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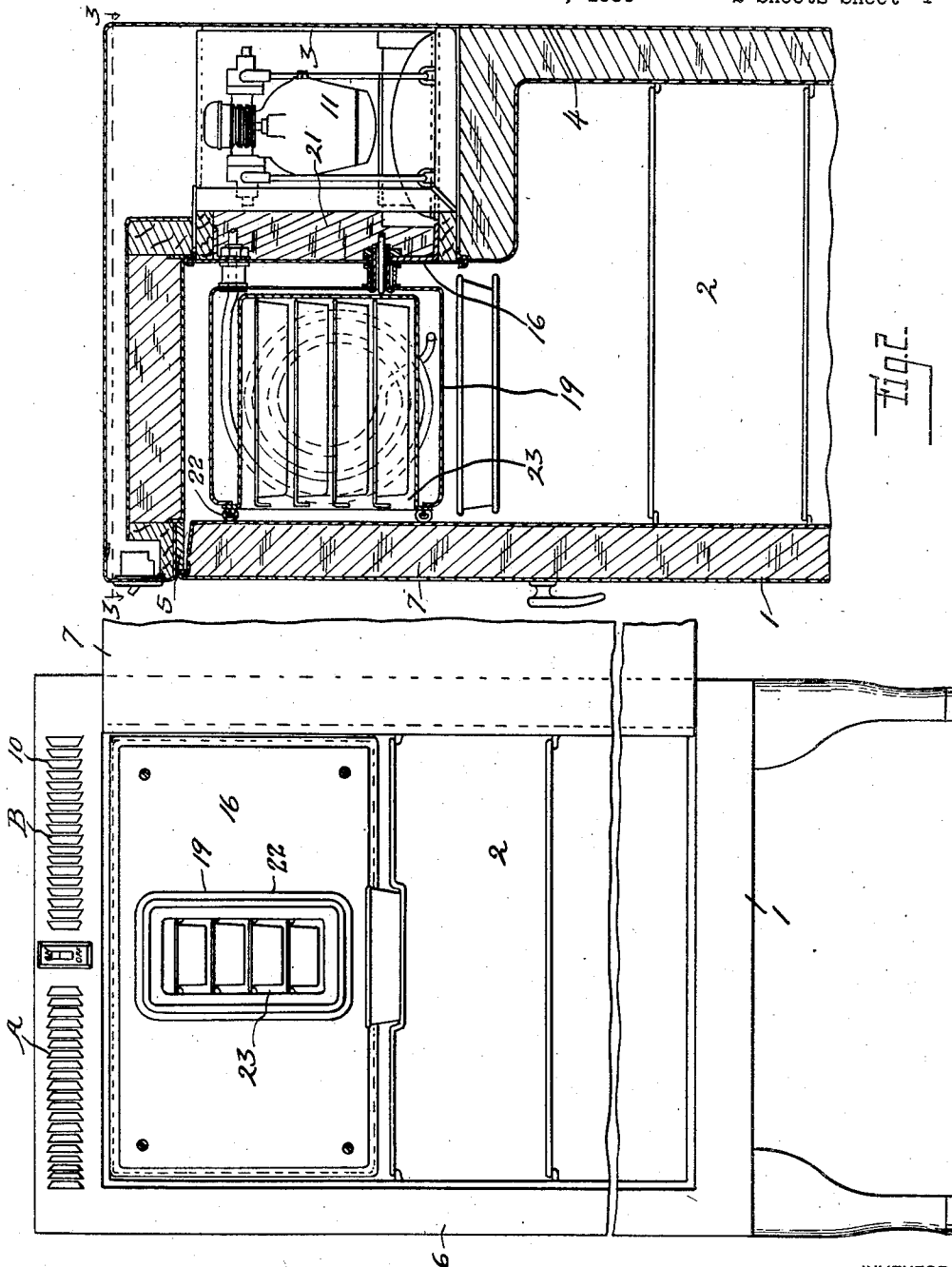
H. A. GREENWALD

