July 16, 1935. R. P. DAEMICKE 2,008,203

REFRIGERATOR DISPLAY CASE

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Fig. 1.

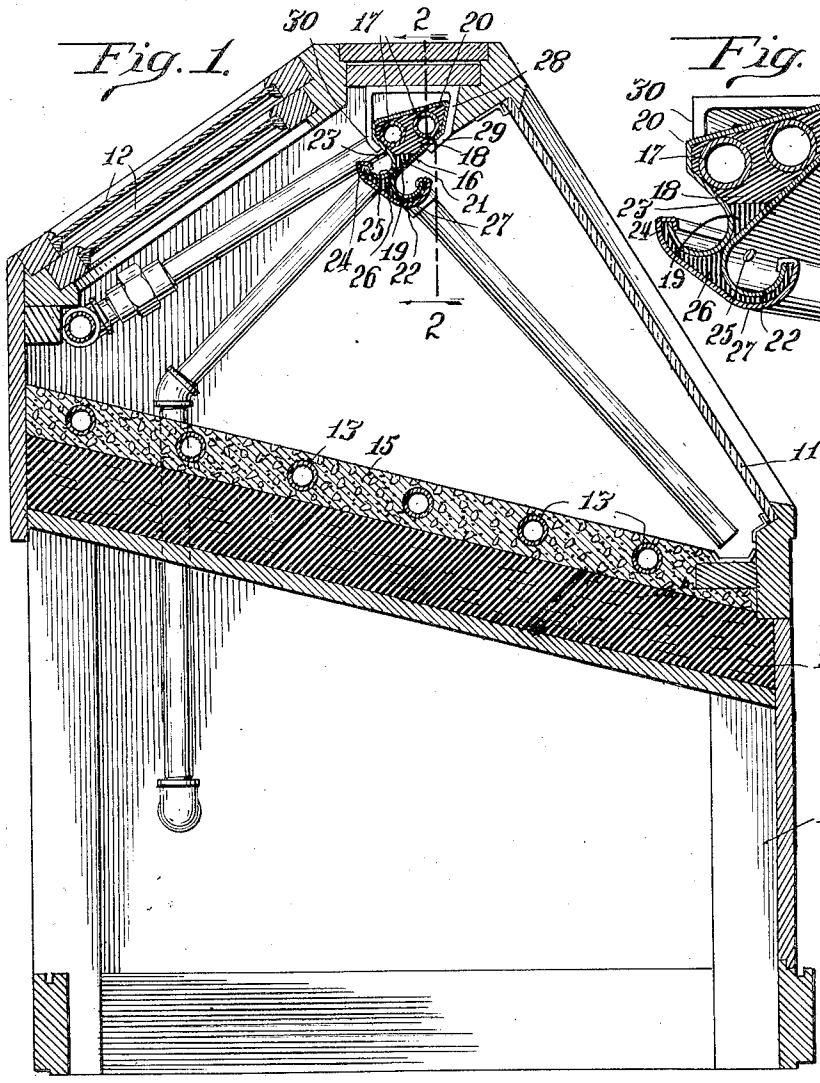
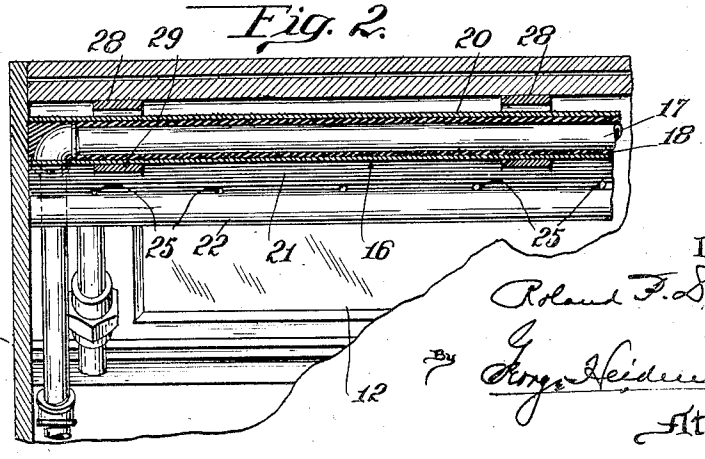


Fig. 3.

