

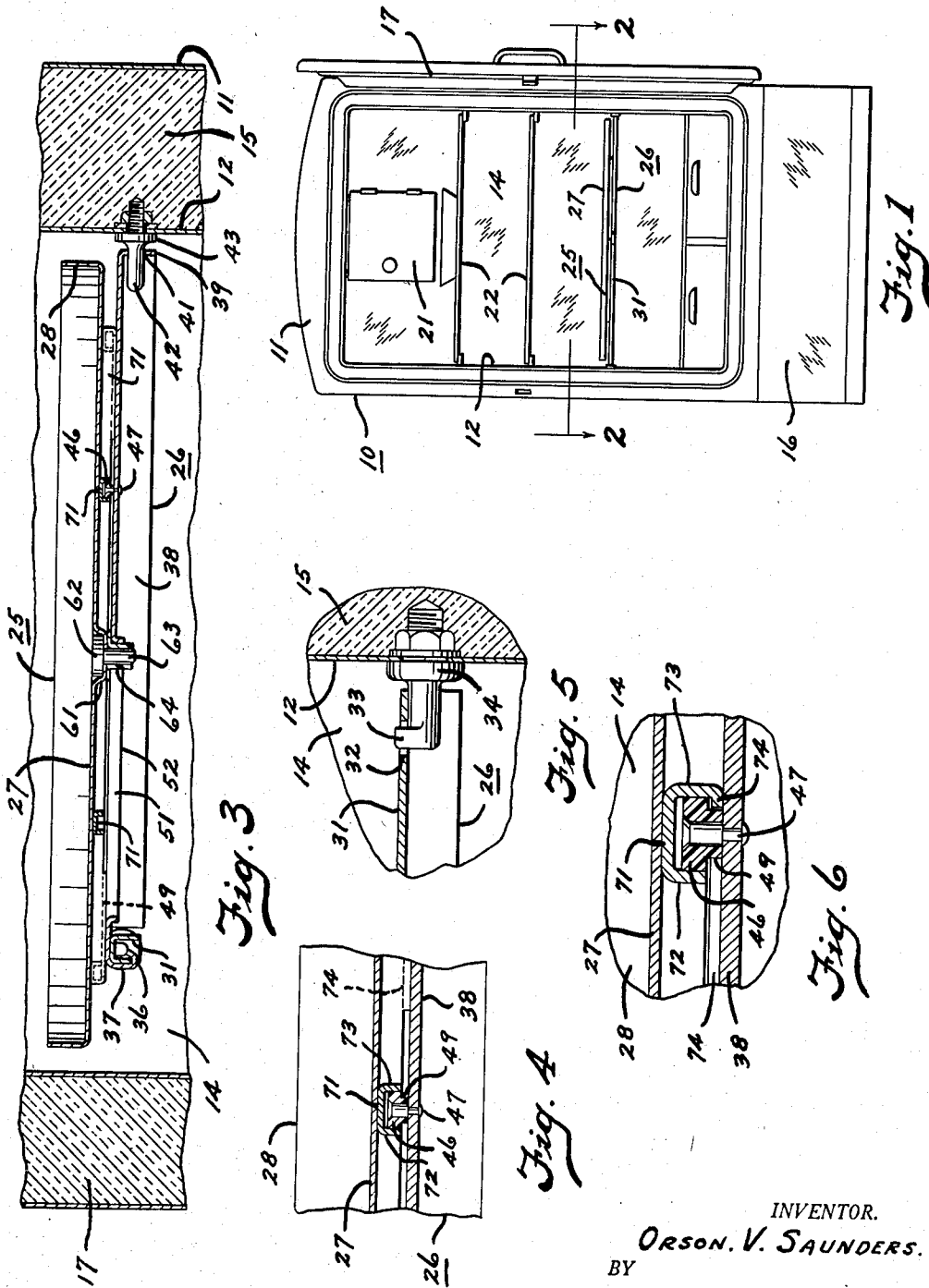
Aug. 4, 1953

O. V. SAUNDERS
REFRIGERATOR SHELF

2,647,812

Filed March 10, 1950

3 Sheets-Sheet 1



INVENTOR.
