

Feb. 17, 1953

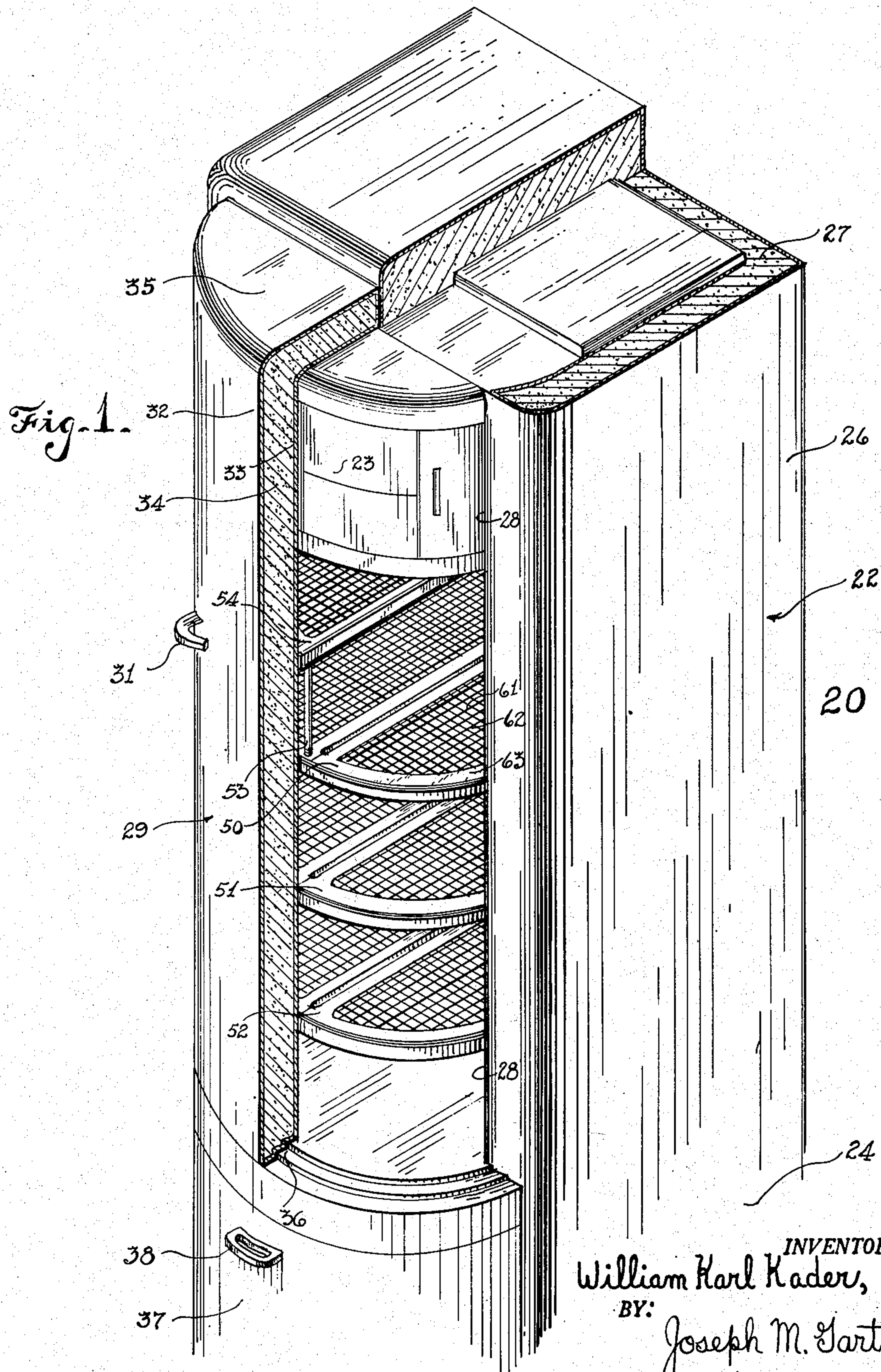
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2,628,880

REVOLVING SHELVEING FOR REFRIGERATORS AND THE LIKE

Filed July 13, 1946

4 Sheets-Sheet 1



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Fig. 2.

