

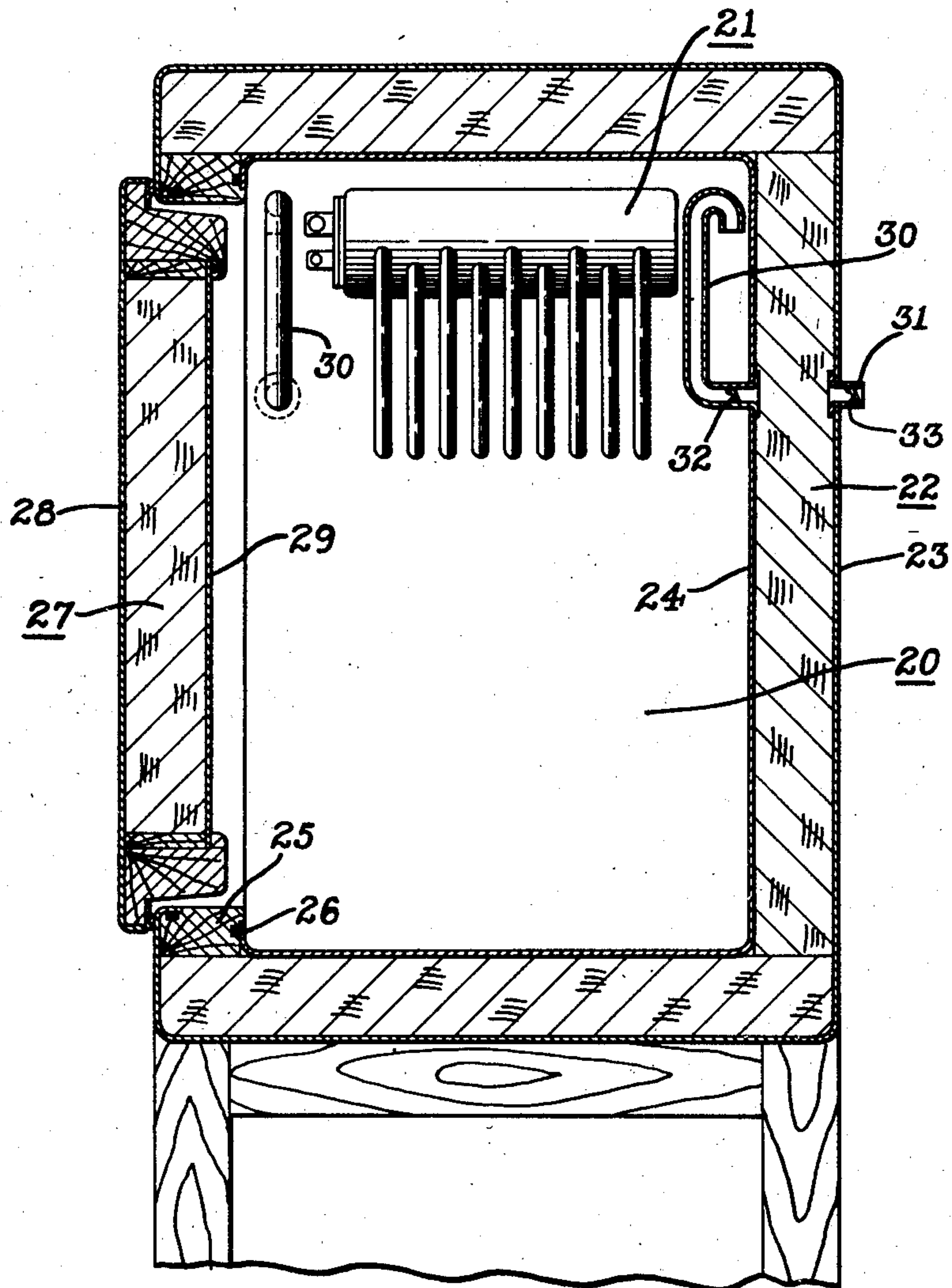
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REFRIGERATING APPARATUS

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REFRIGERATING APPARATUS

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This invention relates to a refrigerator having an insulated wall.

In refrigerators of this character, air entering the insulated wall has condensed moisture on the lining of the refrigerator. This moisture wets the insulation and causes a very insanitary and disagreeable condition. The condensation of moisture is caused by air having a high relative humidity being cooled below the dew point by the relatively cold lining of the refrigerator.

With the varying temperatures outside, and possibly inside the refrigerator, the air within the insulating wall is caused to expand and contract periodically. This, in turn, periodically renews the high relative humidity of the air within the insulating wall, since the periodic expansion and contraction causes a fresh supply of air to enter the insulating wall, which fresh supply of air generally has a relatively high humidity.

