Nov. 19, 1940. J. B. WOLF, JR 2,222,524

DISPLAY CASE

Filed Jan. 18, 1940 2 Sheets-Sheet 1

Fig. 1.

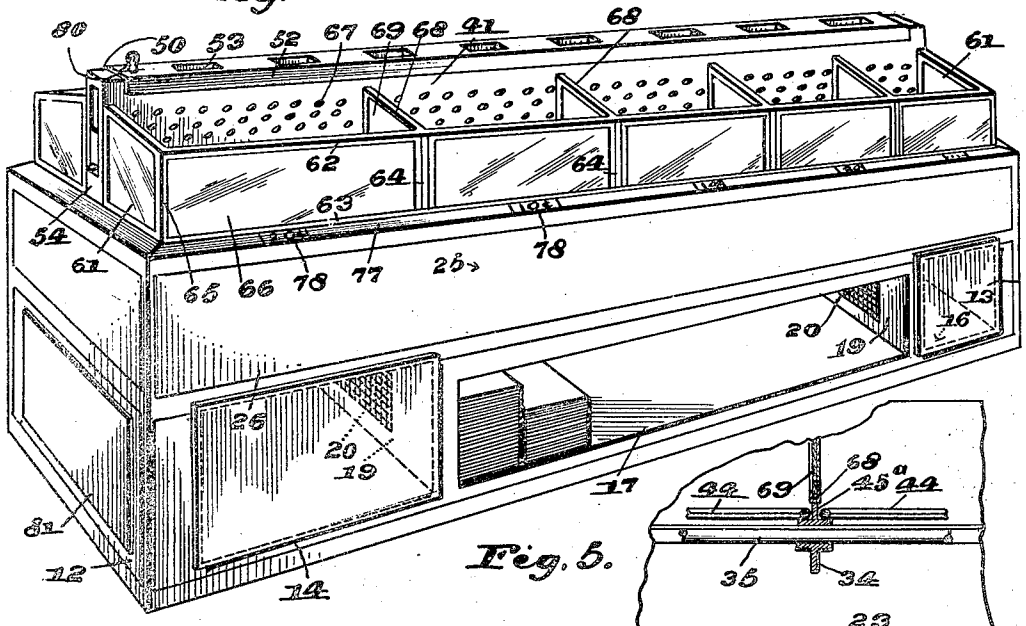


Fig. 5.

Fig. 3.

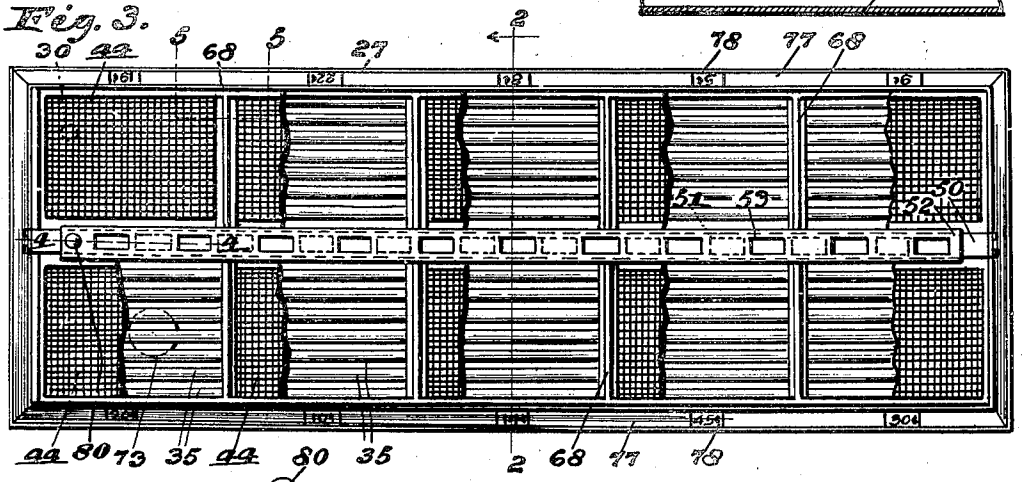
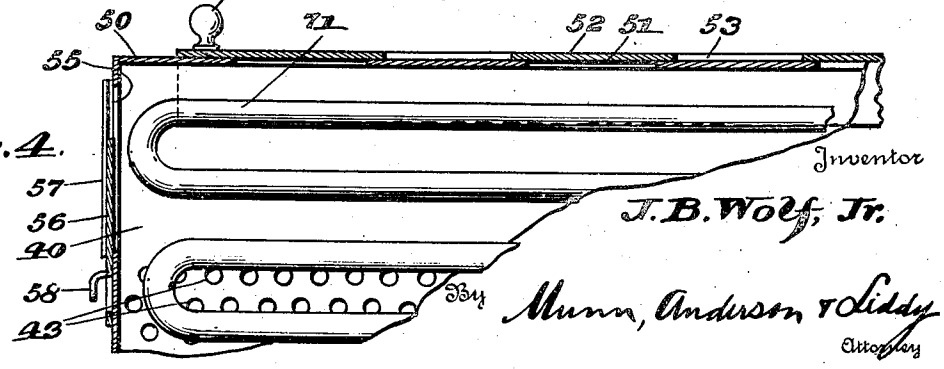


