Dec. 29, 1936. D. H. REEVES 2,065,538

REFRIGERATING APPARATUS

Original Filed July 31, 1930 3 Sheets-Sheet 1

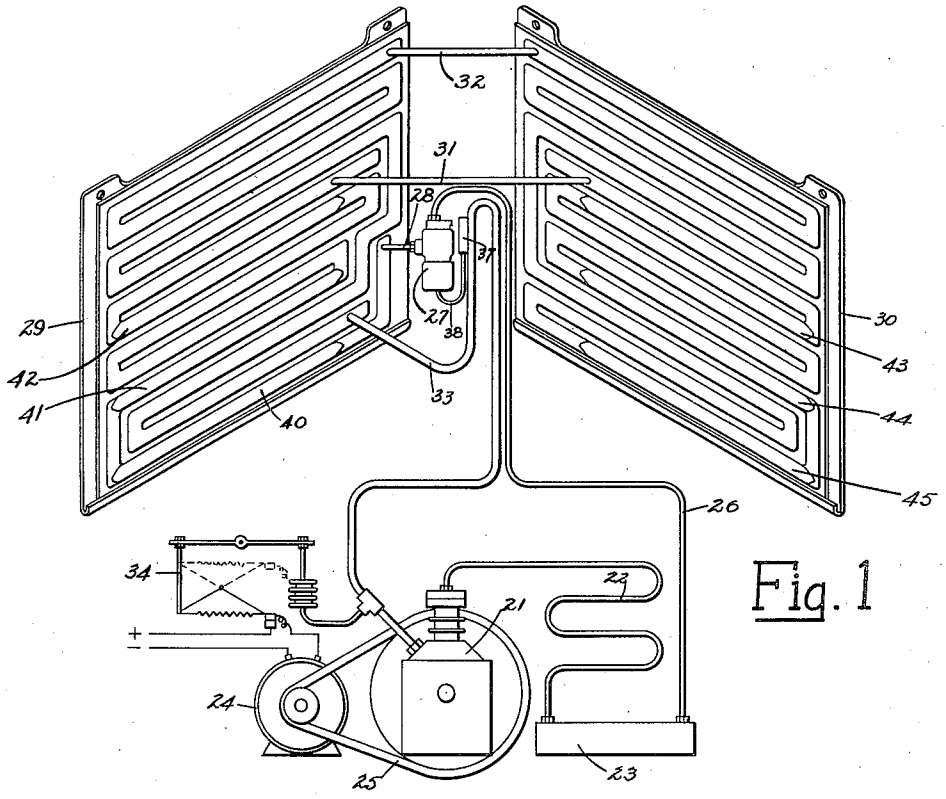


Fig. 1

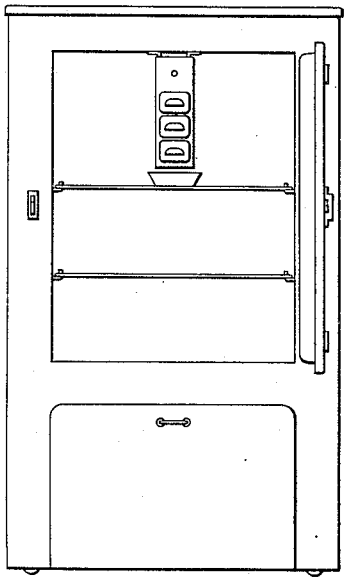


Fig. 2

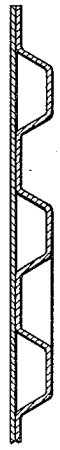


Fig. 5

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REFRIGERATING APPARATUS

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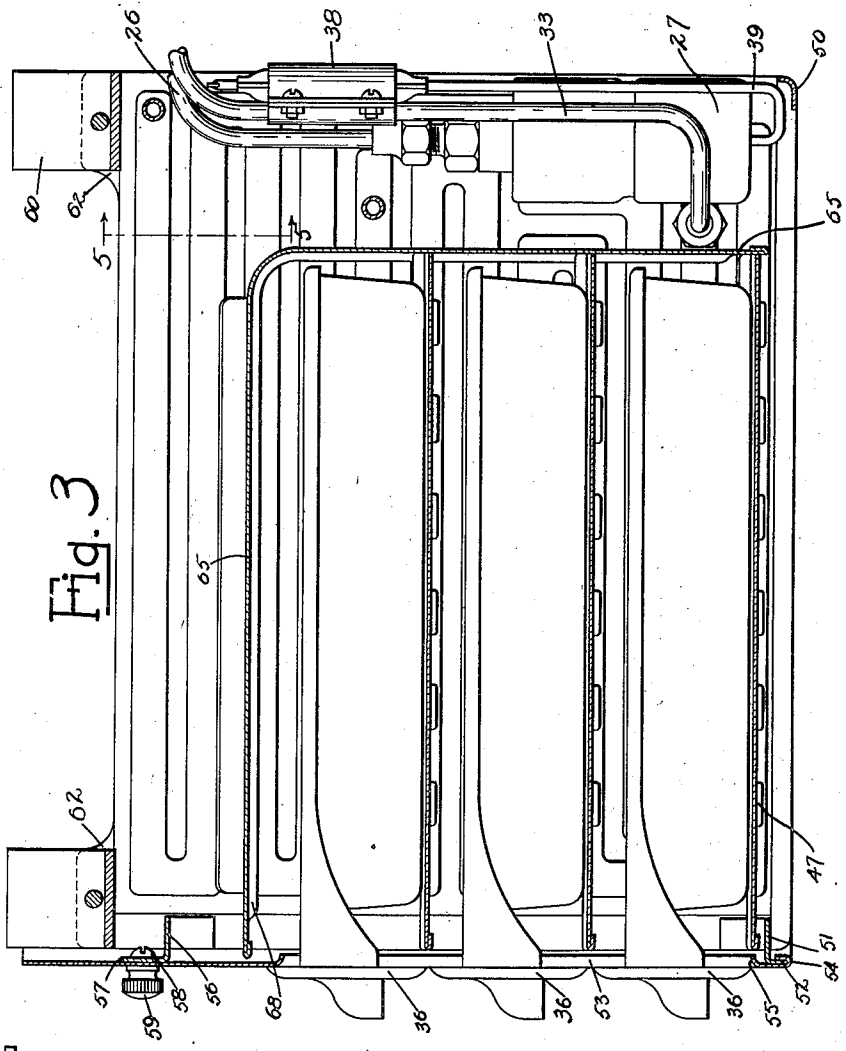