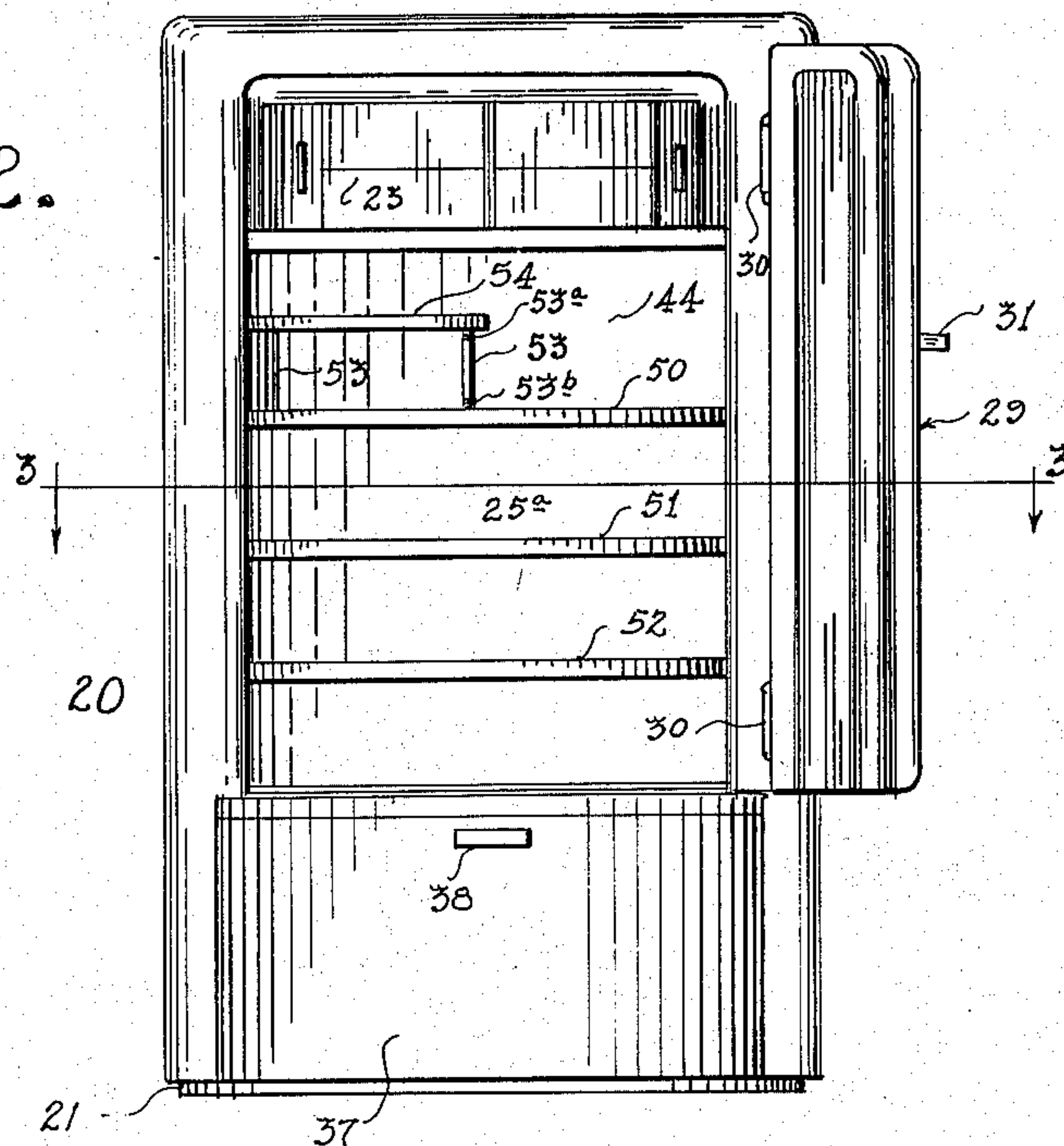
