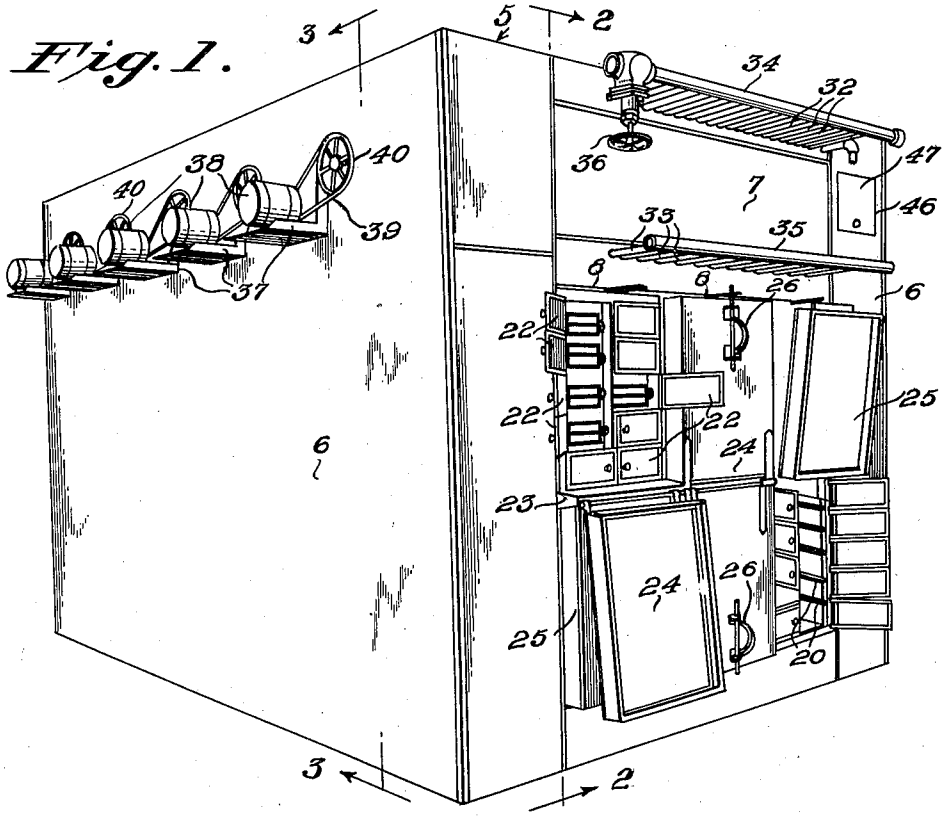
Dec. 13, 1949 F. P. YOARS 2,491,145

REFRIGERATOR

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Fig. 1.



