Aug. 7, 1951 G. H. BUGENHAGEN 2,563,208

REFRIGERATOR HAVING A VERTICALLY MOVABLE SHELF SECTION

Filed July 30, 1945 2 Sheets-Sheet 1

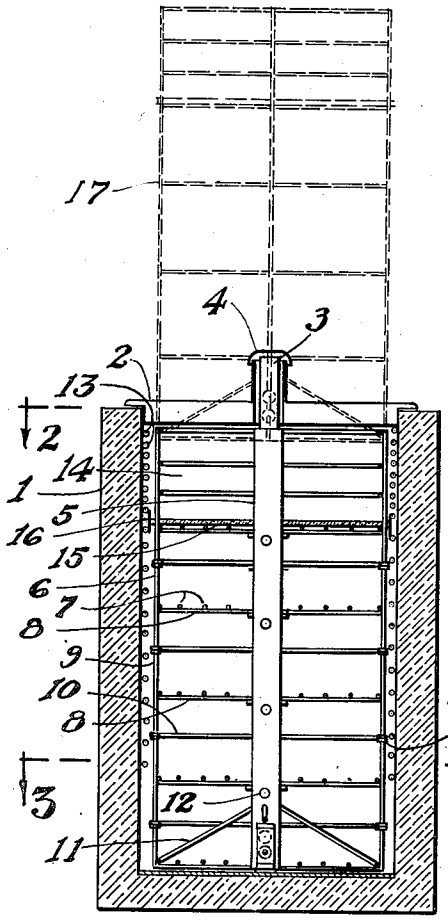


Fig. 1

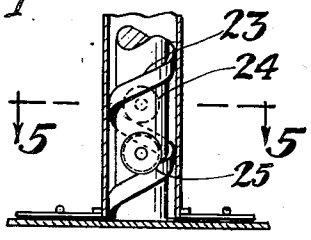


Fig. 4

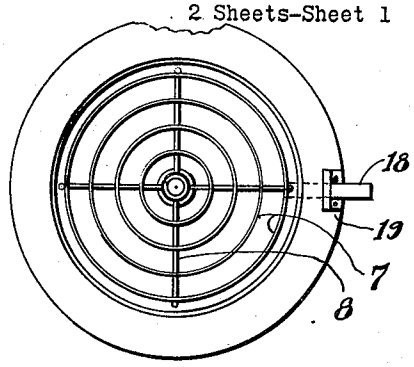


Fig. 2

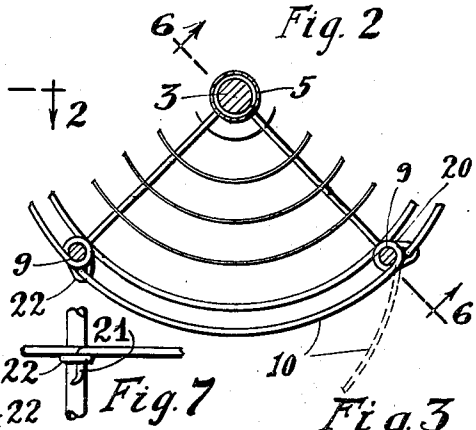
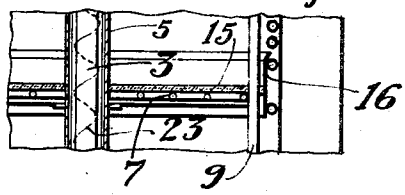


Fig. 7

Fig. 3



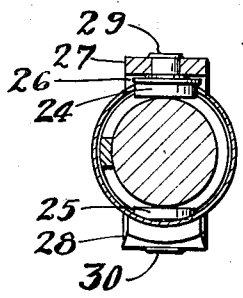


Fig. 6

Fig. 5

INVENTOR.
Geo. H. Bugenhagen
BY
Carroll R. Sims
Atty

Aug. 7, 1951 G. H. BUGENHAGEN 2,563,208

REFRIGERATOR HAVING A VERTICALLY MOVABLE SHELF SECTION

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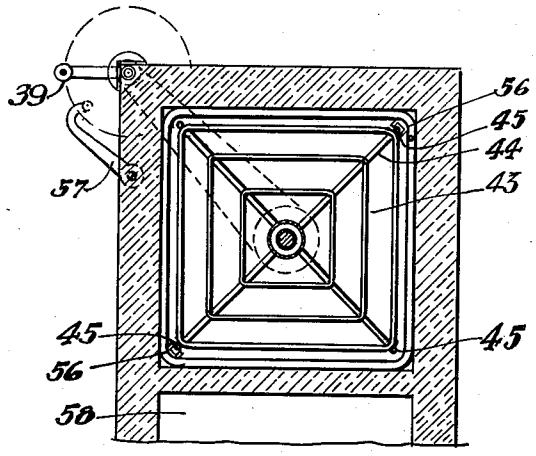


