Aug. 19, 1952 H. W. KLEIST 2,607,204

DISPENSING CASE FOR FROZEN FOODS

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Fig. 1

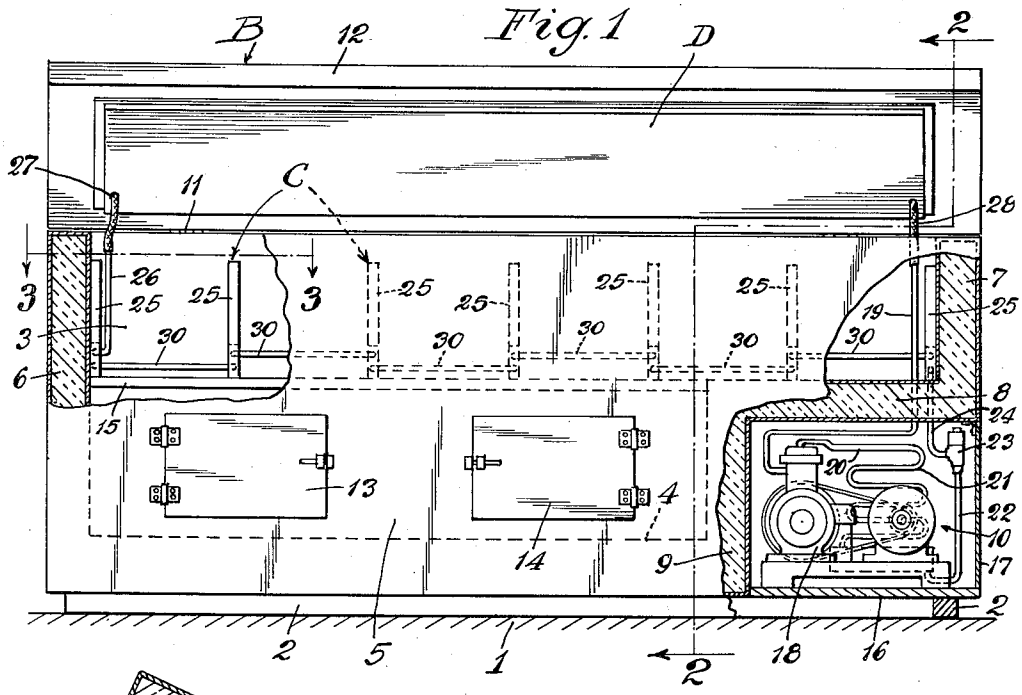

Fig. 2

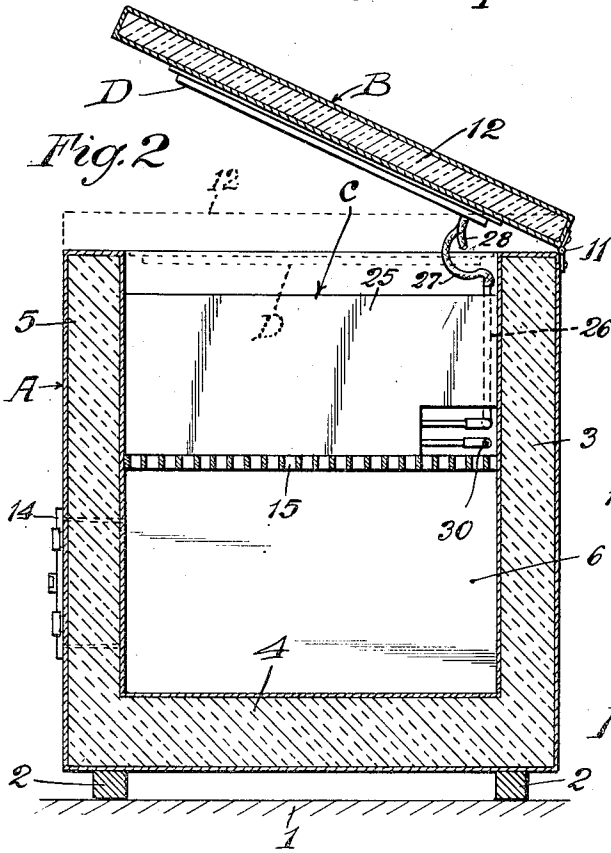