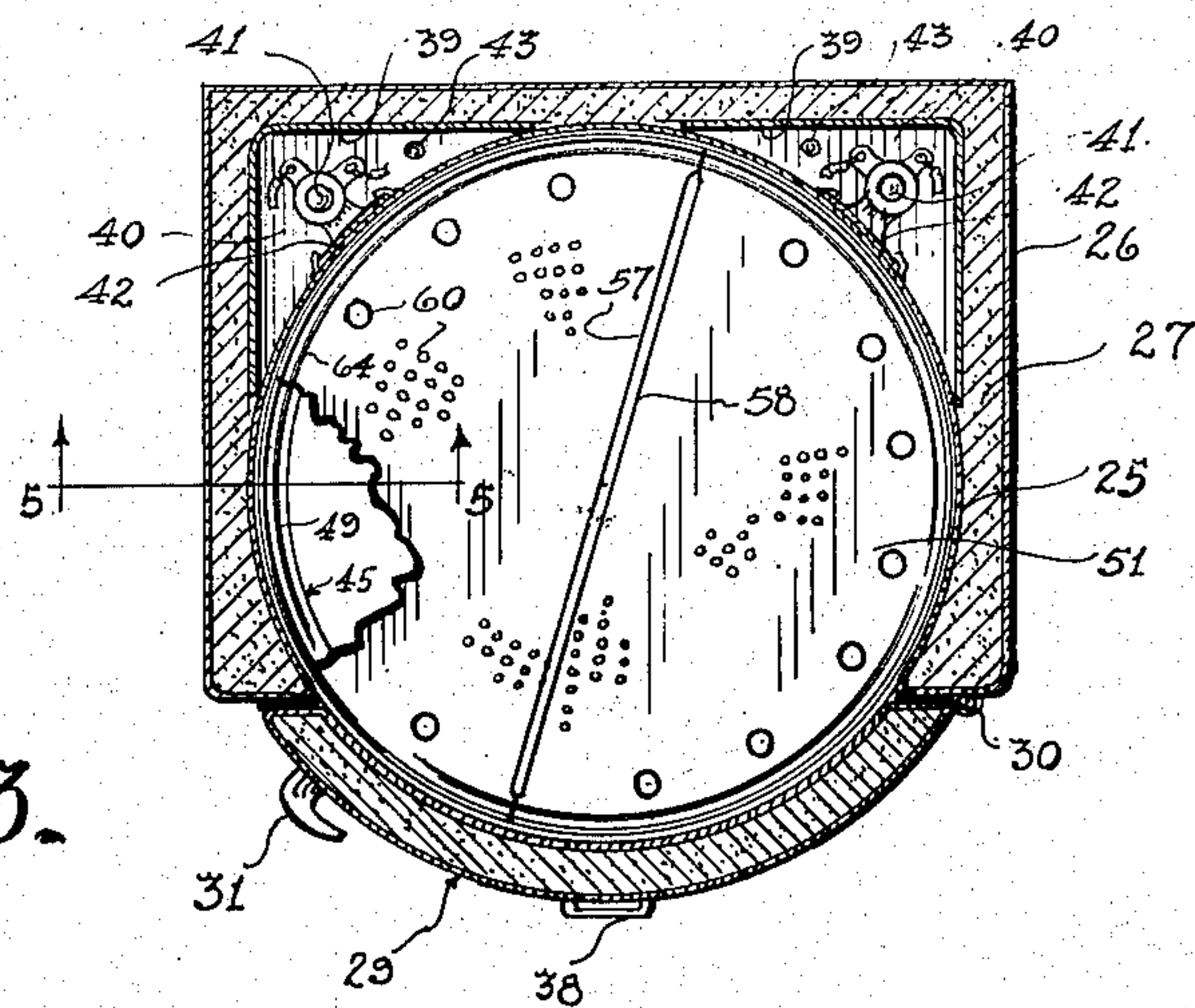


