May 12, 1959 L. ALTMANN 2,885,723

RIGHT AND LEFT OPENING REFRIGERATOR DOOR

Filed Sept. 13, 1955 2 Sheets-Sheet 1

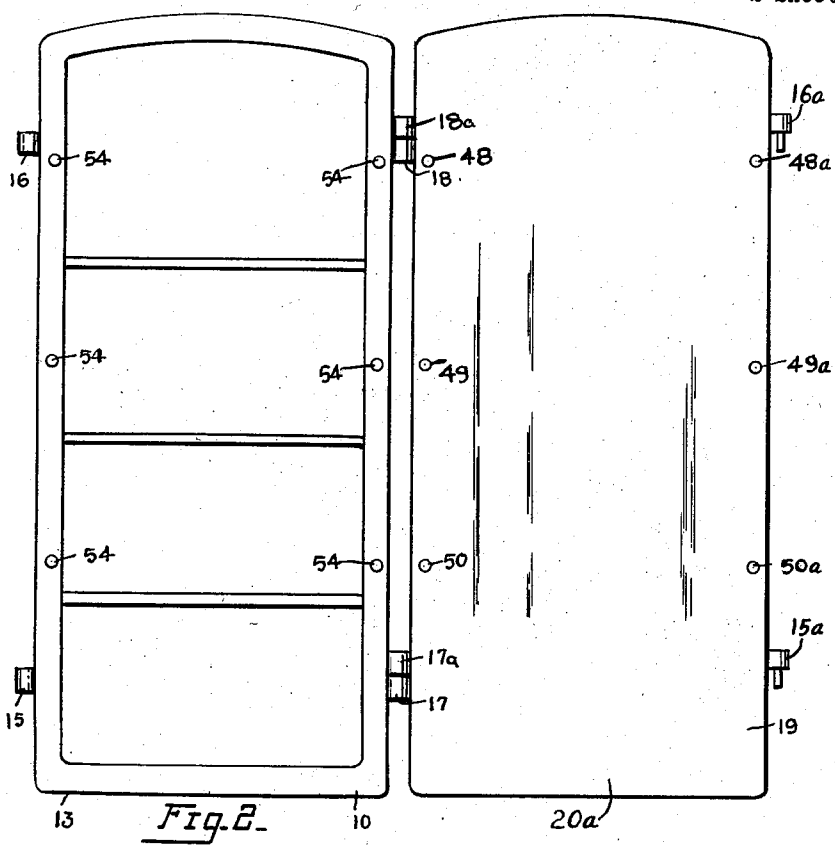


Fig. 2.

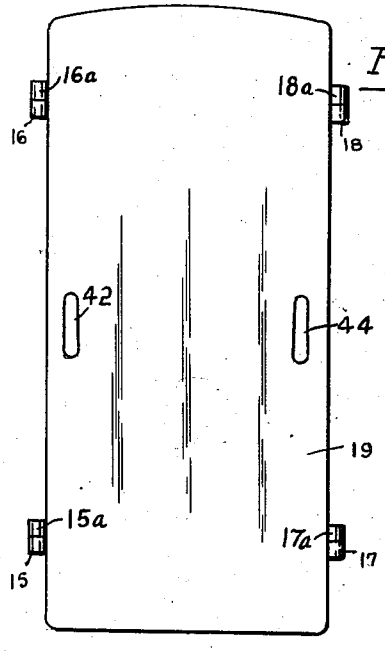
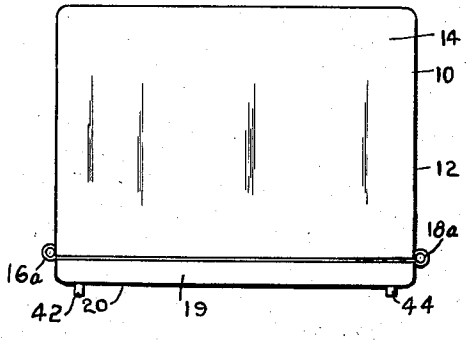


Fig. 1.

Fig. 3.



