

Sept. 16, 1958

R. F. SMITH

2,852,329

ADJUSTABLE REFRIGERATOR SHELF

Filed March 26, 1957

2 Sheets-Sheet 1

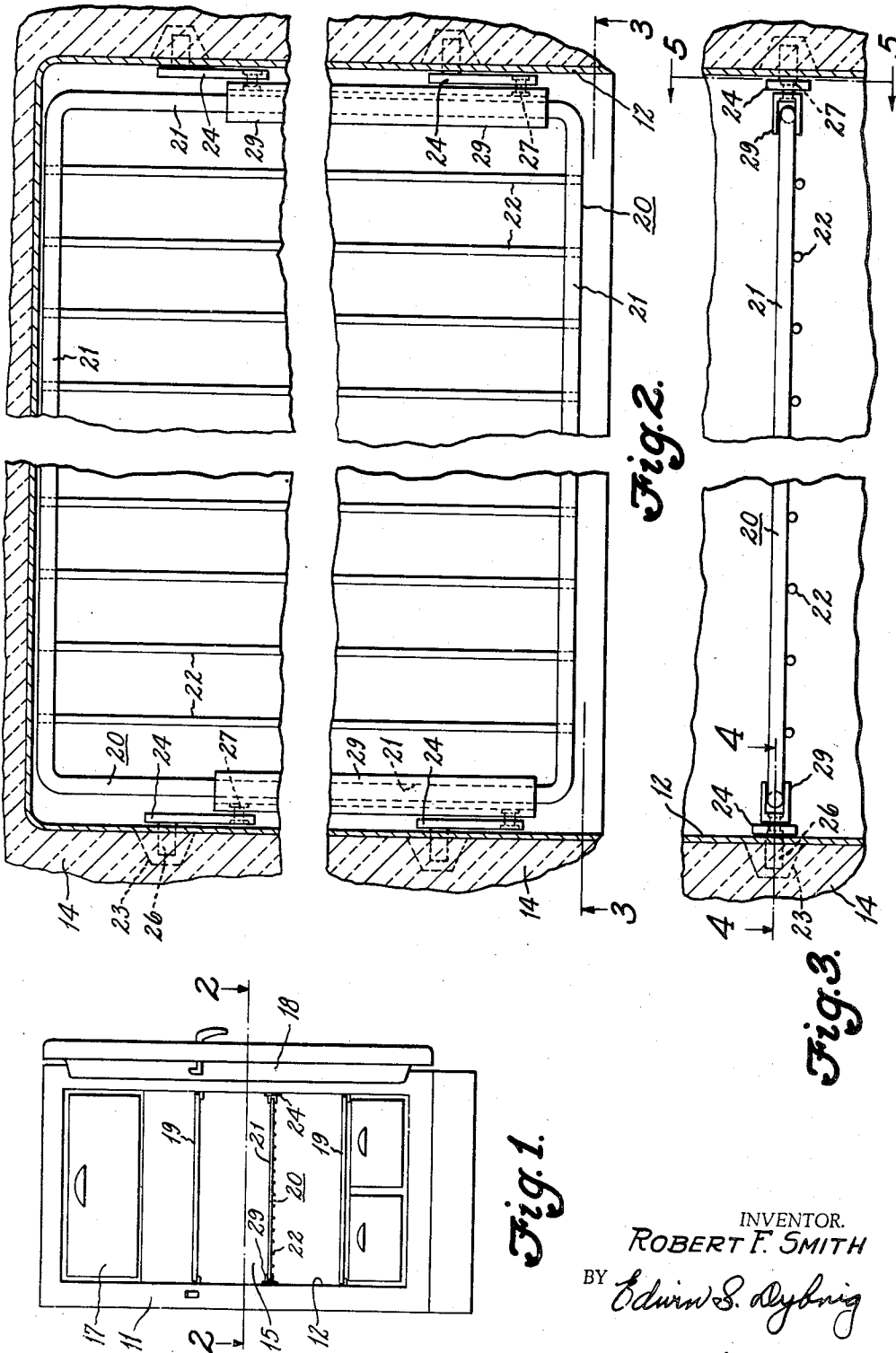


Fig. 1.

Fig. 2.

Fig. 3.

