

Sept. 22, 1959

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2,904,823

DOUBLE HUNG DOOR MOUNTING, LATCHING AND OPENING MEANS

Filed Sept. 21, 1955

5 Sheets-Sheet 1

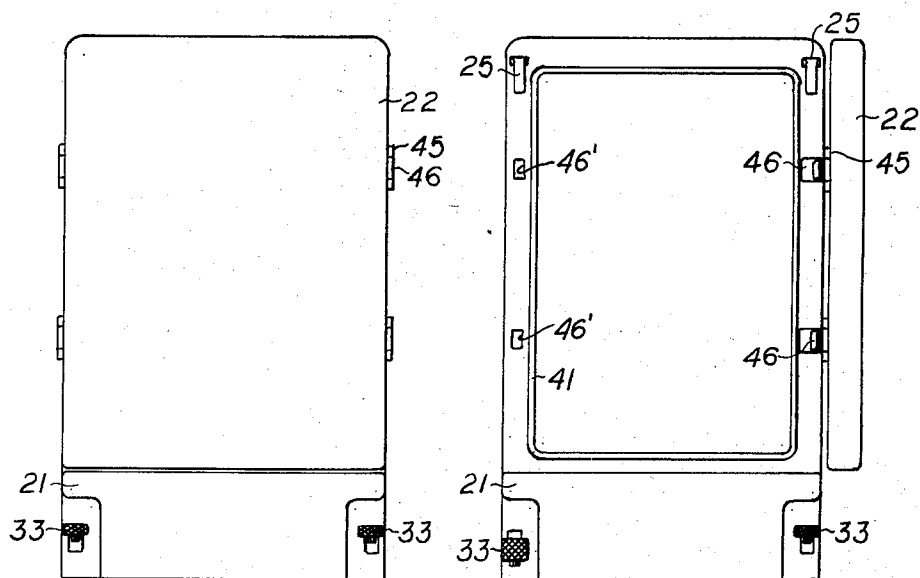


FIG 1

FIG 2

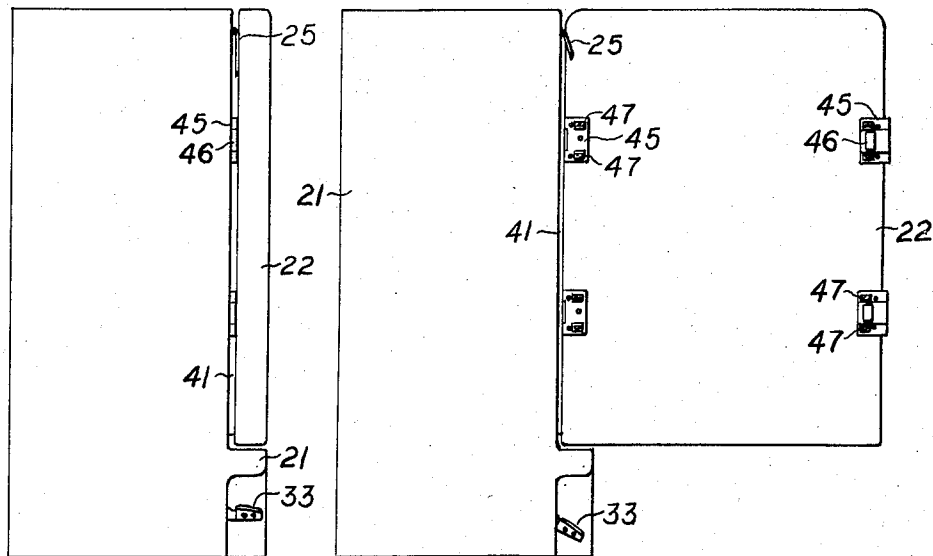


FIG 3

FIG 4

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5 Sheets-Sheet 2

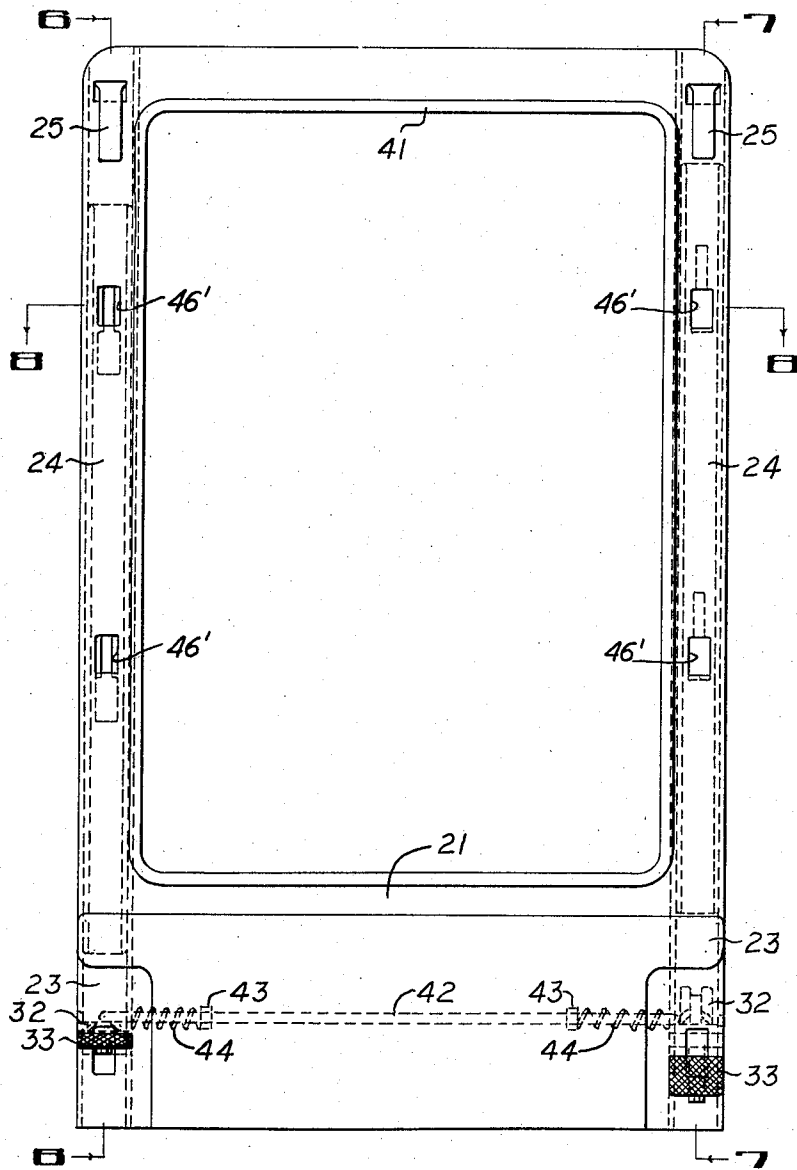


FIG_5_

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5 Sheets-Sheet 3

