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DISPLAY CASE

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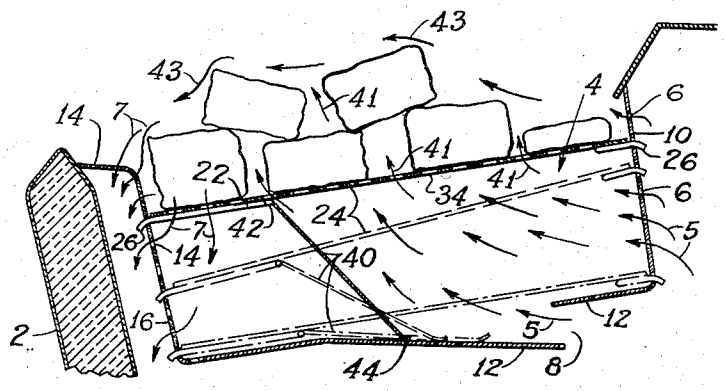


Fig. 3

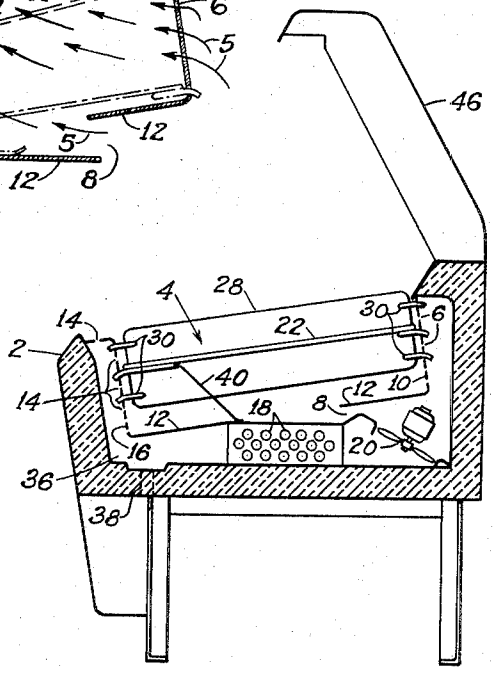


Fig. 2

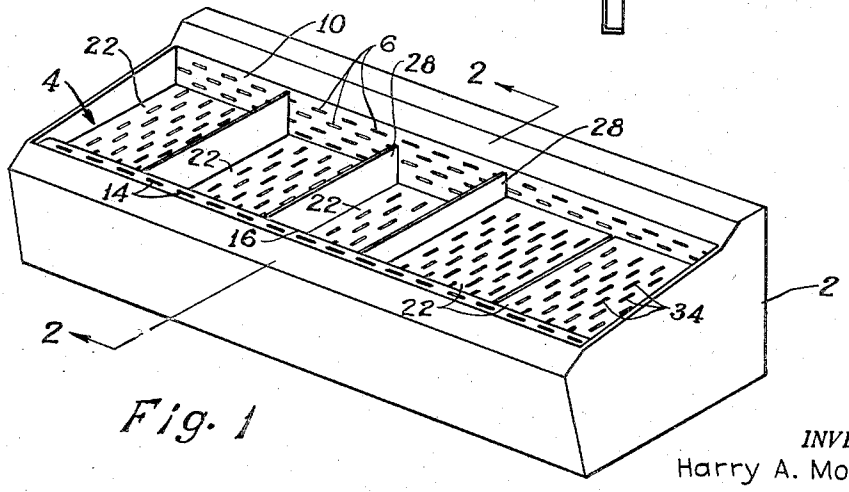


Fig. 1

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DISPLAY CASE

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9 Claims. (Cl. 62—256)

This invention relates to refrigerated display cases and is particularly directed to open top display cases.

In modern grocery stores, especially of the supermarket type, it is customary for food to be displayed in large quantities within easy reach of the customers who select the food for themselves. This presents a problem, however, since many items, such as meats, vegetables and dairy products require refrigeration, and yet must be readily available for selection by the customers.

The open top cases of the prior art have circulated cold air only within the confines of the case. Thus, the quantity of food which could be displayed was limited by the volume of the case and any items which projected above the edge of the case would be unrefrigerated. Furthermore, when such cases were filled to capacity, the food often blocked the openings through which the cold air entered the case and, thereby, prevented proper circulation of the air.

