

Oct. 1, 1946.

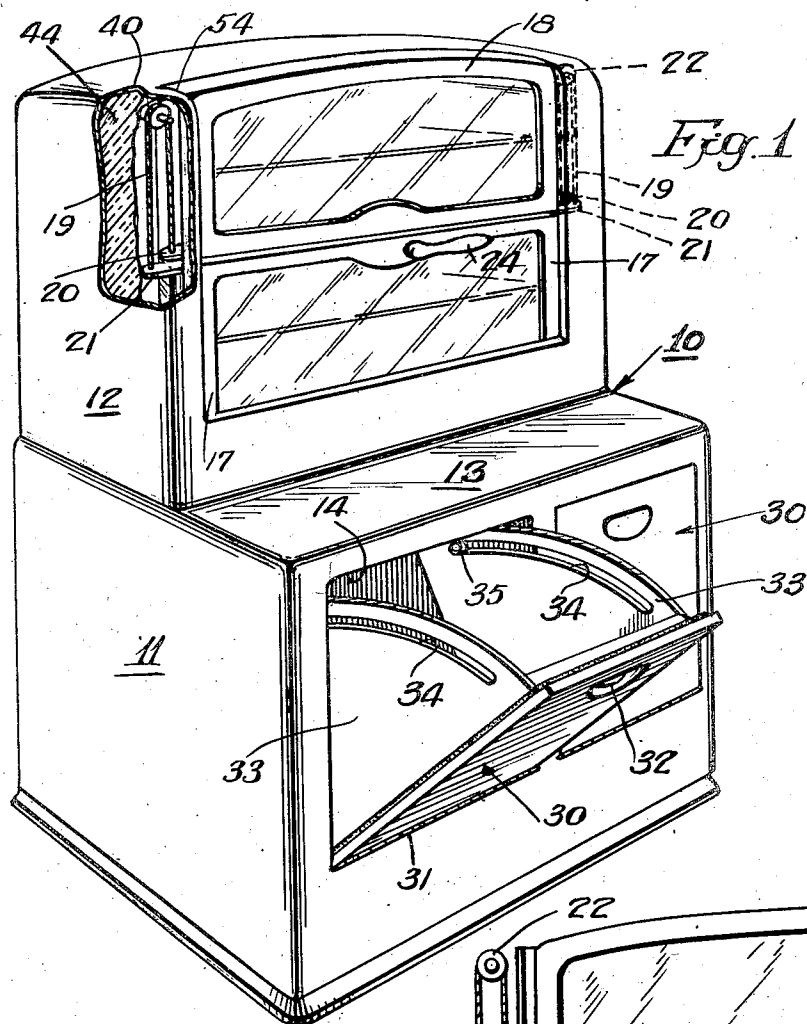
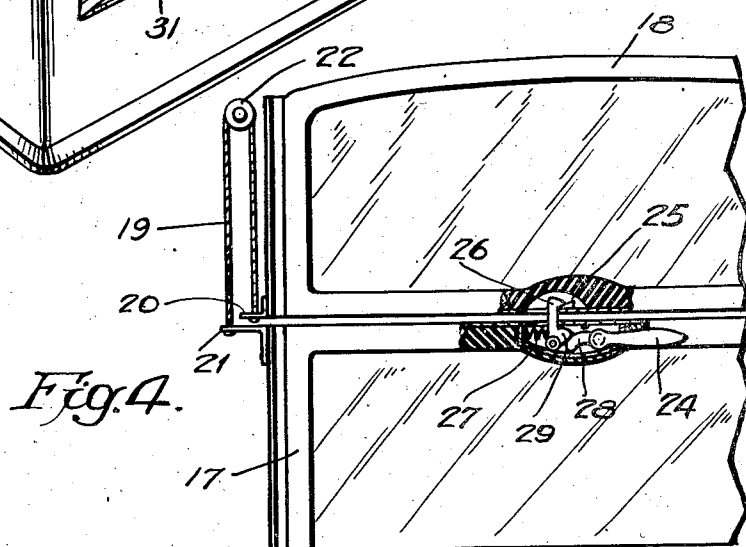
H. VAN DOREN

