Dec. 19, 1933. F. R. SUNDLING ET AL 1,940,515

REFRIGERATED DISPLAY COUNTER

Filed April 7, 1930 2 Sheets-Sheet 1

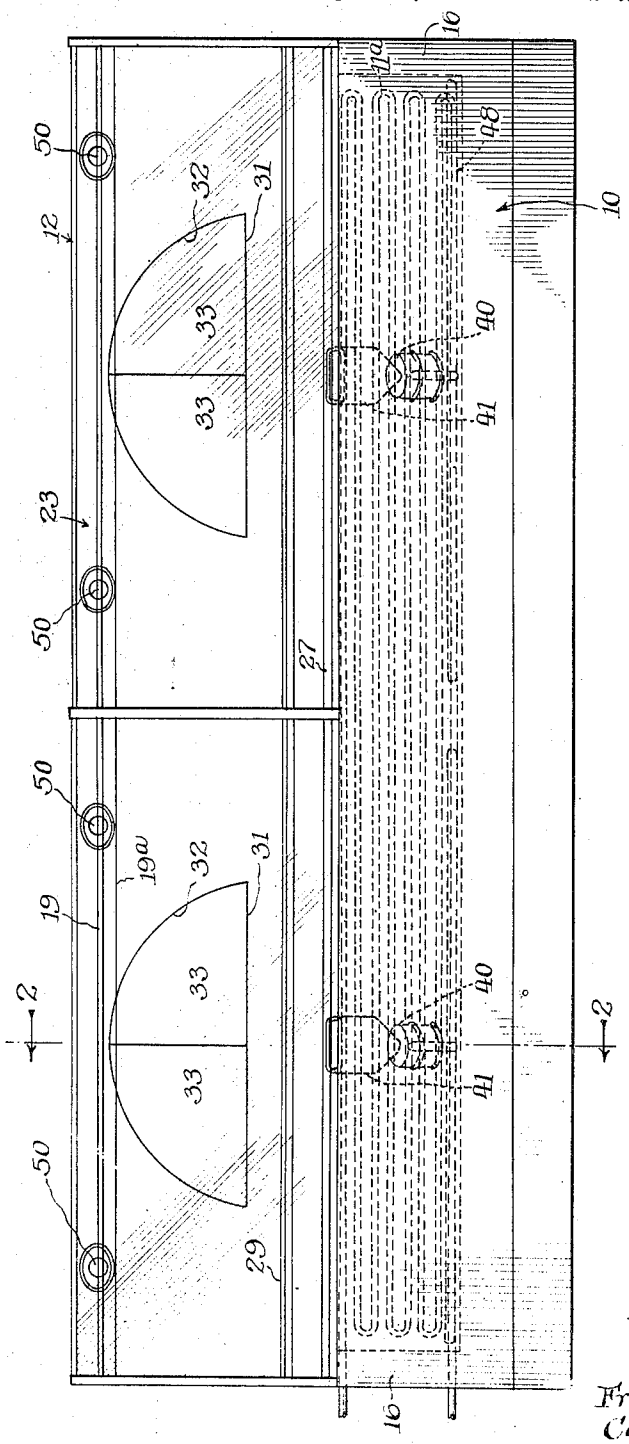


Fig. 1.

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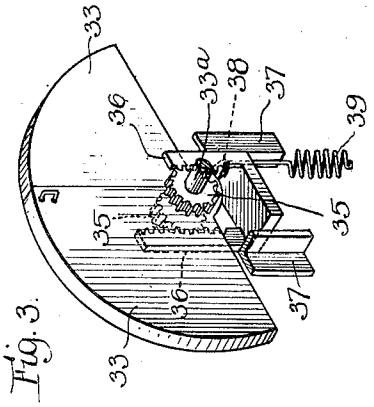


Fig. 3.

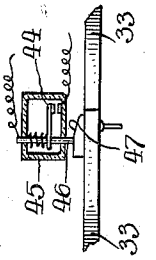


Fig. 4.