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REFRIGERATING APPARATUS AND CABINET THEREFOR

Filed March 31, 1930

2 Sheets-Sheet 1



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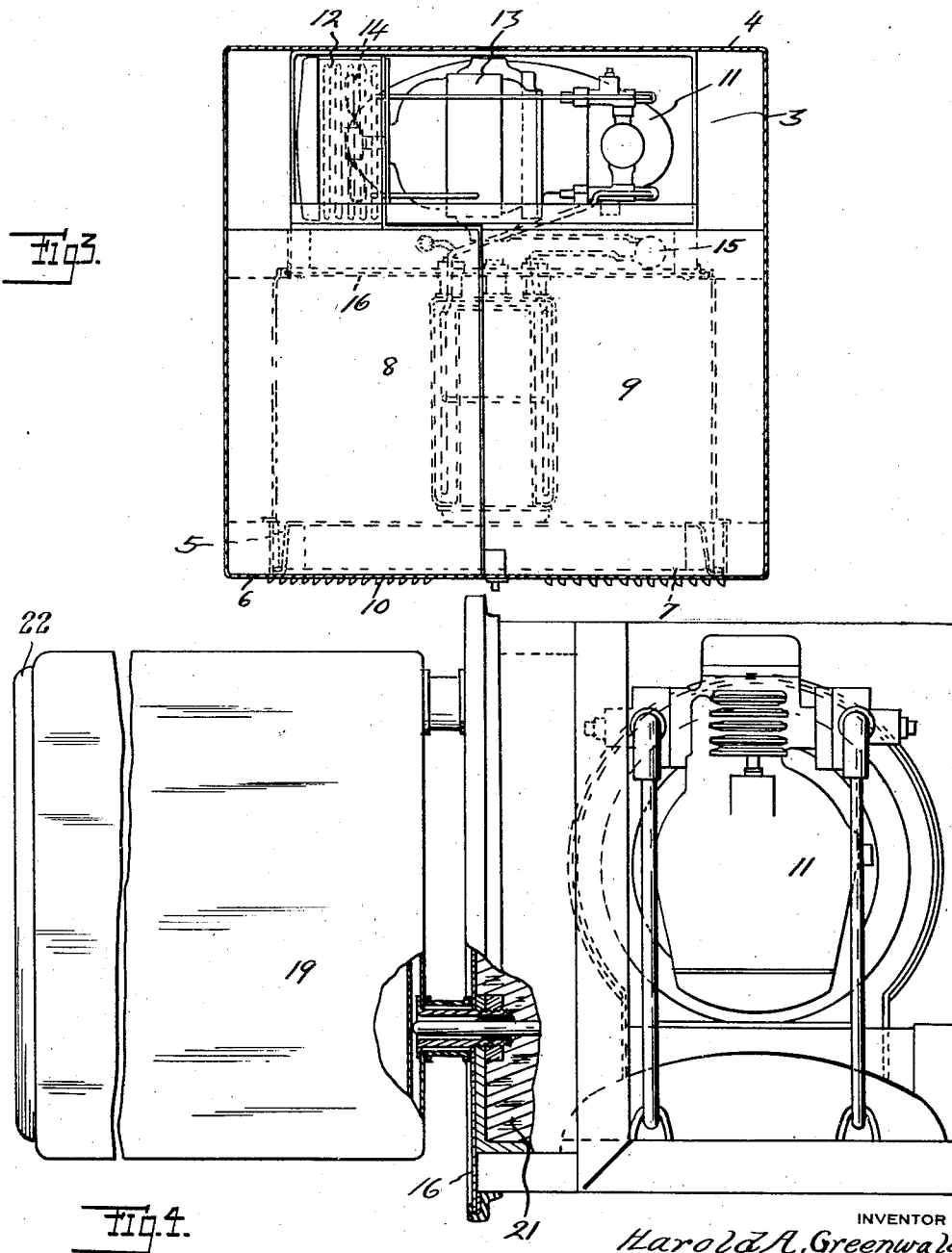
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REFRIGERATING APPARATUS AND CABINET THEREFOR

Application filed March 31, 1930. Serial No. 440,556.

This invention relates generally to refrigerating apparatus and cabinets therefor.

Heretofore it has been customary when installing refrigerating apparatus on or in refrigerating cabinets to mount the refrigerant low side such as the cooling coils or chamber within the food compartment or in a cooling chamber of the cabinet and to mount the refrigerant high side or "machine" such as the compressor, condenser and motor either on top or at the bottom of the cabinet. Ordinarily it was difficult to install the machine upon or to remove it from the top of the cabinet. In fact, it has been necessary sometimes to use derricks and/or cranes to effect the desired installation or removal of the high side parts. The space occupied was great since it was necessary to allow not only the actual space required by the cabinet and machine, but also sufficient space for installing or removing the machine and a large space for air circulation, especially where convection currents in the air were depended upon. Moreover, the space above the cabinet about the apparatus could not be used satisfactorily as cabinet or cupboard space, hence was wasted. In addition such installations usually included box-like covers or cages for the machine, and such enclosures were unsightly. When placed at the bottom of the cabinet the machine occupied space which might otherwise have been useful for cupboard space or for receiving foods, and from an efficiency standpoint was objectionable. Due to the location and arrangement of parts the entire machine could not be installed in or removed from the cabinet without making or breaking pipe connections, with the consequent chances of gas and oil escaping or dirt and moisture entering the system. This required skilled workmen. In fact, such workmen had to leave the service station or factory to travel to and from installations and thereby consumed much time in just traveling as truck drivers back and forth between jobs. Consequently such workmen were unable to devote their entire time to skilled work and were expensive to maintain.