Fig. 4.



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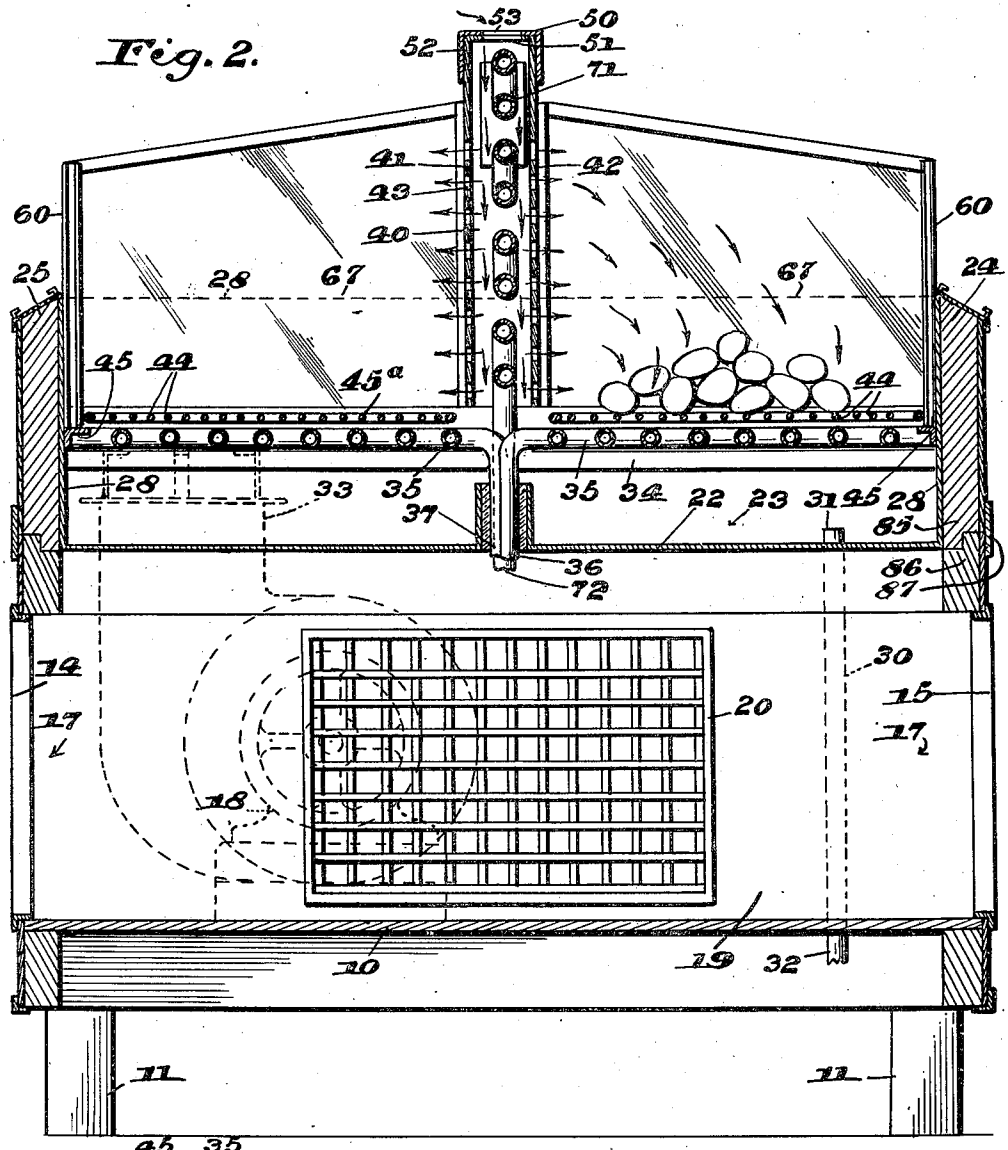
Attorneys

