

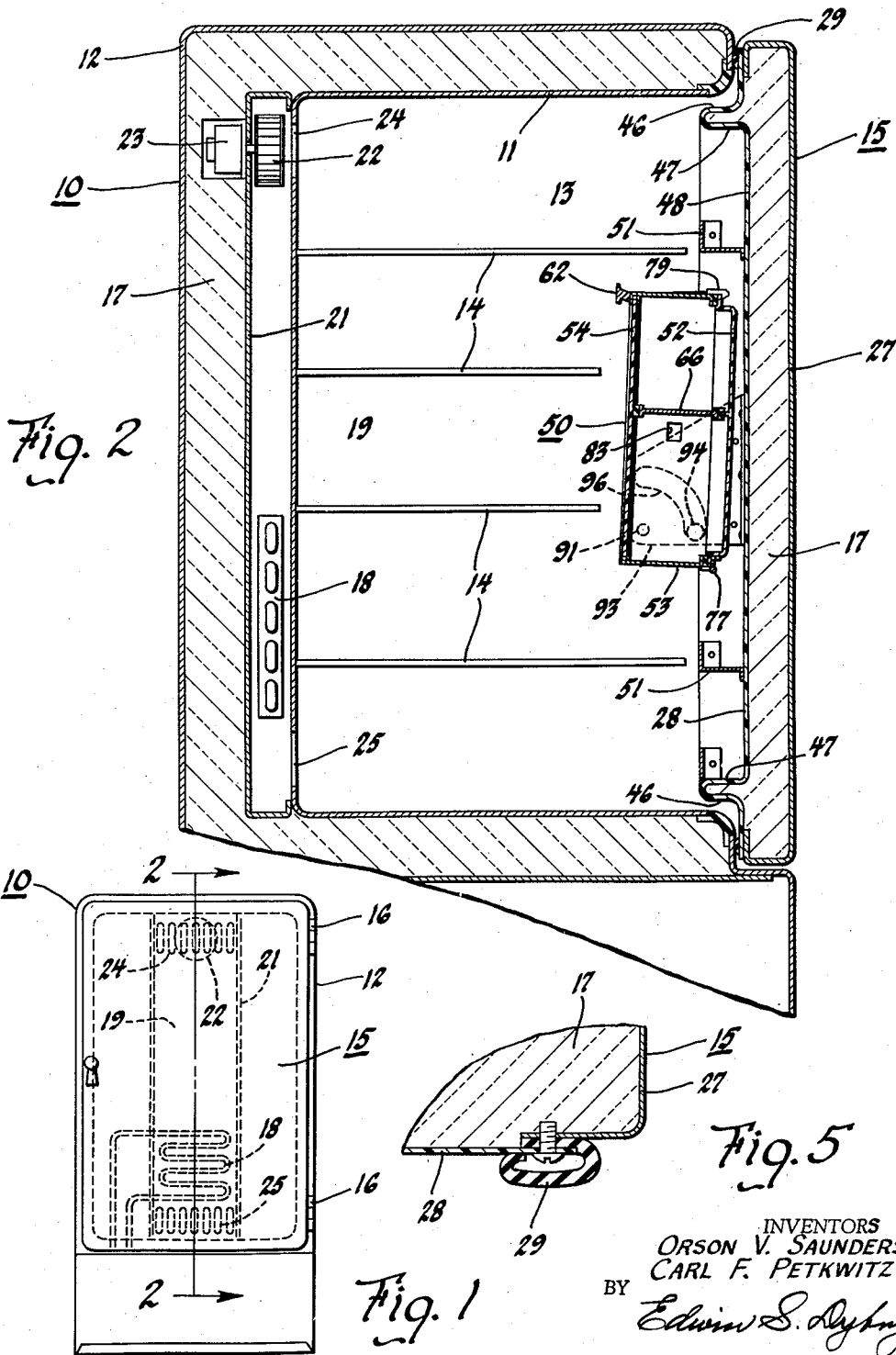
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O. V. SAUNDERS ET AL  
REFRIGERATING APPARATUS