a motor, pump, condenser and cooling element including a fan are assembled as a relatively small, compact and light portable unit, and as such may be easily and quickly installed within or removed from the cabinet at the top thereof without the aid of derricks and/or cranes and without uncoupling or breaking any refrigerant connections or disassembling any of the parts except the connection to the electric supply line. Hence, (a) the refrigerant, etc., in the apparatus cannot escape during installation or removal; (b) unskilled workmen such as ordinary truck drivers may be used to make such installations or removals; and (c) skilled workmen may remain in a central service station and devote their entire time to skilled service work.

(2) All parts of the refrigerating apparatus except the cooling element are concealed and invisible when installed within the cabinet so that the latter is exceptionally neat and attractive in appearance.

(3) Air from a suitable source is received within the cabinet to cool the concealed high side parts such as the compressor, condenser and motor, and to effect the desired condensation of refrigerant.

(4) The construction and arrangement of the refrigerating apparatus within the cabinet at the top thereof is such that the maximum food space, including space upon opposite sides of the cooling element and all space below the element to the bottom of the cabinet, is provided. In fact, the ratio of food chamber volume to the total volume of refrigerating apparatus is higher than in any other installation of which I have knowledge. Thus with my installation the lower portion of the cabinet heretofore used in some instances to receive refrigerating apparatus is now available for foods, or for cupboard space, and the arrangement is such that the upper and lower portions of the cabinet have different temperatures and may therefore receive different kinds of food.

Thus my improved construction obviates the necessity for space on top, about, or at the bottom of the cabinet for refrigerating apparatus and obviates the unsightly box-like

With the present invention, however, (1)

cover or case for the apparatus. Moreover, the cabinet may actually be built in a wall or cupboard and is adapted to fit snugly within an opening of substantially corresponding size. Hence the construction and arrangement is such that (1) the maximum food compartment and cupboard space is obtained, (2) the machine is removable, and (3) the necessary air circulation for this apparatus is provided. In fact, the cabinet and apparatus have been designed especially for one another so that the assembly will have the maximum efficiency.

In the accompanying drawings:

Figure 1 is a front elevation of an assembly embodying my invention and showing the cabinet door in open position;

Figure 2 is a vertical sectional view through the assembly;

Figure 3 is a sectional view taken on line 3-3 of Figure 2;

Figure 4 is a detail view of the portable refrigerating apparatus.

Referring now to the drawings, 1 is a refrigerator cabinet adapted to be received within a wall or cupboard and having a compartment 2 for food and a chamber 3 for refrigerating apparatus. As shown, the compartment 2 is in front of and below the chamber 3 and extends from a point adjacent the top to the bottom of the cabinet, while the chamber 3 projects forwardly from the rear wall 4 of the cabinet adjacent the top thereof and opens into the food compartment 2. Both the food compartment 2 and chamber 3 are accessible through an opening 5 in the front wall 6 of the cabinet. Preferably this opening 5 is substantially equal in area to the front of the cabinet and normally receives a door 7 having the outer face thereof flush with the outer face of the wall 6.

In the present instance the chamber 3 is open at the top and is adapted to receive air from and to discharge air into passages 8 and 9 respectively extending rearwardly from louvers 10 upon the front wall of the cabinet. As shown, these louvers are spaced apart in a horizontal plane above the opening 5 and are in two groups, A and B respectively, group A preferably inclining to the left and constituting air inlets for the passage 8 and group B inclining to the right and constituting air outlets for the passage 9.

