Nov. 9, 1954 R. SANTANA ET AL 2,693,989

REVOLVING TRAY FOR REFRIGERATORS

Filed Dec. 16, 1952

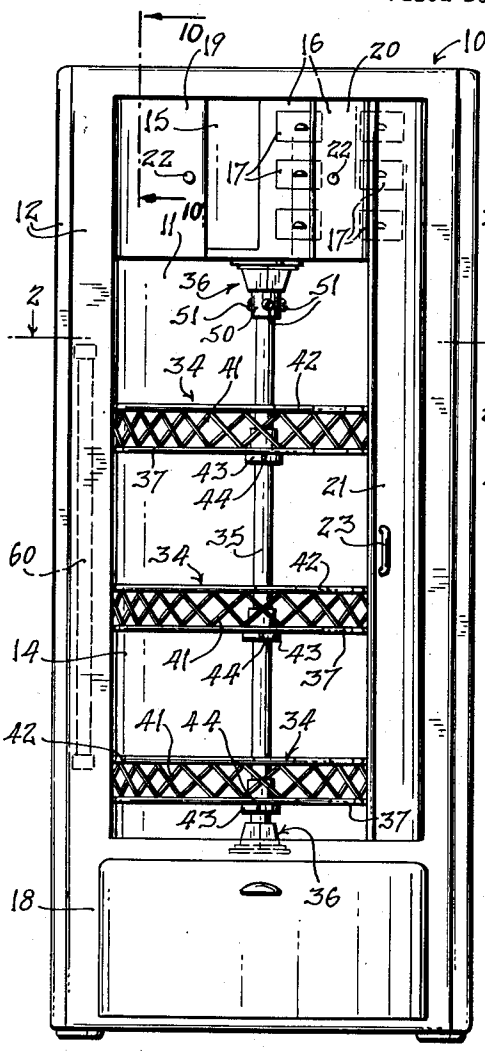


FIG. 1.

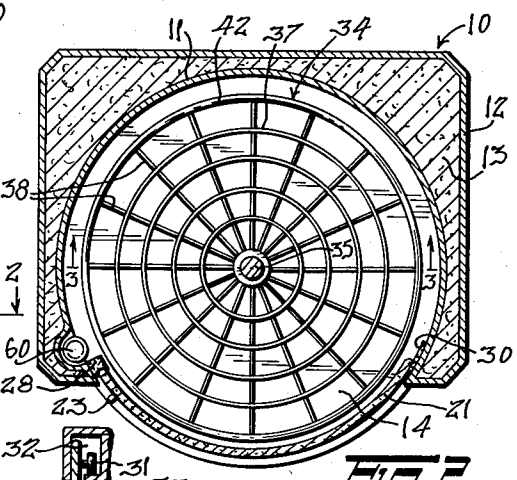


FIG. 2.

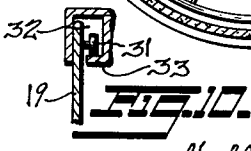


FIG. 10.

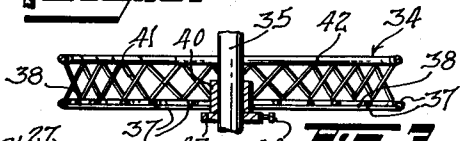


FIG. 3.

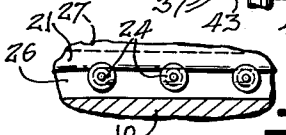
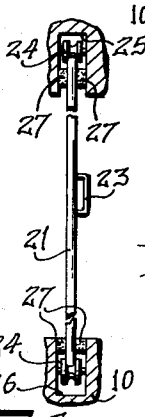


FIG. 9.



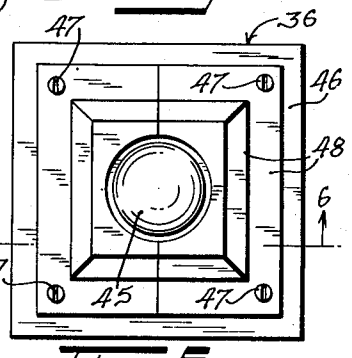


FIG. 5.