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3 Sheets--Sheet 1



INVENTORS  
ORSON V. SAUNDERS  
CARL F. PETKWITZ  
BY  
*Edwin S. Dykstra*  
THEIR ATTORNEY

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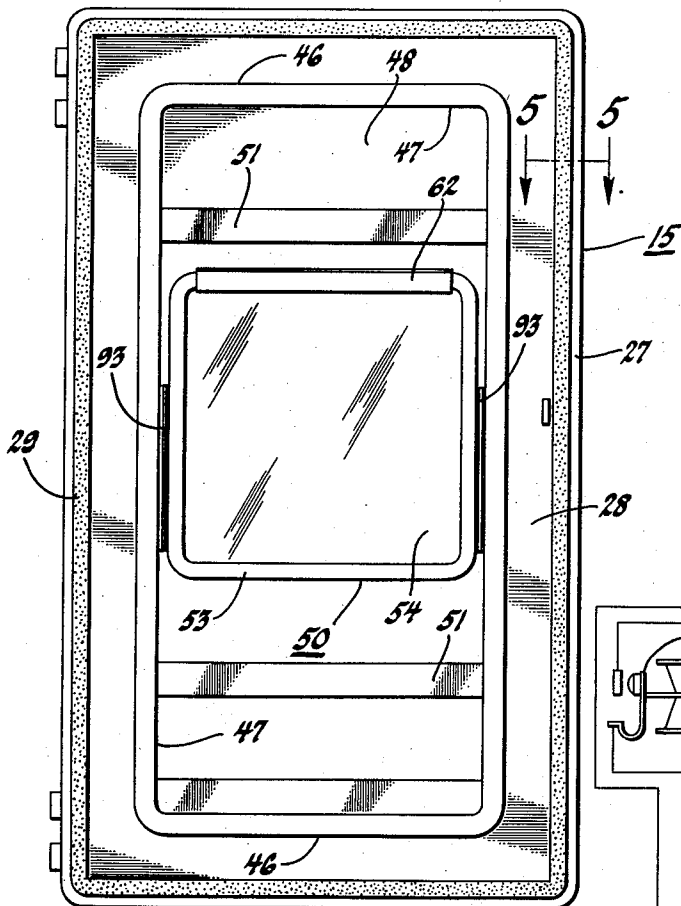


