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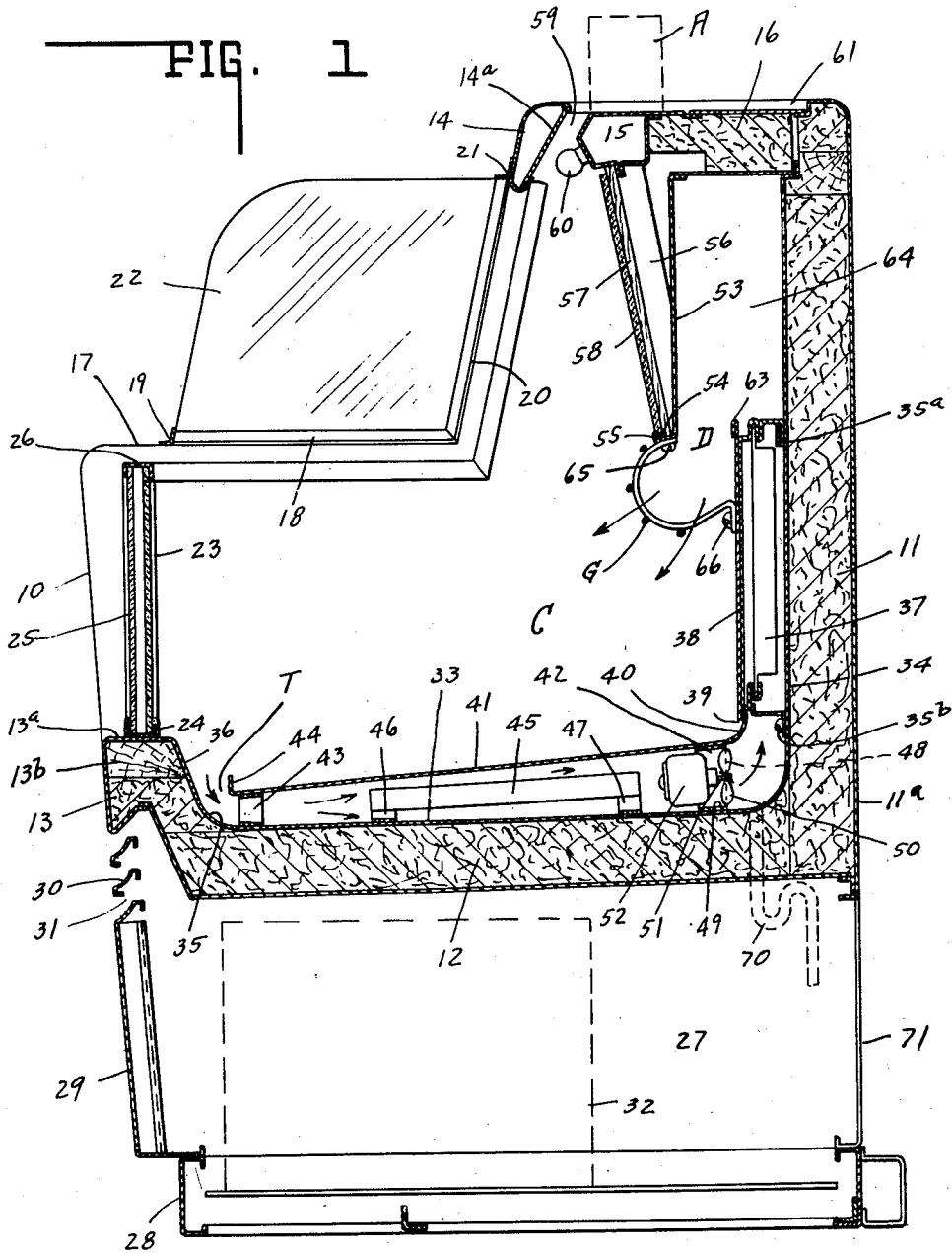
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OPEN DISPLAY REFRIGERATED CASE

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OPEN DISPLAY REFRIGERATED CASE

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10 Claims. (Cl. 62—89.5)

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This invention relates to an open, display type, refrigerated case.

The chief object of the present invention is to provide a case of the aforesaid character wherein an improved cycle of cold air is utilized for semi-perishable products, such as bottled milk and cream, cheese, yeast, vegetables, cured and aged meats, which are displayed for purchaser selection and removal and, while displayed, are maintained at a predetermined temperature inhibiting deterioration or spoilage, such as between 50° and 60° F., by way of example only.

Cases of this general type are broadly old and the invention herein relates to improvements thereon.