INVENTOR.
ROBERT F. SMITH
BY *Edwin S. Dybnig*
ATTORNEY

Sept. 16, 1958

R. F. SMITH

2,852,329

ADJUSTABLE REFRIGERATOR SHELF

Filed March 26, 1957

2 Sheets-Sheet 2

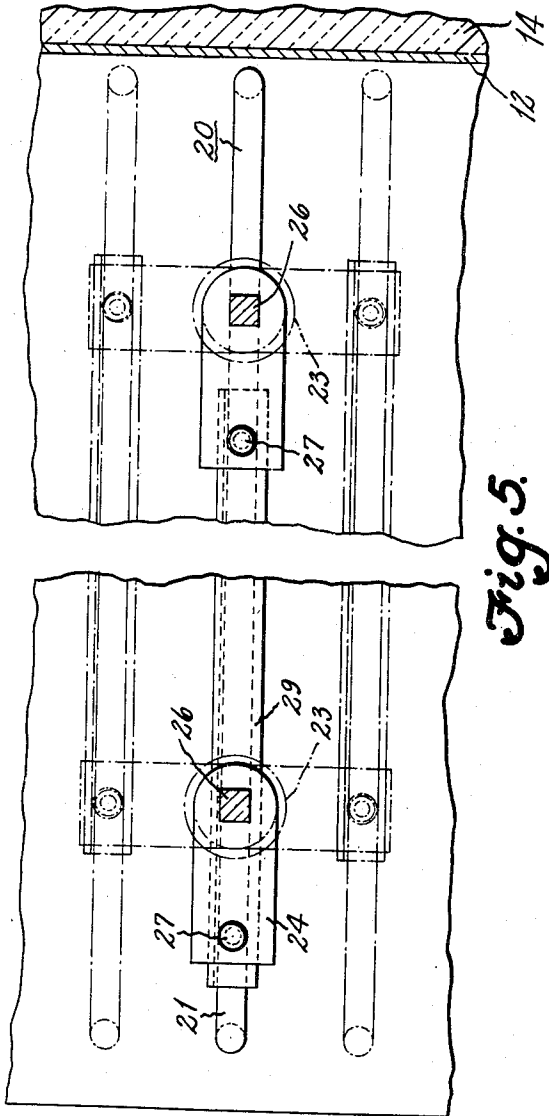


Fig. 5.

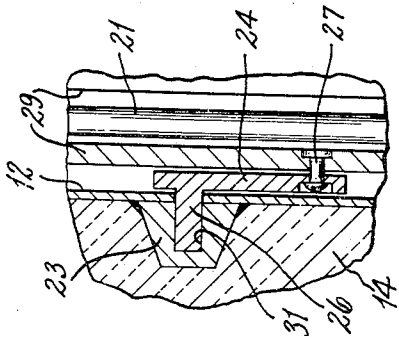


Fig. 4.

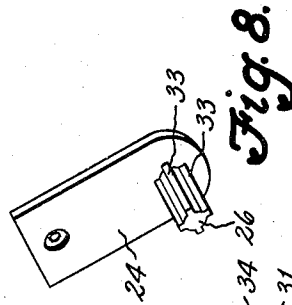


Fig. 8.

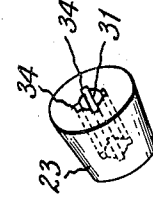


Fig. 9.

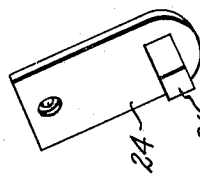


Fig. 6.



Fig. 7.

INVENTOR.
ROBERT F. SMITH
BY *Edwin S. Rybick*
ATTORNEY

1

2,852,329

ADJUSTABLE REFRIGERATOR SHELF

Robert F. Smith, Grosse Pointe Woods, Mich., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Application March 26, 1957, Serial No. 648,544

2 Claims. (Cl. 312—351)

This invention relates to an adjustable shelf arrangement and particularly to such for use in the food storage compartment of a household refrigerator cabinet.

I am aware of the fact that refrigerators have heretofore been provided with a plurality of vertically spaced apart sets of shelf supports within the food compartment thereof for varying the height of a shelf therein and also of the use of reversible shelves supported on a single set of shelf supports which when reversed thereon also varies the height of the shelf in a compartment. These arrangements have not been entirely satisfactory due to the plurality of sets of supports not used or occupied by a shelf being or becoming unsightly and due to the fact that in many reversible shelf arrangements two different positions of elevation only of the shelf is obtainable. I therefore contemplate the provision of a shelf arrangement for the interior of a food storage compartment of a refrigerator cabinet that can be adjusted into a plurality of elevations therein such, for example, as into three or more different positions as distinguished from prior arrangements of which I am familiar.