Fig. 3

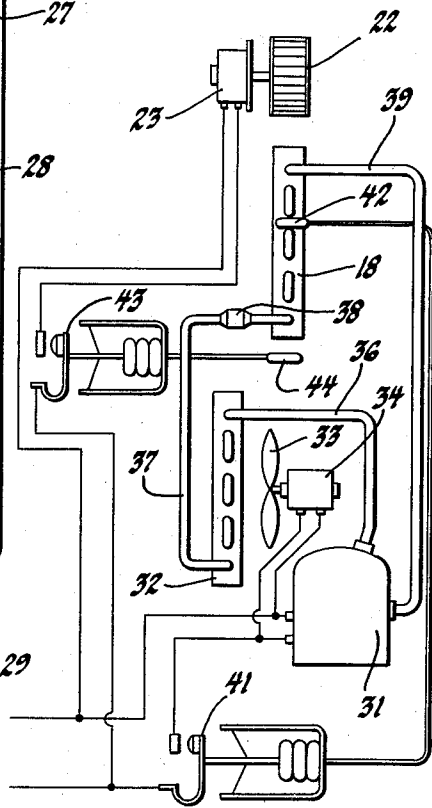


Fig. 10

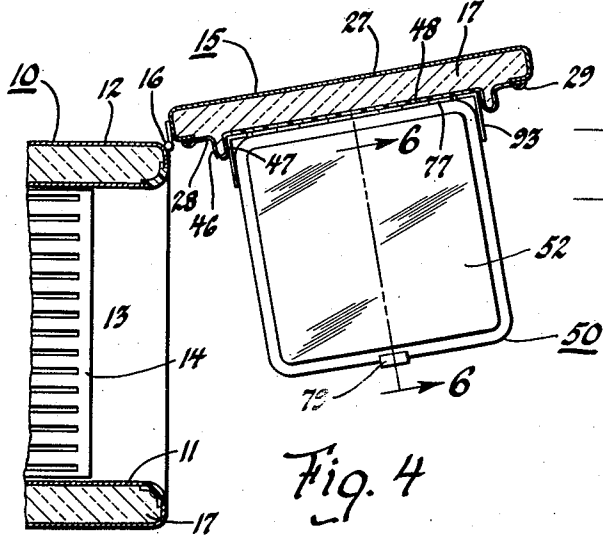


Fig. 4

INVENTORS  
ORSON V. SAUNDERS  
CARL F. PETKWITZ  
BY  
*Edwin S. Rydberg*  
THEIR ATTORNEY

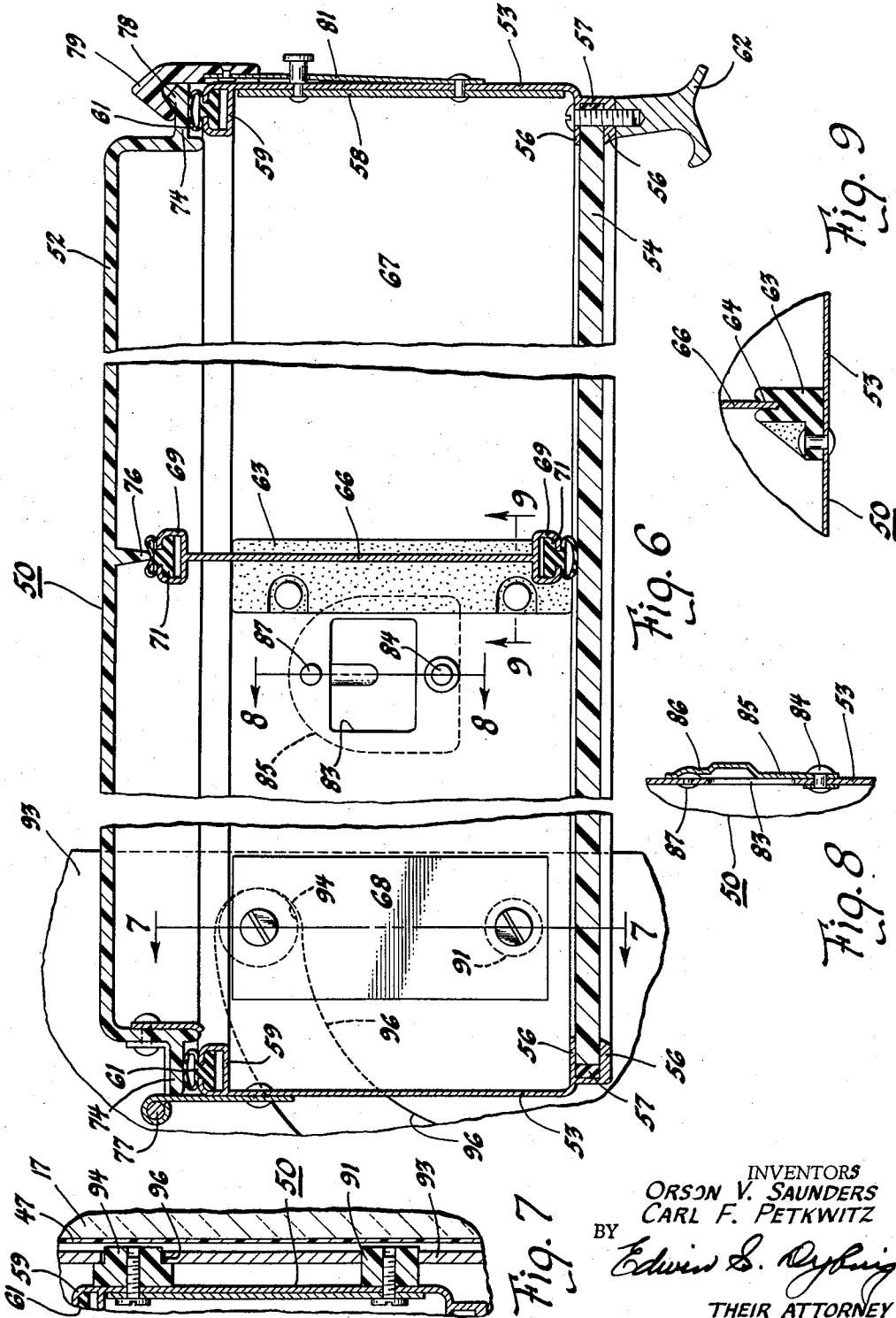
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INVENTORS  
ORSON V. SAUNDERS  
CARL F. PETKWITZ  
BY  
*Edwin S. Ryberg*  
THEIR ATTORNEY

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2,894,378

**REFRIGERATING APPARATUS**

**Orson V. Saunders and Carl F. Petkowitz, Dayton, Ohio,**  
**assignors to General Motors Corporation, Detroit,**  
**Mich, a corporation of Delaware**

**Application May 17, 1957, Serial No. 659,967**

**4 Claims. (Cl. 62—337)**

This invention relates to refrigeration and particularly to the construction and arrangement of a hydrator receptacle in a household refrigerator cabinet.

