to that of Fig. 8 to dispose the toggle off-center with respect to the line of axes of pins **34** and **45**. In the position of Fig. 8 it will be observed that the axis of pin **57** lies inwardly of a line connecting the axes of pins **34** and **45**, in which position the links are retained by the exerted force of spring **52**. The latch is, therefore, in cocked position and will remain in such position until force exerted in a clockwise direction upon the trigger bolt by the abutments **71** during closing movement of the door moves the links **56** outwardly to carry the pin **55** across the line connecting pins **34** and **45**, whereupon the parts will be snapped by the spring **52** into the locking position of Fig. 10.

It will be observed that the maximum leverage of the toggle links is utilized to hold the door in a closed position, as illustrated in Fig. 10, thereby insuring adequate compression of the sealing gasket to prevent leakage. It will also be apparent that the maximum strength of spring **52** is utilized to retain the latch in cocked position of Fig. 8, since in that position the spring **52** is under maximum compression.

Since the roller **63** of the latch bolt is retained by the spring **65** in engagement with the holding face of the keeper hook until the trigger latch is swung about its pivot by engagement of the tail **61** with the wall **33**, and since this swinging movement, when it occurs, is substantial in length and is effected almost instantaneously, it follows that the accuracy of relative positions between the latch mechanism and the keeper, heretofore essential in snap action latches, is not here important. In other words, retention of the door in closed position and compression of the sealing gasket are not dependent upon any cam action

or inclined wedging relation between the keeper and the latch and bolt, but, on the contrary the door will be held in snugly closed relation so long as the roller **63** engages any point on the inner face of the keeper hook. The point of engagement between that face of the hook and the roller is quite immaterial. Latching of the door in snugly closed position is accordingly assured, notwithstanding a substantial mis-placement of the keeper from its theoretically correct position.

Likewise, cocking of the latch is insured, because the cocking is effected by relative movements between the parts of the latch rather than by any relative relation between the latch and the keeper. In other words, the cocking is dependent upon engagement of the tail **61** of the trigger latch bolt with the wall **33**, and not upon any relation between the roller **63** and the holding face of the keeper hook. Displacement, therefore, of the keeper to a substantial degree in either direction from its theoretically correct position will not render uncertain the cocking of the latch when the door is opened.

It is possible, of course, accidentally to trip the latch when the door is open. In this case the lugs or stops **50** come into play to prevent the bolt carrier or unit **58** from swinging counter-clockwise to a position where it would become inoperative. The stops **50**, being disposed in the path of movement of unit **58** as it swings counter-clockwise, engage the edges **68** of that unit and prevent its movement in such direction beyond the relative position of the parts shown in Fig. 10. When this situation develops, a slight slamming action of the door is required, the bolt roller striking the outer inclined face **21** of the keeper and being swung thereby about pivot **57**, against the action of light spring **65**, until the latch keeper has been cleared. The action in such case is similar to that of any conventional roller tripped latch. After closing the door, the latch will be in its normal operational position and, upon opening the door, will resume its normal cycle of cocking open, etc.

While I have shown and described the structure of that embodiment of my invention which at present seems preferable, it should be appreciated that substantial modification and variation in the structural details illustrated may be resorted to without departing from the spirit of the invention as defined in the following claims.

I claim:

1. A latch, comprising a housing adapted for mounting on a door, a toggle mechanism carried by said housing, said toggle mechanism including a pair of links pivotally connected together by one end of each, the other end of one of said links being pivotally connected to said housing, a spring for holding said mechanism in off-center positions, a latch element pivotally mounted on said one link intermediate of the pivot connections thereof, means for actuating said toggle mechanism to effect the engagement of said element with a member fixed to said door whereby said element is swung to released position to permit opening of the door, and means fixed with respect to the door frame for swinging said element in a reverse direction upon closing movement of the door into latching position and for moving said toggle mechanism across center.

2. A latch, comprising a housing adapted to be mounted upon a refrigerator door, a toggle mechanism disposed within and carried by said housing, a spring arranged to yieldably retain said mechanism in off-center position, a latch element

bodily carried and wholly supported by said toggle mechanism and movable therewith and with respect thereto, said latch elements having a tail projecting therefrom and adapted to engage an edge of a wall of said housing for pivoting the latch element to retracted position, said latch element being also provided with an arm adapted, during closing movement of the door, to engage a stationary member mounted on the door frame whereby said latch element is swung to move the toggle mechanism over center in one direction, and means for actuating said toggle mechanism to move the same over center in the opposite direction upon opening movement of the door to thereby cock the latching mechanism and hold the latch element in retracted position.