2,408,460

REFRIGERATOR

Filed March 30, 1944

2 Sheets-Sheet 1



Inventor: -
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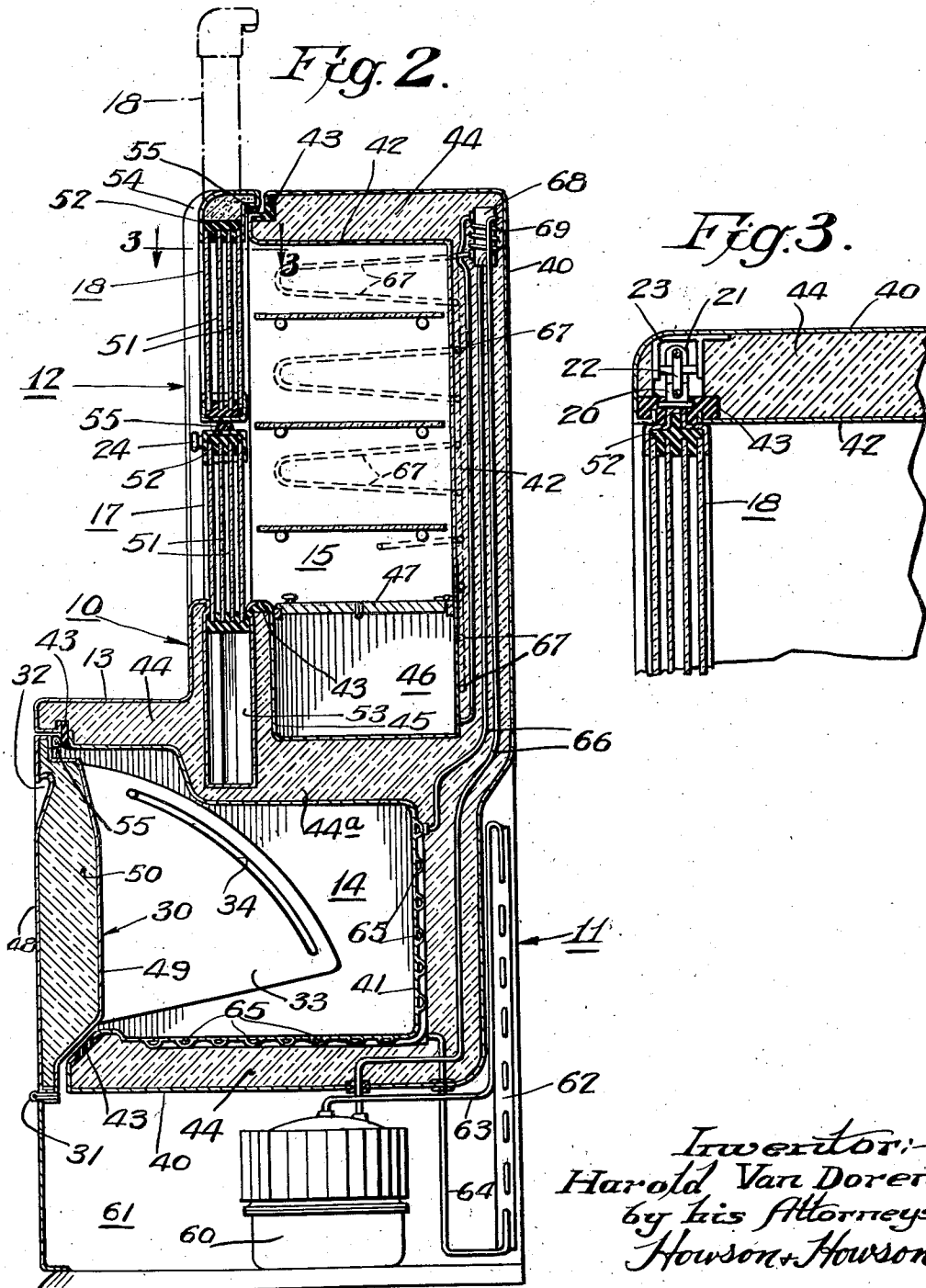
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UNITED STATES PATENT OFFICE

2,408,460

REFRIGERATOR

Harold van Doren, Bryn Mawr, Pa., assignor, by
mesne assignments, to Philco Corporation,
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3 Claims. (Cl. 62—89)

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The present invention relates to refrigerators, and more particularly to improvements in refrigerator cabinets of the type providing upper and lower refrigerated areas and an intermediate work surface.

A primary object of the invention is to provide a refrigerator cabinet of the aforementioned general type constructed so that access may be had to the aforesaid refrigerated areas without interference with, or interruption in the use of, the intermediate work surface.

More specifically, an object of the invention is to provide a refrigerator cabinet of the stated type having a work table surface and food storage compartments opening above and below such surface, the closures for such compartments being constructed and arranged so that they may be opened and closed without necessitating removal of articles occupying the worktable surface.

To this end, the invention contemplates the provision of a refrigerator including a worktable surface and a rearwardly disposed food storage compartment extending upwardly from said surface substantially at right angles thereto and having closure means adapted for opening and closing movements substantially in the plane of the front of the compartment so that said closure means may be opened and closed without interfering with the use of said work surface.

Other objects and advantages of the invention will appear to those skilled in the art from the following detailed description and the accompanying drawings, in which:

Fig. 1 is a perspective view of a refrigerator cabinet constructed in accordance with this invention;

Fig. 2 is an enlarged vertical cross-sectional view of the cabinet;

Fig. 3 is a fragmentary cross-sectional detail view looking in the general direction of line 3—3 of Fig. 2; and

Fig. 4 is an elevational detail view of the sliding doors with parts broken away to disclose elements of the door-operating mechanism.