We are aware of the fact that hydrator receptacles for the storage of fresh vegetables have been previously located in and exposed to the low temperature air in a food storage chamber of a refrigerator cabinet. Such hydrator receptacles substantially isolate vegetables from the interior of a food storage chamber while being cooled therein and are usually provided with a loose fitting cover or fixed openings in walls thereof permitting a restricted or limited ventilation of the receptacle to the interior of the food chamber. This has been the general practice in refrigerators wherein air is moved by convection currents throughout a food storage chamber thereof. However with the advent of refrigerators wherein air is chilled by an evaporator of a refrigerating system and propelled or forced to circulate within a food storage chamber such is not satisfactory especially during variable climatic conditions ambient to a refrigerator cabinet. For example an installation of a refrigerator in a dry climate or zone the predetermined or fixed opening in the hydrator receptacle located in the refrigerator causes too much drying out of vegetables stored in the receptacle and they lose their natural fresh crisp and brittle character and become dry and tough irrespective of the number of times a day the cabinet door is opened. In other installations of a refrigerator cabinet in a damp climate or zone the predetermined or fixed opening in a hydrator receptacle within the cabinet causes a too moist condition therein and the vegetables soon wilt and spoil. It has been found that to properly preserve vegetables, in a hydrator receptacle within a refrigerator cabinet under various atmospheric conditions in a certain region or in widely scattered regions throughout this country the receptacle should be sealed so as not to permit any forced circulating air in a food storage chamber to enter the receptacle and to provide an adjustable vent on the receptacle whereby to regulate or change at will ventilation of the receptacle to the interior of a food storage chamber in the refrigerator to meet the various prevailing atmospheric conditions. Furthermore and even under a substantially constant atmospheric condition ambient to a refrigerator cabinet it has been found that one user of a refrigerator may desire a different air condition in a hydrator receptacle than that of a neighbor user. In other words the one refrigerator user may prefer to have a rather damp condition in a hydrator receptacle whereas the neighbor user may prefer a drier condition in at least a part of the hydrator receptacle. We therefore contemplate the construction of a hydrator receptacle for a refrigerator cabinet which will render the receptacle universal in use regardless of the region in which the refrigerator cabinet is installed and in accordance with different desires of neighbor users.

It is an object of our invention to provide a hydrator receptacle for use in a refrigerator cabinet which is normally sealed against entrance thereinto of air circulating

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in the food storage chamber of the cabinet with adjustable vent means carried by the receptacle so as to regulate venting of the interior thereof to air in the chamber.

Another object of our invention is to pivotally mount a hydrator receptacle of the type described in the preceding object on the inner side of a food storage compartment door of a refrigerator whereby it is swingable therewith and relative thereto for providing access to the interior of the receptacle and to provide the receptacle with means for permitting viewing of the contents thereof both when it is swung with the door and while it is swung with respect thereto.

A further object of our invention is to provide a partition in a hydrator receptacle for a refrigerator cabinet which divides the interior thereof into compartments and to attach a resilient gasket to the top of the partition and to the top of walls of the receptacle whereby the gasket extends continuously around the compartments and is engageable by the receptacle cover member for normally sealing the compartments and isolating them from communication with one another.

In carrying out the foregoing object it is a still further and more specific object of our invention to provide a normally sealed compartmented receptacle for a household refrigerator with adjustable vent means thereon associated with one of the isolated hydrator compartments for regulating ventilation thereof to air circulated in a food storage chamber of the refrigerator while another of the hydrator compartments is closed by the receptacle cover member so as to maintain it sealed whereby different air conditions in the isolated compartments can be had.

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:

Figure 1 is a front view of a refrigerator having our invention embodied therein;

Figure 2 is an enlarged fragmentary vertical sectional view of the refrigerator shown in Figure 1 and is taken on the line 2—2 thereof;

Figure 3 is a view of a part of the refrigerator door looking toward the inner side thereof and showing our improved hydrator receptacle mounted thereon;

Figure 4 is a fragmentary horizontal sectional view through the refrigerator with the food storage chamber door thereof in open position and showing our hydrator receptacle moved into a horizontal plane relative to the door.

