Jan. 19, 1943. G. E. CURTISS, JR., ET AL 2,309,049

REFRIGERATOR LATCH

Filed June 27, 1940 2 Sheets-Sheet 1

Fig-1

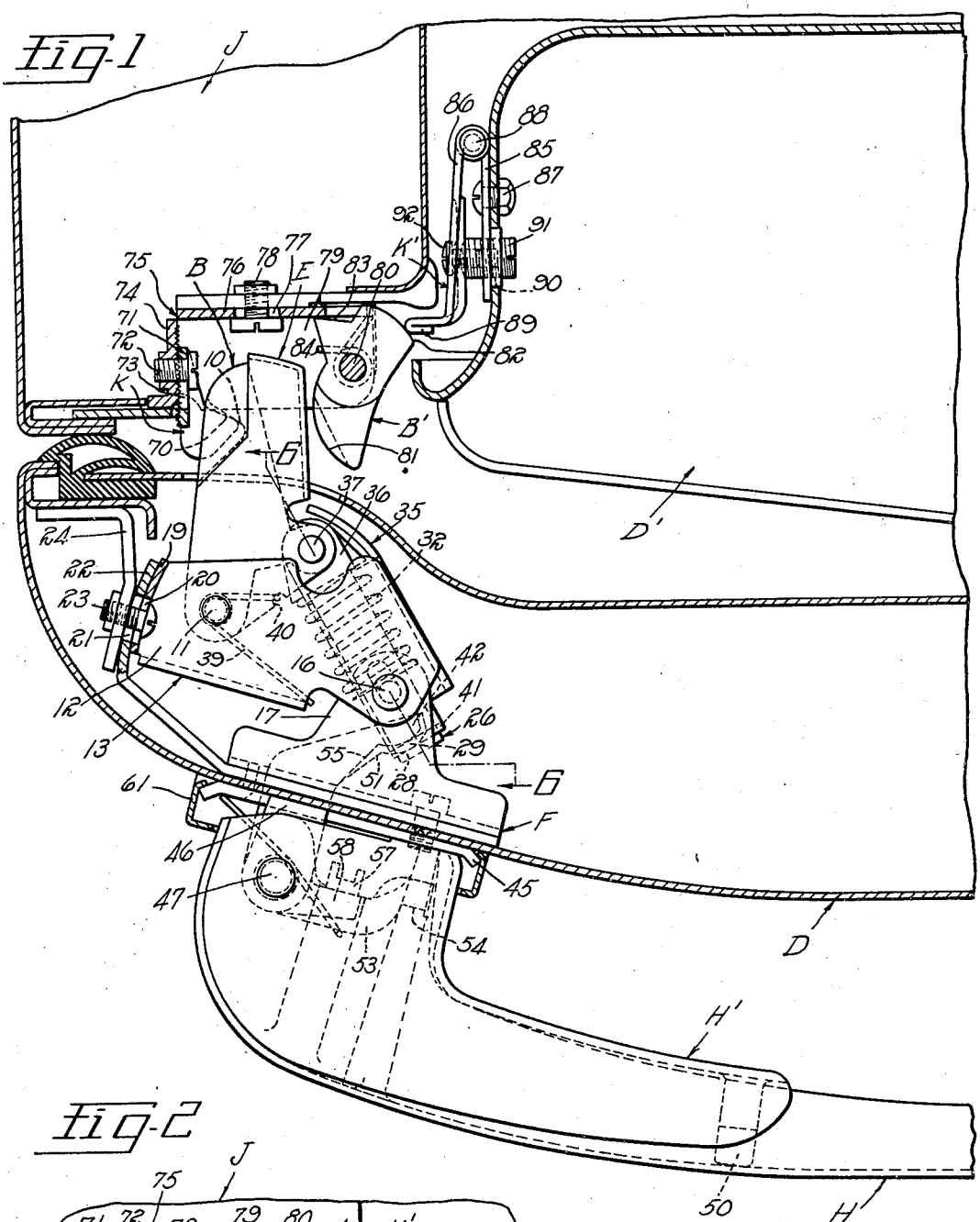
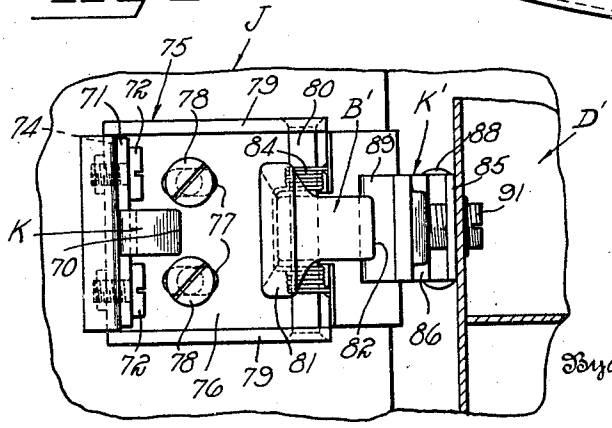


