Nov. 22, 1955 O. V. SAUNDERS 2,724,630

EXTENSIBLE SLIDES FOR REFRIGERATOR SHELVES

Filed May 8, 1952 2 Sheets-Sheet 1

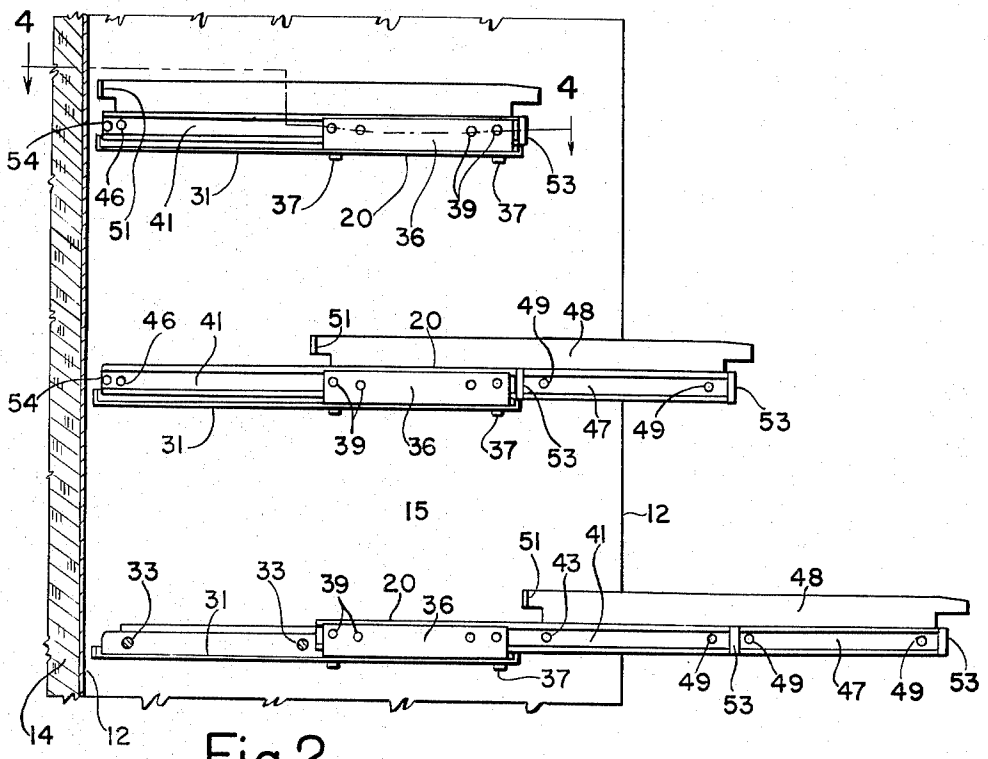

Fig.2

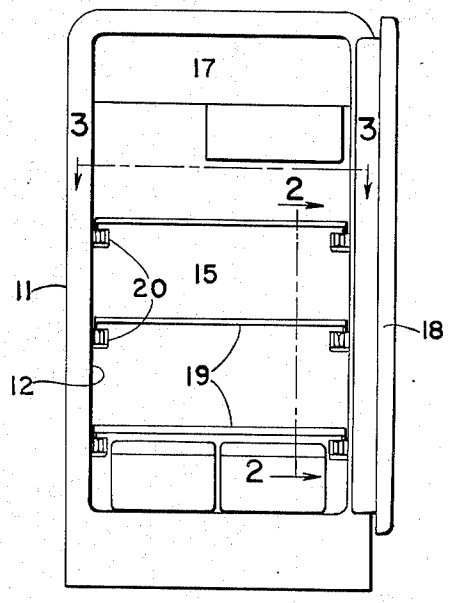

Fig. 1

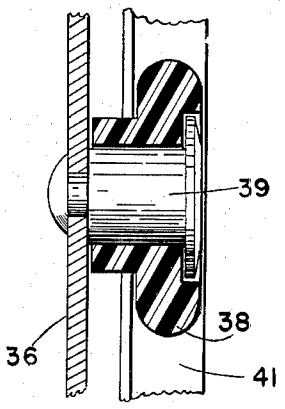

Fig.6

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2 Sheets-Sheet 2

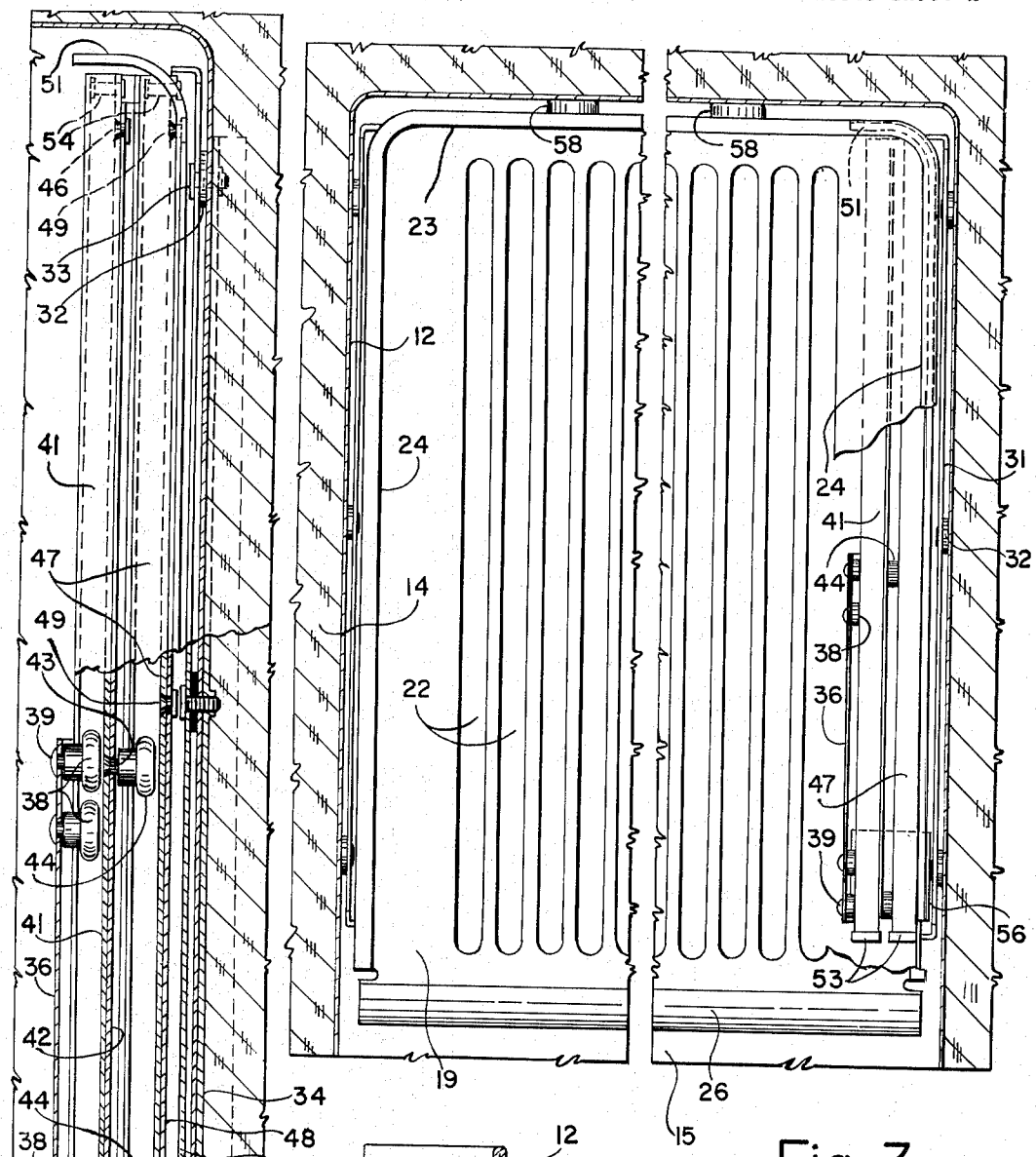

Fig. 3

Fig. 4

Fig. 5

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EXTENSIBLE SLIDES FOR REFRIGERATOR SHELVES

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1 Claim. (Cl. 312—340)

This invention relates to refrigerator cabinets and particularly to a rollable shelf arrangement therefor.

I am aware of the fact that sliding and/or extensible shelves have heretofore been provided in household refrigerator cabinets. Such shelves have not been entirely satisfactory for several reasons. Some of such shelves are difficult to move and in addition will bind at certain points of movement thereof due to unbalanced loads thereon or due to applying a pulling force at one side only of a shelf. Most extensible shelf supporting arrangements have been located at the side of a shelf supported therefrom, and therefore the shelf itself has been prevented from occupying the entire area intermediate upright side walls of a food storage compartment of a refrigerator cabinet thus wasting valuable space.