Fig. 3

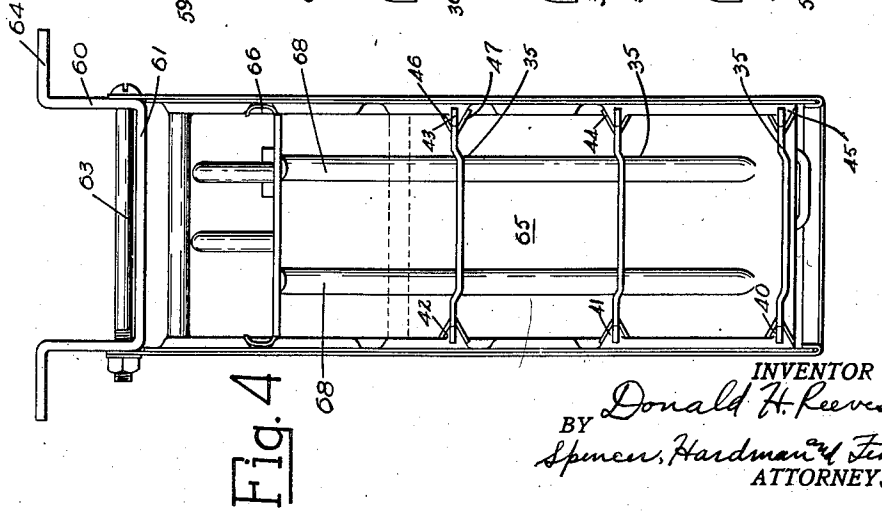


Fig. 4

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REFRIGERATING APPARATUS

Original Filed July 31, 1930 3 Sheets-Sheet 3

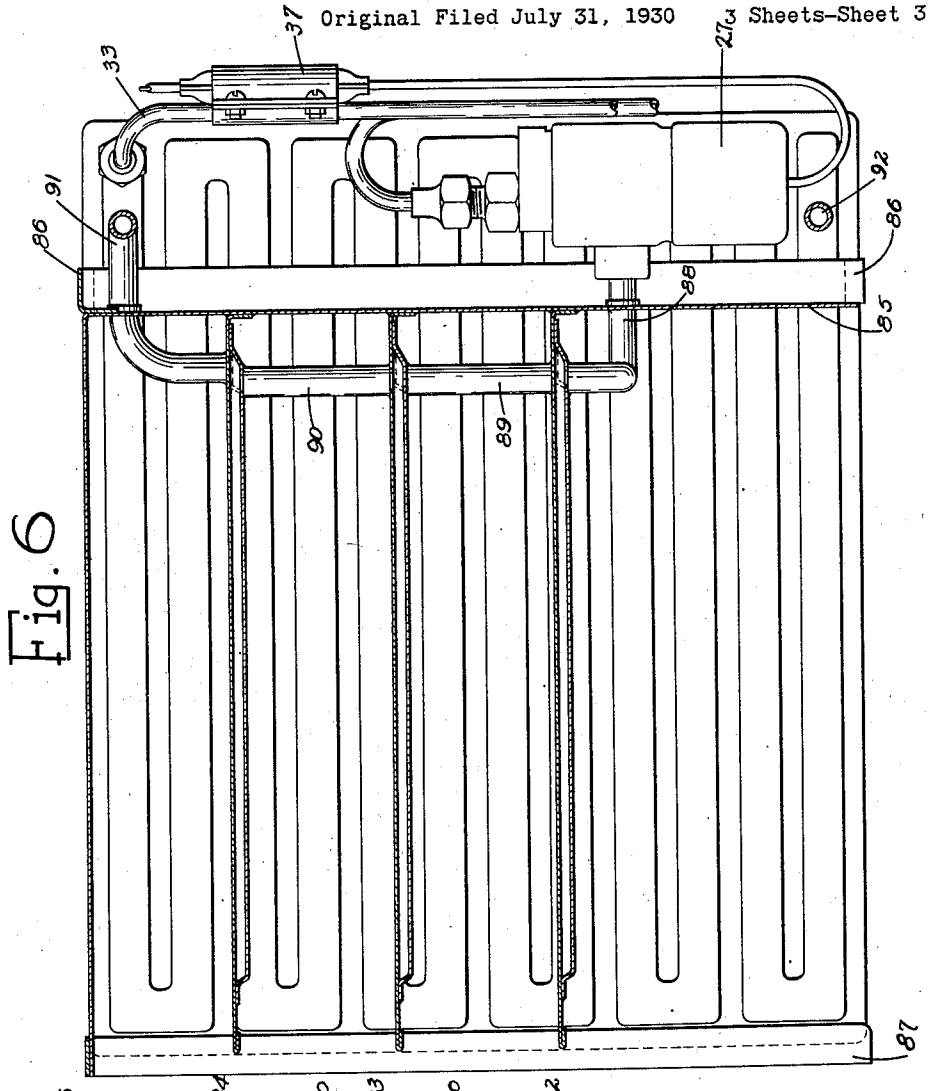


Fig. 6

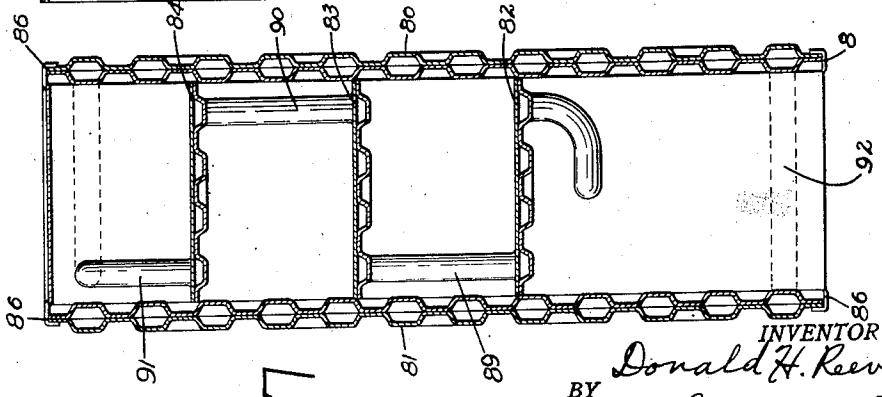


Fig. 7

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2,065,538

REFRIGERATING APPARATUS

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Application July 31, 1930, Serial No. 471,928
Renewed November 13, 1935

30 Claims. (Cl. 62—99)

This invention relates to refrigerating apparatus and more particularly to cooling units for refrigerator cabinets.

One of the objects of the invention is to provide a cooling unit which is attractive in appearance and easily cleaned.

Another object of the invention is to provide a cooling unit having ducts arranged so as to exert the maximum cooling effect upon the ice tray shelves.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a view of the side plates of a cooling unit spread apart so as to show the inner surfaces together with a diagrammatic representation of a refrigerator system;

Fig. 2 is a front view of the refrigerator cabinet with the door open, showing applicant's improved cooling unit mounted in the food storage compartment of the cabinet;

Fig. 3 is a longitudinal vertical sectional view of the form of cooling unit disclosed in Fig. 1;

Fig. 4 is a front view of the cooling unit disclosed in Fig. 3 with the front cover removed;

Fig. 5 is a cross section on the line 5—5 of Fig. 3;

Fig. 6 is a longitudinal vertical sectional view of a modified form of the cooling unit; and

Fig. 7 is a transverse vertical sectional view of the modified cooling unit.

Referring to the drawings, there is shown diagrammatically for illustrative purposes, a refrigerating system of the expansion type including the compressor 21 for compressing the refrigerant, preferably sulphur dioxide, and for forwarding it to the condenser 22 where it is liquefied and collected in the receiver 23. The actuating means for the compressor comprises a motor 24 connected by pulley and belt means 25 to the compressor. A supply conduit 26 supplies liquid refrigerant to an expansion valve 27 where the liquid refrigerant is allowed to expand and pass by means of the connection 28 into the left plate 29 of the cooling unit.