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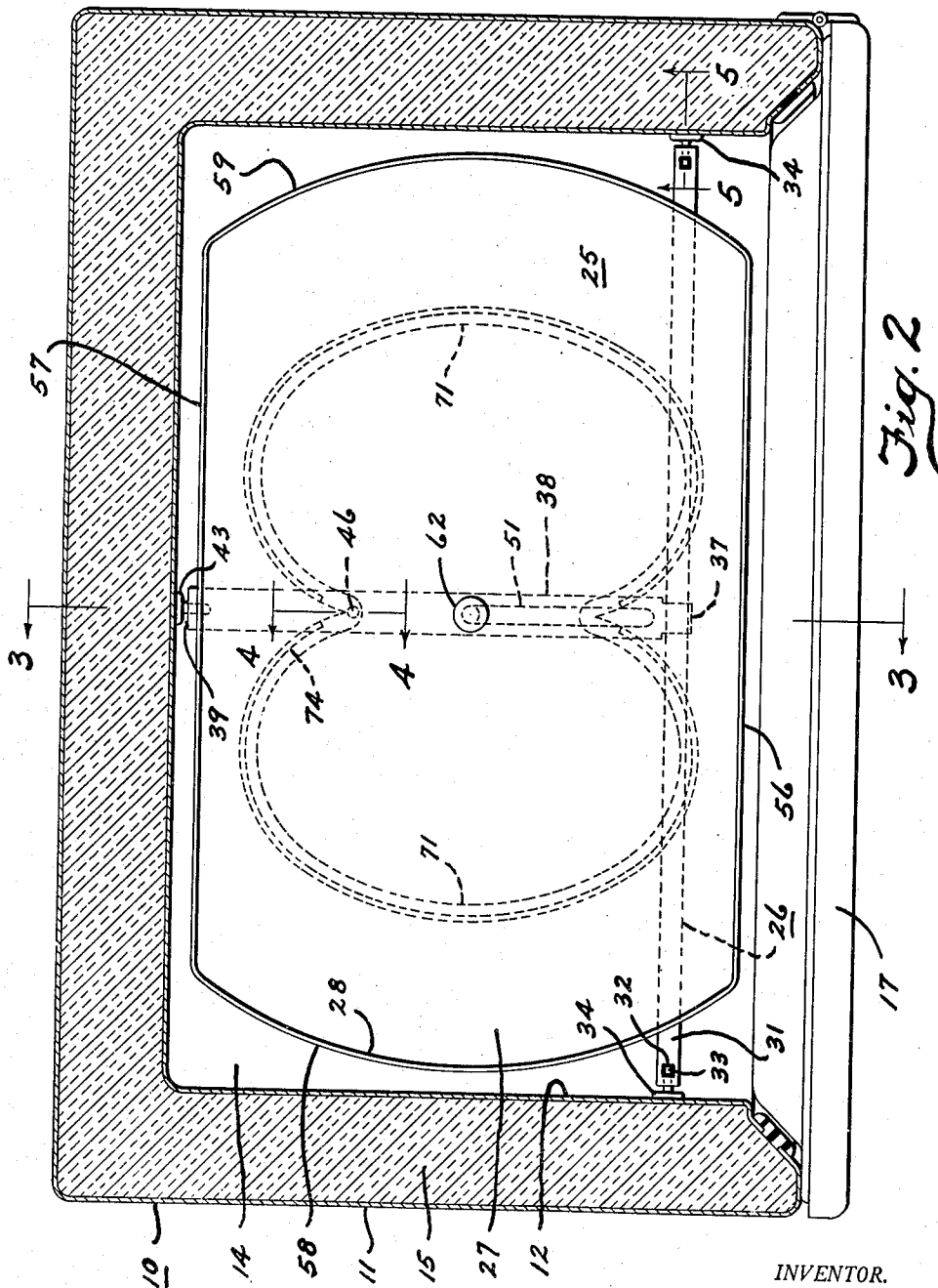
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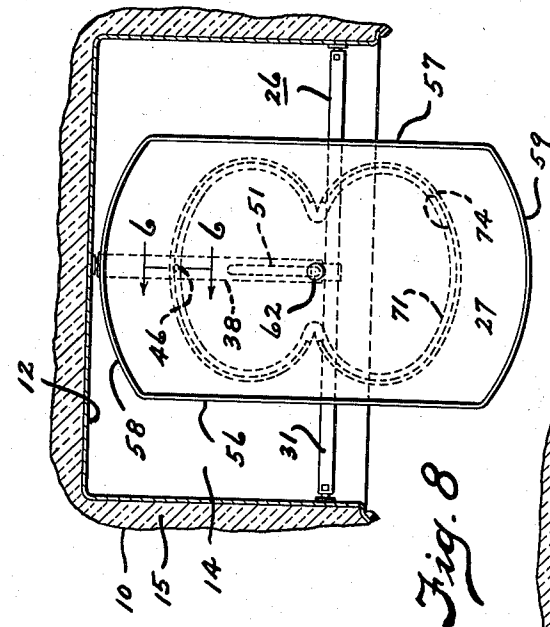