Fig. 3.



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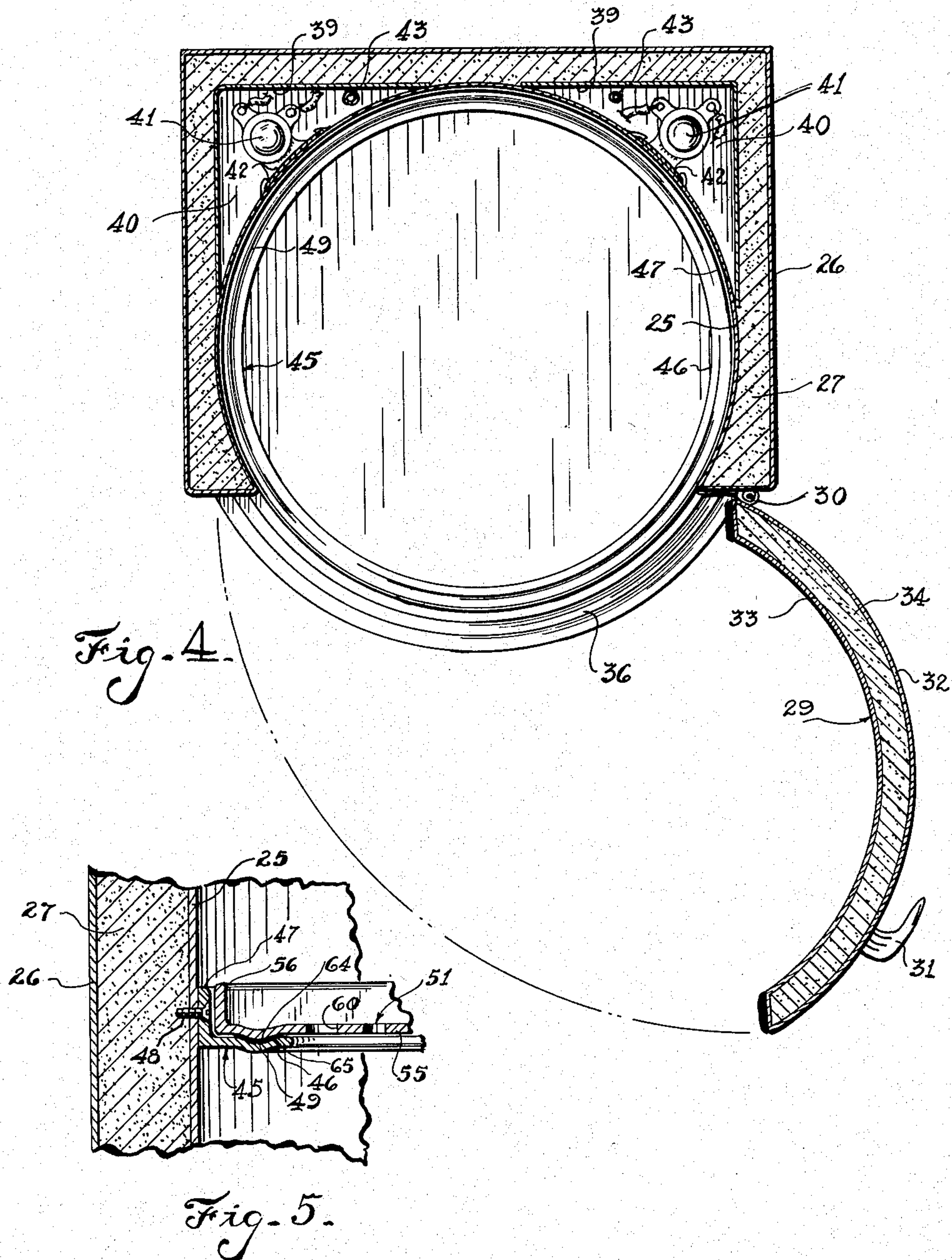
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4 Sheets-Sheet 3