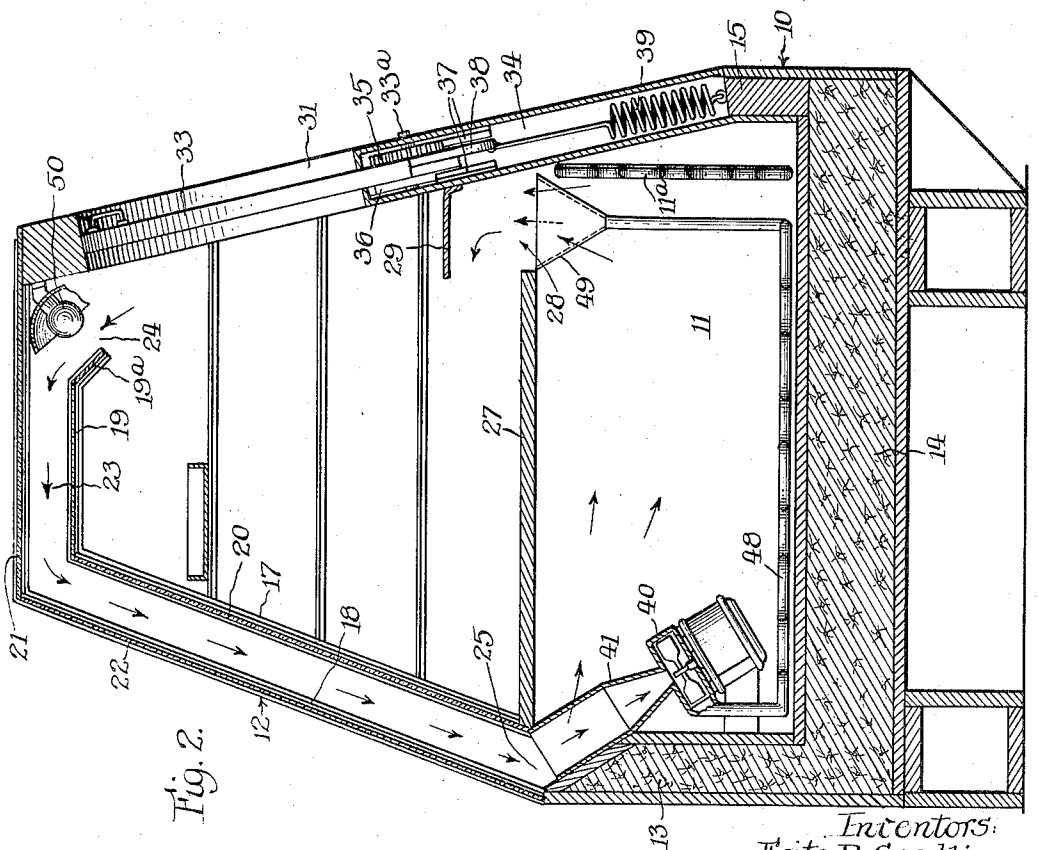


Fig. 2.

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UNITED STATES PATENT OFFICE

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REFRIGERATED DISPLAY COUNTER

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Application April 7, 1930. Serial No. 442,134

7 Claims. (Cl. 62—89.5)

In refrigerated display counters it has been found that the moisture contained in the warm air admitted when the doors are opened tends to condense on the foods contained in the counter. This warm air also tends to increase the temperature of the foods.

The primary object of the present invention is to provide a refrigerated display counter having means operable to prevent such warm air from coming into contact with the foods in the display compartment.

Another object of the present invention is to provide such a counter embodying means for conducting the warm air admitted through the open doors directly to the cooling compartment of the counter so that the temperature of the air will be reduced and the moisture removed therefrom before the air has an opportunity to come into contact with the foods in the display compartment.

Another object is to provide a counter of this type having means operable automatically when the doors are opened to draw the comparatively warm air from the display compartment adjacent the doors and conduct it to the cooling compartment.

In attaining the above and other objects the present invention provides a counter having a display compartment, a cooling compartment communicating therewith, and a passage leading from the upper part of the display compartment to the cooling compartment so that the comparatively warm air in the top of the counter may be returned to the cooling compartment without striking the foods contained in the counter.

Other objects and advantages will become apparent from the following description in connection with the accompanying drawings, in which:

Fig. 1 is a front elevational view of a counter embodying the invention in its preferred form.

Fig. 2 is an enlarged vertical sectional view taken along the line 2—2 of Fig. 1.

Fig. 3 is a fragmental perspective view showing the operating connections between the doors.

Fig. 4 is a fragmental plan view of the top of the doors showing a switch box in section.

For the purposes of disclosure, we have illustrated in the drawings and will hereinafter describe in detail the preferred embodiment of the invention, with the understanding that we do not intend to limit our invention to the particular construction and arrangement shown, it being contemplated that various changes may be made by those skilled in the art without departing from the spirit and scope of the appended claims.

As illustrated herein, the invention is embodied in a counter having a hollow base 10 with a cooling compartment 11 therein, above which a display compartment 12 is provided communicating with the cooling compartment. The cooling compartment 11 is formed by front, bottom, and rear walls 13, 14, and 15 of insulated construction and is closed at the ends by insulated walls 16. In the cooling compartment 11 a suitable refrigerating means, such as a plurality of brine coils 11^a, is provided so as to cool the air passing through that compartment.