Fig-2



Inventors

GEORGE E. CURTISS, JR.

ELMER A. PAGELLA

By Lindsey & Pabellard

Attorneys

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Filed June 27, 1940 2 Sheets-Sheet 2

Fig-3

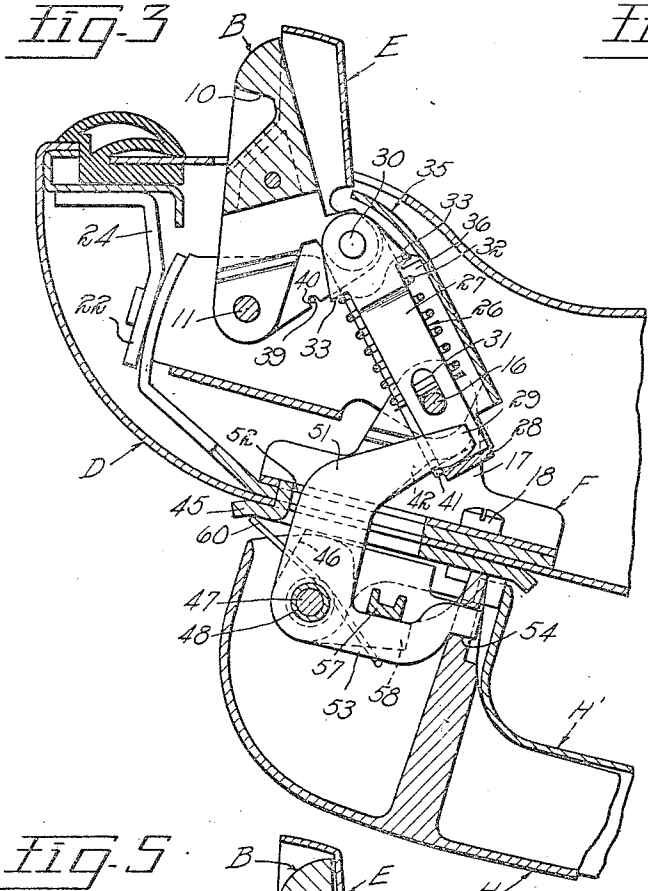


Fig-4

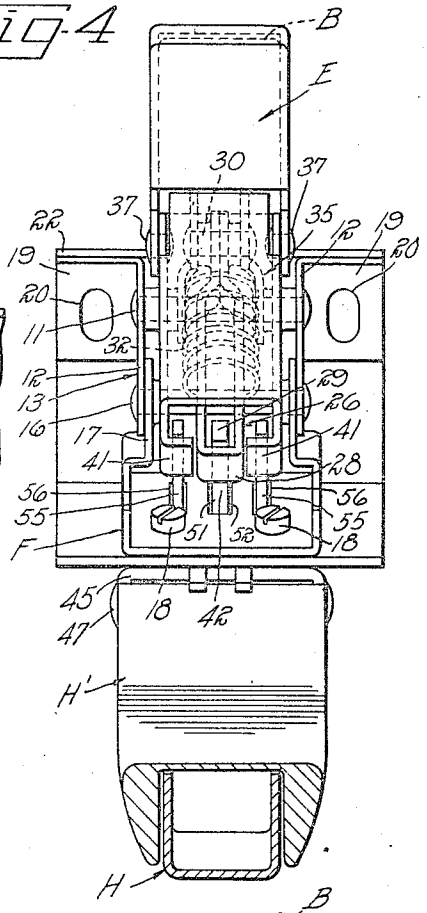


Fig-5

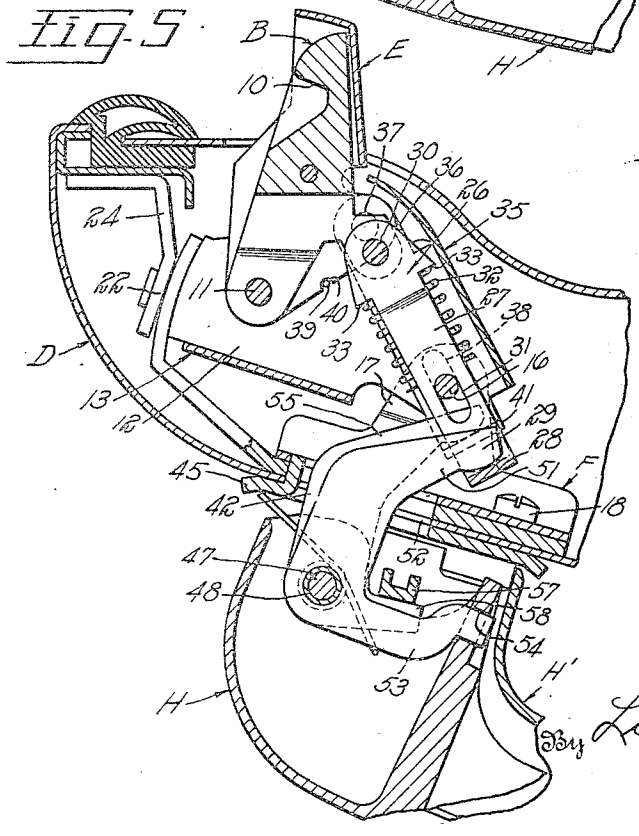
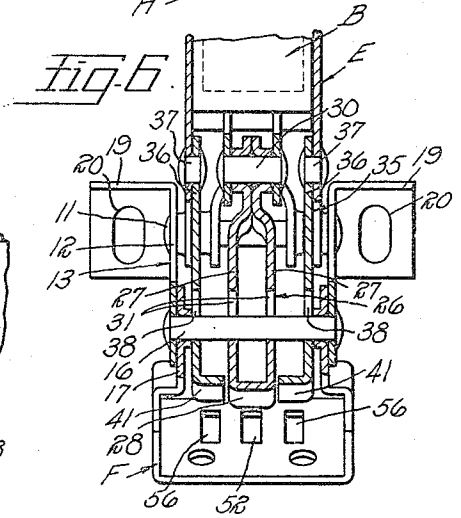


Fig-6



Inventors

GEORGE E. CURTISS, JR.

ELMER A. PAGELLA

By Lindsey & Pollard

Attorneys

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REFRIGERATOR LATCH

George E. Curtiss, Jr., and Elmer A. Pagella, New Britain, Conn., assignors to The Stanley Works, New Britain, Conn., a corporation of Connecticut

Application June 27, 1940, Serial No. 342,752

8 Claims. (Cl. 292—48)

The present invention relates to refrigerator latches and more particularly to a latch for use in a refrigerator of the type having an inner and outer door, both of which are hinged on a common axis and are adapted when closed to abut a common door jamb.