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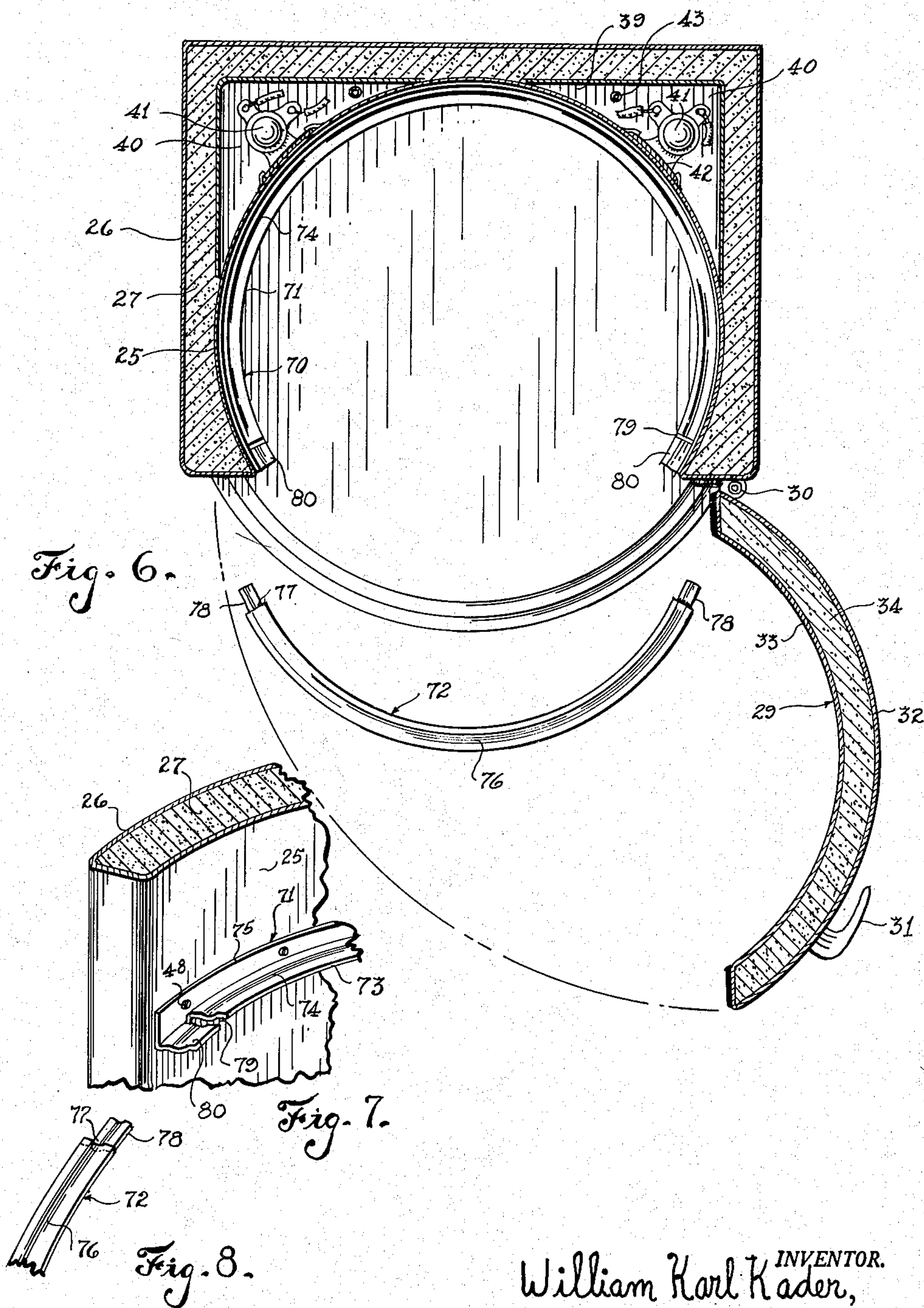
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REVOLVING SHELving FOR REFRIGERATORS AND THE LIKE

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4 Sheets-Sheet 4



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## UNITED STATES PATENT OFFICE

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## REVOLVING SHELVING FOR REFRIGERATORS AND THE LIKE

William Karl Kader, Chicago, Ill.

Application July 13, 1946, Serial No. 683,506

1 Claim. (Cl. 312—307)

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This invention relates to refrigerators, and more particularly to the shelving thereof. It has also to do with the general form of the housing body or casing.

One object is to improve the housing body or casing structure and also the external form so as to enhance the fanciful appearance thereof.

The prime object and accomplishment of the invention, however, is to provide an improved, practical and efficient rotatable shelf structure for the interior of the body housing or casing, which is simple and compact, yet strong and durable, and at the same time is easily cleaned and maintained in a sanitary condition, and which is adaptable to bring any particular article of food or other object into position to be conveniently removed from the front of the refrigerator body.

Another object is to enable the removal of a tray from the food storage chamber through a relatively narrow door opening, thus tending to minimize the lowering of the temperature of the chamber.

A further object of the invention is to provide an improved tray carrier structure which facilitates easy manipulation of the trays and their removal from the casing and to prevent accidental tilting of the trays when the chamber door is open.

A feature of the invention is to provide a refrigerator in which the articles of food are easily accessible and any desired article may be brought to a position at the front of the refrigerator where it can be easily withdrawn without interference from other articles and without requiring a rearrangement of any of the articles in the refrigerator. In the present invention a plurality of trays are provided which may rotate in order to eliminate the ordinary method of finding what is wanted; for instance, after shopping and when all perishable foods are in the refrigerator, it is necessary, when looking for an article, to take out most foods which are placed on the trays in order to find the article wanted, but with this invention, all that is necessary is to turn the said trays in either direction until the article is found, without molesting anything else. Accordingly, the invention provides a plurality of trays which will firmly support and carry dishes and food and which may be turned within the refrigerator casing to bring a desired article to the front so that it may be easily removed.