These disadvantages of prior art cases are overcome with the present invention and an open top refrigerated display case is provided wherein food may be piled to a height of a foot of more above the edge of the case while still under refrigeration and without wasting cold air. Moreover, with the case of the present invention, cold air is distributed evenly throughout the food regardless of the amount or distribution of food within the case. In addition, the case can be arranged to present an attractive display even when nearly empty.

The advantages of the present invention are preferably attained by providing an open top refrigerated display case having a perforated shelf or rack which is adjustable as to height and having openings through which cold air is supplied located below the shelf. Moreover, the shelf carries a deflecting vane which automatically positions itself to deflect air upward through the shelf and about the food in any position of the shelf.

Accordingly, it is an object of the present invention to provide a novel open top refrigerated display case in which food may be piled to a height of a foot or more above the edge of the case while still being refrigerated.

Another object of the present invention is to provide a novel open top refrigerated display case wherein cold air is distributed uniformly throughout the food regardless of the amount and distribution of the food.

A further object of the present invention is to provide a novel refrigerated display case which can be arranged to provide an attractive display even when nearly empty.

A specific object of the present invention is to provide a novel open top refrigerated display case having a perforated shelf which is adjustable in height and which carries a cold air deflecting vane which is automatically adjustable to deflect air upward about the food in any position of the shelf. Moreover, the case has below the shelf openings through which the cold air to be circulated is supplied.

These and other objects and features of the present invention will be apparent from the following description

thereof wherein reference is made to the figures of the accompanying drawing.

In the drawing:

Fig. 1 is a perspective of a typical refrigerated display case embodying the present invention;

Fig. 2 is a transverse section through the case of Fig. 1 taken on the line 2—2 thereof; and

Fig. 3 is an enlarged section of a detail of the device of Fig. 1.

In that form of the invention chosen for purposes of illustration in the drawing, the invention is shown as comprising a refrigerated display case **2** having a display chamber **4**. Cold air is preferably admitted to the display chamber **4** through air inlet openings **6** and **8** formed respectively in the rear wall **10** and floor **12** of the chamber **4**, as indicated by arrows **5** in Fig. 3. After passing through chamber **4**, the air is drawn through outlet openings **14** in the front wall **16** of the chamber **4** as shown by arrows **7** and then is passed over refrigerating coils **18** to be cooled and is recirculated by a fan **20** or other suitable means. In this way, a continuous flow of cold air is available to refrigerate and preserve articles in the display case **2**.

Within the display chamber **4**, articles to be displayed are placed on article supporting shelves **22** each of which comprises a tray **24** of metal or other suitable material formed with retaining means such as projections **26** adjacent the opposite ends thereof for engagement with the case to maintain the shelf **22** in a desired position. As shown, the projections **26** may be arranged to project into selected air inlet openings **6** and selected air outlet openings **14** for holding the shelf **22** in a predetermined position. However, the projections **26** or other elements may be formed and arranged in any suitable manner to support the shelf in a desired position. By selecting the openings in which projections **26** are inserted, the position of the shelf **22** may be adjusted to any desired height within the chamber **4**. Thus, when large quantities of goods are to be displayed, the shelf **22** may be lowered to lie along the floor **12** of the chamber **4**, as seen in broken lines in Fig. 3. On the other hand, as the quantity of goods is reduced, the position of the shelf **22** may be raised to the positions indicated in dotted or full lines in Fig. 3. In this way, the appearance of the display can be maintained uniform regardless of whether a large or limited supply of goods is to be displayed. Furthermore, as the supply of goods is reduced, the shelf may be raised to present them in a convenient and attractive manner even though the case is in effect nearly empty. Moreover, where several different articles are displayed in the same case, the quantity of each article may vary. Nevertheless, by adjusting the shelves **22** to various positions as illustrated in Fig. 1, the surface of the display may still be kept neat and even.