3. A latch, comprising a housing adapted to be mounted in a door, a toggle link assembly, including a slidably mounted link, a link mounted upon a substantially fixed pivot and a link pivotally connected to each of the aforesaid links, disposed in said housing, a latching element pivoted upon and bodily movable with the second said one of said links, said element comprising a pair of oppositely projecting arms adapted to respectively engage a wall of said housing and a stationary abutment to actuate said element and said toggle link assembly, a spring biasing said slidably mounted link in one direction, and manually operable means for moving said slidably mounted link in the opposite direction against the force of said spring.

4. A latch, comprising a housing, a toggle link mechanism mounted therein including a slidable link, a pivoted link and a link pivotally connecting said slidable and pivoted links, a latch element pivotally mounted on said pivoted link, having an arm adapted to latchingly engage with the hook of a keeper, an arm adapted to engage a fixed abutment and a tail adapted to engage a wall of said housing, a spring acting on said toggle assembly to hold said latch element in latching position or in cocked position, manually operable means for actuating said toggle assembly to disengage said latch element from said keeper, and an abutment in the path of said element for releasing said latch from cocked position.

5. In a latching mechanism for securing a closure member against a cooperative member having a keeper with a latch engaging surface facing in a direction away from the closure, a locking bolt carried by said closure member and mounted for limited rotary movements between keeper-engaging and keeper-releasing positions, spring means normally tending to rotate said bolt toward keeper-engaging position, means for moving the bolt to its keeper-releasing position, means for retaining the bolt in keeper-released position, means operative upon movement of said closure member toward said cooperative member and to a predetermined position with respect thereto for releasing said retaining means, and means including a spring independent of the first said spring means and automatically operative upon release of said retaining means for moving said bolt in one direction in its rotary path into keeper-engaging position with components of force acting to thrust the bolt against said keeper surface in a direction substantially normal to the plane of said closure when the closure is against said cooperative member.

6. In a latching mechanism for securing a closure member to a cooperative member, one of said members having a keeper with a bolt engaging surface facing away from the other member and the other member carrying a bolt housing and a bolt therein for latching engagement with said surface, a lever pivoted in said housing, said bolt being pivotally supported upon said lever on an axis spaced from the axis of the lever pivot for movements with and relative to said lever between keeper-engaging and keeper-releasing positions, means including cooperative abutments on the bolt and said housing normally operative when the bolt is in keeper-released position for retaining the bolt in such position until the bolt and keeper have been moved relatively toward and beyond one another to position said bolt at a predetermined position past said keeper-engaging position by movement of the closure member toward said cooperative member, means operative when said bolt reaches said predetermined position for releasing said retaining means, and means operative upon release of said retaining means for moving said bolt against said keeper surface in a direction relatively opposite to that in which the bolt was moved in approaching said predetermined position.

7. In a latch including, a housing adapted to be mounted on either member of a body member having an opening and a closure member for said opening, and a latch bolt keeper adapted to be mounted on the other member, a toggle mechanism carried by said housing and movable to each side of dead-center, means normally tending to urge said toggle mechanism to off-center position in one direction, means for moving the toggle mechanism toward off-center position in the opposite direction, a latch bolt wholly supported and carried by said toggle mechanism and movable therewith and relative thereto, means, independent of the first said means, normally tending to move said bolt relative to said toggle mechanism toward keeper engaging position, means operative upon movement of said toggle mechanism toward said off-center position in said one direction for moving said bolt relative to said toggle mechanism toward keeper engaging position, and means for tripping said toggle mechanism to effect its movement across dead-center from said off-center opposite direction position.

8. In a latch including, a housing adapted to be mounted on either member of a body member having an opening and a closure member for said opening, and a latch bolt keeper adapted to be mounted on the other member, a toggle mechanism carried by said housing and movable to each side of dead-center, means normally tending resiliently to urge said toggle mechanism to off-center position in one direction, manually operable means for moving the toggle mechanism toward off-center position in the opposite direction, a latch bolt wholly supported and carried by said toggle mechanism and movable therewith and relatively thereto, means, independent of the first said means, normally tending to move said bolt relative to said toggle mechanism toward keeper engaging position, means automatically operative upon movement of said toggle mechanism toward said off-center position in said one direction for moving said bolt relative to said toggle mechanism toward keeper engaging position, and means for tripping said toggle mechanism to effect its movement across dead-center from said off-center opposite direction position.