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DISPLAY CASE

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Fig. 2.



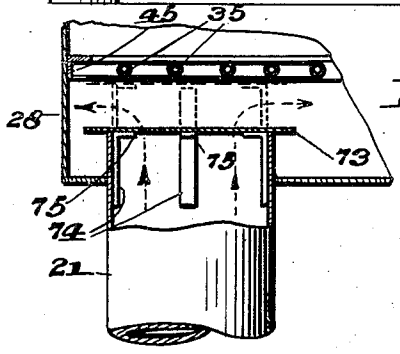


Fig. 6.

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UNITED STATES PATENT OFFICE

2,222,524

DISPLAY CASE

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Application January 18, 1940, Serial No. 314,519

7 Claims. (Cl. 62—89.5)

This invention relates to refrigerators.

An object of the invention is the provision of a refrigerator of the display type in which a number of bins are arranged for holding fruits or vegetables with the bins being separated by glass partitions and with a drip pan being located beneath the bins, means being employed for maintaining a circulation of air under forced draft through the bins, an air duct through which the cold air is forced being normally closed by a cover when a blower which maintains the forced draft is inoperative, the cover being automatically raised by the forced draft.

An object of the invention is the provision of a refrigerator of the display type in which a plurality of bins are arranged within a glass housing, a refrigerating system being employed for maintaining a refrigerant in circulation through a plurality of coils beneath the bins, the refrigerator being operated in connection with a blower for forcing air through the coils and thence through the bins for maintaining fruits or vegetables within the bins at a predetermined temperature, the upper portion of the bins being provided with a transparent partition separating the bins from each other.

A further object of the invention is the provision of a display refrigerator for fruits or vegetables in which the upper part of the refrigerator has a transparent section so that the comestibles located in the refrigerator may be viewed by the customers, the fruits or vegetables being housed in removable perforated containers so that when air is blown through coils containing a refrigerant the air will be circulated upwardly through the comestibles, means being employed for evenly distributing cold air under a forced draft laterally through the comestibles when necessary, the bottoms of the containers housing the comestibles being located adjacent cooling coils, means being employed for eliminating warm air from the refrigerator.

This invention will be best understood from a consideration of the following detailed description, in view of the accompanying drawings forming a part of the specification; nevertheless, it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications as define no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a view in perspective of a refrigerator constructed in accordance with the principles of my invention.

Figure 2 is a vertical section taken along the line 2—2 of Figure 3.

Figure 3 is a plan view of the refrigerator.

Figure 4 is a fragmentary vertical section taken along the line 4—4 of Figure 3.

Figure 5 is a fragmentary vertical section taken along the line 5—5 of Fig. 3.

Figure 6 is a fragmentary vertical section through the upper end of a controlled air conduit.

Referring more particularly to the drawings, 10 designates a base member supported by feet 11 above a floor of the building. Upon the base member are mounted end walls 12, 13, a front wall 14 and a rear wall 15. These walls house a refrigerating unit (not shown) in a chamber generally designated by the numeral 16. A chamber 17 which has an open end in the front and rear walls is adapted to be used for storing bags for the convenience of the customers. This chamber is isolated from the chamber 16 containing the refrigerating unit and a chamber 16a having a blower 18 by means of partitions 19.