I have overcome these objections by causing the periodic expansion and contraction of the air within the insulating wall to withdraw air into the wall from a source of relatively dry air, and to discharge the air from within the insulating wall to any convenient place which does not pollute the interior of the refrigerator, such as the outside atmosphere. The periodic expansion and contraction of air, with the ordinarily attendant influx and discharge of air, I have preferred to call a breathing action. This breathing action, according to my invention, introduces relatively dry air into the insulating wall and prevents the introduction of air from the wall into the interior compartment of the refrigerator.

An object of this invention is to prevent the condensation of atmospheric moisture within an insulating wall of the refrigerator.

Another object of this invention is to permit free flow of air into and out of the insulating wall and at the same time prevent condensation of atmospheric moisture within the insulating wall.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein a

preferred form of the present embodiment is clearly shown.

In the drawing:

The figure is a vertical cross sectional view of a refrigerator embodying my invention.

A refrigerator, embodying my invention, generally designated as 20, has refrigerating means, such as an iceless cooling unit, generally designated as 21 which contains refrigerant and which does not discharge said refrigerant into the refrigerated space. The refrigerator may be provided with an insulating wall 22 having a shell comprising an outside cover 23, an inside lining 24 and a stationary insulating material, such as cork or the like. The shell of the insulating wall may be connected to the frame work 25 and may have means for hermetically sealing the wall, such as a gasket at 26. The door also may comprise an insulating wall 27 provided with an outside cover 28 and an inside lining 29 and this door may also be a hermetically sealed insulated wall.

In order to compensate for the expansion of air within the insulating walls of the refrigerator, I provide breathing means which may comprise a passage or tube structure 30 leading from a source of dehydrated air independent of the refrigerant in the cooling unit 21, as, for instance, the inside of the refrigerator and another passage or tube structure 31 leading from the inside of the wall to the outside of the refrigerator. There may be a plurality of these passages and the door also may be provided with one or more of these passages. The passages may be provided with check valves 32 and 33 which cause the insulating wall to withdraw air only from the source of dehydrated air during the periods when the air within the wall is contracting. The check valves also permit the air from within the wall to escape outside of the refrigerator during such periods when the air within the wall is expanding. This is the operation during normal conditions as when the door 28 is closed.

It is obvious that, since the air within the refrigerator ordinarily is colder than the air

within the insulating wall, air withdrawn from the interior of the refrigerator will not condense moisture within the insulated wall because the relative humidity of the air within the refrigerator has been reduced by the cooling unit below the dew point of air within the insulating wall.

Ordinarily it is desirable to prevent air from within the insulating wall from entering the interior of the refrigerator, because of sanitary reasons. The air within the insulated wall is generally undesirable in the refrigerator because of the odor of the insulation. By the means described herein, it is possible to prevent the fouling of the air within the refrigerator by the air of the insulating wall, since the passages always induce the air outwardly from the inner compartment of the refrigerator to the wall instead of inwardly.

While, in the preferred embodiment, the air from within the insulated walls is discharged outside of the refrigerator, sometimes it may be possible to discharge the air back into the food compartment without causing too objectionable an odor within the refrigerator. In such a case one or more passages may be provided into the insulated wall from the food compartment where the air is dehydrated. It is important to prevent the outside, warm and humid air from entering the insulated wall and to thus prevent rotting of the insulation.

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. A refrigerator having an insulating wall provided with breathing means adapted to inhale from within the refrigerator and to exhale outside the refrigerator by reason of periodic changes in the temperature of said wall and having a cooling element containing refrigerant and permitting said wall to inhale and to exhale independently of the flow of said refrigerant.

2. A refrigerator having an insulating wall provided with a relatively impervious shell, and breathing means adapted to inhale into the wall from within the refrigerator, and to exhale outside the refrigerator by reason of periodic changes in the temperature of said wall and having a cooling element containing refrigerant and permitting said wall to inhale and to exhale independently of the flow of said refrigerant.

3. A refrigerator having an insulating wall provided with breathing means adapted to inhale from within the refrigerator and to exhale outside the refrigerator, comprising a passage connecting the interior of the wall with the interior of the refrigerator, another passage connecting the interior of

the wall with the exterior of the refrigerator and means to cause air to flow in said passages only from the interior of the refrigerator to the interior of the wall and from the interior of the wall to the exterior of the refrigerator, said refrigerator having a cooling element containing refrigerant and permitting said wall to inhale and to exhale independently of said refrigerant.