Fig. 8

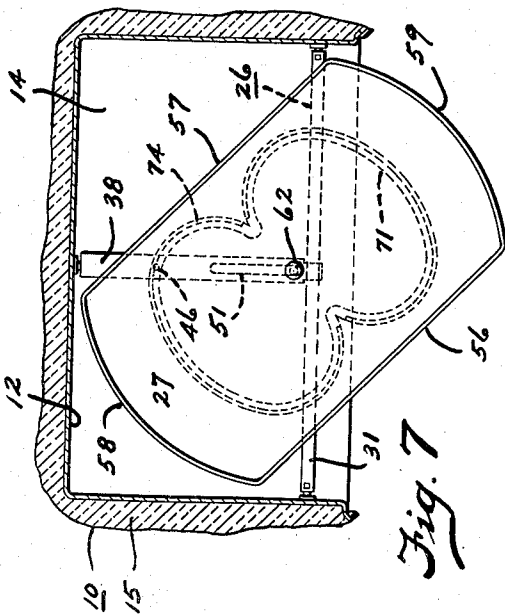


Fig. 7

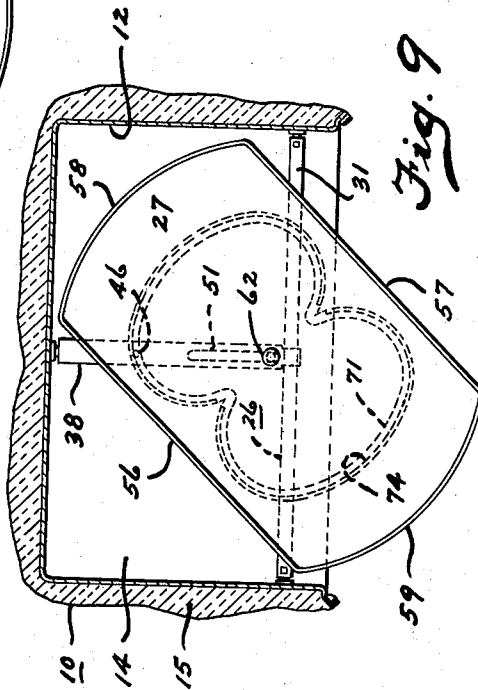


Fig. 9

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UNITED STATES PATENT OFFICE

2,647,812

REFRIGERATOR SHELF

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2 Claims. (Cl. 312-294)

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This invention relates to refrigerator cabinets and particularly to an improved shelf arrangement therefor.

An object of my invention is to improve the interior arrangement of a refrigerator cabinet so as to increase the accessibility of food products stored in the food storage compartment thereof and supported on shelves therein.