Preferably a portable refrigerating apparatus such as that illustrated in my companion application No. 23,776 is received in the cabinet. As illustrated in Figure 2, the compressor 11, condenser 12, motor 13, fan 14 and expansion valve 15 thereof are received in the chamber 3 and are normally concealed by the trim panel 16 while the cooling element 19 upon the outer side of the trim panel 16 is received within the upper portion of the food compartment 2 and is insulated by the trim panel 16 and intermediate

wall 21 from the rest of the apparatus in the chamber 3. With this construction a bead 22 of yieldable material such as rubber is secured upon the outer face of the cooling element so as to be engaged by the door 7 when in closed position, hence the outwardly opening tray compartment 23 within the cooling element is accessible at the front of the cabinet when the door 7 is open and is closed by the door when the latter is in closed position. Thus the cooling element 19 is the only visible part of the refrigerating apparatus and this occupies very little space. As a result the maximum food compartment space is obtained. Moreover, the construction is such that the portable apparatus as a unit may be bodily moved in substantially a horizontal plane through the opening 5 in the front wall of the cabinet to and from the chamber 3 without uncoupling any of the refrigerant conduits or connections and without disturbing any of the other parts. This is one feature that enables the cabinet to be built in or received within an opening of substantially corresponding size in a wall or cupboard.

The electric motor may be in any suitable electric circuit (not shown) and is preferably under the control of an electric switch and/or "cold control" upon the front wall 6 of the cabinet. As shown, this switch is set in the front wall in the center thereof between the groups A and B respectively of louvers.

In use the fan 14 will draw air from the atmosphere inwardly through the louvers of group A into the passage 8 to the chamber 3 and will force such air over the motor, compressor and condenser thence outwardly through the passage 9 and louvers of group B to the atmosphere. Consequently the parts within the chamber 3 will be cooled and proper condensation of refrigerant in the condenser will be obtained. This is another feature that enables the cabinet to be built in or received within an opening of corresponding size in a wall or cupboard.

While it is believed that from the foregoing description the nature and advantages of the invention will be readily apparent, I desire to have it understood that I do not limit myself to what is herein shown and described and that such changes may be resorted to when desired as fall within the scope of what is claimed.

What I claim as my invention is:

1. In combination, a refrigerator cabinet having an opening in an upright wall thereof extending from a point adjacent the top of the cabinet to the bottom thereof, a food compartment in rear of said opening and substantially equal in height to the height of said opening, a chamber for refrigerating apparatus beside a portion of said compartment opening into the same in alignment with the opening in said upright wall, and com-

pletely assembled refrigerating apparatus bodily movable through the opening in the upright wall to and from the chamber aforesaid.

2. In combination, a refrigerator cabinet having an opening in an upright wall, a food compartment extending from a point adjacent the top of the cabinet to the bottom thereof, a chamber for refrigerating apparatus projecting forwardly from the rear wall of the cabinet and opening into the food compartment in alignment with the opening in the front wall, and refrigerating apparatus bodily movable through the opening in the front wall, having a portion within the food compartment, having other portions within the chamber, and having an intermediate portion insulating the first mentioned portion from the other portions, crossing the chamber and concealing the said other portions within the chamber.

3. In combination, a refrigerator cabinet having an opening in the front wall thereof, a food compartment in rear of said opening, an open top chamber in rear of said food compartment, louvers on the front wall above the opening therein, and passages for air extending between said louvers and open top chamber, and refrigerating apparatus having a portion within the food compartment and having other portions within the chamber, including a fan for drawing air from the atmosphere through certain of the louvers through one of the passages into the chamber and forcing air from the chamber through the other passage and certain of the louvers to the atmosphere.

4. In combination, a refrigerator cabinet having an opening in its front wall, a chamber for refrigerating apparatus in rear of said opening, and a food compartment having a portion below said chamber and having another portion communicating with the first and located between said opening and chamber in substantially horizontal alignment therewith, and refrigerating apparatus bodily movable through the opening, having a cooling element within the second-mentioned portion aforesaid of the food compartment and having the remainder thereof within the chamber.

5. In combination, a refrigerator cabinet having a food compartment and a chamber for refrigerating apparatus arranged side by side with an opening therebetween, and a portable refrigerating apparatus having a cooling element in said compartment and having other elements in said chamber but bodily movable through the opening between said chamber and compartment, and a panel associated with the cooling element normally closing said opening and concealing the elements in said chamber.

6. In combination, a refrigerator cabinet having a food compartment and a chamber

for refrigerating apparatus arranged side by side with an opening therebetween and a portable refrigerating apparatus including a base movable through the opening and slidably mounted in the chamber, refrigerating elements on the base, an insulated panel carried by the base normally closing the opening between the compartment and chamber and concealing the base and elements thereon, and a cooling element in the food compartment carried by the base in advance of the panel and connected to certain of the elements within the chamber.