Fig. 9

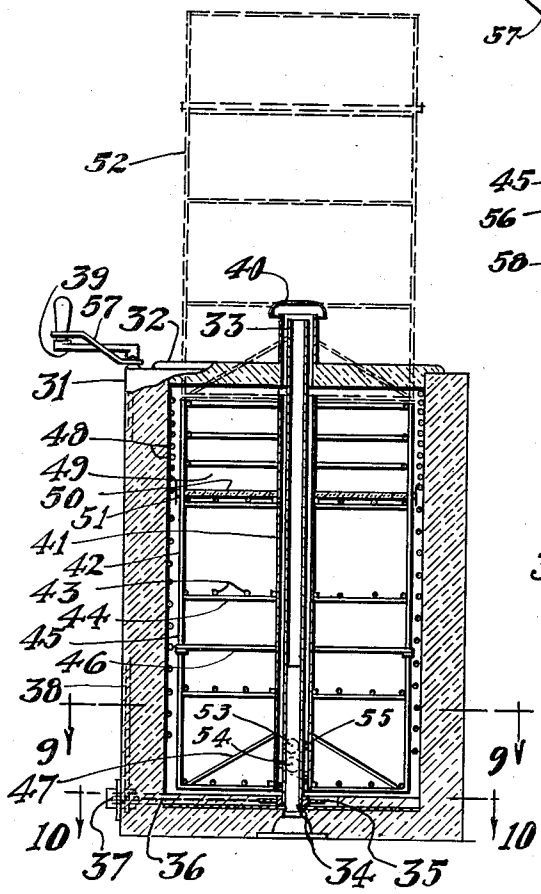


Fig. 8

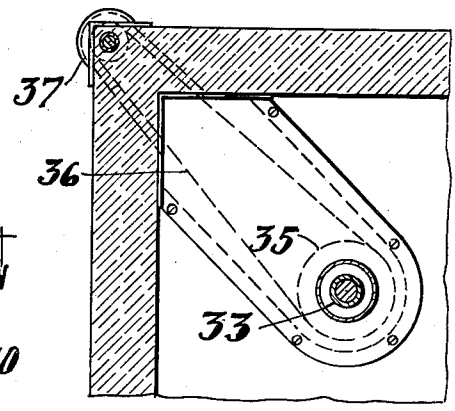


Fig. 10

INVENTOR.
Geo. H. Bugenhagen
BY Carroll R. Sims
Atty

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REFRIGERATOR HAVING A VERTICALLY MOVABLE SHELF SECTION

George H. Bugenhagen, Midland, Mich.

Application July 30, 1945, Serial No. 607,743

2 Claims. (Cl. 312—236)

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The invention relates to a quick freeze apparatus and more particularly refers to an apparatus suitable for quick freezing and the refrigerated storage of so frozen or other articles.

It is, therefore, one of the objects of the invention to provide an apparatus of the aforesaid type in which the stored articles are readily accessible regardless of where they are stored in the cabinet.

Another object of the invention is to provide a pit type refrigeration cabinet having a storage cage adapted to be elevated from the cabinet proper whereby to permit access to any stored article as desired.

Another object of the invention is to provide a quick freeze compartment at the top of the storage cage for easy placement of articles within the cabinet for quick freezing or cooling, said quick freeze compartment having a removable insulating bottom whereby the entire refrigerator may be quickly converted into a single purpose chamber.

Still another object of the invention is to provide a storage cage having tiered shelves which permit free circulation of air throughout the cage, securely retain the stored packages, and yet permit access to any portion of the storage cage.

Another object of the invention is to provide an elevating storage cage that is extremely simple in operation.

Another object of the invention is to utilize a pit or well type of refrigerator cabinet whereby high refrigeration efficiency is attained due to the tendency of the cold air of high density seeking to remain in the refrigeration chamber rather than flowing out of the chamber when the cover is removed.

Other objects and advantages will be apparent when the following description of the invention is considered in connection with the accompanying drawings, such description setting forth in detail certain means of carrying out the invention, such disclosed means illustrating, however, but several of the various ways in which the principle of the invention may be used.

Fig. 1 is a side elevational sectional view of one modification of the invention.

Fig. 2 is a top plan view along lines 2—2 of Fig. 1 with the cabinet cover removed.

Fig. 3 is fragmentary sectional view along lines 3—3 of Fig. 1 showing in greater detail the construction of one tier of the storage cage.

Fig. 4 is an enlarged detail in fragmentary section of the center column and elevating mechanism for the storage cage of Fig. 1.

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Fig. 5 is a view taken along lines 5—5 of Fig. 4 showing in plan the center column elevating rollers and their spiral track.