In refrigerators of this type shelves are provided in the inner door for storing frequently needed food stuffs. This type of arrangement is advantageous in that it is only necessary to open the outer door to gain access to the most frequently needed foods, thus making it unnecessary to open the inner door and expose the refrigerator interior to frequent drafts of warm air. Consequently, the use of two doors in this manner, not only eliminates the necessity of searching the refrigerator interior for certain foods but also eliminates the resultant drafts of warm air which would make additional energy necessary to restore the refrigerator interior to its desired temperature. Obviously, with this construction, it is possible for the refrigerator to retain its desired cold temperature at a minimum cost, and greater economy results.

The object of the present invention therefore is to provide a latching mechanism for retaining the inner and outer doors in closed position and of such construction that it may be manually operated either to unlatch the outer door independently of the inner door or to unlatch and open both doors simultaneously.

A further object of the invention is to provide such a latch which can be inexpensively manufactured, easily installed and adjusted, and, thereafter, operated in a simple manner.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the accompanying drawings:

Figure 1 is a cross sectional view of a portion of a refrigerator showing the inner and outer doors retained in latching position by a latching mechanism embodying the present invention suitably mounted therein;

Fig. 2 is a plan view of the keeper and secondary bolt mounting, showing the latching engagement of the secondary or inner door bolt and cooperating keeper;

Fig. 3 is a cross sectional view of the portion of the latching mechanism mounted in the outer refrigerator door illustrated in latching position;

Fig. 4 is a profile view of the portion of the latching mechanism illustrated in Fig. 3;

Fig. 5 is a view similar to Fig. 3 showing the outer door bolt retracted to unlatched position and the actuator for the secondary bolt in inoperative position; and

Fig. 6 is a cross sectional view taken substantially along line 6—6 of Fig. 1.

Referring to the drawings there is shown generally a primary latching mechanism for latching an outer door D, and a secondary latching mechanism for securing an inner door D' in closed position. As illustrated in Fig. 1, the primary mechanism is mounted in the outer door D and includes a latch bolt B having a notch 10 latchably engageable with a keeper K secured to the door jamb J. The primary mechanism further includes an actuator E for unlatching a secondary latch bolt B' mounted on the jamb J in a manner that will be hereinafter described. Manually operable handles H and H' are mounted on the outer surface of the door D and are respectively connected through suitable linkages to the bolt B and the actuator E. Handles H and H' are so mounted that handle H may be manually operated independently of handle H' to retract bolt B without moving actuator E. However, movement of handle H' can only be accomplished by moving handle H therewith, whereby bolt B is retracted when actuator E is operated to force bolt B' to unlatched position. Thus door D may be opened independently of door D' by operation of handle H whereas operation of handle H' opens doors D and D' simultaneously.

Referring more specifically to the bolt B and the actuator E, both members are pivotally mounted on a stud 11 secured to flanges 12 of a U shaped support 13 located in the door D. In order to adjust the bolt relative to the door the support flanges 12 are pivotally secured by a stud 16 to ears 17 of a frame F secured to the door by screws 18 whereby the support 13 and thereby the bolt stud 11 may be rotated to a desired position relative to the door. To prevent movement of the support from its adjusted position, the outer edges of the flanges 12 are provided with arcuated lugs 19, each of which has cut therein a slot 20 pivotally aligned with slots 21 in a similarly arcuated wall 22 of the frame. Suitable bolt and nut fasteners 23 are located in the aligned slots 20 and 21 and clamp the support 13 to the frame F in the position desired. To give the frame greater rigidity

the bolt fasteners 23 likewise secure the wall 22 to a bracket 24 fastened to the door D. as by spot welding.

In order to connect the bolt B to the handle H for retraction thereby, there is provided a plunger 26 comprising a pair of coextensive arms 27, the lower ends of which are joined by a flange 28, operatively engaged by a bell crank lever 29 secured to the handle H, and the upper ends of which are pivotally secured to the bolt by a stud 30. Adjacent the flange 28, the plunger arms 27 are provided with aligned slots 31 mounted on the stud 16 for limiting the movement of the plunger and consequently the movement of the bolt. In order to urge the plunger to the forwardmost position permitted by the slots 31, there is provided a heavy spring 32 surrounding the plunger and compressed between a shoulder 33 thereon and the stud 16 whereby the bolt is resiliently forced to latching position. The slots 31 are of such length as to limit the retraction of the bolt so that the actuator will not be engaged and retracted by the bolt.

