REFRIGERATED DISPLAY CASE HAVING HUMIDIFYING MEANS

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3 Sheets—Sheet 2
The present invention relates to improvements in a display stand. The display stand to which my invention applies is so used for displaying produce of various types, particularly vegetables and fruits, in grocery markets where the products are open for inspection by the public and therefore are exposed to the air in the store. In such display cabinets it is desirable to have the products so displayed as to be readily accessible to the public and in such quantities as to permit sales from the display stock throughout most of an ordinary business day without the necessity of frequent replenishment. The best position for display is one in which the product is so arranged that the buyer in passing by it can conveniently look down upon it at a relatively close level. The capacity of the stand has to be quite large so the construction must be such as to permit long display stands to be used.

It is the purpose of my invention to provide a novel display stand wherein the products displayed are arranged so as to be open to the public, but wherein the products are kept at the proper cooled temperature and are prevented from drying out by maintaining them under a cool blanket of air charged with moisture. The maintenance of the moisture content of the air must be either substantially continuous or at such frequent intervals as to prevent drying out of the products.

It is also a purpose of my invention to provide in a display stand of the character described, a novel construction which permits the various products to be arranged in rows spaced according to the demand for products with adequate drainage for any excess moisture that may be delivered in the maintenance of the proper moisture content over the product.

It is also a purpose of my invention to provide a novel air circulating and cooling mechanism in a display stand of this character whereby proper distribution of the cold blanket of air over the product is attained.

It is also a purpose of my invention to provide in a display stand of the character described a novel arrangement of parts whereby the moisture content of the air supplied over the products may be regulated to suit any particular condition without disturbing the flow of air in a continuous fashion over the products being displayed.

A further and more detailed object of my invention is to provide in a display stand a combination with an air circulating unit of a distributing box arranged to pre-cool the air in contact with water and to thereafter lower the temperature of the air further by refrigeration while distributing it uniformly throughout the length of the display stand and subsequently entraining a mist of moisture in the air before directing it down over the products.

The novel features that I consider characteristic of my invention are set forth with particularity in the claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will be understood from the description of a specific embodiment when read in connection with the accompanying drawings, in which:

Figure 1 is a cross sectional view through a display stand embodying my invention;

Figure 2 is a front view of the stand showing how it is arranged to carry the vegetables, fruits and the like;

Figure 3 is a fragmentary sectional view taken substantially on the line 3-3 of Figure 1;

Figure 4 is a fragmentary sectional view taken on the line 4-4 of Figure 1; and

Figure 5 is a somewhat diagrammatic view illustrating the control apparatus by which the supply of moisture to the display stand is maintained; and

Figure 6 is a fragmentary sectional view illustrating a modified form of air deflector for controlling the distributing of air over the produce.

Referring now to the drawings, particularly Figures 1 and 2, my invention is embodied in a display stand, the main body portion of which comprises end panels 9, a front panel 10, a base 11, a back panel 12 and a top panel 13. Preferably, these panels are made of a suitable sheet metal such as sheet aluminum and are secured together in any suitable fashion, such for example, as means of the angles 14, 15 and 16. The wall portions may be of any desired length. Preferably the display stand is made up sectionally, using standard lengths of say 10 feet per section for the various wall portions. It is only necessary then to abut the standard sections together to make longer display stands. These display stands are provided at the front of the top wall 13 with illuminating means indicated generally by the numeral 17, whereby the produce to be displayed may be illuminated and whereby an advertising area is provided. As shown, I mount a supporting rail 18 directly below the forward end 13a of the top wall 13. Flanges 19 and 20 are provided on the parts 13a and 18 so as to receive a transparent or translucent panel 21 in.
front of which individual characters 22 may be mounted to spell out the desired advertising information. A channel plate 23 is spaced rearwardly from the parts just described and forms with the elements 16, 21 and 18, a downwardly opening recess 24 in which suitable illuminating means such as the fluorescent lamps 25 are mounted. Cross ties 26 extend from the member 18 to the rear wall 12 and are connected to the channel 23 to complete the construction of the upper portion of the display cabinet.