Another object of my invention is to provide in the food storage compartment of a refrigerator cabinet a novel form of shelf which is simultaneously slidable and rotatable to dispose a part thereof exteriorly of the compartment.

A further object of my invention is to provide an improved shelf for a refrigerator cabinet which will occupy a maximum of the horizontal cross-sectional area of the food compartment thereof and which is both rotatably and slidably mounted to permit a part thereof to be moved out of the compartment when the door of the compartment access opening is opened.

A still further object of my invention is to provide an improved shelf arrangement for the food storage compartment of a refrigerator cabinet wherein the shelf is supported for simultaneous sliding movement and rotation to move a part of the shelf outwardly of the compartment and is also again simultaneously slidable and rotatable to return the shelf to its normal position within the compartment with either its front or its back edge adjacent the rear wall of the compartment.

In carrying out the foregoing objects it is a still further and more specific object of the invention to provide for detaching and removing my improved shelf from the food compartment while it is in its normal position therein and to provide for locking the shelf against such removal during movement thereof.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a front view of a household refrigerator cabinet having a food supporting shelf therein constructed and arranged in accordance with my invention;

Fig. 2 is an enlarged horizontal cross-section taken on the line 2-2 of Fig. 1 and showing a top view of my improved shelf within the food compartment of the refrigerator cabinet;

Fig. 3 is a vertical cross-sectional view taken on the line 3-3 of Fig. 2, showing the support of my improved shelf within the refrigerator;

Fig. 4 is an enlarged section taken on the line 4-4 of Fig. 2, showing a roller secured to the

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shelf support and positioned in a track beneath the shelf;

Fig. 5 is an enlarged section taken on the line 5-5 of Fig. 2, showing the shelf support mounted upon a peg;

Fig. 6 is an enlarged section taken on the line 6-6 of Fig. 8 showing the roller locked within its track to prevent removal of the shelf from its support;

Fig. 7 is a fragmentary sectional view similar to Fig. 2 showing the shelf rotated and partially slid outwardly of the food compartment;

Fig. 8 is a view like Fig. 7 and shows the shelf in a position after having been slid outwardly of the compartment and rotated 90 degrees from its normal position therein; and

Fig. 9 is a view similar to Figs. 7 and 8 showing the shelf disposed at a 45 degree angle in a direction opposite to that shown in Fig. 7.

Referring to the drawings, for illustrating my invention, I have shown in Fig. 1 thereof a household refrigerator cabinet generally represented by the reference character 10 and comprising an outer metal shell 11 and an inner metal liner 12 (see Fig. 2) forming walls of a food storage chamber or compartment 14. Any suitable or conventional insulating material 15 is located between the shell 11 and liner 12. The insulated walls of cabinet 10 surrounding the compartment 14 are polygonally arranged, as distinguished from a circular walled refrigerator, to provide a rectangular-shaped refrigerator which is best suited for maximum food storage space and wherein my invention is particularly adaptable. The outer shell 11 extends downwardly below the insulated bottom wall of food compartment 14 and defines walls of a machine compartment in the bottom of cabinet 10 having an access opening closed by a door 16. An opening in the cabinet front wall provides access to the food storage chamber or compartment 14 and a suitably insulated hinged door 17 normally closes this access opening. Within the upper part of compartment 14 there is mounted an evaporator or cooler element 21 of a closed refrigerating system including a refrigerant translating device (not shown) normally positioned within the machine compartment behind the door or closure 16. Operation of the refrigerant translating device causes evaporator 21 to withdraw heat from compartment 14 as is common practice in the refrigerating art. The low temperature produced by evaporator 21 cools and causes a thermosiphonic circulation of air within the compartment 14 whereby food products stored therein are properly cooled and preserved. One or more conventional food supporting shelves 22 are mounted within compartment 14 and the food

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supporting shelf arrangement, generally represented by the reference character 25, constructed in accordance with my invention, is also mounted within compartment 14.