The expansion valve 27 is normally responsive to the pressure of the expanded refrigerant but the flow of refrigerant is also controlled in a manner hereafter described by the thermostat 37 which is connected onto the return conduit 33 and communicates with a separate diaphragm in the expansion valve 27 through the conduit 38. The thermostat 37 actuates the separate diaphragm in the expansion valve when the cooling action reaches the portion of the duct 33 to which it is attached to reduce the flow of refrigerant through the valve. Refrigerant passes through a number of connecting ducts in the left plate 29 and is conducted to the right plate 30 by the conduit 31, passes through the passages in the right plate 30 and is returned to the left plate 29 through the conduit 32 and after passing through the remaining passages in the left side plate 29 the refrigerant returns to the compressor through the return conduit 33. A pressure responsive switch means 34 is preferably connected to the return conduit 33 for controlling the motor 24 to provide alternating and operating periods in response to the pressure and temperature of the evaporator.

The cooling unit shown in Figs. 1 to 4 inclusive is of the box type, the plates 29 and 30 forming the sides of the box and supporting shelves 35 between them. The refrigerant passages within the side plates are arranged so as to give maximum cooling effect to the shelves 35 which are provided for the purpose of supporting the ice trays 36 within the cooling unit. In carrying out this purpose (see Fig. 1) a passage is provided in the left side plate 29 for conducting refrigerant from the point of connection of the conduit 28 with the left side plate 29 downwardly to the lower portion of this side plate from which point the passage extends horizontally frontwardly, and has a V-shaped bulge or projection 40 for supporting one side of the lower shelf 35, from which point the passage extends upwardly for a short distance and then horizontally rearwardly having a similar V-shaped bulge or projection 41 for supporting the left side of the middle shelf from which point a passage extends upwardly in serpentine fashion and has another V-shaped bulge or projection 42 for supporting the left side of the upper shelf 35. From this point the passage extends rearwardly and has a connection to which the conduit 31 is fastened, which conducts refrigerant to a passage on the other side which extends downwardly in serpentine fashion within the right side plate 30 and has V-shaped bulge portions or projections 43, 44, and 45 directly opposite the V-shaped portions 40, 41, and 42 for supporting the right side of the upper, middle, and lower shelves 35.