Fig. 2.



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REFRIGERATOR DISPLAY CASE

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5 Claims. (Cl. 62—103)

My invention relates to a refrigerated service display case or counter for perishable articles of food such as meat and the like; the invention having for its object the provision of a construction whereby increased efficiency and economical refrigeration are produced and the food-stuffs or meats will be maintained in the desired chilled condition not only by contact on one side with the chilled bottom of the case or a cold conducting tray but also by cold air contacting with the other or upper side of the article also.

The invention also has for its object the provision of a construction wherein defrosting of the refrigerator elements is eliminated and dehydration of the food-stuffs is to a great extent avoided; a construction wherein free coils and radiating fins are eliminated, while on the other hand a "hold-over" of the low temperature is had after the refrigerator apparatus has been shut down.

Another object of the invention is a construction wherein the cooling elements in the upper part of the display case are encased in a conducting and cold temperature retaining material which is so arranged that the condensate which occurs and accumulates on my improved chilling unit will be conveyed to the display case exterior without coming into contact with the food-stuffs or meats.

The objects and advantages of my invention will be readily comprehended from the following detailed description of the embodiment of my invention as disclosed in the accompanying drawing, wherein:

Figure 1 is a cross sectional view through a display case involving my invention.

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1 looking in the direction of the arrows.

Figure 3 is a perspective view of a portion of the cooling element, also shown in section, and one of the holding brackets.

My invention relates to a refrigerator display case especially intended for containing and displaying meats and other food-stuffs which require a proper temperature while on display; the invention involving, in addition to the refrigerating coils generally disposed in the bottom of the case, refrigerating means arranged in the upper part of the case so as to provide a cold air current above and on the upper sides of the cuts of meats or other food-stuffs arranged in the case.

The specific type of display case illustrated involves a suitable supporting lower portion or frame 10; while the upper portion constitutes the display counter proper. The forward side of the display counter usually consists of glass as at 11, held in place by suitable frames; while the rear or salesman's side involves suitable slide panels or doors as at 12 arranged in slideways disposed in different planes to permit independent movement of each panel longitudinally of the case.

The front and rear sides of the case are preferably arranged at suitable and different inclinations to permit proper visibility of the case contents; and the bottom of the case is preferably arranged at an inclination as shown.

My invention relates to a mechanically refrigerated case; and therefore the bottom and rear lower portion of the case is provided with refrigerating coils as at 13 arranged lengthwise of the case and connected by suitable ingoing and outgoing pipes as usual which lead to a mechanical refrigerating unit located at a suitable or distant place. The bottom involves a wall of suitable insulating material as at 14, on top of which is a comparatively thick layer of waterproof and at the same time cold conducting material 15 in which the coils 13 are embedded. With the insulating material 14 beneath and the coils fully covered or encased, the coils are sealed against air and the cold practically entirely transmitted to the top of the bottom of the case and on which trays containing the food-stuffs or meats are generally placed.

It has been found in practice that while that portion of the food-stuffs or meats in immediate contact with the cold bottom slab may be sufficiently chilled, such portions of the food-stuffs which may be somewhat removed from or above the bottom of the case may not be sufficiently chilled, especially where the slide doors or panels 12 have been frequently opened, allowing inrush of warm air. This warmer air will, of course, accumulate in the upper part of the display case and hence be in contact with the upper sides of the food-stuffs, especially if they are somewhat above the bottom of the display case.

It has therefore been found desirable to arrange cooling coils above the bottom of the case in an effort to obtain a greater chilling of the interior of the case and its contents.

The arrangement of the coils, however, has been found objectionable in many ways, because of improper dehydration of the food-stuffs. Then, too, the heat absorbing or air cooling period is very short lived after the refrigerating unit has been shut down; the open coils also

necessitating frequent defrosting during which periods the display case is out of use.