It is the general purpose of my novel shelf arrangement 25 to combine the advantages of a rectangular refrigerator with the advantages of a rotatable shelf in a circular refrigerator and in addition to provide such an arrangement wherein the shelf will occupy all of the area of a food compartment which is rectangularly shaped in horizontal cross-section. In my improved shelf arrangement the shelf itself is slidable and simultaneously rotatable and/or is simultaneously rotatable and slidable relative to a stationary support as distinguished from shelf arrangements which are slidable outwardly of a food compartment and thereafter rotatable. The shelf arrangement 25 herein disclosed includes a mounting bracket or the like, generally represented by the reference character 26 (see Fig. 2), which is of inverted T-shape and supported in the food compartment 14 of cabinet 10 against horizontal movement as will be presently described. Shelf arrangement 25 also includes a shelf 27 in the form of a pan having an upturned peripheral flange 28. Such a shelf or pan 27 is normally reticulated to permit the cool circulating air in compartment 14 to pass around foods stored thereon and to flow there-through. However, shelf or pan 27 is herein disclosed as being unreticulated for sake of clearance in showing and describing the present invention.

Referring now particularly to Figs. 2 and 3 of the drawings it will be noted that the shelf supporting bracket 26 comprises a metal channel member 31 which extends across the interior of compartment 14 intermediate its side walls and is positioned substantially parallel to door 17 and consequently the front wall of cabinet 10. The horizontal part of channel 31 is provided with an opening 32 at each of its ends which opening receives an up-turned hook 33 provided on a peg 34 secured to liner 12 in any suitable or conventional manner (see Fig. 5). The mounting of channel member 31 at each of its ends as described, prevents movement of bracket 26 in a horizontal direction. The central part of the down-turned front leg portion of channel member 31 is cut away as at 36 (see Fig. 3) to removably and interlockingly receive a bent hooked end part 37 of another metal channel member 38 forming a part of bracket 26. Channel member 38 extends rearwardly from member 31 to a point adjacent the back wall of compartment 14 and is provided with a down-turned end part 39. This end part 39 of channel 38 is provided with a hole 41 which receives a shank part 42 on a peg or stud 43 secured to the liner 12 forming the rear wall of compartment 14 in any suitable or conventional manner (see Fig. 3). This method of interlocking channel member 38 to channel member 31 and of supporting member 38 at the rear of food compartment 14 prevents vertical tilting movement of the shelf support or bracket 26. A roller 46 is secured to channel member 38 inwardly of its end 39 by a stud or rivet 47 (see Figs. 2, 4 and 6). This roller 46 has an under-cut shouldered surface 49 for a purpose to be presently described. Preferably the roller 46 is formed from a molded plastic material, such for example, as molded synthetic acrylate resin, styrene, polyvinyl-acetate or polyvinyl chloride, since elements

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molded from these compounds are now well-known to offer little or no frictional resistance when rolling upon or sliding over metallic guides or tracks. The top horizontal part of channel member 38 is provided, forwardly of roller 46, with an elongated opening 51 (see Fig. 2) having its walls 52 formed by turning or flanging down some of the metal thereof (see Fig. 3). This opening 51 is also for a purpose to be presently described. The mounting bracket 26 may be bodily removed from compartment 14, by elevating channel member 31 thereof above the support pegs 34 and moving the bracket forwardly of compartment 14 to slide the rear end 39 of channel member 38 off of peg 43. If desired channel member 38 may be removed from channel 31 by rotating its end 39 about channel 31 to cause the hooked end 37 thereof to become detached therefrom. The removability of support bracket 26 and dismantling of its parts is preferable so that it can be occasionally cleaned.