With reference to the drawings, the refrigerator cabinet 10 therein illustrated is of the type having a lower section 11 and an upper section 12. The lower section 11, which in the present instance constitutes the base of the cabinet, is preferably of work-height dimensions so that the top thereof, or the forward portion thereof, may serve as a worktable surface 13. In the interior of the section 11 is a food storage compartment 14, or there may be a plurality of such compart-

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ments. The upper section 12 extends upwardly and substantially vertically from the rear of the work surface 13 and contains a food storage compartment 15. The compartments in both the lower and upper sections 11 and 12 have front access openings so that, in actuality, the compartment 15 in the upper section 12 opens in a vertical plane at the back of the work surface 13.

According to the present invention, the closure means for the compartment 15 is so constituted as not to interfere with the use of the worktable surface 13 when access to said compartment is desired. To this end, the closure means comprises a pair of complementary door sections 17 and 18 mounted on the cabinet for sliding movement toward and away from each other in the plane of the access opening of said compartment 15 and preferably perpendicular to the work surface 13. With this arrangement, opening and closing of the door sections 17 and 18 does not necessitate removal of articles which may have been placed on the worktable surface, nor interrupt the use of said surface.

In order to facilitate operation of the door sections 17 and 18 it is desirable that they be counterbalanced and for that purpose cables 19 may be connected to the sections, as shown at 20 and 21 for example, said cables passing over pulleys 22 supported in brackets 23 on the cabinet structure. The door sections being thus connected, one of said sections, preferably the lower one 17, may be provided with a handle 24, so that by moving said section up or down by means of the handle, the other or upper door section 18 will be made to move in unison with, but oppositely to, the movement of said lower door section both in opening and closing the compartment 15.

When in closed position, the door sections 17 and 18 may be held together by suitable latching means which, in the form shown in Fig. 4, may consist of a keeper 25 fixed on one door section, and a latch being urged by action of a spring 27 into operative engagement with said keeper. By mounting the latch 26 on the door section 17 which carries the handle 24, it is possible, by manipulation of the handle 24 to unlatch the door sections and initiate movement of said sections toward open position. This may be accomplished by pivotally mounting the handle and by providing the same with an extension 28 engageable with a cam piece 29 associated with the latch, these elements being arranged so that when pressure is applied to the handle in a direction to open the door sections, the extension

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28 will act through the cam 29 to disengage the latch from the keeper.

The open front of each compartment 14 in the lower or base section 11 of the cabinet 10 is closed by means of a door 30 which preferably is pivoted at its bottom edge portion, as indicated at 31, and has handle means 32 at its top edge portion so that said door may be drawn outwardly and downwardly to an open position shown in Fig. 1. The door 30 may be provided with wing portions 33 extending into the compartment and preferably having arcuate slots 34 engageable with roller-carrying pins 35 or the like. By this means the outward movement of the door is limited so that, in open position, the door assumes an angular relationship with respect to the associated compartment and, together with the wing portions 33, forms a hopper-like access port to said compartment.

In the detail construction of the cabinet, I prefer to employ the conventional outer metallic shell 40 having the general shape indicated in the drawings, said shell forming the outside of the cabinet 10, and an inner metallic liner 41 to form the compartment 14 in the lower section 11 of said cabinet. Another metallic liner 42 defines the compartment 15 of said cabinet. The inner liners 41 and 42 may be supported, in the usual manner, in spaced relation to and within the outside shell 40 and may be effectively thermally separated therefrom by means of thermal-break elements 43, and suitable insulating material 44 interposed between said liners and shell.

The inner liner 42 which defines the upper compartment 15 may be provided with a depending portion 45 forming a well-type compartment 46 and closed by means of a suitable removable cover as shown at 47. It is to be noted that, in accordance with the present invention, the liners 41 and 42 which respectively define the lower and upper compartments, are separated from each other, and that insulating material is interposed therebetween, as represented at 44a in Fig. 2 of the drawings. In this manner the superimposed compartments are thermally insulated from each other so that the compartments may be cooled at different temperatures and be maintained under different humidity conditions.

As shown in Fig. 2, the door 30 associated with the compartment 14 may have the usual construction consisting of relatively spaced outer and inner panels 48 and 49 respectively, the outer panel 48 preferably being made of metal and the inner panel 49 of plastic, insulating material 50 filling the space between said panels.

