Jan. 26, 1943. F. M. HOGG 2,309,507

LATCH

Filed June 13, 1941

Fig. 1.

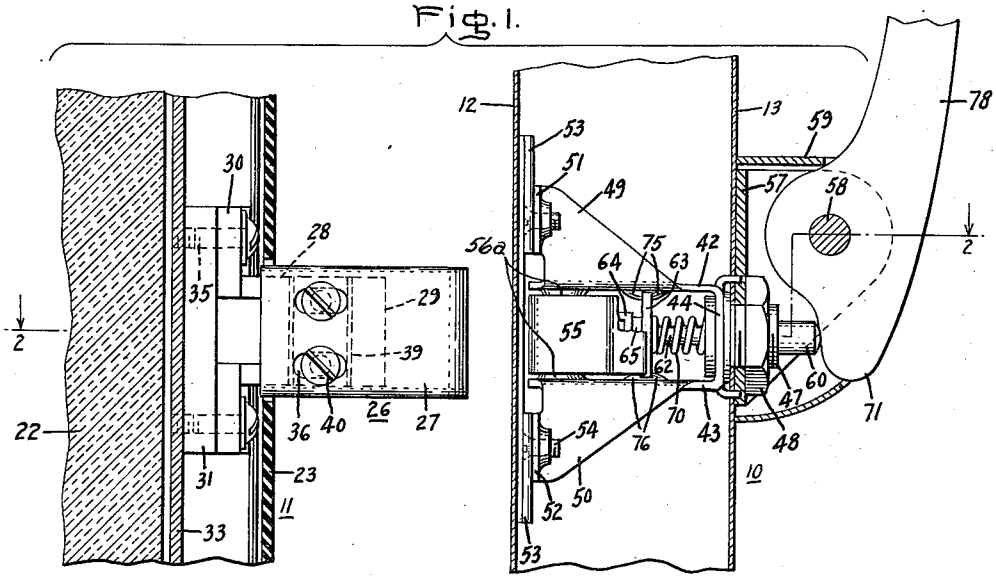


Fig. 2

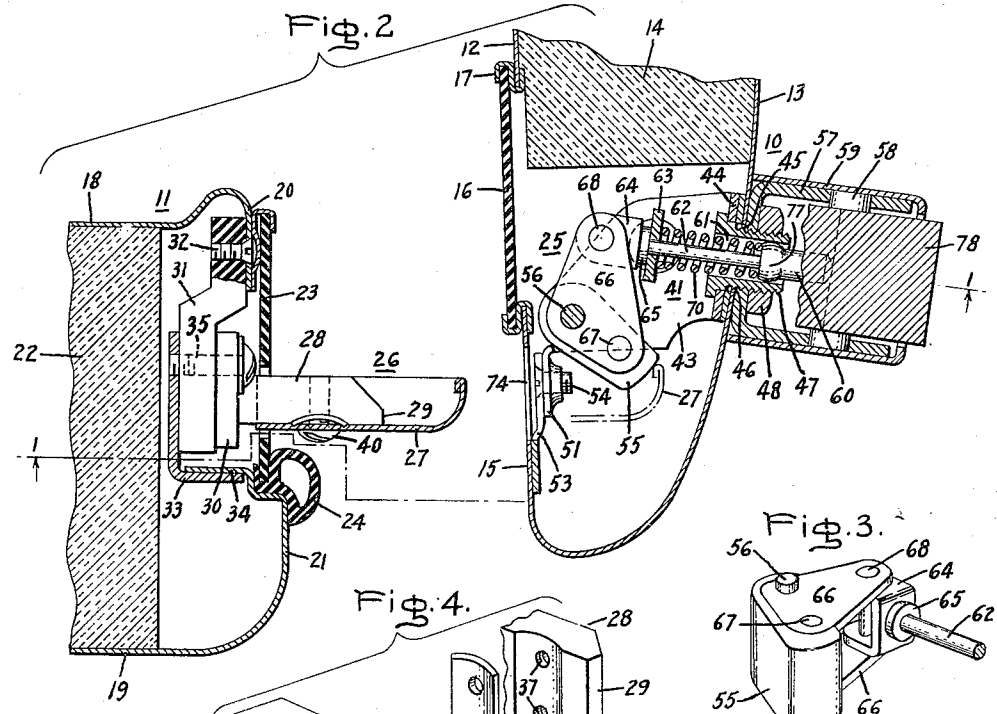
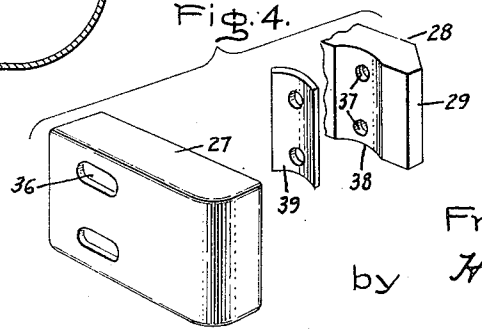


Fig. 3.