An object of my invention is to provide an improved shelf arrangement for the interior of a refrigerator cabinet which can be easily moved or extended outwardly of a compartment in the cabinet irrespective of the point of application of a horizontal pulling force thereto.

Another object of my invention is to provide rollable extensible elements for supporting a shelf therefrom, which elements are located below the shelf to thereby permit the shelf to occupy substantially the entire horizontal cross-sectional area of a food storage compartment.

A further object of my invention is to mount a plurality of extensible shelf supporting elements in horizontal side-by-side relation on upright side walls of a compartment and to carry a shelf upon one of the extensible elements nearest the compartment side walls above the supporting elements whereby the shelf may extend substantially from one upright side wall to the other of the compartment to avoid wasting a portion of the horizontal area of the compartment between its side walls.

A still further and more specific object of my invention is to mount pairs of shelf supporting elements extensible longitudinally relative to one another in side-by-side relation upon opposed upright side walls of a compartment and to provide roller members forming the sole means of connecting each element of the pairs thereof together and of preventing sidewise movement of the elements relative to one another.

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 invention is clearly shown.

In the drawings:

Figure 1 is a front view of a household refrigerator cabinet having my invention embodied in the food storage compartment thereof and showing the compartment door in open position;

Figure 2 is a fragmentary vertical sectional view taken on the line 2—2 of Figure 1 showing extensible shelf supporting elements in different extended positions relative to one another;

Figure 3 is a fragmentary horizontal sectional view taken on the line 3—3 of Figure 1 with a portion of a shelf broken away along one side edge thereof and looking down on one pair of the shelf supporting elements;

Figure 4 is a fragmentary enlarged view taken on the line 4—4 of Figure 2 showing one pair of shelf supporting elements partly in section and partly in elevation;

Figure 5 is an enlarged sectional view taken on the line 5—5 of Figure 4 with the shelf removed from a supporting element; and

Figure 6 is an enlarged sectional view taken on the line 6—6 of Figure 5 showing a roller member secured to the mounting means of the shelf supporting elements.

Referring to the drawings, for illustrating my invention, I have shown in Figure 1 thereof a household type refrigerator cabinet of rectilinear configuration and comprising an outer shell or panels 11 and an inner metal liner 12 having suitable insulating material 14 disposed therebetween (see Figures 2 and 3). Liner 12 forms walls of a food storage compartment 15 within the refrigerator cabinet. Compartment 15 may be cooled by an evaporator 17 located in the upper portion thereof. Evaporator 17 forms a part of a closed refrigerating system and has conduit connections with a refrigerant translating device of any suitable or conventional design such as a motor-compressor-condenser unit (not shown) ordinarily mounted in a machine compartment below the food storage compartment 15. Suitable controls for the refrigerant translating device and for admitting refrigerant to evaporator 17 may be provided to maintain a predetermined temperature within the food storage compartment 15. A door 18 (shown in open position in Figure 1) normally closes an opening in the front of the refrigerator cabinet affording access to compartment 15. Compartment 15 is provided with a plurality of vertically spaced apart shelves 19 detachably supported upon one of a plurality of sets of shelf supporting units, generally represented by the reference character 20 in Figure 1, and secured to opposed upright side walls of the compartment. The shelves 19 are formed of aluminum or other siutable material and are reticulated to permit air, cooled by the evaporator 17, to circulate therethrough and about the compartment over foods stored therein. Each shelf 19 is of rectangular configuration (see Figure 3) and has a flat article supporting surface provided with a plurality of elongated slots 22. Each shelf 19 is provided with a raised rear wall 23 and raised side walls 24 which are rolled over to provide a hollow rim about the three sides thereof for a purpose to be hereinafter described. A downwardly turned or inclined lip 26 is provided at the front of each shelf 19.