Each partition is provided with an opening and a grid 20 to permit the circulation of air and this air is drawn in by the fan or blower 18 and is forced through a conduit 21.

A drip pan 22 forms the top of the lower compartment and the bottom of a cooling chamber 23. This cooling chamber is housed by insulated end walls 24, 25, a front wall 26 and a rear wall 27. It will be noted from Fig. 2 that walls 28 of the drip pan 22 extend upwardly from the side edges of the pan and terminate at the upper ends of the walls of the cooling chamber.

A drain pipe 30 has its upper end, as shown at 31, extending above the bottom of the drip pan 22, while the lower end 32 passes through the bottom 10 of the refrigerator. The pipe 30 is adapted to be adjusted so that the upper end 31 will be at a predetermined height above the bottom of the drip pan 22 but below the horizontal plane passing through the top 33 of the air conduit 21 so that the water collected in the pan 22 will not enter the air pipe 21.

A plurality of angle irons 34 which are T-shaped in cross section extend transversely of the cooling chamber 23 and are secured at their ends to the side walls 28 of the pan 22 for supporting a plurality of refrigerating coils 35 above the upper end 33 of the air conduit 21. These coils are located in spaced relation throughout the length and width of the cooling chamber 23.

Pipes 36 and 37 are connected with the compressor of the refrigerator in the usual manner.

A vertical chamber 40 extends the entire length of the refrigerator, is located above the coils 35 and is disposed centrally of the refrigerator. The side walls 41 and 42 of this chamber are provided with a plurality of perforations 43 to permit the passage of air from the chamber 40 to the interior of baskets or containers for vegetables and fruits which are supported by angle irons 45a resting on angle wires 45 running longitudinally of the cooling chamber and secured to the side walls 28 of the drip pan 22. The perforated bottoms 44 may

be formed of heavy mesh wire, perforated sheet metal or the bottoms may be in the form of a grill so that cold air which is forced from the pipe 21 will pass through the bottoms 44 and upwardly through the vegetables.

The top 50 of the chamber 40 is provided with a plurality of elongated openings 51 which are adapted to be closed by a slidable cover 52 having elongated openings 53 which are adapted to aline with the openings 51 to permit the escape of warm air from the chamber when desired.

Referring more particularly to Figs. 1, 2 and 4 it will be seen that the end walls 54 are provided with openings 55 which are adapted to be closed by a sliding cover 56 mounted in guides 57 formed on the end walls 54. A lip 58 projects from the bottom of the sliding cover 56 for operating the same. This sliding cover when moved in its uppermost position is adapted to close the openings 55 so that air from the chamber 40 will not escape to the atmosphere.

The side walls 41 of the chamber 40 are supported at their ends on the walls 28 of the drip pan 22. The angle irons 45a carried by the angle irons 45 support the side walls 41 at spaced points along the cooling chamber.

It will be noted that the inner edges of the perforated bottoms 44 terminate inwardly of the side walls 41 of the chamber 40 and these bottoms are removable from their positions on the angle irons 45a which are more particularly shown in Fig. 5.

It will be seen from Figs. 1 and 2 that the refrigerator is formed of three sections, a lower section containing the refrigerating unit, a blower 18 and the storage space 17; an intermediate section defined by the walls 25 and including the drip pan 22; and an upper section which includes the chamber 40, the perforated bottoms 44, side walls 60 and end walls 61.

The side walls 60 consist of a metal framework having horizontal bars 62, 63 and vertical bars 64, 65. Glass plates 66 are supported by said bars so that customers may view the vegetables or fruits located in bins 67. These bins are formed between the side walls 41 of the chamber 40 and transverse partitions 68. These partitions also have a metal framework enclosing glass plates 69. The upper section may be removable as a unit from the intermediate section.

The intermediate section may be removable from the lower section at a point where the tongue and grooved portions 85 and 86 of the sections are joined. A finishing strip 87 of metal embraces the connected sections.

A plurality of coils 71 are located in a vertical plane and are connected with the compressor of the refrigerating unit by means of pipes as indicated at 72. These coils are located within the narrow elongated chamber 40.