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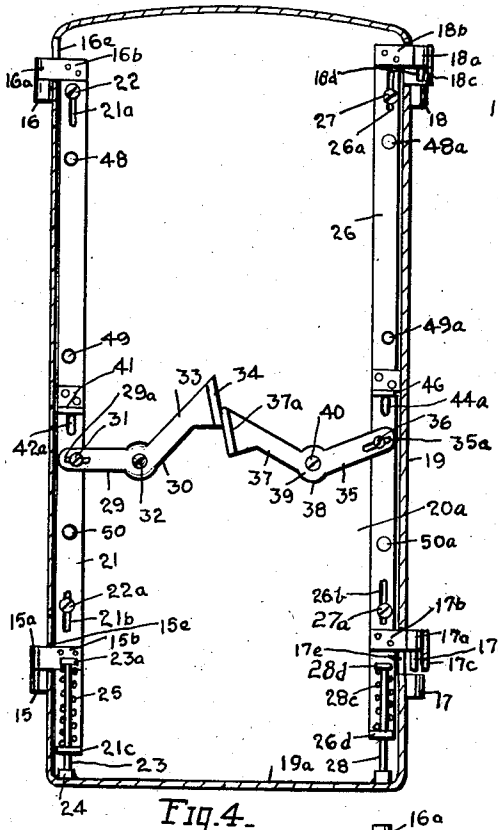


Fig. 4.

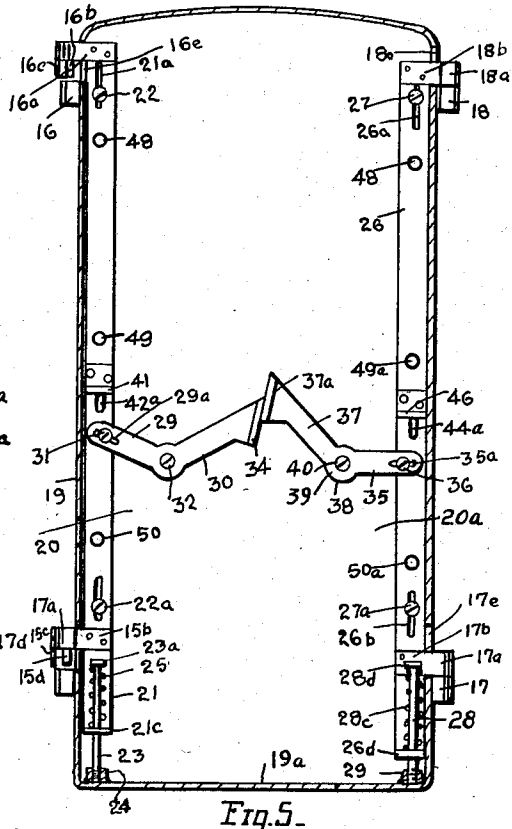


Fig. 5.

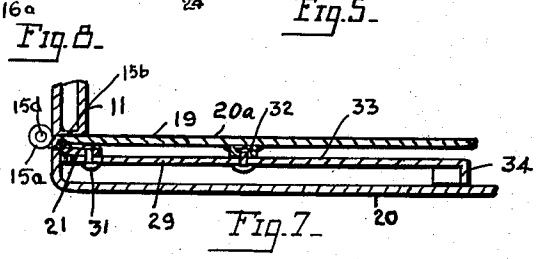


Fig. 7.

Fig. 8.

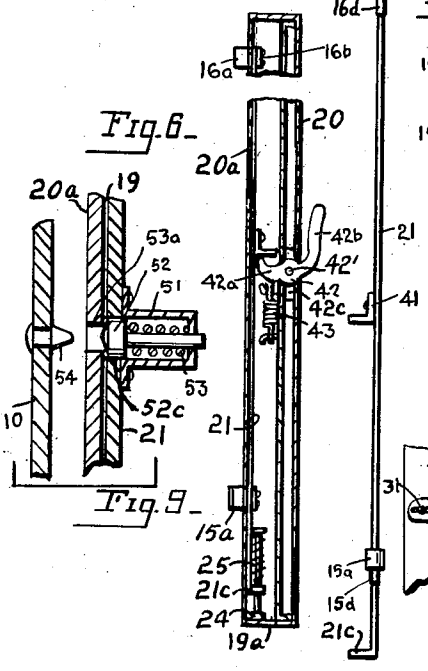


Fig. 6.