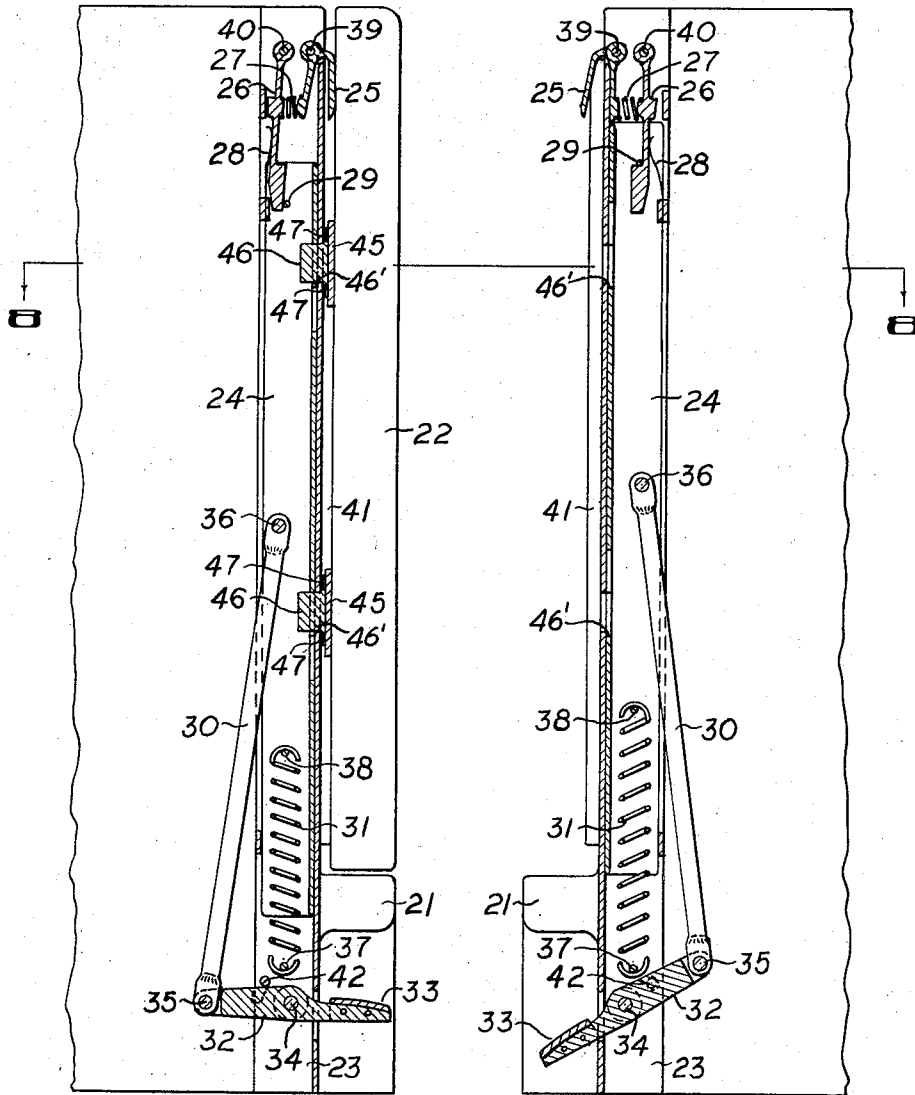


FIG. 6

FIG. 7

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5 Sheets-Sheet 4

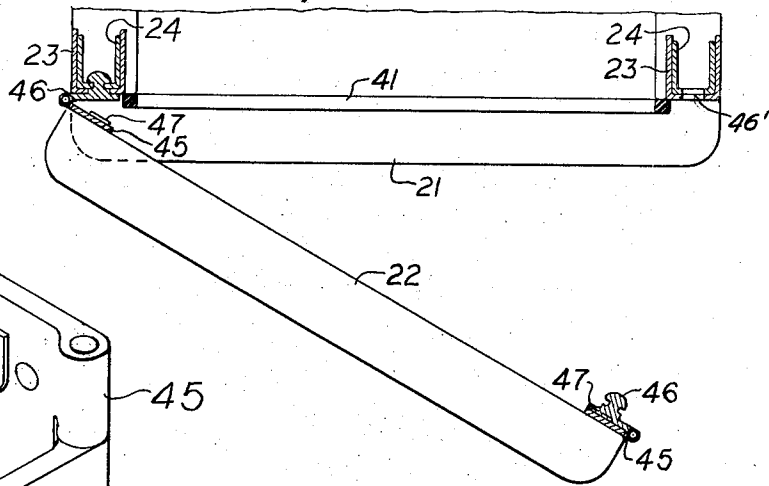


FIG. 8

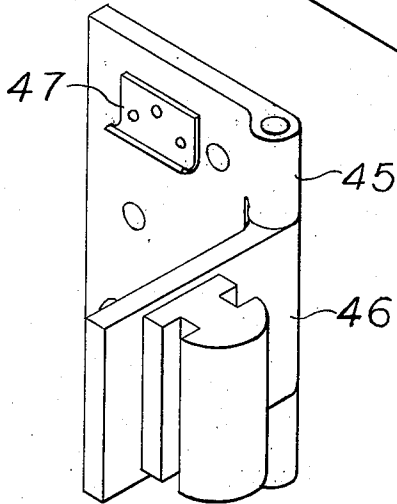


FIG. 9

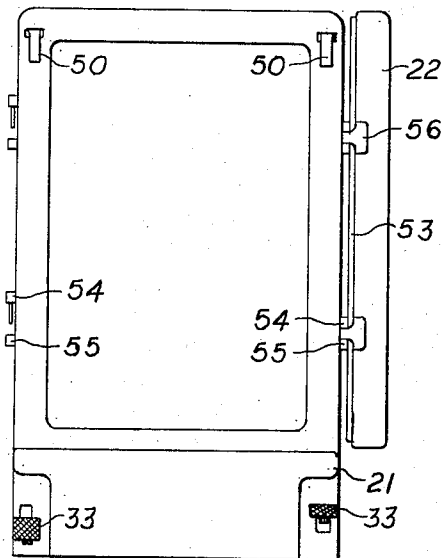


FIG. 10

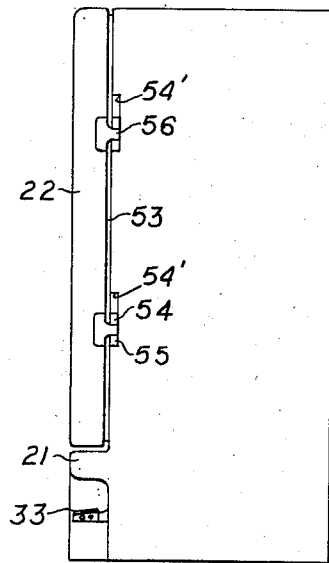


FIG. 11

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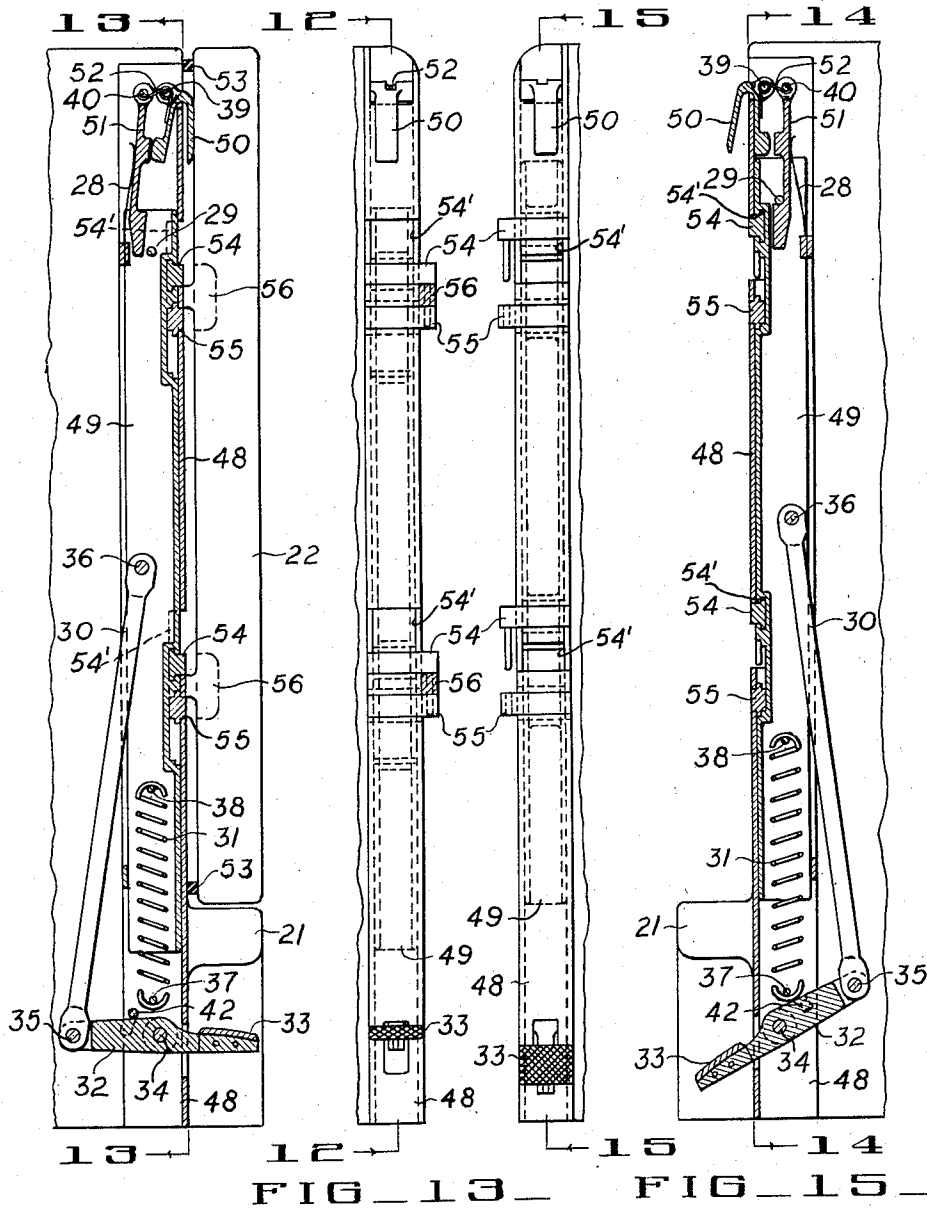
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FIG_12_ FIG_14_



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DOUBLE HUNG DOOR MOUNTING, LATCHING AND OPENING MEANS

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Application September 21, 1955, Serial No. 535,585

6 Claims. (Cl. 16—147)

The present invention relates to a new and novel double hung door mounting, latching and opening means, using foot pedals to open the door. While the invention can be used for other types of doors it is designed primarily for use on refrigerators.