One feature of the present invention resides in the utilization of positive circulation as distinguished from thermo-syphon circulation.

Another feature of the invention resides in the pull-push arrangement of a plurality of air cooling units with an intermediate power means therebetween, such as a fan that pulls air through or over one such unit and which fan pushes the air through or over another such unit.

A further feature of the invention resides in a turbulence chamber adjacent the cold air discharge to the display chamber, which first mentioned chamber kills or mitigates excess air velocity incident to the power of the forced circulatory system.

Still a further feature of the invention resides in the cold air discharging from the rear and upper portion of the display chamber, downwardly and forwardly to the front and bottom of said chamber.

Other objects and features of the invention will be set forth more fully hereinafter.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

In the drawings—

Fig. 1 is a vertical front to rear sectional view taken in the plane I—I of Fig. 2 and in the direction of the arrows.

Fig. 2 is a front elevation of the left hand end of a case embodying the invention.

In Fig. 1 of the drawings 10 indicates a substantially L-shaped end and it is to be understood that there are two ends to the case and they are connected by the back, generally indicated by the numeral 11, and a false bottom 12 and an intermediate front portion 13. The upper portion is connected at the top by the forward portion 14 and the portion 15 spaced therefrom. Between the upper portion of the back 11 and the portion 15 is a removable top section 16.

Upon the top ledge 17 of the major side portion there is a channel structure 18 with an end stop 19 and the forward wall of the side 10 is

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also provided with a channel 20 terminating in a stop structure 21. The glass side panel 22 is thus retained therein. On the inside of each of the ends 10, in confronting relation, are the channels 23 and upon the top 13a of the front portion 13 is the horizontal channel 24. The glass 25 is supported in channels 23 and 24 and is retained therein as at 26.

Below the false bottom 12 is a chamber 27 and this chamber is provided with a base 28. It will be noted that the same terminates inwardly of the front 29 of said chamber so that toe accommodation is provided. The upper portion of the front 29 immediately contiguous to the front 13 is louvered as at 30 to provide ventilating apertures or vents 31 to permit the access of air to chamber 27 in which is mounted the refrigerating mechanism which may be of conventional type and the block diagram 32 indicates merely the compressor of such mechanism.

The false bottom 12 provides an upper surface 33 which is herein shown pitched slightly rearwardly from front to back, the rear end of that surface being indicated as at 34. The front end of that surface is also curved as at 35 and blends into the extension 36, forming the rear of the front wall 13 and the surface 36 is directed upwardly and forwardly and terminates at the top surface 13a.

The rear wall 11 above the false bottom 12 is interiorly defined by the forward wall 34 and the same may be suitably extended as the radius portion 34 as shown, or in any other desired manner, wall 34 is secured in spaced relation to the back wall 11a. The false bottom and the front 13, except for the portion 13b as illustrated, and the rear wall 11 all are of insulation material of any desired and suitable character.

Rigid with the interior rear wall 34 which terminates immediately adjacent the top of the cabinet or case and more particularly the removable insulation portion 16, are the brackets 35a and 35b and the same support a cooling coil unit 37 in any suitable manner. Said coil unit is substantially coextensive in length with the interior of the case.

Forwardly of the wall 34 is a display chamber forming rear wall 38 and the latter at its lower end has a detachable connection as at 39 with the upwardly directed rearward end of the curved portion 40 of the display chamber forming bottom wall 41, which, as shown, is inclined upwardly and rearwardly and is suitably supported as at brackets 42 and 43 upon the wall 33.

The lower forward end of this panel 41 has an upwardly directed flange portion 44. This display chamber bottom is substantially coextensive with the case from one end to the other, having reference to the inside surfaces of the ends or sides of the case.

This removable bottom can be readily detached

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at 39 and elevated from its supporting brackets 42 and 43 whenever desired or required. In the resulting lower channel formed between the portions 33 and 41 is a second cooling coil 45 rigidly connected by brackets 46 and 47 to the false bottom upper plate 33.

Coextensive with the case from one inside wall to the other is a partition 48, the same being part of the bracket 42 aforesaid, upon which the removable bottom 41 rests at the rear of the display chamber. This partition is provided herein with two circular apertures 49, although only one is shown in Figs. 1 and 2, it being understood that there is at least another one similarly positioned with respect to the right end of the case and, if desired, any additional number may be provided, although two has been found sufficient.