Fig. 4.



Inventor:
Francis M. Hogg,
by Harry E. Dunham
His Attorney.

Patented Jan. 26, 1943

2,309,507

UNITED STATES PATENT OFFICE

2,309,507

LATCH

Francis M. Hogg, Findley Lake, N. Y., assignor to General Electric Company, a corporation of New York

Application June 13, 1941, Serial No. 397,881

4 Claims. (Cl. 292—221)

This invention relates to latches for doors of refrigerator cabinets and the like.

It is an object of my invention to provide a new and improved latch assembly having smooth and positive operating characteristics.

Further objects and advantages of my invention will become apparent as the following description proceeds, and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of my invention reference may be had to the accompanying drawing in which Fig. 1 is a partial exploded view, partly in section, of a household type refrigerator provided with a door latch embodying the principles of my invention; Fig. 2 is a sectional view taken along the line 2—2 of Fig. 1 and illustrating details of my invention; Fig. 3 is a perspective view of the latch bolt and associated parts shown in Figs. 1 and 2, and Fig. 4 is a perspective exploded view of the door strike and associated parts used in connection with the latch bolt shown in Figs. 1, 2 and 3.

In the drawing there is illustrated a door 10 adapted to close a door opening in a casing or cabinet such as a refrigerator cabinet, a portion of the cabinet adjacent the free edge of the door being indicated by the numeral 11. The door 10 comprises an inner door or liner 12 and an outer wall or casing 13 maintained in spaced apart relation, the space therebetween being filled with suitable heat insulating material 14. The outer casing is curved adjacent the edges thereof and provided with a rearwardly and then inwardly directed flange 15, the flange 15 being disposed in the assembled position of the parts in alignment with the inner door 12. The space between the inner and outer members 12 and 13 is closed by a breaker strip 16 of suitable heat insulating material such as a non-metallic nonhygroscopic material, for example a resinous product known to the trade under the trade names Bakelite, Textolite, etc. In order to retain the breaker strip in position, suitable bezels 17 may be provided.

The adjacent wall of the refrigerator defining the door opening comprises an inner casing 18 and an outer casing 19, having inwardly directed flanges 20 and 21, respectively. The space between the casings 18 and 19 is filled with suitable heat insulating material 22. The space between the flanges 20 and 21 is closed by a strip 23 of thermally resistant material which may be the same as that used for the breaker strip 16. The breaker strip 23 may be maintained in position by any desired means.

In order to seal the space between the cabinet wall and the door around the door opening in the closed position of the door I have provided a suitable gasket or sealing member 24 preferably of relatively resilient material such as rubber, for example. As shown in Fig. 2 the door 10 is arranged to overlap the walls of the refrigerator.

In order to maintain the door in its closed position there is provided a latch mechanism 25 in association with the door, and a lock keeper or strike mechanism 26 associated with the cabinet.

The strike assembly comprises a generally channel-shaped strike member 27 and a strike base 28. The strike base 28 is generally of T-shaped formation and comprises a central outwardly directed portion 29 and leg or transversely extending portions 30. In order to maintain the strike base in position there is provided a supporting member or block 31 formed of suitable heat insulating material. The insulating block is attached at one end thereof to the inner casing 18 as by means of a threaded member 32 extending through a suitable opening in the inwardly directed flange 20 of the inner casing into threaded engagement with a suitably tapped opening in the block 31. The other end of the supporting insulating block is secured to the outer casing 19 in any suitable manner as by means of a support 33 and a rearwardly directed portion 34 of the flange 21, the latter members being suitably secured together as by welding, for example. The block 31 may be secured to the support 33 as by means of a suitably threaded member 35 extending through a suitable opening in the block 31 into threaded engagement with a suitably tapped opening in the support 33. In the form of my invention illustrated in the drawing, I have illustrated the use of two members 35 for this purpose, the members 35 also serving to support the strike block 28 and the support 31, the fastening members 35 extending through suitable openings in the transversely or laterally extending arms 30 of the strike block.

I have shown the strike 27 secured to the strike block 28 by the use of a pair of threaded fastening members 40 extending through longitudinally extending slots 36 in the outer face of the strike member into threaded engagement with suitably tapped openings 37 in the strike block. The strike 27 is provided with side and end portions, the latter serving to engage the bolt of the latching mechanism. The longitudinally extending slots 36 are provided in order to permit the longi-

tudinal adjustment of the strike in order to provide adjustment of the latch mechanism as a whole.

