

April 5, 1949.

E. L. STULTZ

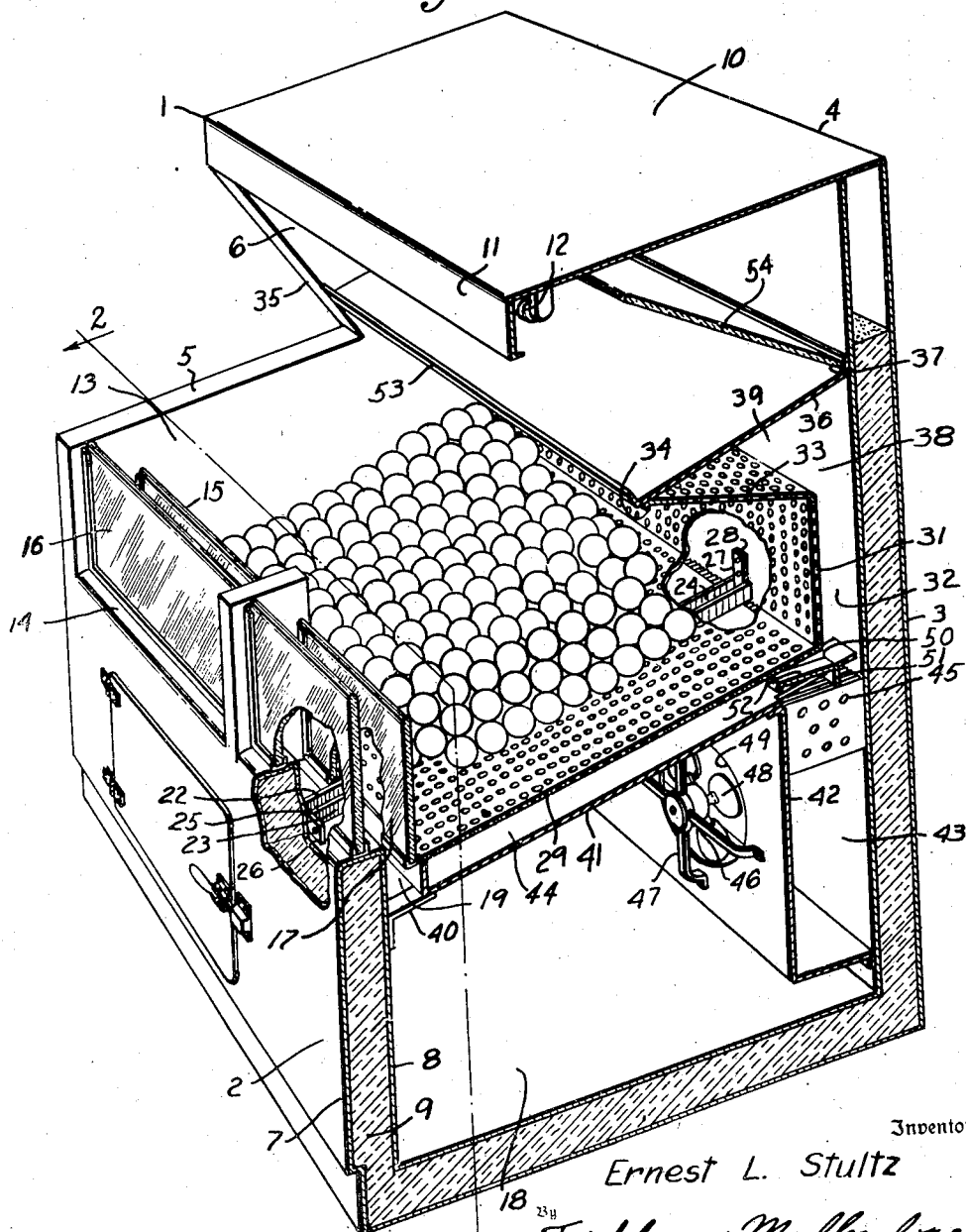
2,466,286

REFRIGERATOR DISPLAY CASE

2 Sheets-Sheet 1

Filed Sept. 5, 1947

Fig. 1.