4. A refrigerator having an insulating wall provided with breathing means adapted to inhale from within the refrigerator and to exhale outside the refrigerator, comprising a passage connecting the interior of the wall with the interior of the refrigerator, another passage connecting the interior of the wall with the exterior of the refrigerator and means to cause air to flow in said passages only from the interior of the refrigerator to the interior of the wall and from the interior of the wall to the exterior of the refrigerator, said last named means including a check valve in one of said passages, said refrigerator having a cooling element containing refrigerant and permitting said wall to inhale and to exhale independently of said refrigerant.

5. A refrigerator having an insulating wall provided with breathing means adapted to inhale from within the refrigerator and to exhale outside the refrigerator, comprising a passage connecting the interior of the wall with the interior of the refrigerator another passage connecting the interior of the wall with the exterior of the refrigerator and means to cause air to flow in said passages only from the interior of the refrigerator to the interior of the wall and from the interior of the wall to the exterior of the refrigerator, said last named means including a check valve in each of said passages, said refrigerator having a cooling element containing refrigerant and permitting said wall to inhale and to exhale independently of said refrigerant.

6. A refrigerator having an insulating wall provided with a relatively impervious shell, and breathing means adapted to inhale into the wall from within the refrigerator, and to exhale outside the refrigerator, comprising a passage connecting the interior of the wall with the interior of the refrigerator, another passage connecting the interior of the wall with the exterior of the refrigerator and means to cause air to flow in said passages only from the interior of the refrigerator to the interior of the wall and from the interior of the wall to the exterior of the refrigerator, said refrigerator having a cooling element containing refrigerant and permitting said wall to inhale and to exhale independently of said refrigerant.

7. A refrigerator having an insulating wall provided with a relatively impervious shell, and breathing means adapted to in-

hale into the wall from within the refrigerator, and to exhale outside the refrigerator, comprising a passage connecting the interior of the wall with the interior of the refrigerator, another passage connecting the interior of the wall with the exterior of the refrigerator and means to cause air to flow in said passages only from the interior of the refrigerator to the interior of the wall and from the interior of the wall to the exterior of the refrigerator, said last named means including a check valve in one of said passages, said refrigerator having a cooling element containing refrigerant and permitting said wall to inhale and to exhale independently of said refrigerant.

8. A refrigerator having an insulating wall provided with a relatively impervious shell, and breathing means adapted to inhale into the wall from within the refrigerator, and to exhale outside the refrigerator, comprising a passage connecting the interior of the wall with the interior of the refrigerator, another passage connecting the interior of the wall with the exterior of the refrigerator and means to cause air to flow in said passages only from the interior of the refrigerator to the interior of the wall and from the interior of the wall to the exterior of the refrigerator, said last named means including a check valve in each of said passages, said refrigerator having a cooling element containing refrigerant and permitting said wall to inhale and to exhale independently of said refrigerant.

9. A refrigerator having an iceless cooling unit containing refrigerant and an insulating wall provided with breathing means adapted to inhale into the wall air independent of said refrigerant and dehydrated by said cooling unit and to exhale outside the refrigerator.

10. A refrigerator having an iceless cooling unit containing refrigerant and an insulating wall provided with a relatively impervious shell and breathing means adapted to inhale into the wall air independent of said refrigerant and dehydrated by said cooling unit and to exhale outside the refrigerator.

11. A refrigerator having an iceless cooling unit containing refrigerant and an insulating wall provided with breathing means adapted to inhale into the wall air independent of said refrigerant and dehydrated by said cooling unit and to exhale outside the refrigerator, comprising a passage connecting the interior of the wall with air dehydrated by said cooling unit, another passage connecting the interior of the wall with the exterior of the refrigerator and means to cause air to flow in said passages only from the source of dehydrated air into the wall and from the wall to the exterior of the refrigerator.

12. A refrigerator having an iceless cooling unit containing refrigerant and an insulating wall provided with breathing means adapted to inhale into the wall air independent of said refrigerant and dehydrated by said cooling unit and to exhale outside the refrigerator, comprising a passage connecting the interior of the wall with air dehydrated by said cooling unit, another passage connecting the interior of the wall with the exterior of the refrigerator and means to cause air to flow in said passages only from the source of dehydrated air into the wall and from the wall to the exterior of the refrigerator, said last named means including a check valve in one of said passages.