In order to overcome these serious objections, I provide the upper part of the case with a chilling slab as at 16 composed of molded temperature conducting material. This slab 16 involves one or more refrigerator pipes or coils as at 17 (see Figure 3) which are completely embedded or encased in a suitable cold resisting and conducting plastic material indicated at 18, which at the same time will retain its refrigerating temperature for a considerable period of time.

After the coils (of suitable number and length) have been embedded in the molded material or composition, the lower part of the slab is provided with a covering of insulating material as at 19 to prevent condensation; and the slab with the layer of covering of insulating material is then provided with a metallic covering, preferably a sheet of stainless steel or of porcelain enamel, as indicated at 20.

This metallic sheet 20 is bent about the slab in intimate contact with the slab so as to radiate the temperature thereof, except at the lower portion or end where the sheet encloses the insulating material 19.

In the particular exemplification of the invention, my improved slab 16 is shown with two coils 17 and the slab arranged to slope downwardly toward one longitudinal side at which lowest point of the slab I prefer to provide the insulating material 19.

The sheet metal covering 20 is bent so that the lower side of this cooling unit involves the sloping lower side 21 which terminates at its longitudinal edge in the outwardly bent or curled trough portion 22; and the oppositely sloping lower side 23 which contacts with sloping side 21 and has its longitudinal edge bent or curled outwardly into a trough forming portion 24. The contacting portions of the two oppositely sloping bottom sides 21 and 23 are preferably intimately secured together and communication between the two troughs 22 and 24 is preferably established by means of a suitable number of holes as at 25, see Figure 3.

The valley formed between the two troughs and the outer surfaces of the troughs are then preferably filled and provided with a suitable insulation as at 26, which may be held in place by an outer covering of suitable material or sheet metal as at 27.

The lower part of the coil containing slab and the troughs of the covering are preferably insulated as shown to prevent said portions being chilled to the same degree as the remainder or upper part of the unit and hence to reduce condensation at the lower part of the unit; while the condensate which accumulates on the upper or main portion of the unit will flow down the sloping top toward the sloping bottom wall 23 and enter trough 24, and the condensate on the other side of the unit will flow down lower wall 21 into trough 22. As trough 22 is disposed in a lower horizontal plane than trough 24, the condensate gathered by trough 24 will flow through the communicating holes 25 into trough 22, one end whereof is intended to be connected or have communication with a suitable discharge conduit (not shown) whereby the accumulated condensate will be conveyed to the desired point or to the case exterior. With this construction it is apparent that condensation will not drip onto or come into contact with the food-stuffs.

Instead of forming the unit 16 as heretofore described and then applying the sheet metal covering 20 thereto, the cooling unit in actual practice is made by first forming the covering 20, then inserting the desired cooling coil or coils therein through the open end of the covering while the covering element 20 is set on end.

After the coil or coils have been inserted into the formed covering 20 and properly positioned so as to present the coil or coils close to the top wall of the covering, the liquefied or heated temperature conducting composition is poured into the open end of the covering 20 and allowed to "set" or solidify. I find that a very efficient temperature conducting and temperature holding compound may be formed by using either crushed stone or metal filings and asphalt, mixed in proper proportions and so manipulated or treated as to cause the crushed stone or metal filings to contact with the refrigerating coils and with each other; a quantity of asphalt being employed merely sufficient to act as a binder and to maintain the intimate relation between the coils, crushed stone—or metal filings—and the outer metal covering; the whole forming a chilling unit which will retain its air chilling condition for a considerable period of time after operation of the refrigerator apparatus has been discontinued; that is to say, my improved unit has a considerable "hold-over" capacity which is not obtainable with exposed coils as heretofore employed in the upper portions of display cases of the type here under consideration.

The cooling unit is secured to the top wall of the display case by brackets as shown at 28; a sufficient number of brackets being employed.

