Nov. 21, 1939. G. L. C. EARLE 2,180,460

REFRIGERATOR

Filed March 14, 1939

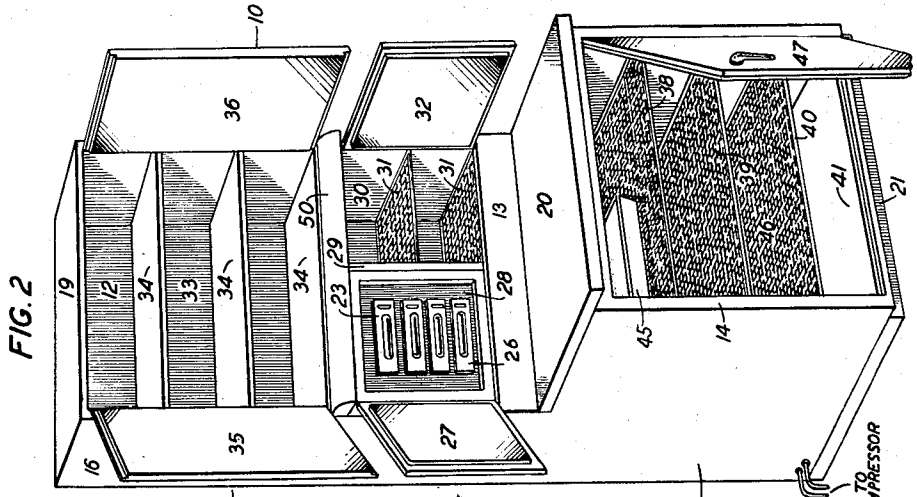


FIG. 2

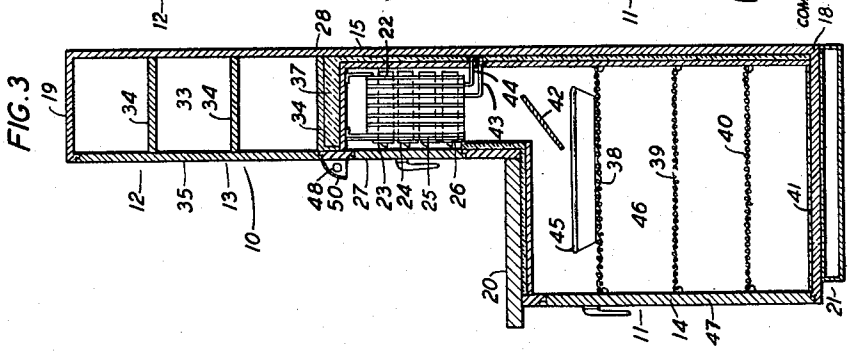


FIG. 3

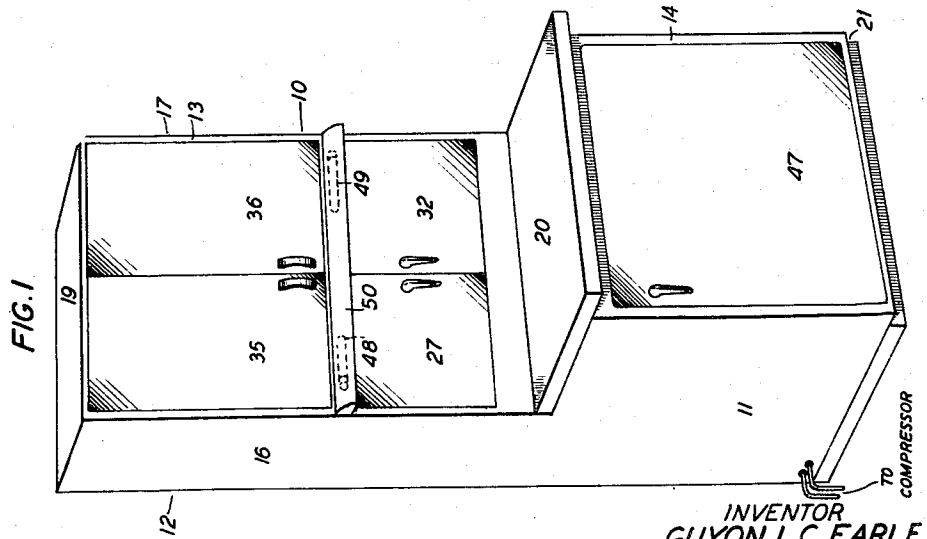


FIG. 1

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REFRIGERATOR

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Application March 14, 1939, Serial No. 261,730

4 Claims. (Cl. 62—89)

This application relates to kitchen devices and more specifically to mechanical refrigerator units.

