

[54] **TOP OPENING REFRIGERATOR DEVICE**

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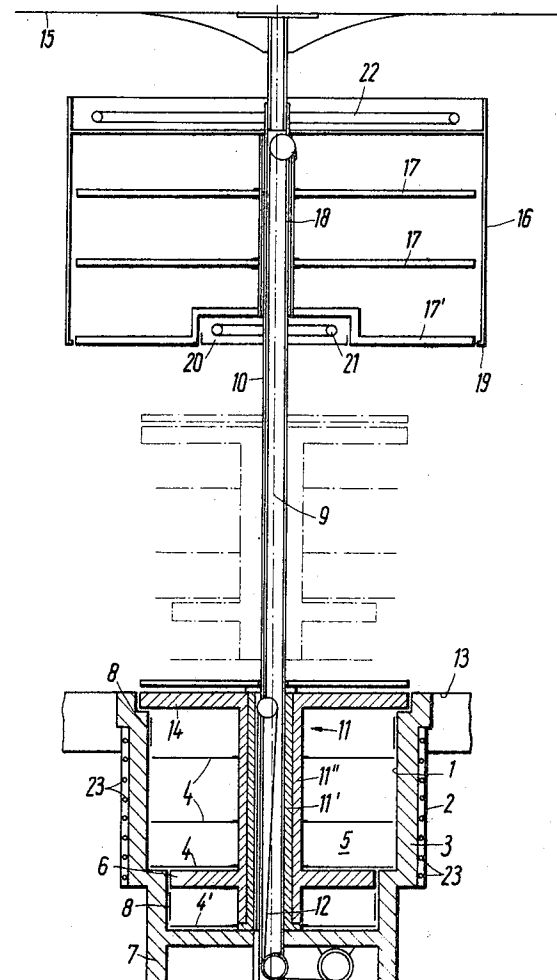
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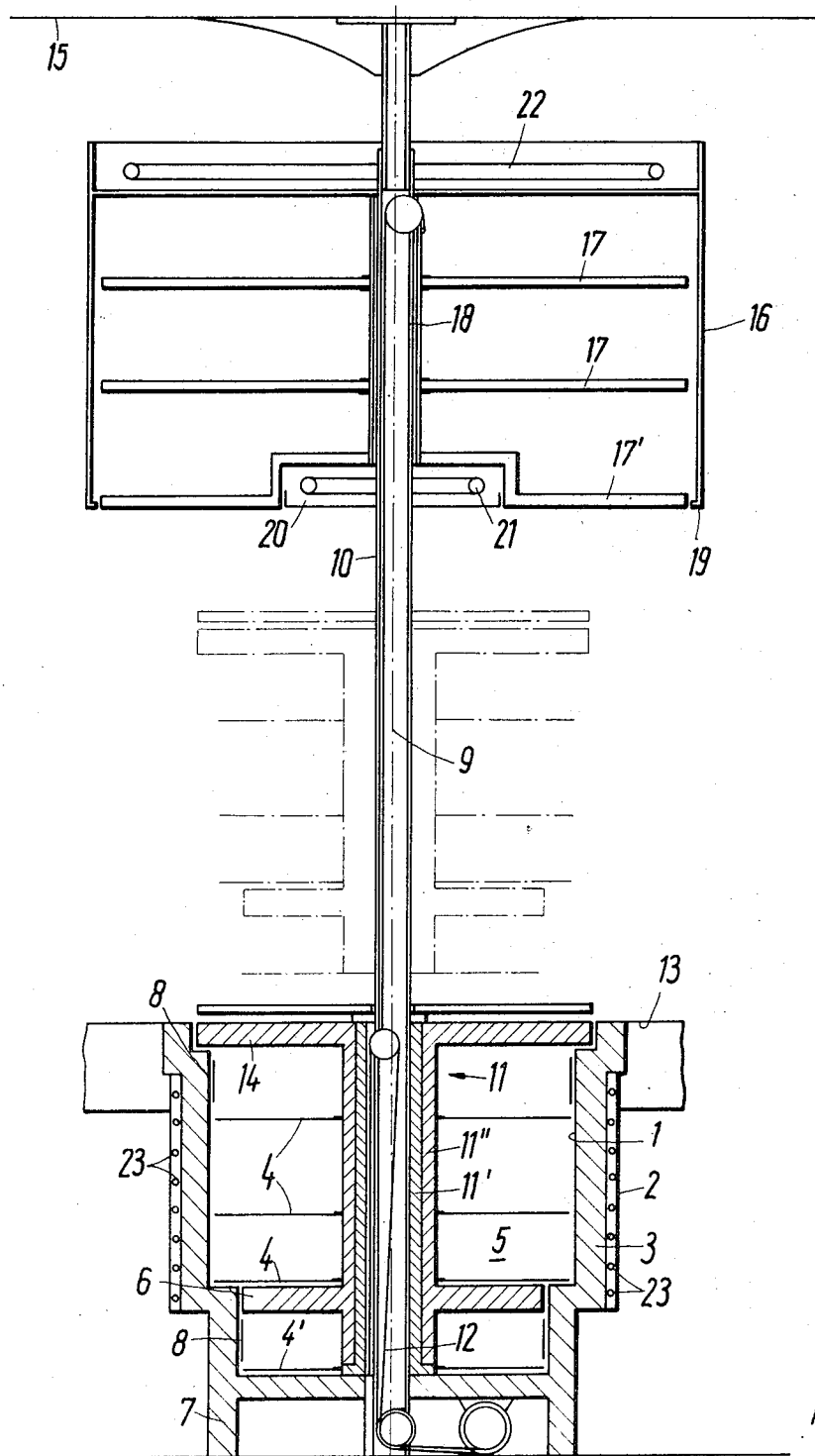
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[57] **ABSTRACT**