Fig. 3

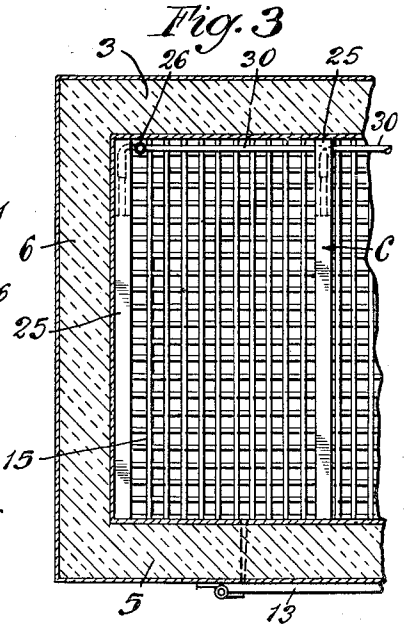

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Fig. 4

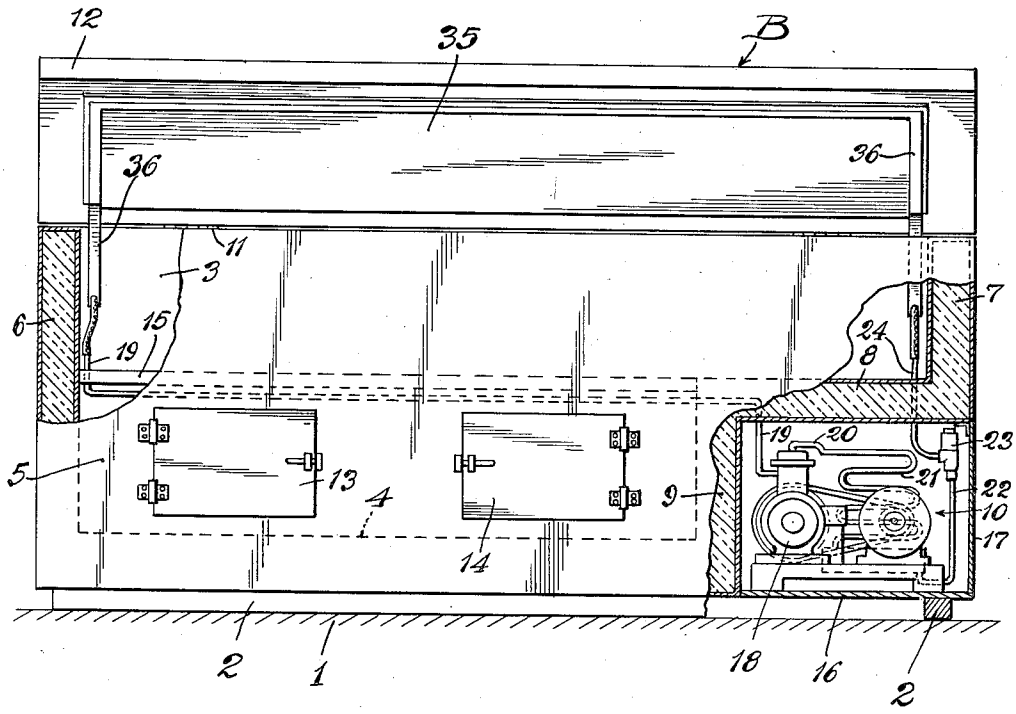

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Fig. 5.