Referring more particularly to Fig. 6 it will be seen that the air conduit 21 is provided with an air disperser and a closure 73 formed of some light material such as aluminum which extends beyond the confines of the walls of the conduit. This closure is held in place on the upper end of the conduit 21 by means of guides 74 which have their upper ends as shown at 75 connected to the inner face of the cover 73. The guides 74 are in close contact with the inner wall of the conduit 21 so that when the cover 73 is moved upwardly by the pressure of air within the conduit 21 the guides will maintain the cover in position. The air disperser is limited in its upward movement by the horizontally disposed coils 35.

The cabinet for enclosing the refrigerating display case may be formed of any suitable material and any suitable decoration may be employed for making the cabinet attractive. The metal parts may be chromium plated or they may be formed of stainless, or any other suitable non-corrosive metal.

An inclined ledge 77 is provided on the upper ends of the walls of the intermediate section and surrounds the upper section where it joins the intermediate section. On the ledge adjacent each compartment or bin in the uppermost section are located tag holders 78 to receive tags for indicating the prices of vegetables or fruits located in the bins.

A knob 80 is connected to the slidable cover 52 so that the cover may be manually adjusted along the top 50 of the chamber 40 for alining the openings 53 in said cover with openings 51 in said top so that when it is desired to eliminate warm air from the cabinet and particularly when the refrigerating unit is started the openings 51 may be opened to the atmosphere as well as the openings 55 in the end walls of the chamber 40. During the normal operation of the refrigerator these openings are closed.

A door 81 which may be in the form of louvers encloses an opening in each of the opposite end walls of the lower section as shown in Fig. 1. These doors may be hinged or may be removable so that a mechanic may enter either the compressor cabinet 16 or the blower cabinet 16a at the opposite ends of the refrigerator for making repairs when necessary.

The operation of my device is as follows: The bins 67, as shown in Fig. 1, may be directly filled with vegetables or fruits as the case may be, or fruits or vegetables may be placed in wire baskets and deposited in the bins.

The sliding cover 52 and likewise the plate 56 are then adjusted so that the openings 51 and 55 will be covered, so that when the blower 18 and the refrigerating unit are operated, cold air will be forced from the cooling compartments by means of air from the conduit 21. At this time the member 73 will be raised on the upper end of said conduit and since said member acts as a diffuser the air will be distributed in all directions above the bottom of the fan 22. This air is then forced upwardly through the coils 35, perforated bottoms 44, through the chamber 40, thence through the perforations 43 and laterally through the vegetables. The pressure of air from the conduit 21 will force the cold air outwardly and as soon as the air is sufficiently chilled by the coils 35 and the coils 71 the openings 51 and 55 are then opened, and the blower cut off and the refrigerator is in operating condition by normal circulation of air. The openings 51 and 55 being open, will allow the air from the outside, which is warm, to be chilled on the coils 71, and will, by gravity, drop through the holes 43 into and through the vegetables or fruits.

It will be noted from Fig. 2 that the air is forced into the chamber 40 then laterally through the perforations 43 and through the vegetables or fruits. The warm air will rise but the cold air will settle down in the regions embraced between the drip pan 22 and the upper ends of the bins.

Since this air is forced under pressure by the blower 18 and evenly distributed the air is maintained in circulation at all times.

The vegetables or fruit at all times during business hours, are for sale and on display in

the case. At night, or holidays, the case may be covered with heavy canvas to keep the hot air out and the cool air in.

The moisture which has been condensed will be deposited on the bottom of the pan 22 and when this moisture rises to a predetermined height it will be discharged from the upper end of the drain pipe 30. The lower end 32 of this pipe is connected with a pipe which will carry the excess moisture to a sewer as is usual.

When the blower 18 is cut off the pressure is released from the pipe 21 and the light weight diffuser will settle back upon the upper end of the conduit and close the same to prevent the loss of cold air from the refrigerator.

The refrigerating unit (not shown) and likewise the blower 18 are controlled by the usual thermostats as is well known in the art.