7. In combination, a refrigerator cabinet having a food compartment and a chamber for refrigerating apparatus in rear of a portion of said compartment, and a portable refrigerating apparatus in the chamber having the high and low sides thereof side by side and bodily removable through the food compartment.

8. In combination, a refrigerator cabinet having a food compartment and a chamber for refrigerating apparatus arranged side by side with an opening therebetween, and a portable refrigerating apparatus having a cooling element in the compartment, other elements within the chamber and bodily removable through the opening aforesaid, and a wall of insulating material insulating the cooling element from the other elements and normally closing the opening and concealing the elements in the chamber.

9. In combination, a refrigerator cabinet having a food compartment and a chamber for refrigerating apparatus arranged side by side with an opening therebetween, and a portable refrigerating apparatus having a cooling element in the compartment, other elements within the chamber and bodily removable through the opening aforesaid, and means between the cooling element and other elements movable with the apparatus, and normally closing the opening and insulating the chamber from the compartment.

10. In combination, a refrigerator cabinet having a food compartment opening and openings for air from the atmosphere in its front wall, a chamber for refrigerating apparatus in rear of said food compartment opening, means for conducting air from one of said air openings to said chamber, means for conducting air from said chamber to another of said air openings, and refrigerating apparatus within said chamber including means for circulating air through the means and air openings aforesaid.

11. In combination, a refrigerator cabinet containing spaces side by side substantially in a horizontal plane for receiving refrigerating apparatus and food respectively and provided in advance of the space provided for food with an opening, and completely assembled portable refrigerating apparatus having portions within the spaces aforesaid

and bodily removable through the opening.

12. In combination, a refrigerator cabinet provided in its front wall with an opening and provided in rear of said opening with a food compartment and a chamber for refrigerating apparatus, and refrigerating apparatus within said chamber and having a cooling unit within the food compartment in advance of said chamber whereby spaces for food are provided upon opposite sides of said unit, the apparatus being constructed and arranged in such a way that it is removable as a complete unit from the chamber through the food compartment and out through the opening aforesaid.

13. In combination, a refrigerator cabinet having an opening in its front wall and having a food compartment and a chamber for refrigerating apparatus arranged in tandem in rear of said opening and having an opening therebetween, said cabinet also having openings for air in its front wall and means for conducting such air to and from the chamber aforesaid, and refrigerating apparatus in the chamber and including means for closing the opening between the food compartment and chamber and means for circulating air through the conducting means and air openings aforesaid.

14. In combination, a refrigerator cabinet having a rigid front wall provided with an opening, a solid rear wall substantially equal in length and fixed relative to said front wall, and an upright partition between said walls and fixed relative thereto, and portable refrigerating apparatus having parts between the partition and solid wall and a part between the partition and front wall, the parts between the partition and rear wall being movable as a unit through an opening in the partition, and the apparatus as a whole being bodily movable through the opening in the front wall.

15. In combination, a refrigerator cabinet having its top, back, front and side walls rigidly secured together and having a partition rigid with certain of said walls and dividing the cabinet into two chambers, one of said walls and said partition having openings therein, and portable refrigerating apparatus having a door closing the opening in the partition and having means in rear of said partition within one of said chambers for circulating air through the opening in the wall aforesaid and movable through the openings in said partition and wall.

16. In combination, a refrigerator cabinet having rigid front and rear walls of substantially uniform height and provided therebetween with a substantially L-shaped partition, the upright portion of the L and the front wall of the cabinet having aligned openings therein, and a completely assembled portable refrigerating apparatus having a compressor, condenser and motor above the

base of the L and movable as a unit through the aligned openings in the upright portion of the L partition and front wall aforesaid.

17. In combination, a refrigerator cabinet having fixed front and rear walls of substantially uniform height and provided therebetween with a fixed upright partition, the partition and one of said walls having aligned openings therein, and a portable refrigerating apparatus having parts upon opposite sides of said partition, having parts movable through the opening in the partition, and bodily movable through the opening in said wall.

18. In combination, a refrigerator cabinet having a food compartment, and a machine compartment accessible from the food compartment, and being provided in advance of the food compartment with an opening, and completely assembled portable refrigerating apparatus having portions within each of the compartments aforesaid and bodily removable from the cabinet through said food compartment and said opening.

In testimony whereof I affix my signature.
HAROLD A. GREENWALD.

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