Fig. 9.

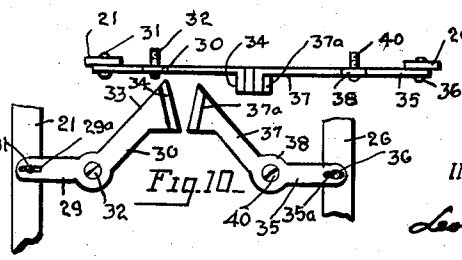


Fig. 10.

Fig. 11.

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RIGHT AND LEFT OPENING REFRIGERATOR DOOR

Leon Altmann, New York, N.Y.

Application September 13, 1955, Serial No. 534,028

4 Claims. (Cl. 16—147)

This invention relates to a door construction for refrigerators and the like, and a principal object of the invention is to provide a refrigerator with a door which is mounted to open on its right vertical side edge or on its left vertical side edge at the option of the user of the refrigerator, exercised by grasping a handle located near the side of the door selected to be opened, the opening action involving the automatic locking of the door where hinge movement takes place.

Another object of the invention is to provide a refrigerator with a door having supporting hinges on each vertical side edge thereof, and means concealed within the fabricated body of the door which locks the hinges forming the pivots for the door opening and closing, which means includes opposing levers pivoted within the door and coupled to the operating mechanism for the selective use of the hinges, and so arranged that when any set of hinge members of one side of the door is operated the other set will be locked against operation, by the end engagement of one lever with the other lever.

A still further object of the invention is the construction of a door for a refrigerator and the like, having a pair of movable hinge members on the left side of the door, a pair of movable hinge members on the right side of the door, a sliding vertical rod for operating the left hinges, a sliding vertical rod for operating the right hinges, a handle located near the side edge of the right of the door for operating the right vertical sliding bar, a handle located near the left side edge of the door for operating the left vertical sliding bar, and spring pins for automatically locking the raised vertical bar on each side of the door, to prevent accidental release thereof.

A still further object of the invention is the provision of a refrigerator door with a vertical sliding bar on the left side of the door, a vertical sliding bar on the right side of the door, upper and lower hinge members on each bar which project outwardly of the door, a spring for forcing each bar and its hinge members downwardly, a lever enclosed by the frame of the door which has pivotal engagement with the left vertical sliding bar, a companion lever which has pivotal engagement with the right vertical sliding bar, arms on the inner confronting ends of the levers which have sliding engagement with each other, so that when one sliding bar is raised the other sliding bar will be locked downwardly, a handle located near the left vertical side edge of the door for operating the left sliding bar, a handle located near the right vertical side of the door for operating the right sliding bar, and automatic means for locking the bar of the open side of the door against accidental displacement while the door is opened.

With the above and other objects in view the invention comprises certain new and useful constructions, combinations and arrangements of parts, shown in the accompanying drawings, and described in the following specification thereof, and in which:

Fig. 1 is a front elevation of the door shown in closed position on a refrigerator cabinet or box.

Fig. 2 is a similar view showing the door opened on the right side of the refrigerator cabinet or box.

Fig. 3 is a top plan view thereof.

Fig. 4 is a vertical sectional view through the door, showing the right movable hinge members raised and the left movable hinge members locked downwardly.

Fig. 5 is a similar view, showing the left movable hinge members of the door in raised position and the right movable hinge members locked in lower position.

Fig. 6 is a vertical sectional view through the door, showing the mounting of the handle on one side of the door and the manner it operates the vertical sliding bar of the same side of the door, shown partly broken away.

Fig. 7 is a fragmentary horizontal sectional view, taken through one of the hinges.

Fig. 8 is a detail edge view of one of the vertical sliding bars.