A refrigerator is formed of an open-topped tank enclosed by heat insulating material and an exterior casing. The tank contains storage shelves and a cover closes its top opening. A vertically arranged support column is associated with the tank and, preferably, is positioned centrally of and extends upwardly out of the tank. Lifting means are incorporated into the support column for vertically displacing the cover and shelves of the tank. In a preferred arrangement the top of the tank is located at about table top level and additional storage shelves are positioned in a casing spaced above the tank. These storage shelves are movably mounted on the support column.

6 Claims, 1 Drawing Figure





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TOP OPENING REFRIGERATOR DEVICE

SUMMARY OF THE INVENTION

The present invention is directed to a refrigerator device such as normally employed in kitchen use for keeping foods and beverages fresh and, more particularly, it is directed to a refrigerator formed by an open-topped tank containing storage shelves and having a cover for its opening, and, in addition, a support member and lifting means for automatically vertically displacing the cover and storage shelves from the tank.

Refrigerators are a conventional kitchen appliance and they come in floor standing models or they are built into a cabinet below table top level. In these known models the interior of the refrigerator is accessible through a front door. When the front door on such refrigerators is opened, the cold air in the refrigerator can escape unhindered. Further, it is considerably more difficult for a person to load or unload a refrigerator when it is located below table top level or some of its shelves are below that height. Accordingly, when access to the interior of a refrigerator is required, it is preferable if its shelves are located at a position above table top level which does not require any bending or the assumption of an awkward or difficult position. However, as indicated above, even though a front opening door is positioned above table top level, the cold air will escape when the door is opened. Another disadvantageous feature of refrigerators located above table top level is that they occupy space which is often needed for other kitchen uses.

Accordingly, it is the primary object of the present invention to overcome the difficulties experienced in the past and to provide a refrigerator having its storage space located below table top level, but with its cover or door and storage shelves being vertically displaceable so that any loading or unloading operations can be accomplished above table top level.

Still another object of the invention is to combine other storage shelves spaced from and in alignment with the refrigerator whereby the storage shelves can be vertically displaced into the same location as the refrigerator shelves for access.