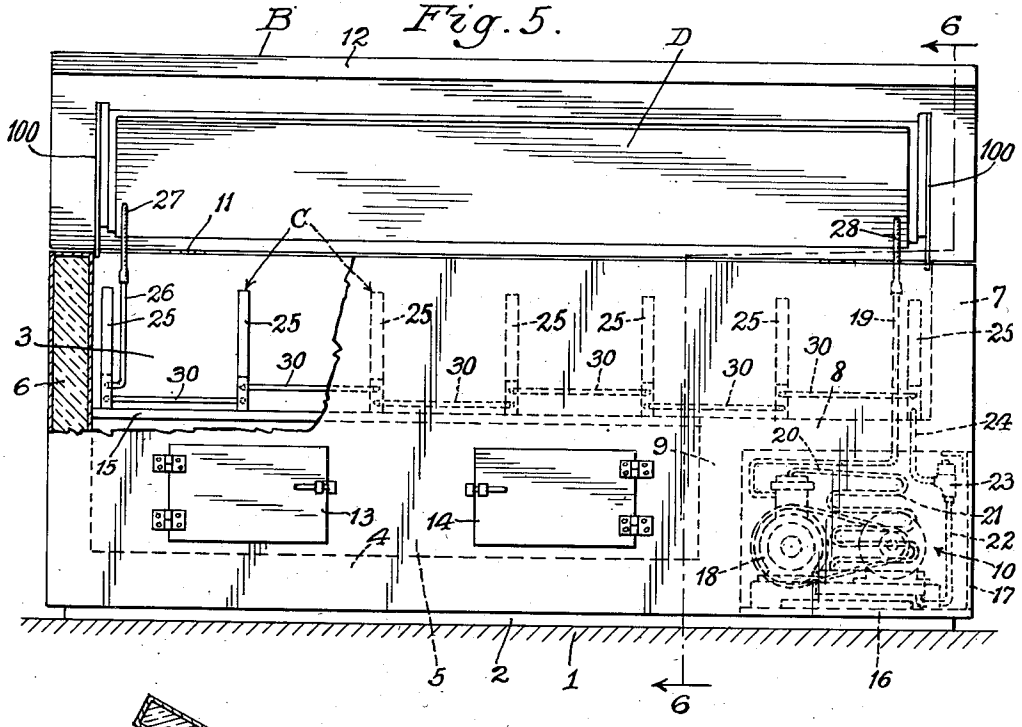
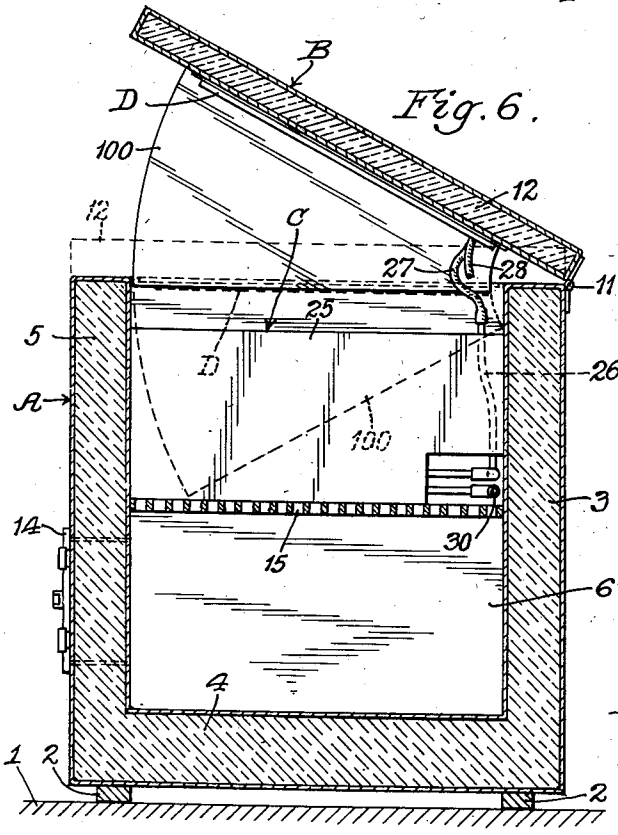


Fig. 6.



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UNITED STATES PATENT OFFICE

2,607,204

DISPENSING CASE FOR FROZEN FOODS

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Application November 18, 1949, Serial No. 128,221

4 Claims. (Cl. 62—116)

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My invention relates to an improvement in refrigerating devices, and has for one purpose to provide an improved dispensing refrigerator.

Another purpose is to provide an open top refrigerator and refrigerating means therefor.

Another purpose is to provide a refrigerating unit in which the evaporator component is mounted on and movable with the refrigerator cover.

Other purposes will appear from time to time in the course of the specification and claims.

The present invention is a continuation-in-part of my copending application, Serial No. 767,924, filed August 11, 1947, now abandoned.

I illustrate the invention more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a side elevation with parts in vertical section;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a section on the line 3—3 of Figure 1;

Figure 4 is a partial view, like Figure 1, illustrating a variant form of my invention;

Figure 5 is a side elevation, with parts in vertical section, illustrating a variant form of the device; and

Figure 6 is a section on the line 6—6 of Figure 5.

Like parts are indicated by like symbols throughout the specification and drawings.