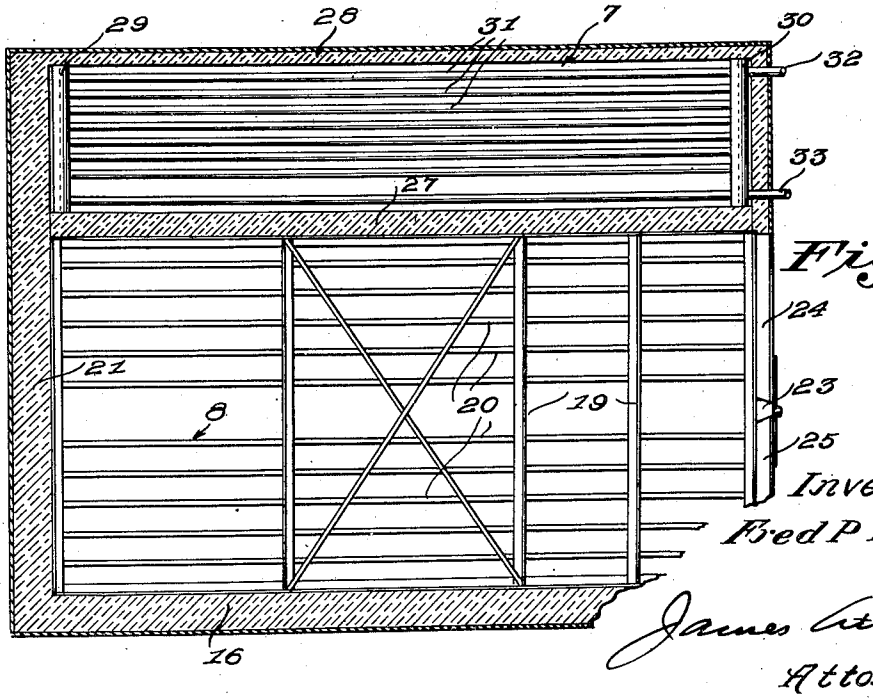


Fig. 2.

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Fig. 3.

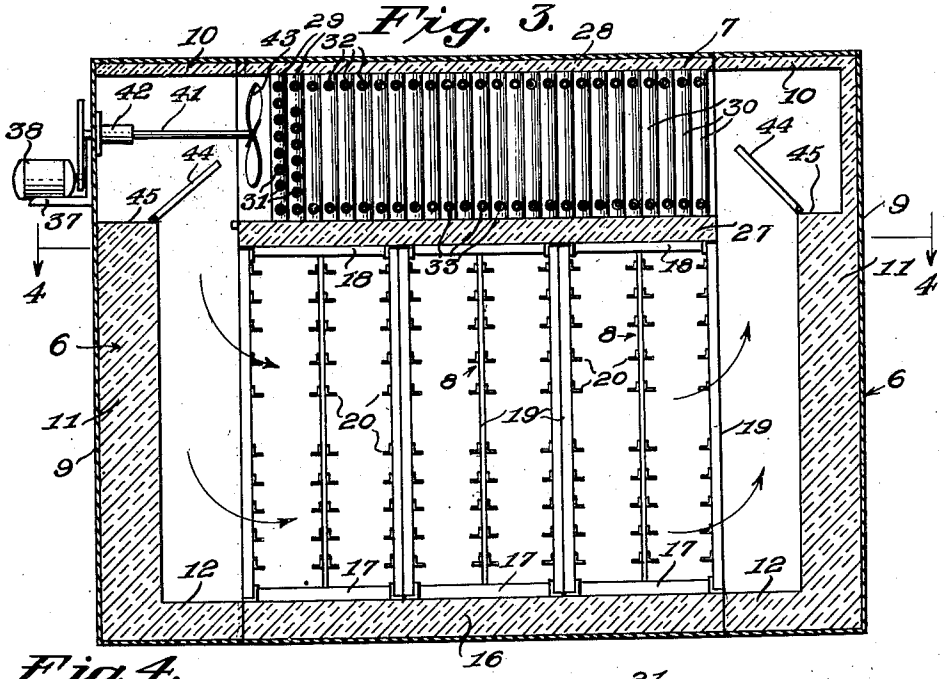
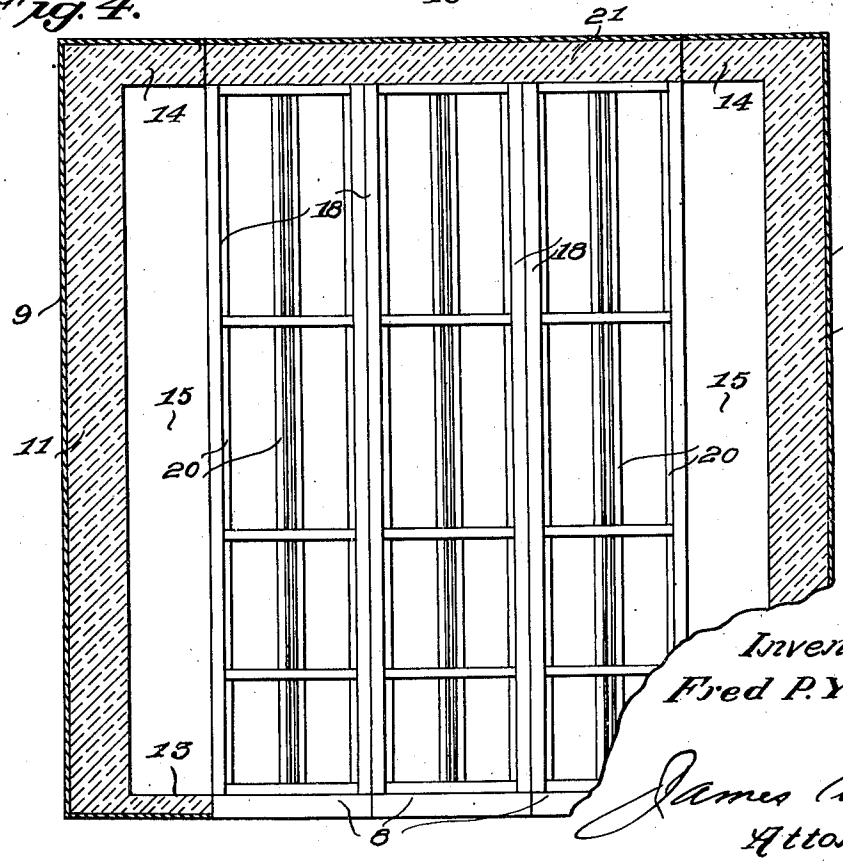