The end walls 16 and the rear wall 15 are extended upwardly to provide end and rear walls for the display compartment. Preferably both the top and forward walls of the display compartment 12 are transparent and, as herein shown, these two walls each comprise a pair of spaced plates of glass having an air space therebetween which will aid in maintaining a low temperature in the display compartment. For supporting the front and top walls of the display compartment, inner and outer angular frames 17 and 18 (Fig. 2) extend forwardly in spaced relation from the top of the rear wall 15 and then downwardly to the top of the front wall 13, so that inner plates 19 and 20 may be mounted on the top and forward sections respectively of the inner frame 17, and outer plates 21 and 22 of glass may be mounted in corresponding positions on the outer frame 18.

In accordance with the present invention the circulatory path of the air is such that the air from the top of the display compartment is returned to the cooling compartment without passing over the foods in the display compartment. This is accomplished, in the present instance, by utilizing the space between the plates 19 and 21 of the top wall and the plates 20 and 22 of the forward wall as a part of a passage 23 leading between the two compartments 11 and 12. To provide an inlet opening for the passage 23, the inner plate 19 of the top wall terminates short of the rear wall 15 so as to leave a space 24 through which the air may enter the passage. At the lower edge of the plates 20 and 22, the front wall 13 of the base has a longitudinally extending opening 25, which permits the air from the passage 23 to discharge into the cooling chamber 11.

The circulatory path for the air may be completed by suitable openings between the cooling compartment 11 and the display chamber. In the present case the two compartments 11 and 12 are separated by a horizontal wall 27 connected to the

lower edge of the plate 20 so as to prevent air from passing between the compartment at this point. The wall 27 terminates short of the rear wall 15 to form a space 28 extending longitudinally of the counter through which air may pass from the cooling compartment 11 into the display compartment. The cooled air which moves upwardly through the space 28 is directed forwardly over the lower wall 27 of the display compartment by means of a forwardly extending shelf or baffle 29 mounted on the rear wall 15 above the plane of the wall 27 and overlying the space 28. This air will gradually increase in temperature as it contacts the food contained in the display compartment so that the air will rise to the intake opening of the passage 23. The action of the rising air will cause a continuous circulation of the air as above described and each time the air passes through the cooling chamber 11 the moisture carried by the air will be removed.

Access may be had to the display compartment 12 through one or more door openings 31, formed in the upper portion of the rear wall 15. In the preferred form, each opening 31 is of segmental shape, as shown in Fig. 1, with an upper arcuate edge 32, and each opening is closed by a pair of sliding segmental doors 33 movable about a common pivot pin 33a at substantially the pivotal center of the arcuate edge 32 of the door opening. When in their closed positions the two doors 33 are arranged to abut each other at the highest point of the arcuate edge 32 and when in their open positions they are located in a recess 34 formed in the rear wall 15 below the door opening.

Preferably the two doors 33 of each pair are arranged to move in unison so that force applied to one door will cause both doors to move. This is accomplished by securing a pinion 35 (Figs. 2 and 3) to each door 33 and providing two interconnected racks 36, one rack engaging one pinion 35 on one side and the other rack engaging the other pinion on the opposite side thereof. A guide 37 is provided for the connected ends of the racks 36 so that the two doors will move together. To move the doors 33 to their closed position an arm 38 is secured on one door with a spring 39 stretched between the end of the arm and an anchor in the wall 15.

When the doors 33 are opened warm air is, of course, admitted to the display compartment, but since the normal circulation of the air in the compartment is upward, this warm, moisture-carrying air will move into the passage 23 and to the cooling chamber 11 before it has an opportunity to strike the food in the display compartment. To deflect the air into the passage 23, a downwardly extending baffle plate 19a may be positioned at the rear edge of the plate 19 (Fig. 2). Upon reaching the cooling compartment, the moisture will be condensed out of the fresh air so that it is in a proper condition to be utilized in the counter. Thus, it is possible to introduce fresh air into the counter without detriment to the food therein.

Although the normal action of the construction above described will under most conditions prevent the air entering through the doors from striking the food, the present invention also provides additional means to insure against such an event. This means, in the present case, serves to induce additional circulation of air along the path above described, whenever the doors 33 are opened. To this end, as shown in Figs. 1 and 2, a motor operated fan 40 is mounted in the cooling chamber 11 with an intake opening in the form of a funnel 41 positioned at the lower end of the passage 23. The funnel 41 extends only a short distance longitudinally along the lower end of the passage 23 (Fig. 1) so that it does not interfere materially with the normal flow of air from the passage.

As shown in Fig. 1, one fan 40 and funnel 41 are provided for each door opening 31, and the funnels 41 are located in substantially the same longitudinal positions as the doors. Thus when a fan 40 is operated, it will apply its greatest suction to that part of the passage 23 which leads from just above the corresponding door.

In order to cause the proper fan 40 to operate when a pair of doors 33 are opened, separate control circuits (not shown) are provided for the two fan motors, and each circuit includes a normally closed switch 44 (Fig. 4) within a box 45 mounted on the rear wall 15, adjacent the corresponding pair of doors 33. From the box 45, a pin 46 projects which is engaged by a cam surface 47 on one of the doors 33 to open the motor circuit when the doors are closed.