The secondary bolt actuator E is similarly connected to handle H' and for this purpose there is provided a link 35 of U shaped cross section, having side walls 36 pivotally secured to the actuator E by headed studs 37 aligned with the stud 30 which similarly connects the bolt and plunger as heretofore indicated. As illustrated in Fig. 6 the walls 36 are further provided with slots 38 aligned with the plunger slots 31 and similarly mounted on the stud 16. The actuator E, like bolt B, is normally urged in a counterclockwise direction away from the position in which it retracts bolt B', and for this purpose a spring 39, located on the stud 11, is compressed between the support 13 and notches 40 in the actuator E. In order to rotate the actuator in a clockwise direction to actuate bolt B', the side walls 36 are further provided with inwardly turned flanges 41, operatively connected to handle H, by means of bell crank levers 42 similar to the bell crank lever 29 for retracting the bolt.

Referring now to the manually operable handles H and H', they are pivotally secured on a mounting 45 fastened to the outer surface of the door D by the screws 18. The mounting 45 includes a pair of outwardly extending ears 46 rotatably supporting both handles on a stud 47. To accomplish the dual mounting, the stud rotatably supports between the ears 46 a bushing 48 secured in one end of the handle H, and outwardly of the ears the stud 47 pivotally supports the handle H'. As indicated in Figs. 1 and 4, the handle H is somewhat longer than H' whereby it can be gripped and operated independently. The handle H' substantially overlaps or saddles the sides and back of the handle H in such a manner that the two may be gripped and operated as a unit. Inasmuch as handle H' saddles handle H, it cannot be operated independently of the latter. However, handle H may be operated independently of handle H', and to prevent noisy engagement therebetween the handle H' is provided with a rubber headed lug 50 engageable with handle H. As heretofore indicated the handles H and H' are connected to and operatively engageable with the bell crank levers 29 and 42 respectively, whereby pivotal movement of handle H retracts the bolt B, and similar movement of handle H' retracts the actuator E. For this reason, the bell crank levers 29 and 42 are pivotally supported on the sleeve 48 (see Figs. 3 and 4). Arm 51 of lever 29 extends through a central slot 52 in the door D to engage the plunger 26 and the other arm 53 thereof is fixed as at 54 to the handle H whereby rotation of handle H will rotate the lever 29 and retract the bolt B to unlatched position.

Similarly the arms 55 of levers 42 extend through adjacent slots 56 in the door and engage the flanges 41 of the actuator. Bell crank levers 42, however, are not secured to handle H'. In order to rotate the levers in a clockwise direction to retract the actuator E, the handle H' is provided with a cross bar 57 which, when handle H' is rotated in a clockwise direction, retractably engages the free arms 58 of said levers to thereby retract the actuator E. In addition, the cross bar 57 engages and rotates the bell crank lever 29 to retract the bolt B concurrently with the retraction of the actuator E. Since the bell crank lever 29 is fixed to handle H, rotation thereof by the handle H' will cause handle H to rotate therewith. In order to insure the handles returning to inoperative position when they are released, a spring 60 is provided on the bushing 48 which is compressed between the bell crank arm 53 secured in handle H and the handle mounting 45 and as a result, the spring normally urges handle H, and the underlying handle H' therewith, to the inoperative position.

As seen in Fig. 1, an escutcheon 61 surrounds the handles and is secured to the door by the handle mounting plate 45 thereby giving the exposed portion of the latch a finished appearance.