The display portion proper of the cabinet is supported on a platform member 27 which, as shown, comprises an L-shaped metal sheet, the upstanding flange 28 of which serves as a back piece. The sheet 27 is suitably supported in the case by cross members 29 and they are secured at their opposite ends to the front wall 10 and the rear wall 12. Also intermediate the front and back walls 10 and 12, the plate 27 is additionally supported by an upstanding wall 30 that extends full length of the display case. The front edge of the plate 27 terminates short of the upper inner edge 10c of the front wall 10 so as to leave an opening 31 for the downward passage of air, water and the like. A front wall 32 preferably of glass or similar transparent material is mounted on the portion 10c of the front wall and projects upwardly from the lower edge of the display case.

The panel 32 is secured by suitable securing strips 33 spaced at intervals lengthwise of the display stand. A small angle strip 34 forms a stop for the lower edge of the panel 32. A removable screen plate 35 is arranged over the opening 31.

Since considerable moisture is generally found on the produce or maintained there by circulation of the water-laden air over the produce, it is necessary to provide drainage whereby the excess water may drain off the plate 27. At the front edge of the plate I mount a metal barrier 36 which serves to keep the produce rearward of the screen 35. This barrier 36 is substantially L-shaped in cross section with spaced lugs 37 arranged at intervals lengthwise of the barrier to fit in the recess 10c. The member 36 is fastened to the plate 27 by screws which extend down through the lugs and thread into the plate 27.

It should be noted that the illumination from the fluorescent lamps 28 is directed down upon the plate 27. A further feature of the display stand is the provision of a mirror strip 38 above the upper edge of the flange 28 which forms the back wall of the display area. This mirror is so situated that when viewed from the front, the produce is displayed twice, once by the direct appearance on the plate 27 and again by the reflection from the mirror. The mirror 38 is mounted by means of suitable mounting strips 39 and 40 at the upper edge, these strips being secured to the cross ties 26 and the channel 23. At its lower end, the mirror is supported on a curved deflector 41 which is secured to the back wall 12 and curves forwardly and upwardly over the top edge of the flange 28 to provide a narrow passage 42 for directing a sheet of cool water laden air forwardly over the plate 27.

In Figure 5 of the drawings I show a modified deflector plate 41a which has means for closing off entirely the passageway 42. In this form of the device a lip 43 is mounted for adjustment on the deflector 41a and can be moved outwardly to direct the air and in a more downward direction and as moved out to its full limit the lip may turn downward to completely block the passage 42 as illustrated in the dotted lines in Figure 5. The lips 43 are not continuous through-out the length of the display stand but are made in sections so that one portion of the passage 42 may be closed to keep air and water off of a particular part of the produce without preventing it from spreading over the rest of the produce displayed in the stand.

A novel arrangement is provided for supporting various types of produce on the plate 27. A shelf member 45 is constructed of a suitable non-rusting sheet metal such as stainless steel or aluminum. This member has side flanges 46 and 47 (see Figures 1 and 3) which normally rest on the plate 27 and support the member 45 so that it slopes downwardly from the flange 28 to a point adjacent the barrier 36. The rear edge of the member 45 has a down turned lip 48. The flange 28 has a series of lugs 49 arranged thereon so as to receive the flange 48 and hold the member 45 in a raised position such as indicated by the dotted lines in Figure 1 whenever it is desired to have a shallow display area. When it is desired to have a deep display area, the member is turned over so that the flanges 46 and 47 extend upwardly and the main portion of the member 45 lies flat against the plate 27. The members 45 are made in widths that are convenient to have readily available and it will be apparent that two adjacent members may be arranged with one inverted and the other right side up and the adjacent edge portions 46 and 47 will form a partition to prevent the produce from getting beneath the one that is right side up. In fact the one that is right side up may be raised to the dotted line position shown in Figure 1 without opening any passage for the produce to get beneath it.