This application is a continuation in part of an application of Guyon L. C. Earle, Serial No. 189,036, filed Feb. 7, 1938.

It is an object of this invention to provide a novel mechanical refrigerator unit.

The usual mechanical refrigerator has a box shaped inner compartment for the refrigeration of food. Within this compartment is a cooling coil surrounding three, four or more ice cube trays. In refrigerators of comfortable capacity, the cooling coil does not usually take up all the room available from the back of the cooling compartment to the front and the space left either in front of or in back of the coil is wasted as far as use is concerned.

It is another object of this invention to eliminate the above mentioned disadvantage by providing a refrigerator in which the cooling coil and ice cube trays are located in an upper setback portion thereof.

It is another object of this invention to provide an upper shallow refrigerated compartment and a lower deep refrigerated compartment together with means for ensuring circulation of refrigerated air therebetween.

It is a further object of this invention to provide a table-top member located on top of the bottom portion of said refrigerator which member is available as a working table and as a support for ice trays and food being taken out of and put in said refrigerator.

In modern homes and apartments, kitchen space is necessarily very limited. A refrigerator takes up much floor space in the kitchen and because of its shape, (it is usually much higher than the other units, that is, higher than the stove, sink and table, and its depth is the same all the way up to its top, making it difficult to reach cabinets placed above it) cabinets are not usually located above it. In such a situation, the best use of the space available cannot be made as the cabinets do not fit snugly with the refrigerator. Moreover, there is usually no table space handy so that a portion of the articles to be placed in the cabinets are supported while the others are placed therein.

It is, therefore, another object of this invention to provide a refrigerator unit or ample capacity in which cabinet space is integral therewith and which is conveniently placed with respect to the table top member.

It is another object of this invention to use as part of the refrigerator that space between the top cabinet and the refrigerator base.

As ventilation is not required (the compressor is located outside of the unit), there is no need for open space between the top of the refrigerator and the cabinets as in the usual arrangement, which open space is never efficiently used and which only serves to collect dirt.

Another feature of this invention is that the table top member conveniently and preferably serves as part of the drain board of a sink attached to one side of the refrigerator as in the parent application mentioned above. A stove is conveniently and preferably located on the side of the sink remote from the refrigerator of this invention. Because of this invention, it is possible to place an ample sized refrigerator, sink and stove in a space not large enough for similar arrangements of the prior art.

Other objects and features of this invention, some of them more or less ancillary or incidental to those above mentioned, will appear hereinafter as the description proceeds.

In the illustrated embodiment of this invention, which is herein described by way of example, there is provided a refrigerator unit comprising a vertical back wall, side walls and preferably two front walls, the top front wall being set back from and parallel to the bottom front wall. A table top member is mounted on top of that part of the bottom portion of the refrigerator unit not covered by the top portion of the refrigerator unit. The top portion of the unit preferably contains the cooling coil, a plurality of ice cube trays, a small refrigerated compartment preferaby for small articles, eggs, etc. at the side of the cooling coil, and cabinet space having a plurality of shelves therein. The cabinet space is preferably insulated from the top of the refrigerator itself. In the bottom of the refrigerator unit, there is a large and deep refrigerated storage space having a plurality of selves therein. Between the upper and lower portions of the refrigerator itself and preferably placed at an angle with respect to a vertical plane so as to ensure circulation of refrigerated air to both front and back of the lower portion of the refrigerator is a baffle member which preferably extends the entire width of the cooling coil. Below this refrigerated space may be a compartment for the motor and compressor although this space is preferably also refrigerated and the motor and compressor located elsewhere, as, for example, beneath the sink if a sink unit is located adjacent the refrigerator unit. Lamps

with a shade therefor may be provided over the refrigerator doors in the upper portion of the unit which may be lighted automatically upon opening the door beneath the respective lamp or they may be so arranged that their lighting can be controlled from without. The unit is preferably mounted on a recessed base.