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Fig. 2.

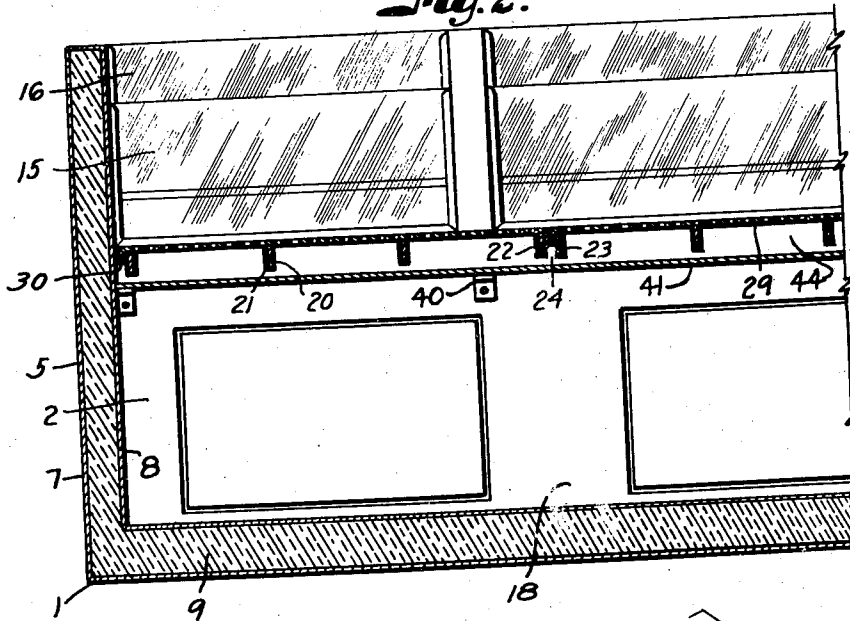
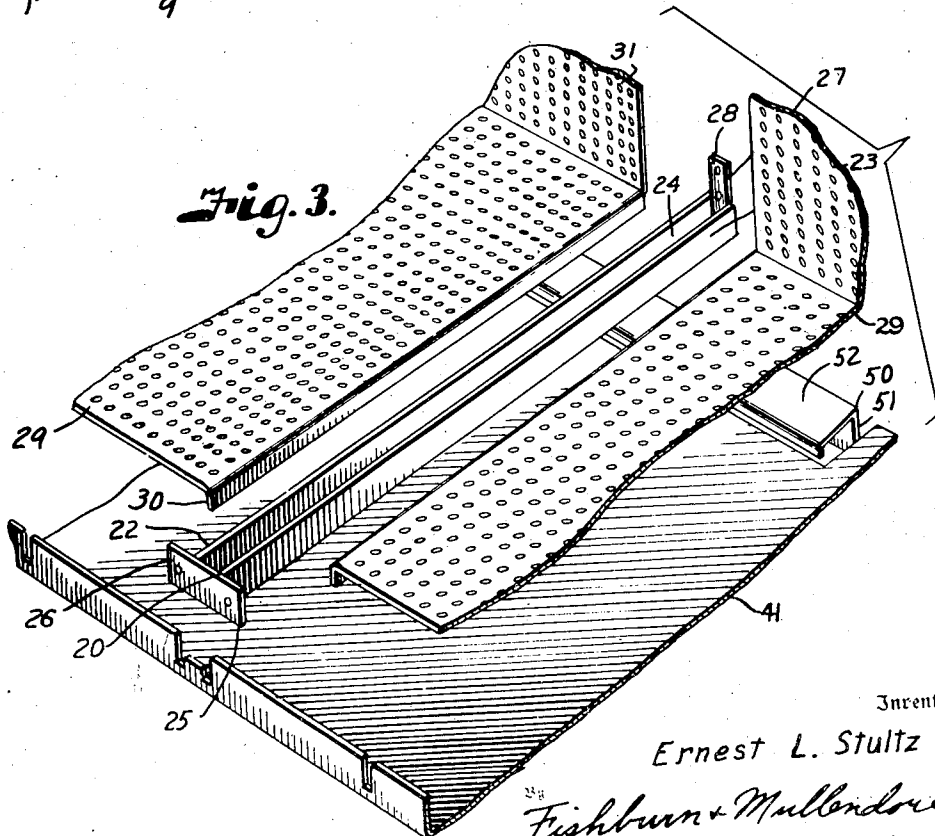