Referring again to Figs. 2 and 3 it will be noted that shelf 27 has a relatively long straight front edge 56, a similar parallel back edge 57 and curved or semi-cylindrical side edges 58 and 59. Centrally of these edges shelf 27 is provided an apertured depression 61 which receives the head of a round stud 62 having a shank portion 63 extending through the aperture (see Fig. 3). This stud 62 is welded or otherwise suitably secured to the pan-like shelf 27 and its shank portion 63 extends downwardly through the elongated opening or slot 51 in channel member 38 to a point below walls 52 of opening 51. A combined bearing and thrust washer element 64 fits over the shank part 63 of stud 62 and this element is preferably formed of the same material hereinbefore described and employed to form the roller 46. The stud 62 forms a pivot about which shelf 27 rotates and the bearing part of element 64 engages walls 52 of slot 51 and permits sliding of shelf 27 relative to its supporting bracket 26 as will hereinafter be described. In order to render shelf 27 rotatable simultaneously with sliding thereof I weld or otherwise suitably secure a cam means on the underside of the shelf. In the present disclosure this cam means is in the form of a track 71 having spaced apart parallel inner and outer depending legs 72 and 73 which straddle the roller 46. The track 71 has a plan geometric form (see Fig. 2) of overlapping ellipses wherein the overlapping portion of each ellipse is omitted from the track. The outer leg 73 of track 71 has an in-turned foot portion 74 (see Fig. 6) extending into the shouldered undercut part 49 of roller 46. This foot portion 74 extends (see Fig. 2) from points spaced a short distance from the two intersecting parts of the two ellipses of the track 71 and prevents tilting of the shelf 27 relative to its support 26 during movement of the shelf. However, the break in the extension of foot portion 74 at the points described permit detachment of shelf 27 from bracket 26 and removal thereof from compartment 14 for inspection or cleaning. It is to be understood that such removal of shelf 27 can be carried out only while the shelf is in its normal position within compartment 14.

Having described the construction of my novel shelf arrangement and its mounting within the food compartment 14 of cabinet 10 I will now proceed to describe the method of simultaneously sliding and rotating the shelf. Assume that the shelf 27 is in its normal position within food

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storage compartment 14 as shown in Fig. 2 of the drawing and it is desired to move a part thereof outwardly of the compartment 14. Door 17 is opened, as shown in Fig. 1 of the drawing, and the front edge 56 of shelf 27 is grasped by the hand. Either side of the front edge of shelf 27 may be grasped in accordance with the side thereof desired to be moved outwardly. In the illustration shown in the drawings and herein described the front edge 56 of shelf 27 to the right of the center thereof is grasped and a pulling force applied thereto. This pulling force slides shelf 27 forwardly toward the compartment access opening and at the same time moves that portion of track 71 located to the left of channel member 38 along and in contact with roller 46 to cause the shelf to also rotate. The result of this simultaneous sliding and rotating movement of shelf 27 is indicated in Fig. 7 of the drawing wherein I show a part of the shelf slid outwardly of compartment 14 and the shelf rotated through an arc of 45 degrees relative to cabinet 10. During this clockwise rotation of shelf 27 the shouldered undercut part 49 of roller 46 rides under the foot portion 74 on leg 73 of track 71 to prevent any unbalanced load on the shelf from tilting the same and prevents detachment and removal of the shelf 27 from its support 26. Shelf 27, after having been simultaneously slid and rotated into the position shown in Fig. 7 may thereupon be further rotated in a clockwise direction another 45 degrees to complete a rotary movement thereof throughout an arc of 90 degrees as shown in Fig. 8 of the drawings to thereby dispose a greater portion thereof outwardly of compartment 14 through the access opening normally closed by door 17. While I have described the shelf 27 as first being pulled outwardly to cause the cam or track 71 to engage and slide along roller 46 it is to be understood that a rotary force first applied to the shelf 27 will also cause the track 71 to engage and slide along roller 46 whereupon the track causes a camming force to be exerted against the pivot stud 62 to thereby slide the same within the slot 51 and consequently slide shelf 27 toward the front cabinet wall. Thus it should be apparent that the construction and arrangement of supporting my shelf upon the mounting bracket 26 is such that either of the two forces, a pulling force or a rotating force applied to shelf 27 will initially cause simultaneous sliding and rotating movements thereof.