In order to maintain straight division lines at available intervals between adjacent groups of produce arranged on the shelf member 45, I provide partition members 50 which are adapted to be placed at the desired intervals upon the shelf members 45 and which will be held in place by the produce itself. The members 50 are alike and are shown in solid lines in Figure 4. The hinged member 50 is extended to form an upstanding ridge 51 (see Figure 3) and then bending the sheet member outwardly in opposite directions to form ridges 52 and 53 which are of substantial width such as about 4 inches in a horizontal plane and 5 inches in the vertical plane. When the produce is placed within the space between the adjacent members 50 it will in part rest on the flanges 52 and 53 so as to secure the members 50 in place. Thus it is possible when two adjacent spaces on opposite sides of the member 50 are filled to remove all of the material on one side without causing the member 50 to spread away from the filled side.

Referring now to the means for maintaining the blanket of air over the produce that is arranged on the shelf members 45, I provide beneath the plate 27 an air distribution chamber 55. This chamber is formed by means of the supporting wall 30, a bottom wall 56 and a rear flange 57, which flange is secured to the rear wall 12. The chamber 55 extends full length of the display case and forms a trough in which a body of water indicated at 58 is maintained. An overflow pipe 59 maintains the level of the water 58. Air is forced into the chamber 55 by means of a centrifugal fan 60 which is mounted on a supporting platform 61 in the display stand. The fan 60 has its outlet 62 extending through an aperture 63 that is provided in the wall 30. Preferably the
outlet 2 is fitted rather closely in the aperture so that the fan may build up a substantial air pressure in the chamber 55. The fan 66 is driven by a motor 64 and draws the air down through the aperture 56 and the passage 57 and outlet channel 58. Since the moisture also passes down through the opening 31, I provide a drain trough 65 directly beneath the opening 31 and a drain pipe 66 carries the water from the trough to the overflow pipe 59 and out through a discharge pipe 67 for disposal.

Flange 28 is mounted between the upstanding flange 28 and the rear wall 12. This refrigeration unit is shown somewhat diagrammatically in Figure 4 as comprising cooling coils 56 which extend lengthwise of the cabinet and are supplied with a suitable cooling medium. The coils 56 are provided with closely spaced fins 10 that substantially fill the space between the wall 12 and the flange 28 for a substantial distance upwardly from the bottom edge of the flange 28. Thus the air which is blown through the chamber 55 must pass upwardly around the refrigeration coils 56 and their fins 70 to the outlet channel or opening 42. This cool air, of course, is laden with moisture because of the fact that it is in contact with the water 58. It is not sufficient for most vegetables and fruits to merely employ air of nearly 100 per cent humidity as a cooling medium because the produce will dry out to a serious extent under such circumstances. I provide means whereby a mist of moisture can be entrained with the air so as to convey the moisture over the produce in order to maintain the proper moisture content.

I provide a pump 71 driven by a motor 77 (see Figure 6) and a cooling unit 72 by which water may be drawn from any suitable source such as a city water supply and cooled down to the desired temperature and supplied to the air being forced through the chamber 55. The water from the cooling unit 72 is forced upwardly through pipe coils 75 immersed in the water bath 55 to a series of distributing pipes 74 which have spray nozzles 76 at their upper ends. These spray nozzles are located between the rear and the front walls and spaced from both of them, said platform having an upstanding rear wall, an air distributing box beneath said platform, a fan beneath the platform for forcing air into said box, a screened inlet between the front wall and the front edge of the platform for air to the fan, the front wall having a shield thereon extending substantially above the inlet, said platform having a substantially lower shield at its forward edge for separating produce on the platform from said inlet, an outlet channel for said box extending upwardly between the front wall of the casing and the rear wall of the platform, a top shield extending forwardly from the back wall of said channel in proximity to and directly between the rear wall of the platform, said shield including adjustable means for varying the amount of air delivered to a particular section of the platform, means in said channel to cool the air, and spray heads in the channel for supplying moisture to the air.