The shelf supporting units 20 are shown in Figure 2 of the drawings, with the shelves 19 removed therefrom for the sake of clearness, in different positions relative to one another. The purpose of these units 20 is to permit each shelf 19 to be rolled or extended from a normal retracted position within compartment 15, as shown by the upper units 20 in Figure 2, to any one of a plurality of desired positions outwardly of the refrigerator cabinet through the access opening of storage compartment 15. When a shelf 19 is rolled out of compartment 15 into a loading position, indicated by the lower units 20 in Figure 2, it extends forwardly of compartment 15 a distance substantially equal to the fore-and-aft width of the shelf. This full extension of shelf 19 is accomplished with the use of only two extensible elements at the sides of the compartment, whereas to my knowledge others in the past have attained such full extension by the utilization of more than two extensible elements.

Each opposed unit 20 of the plurality of vertically spaced units comprises a mounting means including an angle iron 31 which extends a substantial distance horizontally along the upright side walls 12 of compartment 15 (see Figures 2, 3 and 5). The vertical leg of an-

gle iron 31 is secured to liner 12, with a rubber or the like washer 32 therebetween, by screws 33 which are threaded into suitably tapped openings provided in a reinforcing channel iron 34. Channel iron 34 abuts the outer surface of liner 12 and is disposed in the insulated chamber between liner 12 and the cabinet outer walls 11. A relatively short angle iron 36 has its horizontal leg secured to the horizontal leg of angle iron 31 by screws 37 (see Figures 2 and 5). The upright leg of angle iron 36 has roller members secured thereto. These roller members include two spaced pairs of rollers 38 which are mounted on studs 39 riveted or otherwise suitably secured to angle iron 36 (see Figure 6). A substantially C-shaped, in cross-section, metal track or extensible supporting element 41 is slid over the two pairs of rollers 38 so that it substantially embraces the rollers and prevents sidewise movement thereof relative to these rollers. The track or extensible support 41 is secured to an L-shaped, in cross-section, iron 42 by a pair of studs 43 each having a roller 44 mounted thereon. A rivet 46 (see Figures 2 and 4) near the rear end of support 41 also passes through iron 42 to aid in securing these elements to one another. A second substantially C-shaped, in cross-section, metal track or extensible support 47 is slid over the two rollers 44 so that it substantially embraces these rollers and prevents sidewise movement thereof relative thereto. The support 47 has a member 48 secured thereto, by rivets 49 (see Figure 5), and projecting upwardly therefrom in closely spaced relation to the upright side wall 12 of compartment 15. Member 48 is substantially coextensive with support 47 and has its rear end bent laterally inward away from the compartment walls 12 as at 51 (see Figures 2, 4 and 5). This member 48 forms a shelf receiving projection on the track or support 47. The bent-over top rim along the sides and back of shelf 19 fits over member 48 and its inturned end 51 to thereby tie the extensible support 47 of each horizontally aligned and opposed unit 20 together for simultaneous movement when a horizontal force is applied to shelf 19.

Each of the extensible supports 41 and 47 has a cap member 53 tightly pressed over its front end to improve the appearance of these supports from in front of the food compartment 15. Each of the extensible supports also has a pin 54 secured to its rear end and a pin 55 secured to its front end for a purpose to be hereinafter described. A relatively short block or pad 56 (see Figure 5) is located at the front of the secured together angle irons 31 and 36, forming the mounting means for the two shelf supporting extensible elements 41 and 47. Block or pad 56 is cut out to fit over a raised portion of angle iron 36 about the tapped hole therein which receives screw 37. In all positions of the extensible shelf supports 41 and 47, the lower foot part of L-shaped iron 42 bears against block or pad 56 to retain the same in the position shown without the aid of additional means. The iron 42 slides on block or pad 56 during movement of the extensible supports 41 and 47. It is well known that objects constructed of polyamide material or polymeric amides having a protein-like chemical structure may be moved along or rolled upon metal surfaces or metal surfaces may be slid or rolled along objects so constructed with much less friction than moving metal members upon or along one another. For this reason I prefer to form the rollers 38 and 44 and the skid block or pad 56 of such polyamide material. If desired, soft rubber bumper buttons or the like 58 may be mounted on the back edge of the shelves 19 (see Figure 3) so as to strike the rear wall of compartment 15 substantially at the same time stop pins 55 engage the front rollers 38 and 44 to relieve the shock on pins 55 when the shelves 19 are moved into their fully retracted position.