Fig. 3.



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REFRIGERATOR DISPLAY CASE

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8 Claims. (Cl. 62—89.5)

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This invention relates to refrigerator display cases particularly adapted for the display of vegetables, dairy products and similar perishable goods that are to be made available to customers of self-service stores and has for its principal object to provide a display case of this character which is efficient, attractive, and capable of keeping such goods at the desired temperatures.

Other objects of the invention are to provide for the dispersion of chilled air under the bottom of the display for movement upwardly in and around the goods and a downwardly and forwardly flow of chilled air over the top of the goods to direct the air to a return duct at the front of the display for re-circulation in heat exchange contact with a refrigerating element; to provide a return duct which is sufficiently high relative to the display for preventing over-spilling of chilled air and which does not interfere with access to the display or reduce the effectiveness of the display from the front of the case; to provide a rigid bottom support for the goods on display and which does not materially interfere with flow of air upwardly around the goods; to provide a removable bottom and air distributing means to facilitate cleaning thereof; and to provide for proportioning the chilled air that is discharged above and below the goods on display.

In accomplishing these and other objects of the invention hereinafter pointed out, I have provided improved structure, the preferred form of which is illustrated in the accompanying drawings wherein:

Fig. 1 is a perspective cross sectional view through a display case constructed in accordance with the present invention, parts being broken away to show other parts of the case.

Fig. 2 is a vertical section through one end of the display case taken on the line 2—2 of Fig. 1 and looking in the direction of the arrows.

Fig. 3 is a fragmentary perspective view of the parts composing the bottom structure of the display compartment of the case.

Referring more in detail to the drawings:

1 designates a display case constructed in accordance with the present invention and which includes a cabinet-like structure having a front wall 2, a back wall 3 of substantially greater height than the front wall to provide the back of a canopy 4. The cabinet also includes end walls 5 having forward portions substantially conforming to the height of the front wall and upwardly extending rear portions 6 forming ends of the canopy 4. The walls thus described may be formed of any suitable materials; for example,

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inner and outer sheet metal casings 7 and 8 that are spaced apart to contain therebetween an insulation material 9 of any suitable type.

The canopy 4 includes a horizontal top portion 10 extending forwardly and terminating in a depending flange or facing 11, behind which is mounted illuminating devices such as fluorescent lamps 12. The portion of the cabinet in front of the canopy has an open top portion 13 through which access is had to the goods on display and which permits ready removal of the goods so that the display case is particularly adapted for use in self-service stores.

To promote visibility of the displays, the upper front wall portion of the case has openings 14 covered by inner and outer transparent panels 15 and 16, the panels being suitably mounted in the openings and spaced apart to provide downdraft ducts 17 therebetween and which communicate with a storage compartment 18 in the bottom of the case through openings 19 that are formed by offsetting the inner panels rearwardly from the front wall portion of the case as best shown in Fig. 1.

Extending transversely of the case in inset relation below the open top portion 13 are spaced supporting brackets 20 comprising bars 21 having forward ends attached to the inner side of the front wall of the case and their rear ends attached to the front face of the rear wall of the case at a higher level so that the supporting brackets slope downwardly toward the front of the case as shown in Fig. 1. Selected supporting brackets constitute double bars 22 and 23 spaced apart as at 24 and which have the forward ends connected by a plate 25 that extends laterally from the respective bars to provide apertured ears 26 by which the ends of the bars are attached to the front wall of the case. The opposite ends of the bars are suitably attached as by welding to vertical plates 27 having upwardly projecting apertured ends 28 by which the plates are secured to the back wall by suitable fastening devices extended through the respective openings.