Fig. 4.



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REFRIGERATOR

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Application December 9, 1946, Serial No. 715,018

6 Claims. (Cl. 62—102)

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This invention relates to improvements in refrigerators, and more particularly to refrigerators of the air-pump circuit type.

One of the objects of the invention is to provide a refrigerator of this type and of sectional construction so it may be built to any desired capacity by simply adding additional sections of refrigerant coils and receptacle supporting sections or lengthening them.

Further objects are to provide a refrigerated compartment for use in maintaining ice cream or the like in better condition than in the present commercial methods of handling; to obtain and maintain lower temperatures than with conventional hardening rooms; which will harden more portions, packaged contents, and gallons of frozen confections in less space and in far less time; which will improve the quality of ice cream or the like because of hardening it faster; which is more economical than the conventional hardening rooms; which permits more refrigerant pipe per cubic foot of space; and which will facilitate the introduction and removal of confection supports more rapidly than the ordinary hardening rooms.

Another object is to supply a refrigerator of the wind-tunnel type which will allow defrosting without affecting the hardness of frozen confections.

With the foregoing objects outlined and with other objects in view which will appear as the description proceeds, the invention consists in the novel features hereinafter described in detail, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a perspective view of one example of my improved refrigerator.

Fig. 2 is a longitudinal vertical sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a transverse vertical sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a horizontal sectional view on the line 4—4 of Fig. 3.

Before proceeding with a detailed description of the invention, I may state that I have conceived of a sectional-built, mechanical refrigerated compartment enclosure for quick-freezing and handling of ice cream in packages, and other packages of food to be quickly frozen by cold forced air circulation. The refrigerator is more or less portable, constructed of cork-insulated prefabricated wall, floor and ceiling sections. The refrigerant coils are so arranged with reference to the food compartment that the coils may be

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defrosted and dried with outside air circulation or water, thereby avoiding the necessity of removal of food trays to prevent thawing of food during the defrosting operation.

Each food tray compartment or rack section is constructed of horizontal angle iron so that the capacity may be increased by the addition of longer sections or more sections placed side by side.

At at least one end of each food tray compartment or rack section, individual small doors are provided for each individual run of food tray conveyor track, and each section is also provided with one or more larger doors that cover the inner series of doors.

Referring to the drawings, 5 designates a refrigerator comprising opposite side sections 6, a loft section 7, and one or more intermediate rack sections 8, all detachably connected together to facilitate building the structure up to any desired capacity.