Figure 5 is an enlarged fragmentary sectional view taken on the line 5—5 of Figure 3 showing the mounting of a gasket on the food chamber door;

Figure 6 is a fragmentary enlarged broken sectional view taken on the line 6—6 of Figure 4 showing the sealing of the hydrator receptacle and an adjustable vent therefor;

Figure 7 is a fragmentary sectional view taken on the line 7—7 of Figure 6 showing the pivotal mounting of the hydrator assembly;

Figure 8 is a fragmentary sectional view taken on the line 8—8 of Figure 6 showing the valved vent for the receptacle;

Figure 9 is a fragmentary sectional view taken on the line 9—9 of Figure 6 showing a bracket for mounting a partition in the hydrator receptacle; and

Figure 10 is a diagrammatic illustration of a closed refrigerating system associated with the refrigerator disclosed in Figure 1.

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 Referring to the drawings, wherein our invention is illustrated, we show in Figure 1 thereof a refrigerator cabinet 10 of the household type having inner and outer metal shells or panels 11 and 12 respectively (see Figures 2 and 4) defining or forming walls of a food storage chamber 13. A plurality of vertically spaced apart food supporting shelves 14 are mounted in chamber 13 in any suitable or conventional manner. Chamber 13 is provided with an open front which is closed by an insulated door structure 15 pivotally mounted on cabinet 10 by hinges 16 for horizontal swinging movement relative thereto. Any suitable or desirable insulating material 17 may be disposed between the shells 11 and 12 to thermally insulate the food chamber 13. The outer cabinet shell 12 is extended downwardly beyond chamber 13 to provide walls of a machine compartment, in which a refrigerant translating device or condensing unit portion of a closed refrigerating system is located, as is conventional in the art. An evaporator or cooling element 18 of the refrigerating system is mounted in a flue 19 in the back wall of cabinet 10 inset in the insulation 17 and formed by a substantially U-shaped in cross section length of metal 21 cooperating with the inner metal shell or liner 11 of chamber 13. A fan or blower 22 is also located in the flue 19 and is driven by an electric motor 23 drivingly connected thereto. The evaporator 18 may be of any desired or conventional construction and cools air circulated thereover by blower 22 which blower draws air from chamber 13 into flue 19, by way of the openings 24 in liner 11, and forces the cooled air into and throughout chamber 13 by way of the openings 25 in liner 11. A forced circulation of air within chamber 13 is thus created and the blower 22 may be operated continuously but is preferably cyclically operated in response to temperature conditions in the food storage chamber as hereinafter described. Door structure 15 includes an outer metal pan 27 and an inner molded plastic panel 28 having insulation, such as the insulated material 17, disposed therebetween. The door pan 27 and panel 28 are secured together at their edges in any suitable manner well-known in the art and a gasket 29 located therebetween (see Figure 5) and extending around the door engages the front of cabinet 10 to normally close chamber 13 about its front access opening when door 15 is latched shut. Inner door panel 28 is shaped to provide a recess in the inner face of door 15 for a purpose to be hereinafter described.

The closed refrigerating system associated with cabinet 10 is diagrammatically illustrated in Figure 10 of the drawings and includes, in addition to evaporator 18, a refrigerant translating device comprising a motor-compressor 31, a condenser 32 and a fan 33 driven by an electric motor 34 for circulating air over the condenser 32. Pipes or conduits connect the various elements of the refrigerating system in closed circuit relation. For example, refrigerant compressed in the motor-compressor 31 is directed into condenser 32, by a conduit 36, wherein the compressed refrigerant is cooled, with air circulated thereover by fan 33, and condensed or liquefied. A pipe 37 leading from condenser 32 directs liquid refrigerant into the evaporator 18, through a restrictor 38, whereafter the liquid refrigerant expands or evaporates upon absorbing heat from the circulated air in chamber 13 which is given up to the air by foods stored in the chamber. The evaporated or gaseous refrigerant flows from evaporator 18 back to the motor-compressor 31 through a conduit 39 where it is recompressed, recondensed and recirculated throughout the closed system. A thermally operated electric switch 41, having a thermostat bulb 42 in contact with evaporator 18 for actuating the switch, is provided for controlling operation of the motor-compressor unit 31 and fan motor 34 in response to the temperature of the evaporator. Switch 41 is interposed in suitable electric power lines as is conventional in the art. As before stated the blower

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 22 may be cyclically operated and a thermally actuated electric switch 43, connected to the power lines, is provided for this purpose. Switch 43 has a thermostat bulb 44 connected thereto for actuating same and this bulb is located in flue 19 below evaporator 18. The bulb 44 senses a rise in temperature of the air in chamber 13 of cabinet 10 and actuates switch 43 to energize motor 23 which operates the blower 22 to force air over evaporator 18 where it is cooled and circulated throughout chamber 13 to properly preserve food products stored therein.