Supported upon the brackets are perforated plates 29 having depending flanges 30 on the side edges thereof which hook over the brackets composed of a pair of bars as shown in Fig. 2, the flanges depending into the space between the bars to support the plates in rigid position with the forward edges cooperating with the lower edge of the panel 16 to close the space therebetween and the rear edges terminating short of the rear wall 3 to connect with a vertical apertured plate 31 that extends longitudinally of the case to provide a

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vertical passageway 32 from which air is discharged through the apertures or outlets in the plate forwardly across the display to be carried on said plate. The upper portion of the vertical plate 31 rises slightly above the upper edge of the front wall and terminates in an upwardly sloping apertured plate portion 33 that projects over the rear portion of the display as shown in Fig. 1. The forward edge 34 of the portion 33 terminates in registry with the forward edges 35 of the upward extension 6 forming the ends of the canopy.

Cooperating with the terminal edge of the plate portion 33 as a deflector shelf 36 that slopes upwardly and rearwardly to join with the rear wall of the case as indicated at 37. The perforated plate portion 33 cooperates with the shelf 36 to provide a space 39 in connection with the vertical passageway 38 from which chilled air is distributed downwardly through the apertures or outlets onto the goods for movement across the display to the downdraft passageway 17.

To facilitate entrance of the forwardly moving stream of air, the inner transparent plate 16 is of shorter height than the outer transparent plate so that the air flow will pass over the upper edge of the inner transparent panel and be stopped by the outer transparent panel as will be clearly apparent upon inspection of Figure 1 of the drawing.

Carried on suitable brackets 40 attached to the inner side of the front wall of the case in downwardly spaced relation with the brackets 20 is a partition 41 having an upturned flange along the forward edge adapted to join with the forward edge of the apertured plates and close the space therebetween from the downdraft passageway 17. The rear portion of the partition terminates short of the rear wall and joins with a vertical partition 42 spaced inwardly from the rear wall to provide a transverse longitudinally extending duct 43 through which air is distributed longitudinally of the case. The partition cooperates with the overlying perforated plates 29 to provide an air distributing duct 44 therebetween.

Located along the upper portion of the duct 43 is a refrigerating element 45 of any suitable type for maintaining the chilled condition of the air that is circulated through the case as later described by means of one or more fans or blowers 46 that are mounted on suitable brackets 47 with the impeller 48 of the fans adapted to rotate within openings 49 formed within the partition 42.

In order to distribute air to the passageway 38 and to the transverse passageway or duct 44, a baffle 50 is provided which extends longitudinally of the case and has a vertical portion 51 that extends upwardly from the refrigerating element in spaced relation with the rear wall so that a portion of the air goes upwardly therebetween into the passageway 38 while the remaining portion of the air is directed into the passageway 44 by a forwardly projecting portion 52 of the baffle as shown in Fig. 1.

To prevent sliding of articles off the shelf 36, the forward edge of the shelf may be provided with a rail 53. To enhance the appearance of the display, the canopy may also include a mirror panel 54 that extends longitudinally of the case and slopes upwardly and forwardly from the rear edge of the shelf.