Fig. 9 is a detail vertical sectional view, showing the automatic means for locking the vertical sliding bar of the open side of the door when the door is in open position.

Fig. 10 is a detail view in elevation, showing the inner ends of the levers disengaged from each other, in normal closed door position.

Fig. 11 is an edge view of the levers engaged with each other, looking from the top thereof.

Referring to the accompanying drawings, which illustrate the practical embodiment of my invention, **10** designates a commercial type of refrigerator cabinet or box, having vertical side walls **11** and **12** and a bottom wall **13**, and a top wall **14**.

On the left vertical side of the cabinet, attached to the side wall **11** a lower hinge member **15** is secured to the refrigerator permanently, and near the upper end of the refrigerator an upper hinge member **16** is fixed on the side wall **11**, in vertical alignment with the lower hinge member **15**. On the right side wall **12** a lower hinge member **17** is fixed and in the same horizontal plane as the hinge member **15** of the left side of the refrigerator, and near the upper end of this right side wall **12** another hinge member **18** is fixed, in the same horizontal plane as the upper left hinge member **16** of the left side of the refrigerator, and in vertical alignment with the lower hinge member **17**.

A metal door **19** is constructed to match the refrigerator, and is formed hollow, according to conventional practice, and is provided with the usual front wall **20**. A left bar **21** is arranged to slide vertically against the left side of the door, and is provided with a longitudinal slot **21***a* near its upper end, through which a fastener or pin **22** extends to engage the door, and hold the bar **21** for limited sliding movement on the door. The bar **21** is further provided with a longitudinal slot **21***b* near its lower end, through which the fastener or pin **22***a* extends to engage the door, to permit limited sliding movement of the bar, and to hold the bar in proper working relation to the door.

The lower end of the bar **21** is provided with a lateral flange **21***c*, through which a vertical rod **23** extends, this rod being secured at **24** to the bottom wall **19***a*. The rod **23** is provided on its upper end with a head **23***a*, which is engaged by the coil spring **25** disposed around this rod, and which engages the lateral flange **21***c* of the vertical sliding bar **21** to force this bar downwardly.

Another bar **26** is arranged to slide vertically on the right side of the door, and for this purpose is formed with a longitudinal slot **26***a* near its upper end and another longitudinal slot **26***b* near its lower end. A fastener **27** extends through the upper slot **26***a* and is engaged with the door, and a fastener **27***a* extends through the lower

slot 26*b* to hold the bar 26 for limited sliding movement on the door.

A bar 28, having a head on its upper end, projects through the terminal flange 26*d* of the lower end of the bar 26, and a coil spring 28*c* is mounted on the bar or rod 28 and exerts pressure against the lateral stop flange 28*d*. The rod or bar 28 is secured at 29 to the bottom wall 19*a* of the door.

On the left side of the door, a lever 29 having a longitudinal slot 29*a* in its outer end, is pivotally secured to the bar 21 by means of the fastener 31, which extends through the slot 29*a*, and is pivotally secured to the door by the fastener 32. This lever has an inner arm 30 disposed in diagonal relation to the outer arm thereof, and is provided with a terminal shoe or strike head 34 on its inner end. A second and companion lever 35 is pivotally secured to the sliding vertical bar 26 by means of the fastener 36, which extends through the longitudinal slot 35*a* of said lever to engage said vertical bar 26. This second lever has an inner arm 37, disposed in diagonal relation to the outer lever arm, which is pivoted by the fastener 40 to the door.

The right lever 35 is provided with a striking head 37*a* on the inner end of the arm 37, which is designed to abut against the striking head 34 of the lever arm 30. When the vertical sliding bar 26 is in a raised position, the outer lever arm 35 will be raised and this will mean that the inner lever arm 37 is lowered, so that it abuts against the end of the striking head 34 of the lever arm 30. When the vertical sliding bar 21 is raised, the outer lever arm 29 will also be raised, thereby lowering the inner lever arm 30 and this will cause the striking head 34 thereof to abut against the striking head 37*a* of the inner lever arm 37, and this will lock the sliding bar 26 against vertical movement. When the bar 21 is locked in its lower position, the door will swing on the left hinge members which are coupled to each other, and when the bar 26 is locked in its lower position, the door will swing on its right hinge members.