Referring to the drawings, 1 indicates a floor or any suitable surface on which my refrigerator is mounted. 2, 2 are ground-engaging supports. A generally indicates an open-top refrigerator housing having a rear wall 3, a bottom wall 4, a front wall 5, an end wall 6, an opposite end wall 7, and a horizontal, intermediate wall 8, which, with a wall 9, defines an engine space 10, as will be clear from Figure 1. All the above-mentioned walls are of suitable heat-insulating material.

Hinged at 11, to the rear wall 3, is the heat-insulated top closure 12. The front wall 5 is shown as having a plurality of insulated doors 13, 14, effective to give access to the lower part of the storage space within the housing A. This lower part of the storage space is shown as separated from the upper door part by a horizontal grille 15, shown as lying in the plane of the upper part of the intermediate wall 8. The engine compartment is bounded by any suitable non-insulating walls, including a bottom wall 16 and an end wall 17. 18 indicates any suitable motor compressor unit which receives evaporated refrigerant through the suction or return duct 19,

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and which delivers it through the pressure duct 20, through the condenser 21 and the pressure line 22. 23 is any suitable pressure reduction means from which liquid refrigerant, at reduced pressure, flows along the duct 24. A battery of evaporator plates, generally indicated at C, is located above the grille 15. It may include a plurality of evaporator plates 25, within which the volatile refrigerant is circulated, by any suitable means, and is evaporated. It will be understood that the refrigerant flows through the plates 25 and evaporates therein, with a consequent abstraction of heat from the interior of the housing.

In the form of Figures 1 to 3, I illustrate an additional evaporator plate D, secured to the lower surface of the hinged cover 12. It is shown as receiving a volatile refrigerant from the terminal plate 25 of the C-series of plates, through the duct 26 and its flexible continuation 27. A second flexible duct 28 returns the evaporated refrigerant to the suction line 19, and thus back to the compressor. The cycle or circuit is completed by any suitable intermediate ducts 30, connecting adjacent plates 25. Whereas I have shown a practical arrangement of plates, it will be understood that the plates may be connected otherwise than in series, depending upon the design of the unit and the needs of the operator. However, in Figures 1 to 3, I illustrate the refrigerating container in which a single compressor-condenser unit supplies a volatile refrigerant, for evaporation, to one or more plates or evaporator elements mounted in or fixed in the container, and to a plate mounted on and movable with the container closure. Whereas I have shown but a single plate D, it will be understood that a multiple of plates may be employed on the closure 12.

In Figure 4, I illustrate a structure, shown as identical with Figure 1, except for the elimination of the series of plates C in the container A. In the form of Figure 4, a single plate or series of plates 35, mounted on the container cover B, gives the entire refrigerating effect. I may find it advantageous to provide end plates or plate portions 36 which extend downwardly into the interior of the container, or these end portions may be omitted. When used, it is practical to provide what is, in effect, a U-shaped plate.

In either form, the grille 15 may be used or omitted, as desired, and insulating portions 13 and 14 may be employed for lateral access to the space within the container A.

In the form of Figures 5 and 6, I illustrate substantially the structure of Figures 1 and 2, but I

employ end closures 100 at each end of the unit. I illustrate the members 100 as depending from the cover B, and as being formed and positioned to penetrate within the space surrounded by the insulated container A when the cover B is in closed position. The members 100 may be of plastic or any other suitable material, their primary function being to prevent the movement of air through or out of the ends of the space defined or covered by the cover B when it is in elevated position. In order to provide room for the closure members 100, I illustrate the end plates, in Figure 5, as spaced somewhat inwardly from the end walls 6, 7 of the insulated container A.

It will be realized that, whereas I have described and illustrated a practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. I, therefore, wish my description and drawings to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting me to my precise showing.

The use and operation of my device are as follows:

I employ a heat-insulated storage container, generally indicated at A, with a hinged or removable insulating lid, generally indicated as B. In the drawings as they appear, I provide a double refrigerating system in which evaporators or cold plates are grouped as at C, in the storage interior, and in which one or more plates D are mounted on the lower surface of the cover B. My invention is adapted to at least two major uses. In the first place, the user may employ the plate D on the cover B to supplement the evaporator system C within the cabinet or container A. This is useful in dispensing containers such as are used in the storage and sale of frozen foods in retail stores. Where a succession of customers have access to the interior of the container A, the cover B may be elevated, and moved over center, if necessary. When the cover B is open, the effective refrigerating effect of the plate D is small. Of course, cold air will flow downwardly from the plate D into the interior of the cabinet, but the primary purpose of the plate D is to serve as a cold wall or refrigerating element when the cover B is only partly open, as in Figure 2, or is entirely closed, as in the dotted-line position of Figure 2.