The shelves 35 are made of sheet metal and have their side edges notched in all except the front portions. The small square projections formed by the notches are bent alternately upwardly and downwardly forming a V-shaped groove along the side edges of the shelf which conform to the contour of the V-shaped bulges

or projections formed in the passages of the side plates of the cooling unit. The upper projections are indicated by the reference character 46 and the lower projections by the reference character 47 shown in Figs. 3 and 4. The V-shaped groove formed between the upper and lower projections 46 and 47 receives the V-shaped bulges or projections in the left and right side plates 29 and 30, gripping them tightly, supporting the shelves 35 thereby, and providing excellent thermal contact between the shelves 35 and the side plates so that heat and cold may be readily conducted from the ice trays which are placed on the shelves through the shelves to the side plates, whereby freezing of liquids placed within the ice trays will quickly take place. The gripping action of the sheet metal shelves with the V-shaped bulges or projections formed in the passages of the side plates of the cooling unit above described is obtained by making the projections 46 and 47, on shelves 35, of smaller spread than the spread of the V-shaped bulges or projections on the side plates of the cooling unit so that, when the projections 46 and 47 are placed in position on or slipped over the oppositely disposed pairs of bulged portions on the side plates of the cooling unit, the projections 46 and 47 will tend to be spread farther apart. The projections 46 and 47 are spread, when slipped upon the bulged portions, slightly out of their normal position and produce a spring action to firmly grip the projections on the side plates of the cooling unit. This gripping action aids in maintaining the shelves in position in the cooling unit during removal of trays therefrom.

The side plates are made of two sheets of metal welded together, one or both of which, as desired, may have depressions therein forming the refrigerant passages as shown in Fig. 5. The side plates are held in their spaced parallel position at their lower end by a sheet metal spacer 50 at its rear end and by a different U-shaped spacer 51 at its lower front end. These spacers are welded at their ends to the side plates. The front spacer 51 has a flange 52 turned down about which the lower end of the shield 53 is turned and bent upwardly so as to form a hook 54. The shield 53 is provided with apertures 55 in suitable locations for receiving the ice trays 36. The shield 53 is supported at its upper end by a sheet metal spacer 56 which has its front end turned up, forming a flange 57 through which a screw 58 passes, having a thumb screw 59 thereon for supporting the upper end of the shield 53. The side plates are also held in spaced relation by the U-shaped brackets 60 which also form a support for the cooling unit within the refrigerators. The U-shaped portion 61 of these brackets is positioned between the ears 62 formed at the upper corners of each of the side plates. These ears as well as the sides of the U-shaped brackets 60 have apertures therein through which the pair of long bolts 63 pass through and clamp the side plates to the U-shaped brackets. The U-shaped brackets have the upper flanges 64 for fastening the cooling unit to the top of the food storage compartment of a refrigerator as shown in Fig. 2.

An L-shaped shield 65 of sheet metal is positioned between the side plates 29 and 30 and covers the top and rear portions of the shelves 35 of the ice trays 36 which are supported by them. This shelf has upwardly turned flanges 66 along the side upper edges which are properly shaped so as to fit within the spaces between the refrigerant passages within the side plates 29 and 30 as shown in Fig. 4. This shield has a pair of beads 68 pressed therein for strengthening purposes. This shield, like the front shield, is easily removable and may be slid to the front of the cooling unit.

A modified construction is shown in Figs. 6 and 7. In this construction, refrigerant first passes to the shelves, in this case the passages being underneath the shelves instead of at either end. This unit is also of a box-shaped construction and has side walls 80 and 81 which are made up of metal sheets having serpentine depressions therein, the sheets being placed together with the depressions adjacent each other forming refrigerant passages and welded together at the edges and between the depressions. Similar in construction to the side walls are the shelves 82, 83, and 84, each of which are formed of a sheet metal member, having serpentine depressions therein, and a flat piece of sheet metal, the two of which are welded together at their edges and between the depressions, making the refrigerant passages fluid tight. The shelves each have a downwardly turned flange at their rear end which is welded to an L-shaped shield 85 similar to the shield 65 of the construction shown in Figures 1 to 4. This L-shaped shield 85 forms the rear and top wall of the ice freezing compartment and also acts as a spacer between the side plates 80 and 81. This shield is supported at its rear end by flanges 86 which hook over the lower edges of both of the plate members, and is supported at its front end, as well as the three shelves 82, 83, and 84, by the binding strip 87, of U-shaped form which is fastened to the front edges of both of the side plates.