In using the case constructed and assembled as described, the refrigerating element is connected

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with a source of refrigerant supply and the fans with a suitable current supply so that the refrigerating elements may be brought to the desired low temperature and the air circulated from the storage compartment 18 through the openings 49 into the longitudinal duct 43 from where the air is discharged upwardly through the refrigerating element to be cooled by heat exchange contact therewith, a portion of the air being directed by the forwardly projecting portion 52 of the baffle into the passageway 44 under the apertured bottom of the display compartment from where the chilled air is distributed substantially uniformly throughout the bottom area of the display compartment for upward movement under force of the the fan pressure in and around the merchandise that is carried in the display compartment. Simultaneously a portion of the air flows through the openings 49 into the space 39 for distribution through the apertures in the plate portions 31 and 33, the air being directed forwardly and downwardly across the goods on display. Since the fans are connected with the downdraft passageways between the panels, a low pressure area develops at the inlets of the passageways and the cold air flows over the upper edge of the inner panel in the manner of a weir and downwardly into the storage compartment for recirculation.

When it is desired to clean the passageways, the apertured bottom members may be removed by lifting them from the transverse supports. The underneath passageway may then be cleaned of any materials that may have passed through the apertures of the bottom plates. The plates are readily replaced by hooking the flange edges thereof over the brackets composed of the pairs of supporting bars.

From the foregoing it is obvious that I have provided a display case which is efficient, attractive and capable of keeping perishable goods in ready access to the customers of self-service stores. It is also obvious that I have provided for substantially uniform distribution of chilled air in a manner so as to prevent minimum loss thereof and yet provide for full and free circulation of the air in surrounding and overlying relation with the goods on display.

What I claim and desire to secure by Letters Patent:

1. A display case of the character described including a substantially open top cabinet, display supporting means inset within the open top of the cabinet to provide the bottom of a display compartment accessible through said open top and having openings for passing chilled air into the display compartment, means forming a duct below the display supporting means for conducting the chilled air to be distributed into the display compartment, inner and outer panels in a front wall of said cabinet and forming the front of the display compartment, said panels being spaced apart with the outer panel extending above the inner panel for forming a down flow passageway, and a fan in connection with said passageway for creating a low pressure area adjacent the upper edge of the inner panel and for drawing the air downwardly through said passageway and for delivering the air under pressure to said duct, and refrigerating means located in the cabinet in the path of said air.

2. A display case of the character described including a substantially open top cabinet, display supporting means inset within the open top of the cabinet to provide the bottom of a display

compartment accessible through said open top and having passages for discharge of chilled air into the display compartment, means forming a duct below the display supporting means for conducting the chilled air to be distributed into the display compartment, means spaced from a wall of the cabinet and extending upwardly and forwardly over a portion of the display compartment to provide an air distributing duct and having outlets from which chilled air is adapted to be discharged downwardly and across the display compartment toward the opposite wall, inner and outer panels in said opposite wall and forming the front of the display compartment, said panels being spaced apart with the outer panel extending above the inner panel for stopping said directed air and a fan in said cabinet for creating a low pressure area between said panels for drawing the air downwardly through said space and delivering the air under pressure to said ducts, and refrigerating means located in the cabinet in the path of said air.

3. A display case of the character described including a substantially open top cabinet, an apertured display supporting means inset within the open top of the cabinet to provide the bottom of a display compartment accessible through said open top, means forming a duct below the display supporting means for conducting chilled air to be distributed through the apertures of said supporting means into the display compartment, apertured means spaced from a wall of the cabinet and extending upwardly and forwardly over a portion of the display compartment to provide an air distributing duct from which chilled air is adapted to be discharged downwardly across the display compartment toward the opposite wall, a downwardly sloping shelf extending from the first-named wall and joining with said second-named apertured means to direct the air through said apertures, inner and outer transparent panels in said opposite wall and forming the front of the display compartment, said panels being spaced apart with the outer panel extending above the inner panel for stopping said directed air and a fan in said cabinet for creating a low pressure area between said panels for drawing the air downwardly through said space and delivering the air under pressure to said ducts, and refrigerating means located in the cabinet in the path of said air.