Fig. 6 is a fragmentary sectional view along lines 6—6 of Fig. 3 showing in enlarged detail the removable insulating floor and sealing plate.

Fig. 7 is a fragmentary side elevation in enlarged detail taken from Fig. 3 showing the retaining member or door for holding the packages in the cage.

Fig. 8 is a side elevational sectional view of another modification of the invention.

Fig. 9 is a view taken along lines 9—9 of Fig. 8, being in fragmentary section however.

Fig. 10 is a view taken along lines 10—10 of Fig. 8.

Referring to Fig. 1, an insulated cabinet 1 of cylindrical shape is provided with a suitable insulated cover 2. A column 3 is rigidly supported by the base of the cabinet and extends centrally and vertically in the cabinet and through the cover 2 which is suitably capped at 4 to accommodate the upper end of the column. A column housing 5 surrounds the column 3 and acts as a support for the storage cage 6 which consists of tiered shelves suitably spaced and formed by concentric rod members 7 attached to radially extending rods 8 and vertical struts 9. Gates or doors are provided for the shelves in the form of bars or rods 10 suitably retained in a manner to be described in connection with Figs. 3 and 7. The cage 6 is suitably braced to the column housing 5 by means of braces 11 in order to provide a more rigid structure. The column housing 5 is ported or vented through spaced ports 12 to allow ready air circulation. Circular cooling coils 13 extend spirally into the cabinet and occupy the space between the outside of the storage cage and the insulated wall of the cabinet. As shown the cooling coils are more closely spaced about the top section or compartment 14 of the storage cage. In this manner the section 14 receives more refrigeration and acts as the quick freeze compartment of the cage 6. Section 14 is provided with an insulated floor 15 which extends out to the circular sealing plate 16 whereby the quick freeze section 14 of the storage cage is substantially sealed from the remaining shelves. The position of the storage cage 6 at complete elevation is shown by dotted lines and indicated generally by numeral 17.

Referring to Fig. 2 the concentric rod members 7 and the radial rods 8 forming the shelves are more clearly seen. A hinged latch 18 carried by the cage 6 is retained by guide catch 19 and serves

as a means whereby the storage cage may be locked at any desired degree of elevation.

In Figs. 3 and 7 the enlarged detail of the gates or doors for the shelves are shown. The rods 10 which serve to retain the stored packages in the storage cage are coiled at one end 20 so that the coiled end 20 swings on the vertical strut 9. The other ends of rods 10 are provided with hooks 21 having outwardly flared ends. The hooks 21 are adapted to register in holes in the lugs 22. Lugs 22 are mounted on vertical struts 9 and serve to restrain downward movement of the rods 10.

In Figs. 4 and 5 the means for elevating the storage cage 6 are more clearly shown. As seen a spiral strap 23 is wound around and secured to the column 3 and acts as a track for rollers 24 and 25. As seen in Fig. 5 the rollers 24 and 25 are provided with flanged edges seen more clearly in the case of roller 24 at 26. The rollers are suitably mounted one above the other on the column housing 5 on opposite sides thereof and run in bearing members 27 and 28 on suitable journals 29 and 30. This arrangement allows the storage cage 6 to be moved upwardly or downwardly as desired simply by rotating the storage cage.

In Fig. 6 an enlarged detail shows the removable insulating floor 15 of the quick freezing compartment seating on supporting concentric rods 7 and abutting the sealing plate 16 in such a manner as to substantially seal the top section of the freezing apparatus from the lower sections.

In the modification shown in Fig. 8 a generally square or rectangular insulated cabinet 31 is provided with a suitable insulated cover 32. A center column 33 is rotatably mounted in the base of the housing in bearing 34. A sprocket 35 splined or otherwise secured to the column 33 serves as a means whereby the shaft may be driven through sprocket chain 36, a second smaller sprocket 37, vertical shaft 38, and crank 39. The column 33 extends vertically through the cover 32 which is capped at 40. A column housing 41 surrounds the central rotatable column 33 and acts as a support for the storage cage 42 which consists of tiered shelves suitably spaced and formed by spaced rod members 43 attached to radially extending rods 44 and vertical struts 45. Gates or doors 46 are provided for the shelves in the same manner described in connection with the modification shown in Fig. 1. Braces 47 extend between the column housing 41 and the storage cage 42 to give a more rigid structure. Cooling coils 48 are wound spirally in the space between the storage cage 42 and the wall of the cabinet 31. As shown the cooling coils are more closely spaced about the top compartment to form a quick freeze compartment 49. Compartment 49 is provided with an insulated floor 50 which extends out to the sealing plate 51 whereby the quick freeze section 49 is effectively sealed from the storage shelves. The elevated position of the storage cage 42 is shown in dotted lines and indicated generally by numeral 52. The elevation of the storage cage is effected through the movement of rollers 53 and 54 on spiral track 55 in a manner similar to that described in connection with the modification of Fig. 1. The movement of crank 39 can be checked and secured by means of rotatably mounted latch 57.