Refrigerant from the expansion valve 27 is conducted through the serpentine passages in the lower shelf 82 through the conduit 88. From the other end of the serpentine passage in the shelf 82 a duct 89 extends upwardly and connects with one end of the serpentine passage in the shelf 83. The duct 90 connects the other end of the serpentine passage 83 with the other end of the serpentine passage in the shelf 84. The duct 91 connects the other end of the serpentine passage in the shelf 84 to the upper end of the serpentine passage in the side plate 80. Refrigerant passes downwardly through the serpentine passage in the side plate 80 and is conducted from the lower end of this serpentine passage and side plate 81 by a duct 92. Refrigerant passes upwardly through serpentine passages, side plate 81 and at the other end a conduit 33 leading to the compressor.

Thus in both embodiments quick freezing of the liquid within the freezing trays is assured, since in both cases the refrigerant passes first to the ice tray shelf from which point the refrigerant is conducted to refrigerant passages which cool the food storage compartment within the refrigerator cabinet. In the first case the refrigerant passages within and under the shelves are eliminated and quick freezing is accomplished by the transfer of heat between the shelves and the bulged portion of the refrigerant ducts whereas in the modified form the cooling of the shelf takes place by the refrigerant passing within them. By shielding and enclosing the freezing chamber, and by supporting the individual or separate refrigerated sheet metal shelves 82, 83, and 84 within the freezing chamber by mounting same upon the shield 85 and strips 87, instead of securing the shelves directly to

and in intimate thermal contact with the refrigerated walls 80 and 81, so as to permit only limited flow of heat from the refrigerated air cooling walls to the freezing shelves together with the particular refrigerant flow circuit through the evaporator permits the walls 80 and 81 to be warmed by any suitable means such as by the air within the food storage compartment. Thus the refrigerated air cooling walls 80 and 81 will defrost when the operation of the refrigerating system is temporarily modified or when operation thereof is suspended for a predetermined period of time without materially or substantially affecting the temperature of an ice tray supported upon any one of the refrigerated shelves disposed within the freezing chamber. Therefore, the temperature of the contents of a tray disposed on the support within the freezing chamber is prevented from increasing materially and such contents after once being frozen remain in a frozen condition or state during periodic defrosting of the food storage compartment air cooling walls of the evaporator. By using cooling surfaces of welded sheet metal, the cost of manufacture of the cooling unit is reduced, since this construction is better adapted to the use of machinery such as punch presses, since welding is cheaper than soldering which is used in present construction.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In a cooling unit for refrigerating apparatus, the combination of a plurality of horizontal refrigerant ducts connected in series and arranged in two generally vertical formations, and a plurality of shelves supported upon the horizontal refrigerant ducts between the two generally vertical formations, said ducts being so arranged that the refrigerant will first pass along the edges of a plurality of shelves and then pass through the remainder of the vertical formation.

2. In a cooling unit for refrigerating apparatus, the combination of a plurality of horizontal refrigerant ducts connected in series and arranged in two generally vertical formations, and a plurality of shelves supported upon the horizontal refrigerant ducts between the two generally vertical formations, said ducts being so arranged that the refrigerant will pass along an edge of the lower shelf first and then pass through the remainder of the vertical formation.

3. In a cooling unit for refrigerating apparatus, the combination of a plurality of horizontal ducts arranged in two generally vertical formations, a shelf between said formations having a refrigerant passage therein, means for supplying refrigerant to said passage and means to conduct refrigerant from said passage to said horizontal ducts.

4. In a cooling unit for refrigerating apparatus, the combination of a plate member and a shelf having one edge in contact with said plate member, a plurality of horizontal refrigerant passages within said plate member and connected in series with a source of refrigerant supply, said passages first extending substantially along the edge of the shelf in contact therewith and then extending through the remainder of the plate member.

5. In a cooling unit for refrigerating apparatus, the combination of a plurality of horizontal refrigerant ducts connected in series and arranged in two generally vertical formations and a plurality of ice tray shelves supported upon some of the horizontal refrigerant ducts between the two generally vertical formations, an expansion valve for controlling the supply of refrigerant to said horizontal ducts, and means for conducting refrigerant from the expansion valve first to some of the horizontal ducts upon which the ice tray shelves are supported and then conducting the refrigerant to other horizontal ducts in the generally vertical formations.

6. In a cooling unit for refrigerating apparatus, the combination of a plurality of horizontal refrigerant ducts connected in series and arranged in two generally vertical formations, some of said horizontal ducts being shelf supporting ducts arranged in proper spaced relation in both of the vertical formations, a plurality of tray supporting shelves supported upon said shelf supporting ducts, other of said horizontal ducts being positioned between said shelf supporting ducts, and means for supplying refrigerant to some of the shelf supporting ducts first and then directing the refrigerant through some of the horizontal ducts between the shelf supporting ducts.

7. In a cooling unit for refrigerating apparatus, the combination of a plurality of horizontal refrigerant ducts connected in series and arranged in two generally vertical formations, some of said horizontal ducts being shelf supporting ducts arranged in proper spaced relation in both of the vertical formations, a plurality of tray supporting shelves supported upon said shelf supporting ducts, other of said horizontal ducts being positioned between said shelf supporting ducts, an expansion valve for controlling the supply of refrigerant to the horizontal ducts, and means for conducting the refrigerant from the expansion valve to some of the shelf supporting ducts first and then sending the refrigerant through some of the horizontal ducts between the shelf supporting ducts.