The temperature of evaporator 18 is normally or is at times below 32° F. and it, especially with forced circulation of air thereover and throughout the interior of chamber 13, tends to withdraw moisture from air in the chamber and deposits such moisture thereon. This dries the air and air coming into contact with exposed or uncovered foods in chamber 13 will have a tendency to remove moisture from the foods. Consequently left-over foods from a dinner table and stored in the main food storage chamber 13 are usually kept covered. Moisture should not be rapidly withdrawn from fresh green vegetables and the like if they are to be properly preserved over long periods of time. Thus it has been customary to provide household refrigerator cabinets, wherein convection air currents are created, with a special permanently ventilated receptacle commonly referred to as a hydrator for the storage of fresh green vegetables. Such a permanently vented hydrator receptacle is not entirely satisfactory when used in refrigerators wherein a forced circulation of air is established in the food storage chamber thereof because this forced circulation too rapidly dries out the interior of the receptacle. It is according to our invention desired to provide a hydrator receptacle in a refrigerator cabinet which is normally sealed and may be adjustably vented. Such a sealed hydrator is on the one hand capable of storing green vegetables in a forced cold air circulation without being dried and the adjustable venting or a restricted flow of refrigerated air into and out of the hydrator receptacle on the other hand retards the growth of molds, yeast or bacteria therein and maintains vegetables stored in the receptacle fresh and crisp over long periods of time. As will be noted hereinafter we prefer the special hydrator receptacle to be a compartmented one wherein the compartments are both sealed and isolated from one another and only one compartment of which is to be adjustably ventilated.

In the present disclosure the inner molded plastic panel 28 of food chamber door 15 is flared outwardly from edge portions thereof as at 46 and reversely turned inwardly as at 47 so as to provide a recess in the inner face of door 15 lined by a wall portion 48 of the inner door panel. A hydrator receptacle generally represented by the reference numeral 50, constructed as hereinafter more specifically described, is pivotally mounted on door 15 and arranged so that its interior is made readily accessible. The reversely turned portion 47 of door panel 28 at the bottom of door 15 provides a food supporting shelf on the inner face of the door and other shelves, such as is indicated at 51, may be mounted in the door recess. The hydrator assembly or receptacle 50 comprises wall forming members one of which is a clear or transparent molded plastic cover member 52 while others include a sheet metal frame 53 and a clear or transparent window 54. Edges of window 54 are located in a channel formed by a U-shaped extension 56 along one edge of the metal frame 53 (see Figure 6). A soft sealing strip 57 bounds the edges of window 54 and is compressed in the channel by bringing ends of the frame 53 into registration with one another about the window and securing these frame ends together in any suitable or desirable manner such as by riveting a gusset plate 58, overlapping said ends, to frame 53. The other edge of metal frame 53 is formed into a substantially C-shape as at 59 (see Figure 6) and provides a channel around the