It may be desirable for the purpose of maintaining the proper temperatures in the chamber 55 and the air passage to the outlet 42 to insulate the back wall 12. I have shown as an example, an auxiliary wall 79 spaced from the wall 12 so as to provide an insulating space 78 that may be filled with any desired insulation. It is believed that the nature and advantages of my invention will be clear from the foregoing description. The particular matter of supplying the air in its cooled and moistened condition as a sheet or blanket issuing from passage 42 in combination with the front barrier 22 and the down draft at the opening 31 enables me to maintain the cool blanket of air directly over the produce from the passage 42 to the opening 31 with very little intruding of warm air in the room with it. This is due to the fact that I direct the cool air in a downward direction which takes advantage of the tendency of the warmer air to be replaced upwardly by the cool air because the warm air is lighter. Thus the blanket of cool air serves to protect the produce from the warm air in the store and, since it travels in the most natural direction for it to take, this blanket of cold air will maintain or re-establish itself when broken by removal of produce items, to cover the entire produce display area and to effectively block off warm air from the produce area.

Having thus described my invention, I claim:

1. A display stand comprising in combination a casing having a rear wall and a lower front wall, a top wall extending forwardly from the top of the rear wall, a display platform disposed between the front and back walls and spaced from both of them, said platform having an upstanding rear wall, an air distributing box beneath said platform, a fan beneath the platform for forcing air into said box, a screened inlet between the front wall and the front edge of the platform for air to the fan, the front wall having a shield thereon extending substantially above the inlet, said platform having a substantially lower shield at its forward edge for separating produce on the platform from said inlet, an outlet channel for said box extending upwardly between the rear wall of the casing and the rear wall of the platform, said shield including adjustable means for varying the amount of air delivered to a particular section of the platform, means in said channel to cool the air, and spray heads in the channel for supplying moisture to the air.

2. A display stand comprising in combination a casing having a rear wall and a lower front wall, a top wall extending forwardly from the top of the rear wall, a display platform disposed between the front and back walls and spaced from both of them, said platform having an upstanding rear wall, an air distributing box beneath said platform, a fan beneath the platform for forcing air into said box, said box having a body of water therein for supplying moisture to the air, a screened inlet between the front wall and the front edge of the platform, for air to the fan, the front wall having a shield thereon extending substantially above the inlet, said platform having a substantially lower shield at its forward edge for separating produce on the platform from said inlet, an outlet channel for said box extending upwardly between the rear wall of the casing, and the rear wall of the platform,
and opening forwardly over the rear wall of the platform, air deflecting means above the rear wall of the platform for directing the air forwardly over the platform, and air cooling means in said channel.

3. A display stand comprising in combination a casing having a rear wall and a lower front wall, a top wall extending forwardly from the top of the rear wall, a display platform disposed between the front and back walls and spaced from both of them, said platform having an upstanding rear wall, an air distributing box beneath said platform, a fan beneath the platform for forcing air into said box, a screened inlet between the front wall and the front edge of the platform for air to the fan, the front wall having a shield thereon extending substantially above the inlet, said platform having a substantially lower shield at its forward edge for separating produce on the platform from said inlet, an outlet channel for said box extending upwardly between the rear wall of the casing and the rear wall of the platform, and opening forwardly over the rear wall of the platform, and means for cooling and supplying moisture to the air before it is discharged over the platform from said channel comprising cooling coils and water supplying means in the path of the air from the fan to the discharge opening of the outlet channel, at least part of the water supplying means being positioned to supply water to the air after it passes the cooling coils.

4. A display stand comprising in combination a casing having a rear wall and a lower front wall, a top wall extending forwardly from the top of the rear wall, a display platform disposed between the front and back walls and spaced from both of them, said platform having an upstanding rear wall, an air distributing box beneath said platform, a fan beneath the platform for forcing air into said box, a screened inlet between the front wall and the front edge of the platform for air to the fan, the front wall having a shield thereon extending substantially above the inlet, an outlet channel for said box extending upwardly between the rear wall of the casing and the rear wall of the platform, and opening forwardly over the rear wall of the platform, air deflecting means above the rear wall of the platform for directing the air forwardly over the platform, and air cooling means in said channel, said platform having a series of shelf members thereon the rear ends of which are spaced above the platform by triangular side flanges on said members, the rear ends of the shelf members and the rear wall of the platform having cooperating projections for further elevating the rear ends of the shelf members.

HARRY GENECK.

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The following references are of record in the file of this patent:

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