As may be seen from Fig. 3, each side section 6 preferably comprises a casing or housing 9 lined at the top, side, and bottom with insulation, indicated at 10, 11 and 12. As shown in Fig. 4, such casing is also lined at the front and rear ends of the refrigerator with insulation 13, 14. The insulation is so arranged in each side section as to provide a vertical recess or passageway 15 for the circulation of air or the like, as will be hereinafter explained.

The refrigerator is also provided with a central insulated bottom 16 on which the rack sections 8 rest, and as shown in Fig. 3, each rack section consists of a horizontally disposed bottom frame 17, and a similarly disposed top frame 18, rigidly connected by vertical posts 19. The posts in turn rigidly support spaced horizontal tracks 20, preferably of angle iron and extending from the front of the refrigerator to the insulated rear wall 21 thereof, as shown in Figs. 2 and 4. The tracks are designed to slidably support trays or tray cars of the type disclosed in my application Serial No. 715,019, filed December 9, 1946.

As best shown in Fig. 1, each rack section is provided with a small hinged door 22, corresponding to each pair of tracks, so that a door allowing access to any pair of tracks may be opened or closed without opening the door corresponding to any other pair of tracks. This facilitates the introduction or removal of trays or trucks of frozen confections onto or off any pair of tracks without permitting outside air to interfere with conditions within the refrigerator.

Each rack section is provided at its front and

intermediate its top and bottom with a horizontal support 23 to which is pivoted upper and lower large doors 24, 25 designed to close the space in front of a series of the small doors 22. In practice, the large doors will be provided with gaskets to cooperate with the fronts of the rack sections to seal the joints. Each large door is provided with any suitable latch or lock 26 to permit the opening or closing of any one of the large doors without interference with the other doors 24, 25.

An insulated ceiling 27 is arranged within the refrigerator between the rack sections 8 and the loft section 7, and an insulated roof 28 is provided for the loft section. Sectional refrigerant coils are arranged in the loft, and each section preferably consists of a pair of vertical headers 29, 30 connected by horizontal tubes 31. These tubes are so connected to the headers that if every other one of the sections is inverted, the tubes 31 will be arranged in staggered relation with reference to the tubes of adjacent sections, as indicated in Fig. 3. Consequently, air traveling through the spaces between the tubes will be forced to move in undulating paths.

As shown in Figs. 1 and 2, each of the headers 30 is connected to inlet and outlet branches 32, 33 and the branches 32 are connected to a common horizontal header 34, while the branches 33 are connected to a common header 35. The inlet header 34 is provided with a control valve 36 to cut off the refrigerant from the coils when it becomes necessary to defrost the refrigerator.

For air circulating purposes, one of the side sections 6 is provided externally with shelf means 37 for the support of electric motors 38 or the like. Each motor, by means of a transmission belt 39 or its equivalent, drives a wheel 40 arranged at the exterior of the refrigerator. As shown in Fig. 3, each wheel is fixedly mounted on a horizontal shaft 41, journaled in a bearing 42, supported by one of the side walls of the refrigerator. Each shaft drives a fan or propeller 43 which functions to draw warm air through the spaces between the tubes 31 of the refrigerant sections, force the cold air downwardly through one of the passageways 15 and cross-wise through the spaces in the rack sections 8, and then upwardly through the other passageway 15 into the loft.

For defrosting purposes, hinged doors 44 are mounted on ledges 45 within the side sections of the refrigerator, and they cooperate with the ceiling 27 to segregate the loft from the passageways 15. The doors may be operated by any suitable means not shown, and when they are in the open position illustrated in Fig. 3, they converge upwardly to facilitate guidance of the air from one passageway 15 through the loft and into the opposite passageway 15.

During defrosting, it is advisable to admit air to the loft, and this may be accomplished in any suitable way. For example, as shown in Fig. 1, a doorway 46 may be arranged in the front wall of the refrigerator and may be provided with a door 47.