I have provided means for locking the strike 27 in the desired position. For this purpose there is provided a recess 38 in the face of the strike block adjacent the strike 27 and a curved lock washer 39. When the adjusting screws 40 are tightened the ends of the lock washer will be drawn into biting engagement with the inner surface of the strike, thereby tending to retain the strike in the desired position. The curved recess and curved lock washer also serve to provide a self-aligning arrangement.

The latching mechanism is located between the inner and outer casings or walls of the door. There is provided a support 41 having spaced apart sides 42 and 43 joined at the outer end by a connecting portion or member 44. Aligned openings 45 and 46 in the connecting member 44 and the outer case 13 of the door, respectively, are arranged to provide an opening for the external latch operating mechanism. As shown, I have provided an externally threaded bushing 47 having a bore or opening extending therethrough. A suitably internally threaded fastening member such as a nut 48 is threaded into engagement with the bushing 47 to retain the outer end of the support 41 in position. The inner ends of the arms 42 and 43 are provided with laterally extending wings or portions 49 and 50, respectively, the wings being provided with laterally extending flanges 51 and 52, respectively. The flanges provide means for securing the inner end of the support 41 to the flange 15 of the outer case, suitable supporting members 53 being interposed between the flanges 51 and 52 and the flange 15. The supporting members 53 are secured in any suitable fashion to the inner surface of the flange 15 as by welding for example, and the supporting members and flanges 51 and 52 may be suitably connected together as by means of threaded fastening members 54 extending through suitable openings in the supporting member into threaded engagement with suitably threaded recesses in the flanges 51 and 52.

In order to retain the door in closed position there is provided a latch bolt 55 arranged for engagement with the strike 27 as indicated by the dot-dash line in Fig. 2, the strike extending through a suitable opening 74 into the interior of the door. The latch bolt is pivotally mounted at one end between the arms 42 and 43 by means of a pin 56 extending through the latch bolt and being journaled in suitable openings or collars as indicated by the numeral 56a in the arms 42 and 43 adjacent the free ends thereof. The latch bolt is so positioned that in the closed position of the door the latch bolt enters the recessed portion of the strike member and the outer curved surface of the latch bolt engages the edge of the outer flange of the strike 27.

In the latch illustrated herein I have provided means for transmitting motion of an operating handle 78 to the bolt 55. The handle is suitably and pivotally supported on the outer surface of the casing 13 by means of a substantially U-shaped supporting member 57 suitably retained on the outer casing. The support 57 may most conveniently be provided by arranging the same for reception on the bushing 47, the assembly being secured by the nut 48. The handle 78 is supported from the support 57 by means of a pin 58 extending through the handle and journaled at the ends thereof in the arms of the support 57. In order to provide a finished and decorative appearance to the latch there is provided a suitable housing 59. In order to transmit the motion of the handle 78 to the latch bolt 55 there is provided a plunger 60 slidably positioned within an opening or passage 61 of substantial length extending through the bushing 47. The plunger is provided with a reduced end 62 which extends through a supporting plate 63 suitably supported between the arms 42 and 43. A separate, removable pin suitably secured to the plunger may be substituted, if desired, for the end 62. The inner end of the pin or the reduced end of the plunger is suitably secured to a clevis 64 as by means of threaded engagement with a collar 65, the latter being secured to or integral with the cross portion of the clevis. The latch bolt 55 is provided with a pair of side plates 66 suitably secured to the latch bolt as by means of a pin or a rivet 67 extending through the latch bolt and suitable openings in the latch plates and also by the pin 56. The side plates are preferably received in recesses in the side faces of the latch bolt so that the side plates and the remaining portion of the side faces lie in the same plane. The side plates are pivotally associated with the clevis 64 as best seen in Fig. 3, the members being joined in pivotal relationship by means of the pin 68 extending through the side plates and the arms of the clevis. The parts are maintained in their latching position by means of a spring 70 extending between the inner end of the plunger 60 and the plate 63, the latter thereby serving as a spring abutment. As seen in Fig. 2 the member 63 also serves as a stop limiting the movement of the mechanism in the latching position, the collar 65 on the clevis engaging the inner face of the plate in the limiting position.

It will be seen that when the operating handle 78 is moved away from the outer door, clockwise as viewed in Fig. 1, engagement between the cam portion 71 of the handle will cause the plunger 60 and the pin or end 62 to move inwardly thereby causing the latch bolt 55 to move in a counter-clockwise direction as viewed in Fig. 2 about the pin 56.

Because the latch bolt, and therefore the side plates 66, move pivotally about the pin 56 the pin 68 joining the side plates to the clevis will also move in an arc. The result is that the clevis, pin 62, and plunger 60 have a tendency to move laterally as well as longitudinally during operation of the latch. I have provided means for minimizing any tendency for binding because of this sidewise or lateral movement. I have provided an arrangement by means of which plate 63 is free to move laterally or transversely of the longitudinal axis of the pin 62 as the latch is operated. For this purpose I have provided a pair of spaced apart projecting portions or members 75 on the inner face of the arm 42 of the support 41 and a similar pair of spaced apart guide members 76 on the inner face of the arm 43 opposite to the members 75. These members thereby form slots disposed in association with the inner faces of the side arms and extending transversely of the pin 62 in order slidably to receive the member 63. Thus, as the pin 62 moves inwardly and the parts heretofore mentioned attempt to move transversely the member 63 will shift transversely to accommodate any similar movement of the operating mechanism.