For the door sections 17 and 18 for the upper compartment 15, I prefer to use a transparent structure of the kind commonly known in the trade as "Thermopane" which structure embodies a plurality of transparent panes 51 mounted and sealed in a frame 52. In accordance with the embodiment shown, such door sections are slidably mounted in suitable channels formed in the cabinet structure, the lower door section 17 being retractable into a recess 53 in the wall of the cabinet, and the upper door section 18 being slidable into and out of engagement with a ledge portion 54 at the upper front edge of the cabinet.

Gasket strips such as shown at 55 may be arranged on the several doors to bear against adjoining portions of the cabinet for sealing the gaps therebetween when the doors are closed.

The compartments 14, 15 and 46 are to be cooled by suitable refrigerating means. Prefer-

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ably a primary refrigerating system is used to cool the compartment 14, and a closed secondary system may be utilized to cool the storage compartment 15 and the well-type compartment 46.

In the arrangement shown in Fig. 2, a motor compressor 60 is mounted within a housing 61 in the lowermost portion of the base 11 and is connected with the condenser 62 through a pipe 63. Leading from the condenser 62 is a liquid line 64 which discharges into a series of cooling coils 65 arranged in heat exchange relation with the liner 41 defining the compartment 14. A return line 66 connects the series of cooling coils 65 with the motor compressor 60 thus completing the circuit of the primary refrigerating system.

With further reference to Fig. 2, the secondary system utilized to cool the compartments 15 and 46 comprises an evaporator portion consisting of a series of coils 67 in heat exchange relation with the back and side walls of the metallic inner liner 42 defining said compartments. The series of cooling coils 67 communicates with a secondary condenser portion 68 located above said coils and conveniently arranged in heat exchange relation with the primary system, preferably in the return line 66 thereof which, for that purpose, may have a coil section 69 wound about said secondary condenser portion. The association and operation of the primary-secondary system of the above-described type are well-known in the art and form no part of the present invention, and accordingly, a detailed description of the construction and operation thereof may be dispensed with herein.

However, it is pointed out that in accordance with the present invention, the lower compartment 14, being cooled by the primary refrigerating system, may be maintained at sharp freezing temperatures best suited for the preservation of frozen foods, and that the upper compartment 15, being cooled by the secondary refrigerating system, may be kept at the moist-cold temperatures which are most effective for the preservation of ordinary foodstuff. This result is possible in the arrangement herein shown and described because the compartments above-referred to are separate and thermally insulated from each other so that the cooling conditions in one compartment cannot affect, and cannot be affected by, the cooling conditions in the other compartment.

In use, it will be appreciated that, because of the particular construction of and relation between the worktable surface 13 and the various food storage compartments, and with the particular door structures, ready access may be had to the compartments without adversely affecting the utility of said worktable surface. In other words, the doors to said compartments may be opened and closed freely without necessitating removal of articles occupying said surface.

It is believed that the invention, the mode of construction and assembly of its physical embodiment, and its advantages will be readily understood from the foregoing description; and it will be understood that while a preferred embodiment of the invention has been shown and described for illustrative purposes, the structural details are capable of material variation within the scope of the appended claims.

I claim:

1. In a refrigerator, a cabinet having upper and lower compartments and an intervening insulated wall, said upper compartment having a side access opening and said wall having a section of

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major thickness extending upwardly at the open side of said upper compartment so as to form in the bottom of the latter a well-type chamber, said wall section being recessed from the top, a closure member for the access opening of said upper compartment movable vertically in the cabinet structure to and from an open position within said recess, a primary refrigerating system associated with said lower compartment for cooling the same, and a secondary refrigerating system in heat exchange relation with said primary refrigerating system and associated with said upper compartment for cooling the latter.

2. In a refrigerator, a cabinet having upper and lower compartments and an intervening insulated wall, said compartments having separate side access openings and said wall having a section of major thickness extending upwardly at the open side of said upper compartment so as to form in the bottom of the latter a well-type chamber, said wall section being recessed from the top, a closure member for the access opening of said upper compartment movable vertically in the cabinet structure to and from an open position within said recess, a separate movable closure within the upper compartment for the said chamber, closure means for the access opening of said lower compartment movable about a horizontal pivot at the

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lower edge thereof to open and close said opening, a primary refrigerating system associated with said lower compartment to cool the same, and a secondary refrigerating system in heat exchange relation with said primary refrigerating system and associated with the upper compartment for cooling the said compartment and said chamber.

3. In a refrigerator, a cabinet having upper and lower compartments and an intervening insulated wall, said upper compartment having a side access opening and said wall having a section of major thickness extending upwardly at the open side of said upper compartment so as to form in the bottom of the latter a well-type chamber, said wall section being recessed from the top, a closure member for the access opening of said upper compartment movable vertically in the cabinet structure to and from an open position within said recess, said insulated wall having a lateral extension from said section of major thickness affording a work surface area at the bottom of said upper compartment, a closure for said lower compartment mounted for engagement with the outer end of said wall extension, and refrigerating means operatively associated with said compartments.

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