An object of my invention is to provide means whereby the user of a refrigerator cabinet can adjust a shelf within a compartment of the cabinet upwardly and/or downwardly relative to a normal predetermined height or position of the shelf therein.

Another object of my invention is to support a shelf of the type which is slidable outwardly and inwardly of a compartment in a refrigerator cabinet through the compartment access opening, when the compartment door is opened, while being supported upon an adjustable supporting means employed to vary the height of the shelf.

A further object of my invention is to provide a shelf supporting bracket means with complementary indexing means which can be changed to locate a shelf at any one of three or more positions of elevation and which latter means also holds the shelf in a desired position while permitting same to be slid relative to its supporting means.

A still further and more specific object of my invention is to provide opposed single sets of stationary socket members on a refrigerator compartment wall, to associate bracket members, hingedly or swivelingly carrying a shelf receiving element, with the socket members and to provide complementary indexing means in or on the members which is disengageable by moving the bracket members axially of the stationary socket members for changing the angular relationship between the bracket members and the shelf receiving element and consequently the height of a shelf on the element.

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

In the drawings:

Figure 1 is a front view of a household refrigerator

2

cabinet having my invention associated with the food storage compartment thereof and showing the compartment door in open position;

Figure 2 is an enlarged fragmentary or broken horizontal sectional view taken on the line 2—2 of Figure 1 showing an extensible or sliding shelf supported in the food compartment of the refrigerator in accordance with my invention;

Figure 3 is a fragmentary sectional view of the shelf and its supporting means taken on the line 3—3 of Figure 2;

Figure 4 is an enlarged fragmentary sectional view taken on the line 4—4 of Figure 3;

Figure 5 is an enlarged fragmentary sectional view on the line 5—5 of Figure 3 showing the shelf in a normal position and illustrating in dot dash lines two adjusted positions thereof;

Figure 6 is a perspective view of a shelf bracket member provided with a squared surface pin or shaft extending laterally therefrom and forming a complementary part of an indexing means employed in the present arrangement;

Figure 7 is a perspective view of a socket member having a squared aperture therein and forming another complementary part of the indexing means employed in the present arrangement;

Figure 8 is a perspective view showing a modified form of a complementary part of an indexing means suitable for use in the present shelf supporting arrangement; and

Figure 9 is a perspective view showing a socket member having a splined aperture therein for use with the complementary part of the modified indexing means.

Referring to the drawings, for illustrating my invention, I show in Figure 1 thereof a household type refrigerator cabinet of rectilinear configuration and comprising an outer shell or panel 11 and an inner metal liner 12 with any suitable or conventional insulating material 14 disposed therebetween (see Figures 2 and 3). Liner 12 forms the top, bottom, back and upright side walls of a food storage compartment 15 within the refrigerator cabinet. The upright walls of compartment 15 provides a support for shelves adapted to be located therein. Compartment 15 may be cooled by an evaporator of a closed refrigerating system (not shown) associated with the refrigerator. The evaporator is mounted in the upper portion of compartment 15 behind a hingedly mounted door 17 which conceals same and closes a sharp freezing chamber formed or surrounded thereby. The cooling effect produced by the evaporator chills and causes circulation of air throughout compartment 15 to preserve foods adapted to be stored therein. The evaporator has conduit connections with a refrigerant translating device of any suitable design or construction such as a motor-compressor-condenser unit, ordinarily mounted in a machine compartment located below the insulated food compartment 15 as is conventional in the art. An insulated door 18, shown in open position in Figure 1, normally closes the open front of compartment 15 providing access thereto. Any number of conventional or non-adjustable shelves 19 along with an adjustable shelf 20, constructed and supported in accordance with my invention, may be mounted in vertically spaced apart relationship within compartment 15 for receiving and supporting food products in the refrigerator cabinet.