I have also provided the plunger 60 with an

enlarged portion slidably engaging the walls of the passage or bore 61 in order to provide a partial seal and having a limited area of engagement with the walls of the passage as a rounded portion 77 of substantially the same diameter as the internal diameter of the bore 61 of the bushing 47 which permits the plunger and pin 62 to rock slightly on the surface of the enlarged portion to further permit lateral movement of the operating mechanism.

In order to seal the space between the enlarged portion 77 and the bore 47 of the bushing, I provide a lubricating material such as a suitable grease, for example, on the surface of the rounded portion 77, the grease thereby serving to seal the space between the enlarged portion and the bushing. In this manner, the enlarged portion 77 serves as a sealing gland for restricting the flow of air between the interior and exterior of the door member 10.

While I have shown a particular embodiment of my invention, modifications will occur to those skilled in the art. For example, instead of disposing the member or plate 63 between recesses or slots formed by projections 75 and 76, I may provide slots or openings in the opposite arms 42 and 43 and provide ears on the sides of the plate 63 extending into the slots, the slots or openings being sufficiently long in the direction transverse to the longitudinal axis of the pin 62 to permit transverse movement of the plate. Further, the side plates 66 may be so constructed that engagement between edges thereof and the inner face of the plate 63 serves to limit movement of the latching mechanism in the latching direction. Therefore, I do not desire my invention to be limited to the particular construction shown and described and I intend in the appended claims to cover all modifications within the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A latch assembly comprising a support having spaced apart sides joined at one end by a connecting member, a latch bolt pivotally mounted between said sides adjacent the other end thereof, said connecting member having an opening therethrough, a plunger extending through said opening, means for actuating said plunger, and means disposed between said plunger and said latch bolt for transmitting the motion of said plunger to said bolt, means normally urging said plunger outwardly and said bolt into the latching position, said means comprising a stop member disposed between said sides and spring means extending between said stop member and said plunger, said stop member having an aperture for said plunger, and means for permitting said stop member and said plunger to move transversely during operation of said latching means thereby preventing binding of the parts during operation of the latch.

2. A latch assembly comprising a support having spaced apart sides joined at one end by a connecting member, a latch bolt pivotally mounted between said sides adjacent the other end thereof, said connecting member having an opening therein, a plunger slidably positioned in said opening, means for actuating said plunger, and means disposed between said plunger and said latch bolt for transmitting the motion of said plunger to said bolt, means normally urging said plunger outwardly and said bolt into the latching position, said means comprising a stop member disposed between said sides and spring means extending between said stop member and said plunger, said stop member having an aperture for said plunger, and means for permitting said stop member and said plunger to move transversely during operation of said latching means thereby preventing binding of the parts during operation of the latch, said last-mentioned means including a slot disposed in association with each of said sides and extending transversely of said pin for slidably receiving said stop member.

3. A latch assembly comprising a support having spaced apart sides joined at one end by a connecting member, a latch bolt pivotally mounted between said sides adjacent the other end thereof, means providing a passage through said connecting member, a plunger slidably positioned in said passage, said plunger having an enlarged rounded portion for engagement with the walls of said passage, means for actuating said plunger, and means disposed between said plunger and said latch bolt for transmitting the motion of said plunger to said bolt, means normally urging said plunger outwardly and said bolt into the latching position, said last-mentioned means comprising a stop member disposed between said sides and spring means extending between said stop member and said plunger, said stop member having an aperture for said plunger, and means for permitting said stop member to move transversely during operation of said latching means, said rounded portion and said stop member cooperating to permit the movable parts of said latch to shift laterally during operation thereof and thereby minimize binding of said parts.

4. A latch assembly comprising a support having spaced apart sides joined at one end by a connecting member, a latch bolt pivotally mounted between said sides adjacent the other end thereof, means providing a passage of substantial length through said connecting member, a plunger slidably positioned in said passage, means for actuating said plunger, and means disposed between said plunger and said latch bolt for actuating said bolt when said plunger is actuated and thereby transmitting motion of said plunger to said bolt, said plunger being provided with an enlarged portion slidably engaging the walls of said passage to provide a partial seal and having a sufficiently limited area of engagement with the walls of said passage to permit rocking of said plunger with respect to said walls, said passage being adapted to receive lubricating material for further sealing the space between said enlarged portion and said passage.

FRANCIS M. HOGG.