The invention will be more readily understood by referring to the following description and the accompanying drawing forming a part thereof, in which:

Fig. 1 is a perspective view of an embodiment of the refrigerator unit of this invention with the various doors in the closed position;

Fig. 2 is a perspective view of the arrangement of Fig. 1 with the various doors in the opened position; and

Fig. 3 is a side elevation view in cross section of the arrangement of Fig. 1.

Referring more particularly to the drawing, Figs. 1 and 2 show, in perspective, an embodiment of the refrigerator unit 10 of the preferred embodiment of this invention. The unit has a bottom portion 11 and a top portion 12, the front 13 of which is parallel and set back from the plane containing the front 14 of the bottom portion. A back wall 15 is parallel to the fronts 13 and 14 and is either in one piece or in sections for convenience in manufacture and handling. Similarly the side walls 16 and 17 are each in one piece or in sections, the width of each wall being smaller for the upper portion than for the lower portion. The lower portion 11 has a bottom 18 while a top 19 is provided for the upper portion 13. On top of all the bottom portion 11 which is not covered by the top portion 12 and in front of this top portion is placed a table top member 20 of any suitable material such as metal or composition. The member 20 is cold insulated from the bottom member 12. The unit is supported by any suitable means such as, for example, a recessed base 21 but it is to be understood that the unit may rest directly on the floor or have a plurality of supporting legs, if desired.

In the lower left hand part of the top member 12 is preferably placed a refrigerating coil 22 (see Fig. 3) the width of which is almost as great as the distance between the back wall 15 and the upper front wall 13. Thus there need be no waste space between the back of the coil 22 and the back wall 15 or between the front of the coil 22 and the front wall 13. Within the coil and in refrigerating contact therewith are four ice cube trays 23, 24, 25 and 26 the fronts of which are closely adjacent the inside surface of the door 27 which closes the ice cube tray compartment represented generally by the reference numeral 28. The door 27 has insulation therein and thereabout so that it makes a good fit with the edges of the ice cube tray compartment 28 and thus prevents the escape of cold air to the room wherein the unit is placed. The ice cube trays 23 to 26, inclusive, are located in back of and slightly above the table top member 20 which is a most convenient arrangement and one which will save the user many steps. Let it be assumed that the refrigerator unit of this invention is closely adjacent and the table top member 20 serves as the drainboard of a sink (as in the combination shown and described in the parent application referred to above) and that the user wishes to ice some bottled drinks. The bottles of drinks would be uncapped on the table top member 20. Then an ice cube tray would be removed from the compartment 28 and rested on the table top member 20 at which place it is convenient to the sink where water can be obtained to release the individual cubes or to dilute the drinks. During all of these operations, the user does not have to take a single step. As soon as the ice cube tray is removed from the compartment 28 it can be rested on the table top member 20, leaving the hands free to remove other articles (such as the bottled drinks, other ingredients for the prepared drinks, food, etc.) If many articles are removed from the refrigerator at one time many steps are saved. There is also a saving in power as the doors of this unit are not open long enough to allow much cold air to escape into the room as would be the case where the door would be open a long time during which repeated trips would be taken between the refrigerator located elsewhere in the room and a table. The bottom edge of the door 27 is conveniently located so that it is sufficiently above the table top member 20 to clear the top of an ice cube tray when the tray is resting on the table top member 20. Thus the trays 23 to 26, inclusive are close enough to the table top member 20 so that there is just one operation in sliding them out from their berths in proximity to the coil 22 and in placing them on the table top member 20 but high enough above the member 20 so that the door 27 may be immediately closed over the tops of the trays placed directly beneath the door 27 on the table top member 20. While four ice cube trays have been shown, it is to be understood that more or less than this number can be used.

Beside the ice cube tray compartment 28 and separated therefrom in the front only by a common partition member 29 serving as a door jamb is a refrigerated compartment 30 which may have one or more shelves 31. These shelves are of mesh so that the free circulation of cold air from the coil 22 to the lower portion of the refrigerator unit and back to the coil is not impeded. The compartment 30, which is closed by a door 32 which is similar to the door 27, is ideally adapted for the storage of milk, soft drinks, beer, etc. In cases where tall bottles are stored, the upper one of the shelves 31 would be removed.