4. A display case of the character described including a substantially open top cabinet, an apertured display supporting means inset within the open top of the cabinet to provide the bottom of a display compartment accessible through said open top, means forming a duct below the display supporting means for conducting chilled air to be distributed through the apertures of said supporting means into the display compartment, apertured means spaced from a wall of the cabinet and extending upwardly and forwardly over a portion of the display compartment to provide an air distributing duct from which chilled air is adapted to be discharged downwardly and across the display compartment toward an opposite wall, a downwardly sloping shelf extending from the first-named wall and joining with said second-named apertured means to direct the air through said apertures, a canopy carried over said shelf including a mirror for reflecting images of the goods in the display compartment, inner and outer transparent panels in said opposite wall and forming the front of the display compartment, said panels being spaced

apart with the outer panel extending above the inner panel for stopping said directed air and forming an inlet, a fan in said cabinet for creating a low pressure area for said inlet for drawing the air downwardly through said space and delivering the air under pressure to said ducts, and refrigerating means located in the cabinet in the path of said air.

5. A display case of the character described including a substantially open top cabinet, a display supporting means inset within the open top of the cabinet to provide the bottom of a display compartment accessible through said open top, apertured means spaced from a wall of the cabinet and extending upwardly and forwardly over a portion of the display compartment to provide an air distributing duct from which chilled air is adapted to be discharged downwardly and across the display compartment toward the opposite wall, duct means at said opposite wall having an upwardly opening inlet, and a fan in said cabinet for creating a low pressure area at said inlet for drawing the air downwardly through said duct means and delivering the air under pressure to said air distributing duct, and refrigerating means located in the cabinet in the path of said air.

6. A display case of the character described including a substantially open top cabinet, a display supporting means inset within the open top of the cabinet to provide the bottom of a display compartment accessible through said open top, apertured means spaced from a wall of the cabinet and extending upwardly and forwardly over a portion of the display compartment to provide an air distributing duct from which chilled air is adapted to be discharged downwardly and across the display compartment toward the opposite wall, a downwardly sloping shelf extending from said first-named wall and joining with said apertured means to direct the air through said apertures, duct means at said opposite wall having an inlet for said directed air and a fan in said cabinet for creating a low pressure area in said inlet for drawing the air downwardly through said duct means and delivering the air under pressure to said distributing duct, and refrigerating means located in the cabinet in the path of said air.

7. A display case of the character described including a substantially open top cabinet, a display supporting means inset within the open top of the cabinet to provide the bottom of a display compartment accessible through said open top, apertured means spaced from a wall of the cabinet and extending upwardly and forwardly over a portion of the display compartment to provide an air distributing duct from which chilled air is adapted to be discharged downwardly and across the display compartment toward an opposite wall, a downwardly sloping shelf extending from first-named wall and joining with said apertured means to direct the air through said apertures, a canopy carried over said shelf including a mirror for reflecting images of the goods in the display compartment, duct means having an inlet adjacent said opposite wall for said directed air and a fan in said cabinet for creating a low pressure area in said inlet for drawing the air downwardly through said duct means and delivering the air under pressure to said distributing duct, and refrigerating means located in the cabinet in the path of said air.

8. A display case of the character described including a substantially open top cabinet, spaced supporting members extending across the cabinet

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at a level inset below the open top of the cabinet, an apertured plate carried on the supporting members for forming the bottom of a display compartment accessible through said open top, means cooperating with said plate for forming a duct below said display compartment for conducting chilled air to be distributed through the apertures of said plate into the display compartment, apertured means spaced from a wall of the cabinet and extending upwardly and forwardly over a portion of the display compartment to provide an air distributing duct from which chilled air is adapted to be discharged downwardly and across the display compartment toward the opposite wall, inner and outer transparent panels in said

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opposite wall and forming the front of the display compartment, said panels being spaced apart to form a duct extending downwardly into the cabinet below the bottom distributing duct and with the outer panel extending above the inner panel for providing an air inlet from the display compartment, and a fan in said cabinet for creating a low pressure area in said inlet for drawing the air downwardly through said space between the panels and delivering the air under pressure to said distributing ducts, and refrigerating means located in the cabinet in the path of said air.

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No references cited.