It is, of course, desirable to cool the fresh air admitted through the doors to a temperature substantially the same as that of the other air in the counter. This is done in the present case by attaching a circuitous conduit 48 (Figs. 1 and 2) to the discharge side of each fan 40, the conduit being located in the cooling chamber 11 and being of sufficient length to insure proper cooling of the air. In the embodiment shown the conduits 48 are arranged to discharge upwardly through funnels 49 into the display chamber directly beneath their respective doors. By this arrangement the cooled air which is in the conduits when the doors are closed, is forced upwardly into the display compartment as soon as the doors are opened and is directed forwardly by the baffle 29 to form a blanket of unusually cool air over the food, which will aid in keeping the warm air away from the food.

With a counter constructed as above described, it is possible to illuminate the display compartment by lights located within the counter, without detriment to the food due to the heat given off by the lights. This is accomplished by mounting each light 50 in the passage 23 so that the heat radiated from the light is absorbed by the air moving through the passage. This air does not strike the food again until it has been cooled and hence the lights do not have a detrimental effect on the food.

From the foregoing it will be apparent that the invention provides an improved and highly efficient counter since the only transparent walls of the counter are of such a character that they are, in effect, insulated. By providing a passage from the upper part of the display compartment which extends exteriorly of that compartment and discharges into the cooling compartment, the present invention prevents the comparatively warm air from coming into contact with the food in the counter. Since the intake end of this passage is located adjacent to the top of the doors, the air which is admitted therethrough passes immediately into the passage and is conducted to the cooling chamber without coming into contact with the food.

It will be apparent that the provision of the draft inducing means operable when the doors are opened, serves to insure that all of the air admitted through the doors will be drawn into the passage. The circuitous conduit which is attached to the draft inducing means and which discharges beneath the doors, serves to cause a large volume

of unusually cool air over the food as soon as the doors are opened and thereby aids in preserving the food.

Furthermore, the utilization of the front and top walls to provide a return passage through which air may be conducted from the top of the display compartment enables the applicant to provide a passage which is coextensive with the counter and which, therefore, produces an even circulation of air throughout the counter.

We claim as our invention:

1. A refrigerated display counter having a hollow base providing a cooling chamber, cooling means in said cooling chamber, walls defining a display chamber above said base, the rear wall of said display chamber having a door therein, and the top and forward walls of said chamber being formed by spaced plates of glass to provide a passage therebetween, the inner plate of said top wall terminating short of said rear wall to provide an inlet opening for the air from said display chamber, means providing an outlet from the lower forward end of said passage into said cooling chamber, a motor operated fan for inducing circulation in said passage from the inlet opening to the said outlet opening, and a control switch for said motor operable to start said motor when said door is opened.

2. A refrigerated display counter comprising a compartment having cooling means therein, walls forming a display compartment, one of the walls having a door therein, means providing a passage leading from directly above said door inside of said display compartment to said cooling compartment, means operable to induce a flow of air through said passage from the display compartment to said cooling compartment, and means controlled by said door to cause operation of said flow inducing means when said door is open and to terminate such operation when the door is closed.

3. A refrigerated display counter comprising a compartment having cooling means therein, walls forming a display compartment communicating with said cooling compartment, one of the walls having a door therein, and means controlled by said door and operable when said door is opened to induce a flow of air from said display compartment to said cooling compartment.

4. A refrigerated display counter comprising a compartment having cooling means therein, walls forming a display compartment, one of the walls having a door therein, and means controlled by said door and operable when said door is opened to induce a flow of air externally of said display compartment from said display compartment to said cooling compartment.

5. A refrigerated display counter having walls defining a display compartment, one of said walls having a door opening therein, the horizontal width of which decreases toward the upper extremity of the opening, a door for closing said opening arranged to be moved downwardly toward its open position, means forming a passage having an inlet opening inside of said compartment above and adjacent to said door, said passage extending externally of said compartment, and means for inducing a flow of air into the inlet end of said passage when said door is opened.

6. A refrigerated display counter comprising, in combination, a base providing a cooling chamber, walls forming a display chamber on said base, one of said walls having a door therein, means forming a passage through which cooled air may pass from said cooling compartment into said display compartment, means forming a second passage extending from above said door within the display compartment into said cooling compartment, motor driven means for inducing a flow of air through said second passage, and a switch actuated by said door to cause said motor to operate when said door is opened.

7. A refrigerated display counter comprising, in combination, a cooling chamber having cooling means therein, walls forming a display compartment communicating with said cooling compartment, one of said walls having a door therein, a fan arranged to be operated when the door is open, and means connected to said fan arranged to direct cool air from said cooling compartment into said display compartment.

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