Referring now to the keeper K latchably engaged by the bolt B, and to the secondary latching mechanism including the keeper K', and the bolt B' actuated by the actuator E. The keeper K includes a bolt engaging lug 70 and a serrated mounting plate 71 adjustably secured by means of screws 72 located in slots 73 to a similarly serrated end wall 74 of a keeper casing 75. The casing 75, as indicated in Fig. 2, comprises, in addition to the end wall 74, a back wall 76 provided with slots 77 through which screws 78 are inserted for adjustably securing the casing 75 on the jam J. The casing further comprises side walls 79 having secured therebetween a stud 80 pivotally supporting the secondary bolt B'. The secondary bolt B' includes a manually operable grip portion or thumb strike 81, an arcuated keeper engaging nose 82, and a stop shoulder 83 engageable with the casing wall 76 for retaining the bolt B' in latching position when normally urged thereto by a spring 84.

Latchably engaging the arcuated end 82 of the secondary bolt is an adjustable secondary keeper K' including a pair of hinged leaves 85 and 86, leaf 85 being secured to the inner door D' by a bolt and nut 87 and the outer leaf 86 being pivotally secured thereto by a pin 88. The outer end of leaf 86 carries a bolt engaging catch 89 engageable with the arcuated nose 82 of the secondary bolt B' for latching the inner door D' in closed position. Obviously when the door D' is swung from an open to a closed position, the catch 89 cams the bolt B' counterclockwise to permit movement of the catch to latching position. In order to provide for adjustment of the catch 89 relative to the bolt B so as to eliminate excessive play therebetween, the leaf 85 is provided with a threaded opening 90 for mounting an adjustment screw 91 forming an adjustable stop for the catch leaf 86. As indicated in the drawing, the catch leaf is retained in fixed engagement with the adjustment screw 91 by means of a set screw 92 secured therein.

Assuming both doors are held in latching position by their respective bolts B and B', handle H may be manually operated to thereby retract bolt B and release the outer door D to unlatched position. Inasmuch as handle H' and the operably connected actuator E are not operated, the bolt B' will retain the inner door in latched position. Subsequently, if the inner door must be opened, it is only necessary to press on the thumb strike 81 to pivot the bolt B' to unlatched position, thus unlatching the keeper K' and the door D'. To return the doors to latched position it is only necessary to swing them closed and their respective keepers K and K' will spring engage the bolts B and B'.

If, however, it is necessary to gain access to the interior of the refrigerator when both doors are closed, they may be opened simultaneously by operating handle H'. Upon operation of handle H' actuator E is rotated in a counterclockwise direction depressing thumb strike 81 and thereby rotating the bolt B' to unlatched position whereby the inner door D' is released. At the same time, inasmuch as handle H must be rotated upon operation of handle H', the bolt B will be withdrawn to unlatched position by handle H and door D will open concurrently with door D'.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

We claim as our invention:

1. In combination with a refrigerator having an inner and an outer swinging door, a pivot pin adjustably supported in the outer door, a latch bolt pivotally supported on said pin and latchably engaging the door jamb, an actuator pivotally mounted on said pivot, a primary handle and a secondary handle pivotally mounted on a common pivot, means operatively connecting said bolt and said primary handle whereby said bolt is retracted when said primary handle is operated, a second bolt latchably securing the inner door to the door jamb, said second bolt being engaged and retracted by said actuator and means operatively connecting said secondary handle to said actuator and said first bolt whereby both bolts are retracted upon movement of the secondary handle.

2. In a refrigerator latch a primary latch bolt latchably securing an outer door to the door jamb and an actuator for unlatching a second latch bolt normally securing an inner door in latched position, a primary handle and a secondary handle mounted on a common pivot located outwardly on the outer door, said secondary handle saddling said primary handle so that said primary handle will be operated upon operation of the second handle, means operatively connecting said primary bolt and said primary handle whereby said primary bolt is retracted when said primary handle is operated, and means operatively connecting said secondary handle to said actuator whereby said actuator is operated and said secondary bolt retracted upon movement of said secondary handle and said primary handle is simultaneously operated to actuate the primary bolt.