Additional objects, features, and advantages of the invention disclosed herein will be apparent to the persons skilled in the art after the construc-

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tion and operation are understood from the within description.

It is preferred to accomplish the numerous objects of this invention and to practice the same in substantially the manner hereinafter fully described and as more particularly pointed out in the appended claim, reference being had to the accompanying drawings which form part of this specification, wherein:

Fig. 1 is a fragmentary perspective view of a refrigerator cabinet embodying the improvements contemplated herein and parts thereof being broken away and shown in section in order to better illustrate the invention;

Fig. 2 is a front elevational view of the refrigerator cabinet shown in Fig. 1, the door being depicted in open position to show the interior of the cabinet;

Fig. 3 is a plan sectional view taken on the plane of line 3—3 on Fig. 2, and looking in the direction of the arrows;

Fig. 4 is an enlarged plan sectional view of the cabinet depicted in Fig. 1 with the door in open position and the trays removed;

Fig. 5 is a fragmentary sectional view of the tray carrier and tray taken on the plane 5—5 on Fig. 3 looking in the direction of the arrows;

Fig. 6 is an enlarged plan view of a modified tray carrier structure;

Fig. 7 is a fragmentary perspective view of the construction of the tray carrier depicted in Fig. 6; and

Fig. 8 is a fragmentary perspective view of a removable tray carrier section depicted in Fig. 6.

The drawings are to be understood as being more or less of a schematic character for the purpose of disclosing typical or preferred forms of the improvements contemplated herein, and in these drawings like reference characters identify the same parts in the several views.

In the exemplary embodiment of the invention depicted in Figs. 1, 2, and 3, the refrigerator cabinet in its entirety is designated by the numeral 20, and generally comprises a base portion 21 which supports the main body or casing 22 of a mechanical or electrical refrigerator preferably having an improved across-the-top evaporator or freezing unit 23 substantially in its upper portions, and having a lower portion 24 adapted to contain the motor, compressor and other parts (not shown), usually provided in mechanical or electrical refrigerators. Suffice it to say, since the invention is not particularly concerned with the refrigerating mechanisms, they will not be described in detail. It is to be understood that



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details of the refrigerating mechanism may be modified to suit particular conditions and I do not wish to be limited to the details of construction as set forth herein.

As shown, the refrigerator cabinet 20 is generally semi-circular in form in its front portions and preferably square in its rear portions, but the front portions thereof may be made in any desired polygonal form. In any case, however, the interior of the refrigerator cabinet 20 is preferably cylindrical so as to provide equal annular spaces between an inner wall lining 25 constituting the side of a cooling chamber 25a and the outer casing 26 and the respective circular trays to be presently more fully described.

The refrigerator cabinet 20 is provided with an outer metal shell 26 which may be enameled or otherwise suitably coated and colored in keeping with the usual present day color scheme and character of ornamentation, said outer shell being spaced from the inner lining 25 with a suitable insulative filler 27 therebetween, the general structure being in accordance with any approved practice. The refrigerator cabinet 20 is obviously provided with a substantially rectangular opening 28 or openings for the reception of a transversely curved insulated door in the usual or desired height, the door being indicated at 29 in Figs. 1 and 2, and supported by hinges indicated at 30 and having latch means as at 31, and whose inner wall is substantially continuous with the inner lining 25 of the cabinet.

The door 29 is generally transversely curved or semi-circular in form and comprises an outer lining 32 and an inner lining 33, insulation 34 therebetween and a top portion 35 defining a closure surrounding the front portions and a portion of the top of the freezing unit 23. At the lower end of the door 29 adequate seals between the cabinet and door as at 36 are provided, the general construction of the seals being in accordance with any approved practice. The concave form of the interior of the door provides space for a plurality of revolving trays with which the present invention is particularly concerned and which will be presently more fully described.

Located forwardly of the motor-compressor unit and directly below the cooling chamber 25a is a vegetable bin having a door 37 swingable outwardly on hinges (not shown) located internally of the door substantially on the lower horizontal edge thereof. The door 37 is provided with a handle 38 of any suitable design.