To prevent the different articles from becoming mixed or intermingled, dividers **28** may be positioned within the chamber **4** wherever necessary or desirable. The dividers **28** are preferably maintained in a desired location by projections **30** which may be similar to the projections **26** on the shelves **22** and are inserted in the openings **6** and **14** or otherwise supported in a suitable manner. If necessary, where a shelf **22** is in a low position, as seen at **32** in Fig. 1, two or more of the dividers **28** may be arranged in vertical alignment to prevent articles on adjacent higher shelves **22** from spilling onto the lower shelf and also to keep articles on the lower shelf from getting underneath the higher shelf.

Preferably, the trays **24** of the shelves **22** are perforated, as indicated at **34**. In this way any moisture which tends to collect in the tray **24** can escape to the floor **12** of the chamber **4** and through air outlet openings **14** adjacent the floor **12** to the refrigerating chamber

36 where it can be drained off in any suitable manner, as by drain 38.

In order to assure effective circulation of the refrigerated air about the goods on display and thereby refrigerate the same, a deflecting plate or vane 40 is provided and has one edge thereof pivotally secured to the tray 24 of shelf 22 as seen at 42 in Fig. 3. The vane 40 is preferably about the same width as the shelf 22 and is slightly longer than the distance between the shelf 22 and the floor 12 of the display chamber 4 when the shelf 22 is in its uppermost position. The lower edge 44 of the vane 40 therefore will rest upon the floor 12 of the display space 6 when the shelf 22 is in any of its various adjusted positions. The vane is positioned so that it is inclined downwardly and rearwardly from its point of attachment to the shelf. Therefore, cold air entering the chamber 4 through inlet openings 6 and 8 beneath the shelf 22 will flow forward until it encounters the vane 40 whereupon it will be deflected forwardly and upwardly through the openings 34 in the shelf 22 to pass through and about the articles on the shelf and thereby refrigerate them. A portion of the air will, of course, flow upward through the shelf 22 and about the articles located rearwardly of the deflector vane 40. Moreover, additional cold air will enter the chamber 4 above the shelf 22. In this way, uniform refrigeration of all of the articles may be accomplished even when large quantities of goods are being displayed in the case. Moreover, as seen in Fig. 3, the vane 40 automatically adjusts itself when the position of shelf 22 is changed so as to assume the most advantageous position for deflecting the cold air upwardly through the shelf 22 and the goods thereon.

Furthermore, where irregularly shaped articles, such as meats, vegetables and the like, are being displayed in the case, the cold air can circulate between the articles, as indicated by arrows 41 in Fig. 3, and it has been found, with the construction of the present invention, that articles can be stacked to a height of a foot or more above the upper edge of the case 2 while still being effectively refrigerated.

In addition, with the device of the present invention, very little cold air is wasted regardless of the quantity of goods displayed or the location of the shelf 22. In this connection, it will be noticed that the rear wall 10 of the display chamber 4 is higher than the front wall 16. Therefore, since cold air is heavier than warm air, after the cold air has been forced upwardly through the goods by the fan 20, it tends to spill forward and downward toward the front wall 16 of the chamber 4, as indicated by arrows 43 in Fig. 3. However, air outlets 14 are located throughout the area of the front wall 16. Consequently, when the cold air reaches the wall 16, it is drawn through the outlets 16 into the refrigerating chamber 36 by the fan 20 and, thence, it is passed over the refrigerating coils 18 and is recooled and recirculated.

It has been found in practice that the cold air rises to a height of about an inch above the level of the articles being displayed. Furthermore, this is true regardless of the quantity of goods or the position of the shelf 22. Thus, where the level of the goods on one shelf is eight inches above the upper edge of the display chamber and the level of goods on an adjacent shelf is two inches below the edge of the chamber, the level of the cold air is about one inch above the level of the goods in each instance.

If desired, a superstructure, such as that indicated at 46 in Fig. 1, may be provided to hold mirrors, additional shelves, or the like. Also, various retaining means may be substituted for the projections 26 and 30. Furthermore, the form of the shelves 22 and the positions of inlet and outlet openings 6, 8 and 14 may, obviously, be varied considerably without departing from the invention. Accordingly, it should be clearly understood that the form of the invention described above and shown in the figures of the accompanying drawing is illustrative only and is not intended to limit the scope of the invention.