The movable hinge member 15*a* is provided with a pintle pin which is received by the female hinge member 15, fixed to the refrigerator box; the movable hinge member 16*a* is secured in place by an arm 16*b* on the upper end of the bar 21, and is provided with a pintle 16*d*, which is received by the hinge member 16, fixed to the refrigerator box. The movable hinge member 17*a* is provided with a pintle 17*d*, which is received by the fixed hinge member 17 of the refrigerator. The movable hinge member 18 is provided with a pintle 18*d*, which is received by the hinge member 18 fixed to the refrigerator. A shield 15*c* may be provided on the movable hinge member 15*a* to conceal the joint between the mating hinge members 15*a* and 15; a shield 16*c* may be provided on the hinge member 16*a* for the same purpose; a shield 17*c* may be provided on the hinge member 17*a* and a shield 18*c* may be provided on the hinge member 18*a* for the same general purpose, of masking the gap between the mating hinge members.

The vertical sliding bar 21 is manually raised by means of a handle 42, which has a handhold 42*b* projecting above the pivot connection of the handle 42' with the door. This handle is provided with an inner hook arm 42*a*, which is designed to engage the small flange 41 fixed to the sliding bar 21. A spring 43 exerts a downward pull on the hook arm 42*a*, and thereby holds the handhold 42*b* contiguous to the front face of the door. By pulling on the handhold 42*b*, the hook arm 42*a* will be raised, thereby raising the sliding bar. The sliding bar 26 is operated in the same way by the handle 44.

Each of the sliding bars 21 and 26 is provided with a group of three spring pins 48, 49 and 50 on each sliding bar. These pins are spaced longitudinally from each other. Each spring pin includes a housing 51, which is secured to its bar, and a plunger pin 52, which slides in the housing and is acted on by the coil spring 53. The head of the pin is formed to engage in an opening 52*d* in the inner door plate 20*a*, said opening being aligned with the opening 52*c* in the bar 21. When the door is opened all of the pins of the vertical sliding bar on the open side of the door will be interlocked with the door part or plate 20*a*. When the door is closed the spring pressed pins will be displaced from locked engagement with the door, by the action of the tapered pins 54, fixed to the refrigerator and it will then be possible to operate the vertical bar. With the door in an open position the movement of the spring pressed pins through the sliding bar on the open side of the door, and into the receiving holes of the door plate 20*a*, will automatically lock this sliding bar against movement.

This safety feature is designed to prevent children from releasing the vertical sliding bar on the open side of the door when the door is in open position. Should one of the spring pins be pressed and thereby displaced by a child, the other two spring pins would hold the vertical bar 21 or 26 latched against accidental dropping, when it is in a raised position.

I am aware that doors have been constructed before which opened on the right or left sides, but the public has not been satisfied with the constructions offered it. In some of the devices which have gone into general use on a limited scale a single handle is provided on the door, which is located midway of the vertical sides of the door, with the result that greater effort is required to open a door because of the central position of the handle. My invention permits of the location of the handle at the extreme side edge portion of the door, so that maximum leverage is obtained, and a child may open the door without unusual effort. The opening action or effort for each side of the door is equal to that of the other side, which provides a balanced construction of high consumer acceptance value.

My invention provides for means for locking the unused sliding vertical bar against operation, by the action of the active lever on the inactive lever, and at the same time locks the handle which is operatively connected with the inactive sliding bar, and also provides means for locking the raised sliding bar in a raised position so that the door can be safely closed, and this locking means as well as the internal lever locking means involves an automatic action, which does not depend on manual selection.

Various changes and adjustments may be carried out in the development and utilization of the invention, within the scope of the invention as defined by the claims.