Rotatable in each of the apertures 49 is a fan 50 carried by shaft 51, rotatable by the motor 52. The motor is of self-contained type and all motors are connected in multiple. Thus, air entering the throat, designated by the letter T, at the forward lower end of the display chamber, designated by the letter C, is drawn through and around the cooling coil 45 by said fan and the cooled air resulting from such passage is discharged through the apertures 49 and thence upwardly in the vertical leg of the L-shaped channel previously described and through and around the cooling coil 37.

As previously set forth, the upper end of the inside wall 34 of the rear wall 11 terminates near the top of the cabinet. Spaced forwardly thereof, and in depending relation relative to the top, is a wall 53 and the same extends forwardly as at 54 at its lower end and slightly upwardly as at 55. Forwardly of the rear wall is insulation 56 and carried by the forward wall 57, which is downwardly and rearwardly inclined, is a mirror 58.

The rearward surface 14a of the portion 14, which is the highest and most forward portion of the case, is inclined downwardly and forwardly and is of light reflecting character, that is, it may be highly polished or may be a mirror. Adjacent thereto and substantially coextensive with the portion 15 and in the channel 59 between portions 14 and 15, is an elongated luminescent tube 60 or a series of longitudinally aligned luminescent tubes.

The heat generated by this light source, or these light sources, is dissipated through the channel 59. Certain of the light rays which are directed upwardly from the light source 60 are reflected through the channel and upwardly and rearwardly upon any article, such as that indicated by the dotted line and legended A, which may be placed upon the recessed top, the recess being indicated by the numeral 61.

Other light rays which impinge upon this reflector 14a are directed rearwardly upon the mirror 58 and thence are reflected forwardly and downwardly upon the articles in the display channel C. Other rays from the light source are directed rearwardly and downwardly upon the reflector or mirror 58 and are similarly reflected. Still other rays are directed downwardly and forwardly for illumination of the contents in the display channel C.

The upper end of the wall 38 terminates as at 63. Thus air from the L-shaped cooling channel is discharged upwardly into the chamber 64. This is at a velocity greater than that necessary to insure forced cycle circulation. Hence the chamber 64 serves as a turbulence chamber and

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reduces the velocity of the discharging air so that as it escapes from between the portion 54 and the upper end 63 of the forward wall 53 and the rearward wall 38 of the display chamber respectively, the velocity of discharge is sufficient to just cause the air to flow gradually from what might be termed the upper and rearward portion of the display chamber to the lower forward end thereof, that is, from back to front and from top to bottom. This discharge is in sheet form substantially coextensive with the length of the case between the side walls thereof.

To prevent the stacking of articles in the display chamber and clogging up this discharge throat D, a grill G is provided and the same is secured as at 65 and 66 to the portion 54 and the rear wall 38 of the display chamber.

It will be observed that the upper elevation of the substantially vertically disposed cooling unit 37 terminates slightly below the lower level of the bottom end of the forward wall structure indicated at 54 and that the upper end 63 of the rearward wall 38 terminates slightly above the upper level of that cooling unit 37.

Condensate that forms upon or about the cooling coil in the form of frost which subsequently discharges as water and moisture which condenses in the L-shaped passage and moisture which is discharged from the cooling unit 45, which might be termed the horizontally disposed unit, as a result of the inclination of the wall 33 can be discharged from the lower point thereof. Since herein this is at the rear end, the drain would be at the rear end and this wall 33 may be inclined from the side edges toward the center so that the center could be slightly lower than the side edges, whereby all the condensate would collect centrally in the case and could discharge through a water type seal that comprises a return bend structure as indicated by the dotted lines in Fig. 1 and designated by the numeral 70.

The lower end of this drain may discharge to a suitable removable container not shown, and the lower rear end of the case may be provided with a removable closure 71 for access to the chamber 27 for container removal or other purposes incident to adjustment, maintenance or repair of the refrigerating mechanism other than the cooling coils and the control parts directly associated therewith.

It will be obvious from the foregoing that the upper forward portion of the display chamber is open so that the potential purchaser can personally select and remove the merchandise therein displayed and maintained at the required temperature to prevent spoilage or deterioration. The end panels 22 prevent air from entering into the display chamber from the ends of the cabinet.

The forward glass 25 prevents the discharge of the cooled air after it is passed substantially through the display chamber. The case herein illustrated has a marked stratification of air. That is, the air discharged at D blows forwardly and downwardly toward the intake throat T with but little tendency of the atmospheric air to enter into the display chamber, thereby resulting in economy of operation, notwithstanding the fact that the display chamber is open to the air, as illustrated.

While the invention has been illustrated and described in great detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character.