9. In a latch including, a housing adapted to be mounted on either member of a body mem-

ber having an opening and a closure member for said opening, and a latch bolt keeper adapted to be mounted on the other member, a toggle mechanism carried by said housing and movable to each side of dead-center, means normally tending to urge said toggle mechanism to off-center position in one direction, manually operable means for moving the toggle mechanism toward off-center position in the opposite direction, a latch bolt bodily mounted on and wholly supported by said toggle mechanism and movable therewith and relative thereto, means normally tending to move said bolt relative to said toggle mechanism toward keeper engaging position, means automatically operative upon movement of said toggle mechanism toward said off-center position in said opposite direction for moving said bolt relative to said toggle mechanism toward keeper releasing position, and means for tripping said toggle mechanism to effect its movement across dead-center from said off-center opposite direction position.

10. In a latch including, a housing adapted to be mounted on either member of a body member having an opening and a closure member for said opening, and a latch bolt keeper adapted to be mounted on the other member, a toggle mechanism including a plurality of interconnected links carried by said housing and movable to each side of dead-center, means normally tending to urge said toggle mechanism to off-center position in one direction, means for moving the toggle mechanism toward off-center position in the opposite direction, a latch bolt bodily mounted on and wholly supported by one of said links of said toggle mechanism and movable therewith and relative thereto, means normally tending to move said bolt relative to said toggle mechanism toward keeper engaging position, means operative upon movement of said toggle mechanism toward said off-center position in said opposite direction for moving said bolt relative to said toggle mechanism toward keeper releasing position, and cooperative means carried by said latch bolt and keeper and operable upon the approach of one of said members relative to the other for moving said toggle mechanism across dead-center from said off-center opposite direction position.

11. A latch adapted to be mounted on either member of a cabinet body member having an opening with a closure member for said opening and cooperative with a latch bolt keeper adapted to be mounted on the other of said members, said latch comprising a housing, a lever pivotally mounted by one of its ends on a fixed pivot on said housing for movements of its other end relative to the housing toward and from said keeper, a latch bolt unit including a keeper-engageable bolt pivotally mounted on a fixed pivot on said lever intermediate of the pivoted and opposite ends thereof and having its pivot axis substantially parallel to and spaced from the axis of said lever pivot for movements with and with respect to the lever toward and from a position for latching relation with said keeper, spring means normally tending to swing said latch bolt unit about its pivot axis on said lever

and relative to said lever toward said latching relation position with respect to said keeper, spring means normally tending to swing said lever about its pivot axis on said housing toward said keeper, toggle means including a spring carried by said housing and operatively associated with said lever in a toggle relationship therewith for movements between opposite sides of a dead-center position, means for limiting the swinging movements of said latch bolt unit about its pivot on said lever, means for moving said toggle means to one side of dead-center to effect release of the bolt from the keeper, and means for tripping said toggle means to effect engagement of the bolt with the keeper.

12. A latch adapted to be mounted on either member of a cabinet body member having an opening with a closure member for said opening and cooperative with a latch bolt keeper adapted to be mounted on the other of said members, said latch comprising a housing, a lever pivotally mounted by one of its ends on a fixed pivot on said housing for movements of its other end relative to the housing toward and from said keeper, a latch bolt unit including a keeper-engageable bolt pivotally mounted on a fixed pivot on said lever intermediate of the pivoted and opposite ends thereof and having its pivot axis substantially parallel to and spaced from the axis of said lever pivot for movements with and with respect to the lever toward and from a position for latching relation with said keeper, spring means normally tending to swing said latch bolt unit about its pivot axis on said lever and relative to said lever toward said latching relation position with respect to said keeper, spring means normally tending to swing said lever about its pivot axis on said housing toward said keeper, toggle means including a spring carried by said housing and operatively associated with said lever in a toggle relationship therewith for movements between opposite sides of a dead-center position, cooperative means on said latch bolt member, housing and lever for limiting the swinging movements of said latch bolt unit about its pivot on said lever, means for moving said toggle means to one side of dead-center to effect release of the bolt from the keeper, and means including a portion of said latch bolt member for tripping said toggle means to effect engagement of the bolt with the keeper.

WILLIAM O. BURKE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,181,493	Nave	Nov. 28, 1939
2,256,447	Burke	Sept. 16, 1941
2,341,416	Anderson et al.	Feb. 8, 1944
2,342,250	Burke	Feb. 22, 1944
2,359,150	Peglow	Sept. 26, 1944
2,385,961	Anderson	Oct. 2, 1945
2,448,083	Curtiss	Aug. 31, 1948
2,451,381	Curtiss	Oct. 12, 1948