3. In combination with a refrigerator having an inner and an outer swinging door, a latch bolt for securing the outer door in latched position and an actuator for retracting a second latch bolt latchably securing the inner door, said first bolt and said actuator being pivotally mounted on a pivot pin, a frame member adjustably supporting said pivot pin, means for securing said pivot in a desired position, a pair of handles pivotally mounted on a common pin supported by the outer door, means operatively connecting said first bolt and one of said handles for retraction of said first bolt upon operation of said handle, means operatively connecting the actuator and the second handle for retraction of said second bolt by said second handle, and means for operating said first handle upon operation of said second handle.

4. In combination with a refrigerator having an inner and an outer swinging door, a latch bolt for securing the outer door in latched position and an actuator for retracting a second latch bolt latchably securing the inner door, said first bolt and said actuator being commonly pivoted on a support member, a frame member carrying a stud pivotally supporting said support member, means for securing said support in a desired position, a plunger pivotally connected to said first bolt having an aperture therein forming a lost motion connection with said stud, spring means for urging the plunger and thereby said first bolt to a latching position, primary means for retracting said plunger and thereby said bolt independently of said actuator, a link pivotally connected to said actuator having a slot therein forming a similar connection with said stud, and secondary means for simultaneously retracting said plunger and said link, to thereby unlatch said second bolt, whereupon said secondary means engages and simultaneously causes retraction of said primary means.

5. In combination with a refrigerator having an inner door and a superimposed outer door mounted on the refrigerator jamb for independent swinging movement, a latch bolt operably mounted in the outer door and engageable with a keeper fastened to the door jamb so as to latchably secure the outer door to the jamb, a second latch bolt operably mounted on the jamb and engageable with a second keeper mounted on the inner door so as to latchably secure the inner door to the jamb, a primary handle and a second handle operably mounted on the outer door, said secondary handle saddling said primary handle so that said primary handle is operated upon operation of the secondary handle, means operatively connecting said first bolt and said primary handle whereby said first bolt is retracted and the outer door unlatched when said primary handle is operated, and means operative by said secondary handle for retracting said second bolt and unlatching said inner door upon operation of said secondary handle.

6. In combination with a refrigerator having an inner and outer swinging door, a latch bolt for securing the outer door in latched position, latching means for latchably securing the inner door, an actuator for releasing said inner door latching means, said latch bolt and said actuator being pivoted on a common member, a plunger pivotally connected at one end to said latch bolt,

a link pivotally connected at one end to said actuator, said plunger and link each having their opposite ends slidably mounted on a common support, a primary handle operatively connected to said plunger for operating said latch bolt, a secondary handle operatively connected to said link for operating said actuator, said primary and secondary handles being mounted on a common pivot with said secondary handle underlying said primary handle, and an operative connection between said secondary handle and said primary handle, whereby upon operation of the secondary handle said latch bolt and actuator will be simultaneously operated.

7. In combination with a refrigerator having an inner and outer swinging door, a latch bolt for securing the outer door in latched position, latching means for securing the inner door in closed position, an actuator for releasing the inner door latching means, said latch bolt and actuator being mounted on a common pivot, and said latch bolt being partially nested within said actuator, primary means for operating said latch bolt and pivoting it relative to said actuator about the common pivot, and secondary means for operating said actuator, said secondary means being operatively connected to said primary means whereby upon operation of said secondary means said latch bolt and actuator will be simultaneously operated.

8. In combination with a refrigerator having an inner and outer swinging door, a latch bolt for securing the outer door in closed position, latching means for latching the inner door in closed position, an actuator for releasing said inner door latching means, said latch bolt and actuator being pivotally mounted on a common pivot, means for operating said latch bolt, including a plunger operatively connected to said latch bolt and a bell crank operatively connected to said plunger, a primary handle for actuating said bell crank, means for operating said actuator, including a link operatively connected to the actuator and a second bell crank operatively connected to said link, and a secondary handle mounted on a common pivot with said primary handle and operatively connected to both of said bell cranks, whereby upon operation of the secondary handle said latch bolt and actuator will be simultaneously operated.

GEORGE E. CURTISS, JR.
ELMER A. PAGELLA.