Therefore, in accordance with the present invention, the refrigerator is provided by an open-topped tank enclosed within heat insulating material and a casing so that its top opening is located at approximately table top level. A support column and lifting means are associated with the tank so that its cover and storage shelves can be lifted and lowered automatically and access to the shelves is possible at a position above table top level. Further, since the shelves are lifted upwardly out of the tank, there is no risk that an excessive amount of cold air can escape from the refrigerator.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawing and descriptive matter in which there is illustrated and described a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWING

The drawing is a vertical cross sectional view of a combination refrigerator and storage shelf unit arranged in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

In the drawing a refrigerator is positioned on the floor and a storage shelf unit is spaced above and in axial alignment with the refrigerator. The refrigerator consists of an open-topped vat-shaped tank 1 having a circular cross section and spaced inwardly from an outer casing 2. Heat insulating material 3 is positioned in the space between the tank and the casing. Located within the tank in vertically spaced relationship are a plurality of shelves 4, 4' which are symmetrically arranged about the vertical axis of the tank. The interior 5 of the tank is divided into three superposed compartments, the top compartment containing the shelves 4, provides a normal refrigerator space, below the top compartment and separated from it by a wall 6 formed of heat insulating material is a freezer compartment containing the shelf 4'. The lower-most compartment contains the requisite refrigerating equipment for the appliance. Further, each of the upper compartment 5 and the freezer compartment 6 contains its own evaporator 8.

Coaxial with the vertical axis 9 of the tank 1 is a tubular vertically arranged hollow column 10 within which a lifting mechanism 12 is positioned, such as a lifting cable. A support member 11 is concentrically disposed about the support column 10 and is connected to the lifting device 12 so that it can be raised and lowered along the column. Attached to and extending transversely of the upper end of the support member 11 is a cover 14 which provides a closure for the top opening in the tank 1. In addition to the cover 14 the shelves 4, 4' are secured to the support member 11 for vertical displacement into and out of the tank. As indicated in the drawing, the support member 11 consists of two parts 11', 11'', with the radially inner part 11' being connected to the lifting mechanism and the radially outer part 11'', to which the cover 14 and the shelves are attached being rotatably mounted relative to the inner part 11'. To prevent heat conduction along the support column 10, it is insulated from the support member 11.

As indicated in phantom lines in the drawing, the support member 11 along with the shelves, 4, 4' and the cover 14 can be lifted upwardly out of the tank 1 so that all of the shelves are accessible at a location above table top level, that is, the level indicated by reference numeral 13. In the embodiment shown in the drawing, the height of the column 10 is in excess of the height required for vertically displacing the cover and shelves out of the tank and the upper end of the column is secured to the ceiling 15 directly above the tank.

For full utilization of the space about the upper end of the support column 10, an axially extending casing 16 is symmetrically arranged about the column and the casing is open at its bottom. Within the casing 16 a plurality of superposed shelves 17, 17' are arranged for vertical movement into and out of the casing in the same manner as the shelves within the tank 1. A support member 18 is provided about the column 10 for

the shelves 17, 17' having the same general construction as the support member 11 within the refrigerator, however, there is no heat insulation provided between the support member and the column since the casing and its shelves are used for normal storage purposes and do not incorporate any refrigeration equipment. As can be appreciated from the drawing, the vertical dimension of the support member 18 and its attached shelves 17, 17' is such that the entire arrangement can be retracted into the casing 16 with the bottom shelf 17' being substantially flush with the bottom edge 19 of the casing so that the bottom shelf 17' forms a closure for the lower open end of the casing. The radially inner portion of bottom shelf 17' forms a recess 20 about the support column 10 in which lamps 21 are arranged. Further, the upper end of the support column 10 extends radially outwardly at the ceiling and provides a reflector for a fluorescent lamp 22 positioned within a recess formed in the upper end of the casing 16. As indicated, the fluorescent lamp 22 is preferably circular.