It is an object of the invention to provide hinging and latching elements which will support the door as a hinge, when the door is opened on the opposite side, without allowing the door to sag.

A further object of the invention is to provide hinging and latching elements which will provide means for locking the door in a firmly closed position when the door is shut.

A further object of the invention is to provide hinging and latching elements that will be relatively small, compact and strong, thereby minimizing the projection of parts beyond the surfaces of the door and/or the refrigerator.

A further object of the invention is to provide an internal mechanism which will operate in conjunction with the hinging and latching elements to accomplish the hinging and locking set forth in preceding paragraphs.

A further object of the invention is to provide means whereby the opening of the door on either side is accomplished through the depression of a foot pedal on that side of the door, leaving the hands free for other tasks.

A further object of the invention is to provide means whereby releasing the door latch automatically releases forces tending to cause the door to swing open without external aid.

A further object of the invention is to provide means whereby the hinging and latching elements are automatically locked in the closed position when the door is pushed into the closed position.

A further object of the invention is to provide means whereby the internal mechanism remains in either the "Open Door" or "Closed Door" conditions as long as the door is respectively open or closed.

A further object of the invention is to provide means whereby only one side of the door can be opened at any one time, thereby preventing the door from falling off the refrigerator.

A further object of the invention is to provide a double hung door latching and opening mechanism which is relatively inexpensive to produce and which requires a minimum amount of labor to assemble.

And finally an object of the invention is to provide a double hung door latching and opening mechanism which can be largely contained within the cabinet structure of the refrigerator, thereby permitting the use of a cabinet design that is pleasing to the eye.

Further objects and advantages of the invention will be pointed out in the course of the following detailed description of those forms of the invention chosen for the purpose of illustrating the principles thereof.

Referring to the accompanying drawings in which my invention is illustrated:

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Figs. 1 through 9 show the use of a preferred type of hinging and latching elements whereas Figs. 10 through 15 show the use of an alternate type of hinging and latching elements. Figs. 13 through 15 also show variations in design of the elements for automatically opening and locking the door. (In Figs. 5, 6, 7, 8, 12, 13, 14 and 15 the skin of the refrigerator is represented by single lines only, showing no appreciable thickness. This has been done to clarify the drawings.)

Fig. 1 is a front view of a refrigerator with the door closed.

Fig. 2 is a front view of the refrigerator with the door opened and hinged on the right side of the drawing.

Fig. 3 is a side view, showing the right side of the refrigerator with the door closed.

Fig. 4 is a right side view of the refrigerator showing the door opened in the same direction as in Fig. 2.

Fig. 5 shows a front view of the refrigerator, with the door removed, showing the position of the slides 24 within the frames 23, in the "Door Open" position on the right side of the drawing and in the "Door Closed" position on the left side of the drawing. This drawing also shows the interlocking mechanism between the door actuating mechanisms on each side of the refrigerator. It also shows the respective positions of the foot pedals 33 and the door opening levers 25 for the open and closed conditions. Details of the mechanisms behind the slides 23 are omitted from this drawing for the sake of clarity. (The number 33 is used interchangeably herein with the name foot pedal to refer to the assembly combination of the foot pedal pad 33 and the foot pedal arm 32 and the name foot pedal pad as a direct reference to the pad alone.)

Fig. 6 is a vertical side cross sectional view of the mechanism on the left side of Fig. 5 along the plane 6—6. It shows elements of the mechanism in the "Door Closed" position as viewed toward the center of the refrigerator.

Fig. 7 is a vertical side cross sectional view of the mechanism on the right side of Fig. 5 along the plane 7—7. It shows elements of the mechanism in the "Door Open" position as viewed toward the center of the refrigerator.

Fig. 8 is a horizontal cross sectional view of the mechanism at the front of the refrigerator along the plane 8—8 of Fig. 5. The door is shown hinged on the left side of the drawing and opened on the right side of the drawing. Elements not directly involved with the hinging and latching elements are omitted for clarity.

Fig. 9 is an enlarged isometric view of the preferred type of hinging and latching elements.

Fig. 10 is a front view of a refrigerator with the door hinged on the right side of the drawing, showing an alternate type of hinging and latching elements.

Fig. 11 is a left side view of a refrigerator having the alternate type of hinging and latching elements, with the door closed.

Fig. 12 is a vertical side cross sectional view along the plane 12—12 of Fig. 13, as viewed towards the side of the refrigerator. This view shows the alternate type hinging and latching elements and a variation in design of the door opening lever 50 and slide latch 51. The mechanism is shown in the "Door Closed" position.

Fig. 13 is a front view of the mechanism along the plane 13—13 of Fig. 12. Portions of the mechanism behind the slide are omitted for clarity. The plane 13—13 is considered as lying between the front face of the frame 48 and the skin of the refrigerator, thereby showing the full view of the front face of the frame 48. Also the foot pedal 33 and the door opening lever 50 are shown in full front view and not sectioned on the plane of the drawing.

Fig. 14 is a front view of the mechanism along the plane

14—14 of Fig. 15. This view shows the mechanism in the "Door Open" position. The same comments on the drawing features of Fig. 13 given in the paragraph immediately above also apply to Fig. 14.

Fig. 15 is a vertical side cross sectional view along the plane 15—15 of Fig. 14 as viewed towards the side of the refrigerator. This view shows the same type of mechanism as Fig. 12, but on the opposite side of the door and in the "Door Open" position.