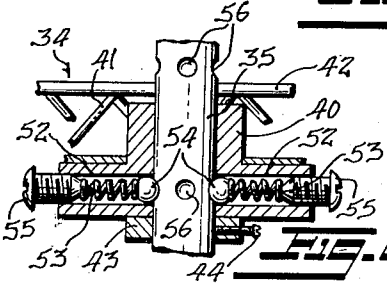


FIG. 4.

FIG. 8.

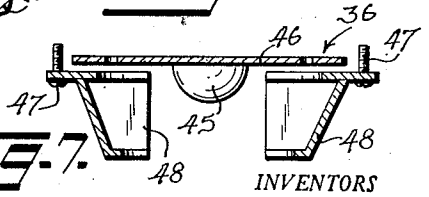


FIG. 7.

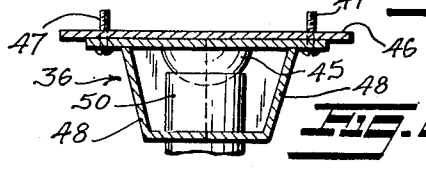


FIG. 6.

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REVOLVING TRAY FOR REFRIGERATORS

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3 Claims. (Cl. 312—305)

This invention relates to improvements in refrigerators, particularly those adapted for household use.

One object of the invention is to provide a circular refrigerated chest within a cabinet of any desired shape, said chest being provided with an arcuate sliding door and comprising a compartment for the cold storage of foodstuffs, a frozen food compartment and an ice cube manufacturing and storage compartment, the latter two compartments being provided each with an arcuate sliding door to isolate it from the remainder of the chest.

Another object of the invention is so to construct said sliding doors and their runways as to make the doors self-closing.

Another object of the invention is to provide the cold storage compartment with a plurality of cylindrical shelves or trays rotatable individually or in unison so as to make all of the contents thereof easily accessible, and also adjustable vertically to provide varying amounts of head room, both simply and efficiently.

A further object of the invention is to provide means whereby the shelves may temporarily be fixed relative to one another so as when rotated to present related foodstuffs present in the several shelves at the door-way simultaneously.

Still another object of the invention is so to construct and arrange the axis for the shelves and the bearing members for said axis as to make both easily removable for cleaning or repair.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a front view of the refrigerator of the invention with the three sliding doors partially open to illustrate the internal construction.

Fig. 2 is a sectional plan view of the refrigerator with the section taken on line 2—2 of Fig. 1 and showing the construction of the cabinet and one of the rotating trays and also illustrating the over-all sliding door in closed position.

Fig. 3 is a detailed sectional view on line 3—3 of Fig. 2, of one of the rotating trays and the means whereby it is supported and journalled on its axis.

Fig. 4 is a fragmentary edge view of the over-all sliding door and its runways and rollers.

Fig. 5 is a view of the upper bearing member for the tray axis as seen from below with the axis itself omitted.

Fig. 6 is a sectional view on line 6—6 of Fig. 5 of the bearing member illustrated in the latter figure but with the tray axis shown in position.

Fig. 7 is a sectional view of the bearing member illustrated in Figs. 5 and 6, but with certain parts omitted and the remaining parts shown disassembled.

Fig. 8 is a sectional view taken on a line through the center of the tray axis and illustrating the means for temporarily fixing one tray relative to another.

Fig. 9 is a fragmentary view of a portion of the over-all refrigerator door and the lower runway in which it is mounted, and serves to illustrate the downward pitch of the runway.

Fig. 10 is a fragmentary sectional view on line 10—10 of Fig. 1 of the door of the frozen food compartment and illustrates the manner in which it is mounted.

In the illustrated instance of the invention the refrigerator cabinet 10 (Figs. 1 and 2) is depicted as generally rectangular in form, but it is to be understood that the cabinet may be of any desired shape.

The cabinet 10 comprises inner and outer metallic sheaths or walls 11 and 12 respectively (Fig. 2), said sheaths being separated by a layer of suitable heat insulating material 13 and the inner sheath forming a substantially cylindrical refrigerated chest. The chest is divided up by suitably insulated partitions into three compartments, a cold, food storage compartment 14 (Fig. 1), a frozen food compartment 15 and an ice cube compartment 16, the last mentioned compartment containing a plurality of ice cube trays 17 as shown more or less diagrammatically in Fig. 1. Immediately below the refrigerated chest there is provided a warm storage bin or drawer 18 of ordinary construction.