For the purpose of illustrating and describing the various positions of the shelf, it should be assumed that a shelf 19 is cradled or mounted on the shelf receiving projections 48 and 51 carried by opposed track or extensible supports 47 of units 20 in the arrangement disclosed in Figure 2 of the drawings. In such case the shelf 19 ties the extensible supports 47 which are adjacent opposed upright walls 12 of compartment 15 together for simultaneous movement. It will be noted that the uppermost opposed units 20 support the shelf in a retracted or normal position in the food storage compartment 15 of the refrigerator cabinet. The shelf 19 and its supports 47 on the next lower set of opposed units 20 are in a position partly extended from the compartment 15 and prior to picking up or causing movement of the tracks or supports 41 and the rollers 44 secured thereto. In this position of shelf 19 the stop pin 46 at the rear of track or support 47 has been moved forwardly into engagement with the rear roller 44. Further forward movement of shelf 19 and its support 47 from the position just described into the position indicated by the bottom opposed units 20 in Figure 2 causes pin 46 at the rear of support 47 to engage the rear roller 44 on the innermost supports 41. Pin 46 will move or pull the supports 41, and consequently both rollers 44 thereon, outwardly until the stop pin 54 on the back end of support 41 engages the rear roller 38, of the back pair of roller means, on angle iron 36 of the shelf supporting mounting means. In this position shelf 19 is moved or extended substantially entirely out of compartment 15 through its access opening. In this fully extended position of shelf 19, the extensible shelf supporting track 47 has two spaced points bearing upon the extensible support 41 which are the rollers 44 to thereby prevent tilting of the shelf. Track or support 41 also has a plurality of bearing points upon the angle iron 36 of the mounting means which are the two pairs of rollers 38 to thereby prevent its tilting relative to the mounting means 31 and 36. When the shelf 19 is returned to its normal position within compartment 15 as indicated by the position of the uppermost of the units 20 in Figure 2, the stop pins 54 at the front end of each extensible support 41 and 47 engage the forwardmost of the rollers 38 and 44. By forming all of the rollers 38 and 44 as well as the skid block or pad 56 of the material herein specified, there is very little friction between the various elements of the present shelf extensible arrangement, and the shelf is therefore movable or extendible with a minimum of force applied thereto.

It should be apparent from the foregoing that I have provided an improved rollable or shiftable storage shelf for a refrigerator compartment of a refrigerator cabinet which provides ready access to remote portions of the compartment or shelves therein. By removably cradling or nesting a shelf in the present arrangement on the extensible supports nearest to the compartment upright side walls and above the supports, the shelf may extend substantially from one upright side wall to the other of the compartment to thereby avoid wasting a part of the horizontal area intermediate the cabinet walls. By forming the track supports of the specific configuration in cross-section as specified, they embrace the rollers in such a manner that these rollers form the sole means of connecting the movable track supports to one another and also prevent excessive sidewise movement of these elements on each unit with respect to one another. This, together with the forming of the skid block and rollers from the material herein specified, provides a free rolling extensible shelf supporting arrangement.

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 claim which follows.

What is claimed is as follows:

A refrigerator comprising in combination, a cabinet having a plurality of walls defining a food storage compartment therein, a shelf supporting unit carried by each opposed upright side wall of said compartment in spaced relation to the bottom wall thereof, each of said units including a mounting means secured to the compartment side wall and a set of extensible supports carried thereon, said extensible supports being disposed in side by side relationship, means interlocking said supports to one another and preventing detachment thereof from said mounting means, the one extensible support of each unit adjacent a side wall of said compartment having a shelf receiving projection extending upwardly therefrom in closely spaced relation to said side wall, the rear end of said upwardly extending projection on said one extensible support of each unit being directed laterally inward away from the compartment side wall adjacent thereto, a shelf separate from said extensible supports removably mounted upon said one support of each unit, said shelf having upwardly directed and rolled over side and back edges fitted over said projections and providing the sole means of tying said one extensible support of each unit together, said shelf also having a reticulated food receiving area extending across said compartment from a point closely adjacent one of its upright side walls to a point closely adjacent its other upright side wall above and in overlapping relation to

said side by side sets of extensible supports, said one support of the set thereof on each unit being movable, upon applying a horizontal force to said shelf, relative to said mounting means and to the other support of the sets thereof to position the shelf a predetermined distance outwardly of said compartment, the other support of the interlocked set thereof on each unit being movable relative to said mounting means, upon applying an additional horizontal force to said shelf, to position the shelf a further distance outwardly of said compartment beyond said predetermined distance of outward movement thereof, and said shelf being at all times detachable from said projections on said one support without releasing said interlock between the sets of extensible supports of said supporting units.

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