frame in which a resilient rubber-like hollow beaded gasket 61 is anchored. This provides a box-like structure having side walls and a front or bottom, the window 54, to which a bar-like handle 62 is secured for a purpose to be hereinafter described. A rubber or molded plastic bracket 63, channeled as at 64, (see Figure 9), is secured in any desired manner to each of opposed walls of metal frame 53 of receptacle 50 about midway between other opposed walls thereof. A metal partition 66 has its ends tightly but removably slip-fitted into channel 64 of the brackets 63 and this partition serves to divide the interior of box-like receptacle 50 into compartments 67 and 68 for storing certain types or characters of vegetables or the like in segregated form. In order to provide a seal between the compartments 67 and 68 the longitudinal edges of partition 66 are formed into a substantially C-shape as at 69 (see Figure 6) whereby a channel is established along said edges of the partition. A resilient strip rubber-like hollow beaded gasket 71 is anchored in each of the C-shaped channels 69 of partition 66 with its ends abutting the gasket 61 around walls of the receptacle 50. The one gasket 71 on partition 66 is tightly pressed against window 54 of the receptacle 50 and the other gasket 71, as well as gasket 61, is adapted to be engaged by the receptacle cover member for the access opening of the receptacle. The cover or closure for receptacle 50 comprises the pan-like molded plastic member 52 having its sides outwardly flanged as at 74 and provided with an integral rib 76 depending from its under surface and extending thereacross. Cover member 52 is pivotally mounted upon receptacle 50 by a piano-like hinge means 77 so as to be swingable relative thereto for providing access to the interior thereof and to the compartments 67 and 68 therein. Cover member 52 has a raised lip portion 78, on flange 74, centrally of the sides thereof opposite its hinged side (see Figure 6) and a latch element 79, mounted on a spring metal strip 81 secured to receptacle 50 in any suitable manner, normally fits over lip portion 78 to maintain the receptacle closed. When the receptacle 50 is closed by latch element 79 rib 76 on cover member 52 registers with top gasket 71 on partition 66 and the flanges 74 on cover member 52 register with the gasket 61 to engage and compress these gaskets for sealing the interior of the hydrator receptacle to normally prevent air circulated in the food storage chamber 13 from entering the receptacle. The gaskets 61 and 71 extend substantially continuously around receptacle 50 and around the compartments 67 and 68 and such compression thereof by latch 79 in addition to holding cover member 52 in sealing engagement with the gaskets also isolates the compartments 67 and 68 in the receptacle from one another to prevent air flow therebetween. Thus latch element 79 forms a means for holding the cover member 52 in tight sealing engagement with the gaskets 61 and 71.

In accordance with our invention it is desired to adjustably vent the interior of the sealed hydrator receptacle or at least one of the compartments 67 or 68 therein to cool air circulated in food chamber 13 by the blower 22. Thus an aperture 83 is provided in frame 53 of receptacle 50 (see Figure 6) on each of two opposed sides thereof which permits communication of air in chamber 13 with the interior of the sealed receptacle and particularly with the interior of the one compartment 68. In order to adjust ventilation of the interior of receptacle 50 or compartment 68 to air in food chamber 13 of refrigerator cabinet 10 we pivotally mount, as by a rivet 84, a valve 85 adjacent each aperture 83 (see Figure 8). These valves 85 each have a dimple 86 pressed therein which fits over the head of a rivet 87 to normally hold the valve in closed position. Valves 85 are free to be manually turned about their pivotal mounting, rivet 84, to uncover the apertures 83 or a portion thereof as is desired and the frictional engage-

ment of dimple 86 with the wall surface of frame 53 will hold the valve in any one of a number of adjusted positions. Opening or uncovering of apertures 83 by the adjustable valve vent means carried by receptacle 50 regulates venting of the interior thereof and particularly compartment 68 to air circulating in food chamber 13 while cover member 52 sealingly closes the access opening of receptacle 50 and the other compartment 67. Thus compartment 68 of hydrator receptacle 52 can be alternatively sealed or vented as desired in order to accomplish the object of our invention.

The hydrator receptacle may be located in any selected position within food storage chamber 13 of refrigerator cabinet 10 but is preferably mounted on the chamber door 15 for vertical swinging movement relative thereto when the door is opened. The receptacle 50 is mounted on door 15, with its cover member 52 unattached thereto, and disposed in substantially parallel relationship with the inner face thereof so that the receptacle is exposed to air circulated in chamber 13 and which air may circulate entirely around the receptacle. Thus we provide a pair of pivot members 91 on receptacle 50 (see Figure 7) each of which fits into a hole in side supporting brackets 93 suitably reinforced within door 15 and also attached to portions 47 and 48 of the door panel 28. Another pair of round members 94, spaced from pivot members 91 and located a slight distance therebelow, are secured to opposite sides of receptacle 50 and are movable in a dead ended curved or arcuate-shaped track slot 96 (see Figures 2 and 7) provided in the opposed supporting brackets 93. One end of the tracks 96 forms stops for vertically supporting the receptacle 50 in a slightly inclined position with respect to the inner face of door 15 so as to prevent the receptacle from swinging downwardly relative to the door when same is moved open and/or closed. The other or upper end of tracks 96 also form stops for supporting the receptacle 50 in a substantially horizontal plane when same is swung out of its vertical position. Receptacle 50 is thereby pivotally mounted on door 15 for vertical swinging movement relative thereto. In order to gain access to the interior of receptacle 50 door 15 of chamber 13 is opened and the bar-like handle 62 is pulled forwardly or outwardly of the inner face of the door. This vertically swings receptacle 50, together with its cover member 52 about the pivot members 91, downwardly whereupon the members 94 move upwardly against the upper dead end of track slot 96 to support the receptacle in a substantially horizontal position at the front of food chamber 13. The access opening in the normal back of receptacle 50 is now at the top thereof and access to the interior of the hydrator receptacle and to compartments 67 and 68 is obtained by releasing latch 79 from lip portion 78 on cover member or lid 52 and raising the cover member about its hinged mounting. Cover member 52 is repositioned into its substantially vertical relation with the chamber door 15 by reversing the operations just described.