In the following description of operation, the same parts are given the same number in each of the various figures. Furthermore, since the mechanisms on both sides of the door are identical in operation, the same numbers have been used for the same parts on each side of the door. Also since certain elements, such as the hinging and latching elements, are duplicated in each side of the mechanism the same numbers are used for such identical parts. Parts in the alternate type of mechanism, Figs. 10 through 15, which are identical to those in the preferred type of mechanism, Figs. 1 through 8, are given the same numbers. Parts which have a different design, in the two types of mechanism, have different numbers although the same names are used. A description of the operation of one side of the mechanism will be sufficient to explain the operation of the mechanism as a whole.

The principal supporting member of the mechanism is the supporting channel or frame 23, which is a U-shaped member with the open side of the U towards the rear of the refrigerator and which is contained and forms the front of the cabinet side. Holes are drilled in the sides of the frame 23 for holding and locating the foot pedal pivot pin 34, the frame-slide closing spring pin 37, the door opening lever pivot pin 39, the slide latch pivot pin 40 and the locking bar 42. An opening in the front face of the frame 23 near the bottom allows the foot pedal arm 32 to extend through the front face of the frame 23 and refrigerator body 21 for access by the operator. Another opening near the top of the frame 23 allows the door opening lever 25 to extend through the front face of the frame 23 and refrigerator body 21 for operation of the "automatic" elements that will be described later. Two apertures along the front center line of the frame 23 allow the body hinge and locking pieces 46 of the hinging and latching elements to enter and project within the frame 23 when the door is closed. Cross pieces are welded across the back or open face of the frame 23, to act as retainers for the slide 24. In Figs. 6 and 7 the top cross piece shown is used as a back-up piece for the slide latch 26. The center cross piece shown in Figs. 6 and 7 and the top cross piece shown in Figs. 12 and 15 serve as a point of attachment for the slide latch closing spring 28 as well as a retainer for the slide 24. The slide latch closing spring 28 is secured to this cross piece by means of bolts and a nut plate.

The slide 24 is also a U-shaped member which slides within the frame 23. The open side of the slide 24 also is towards the rear of the refrigerator. Holes are drilled in the sides of the slide 24 for holding and locating the slide-slide closing spring pin 38, the slide opening rod-slide connecting pin 36 and the slide latch pin 29. Two inverted T-shaped apertures on the center line of the front of the slide 24 are located the same distance apart as the apertures in the frame 23. When the wider portion of these T-shaped apertures line up with the apertures in the frame 23, in the "Door Open" position, the body hinge and locking pieces 46 can enter and project within both the frame 23 and the slide 24. When the slide 24 is lowered to the "Door Closed" position, the portions of the slide 24 adjacent to the narrow part of the T-shaped apertures enter vertical slots in the sides of the tangs of the body hinge and locking pieces 46 thereby locking and positioning the body hinge and locking pieces 46 in the closed position. A slight bottom-to-top taper on the back of the slide 23, on each side of this narrow portion of the

T-shaped aperture, gives a wedging action which ensures that the door will be tightly closed. The lower and wider portion of the T-shaped aperture is made slightly deeper than the corresponding aperture in the frame 23 to permit positive action of the slide latch 26. The width of the aperture in the frame 23 and the wide portion of the T-shaped aperture in the slide 24 are the same.

Movement of the slide 24 from the "Door Closed" position as shown in Figs. 6 and 12 is accomplished by stepping on the foot pedal pad 33. The resulting rotation of the foot pedal arm 32 is translated to vertical linear motion of the slide 24 by means of the slide opening rod 30. The foot pedal arm 32 is connected to the lower end of the slide opening rod 30 by the foot pedal-slide opening rod connecting pin 35. The foot pedal pad 33 has an inverted U-shaped sleeve on its lower surface which fits over the front end of the foot pedal arm 32 after the latter has been installed in the frame 23. Two bolts hold the foot pedal pad 33 in position on the foot pedal arm 32. Movement of the slide 24 from the "Door Open" position to the "Door Closed" position is caused by tension in the slide closing spring 31 when the slide latch 26 and 51 is moved to the rear, clear of the slide latch pin 29. This action will be described in later paragraphs.

Two circular and tapered grooves are milled in the sides of the foot pedal arm 32 so that the rotary motion of the foot pedal arm 32 when opening the door, will force the locking bar 42 to move laterally away from the opened side of the door and towards the hinged side of the door. The length of the locking bar 42 is such that any appreciable lateral motion will result in the "Door Closed" end of the locking bar 42 extending over the top of the foot pedal arm 32 on that side of the refrigerator, thereby preventing operation of that arm until the locking bar 42 has returned to its centered position. The locking bar 42 is centered by the action of two locking bar centering springs 44 which surround the locking bar 42 and bear against the inside surfaces of the two frames 23 and the locking bar collars 43. These locking bar collars 43 can be held in place on the locking bar 42 by set screws, cotter keys or other suitable means. The locking bar 42 is centered only when the mechanisms on both sides of the refrigerator are in the "Door Closed" position. Fig. 5 shows the locking bar 42 displaced to the left, thereby preventing operation of the mechanism on the left side of the drawing.