8. In a cooling unit for refrigerating apparatus, the combination of a pair of vertical plate members having a plurality of horizontal refrigerant ducts connected in series relation therein, some of said horizontal ducts being shelf supporting ducts arranged in proper spaced relation in both of the vertical plate members, a plurality of tray shelves extending between said vertical plate members and supported upon said shelf supporting ducts, other of said horizontal refrigerant ducts being positioned between said shelf supporting ducts, and means for first supplying refrigerant to some of said shelf supporting ducts and then conducting the refrigerant through some of the horizontal ducts between the shelf supporting ducts.

9. In a cooling unit for refrigerating apparatus, the combination of a pair of vertical plate members having a plurality of horizontal refrigerant ducts connected in series relation therein, some of said horizontal ducts being shelf supporting ducts arranged in proper spaced relation in both of the vertical plate members, a plurality of tray shelves extending between said vertical plate members and supported upon said shelf supporting ducts, other of said horizontal refrigerant ducts being positioned between said shelf supporting ducts, an expansion valve for controlling the supply of refrigerant to the horizontal ducts, and means for conducting the refrigerant from

the expansion valve to some of said shelf supporting ducts and then conducting the refrigerant through some of the horizontal ducts between the shelf supporting ducts.

10. In a cooling unit for refrigerating apparatus, the combination of a shelf, a plurality of refrigerant conveying ducts connected in series and arranged in a generally vertical formation on at least one side of said shelf for cooling the shelf and for cooling the interior of a refrigerator cabinet, certain of said plurality of refrigerant ducts contacting with an edge of the shelf and certain other of said plurality of refrigerant ducts extending through the vertical formation beyond the shelf to maintain the shelf at a colder temperature than the refrigerator cabinet.

11. In a cooling unit for refrigerating apparatus, the combination of a shelf, a plurality of horizontally extending refrigerant conveying ducts connected in series and arranged in a generally vertical formation on at least one side of said shelf for cooling the shelf and for cooling the interior of a refrigerator cabinet, certain of said plurality of refrigerant ducts contacting with an edge of the shelf and certain other of said plurality of refrigerant ducts extending through the vertical formation above the shelf to maintain the shelf at a colder temperature than the refrigerator cabinet.

12. In a cooling unit for a refrigerating apparatus, the combination of a plurality of refrigerant conveying ducts connected in series and arranged in two spaced apart generally vertical formations, a shelf supported upon certain of said plurality of refrigerant ducts between the two vertical formations, certain other of said plurality of refrigerant ducts extending through the vertical formations beyond the shelf, and means for directing refrigerant through ducts adjacent to the shelf and thence through the ducts extending beyond said shelf.

13. In a cooling unit for a refrigerating apparatus, the combination of a plurality of horizontally disposed refrigerant conveying ducts connected in series and arranged in two spaced apart generally vertical formations, a shelf supported upon certain of said plurality of horizontal ducts between the two vertical formations, certain other of said plurality of horizontal ducts extending through the vertical formations above the shelf, and means for directing refrigerant through ducts adjacent to the shelf and thence through the ducts extending above said shelf.

14. In a cooling unit for a refrigerating apparatus, the combination of a pair of vertically disposed plate members and a plurality of shelves supported horizontally between the plate members, a plurality of horizontal refrigerant passages within said plate members and connected in series with a source of refrigerant supply, the edge portions of each of said plurality of shelves being in intimate thermal contact with certain of said refrigerant passages, and said passages being so arranged to direct refrigerant from the source of supply first along the edge portions of the plurality of shelves and then through the remainder of the plate members.

15. In a cooling unit for a refrigerating apparatus, the combination of a plurality of horizontally disposed refrigerant conveying ducts connected in series with a source of refrigerant supply, a certain of said plurality of ducts being arranged in two spaced apart generally vertical formations, a shelf supported horizontally between the two vertical formations of refrigerant ducts and having its edge portions in intimate thermal contact with certain of said ducts, and means for directing refrigerant from the source of supply first through ducts adjacent to and contacting an edge of said shelf and thence through certain other of said ducts in the generally vertical formations.

16. In a cooling unit for refrigerating apparatus, the combination of a plurality of vertically disposed and horizontally extending refrigerant conveying ducts, certain of said ducts having portions of a special contour for directly supporting a shelf thereon, and a shelf having an edge provided with oppositely directed flanges formed to fit said special contour for engaging said portions of said ducts to provide good thermal contact between the shelf and the duct.

17. An evaporator for refrigerating apparatus comprising, sheet metal portions cooperating with one another to provide a refrigerant passage therebetween, said cooperating sheet metal portions forming an impervious upright wall of a sharp freezing zone and being exposed to air adapted to flow over said evaporator for cooling said air, a refrigerated shelf disposed within said sharp freezing zone for supporting a receptacle therein, said shelf being formed of material separate from and independent of the sheet metal portions of the air cooling portion of the evaporator to permit a substantial difference in temperature of said air cooling portion of the evaporator relative to the temperature of said shelf, means for supplying volatile refrigerant to said shelf, and means for conducting the volatile refrigerant from the shelf into direct contact with the surface of the air cooling portion of the evaporator.

18. An evaporator for refrigerating apparatus comprising, sheet metal portions cooperating with one another to provide a refrigerant passage therebetween, said cooperating sheet metal portions forming an impervious upright wall of a sharp freezing zone and being exposed to air adapted to flow over said evaporator for cooling said air, sheet metal portions cooperating with one another to provide a refrigerant conduit therebetween disposed within said sharp freezing zone for supporting a receptacle therein, the sheet metal portions of said shelf being separate from and independent of the sheet metal portions of the air cooling portion of the evaporator to permit a substantial difference in temperature of said air cooling portion of the evaporator relative to the temperature of said shelf, means for supplying volatile refrigerant to the conduit in said shelf, and means for conducting the volatile refrigerant from said conduit in the shelf into direct contact with the surface of the air cooling portion of the evaporator.