From the foregoing it should be apparent that we have provided an improved hydrator receptacle for use in household refrigerator cabinets wherein there is employed a forced air circulation. By providing for the selective sealing or adjustable venting of the interior of the receptacle or at least one compartment therein while the receptacle is exposed to the forced cold air circulation in the food storage chamber we increase the utility of the receptacle in that various green vegetables may be stored in different zones wherein the air condition therein may be regulated to suit the desires of users of a refrigerator cabinet. For example when the refrigerator cabinet is installed in a region where the atmosphere is dry the receptacle can be left sealed so that the forced air circulation within its main food storage chamber will not dry out green vegetables in the receptacle. Also under normal atmospheric conditions ambient the refrig-

erator cabinet a user thereof can adjust or regulate ventilation of the sealed hydrator receptacle to prevent an over-moist condition therein and to meet different desired storage conditions of green vegetables for preserving them over a long period of time. Specifically the adjustable venting means carried by the receptacle permits regulating the venting of one of the compartments in the receptacle to the circulating air in the food storage chamber of the refrigerator cabinet while the receptacle cover member sealingly closes the other compartment in the receptacle to provide a choice of air conditioning in the compartments. The normal front face of the hydrator receptacle being transparent permits a quick inventory of its contents without swinging same relative to the door and raising its cover member so as to aid a housewife in making up a shopping list.

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, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. In a refrigerator, a cabinet, said cabinet having walls defining a food storage chamber therein, a refrigerating system associated with said cabinet including an evaporator for cooling air in said chamber, a receptacle within said chamber, a partition extending across the interior of said receptacle and dividing same into a first compartment and a second compartment each having walls thereof directly exposed to the cool air in said chamber, said receptacle having an access opening leading to said compartments, a single cover for the opening in said receptacle common to both of said compartments and normally closing them, said cover being movable relative to said receptacle for simultaneously opening said compartments, a resilient gasket extending along said partition and around the walls of said receptacle at the opening therein, latching means clamping said cover closed in compressive engagement with said gasket to prevent air in said chamber from circulating into said receptacle and between said compartments therein, adjustable vent means carried by said receptacle for regulating venting of said first compartment to air in said chamber while said cover closes and seals said second compartment therefrom, and said closed cover also sealing said second compartment against flow thereinto of the ventilating air from said first compartment.

2. In a refrigerator as defined by claim 1 having a blower forcefully circulating the air cooled by the evap-

erator throughout the interior of the chamber and over walls of the receptacle therein.

3. In a refrigerator, a cabinet, a food storage chamber in said cabinet, a refrigerating system associated with said cabinet including a refrigerant evaporator for cooling air in said chamber, a receptacle within said chamber providing a compartment therein, a partition detachably mounted within and extending across said receptacle to divide the interior of said compartment into a first food storing section and a second food storing section each having walls thereof directly exposed to the cool air in said chamber, said receptacle having an access opening leading to said compartment sections, a single cover for the opening in said receptacle common to both of said compartment sections and normally closing them, said cover being movable relative to said receptacle for simultaneously opening the compartment sections, a resilient gasket on and extending along said partition at the opening in said receptacle, another resilient gasket separate from the gasket on said partition and extending around walls of said receptacle at the opening therein, latching means clamping said cover closed in compressive engagement with said gaskets to prevent air in said chamber from circulating into said receptacle and between the food storing sections of the compartment provided thereby, adjustable vent means carried by said receptacle for regulating venting of one of said compartment sections to air in said chamber while said cover closes and seals the other of said compartment sections therefrom, said closed cover also sealing said other compartment section against flow thereinto of the ventilating air from said one compartment section, and said partition being removable from its mounting in said receptacle whereby said adjustable vent means thereafter regulates venting of the entire interior of said closed compartment to air in said chamber.

4. In a refrigerator as defined by claim 2 wherein a blower forcefully circulates air cooled by the evaporator throughout the interior of the chamber and over walls of the receptacle therein.

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