I claim:

1. A refrigerated display case comprising a display chamber, means for cooling air in said display case, means for forcing said cold air into said chamber adjacent the bottom thereof, a perforated article supporting shelf adjustably positioned within said chamber above the bottom thereof to support articles to be displayed and a deflecting vane pivotally secured to said shelf and inclined downwardly and rearwardly from said shelf to direct cold air upwardly through said shelf and about the articles on said shelf.

2. A self service refrigerated display case comprising a display chamber having an open top, air inlet means formed in one wall of said chamber to permit entry of cold air into said chamber, air outlet means formed in the opposite wall of said chamber to permit passage of air out of said chamber, refrigerating coils, means for drawing air out of said chamber through said air outlet means and for passing said air about said refrigerating coils to be cooled and thereafter through said air inlet means to said chamber, a perforated article supporting shelf adjustably positioned within said chamber to support articles to be displayed, and a deflecting vane pivotally secured to said shelf and movable downwardly by gravity upon positioning of said shelf to cause said cold air to pass upwardly through said shelf and about said articles.

3. A refrigerated display case comprising a display chamber, a perforated article supporting shelf adjustably positioned within said chamber to support articles to be displayed, means for refrigerating air in said display case, means for forcing said refrigerated air into said chamber beneath said shelf and a deflecting vane carried by said shelf and projecting downward beneath the same to direct air upward through the shelf and about the articles thereon.

4. A self service refrigerated display case comprising a display chamber having an open top, a perforated article supporting shelf adjustably positioned within said chamber to support articles to be displayed, means for refrigerating air in said display case, means for directing said refrigerated air into said chamber above and below said shelf, and a deflecting vane pivotally secured to said shelf and adjustable to direct cold air upwardly through said shelf and about the articles on said shelf.

5. An article supporting shelf for use in a refrigerated display case comprising an elongated perforated tray having an air deflecting vane carried thereby and projecting downward from the lower surface thereof to deflect air upward through the shelf, said vane being pivotally movable with respect to the tray to assume various alternative positions upon adjustment of the tray within a display case.

6. A refrigerated display case having a display chamber with air inlet openings in one wall thereof and air outlet openings in an opposite wall thereof, means for refrigerating air in said display case, means for circulating said refrigerated air through said openings and display chamber, a perforated shelf located in said chamber and provided with means thereon removably engageable with said openings to support the shelf in various selected positions, the shelf having an air deflecting vane secured to the lower surface thereof and inclined downwardly toward the air inlet openings to direct air upward through the shelf.

7. A refrigerated display case comprising a display chamber, a perforated article supporting shelf adjustably supported in said chamber above the bottom of the chamber, a vane pivotally connected to said shelf and extending downwardly from the lower surface of said shelf, said vane being of greater width than the distance between the shelf and the bottom of the display space so that the lower edge of the vane will move downwardly by gravity to rest upon the bottom of the display space in various adjusted positions of the shelf, means for

refrigerating air in said display case, and means for directing said refrigerated air into the display space beneath said shelf whereby said vane will serve to direct at least a portion of said air upwardly through the perforated article supporting shelf.

8. A refrigerated display case comprising a display chamber, a perforated article supporting shelf adjustably supported in said chamber above the bottom of the chamber, a vane pivotally connected to said shelf and extending downwardly and rearwardly from the lower surface of said shelf, said vane being of greater width than the distance between the shelf and the bottom of the display space so that the lower edge of the vane will move downwardly by gravity to rest upon the bottom of the display space in various adjusted positions of the shelf, means for refrigerating air in said display case, and means for directing said refrigerated air into the display space beneath said shelf and from the rear toward the front of the display space whereby said vane will serve to direct at least a portion of said air forwardly and upwardly through the perforated article supporting shelf.

9. An article supporting shelf for use in a refrigerated display case comprising an elongated perforated tray having an air deflecting vane carried thereby and located intermediate the ends of the tray, said vane projecting downwardly below the lower surface of the tray and being inclined toward one end thereof in position to direct air flowing beneath said tray upward through perforations in the tray and into contact with articles supported on the upper surface of the tray.

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