Having described my invention I claim as patentable:

1. A refrigerator having a box-like body provided with side, top and bottom walls and a back wall, the side walls being disposed vertically, the left side wall being provided with vertically aligned hinge members projecting outwardly thereof and spaced apart from each other, the right vertical side wall being provided with vertically aligned hinge members projecting outwardly thereof and spaced apart from each other, a door constructed to close the opening of the refrigerator and provided with vertical walls spaced apart from each other to provide a clearance between the walls, a vertical bar mounted to slide in said clearance adjacent to the left side of the door, a vertical bar mounted to slide in said clearance adjacent to the right side of the door, the left vertical sliding bar having vertically aligned hinge members projecting outwardly thereof to have hinge engagement with the hinge members of the left side wall of the refrigerator, the right vertical sliding bar having hinge members projecting outwardly thereof to have hinge engagement with the hinge members of the right side wall of the refrigerator, each of said sliding vertical bars having a lateral bearing, a handle pivoted to the door near the extreme left vertical edge thereof and provided with a part which projects inwardly and engages the bearing of the left vertical sliding bar, a handle pivoted to the door near the extreme right vertical edge thereof and having a part which projects in-

wardly to engage the bearing on the right vertical sliding bar, a lever pivoted between its ends to the door and having an outer arm having sliding connection with the left vertical sliding bar, a lever pivoted to the door and having an outer arm having sliding connection with the right vertical sliding bar, each lever having an inner arm which projects upwardly and each inner arm having a terminal striker thereon, the levers being normally disengaged from each other when the door is fully closed, the door being openable by operating either handle, and the levers and vertical sliding bars being so arranged that when one lever and its vertical sliding bar is actuated the other lever and its sliding bar will be locked against operation by the movement of the striker of the inner lever arm of the actuated lever against the striker of the other inner lever arm whereby movement thereof is obstructed.

2. The construction set forth in claim 1, each vertical side wall of the refrigerator having a plurality of pins disposed in a vertical plane and spaced apart from each other, the door having openings on each vertical side thereof to receive said pins when the door is fully closed, each vertical sliding bar having a plurality of spring pressed pins alignable with the pin receiving openings, the spring pins of each vertical sliding bar being adapted to enter the door openings on the same side of the door when the vertical bar is in a raised position and to support the vertical sliding bar which has been raised in an elevated position when the door is open, the pins of the refrigerator being adapted to displace the holding spring pins of the raised vertical bar when the door is closed.

3. The construction set forth in claim 1 including means for holding each vertical sliding bar in a raised position when the door is open and means carried by the refrigerator for displacing said holding means to release the raised sliding bar when the door is closed against the refrigerator.

4. The combination with a body forming a compartment and having opposing side walls disposed vertically, a pair of hinge members fixed to one side wall and disposed in vertical alignment with each other, a pair of hinge members fixed to the other side wall and disposed in vertical alignment with each other, a door constructed to close the opening between said side walls, a vertical bar mounted to slide on one side edge portion of the door and provided with hinge members disposed in vertical alignment with each other and adapted to have simultaneous hinge coupling action with the hinge members first-named herein, a second vertical bar mounted to slide on the opposite side edge portion of the door and provided with hinge members disposed in vertical alignment with each other and adapted to have hinge coupling engagement with the second-named hinge members, a lever pivoted to the door and having pivotal connection with the first-named vertical sliding bar, a lever pivoted to the door and having pivotal connection with the second-named vertical sliding bar, a handle pivoted to the door near one vertical side thereof and having operating connection with the first-named vertical sliding bar, a second handle pivoted to the other vertical side of the door and having operating connections with the second-named vertical sliding bar, means carried by the door arranged to hold the first-named vertical sliding bar in a raised position when the door is opened from the adjacent side, means carried by the door arranged to hold the second-named vertical sliding bar in a raised position when the door is opened from the adjacent side, means carried by one side wall located in the path of the first-named means for displacing said means from bar holding position engageable with said means when the door is fully closed, and means carried by the other side wall located in the path of said second-named door carried means for displacing said second-named means from bar holding position engageable with said door carried means when the door is fully closed, all of said means being organized to cause the door to automatically lock when it is fully closed, the levers being arranged so that when one lever is actuated by the lifting of its connected vertical bar said lever will intercept the other lever and prevent operation thereof.

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