The brackets are formed with depending sides which in turn terminate in inwardly bent ends 29 and 30 which slope toward each other and are adapted to extend beneath the sloping bottom portion 21 and sloping bottom portion 23 of the casing or covering 20; the lengths and inclinations of the two depending ends of the brackets 28 differing as shown in Figure 1 in order that the longitudinal side of the unit having sloping bottom wall 21 will be held slightly above the plane of the other longitudinal side. This causes any condensate which may gather on top of the unit to flow as heretofore described. With the brackets formed as shown, the unit can edgewisely be forced into the brackets after the latter have been secured to the top of the case. After the unit 16 has been put into place, proper connections between the protruding open ends of the coils 17 and the incoming and outgoing or return pipes of the refrigerator apparatus or system are then made whereby the refrigerating medium from the refrigerator apparatus may be introduced into the coil or coils of unit 16, allowed to flow into coils or pipes 13 and from there be conveyed back to the refrigerator apparatus.

It is apparent that the cooling unit 16 may involve as many refrigerant pipes or coils as desired and that the number of drain troughs may also vary if desired; the troughs being preferably arranged as shown so that all condensate may be conveyed to one trough to be conveyed by means of a single conduit to a point of discharge.

In practice it has also been found that my improved cooling unit 16 has a further advantage over the open coil type of refrigerated counter, in that the slab or unit, during the so-called "hold over" period, will constantly be throwing off a certain amount of moisture whereby the

drying out of the contents of the case will be prevented and the foodstuff thus kept in better condition.

The invention is believed to be set forth in its simplest embodiment and has been described in terms which are not contemplated as terms of limitation because modifications are possible and may be made without departing from the spirit of my invention as defined in the claims hereinafter.

What I claim is:

1. In a refrigerator display case of the character described, a refrigerating unit comprising an outer metallic casing provided with a condensate collecting trough adapted to drain, a refrigerant medium containing coil arranged in said casing, and a filler of temperature conducting material disposed about said coil in intimate relation therewith and with said casing, the lower side of the filler and outer side of said trough being provided with insulating material to prevent condensation and dripping.

2. In a refrigerator display case of the character described, a refrigerating unit comprising an elongated metal casing provided with oppositely sloping bottom walls each terminating in a trough portion, a refrigerant medium receiving coil arranged lengthwise in said casing, and a plastic temperature conducting and retaining compound filler for said casing and disposed about the coil and in intimate contact with the casing.

3. In a refrigerator display case of the character described, a refrigerating unit adapted to be disposed in the upper part of the case, comprising an elongated metal casing provided with a sloping top and two side walls arranged to slope downwardly toward each other and each terminating in a trough portion, with the trough at one side arranged in a plane above that of the other with communicating ports therebetween, a refrigerant medium receiving coil arranged lengthwise in said casing and a filler of plastic temperature conducting compound moulded about the coil and in intimate relation with the coil and the casing, and means whereby said unit may be suspended from the top of the display case.

4. In a refrigerator display case of the character described, a refrigerating unit comprising an outer casing of cold radiating material formed to provide a sloping top wall, two side walls and two opposingly sloping bottom walls and each terminating in an outwardly disposed condensate collecting trough, the troughs being arranged in different horizontal planes and communicating with each other by moisture conveying ports, said troughs sloping toward one end of the unit, a refrigerant medium containing coil arranged in said casing, a filler of temperature conducting material disposed about said coil and in intimate relation with the casing, and insulating material in the lower part of said casing and about the lower sides of said troughs.

5. In a refrigerator display case of the character described, a refrigerating unit comprising an elongated outer metallic casing provided with a top and two side walls and bottom walls sloping toward each other, each of said bottom walls terminating in an outwardly flared trough portion, said bottom walls being secured together and provided with openings therethrough for establishing communication between the trough portions, one of said trough portions being arranged in a horizontal plane above that of the other, refrigerant medium containing coils disposed lengthwise in said casing, a filler of temperature conducting material disposed about the coils and in intimate contact with the walls of the casing, the portion of the casing beneath said filler adjacent the juncture of the sloping bottom walls and the outer sides of said trough portions being provided with insulating material, and a sheet metal covering about the insulating material on the lower side of said trough portions; said unit being slopingly disposed in the upper part of the display case in spaced relation with the top.

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