The preferred type of hinging and latching elements are shown in Fig. 9, an enlarged isometric view. Each hinging and latching element consists of five component parts (not including rivets, bolts or other securing mediums). The door hinge pieces 45 are bolted, riveted or otherwise securely fastened to the back of the refrigerator door 22. The body hinge and locking piece 46 is attached to the door hinge piece 45 by a hinge pin. The salient design feature of the body hinge and locking piece 46 is the H-shaped integral tang which projects through apertures 46' in the refrigerator skin and the frame 23 when the door is closed. The faces of the two vertical slots, in the sides of the tang, toward the rear of the refrigerator have a taper matching those on the slide 24 described previously. These matching tapers provide a tight locking action when the slide 24 is lowered to the "Door Closed" position. The portions of the slide 24 on each side of the narrow part of the T-shaped aperture slide into the slots in the H tang of the body hinge and locking piece 46 as described above. The dimensions of these mating portions of the slide 24 and the body hinge and locking piece 46 are such that no rotation or other movement of the body hinge and locking piece 46 is possible with the slide 24 in the "Door Closed" or lower position. The tension in the slide closing spring 31 keeps the slide 24 in this lower position. Any vibration of the refrigerator due to the operation of the compressor motor will assist in keeping the door tightly locked.

When the mechanism is moved to the "Door Open"

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position the slide 24 and the body hinge and locking piece 46 are unmated and the door is free to open on the side on which the mechanism has been operated. In order to keep the body hinge and locking piece 46 in proper position when the door is opened, two J-shaped body hinge piece retaining springs 47 are riveted to the door hinge piece 45 immediately above and below the body hinge and locking piece 46. The curved portions of these body hinge piece retaining springs 47 bear against the top and bottom edges of the body hinge and locking piece 46 with enough frictional force to hold the body hinge and locking piece 46 against the door hinge piece 45 when the door is open. However, the friction of these springs is not enough to interfere with the motion of the door when the hinging and latching elements are acting as hinges. Fig. 8 shows the positions of the hinging and latching elements when in the hinged and open conditions.

In order to provide automatic opening of the refrigerator door 22 when the slide 24 is moved to the "Door Open" or upper position; to provide that the door will be automatically locked by the slide 24 returning to the "Door Closed" position when the door is closed; and to ensure that the slide 24 is held in the upper or "Door Open" position while the door remains open on that side, certain "automatic" elements are installed in the upper portion of the frame 23. Two design variations of these elements are shown. The "automatic" elements shown in Figs. 6 and 7 are: the door opening lever 25 which is mounted on and rotates on the door opening lever pivot pin 39, the slide latch 26 which is mounted on and rotates on the slide latch pivot pin 40, the slide latch pin 29 which is mounted transversely in the upper end of the slide 24, the slide latch and door opening spring 27 which is located between the inner arm of the door opening lever 25 and the slide latch 26, the slide latch closing spring 28 which is attached to the center cross piece welded on the back of frame 23 and bearing against the back of the slide latch 26, the door opening lever pivot pin 39 which is mounted transversely towards the front of and at the top of the frame 23 and the slide latch pivot pin 40 which is mounted transversely and towards the rear at the top of the frame 23. In Figs. 12, 13, 14 and 15 the "automatic" elements are: the door opening lever 50 which is mounted similarly to the door opening lever 25, the slide latch 51 which is mounted similarly to the slide latch 26, the door opening spring 52 mounted on the mid part of the door opening lever pivot pin 39 and restrained by the slide latch pivot pin 40 and the rear face of the inner arm of the door opening lever 50, the slide latch pin 29, the slide latch closing spring 28, the door opening lever pivot pin 39 and the slide latch pivot pin 40.

In Figs. 6 and 7 the action of these "automatic" elements is as follows:

When the door is closed the door opening lever 25, mounted on the door opening lever pivot pin 39, is rotated towards the rear of the refrigerator by pressure of the door on the outer arm of the door opening lever 25. This rotation of the door opening lever 25 compresses the slide latch and door opening spring 27. When the compression force of this coil spring exceeds the combined resisting forces of the slide latch closing spring 28 and the friction between the slide latch 26 and the slide latch pin 29, the slide latch 26, mounted on the slide latch pivot pin 40, is rotated towards the rear of the refrigerator. This motion of the slide latch 26 forces it clear of the slide latch pin 29 allowing the tension of the slide closing spring 31 to pull the slide 24 down into the "Door Closed" position. The slide latch closing spring 28, a leaf spring, opposes the rotation of the slide latch 26 thereby preventing premature release of the slide 24. While the door is closed and locked the slide latch pin 29 holds the slide latch 26 in its rear position.

When the slide 24 is raised to open the door the body hinge and locking pieces 46 are unmated from the slide 24 and the slide latch pin 29 is raised sufficiently high

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to clear the hook of the slide latch 26. Simultaneously the compression of the slide latch and door opening spring 27 rotates the inner arm of the door opening lever 25 towards the front of the refrigerator, thereby exerting a force by the outer arm of the door opening lever 25 on the refrigerator door 22 causing it to swing open. When the expansion of the slide latch and door opening spring 27 has relieved its compression, the slide latch closing spring 28 will rotate the slide latch 26 towards the front of the refrigerator under the slide latch pin 29 which will become supported by the hook of the slide latch 26. This condition of these "automatic" elements keeps the slide 24 in the upper or "Door Open" position, as shown in Fig. 7, until closing of the door again actuates these elements to lock the door as described above.

The design variation of these "automatic" elements shown in Figs. 12, 13, 14 and 15 perform their functions in a manner almost identical with those described above. The differences in construction and operation are as follows:

The mid-section of the hub of the door opening lever 50 is milled out to permit mounting the coil of the door opening spring 52 on the door opening lever pivot pin 39 at the time these elements are installed in the frame 48. Similarly the mid-section of the hub of the slide latch 51 is milled out so that the slide latch pivot pin 40 can be used as the anchor for one end of the door opening spring 52. The other end of this torsion spring presses against the rear face of the inner arm of the door opening lever 50 tending to force it towards the front of the refrigerator at all times. The inner arm of the door opening lever 50 has a pad at its lower end which engages a corresponding pad on the slide latch 51 during the last portion of travel of the door opening lever 50 when the door is shut. This causes the slide latch 51 to be rotated towards the rear of the refrigerator. This movement of the slide latch 51, while engaged by the door opening lever 50, is restricted to that necessary to disengage the slide latch 51 from the slide latch pin 29. Motion of the door opening lever 50 when not engaged with the slide latch 51 is for the purpose of compressing the door opening spring 52 when the door is closed or to force the door open when the slide 24 is raised. The action of the slide latch 51, the slide latch closing spring 28 and other portions of the mechanism are identical to those described for the other variation in design of the "automatic" elements.