It will be understood from the above that my arrangement provides the exposure of ten (for example) small doors 22, by opening just one large outside door 24, 25 thereby saving refrigeration.

This type of refrigerator or quick-freeze cabinet can be rapidly and economically installed or removed and re-installed without damage and without becoming a part of the housing or building structure wherein located. It would help overcome the objection to the use of rented buildings for freezing and manufacturing purposes. It saves refrigeration through the use of many small food or conveyor trays, instead of large ones, such as hand trucks, because the food packages can be placed on trays or conveyors that enable the quick and easy transfer of packages from warm trays to cold trays, avoiding the warming and cooling of said trays. As the kind of trays containing food constitutes a sizable portion of the refrigeration load, my construction facilitates the handling of such load.

The construction is such as to enable the operator to load and unload the food compartment without going inside where the temperature may range from zero to minus sixty below zero Fahrenheit. Furthermore, it saves valuable floor space in plants manufacturing ice cream or the like, as it refrigerates the contents of more packages per hour in far less space. It places the entire operation of hardening ice cream on economical conveyors.

From the foregoing, it is believed that the construction, uses and advantages of the invention will be readily understood, and I am aware that changes may be made in the details disclosed without departing from the spirit of the invention, as expressed in the following claims.

What I claim and desire to secure by Letters Patent is:

1. A refrigerator of sectional construction comprising opposite side sections, each including a relatively narrow upright casing having an outer side wall and front, rear, top and bottom walls and the casings opening inwardly or toward each other with the edges of the front, rear, top and bottom walls opposite said side walls of the respective casings being in spaced parallel vertical planes, and the said side, front, rear, top and bottom walls of the casings being lined with insulation, a second casing disposed intermediate the said side sections and including bottom, rear, top and a partial front wall with the casing opening at its opposite sides thereof into said casings of the side sections, the said bottom, rear, and top wall of said intermediate casing being lined with insulation, at least one food-supporting rack section disposed within the intermediate casing and supported on the insulation on the bottom wall thereof, said rack section provided with superposed pairs of horizontal tracks, vertical passageways in said side sections communicating with said intermediate casing, a layer of insulation supported within said intermediate casing substantially below and parallel with the insulation on the top wall of the intermediate casing and said layer of insulation resting on said rack section, the space between said layer of insulation and the top wall insulation in the intermediate casing providing a loft communicating with the said vertical passageways in the side sections, refrigerating means disposed in the loft, and means for causing air to circulate through the loft, passageways and rack section within the intermediate casing.

2. A refrigerator as claimed in claim 1, in which the means for causing air to circulate comprises a prime mover mounted on one of the side sections externally thereof, a shaft driven by said prime mover and journaled in a bearing supported by the side wall of said side section, and a fan driven by said shaft and arranged in the loft.

3. A refrigerator as claimed in claim 1, in which the rack section at its rear end engages the insulation on the rear wall of the interme-

diate casing and the front end of the rack section is closed by a series of small doors, there being one door for each pair of tracks, and a larger door hingedly connected to that end of the rack section and forming an outer door arranged outwardly of and covering the small doors.

4. A refrigerator as claimed in claim 1, in which the front end of the rack section is closed by a series of small doors, there being one door for each pair of tracks, and upper and lower large doors hingedly connected to the front end of the rack section and forming outer closures for the rack section outwardly of the small doors.

5. A refrigerator as claimed in claim 1, in which the refrigerating means comprises coils arranged in sections, each section comprising vertical headers arranged respectively at the front and rear walls of the intermediate casing, and spaced tubes connecting the headers of each refrigerating section.

6. A refrigerator as claimed in claim 1, in which the refrigerating means comprises coils arranged in sections, each section comprising vertical headers positioned respectively at the front and rear walls of the intermediate casing, and spaced tubes connecting the headers of each refrigerating section, the tubes of each section being arranged in staggered relation relatively to the tubes of an adjacent section whereby air traveling through the loft will be forced to move in undulating paths.

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