Above the compartments 28 and 30 is a cabinet 33 having one or more shelves 34 therein. The cabinet 33 is preferably integral with the refrigerator so that it forms a single unit therewith, thus preventing any waste space between the refrigerator and the cabinet, although it may, of course, be separate and mounted from the wall in such a way that it is just above the refrigerator. The cabinet space is closed by doors 35 and 36 which when closed are preferably in the same plane as the doors 27 and 32. Between the upper portion of the refrigerator and the cabinet space 33 is preferably arranged a heavy insulating layer 37 so that the cabinet space 33 is maintained at room temperature. In a modification of this invention, however, the cabinet space 33 may be cold insulated around the sides, back and top, the layer 37 removed and the shelves 34 made of mesh material. In this modification, the cabinet space 33 is refrigerated. If desired, only the space occupied by the lower one or two shelves is refrigerated and the remaining shelves or shelf left at room temperature. As a further modification, the ice cube compartment 28 and the small refrigerated compartment 30 may be separated from the lower portion of the refrigerator by a space corresponding to the distance between any two shelves 34 or a multiple thereof. In this last arrangement a refriger-

ated compartment extending across the whole width of the unit would be located directly above the table top member 20.

In another modification of this invention, the space between the first two shelves 34 may be occupied by one or more drawers for the storage of silverware, etc. In this modification the cabinet space would be on top of these drawers and the height of the doors 35 and 36 would be correspondingly reduced (assuming that the overall height remains the same).

The lower portion 11 of the refrigerator unit 10 contains a large percentage of the total refrigerated space. As the depth of the lower portion 11 is equal to the depth of the upper portion 12 plus nearly the entire depth of the table top member 20, and as there are no coil or ice cube trays to subtract therefrom, the cubic foot capacity of this lower portion is, in the usual case, large. An insulated door 47 closes this lower portion 11. Three mesh shelves 38, 39 and 40 and a solid bottom 41 are shown in the drawing but it is to be understood that this number of shelves may be smaller or larger, as desired. The lower portion 11 is cold insulated from the surrounding atmosphere but there is a circulation of air between the top portion 12 of the refrigerator and the lower portion 11. This circulation is assisted by a baffle member 42 which is angularly mounted below the cooling coil 22 so as to divide the cold air between the back and the front of the lower portion 11. This baffle 42 preferably extends the whole width of the cooling coil 22 and it deflects cold air to the front portion of the refrigerator where it might not otherwise circulate. Any other convenient means for promoting this circulation, such as a flue or a fan may also be used instead of or in addition to the baffle 42. A defrosting tray 45 may be placed under the baffle 42. If desired the baffle 42 may be detachably mounted and thus removable when the refrigerator is defrosted.

Pipes 43 and 44 connect the cooling coil 22 to the compressor unit (not shown) which is located elsewhere, such as under the floor of the kitchen or in an enclosed space under the sink when the refrigerator unit is positioned adjacent a sink as in the arrangement shown and described in the parent application referred to above. The pipes 43 and 44 are shown coming out of the side 16 of the unit but they may come out at any convenient place.

Mechanically, the operation of the refrigerator unit is the same as in any well known mechanical refrigerator employing the compressor-expander cycle. While an electric refrigerator has been shown, it is to be understood that a gas refrigerator may be used as well without departing from the spirit of this invention.

Between the compartments 28 and 30 and the cabinet space 33 may be positioned electric lights 48 and 49 covered by a shade 50. These lights may be connected in a known manner to light up when the doors underneath them open or they may have pull cords attached thereto so that they may be operated by hand. A small light (not shown) is preferably located inside the upper portion 12 of the unit and connected to light up when the upper door is opened. There may also be a light in the lower compartment 46 which is lighted when the door 47 is opened.

If desired the lower portion of the refrigerator may be replaced by a refrigerated drawer section as shown in the parent application.

As another modification, the cooling coil and ice cube trays may be located in the lower portion of the refrigerator and the portion of the refrigerator above the table top member used for food refrigeration, etc. If desired a fan or other means may be used to improve the circulation of air between the top and bottom portions of the refrigerator arranged in this manner.

It will be apparent that there has been described above a novel refrigerator unit which embodies a novel combination of an arrangement of a refrigerator and a table top member which saves space, time and money. Moreover, the positioning of the cabinet member integral with the refrigerator conserves space and makes for convenience in the kitchen and in fact quite revolutionizes the arrangement of small kitchens.

With this refrigerator unit and the adjoining units architecturally well planned the combination of refrigerator, sink and stove (as shown in the parent application) may be so built in the end of the kitchen as to be in effect one of the walls of the room and the balance of the kitchen used as a beautiful dining space with no tall bulky ice box to destroy the streamlined harmony of the entire combination.