19. An evaporator for refrigerating apparatus comprising, a plurality of impervious upright walls spaced from one another to provide a freezing chamber, each of said walls including superimposed sheet metal portions secured together at certain points and having certain other points spaced apart to form a refrigerant passage therebetween, said walls providing an air cooling portion for cooling air adapted to flow over said evaporator, a refrigerated shelf disposed within said freezing chamber for supporting a receptacle therein and for dividing the chamber into a plurality of sharp freezing compartments, said shelf being formed of material separate from and independent of the sheet metal portions of the air cooling portion of the evaporator to permit

a substantial difference in temperature of said air cooling portion of the evaporator relative to the temperature of said shelf, means for supplying volatile refrigerant to said shelf, and means for conducting the volatile refrigerant from the shelf into direct contact with the surface of the air cooling portion of the evaporator.

20. An evaporator for refrigerating apparatus comprising, a plurality of impervious upright walls spaced from one another to provide a freezing chamber, each of said walls including superimposed sheet metal portions secured together at certain points and having certain other points spaced apart to form a refrigerant passage therebetween, said walls providing an air cooling portion for cooling air adapted to flow over said evaporator, sheet metal portions cooperating with one another to provide a refrigerant conduit therebetween disposed within said freezing chamber for supporting a receptacle therein and for dividing said freezing chamber into a plurality of sharp freezing compartments, the sheet metal portions of said shelf being separate from and independent of the sheet metal portions of the air cooling portion of the evaporator to permit a substantial difference in temperature of said air cooling portion of the evaporator relative to the temperature of said shelf, means for supplying volatile refrigerant to the conduit in said shelf, and means for conducting the volatile refrigerant from said conduit in said shelf into direct contact with the surface of the air cooling portion of the evaporator.

21. An evaporator for refrigerating apparatus comprising, sheet metal portions cooperating with one another to provide a refrigerant passage therebetween, said cooperating sheet metal portions forming an impervious upright wall of a freezing zone and being exposed to air adapted to flow over said evaporator for cooling said air, a plurality of refrigerated shelves disposed within said freezing zone for supporting receptacles therein and for dividing said freezing zone into a plurality of sharp freezing compartments, each of said plurality of shelves being formed of material separate from and independent of the sheet metal portions of the air cooling portion of the evaporator to permit a substantial difference in temperature of said air cooling portion of the evaporator relative to the temperature of said plurality of shelves, means for supplying volatile refrigerant to one of said plurality of shelves, means for conducting the volatile refrigerant from said one of said shelves to another of said plurality of shelves, and means for conducting the volatile refrigerant from said another of said shelves into direct contact with the surface of the air cooling portion of the evaporator.

22. An evaporator for refrigerating apparatus comprising, a plurality of impervious upright walls spaced from one another to provide a freezing chamber, each of said walls including superimposed sheet metal portions secured together at certain points and having certain other points spaced apart to form a refrigerant passage therebetween, said walls providing an air cooling portion for cooling air adapted to flow over said evaporator, a plurality of refrigerated shelves disposed within said freezing chamber for supporting receptacles therein and for dividing the chamber into a plurality of sharp freezing compartments, each of said plurality of refrigerated shelves being formed of material separate from and independent of the sheet metal portions of the air cooling portion of the evaporator to permit a substantial difference in temperature of said shelves relative to the air cooling portion of the evaporator, means for supplying volatile refrigerant to one of said plurality of shelves, means for conducting the volatile refrigerant from said one of said shelves to another of said plurality of shelves, and means for conducting the volatile refrigerant from said another of said shelves into direct contact with the surface of the air cooling portion of the evaporator.

23. A refrigerating apparatus comprising in combination, a cabinet having an insulated food storage compartment formed therein, a brineless evaporator of the direct expansion type disposed within said food compartment, said evaporator including spaced apart sheet metal portions providing impervious upright walls of a chamber within said food compartment, said walls being in intimate thermal association with the interior of said chamber and with the air within said food storage compartment and providing cooling surfaces for cooling air adapted to flow over said evaporator, a plurality of superimposed refrigerated shelves within said chamber providing a plurality of freezing zones therein adapted to receive and support receptacles, each of said shelves being formed of material separate from and independent of the sheet metal portions of the air cooling portion of the evaporator to permit a substantial difference in the temperature of said air cooling portion of the evaporator relative to the temperature of said shelves, means for supplying refrigerant to one of said plurality of shelves, and means for conducting refrigerant from said one of said shelves directly to another of said plurality thereof.

24. An evaporator for refrigerating apparatus comprising, sheet metal portions cooperating with one another to provide a refrigerant passage therebetween, said cooperating sheet metal portions forming an impervious upright wall of a sharp freezing zone and being exposed to air adapted to flow over said evaporator for cooling said air, a refrigerated shelf within said sharp freezing zone for supporting a receptacle therein and for dividing said zone into a plurality of zones, means for conveying volatile refrigerant from a source of supply directly to said shelf, and means for conducting the volatile refrigerant from the shelf into direct contact with the surface of the air cooling portion of the evaporator.