The frozen food and ice cube compartments are provided with arcuate sliding doors 19 and 20 (Fig. 1) and the complete chest is provided with an over-all sliding door 21. The doors may be provided with any desired type of handles, in the illustrated instance the doors 19 and 20 being provided with conventional knobs 22 and the over-all door 21 with an ordinary pull type handle 23 (see also Fig. 4). All of the doors are, of course, suitably insulated to maintain the desired temperatures in the various compartments.

The over-all door 21 is mounted between rollers 24 (Fig. 4) situated in runways 25 and 26 formed in the framework of the cabinet at the upper and lower extremities respectively of the door. The open ends of the runways 25 and 26 are sealed by felt or rubber pads 27 preferably fastened to the walls of the runways and bearing against the door. The door-way is further insulated against the admission of heat to the refrigerated chest by a felt or rubber door stop and insulating pad 28 (Fig. 2) secured to the inner wall 11 and by a felt or rubber strip 30 secured to said wall immediately adjacent the opposite side of the door-way and bearing on the door.

In order to make door 21 self closing, runways 25 and 26 are pitched downward to the left in Fig. 1 a suitable amount, and the upper and lower edges of the door are formed not at right angles to the lateral edges thereof but at angles appropriate to the degree of pitch of the runways. This is illustrated in Fig. 9 in which the horizontal upper edge of runway 26 can be compared with the pitched bottom of the runway and the pitched lower edge of the door.

Doors 19 and 20 are also self closing, the two however closing in opposite directions toward one another. The means whereby this is accomplished is substantially identical for both doors and a description of one will suffice for both. Referring to Fig. 10, door 19 has mounted thereon a plurality of rollers 31 situated in a grooveway 32 formed in the framework of the cabinet and including a shelf or runway 33 engaged by said rollers. The shelf, the rollers and the top of the door are pitched downward in much the same fashion as described above in connection with door 21, the low ends of the shelves for doors 19 and 20, however, being located at their proximate edges.

The door construction above described adapts a refrigerator utilizing the same to any household space large enough to accommodate the cabinet, no additional space being required as clearance for a swinging door, an advantage to which the smallness and compactness of the modern kitchen lend particular importance.

In order to provide facile access to all of the contents of the cold storage compartment said compartment is provided with a plurality of cylindrical shelves or trays 34 (Figs. 1, 2 and 3) journalled on an upright shaft 35 mounted in upper and lower assemblies 36.

Each of the trays 34 is constructed of several concentric rings 37 of tubular or light rod steel or aluminum, each welded at equidistant intervals along its periphery to similar, but radial, tubes or rods 38 which at their inner ends are welded to a sleeve or collar 40 journalled on shaft 35. The outermost tube or rod 37 has welded thereto a vertical tubular lattice 41 capped by another tubular ring 42 to form a fence to prevent articles from falling over the edge of the tray. The trays are supported

vertically on shaft **35** by bearing collars **43** fastened on said shaft by means of set screws **44**.

In one construction the shaft **35** is fixed in the upper and lower assemblies **36** and the trays are individually spun around on the shaft by hand, the sleeves **40** of the trays bearing on the collars **43**.

In another construction, however, the shaft is itself rotatable in the upper and lower assemblies **36** and each of the trays is provided with means temporarily to fix it on the shaft in a variety of radial positions relative to the other trays. In this construction each of the assemblies **36** (Figs. 5, 6 and 7) includes a half moon bearing **45** welded to a sheet metal plate **46** which is fastened to the floor or the ceiling of the compartment by screws **47** which also pass through a sheet metal guide and protective cover **48** made in two parts and having the formation shown in the drawings to protect the bearing and to act as a guide for the shaft. Said shaft is preferably formed with a counter-shaft **50** (Fig. 1) at its upper end, the two being rigidly connected by means of set-screws **51**. At its upper and lower ends shaft **35** is provided with semi-spherical concavities to receive the bearings **45**.

The arrangement just described is such that the shaft may be removed merely by loosening set-screws **51** (Fig. 1), removing the guideway **48** and sliding off the trays, and that the bearings **45** are accessible on removal of said guideways.