However, I find it advantageous, under some circumstances, to omit the plate or evaporator system C, and to rely upon only the plate D of the cover B. This is practical and useful where the cover is normally closed, and where only occasional access is had to the interior of the container A. In that event, the evaporator or plate D performs its refrigerating function, and especially where relatively high storage temperatures are satisfactory, as in cooling milk or the like, no additional refrigeration is necessary. But where a temperature of below freezing, and, particularly, of substantially below freezing, is necessary, I prefer to employ also the lower plate or evaporator plate C.

Whereas, in the drawings, I illustrate simply a flat plate D which is parallel with the plane of the lower side of the cover B, it will be understood that I may employ one or more plates depending from the cover B, for example, at the ends of the interior of the cabinet A. Such a form is shown, for example, in Figure 4, where the plate is, in effect, U-shaped, with depending arm portions or arms at each end.

While, in the use of my invention, I may employ any desired type of evaporator or cold plate, I find it frequently advantageous to employ a so-called hold-over plate, in which an eutectic is enclosed within the plate in connection with any suitable coil or duct system. When a volatile refrigerant is evaporated in the coil, one effect is to freeze the eutectic, which then serves as a hold-over.

I may find it advantageous to employ a counterweight or a spring, or other suitable means, for maintaining the cover B in raised position when it has been elevated, without the necessity of moving it over center. Preferably, the lid is kept in such a position that the top plate D overlies, to some substantial degree, the refrigerated space, and assists in refrigerating it.

As shown in Figures 5 and 6, I find it advantageous to provide closure means for the space overlaid by the closure B when the closure is in raised position. The members 100 constitute end closures for preventing currents of air from wasting or dispersing cold air. Even when the closure B is elevated to the position in which it is shown in Figures 5 and 6, the user has unimpeded access from the front, but the front access constitutes substantially the entire open space. Thus, there is a minimum disturbance or wastage of cooled air, and a body of cooled air is hastened beneath the upper plate D, which disperses much less rapidly, and with a much less power wastage, than is the case if the members 100 are omitted. The structure of Figures 1 to 4, inclusive, is practical and efficient, but the closure members 100 of Figures 5 and 6 substantially reduce the use of power and maintain an improved refrigerating condition, particularly in the upper part of the interior of the container A.

I claim:

1. In a storage and dispensing device for frozen foods, an insulated housing having insulated side and bottom walls and an open top, refrigerating means for said housing, a movable cover adapted, at one limit of its movement, to close the top of the housing, and adapted, when raised, to give access to the interior of the housing, and refrigerating end closure plates positioned and adapted, when the cover is raised, substantially to prevent flow of air to or from the ends of the space underlying the cover plate, while permitting access to such space through the front opening between the upper edge of the raised cover and the upper edge of the front wall of the housing and means for operatively connecting said refrigerating end closure plates with the refrigerating means.

2. The structure of claim 1 characterized by and including end closures mounted on and movable with the cover.

3. In a refrigerating device adapted for dispensing refrigerated foods and the like, an open-topped refrigerated housing including heat-insulating walls, a refrigerating plate in the housing located at a level below the open top of the housing, means for circulating a volatile refrigerant through said plate, a movable closure for the top of the housing, hinged at its rear end to the rear of the housing, said closure having an insulating layer, a refrigerating plate mounted upon the lower surface of said movable closure and located below the insulating layer and directly exposed to the air within and just above the housing, and duct connections between the refrigerant circulating means and said plate, said plate being located above the level of the upper edge of the

housing when the movable closure is raised, and refrigerating closure elements formed and adapted to close the ends of the space below the movable closure and above the plane of the upper edge of the open-topped housing.

4. In a refrigerating device adapted for dispensing refrigerated foods and the like, an open-topped refrigerated housing including heat-insulating walls, a movable closure for the top of the housing hinged at its rear edge to a rear wall of the housing, a refrigerating plate mounted upon the lower surface of said movable closure, said refrigerating plate having end plates depending from opposite ends thereof and positioned to close the ends of the space below the movable closure and above the plane of the upper edge of the open-topped housing when the closure is open, and means for circulating a volatile refrigerant through the refrigerating plate and the depending ends thereof.

HERMAN W. KLEIST.

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