25. An evaporator for refrigerating apparatus comprising, sheet metal portions having certain parts thereof secured together and certain other parts thereof spaced apart to provide a refrigerant passage therebetween, said sheet metal portions forming an impervious upright wall exposed to air adapted to flow over said evaporator for cooling said air, a refrigerated shelf extending laterally from said upright air cooling wall of said evaporator and adapted to receive and support a receptacle thereon, said shelf comprising sheet metal portions having certain parts thereof secured together and certain other parts thereof spaced apart to provide a closed serpentine path of flow for refrigerant therethrough, means for conveying volatile refrigerant from a source of supply directly to said closed serpentine refrigerant path of flow in said shelf, and means for conducting the volatile refrigerant from the closed serpentine path of flow in said shelf into direct contact with the surface of the upright air cooling wall of the evaporator.

26. An evaporator comprising a double wall in-

cluding sheet metal portions having certain parts thereof secured together and having certain other parts thereof spaced apart to provide a refrigerant passage therebetween, a second double wall including sheet metal portions having certain parts thereof secured together and having certain other parts thereof spaced apart to provide a refrigerant passage therebetween, said double walls being vertically disposed in horizontal spaced apart relation, said refrigerant passage in each of said double walls comprising a plurality of vertically disposed substantially parallel horizontally extending portions connected together by bent conduit portions, certain horizontally extending portions of said refrigerant passage in one wall being disposed in substantially the same horizontal plane as certain horizontally extending portions of said refrigerant passage in the other wall of said evaporator, and said opposed horizontally extending portions of said refrigerant passages being arranged to support a shelf for the reception of a receptacle adapted to contain a substance to be congealed or frozen.

27. A cooling element for household refrigerating purposes and the like in which a freezing temperature is desired for quickly congealing or freezing a substance and in which a higher temperature is desired for cooling a food storage chamber comprising in combination, superimposed sheet metal portions having certain parts thereof spaced apart and certain other parts thereof secured together to provide a passage or passages therebetween and providing a refrigerated wall member arranged to form a wall of a freezing compartment within the food storage chamber, a refrigerated shelf member supported within said freezing compartment and arranged with respect to said wall member as to prevent the temperature of one of said members from substantially affecting the temperature of the other of said members, said shelf member being adapted to support a receptacle for causing the contacts of the receptacle to be congealed or frozen, and means for conducting a volatile refrigerant to said freezing shelf member and into direct contact with the cooling surface of said refrigerated wall member.

28. A cooling element for household refrigerating purposes and the like in which a freezing temperature is desired for quickly congealing or freezing a substance and in which a higher temperature is desired for cooling a food storage chamber comprising in combination, superimposed sheet metal portions having certain parts thereof spaced apart and certain other parts thereof secured together to provide a passage or passages therebetween and providing a refrigerated wall member arranged to form a wall of a freezing compartment within the food storage chamber, superimposed sheet metal portions having certain parts thereof spaced apart and certain other parts thereof secured together to provide a passage or passages therebetween and forming a refrigerated shelf member supported within said freezing compartment and arranged with respect to said wall member as to prevent the temperature of one of said members from substantially affecting the temperature of the other of said members, said shelf member being adapted to support a receptacle for causing the contents of the receptacle to be congealed or frozen, means for conveying a volatile refrigerant directly to said passage or passages in said freezing shelf member, and means for conducting the volatile refrigerant from the shelf member into direct contact with the cooling surface of said refrigerated wall member.

29. A cooling element for household refrigerating purposes and the like in which a freezing temperature is desired for quickly congealing or freezing a substance and in which a higher temperature is desired for cooling a food storage chamber comprising in combination, superimposed sheet metal portions having certain parts thereof secured together and certain other parts thereof spaced apart to form a passage or passages therebetween and providing a refrigerated air cooling surface arranged to form a wall of a freezing compartment within the food storage chamber, a refrigerated shelf supported within said freezing compartment and arranged with respect to said air cooling wall surface as to prevent the increase in temperature of said refrigerated air cooling wall surface while defrosting same from substantially affecting the temperature of said shelf, said shelf being adapted to support a receptacle thereon for causing the contents of the receptacle to be congealed or frozen, and means for conducting a volatile refrigerant to said freezing shelf and into direct contact with the cooling surface of said refrigerated air cooling wall.

30. A cooling element for household refrigerating purposes and the like in which a freezing temperature is desired for quickly congealing or freezing a substance and in which a higher temperature is desired for cooling a food storage chamber comprising in combination, superimposed sheet metal portions having certain parts thereof secured together and certain other parts thereof spaced apart to form a passage or passages therebetween and providing a refrigerated air cooling surface arranged to form a wall of a freezing compartment within the food storage chamber, superimposed sheet metal portions having certain parts thereof secured together and certain other parts thereof spaced apart to form a passage therebetween and providing a refrigerated shelf supported within said freezing compartment, said refrigerated shelf being arranged with respect to said air cooling wall surface as to prevent an increase in temperature of said refrigerated air cooling wall surface while defrosting same from substantially affecting the temperature of said shelf, said shelf being adapted to support a receptacle thereon for causing the contents of the receptacle to be congealed or frozen, means for conveying a volatile refrigerant directly to said passage in said freezing shelf, and means for conducting the volatile refrigerant from the shelf into direct contact with the cooling surface of said refrigerated air cooling wall.

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