In order temporarily to fix a tray **34** on the shaft in a variety of radial positions relative to the other trays, the bearing sleeve **40** of the tray is continued downward below the tray (Fig. 8) and the diameter of the section below the tray substantially increased to accommodate in bores **52** therein, coil springs **53** and ball bearings **54**. At their outer ends the bores **52** are threaded to receive adjusting screws **55** by which the pressure of the springs on the ball bearings can be varied. The ball bearings cooperate detent fashion with semi-spherical indentations **56** in the shaft, said indentations being provided in tiers around the shaft. The number of tiers of indentations and the vertical spacing between them are of course dependent on the users' requirements.

The construction is such that the springs **53** press the ball bearings **54** into the indentations **56** so that if the tray be turned by hand, the shaft **35** also turns and carries with it any other trays having their associated ball bearings pressed into indentations **56**. The trays can temporarily be fixed relative to one another by holding one against turning while rotating one or more others to the desired position. If it is desired to disable the ball bearing detent device for one or more of the trays, all that is required is to move the tray or trays vertically to a position where the ball bearings do not engage a tier of indentations **56** and fix the tray in that position by means of the collar **43** and its set-screw **44**.

The means for cooling the refrigerator may be of any suitable sort and as such means do not enter into the invention they are not illustrated or described. It may be mentioned at this point, however, that the refrigerated chest is preferably provided with a fluorescent lamp **60** automatically turned on and off in the usual manner as the door **21** is opened and closed.

While we have illustrated and described the preferred embodiments of our invention, it is to be understood that we do not limit ourselves to the precise constructions herein disclosed and the right is reserved to all changes

and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described our invention, what we claim as new, and desire to secure by United States Letters Patent is:

1. In the cold storage compartment of a household refrigerator the combination, of a vertical, rotatable shaft comprising a plurality of telescoping sections adjustably connected together, a plurality of cylindrical trays supported on said shaft and each including a sleeve embracing the shaft, a plurality of bores in said sleeve, a coil spring and a ball bearing in each of said bores, a plurality of tiers of semispherical indentations in said shaft for cooperation, detent fashion, with said ball bearings, and a bearing collar adjustably fixed on the shaft below each of said trays, said sleeve bearing on said collar to support the tray.

2. In the cold storage compartment of a household refrigerator the combination, of a vertical, rotatable shaft comprising a plurality of telescoping sections adjustably connected together, a plurality of cylindrical trays supported on said shaft and each including a sleeve embracing the shaft, a plurality of bores in said sleeve, a coil spring and a ball bearing in each of said bores, an adjusting screw to vary the pressure of said spring on said ball bearing, a plurality of tiers of semispherical indentations in said shaft for cooperation, detent fashion, with said ball bearings, and a bearing collar adjustably fixed on the shaft below each of said trays, said sleeve bearing on said collar to support the tray.

3. In the cold storage compartment of a household refrigerator the combination, of a vertical, rotatable shaft comprising a plurality of telescoping sections adjustably connected together and having semi-spherical concavities in either end, half moon bearings secured to the ceiling and floor of said chest and engaging in said concavities, a sheet metal cover for each half moon bearing, said cover acting also as a guide for said shaft, a plurality of cylindrical trays supported on said shaft and each including a sleeve embracing the shaft, a plurality of bores in said sleeve, a coil spring and a ball bearing in each of said bores, a plurality of tiers of semi-spherical indentations in said shaft for cooperation, detent fashion, with said ball bearings, and a bearing collar adjustably fixed on the shaft below each of said trays, said sleeve bearing on said collar to support the tray.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
D. 108,559	Boyce et al.	Feb. 22, 1938
123,295	Sanford et al.	Jan. 30, 1872
799,233	Hubbell	Sept. 12, 1905
844,754	Sardou et al.	Feb. 19, 1907
1,474,847	Phillips	Nov. 20, 1923
1,698,509	Probert	Jan. 8, 1929
1,748,670	Craft	Feb. 25, 1930
2,182,003	Roark	Dec. 5, 1939
2,347,985	Beersman	May 2, 1944
2,457,919	Ramsey	Jan. 4, 1949
2,565,426	Hayes	Aug. 21, 1951
2,596,316	White	May 13, 1952
2,624,650	De Perales	Jan. 6, 1953
2,638,400	Spotts	May 12, 1953