Referring to Figs. 3 and 4, inner liners 39 are formed to provide a hollow space 40 which extends vertically upwardly from and opens into the motor-compressor chamber, and in which space a suitable elongated tubular lamp 41 is located and operated in accordance with any approved practice to provide light for the interior of the cabinet through a suitable frosted glass window or panel 42 which is removably secured to the circular inner lining 25. The space 40 also provides room for running necessary refrigerant conduits 43 therethrough which connect the refrigerating mechanism with the freezing unit 23. Air is also permitted to circulate through the space 40 to cool the lamps 41 and other mechanical parts of the refrigerator.

Having thus described the general environment surrounding the rotatable shelving with which the present invention is particularly concerned, the specific construction and function of parts of said shelving will now be described in detail.

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Referring to Figs. 3, 4 and 5, in the cooling chamber 25a, attached to the inner lining 25 are interspaced annular tray-supporting tracks 45, in this instance, three in number; however, any number may be advantageously employed depending on the requirements and size of the refrigerator. Each track 45 is made of relatively thin sheet metal, formed and welded by any approved practice to define a continuous circuit or ring, transversely triangular in shape and including a substantially horizontally inwardly projecting flange 46, and an upwardly extending back or attaching wall 47. After the formation of the tracks into a one-piece circular ring, there is provided thereon a concentric circular groove 49 located inwardly of the inner peripheral edge of the horizontally projecting flange 46. Preferably, the groove 49 is formed by a single die to provide an accurate concentric depression illustrated in Fig. 5. An annular series of suitable screws 48 removably secures each wall 47 to the inner lining 25. The screws 48 are preferably of the countersunk type to provide a smooth uninterrupted surface on the wall 47 to facilitate easy cleaning.

Supported for rotative movement on each track is a circular container or tray for food as shown at 50, 51 and 52; and supported independently by rods 53 carried by the tray 50 is a half circle tray, as at 54 on Figs. 1 and 2, adapted to carry small articles. This construction permits a large space 44, illustrated in Fig. 2 for large bottles, etc.

The rods 53 are provided with opposed threads at each end thereof as at 53a and 53b so that by merely rotating the rods the tray 54 may be removed from the tray 51 if desired.

The trays, tracks and inner lining may be enameled or otherwise suitably coated and colored in keeping with the usual present-day color scheme and character of ornamentation.

Each tray comprises a circular base portion 55, and a vertical peripheral flange 56. When these trays are employed in conjunction with the tracks illustrated in Fig. 4, I prefer to make them in two equal independent sections as at 57 and 58 best illustrated in Fig. 3. This construction and arrangement facilitates easy removal of the trays from the cabinet for cleaning purposes.

The base 55 of the tray 51 illustrated in Fig. 3 may be provided with air circulation openings 60 which may be of any preferred number, size, shape, arrangement or construction.

Another form of base 55 of the trays is illustrated in Fig. 1. In this instance the openings 61 are the interstices of a circular sheet 62 of metallic mesh suitably secured to an annular marginal portion 63 of the base 55.

In either form of tray, the base 55 of the trays adjacent the flange 56 is provided with a concentric annular projection 64, matching and corresponding to the groove 49 on the tracks 45 as is best illustrated in Fig. 5. This projection 64 may be made with the same die employed to form the groove 49 on the tracks, thereby assuring perfect alignment and matching of the grooves.

In order to eliminate friction between the trays and the tracks, and so that the trays may be easily rotated, I interpose between the tray and track at the groove an adhesive latex base oil, as at 65, which is unaffected by cold or temperature changes. Such an oil, for example, may be Shell "Tenera oil" or Shell "Albus No. 34" a mineral base oil; however, any adhesive oil of



similar characteristics to those mentioned may advantageously be employed.

Experiments and tests have proven that a tray laden with over twenty-five pounds of food or other articles can be easily rotated employing my principle of construction. With this arrangement and construction I have eliminated the rollers and other expensive features found in prior art structures.

If desired a modified form of track 70 as shown in Figs. 6, 7 and 8 may be advantageously employed. The construction of the track 70 is substantially the same as hereinbefore described except that it comprises two arcuate sections 71 and 72. The former is transversely triangular in shape and including a horizontally inwardly projecting flange 73 provided with an annular groove 74, and an upwardly extending back or attaching wall 75, all being of similar construction as the tracks hereinbefore described. The ends of the sections 71 are equi-spaced from the side of the door opening 28.