The present invention resides in a provision for adjusting or changing the height of a shelf 20 within compartment 15 relative to a shelf 19 therein whereby to vary the space between shelf 20 and an upper and lower stationary shelf 19 so as to afford a selection to the user of the refrigerator for the storage of tall or shorter items

in the food compartment. Accordingly and in order to increase the utility of shelf 20 and that of the refrigerator cabinet itself I provide means whereby the user of the refrigerator can adjust shelf 20 upwardly and/or downwardly within compartment 15 and can lock the shelf in any one of a plurality of adjusted positions. Shelf 20 includes a bounding bar or rim 21 and a plurality of spaced apart parallel wires 22 having their ends welded or otherwise suitably secured to the front and back of rim 21. The upright sides of liner 12 form shelf supports and each has two openings or holes therein. A single set of horizontally aligned socket members 23 are welded or otherwise stationarily secured to liner 12 within the insulated space of the cabinet walls in registration with the openings or holes provided in the liner on each side of compartment 15. Means for supporting shelf 20 within compartment 15 is adapted to be associated with the two sets of stationary socket members 23. This means comprises a pair of arms or lever-like bracket members 24 within compartment 15 and at each side thereof having a pin or shaft 26 rigidly or stationarily secured to one end portion of the brackets by being staked or welded thereto. Pin or shaft 26 extends laterally from one side of each of the pairs of the brackets 24 and at least a part of the extension thereof is squared or provided with squared surfaces (see Figures 5 and 6). A pin or stud 27 riveted to the other end portion of each bracket 24 extends laterally from the side thereof opposite the extension of pin or shaft 26. Pin 27 on each opposed pairs of brackets 24 has a headed portion disposed in a counter-bored hole provided in a shelf receiving channel shaped element or rail 29. Pin or stud 27 provides a free rotating joint between two of the brackets 24 and end portions of the opposed rails or channel elements 29 and consequently between shelf 20 and the brackets. Thus brackets 24 swivelingly carry the channel or rail elements 29. The squared surfaced pin or shaft 26 removably fits into a squared aperture or hole 31 provided in the stationary socket members 23 (see Figure 7) and thus pin or shaft 26 and the squared aperture 31 form complementary parts or portions of an indexing means at the pin and aperture connection between the pairs of brackets 24 and members 23. The squared pins or shafts of the indexing means are locked in aperture 31 of members 23 to locate and support the shelf 20 at the one normal predetermined height within compartment 15 shown by full lines in Figures 5 of the drawings in which position the bracket members extend in parallel relationship along the channel or rail elements 29 slidably carrying the shelf thereon.

It is to be understood that the indexing means at the connection of pins or shafts 26 with apertures 31 affords a selection to the user of the refrigerator cabinet whereby shelf 20 may be supported in three positions within compartment 15. For example if it is desired to raise or lower shelf 20 from its normal predetermined or intermediate position, shown in full lines in Figure 5, the shelf is slid out of compartment 15 through its front access opening and removed from rails or channel elements 29. Thereafter the user of the refrigerator grasps the rail or channel element 29 at one side of the compartment and pulls on same to remove the pins or shafts 26 axially from the apertures 31 in two of the stationary members 23 so as to disengage the indexing means. This operation is also carried out on the other side of compartment 15 to remove or disengage the one complementary part of the indexing means from the other part thereof. The angular relationship between a pair of brackets 24 and one of the channel elements 29 is changed by rotating the brackets about their swivel joint or pin 27. In other words brackets 24 are rotated either upwardly or downwardly relative to a channel element 29, depending upon whether the channel or rail element is to be elevated or lowered, 90° from their normal parallel relationship therewith whereafter the pins

or shafts 26 are refitted or caused to reenter the apertures 31 in stationary socket members 23. The shelf 20 is then pushed through the compartment access opening and slid along the rails 29 to relocate same in compartment 15 either in the raised or lowered adjusted position shown by the dot dash lines in Figure 5 of the drawings. Reregistering of the parts, squared shaft 26 and squared aperture 31, of the complementary indexing means thus relocks the shelf supporting means and shelf 20 thereon in an adjusted position which may be above or below the normal predetermined intermediate supported position of the shelf and permits sliding of the shelf along the rails or channel elements 29 without danger of disturbing or shifting the shelf supporting means. Adjustment of shelf 20 increases or decreases the height of the space in compartment 15 either above or below shelf 20 as desired to provide areas in the compartment for selectively storing tall and shorter food products on shelf 20 or on a stationary conventional shelf 19 therebelow. Suitable indicia (not shown) can be placed on liner 12 of compartment 15 in the vicinity of the supports or socket members 23 to facilitate and serve as instructions to the user of the refrigerator cabinet for disengaging the complementary parts of the indexing means and for rotating the brackets 24 relative to members 23 and the channel elements 29 when shelf 20 is to be adjusted. While I have shown and described the complementary parts of the indexing means as being completely removable from one another it is conceivable and well within the realm of the present invention that only the inner portion of apertures 31 in members 23 and the outer end portion of shafts 26 be squared. Such would permit shifting movement of shafts 26 axially of members 23 a short predetermined distance to disengage the indexing means and without entirely detaching the shafts 26 from their apertures in the socket members.