Another advantageous feature of the arrangement is the provision of condenser coils 23 secured, preferably by soldering, on the interior surface of the casing 2.

The following is a description of the manner of operation of the combination kitchen unit shown in the drawing.

It should be noted that the lifting device 12 has two separate independent lifting mechanisms, one for the support 11, shelves 4, 4' and cover 14, and the other for the support 18 and the shelves 17, 17' located at the upper end of the support column 10. The two lifting mechanisms are operated over a suitable switching and control device and they are capable of individually lifting and lowering the two different vertically displaceable units so that they can be positioned in a particularly accessible location above table top level. Further, due to the relative rotatability of the outer part of the support members 11 and 18 about the inner part, the shelves can be rotated about the vertical column so that each shelf is accessible from a single location. In addition to providing individual vertical displacement of the different shelves, the switching and control device is arranged to stop the vertical movement of the shelves so that they do not interfere with or obstruct one another. The space saving feature of the invention can be readily appreciated since the space about the column 10 above table level can be maintained open and free for other kitchen uses except when the shelves of the refrigerator are lifted upwardly or the storage shelves are lowered downwardly to a position where they are easily accessible.

In the embodiment illustrated in the drawing and described above, the support column 10 is positioned centrally within the tank 1 and through the casing 16, however, it would be possible to locate the support column in an eccentric position or to replace the support column with two such columns. In these alternative arrangements it would be possible to provide the relative rotatability between the inner and outer parts of the support member located on the support column.

Further, though the refrigerator is shown mounted on the floor, it would be possible to locate it at the upper end of the support column so that the refrigerated storage spaces and the equipment space would be reversed. However, the embodiment shown in

the drawing is preferred since it provides the better arrangement for retaining cold air within the refrigerator when its cover and shelves are displaced vertically.

What is claimed is:

1. A kitchen appliance for refrigerating food and beverages including an upwardly extending tank closed at its lateral surfaces and at one end surface and open at its oppositely disposed end surface, shelves positioned within said tank, a cover forming a closure for the opening in the end surface of said tank, and means for providing refrigerated conditions within said tank, wherein the improvement comprises support means associated with said tank, said support means including an upwardly extending stationary column and lifting means associated with said column, said column extending through said tank and passing through said shelves and cover, said column having a length at least equal to twice the distance between said cover and said shelf spaced most remotely from said cover, said cover and shelves secured to said support means for displacement between a first position with said shelves located within said tank and said cover closing the opening into said tank and a second position with said cover and shelves displaced outwardly from said tank, a stationary casing arranged about and mounted on said support column and spaced axially along said column from said tank, said casing closed at its lateral and end surface more remote from said tank and open at its end surface closer to said tank, said open end of said casing spaced from the open end of said tank by a distance at least equal to the distance between said cover and said shelf most remotely spaced from said cover, and a plurality of storage shelves movably supported on said column and spaced along said column from said tank, said storage shelves connected to said lifting means for displacement between a first position located within said casing and a second position displaced along said column toward said tank with said storage shelves moved outwardly from said casing.

2. A kitchen appliance, as set forth in claim 1, wherein said tank is positioned at the lower end of said column and said casing is located adjacent the upper end of said column.

3. A kitchen appliance, as set forth in claim 2, wherein said support column is hollow and concentrically arranged about the central axis of said tank, and said support means includes a first support member for said cover and shelves mounted for axial displacement on said column, and a second support member for said storage shelves mounted for axial displacement on said column.

4. A kitchen appliance, as set forth in claim 3, wherein said support column is fixed at its upper end such as to the ceiling of the room containing the appliance.

5. A kitchen appliance, as set forth in claim 3, wherein each said support member comprises a first part secured to said lifting means and a second part in interengagement with said first part for supporting one of said cover and shelves and said storage shelves, and said second part is rotatable relative to said first part about the central axis of said tank.

6. A kitchen appliance, as set forth in claim 1, wherein means within said tank and associated with said shelves for dividing said tank into a refrigerating compartment and a freezing compartment.