The several modifications described herein, as well as others which will readily suggest themselves to persons skilled in this art, all are considered to be within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. In an open type display refrigerated case the combination of an L-shaped channel defining the major part of the bottom and rear portions of an open display chamber, air cooling means in each leg of the channel, and air moving means interposed between the two leg air cooling means for pull-push forced air circulation through the channel, the channel communicating at opposite ends with the chamber, the L-shaped channel being formed by a substantially imperforate top wall member and a substantially imperforate upright wall member, said members at adjacent edges having a detachable connection therebetween, and support means for the wall members.

2. In an open type display refrigerated case the combination of an L-shaped channel defining the major part of the bottom and rear portions of an open display chamber, air cooling means in each leg of the channel, and air moving means interposed between the two leg air cooling means for pull-push forced air circulation through the channel, the channel communicating at opposite ends with the chamber, the L-shaped channel being formed by a substantially imperforate top wall member and a substantially imperforate upright wall member, said members at adjacent edges having a detachable connection therebetween, and support means for the wall members, the air cooling means in each leg being disposed in spaced relation to the adjacent wall member.

3. In an open type display refrigerated case the combination of an L-shaped channel defining the major part of the bottom and rear portions of an open display chamber, air cooling means in each leg of the channel, and air moving means interposed between the two leg air cooling means for pull-push forced air circulation through the channel, the channel communicating at opposite ends with the chamber, wherein a partition in the channel and separating the legs thereof, and the air moving means comprises a fan disposed in an opening in the partitions, the L-shaped channel being formed by a substantially imperforate top wall member and a substantially imperforate upright wall member, said members at adjacent edges having a detachable connection therebetween, and support means for the wall members.

4. In an open type display refrigerated case the combination of an L-shaped channel defining the major part of the bottom and rear portions of an open display chamber, air cooling means in each leg of the channel, and air moving means interposed between the two leg air cooling means for pull-push forced air circulation through the channel, the channel communicating at opposite ends with the chamber, wherein a partition in the channel and separating the legs thereof, and the air moving means comprises a fan disposed in an opening in the partitions, the L-shaped channel being formed by a substantially imperforate top wall member and a substantially imperforate upright wall member, said members at adjacent edges having a detachable connection therebetween, and support means for the wall members, the air cooling means in each leg being disposed in spaced relation to the adjacent wall member and oppositely relative to the partition.

5. In an open type display refrigerated case the combination of an L-shaped channel defining

the major part of the bottom and rear portions of an open display chamber, air cooling means in each leg of the channel, and air moving means interposed between the two leg air cooling means for pull-push forced air circulation through the channel, the channel communicating at opposite ends with the chamber, the L-shaped channel lower leg portion being of substantially progressively increasing depth from the intake end of the channel to the other leg portion of the channel.

6. In an open type display refrigerated case the combination of an L-shaped channel defining the major part of the bottom and rear portions of an open display chamber, air cooling means in each leg of the channel, and air moving means interposed between the two leg air cooling means for pull-push forced air circulation through the channel, the channel communicating at opposite ends with the chamber, the L-shaped channel lower leg portion being of substantially progressively increasing depth from the intake end of the channel to the other leg portion of the channel, the bottom of the lower leg channel being inclined toward one end thereof for drainage purposes, a drain communicating with that lower end, and liquid seal means for said drain.

7. In an open type display refrigerated case the combination of an L-shaped channel defining the major part of the bottom and rear portions of an open display chamber, air cooling means in the channel, power means in the channel for insuring forced circulation of air therethrough, the intake of the channel being at the bottom portion and the discharge at the rear portion, and turbulence chamber forming means juxtapositioned to and above the channel discharge and into which the channel discharges, the turbulence chamber discharging to the display chamber contiguous to the channel discharge.

8. A display case as defined by claim 7 wherein the air cooling means is of multiple character, one portion being in each leg of the channel, and the power means is interposed between the said portions of the air cooling means for pull-push operation.

9. A display case as defined by claim 7 wherein the air cooling means is of multiple character, one portion being in each leg of the channel, and the power means is interposed between the said portions of the air cooling means for pull-push operation, and a partition between the channel legs for separation and having an opening there-through, the power means including a fan positioned in said partition opening.

10. A display case as defined by claim 7 wherein there is provided, forwardly of the turbulence chamber, spaced means forming an upwardly directed ventilating structure in the top of the case and comprising rearwardly and downwardly inclined panel means terminating adjacent the chamber discharge, and shorter panel means inclined downwardly and forwardly and spaced forwardly of the first panel means and terminating adjacent the upper edge of the case display opening.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,298,526	Caulk	Oct. 13, 1942
2,332,174	Shreve	Oct. 19, 1943