Referring now to Figures 8 and 9 it will be noted that the pin or shaft 26 on a bracket or bracket members 24 can be splined as at 33 to form one part of the indexing means of the present disclosure and that the opening or aperture 31 in the stationary socket members 23 can also be splined as at 34 to form the other part of the indexing means. A splined complementary indexing means or pin and connection as shown by the parts in Figures 8 and 9 will permit changing of the angular relationship between the bracket members 24 and the channel or rail elements 29 in the same manner as the squared arrangement hereinbefore described. Removal or axial shifting movement of brackets 24 from or relative to members 23 and rotation thereof relative to the channel elements 29 into a right angled position with respect thereto will adjust the shelf 20 to either a higher or lower elevation in compartment 15 beyond its normal predetermined intermediate position as shown in Figure 5. While I disclose four companion or cooperating splines 33 and 34 in the parts disclosed in Figures 8 and 9 providing complementary parts of the indexing means for shelf 20 it is to be understood that any number of splines could be formed on shaft 26 of brackets 24 and in the aperture 31 of the stationary socket members 23. For example if the shelf is desired to be adjusted vertically in compartment 15 to positions in between the extreme upper and lower positions thereof as illustrated in Figure 5 shafts 26 and apertures 31 can each be provided with more splines suitably spaced apart therearound to permit registering thereof at a plurality of locations and locking of the shelf in any one of such locations.

It should be apparent from the foregoing that I have provided a simplified, inexpensive and improved shelf supporting arrangement for use in the food storage compartment of refrigerator cabinets. In my present arrangement the shelf can be slid outwardly and inwardly of the food compartment through its front access opening while the supporting arrangement is locked by the indexing means in any one position to thereby render foods on the

rear portion of the shelf readily accessible at the front of the refrigerator. The present arrangement eliminates the necessity of providing a series of shelf supports or socket members at different elevations along the food compartment walls and yet affords adjustment of the shelf selectively throughout three different heights within the compartment. By providing a shiftable shelf supporting means to vary the height of a shelf thereon within a food compartment of a refrigerator and particularly an extensible or sliding type of shelf the utility of the shelf and of the refrigerator as well is greatly increased.

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 defining a compartment therein provided with a front access opening, a door normally closing the compartment access opening, means for supporting a shelf within said compartment, said means comprising a pair of spaced apart stationary members on each side wall of said compartment, front and rear bracket members within said compartment associated with said stationary members, the front and rear bracket members on each side of said compartment swivelingly carrying a shelf receiving element extending therebetween at one portion thereon, a shelf slidably mounted on said elements, said stationary members and a portion of said bracket members spaced from said one portion thereof being provided with complementary indexing means holding said shelf at one predetermined height in said compartment, said indexing means being adjustable to swing said bracket members axially relative to said stationary members for changing the height of said shelf into any one of a plurality of positions differing from said one predetermined height thereof and holding the shelf thereat, said shelf being slidable along said element beyond said rear bracket members part way out of said compartment through its access opening, when

said door is opened, while the shelf is in any one of its supported positions, and means on said elements preventing tilting of the shelf thereon during sliding thereof.

2. In combination, a cabinet having walls defining a compartment therein provided with a front access opening, a door normally closing the compartment access opening, means for supporting a shelf within said compartment, said means comprising a pair of spaced apart stationary members on each side wall of said compartment, front and rear bracket members within said compartment associated with said stationary members, the front and rear bracket members on each side of said compartment swivelingly carrying a shelf receiving channel element extending therebetween at one portion thereon, a shelf slidably mounted on said channel elements, said stationary members and a portion of said bracket members spaced from said one portion thereof being provided with complementary indexing means holding said shelf at a normal predetermined height in said compartment, said indexing means being adjustable to swing said bracket members axially relative to said stationary members for raising and/or lowering said shelf within said compartment above and/or below said normal predetermined height thereof and holding the shelf thereat, said shelf being slidable along said channel elements beyond said rear bracket members part way out of said compartment through its access opening, when said door is opened, while the shelf is in any one of its supported positions, and said channel elements preventing tilting of the shelf thereon during sliding thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

504,717	Fanckboner	Sept. 12, 1893
1,393,012	Dilg	Oct. 11, 1921

FOREIGN PATENTS

2,654	Great Britain	June 17, 1881
732,531	Great Britain	June 29, 1955