Another variation in design of the door opening levers 25 and 50 is in the lateral location of the outer arm. This location is dependent upon the location of the refrigerator door seals 41 and 53. When the preferred type of hinging and latching elements are used it is necessary to place the refrigerator door seal 41 inside the elements as shown in Figs. 5, 6, 7 and 8. In this case the outer arm of the door opening lever 25 is symmetrical about the vertical center line of each mechanism. When the alternate type of hinging and latching elements are used it is possible to use a refrigerator door seal 53 that is close to the outside of the refrigerator as shown in Figs. 12, 13, 14 and 15 or an inner door seal 41. When the outer door seal 53 is used it is necessary that the outer arm of the door opening lever 50 be offset towards the center of the refrigerator in order to clear the refrigerator door seal 53.

The description given above has been based upon the use of the preferred type of hinging and latching elements. Use of the alternate type of hinging and latching elements shown in Figs. 10, 11, 12, 13, 14 and 15 involves only a variation in design of certain elements of the mechanism. The operations of the various elements of the mechanism, with the exception of the hinging and latching elements, are identical with the description given above and therefore will not be repeated. The following variations in design are necessary in certain elements when the alternate hinging and latching elements are used.

The frame 48 has transverse milled slots in its front face and sides to provide support for the lower hinge blocks 55 which are stationary at all times. Elongated milled slots 54' are located in the front face and sides of the frame 48 above the milled slots for supporting the lower hinge blocks 55. These elongated slots permit movement of the upper hinge blocks and hinge pins 54 in a vertical direction. Otherwise the design of the frame 48 is the same as the frame 23.

The slide 49 is a U-shaped casting which slides within the frame 48. Thicker sections of the front face of the slide 49 contain milled slots to support and contain the upper hinge blocks 54 and elongated milled slots, located below the slots for the upper hinge blocks 54, to permit free vertical movement of the slide 49 about the lower hinge blocks 55. Other features of the slide 49 are similar to those of the slide 24.

The door hinge blocks 56 are secured to the sides of the refrigerator door 22 and nest between the upper hinge blocks 54 and the lower hinge blocks 55 when the door is closed. The upper hinge blocks 54 project through elongated holes in the skin at the sides of the refrigerator body 21. These elongated holes in the skin coincide with those in the frame 48 and permit vertical motion of the upper hinge blocks and hinge pins 54 when the slide 49 is moved. The lower hinge blocks 55 also project through holes in the skin on the sides of the refrigerator body 21. The hinge pins, permanently attached to the upper hinge blocks 54 outside the refrigerator skin, are slightly tapered axially to facilitate mating with holes drilled on the same axis in both the door hinge blocks 56 and the lower hinge blocks 55 when the refrigerator door 22 is closed. This slight taper of the hinge pins and the mating holes also helps to tighten the fit of the refrigerator door 22 to the refrigerator body 21 when the door is closed.

Action of the hinging and latching elements in this variation is accomplished by inserting or removing the hinge pins in the holes in the door hinge blocks 56 and lower hinge blocks 55 when the slide 48 is respectively lowered or raised.

Having thus described my invention, what I claim as new and novel is:

1. In a right and left hand opening door structure for an access opening of a cabinet structure, latch and hinge assemblies respectively supporting said door structure on opposite sides of said access opening for swinging movements, each of said assemblies comprising: a member carried by said door structure; pivot means connecting said member to said door structure for swinging movements thereon, said member including a projecting part and adapted in the closed position of the door structure to occupy a position contiguous to a facing wall of the cabinet structure with the projecting part extending through an aperture in said facing wall; an elongate latch member mounted on the cabinet structure for longitudinal movement, said latch member having a shoulder carried into and out of engagement with said projecting part, when said projecting part is positioned in said aperture, said shoulder acting, when in engagement with said projecting part, to anchor said member to the cabinet structure so that the associated pivot means provides a hinge support between said structures, and when disengaged from said projecting part enabling movement of said member with the door structure, spring means biasing said latch member in a direction for engaging said shoulder with said projecting part; foot actuated means operable to move said latch member against the action of said spring means in a direction for disengaging said shoulder from said projecting part; means for releasably locking said latch member in the disengaged position of said shoulder with respect to said projecting part upon movement thereof by said foot actuated means; and a tripping member on said cabinet for releasing said locking means, said tripping member being so positioned as to

be engaged by the inner surface of the door and activated by movement of the door to a closed position.

2. In a right and left hand opening door structure for an access opening of a cabinet structure, latch and hinge assemblies respectively supporting said door structure on opposite sides of said access opening for swinging movements, each of said assemblies comprising: a member carried by said door structure; pivot means connecting said member to said door structure for swinging movements thereon, said member including a projecting part and adapted in the closed position of the door structure to occupy a position contiguous to a facing wall of the cabinet structure with the projecting part extending through an aperture in said facing wall; an elongate latch member mounted on the cabinet structure for longitudinal movement, said latch member having a shoulder carried into and out of engagement with said projecting part, when said projecting part is positioned in said aperture, said shoulder acting when in engagement with said projecting part, to anchor said member to the cabinet structure so that the associated pivot means provides a hinge support between said structures, and when disengaged from said projecting part enabling movement of said member with the door structure; spring means biasing said latch member in a direction for engaging said shoulder with said projecting part; foot actuated means operable to move said latch member against the action of said spring means in a direction for disengaging said shoulder from said projecting part; means for releasably locking said latch member in its disengaged position with respect to said projecting part; and spring biased means on said cabinet engageable by the door structure in its closed position for releasing said locking means, and further acting to initiate opening movement of the door upon disengagement of the latch member by the operation of the foot actuated means.