Fig. 9 shows the general shape of the storage compartment of the modification of Fig. 8 as viewed from above. Spaced rods 43 and radially extending rods 44 are seen more clearly with opposite vertically extending struts 45 being provided with guide channels 56 to keep the storage cage 42 properly positioned or aligned during the time it is being raised from the cabinet. A latch is indicated at 57 and serves to engage the elevating crank 39, whereby the storage cage may be held at any desired position of elevation. As indicated at 58 more than one storage cage may be combined in a single cabinet housing if more storage space is desired.

In Fig. 10 a plan view shows the relation of sprocket 35, chain 36, and a second sprocket 37 in driving the rotatable column 33. As shown a recessed area is provided in the base of the cabinet to house the column-driving mechanism, whereby the cabinet may be placed directly on the floor and yet the necessary clearance is obtained to allow the column-driving mechanism to operate.

The operation of the modification of Fig. 1 will be best understood from the following description. Assuming some articles have been frozen in the top compartment 14 and it is desired to store them in one of the other shelves, it will then be only necessary to lift the cover off and remove the desired articles. Thereafter the storage cage 6 will be rotated manually in a counterclockwise direction, whereby the storage cage will move upwardly on the column 3 to the desired height due to the action of the rollers 24 and 25 on spiral track 23 attached to fixed column 3. At this point the storage cage 6 may be latched against downward movement by placing latching bar 18 into latching engagement with the storage cage. The rod serving as a door to the desired storage compartment will then be released and the articles placed in the storage compartment. The door or guard bar 10 will then be closed, the latch 18 released, and the cage rotated in a clockwise direction to return the cage into the cabinet. It will be appreciated from the foregoing description that articles stored in any compartment in the storage cage are readily accessible simply by rotating the cage until the desired compartment is raised above the top of the cabinet. If desired the insulating floor separating the quick freeze compartment from the refrigerated storage space may be removed and the unit is thus simply converted into either a refrigerated storage box or a quick freeze box as desired.

In the operation of the modification of Fig. 8 the storage cage is of square cross section and its elevation is secured by rotating shaft 33 through sprockets 35 and 37, chain 36, shaft 38, and crank 39. The shaft 33, having mounted thereon the spiral track 55 on which rollers 53 and 54 run, causes the storage cage 42 to elevate without rotational movement as the shaft is actuated in the proper rotational direction. The guide channels 56 serve to prevent rotational movement of the cage and keep the cage properly aligned to prevent binding at the corners. It will be apparent that articles may be placed for storage in the desired compartment or removed for use as desired simply by elevating the cage by means of the crank and restraining the cage at the desired position by the latching means 57.

It will be appreciated that the refrigeration coils are of the usual conventional design and may be suitably connected to any of the commonly used refrigeration systems including the usual thermostatic controls.

The apparatus of the invention is thus especially adaptable for household use where ready accessibility of stored frozen articles is desired and in addition provides for quick freezing ar-

ticles prior to such storage. It is to be understood that while in the foregoing description the storage cage is described as being fabricated of metal rod to obtain greater freedom of air circulation it may be made of suitably reinforced screen or other perforate members.

I claim:

1. In a pit type refrigerator having a refrigeration chamber therein and an insulated cover for said chamber, the combination which includes a vertical shaft having a spiral track thereon centrally positioned in the chamber, a circular storage cage rotatably mounted on said shaft, said storage cage being provided with rollers adapted to engage the spiral track, tiered storage compartments in said storage cage, retaining members on the periphery of said compartments for holding packages therein adapted for manual opening and closing, and latching means for locking the storage cage at any desired raised position.

2. In a pit type quick freeze and storage box having a refrigerated chamber therein and an insulated cover for said chamber, the combination which includes a vertical shaft having a spiral track thereon centrally positioned in the refrigerated chamber, a storage cage having tiered compartments therein and a centrally disposed housing which is adapted to move upwardly and downwardly on the vertical shaft, roller elements carried by the housing adapted to engage the spiral track on the vertical shaft whereby the cage can be raised and lowered as the rollers are caused to move up and down the spiral track, the topmost of the said tiered compartments being insulated from the remaining compartments, and being provided with substantially greater refrigeration than the remaining compartments, retaining members releasably secured to the lower compartments located in the outer walls of said compartments for holding packages therein adapted for manual opening and closing, and latching means for locking the storage cage at any desired raised position.

GEORGE H. BUGENHAGEN.

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