While various specific embodiments and modifications of this invention have been described herein, it is to be understood that various other modifications may be made therein without departing from the spirit of the invention, the scope of which is indicated by the appended claims.

What is claimed is:

1. In a refrigerator unit, a bottom enclosure member having a back wall, side walls and a front wall, said front wall having an opening therein and a closure member for said opening, an upper enclosure member located above said bottom enclosure member, said upper enclosure member having a back wall, side walls, and a front wall which is set back from the front wall of said bottom enclosure member, the front wall of said upper enclosure member having an opening therein and a closure member for said opening, a fixed, substantially horizontal table top for said bottom enclosure member which top is in front of said upper enclosure member, said upper enclosure member having a space adapted to be refrigerated and said bottom enclosure member also having a space adapted to be refrigerated, said last mentioned space having a rear portion substantially under the refrigerated space in said upper enclosure member and a front portion under at least a part of said table top, each of said refrigerated spaces containing supporting means for the storage of food, a cooling coil, and ice cube trays within the space bounded by said coil, said upper refrigerated space being open to said bottom refrigerated space, whereby cold air from said coil circulates between upper and lower refrigerated spaces to cool both of them.

2. In a refrigerator unit, a bottom enclosure member having a back wall, side walls and a front wall, said front wall having an opening therein and a closure member for said opening, an upper enclosure member located above said bottom enclosure member, said upper enclosure member having a back wall, side walls, and a front wall which is set back from the front wall of said bottom enclosure member, said front wall of said upper enclosure member having an opening therein and a closure member for said opening, a table top for said bottom enclosure member which top is in front of said upper enclosure member, said upper enclosure member having a space adapted to be refrigerated and said bot-

tom enclosure member also having a space adapted to be refrigerated, said last mentioned space having a rear portion substantially under the refrigerated space in said upper enclosure member and a front portion under at least a part of said table top, each of said refrigerated spaces containing supporting means for the storage of food, a cooling coil, ice cube trays within the space bounded by said coil, and means directing the flow of cold air from said coil to provide circulation of the cold air between the refrigerated space in said upper enclosure member and both front and rear portions of the refrigerated space in said bottom enclosure member.

3. In a refrigerator unit, a bottom enclosure member having a back wall, side walls and a front wall, said front wall having an opening therein and a closure member for said opening, an upper enclosure member located above said bottom enclosure member, said upper enclosure member having a back wall, side walls, and a front wall which is set back from the front wall of said bottom enclosure member, said front wall of said upper enclosure member having an opening therein and a closure member for said opening, a table top for said bottom enclosure member which top is in front of said upper enclosure member, said upper enclosure member having a space adapted to be refrigerated and said bottom enclosure member also having a space adapted to be refrigerated, said last mentioned space having a rear portion substantially under the refrigerated space in said upper enclosure member and a front portion under at least a part of said table top, each of said refrigerated spaces containing supporting means for the storage of food, a cooling coil, at least a large portion of which is located in the upper enclosure member, ice cube trays within the space bounded by said coil, and means directing the flow of cold air from said coil to provide circulation of the cold air between the refrigerated space in said upper enclosure member and both front and rear portions of the refrigerated space in said bottom enclosure member.

4. In a refrigerator unit, a bottom enclosure member having a back wall, side walls and a front wall, said front wall having an opening therein and a closure member for said opening, an upper enclosure member located above said bottom enclosure member, said upper enclosure member having a back wall, side walls, and a front wall which is set back from the front wall of said bottom enclosure member, said front wall of said upper enclosure member having an opening therein and a closure member for said opening, a table top for said bottom enclosure member which top is in front of said upper enclosure member, said upper enclosure member having a space adapted to be refrigerated and said bottom enclosure member also having a space adapted to be refrigerated, said last mentioned space having a rear portion substantially under the refrigerated space in said upper enclosure member and a front portion under at least a part of said table top, each of said refrigerated spaces containing supporting means for the storage of food, a cooling coil, ice cube trays within the space bounded by said coil, and a deflecting member located under said cooling coil directing the flow of cold air from said coil to provide circulation of the cold air between the refrigerated space in said upper enclosure member and both front and rear portions of the refrigerated space in said bottom enclosure member.

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