The section 72 of the track 70 has no vertical flange, is formed of a substantially flat arcuate plate of a thickness corresponding to the thickness of the flange 72 and is provided with an annular groove 76 forming a continuation of the groove 74 of the section 71. Integral with or fixed to the lower face of the plate, centrally of each end of the latter, is a lip or projection 77 constituting a downwardly offset horizontally longitudinally projecting tongue 78 which is adapted to be inserted in the slot 79 and engage the bottom of the flange 73. Normally the end portions of each plate 72 rest in the seats 80 with the terminal edges of the plate 72 abutting the ends of the horizontal flange 73 of its companion section 71, and with its upper face in the plane of the upper face of said flange to afford a practically unbroken bearing surface and the grooves will be continuous to support the trays.

With this construction and arrangement, the trays hereinbefore described as of two-piece construction may be employed, or a tray substantially of the same construction except of one-piece construction may be employed. If the trays of one-piece construction are employed, the trays, which are of greater diameter than the door opening, may be removed from the food chamber 25a by first detaching the track section 72 from the section 71 which is effected by initially lifting the forward edge of the same to withdraw the projected tongues 78 from engagement with the flange 73 and thereafter laterally tilting the section 72 to withdraw the same from the refrigerator casing. This affords room to laterally tilt the tray to a substantially inclined position whereby it may be withdrawn from the casing for purposes of cleaning, etc. The tilting operation and withdrawing of a tray of one-piece construction would otherwise be impossible because of the necessarily restricted space between the adjacent trays and the relative narrowness of the doorway.

The presence of the arcuate section 72 in its normal operating position as a part of the track prevents a downwardly forwardly tilting of trays under all conditions, and presents a continuous groove formation which is very desirable in the present invention.

As many trays and associated tracks may be provided as may be desired or the capacity of the refrigerator will admit and they may be spaced according to the conditions that may prevail.

An article may be conveniently placed upon the tray, at the front thereof, adjacent the door opening of the refrigerator, and the tray may then be rotated to a greater or less degree so that the article may be moved away from the front of the refrigerator to permit additional articles to be placed on the tray and, of course, the same operation will bring an article at the back of the refrigerator to the front thereof, when the removal of such article is desired. With the present construction and arrangement of parts the trays are very easily rotated to give convenient accessibility to any desired article located in the inner portions of the cooling chamber 25a.

It will be seen that by my invention I have provided an extremely simple and efficient rotatable shelving structure for refrigerators and the like which eliminates the rollers and other expensive features found in prior art structures, and which lends itself to low cost in manufacture and high production methods. Furthermore, the utility of the device is increased because of its easy adaptability for use in limited space, as well as for cleaning and access to the interior of the refrigerator cabinet.

Although I have illustrated the refrigerator cabinet of the present invention as having a single door and a single main cooling compartment, it will be understood that the refrigerator may be made of any desired size and may be provided with two or more compartments having a tray or trays, as desired, constructed according to the construction of the present invention.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but wish to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

In a refrigerator cooling chamber having a cylindrical wall provided with an opening, the combination comprising, an arcuate tray-carrying track section transversely angular in shape and including a horizontally inwardly projecting flange and a vertically extending back wall fixed to the cylindrical wall, said track section terminating adjacent each side of said opening in said cylindrical wall and provided with a transverse slot and a seat at each end thereof, said flange having formed thereon a concentric groove located outwardly of the inner peripheral edge of said flange, a detachable arcuate track section comprising portions adapted to rest upon said seats and offset projecting tongue portions for underlapped engagement with the flange of said first section, said detachable section having formed thereon on its upper face a concentric groove normally forming a continuation of the groove of said first section, and whereby the end portions of said detachable section normally rest in said seats with the terminal edges thereof abutting the ends of the horizontal flange of said first section and having its upper face in the plane of the upper face of said flange to afford a practically unbroken bearing surface whereby the grooves in both sections will be continuous to define a complete circle, and a circular tray carried by said track for rotative movement and having an annular projection adjacent its outer peripheral edge, said pro-



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section matching and corresponding to said first mentioned grooves in said track sections.

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