3. In a right and left hand opening door structure for an access opening of a cabinet structure, latch and hinge assemblies respectively supporting said door structure on opposite sides of said access opening for swinging movements, each of said assemblies comprising: a member carried by said door structure; pivot means connecting said member to said door structure for swinging movements thereon, said member including a projecting part and adapted in the closed position of the door structure to occupy a position contiguous to a facing wall of the cabinet structure with the projecting part extending through an aperture in said facing wall; a latch member mounted on the cabinet structure for movement into and out of engagement with said projecting part, when positioned in said aperture, said latch member acting, when in engagement with said projecting part, to anchor said member to the cabinet structure so that the associated pivot means provides a hinge support between said structures, and when disengaged from said projecting part enabling movement of said member with the door structure; spring means biasing said latch member in a direction of engagement with said projecting part; foot actuated means operable to move said latch member against the action of said spring means in a direction for disengaging it from said projecting part; a locking lever pivotally supported at one end on the cabinet structure for swinging movement, and adapted at its other end for locked association with said latch member when disengaged with respect to said projecting part; a spring biasing said lever towards said locked association; a pivoted crank member having angularly disposed arms; a compression spring positioned between one of said arms and said locking lever, the other of said arms being disposed for engagement by the door structure, in its closed position, and then acting to move said locking lever against its spring to an unlocked position with respect to said latch member, and said other arm acting under said compression spring, in the released position of said latch member to swing the associated released projecting part

and adjacent door structure edge away from the cabinet structure.

4. In a right and left hand opening door structure for a vertical access opening of a cabinet structure, latch and hinge assemblies respectively supporting said door structure on opposite sides of said access opening for swinging movements, each of said assemblies comprising: a member carried by said door structure; pivot means connecting said member to said door structure for swinging movements thereon, said member including a projecting part and adapted in the closed position of the door structure to occupy a position contiguous to a facing wall of the cabinet structure with the projecting part extending through an aperture in said facing wall; releasable detent means normally retaining said member in a position enabling entrance of said projecting part into the associated cabinet aperture, but releasing said member for hinged movement during swinging movement of the door structure on its pivot means; and manually operable means on the cabinet structure including a longitudinally movable latch member having a shoulder movable into and out of engagement with said projecting part, when said part is positioned in said aperture, said shoulder acting, when in engagement with said projecting part, to anchor said member to the cabinet structure so that the associated pivot means provides a hinge support between said structures, and when disengaged from said projecting part enabling movement of said member with the door structure.

5. In a right and left hand opening door structure for an access opening of a cabinet structure, latch and hinge assemblies respectively supporting said door structure on opposite sides of said access opening for swinging movements, each of said assemblies comprising: a member carried by said door structure; pivot means connecting said member to said door structure, said member including a projecting part and adapted in the closed position of said door structure to occupy a position contiguous to a facing wall of the cabinet structure with the projecting part extending through an aperture in said facing wall; a latch member mounted on the cabinet structure for movement into and out of engagement with said projecting part, when positioned in said aperture, said latch member acting, when in engagement with said projecting part, to anchor said member to the cabinet structure so that the associated pivot means provides a hinge support between said structures, and when disengaged from said projecting part enabling movement of said member with the door structure; spring means biasing said latch member in a direction of engagement with said projecting part; foot actuated means operable to move said latch member against the action of said spring means in a direction for disengaging it from said projecting part; a locking lever pivotally supported at one end of the cabinet structure for swinging movement, and adapted at its other end for locked association with said

latch member when the latch member is disengaged with respect to said projecting part; a pivoted crank member having angularly disposed arms, one of said arms being positioned adjacent said locking lever, and the other of said arms being positioned for engagement by the door structure and a consequent pivotal movement of the crank member during movement of the door to its closed position, said movement of the crank member by the door further acting through said one arm to move said locking lever to an unlocked position with respect to said latch member; and spring means normally opposing movement of said locking lever to its unlocked position, and the movement of said crank member by engagement of the door with said other arm, and said other arm acting under said spring means, in the released position of said latch member to swing the associated released projecting part and adjacent door structure edge away from the cabinet structure.

6. In a right and left hand opening door structure for a vertical access opening of a cabinet structure, latch and hinge assemblies respectively supporting said door structure on opposite sides of said access opening for swinging movements, each of said assemblies comprising: a plurality of members along an edge margin of the door structure; pivot means respectively connecting said members in aligned spaced positions on said door structure for individual swinging movements thereon, said members being adapted in the closed position of the door structure to occupy a position contiguous to a facing wall of the cabinet structure; and means for releasably simultaneously securing said members to said cabinet structure including a manually operable latching bar having shoulder portions respectively engageable with said members to latch the same; means mounting said latching bar for reciprocable movements to latching and released position of said shoulder portions with respect to said members; a spring biasing the bar towards latching position with said shoulder portions engaging said members; and a foot lever below said door having a connection with said latching bar, said lever being movable in one direction for actuating said bar against the action of said spring towards a released position of said shoulder portions, to enable hinged movement of the door.

References Cited in the file of this patent

UNITED STATES PATENTS

370,331	Hamilton	Sept. 20, 1887
2,166,534	Rosenfeld	July 18, 1939
2,261,147	Dow	Nov. 4, 1941
2,284,921	Purkiss	June 2, 1942
2,577,456	Doman	Dec. 4, 1951
2,660,752	Carcereny	Dec. 1, 1953

FOREIGN PATENTS

806,979	France	Dec. 30, 1936
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