When it is desired to return the shelf 27 to its normal position within compartment 14, as shown in Fig. 2, it may be rotated either in a counterclockwise direction or further in a clockwise direction depending upon which of the edges 56 or 57 of the shelf is desired to be located adjacent the rear wall of food compartment 14. For example if the back edge 57 is again desired to be located adjacent the rear compartment wall then the shelf is rotated counterclockwise to the position thereof shown in Fig. 7 and thereafter slid back and further rotated into its normal position within the food compartment as shown in Fig. 2. However, if it should be desired to locate the front edge 56 of shelf 27 adjacent the compartment back wall then the shelf should be rotated in a further clockwise direction from the position thereof shown in Fig. 8 into the 45 degree position shown in Fig. 9 and thereafter simultaneously slid and rotated back into its normal position within compartment 14 as shown in Fig. 2 of the drawings. While I have illustrated

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and described the shelf 27 as being first rotatable in a clockwise direction it is to be understood that its first rotatable movement may be in a counterclockwise direction, if desired. By providing means whereby the shelf 27 may be rotated throughout an arc of 180 degrees in either a clockwise or counterclockwise direction turning of the shelf a full 360 degrees is made possible. Shelf 27 being rotatable 360 degrees, without detaching the same from cabinet 10, is simultaneously slid outwardly of compartment 14 during at least a part of the rotary motion thereof.

It should be apparent from the foregoing that I have provided a novel and improved shelf arrangement in a refrigerator cabinet. My novel shelf arrangement provides for maximum food storage space within a cabinet of minimum external dimensions and increases the accessibility of food products supported on the shelf. My arrangement furthermore permits quick and easy detachment of the shelf from its supporting structure and removal thereof from the compartment while at the same time providing for locking of the shelf to its supporting structure while sliding and rotating the same. The novel arrangement is also such as to permit the shelf together with its supporting structure to be detached from the refrigerator cabinet and removed from the food storage compartment. The novel shelf arrangement is simple in construction and inexpensive due to parts thereof being formed of sheet metal.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. In combination, a cabinet having walls forming a compartment therein, said compartment having an access opening in one of said walls, a door normally closing said compartment access opening, an article supporting member, a slotted member for mounting said article supporting member within said compartment, said mounting member being secured against horizontal movement relative to said compartment, said supporting member having a part thereof depending into the slot in said mounting member to directly connect the same to said mounting member for horizontal sliding movement relative thereto, a continuously curved endless track associated with one of said members and permitting said supporting member to be rotated 360° relative to said mounting member, an element on the other of said members cooperating with said track, said element being located at a point spaced rearwardly from said depending part of said article supporting member and adapted to coact therewith, said article supporting member being, when a horizontal force is applied thereto, slidable part way out of said compartment through its access opening while said door is open, and the coaction between said element and said depending part of said article supporting member together with the cooperation of said element with said track being such as to rotate said article supporting member in either one of two directions simultaneously with the sliding movement thereof.

2. In combination, a cabinet having walls forming a compartment therein, said compartment having an access opening in one of said walls, a door normally closing said compartment access opening, an article supporting mem-

ber, a slotted member for mounting said article supporting member within said compartment, said mounting member being secured against horizontal movement relative to said compartment, said supporting member having a part thereof depending into the slot in said mounting member to directly connect the same to said mounting member for horizontal sliding movement relative thereto, a continuously curved endless track associated with one of said members and permitting said supporting member to be rotated 360° relative to said mounting member, an element on the other of said members cooperating with said track, said element being located at a point spaced rearwardly from said depending part of said article supporting member and adapted to coact therewith, said article supporting member being, when a horizontal force is applied thereto, slidable part way out of said compartment through its access opening while said door is open, the coaction between said element and said depending part of said article supporting member together with the cooperation of said element with said track being such as to rotate said article supporting member in either one of two directions simultaneously with the sliding movement thereof, means associated with said track and engaging said element during movement of said article sup-

porting member for locking the same against removal from said mounting member, and said means being out of engagement with said element while the article supporting member is in a normal position within said compartment to permit detachment of said article supporting member from said mounting member.

ORSON V. SAUNDERS.

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