I claim:

1. A refrigerating display case comprising a cooling compartment for storing comestibles having a perforated bottom, spaced walls rising from the bottom, dividing the compartment into at least two sections and providing a centrally disposed air chamber, a pair of the walls being perforated, cooling means below the bottom, a drip pan located below the cooling means and provided with an opening, a blower, a conduit connected with the blower passing through the opening in the drip pan and terminating below the cooling means.

2. A refrigerating display case comprising a cooling compartment for storing comestibles having a perforated bottom, spaced walls rising from the bottom, dividing the compartment into at least two sections and providing a centrally disposed air chamber, a pair of walls being perforated, cooling means below the bottom, a drip pan located below the cooling means and provided with an opening, a blower, a conduit connected with the blower passing through the opening in the drip pan and terminating below the cooling means, means on the upper end of the conduit adapted to be moved to an open position by the forced draft in the conduit and adapted to fall back into closing position to prevent the loss of cold air from the cooling compartment when the blower is inoperative.

3. A refrigerating display case comprising a cooling compartment for storing comestibles having a perforated bottom, spaced walls rising from the bottom, dividing the compartment into at least two sections and providing a centrally disposed air chamber, a pair of walls being perforated, cooling means below the bottom, a drip pan located below the cooling means and provided with an opening, a blower, a conduit connected with the blower passing through the opening in the drip pan and terminating below the cooling means, an air dispersing means located on the upper free end of the conduit and adapted to be moved upwardly away from the conduit when air is forced through said conduit, means for guiding the air dispersing means in its vertical movement, said dispersing means adapted to fall by gravity into closing relation with the upper end of the conduit when the blower is inoperative.

4. A refrigerating display case comprising a cooling compartment for storing comestibles having a perforated bottom, spaced walls rising from the bottom, dividing the compartment into at least two sections and providing a centrally disposed air chamber, a pair of the walls being perforated, cooling means below the bottom, a drip pan located below the cooling means and provided with an opening, a blower, a conduit connected with the blower passing through the opening in the drip pan and terminating below the cooling means, a drain pipe extending above the bottom of the drip pan for controlling the height of the condensed liquid collected in said pan.

5. A refrigerating display case comprising a cooling compartment for storing comestibles having a perforated bottom, spaced walls rising from the bottom, dividing the compartment into at least two sections and providing a centrally disposed air chamber, a pair of the walls being perforated, cooling means below the bottom and means for forcing air through the cooling means, the perforated bottom, the chamber and through the perforated walls, the air chamber being provided with a closed top having air discharge openings and means for closing said openings.

6. A refrigerating display case comprising a cooling compartment for storing comestibles having a perforated bottom, spaced walls rising from the bottom, dividing the compartment into at least two sections and providing a centrally disposed air chamber, a pair of the walls being perforated, cooling means below the bottom and means for forcing air through the cooling means, the perforated bottom, the chamber and through the perforated walls, the air chamber being provided with a closed top having air discharge openings and means for closing said openings, the air chamber also having end walls which are provided with openings for the discharge of warm air from the cooling compartment, and means for closing said openings.

7. A refrigerating display case comprising a pair of superposed compartments, the upper compartment being adapted to store comestibles, a blower and refrigerating unit located in the lower compartment, a drip pan separating the two compartments and provided with an opening, a conduit passing through the opening and connected with the blower for supplying cold air to the upper compartment, a plurality of horizontally disposed cooling coils located above the drip pan and operatively connected with the refrigerating unit, a perforated bottom supported above the cooling coils and adapted to support the comestibles so that when air is blown from the conduit through the refrigerating coils and through the perforated bottom said air will be circulated through the comestibles, spaced side and end walls rising from the bottom to form a vertically disposed cooling chamber which divides the upper compartment into at least two sections, the bottom of the air chamber being in open communication with the space between the perforated bottom and the bottom of the drip pan, the side walls being perforated so that when air is blown through the conduit said air will not only be forced upwardly through the perforated bottom but also through the air chamber whence the air will escape laterally through the perforated side walls and likewise be distributed among the comestibles, an air diffuser connected with the conduit for distributing the air to the cooling coils.

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