13. A refrigerator having an iceless cooling unit containing refrigerant and an insulating wall provided with breathing means adapted to inhale into the wall air independent of said refrigerant and dehydrated by said cooling unit and to exhale outside the refrigerator, comprising a passage connecting the interior of the wall with air dehydrated by said cooling unit, another passage connecting the interior of the wall with the exterior of the refrigerator and means to cause air to flow in said passages only from the source of dehydrated air into the wall and from the wall to the exterior of the refrigerator, said last named means including a check valve in each of said passages.

14. A refrigerator having an iceless cooling unit containing refrigerant and an insulating wall provided with a relatively impervious shell and breathing means adapted to inhale into the wall air independent of said refrigerant and dehydrated by said cooling unit and to exhale outside the refrigerator, comprising a passage connecting the interior of the wall with air dehydrated by said cooling unit, another passage connecting the interior of the wall with the exterior of the refrigerator and means to cause air to flow in said passages only from the source of dehydrated air into the wall and from the wall to the exterior of the refrigerator.

15. A refrigerator having an iceless cooling unit containing refrigerant and an insulating wall provided with a relatively impervious shell and breathing means adapted to inhale into the wall air independent of said refrigerant and dehydrated by said cooling unit and to exhale outside the refrigerator, comprising a passage connecting the interior of the wall with air dehydrated by said cooling unit, another passage connecting the interior of the wall with the exterior of the refrigerator and means to cause air to flow in said passages only from the source of dehydrated air into the wall and from the wall to the exterior of the refrigerator, said last named means including a check valve in one of said passages.

16. A refrigerator having an iceless cooling unit containing refrigerant and an insulating wall provided with a relatively impervious shell and breathing means adapted to inhale into the wall air independent of said refrigerant and dehydrated by said cooling unit and to exhale outside the refrigerator, comprising a passage connecting the interior of the wall with air dehydrated by said cooling unit, another passage connecting the interior of the wall with the exterior of the refrigerator and means to cause air to flow in said passages only from the source of dehydrated air into the wall and from the wall to the exterior of the refrigerator, said last named means including a check valve in each of said passages.

17. A refrigerator having a food compartment, an iceless cooling unit in said compartment containing a refrigerant, a door, an insulating wall carrying said door and provided with stationary insulating material and a relatively impervious shell surrounding a substantial part of said food compartment not covered by said door, and breathing means adapted to inhale into and to exhale from the wall air, independent of said refrigerant, said breathing means being adapted to inhale said air, when said door is closed, only from within said compartment.

18. A refrigerator having an iceless cooling unit containing refrigerant, an insulating wall containing stationary insulating material provided with relatively impervious inner and outer shells, and breathing means having a tube structure having connections with the interior of said wall and with the exterior of said refrigerator for inhaling into the wall only air, independent of said refrigerant, dehydrated by said cooling unit and for exhaling outside the refrigerator with the aid of pressure fluctuations between the air inside of said wall and the air outside of said wall.

19. A refrigerator having an iceless cooling unit containing refrigerant, an insulating wall containing stationary insulating material provided with relatively impervious inner and outer shells, and breathing means for said insulating wall including a tube structure extending from said inner shell inwardly near said cooling unit and connected with the interior of said wall, and including a tube structure having an opening to the outside of said refrigerator.

20. A refrigerator having an iceless cooling unit containing refrigerant, a hollow, substantially impervious wall containing stationary insulation, breathing means having a connection with the interior of said wall for inhaling air independent of said refrigerant, and having a discharge opening to the exterior of said refrigerator, and provisions whereby the air inhaled by said

breathing means is chilled and dehydrated by said cooling unit so that condensation of moisture from said air within said wall is prevented at the temperatures prevailing in said wall.

21. A refrigerator having a food compartment, an iceless cooling unit in said compartment containing a refrigerant, a substantially impervious shell having insulation disposed therein and forming an insulated wall surrounding the greater part of said compartment, a closure device for closing a point of entry to said compartment, and means permitting inhalation into and exhalation from said wall of air, independent of the refrigerant, said means being arranged to inhale said air, when said closure device is closed, only from within said compartment.

22. A refrigerator having a food compartment, an iceless cooling unit in said compartment containing a refrigerant, a substantially impervious shell having insulation disposed therein and forming an insulated wall surrounding the greater part of said compartment, a closure device for closing a point of entry to said compartment, and means permitting inhalation into and exhalation from said wall of air, independent of the refrigerant, said means being arranged to inhale said air, when said closure device is closed, only from within said compartment, and said means being arranged to exhale said air to the atmosphere exterior of said shell.

In testimony whereof I hereto affix my signature.

HARRY B. HULL.