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AIR CONDITIONING OR FROSTED DISPLAY DEVICE

Filed Oct. 5, 1931

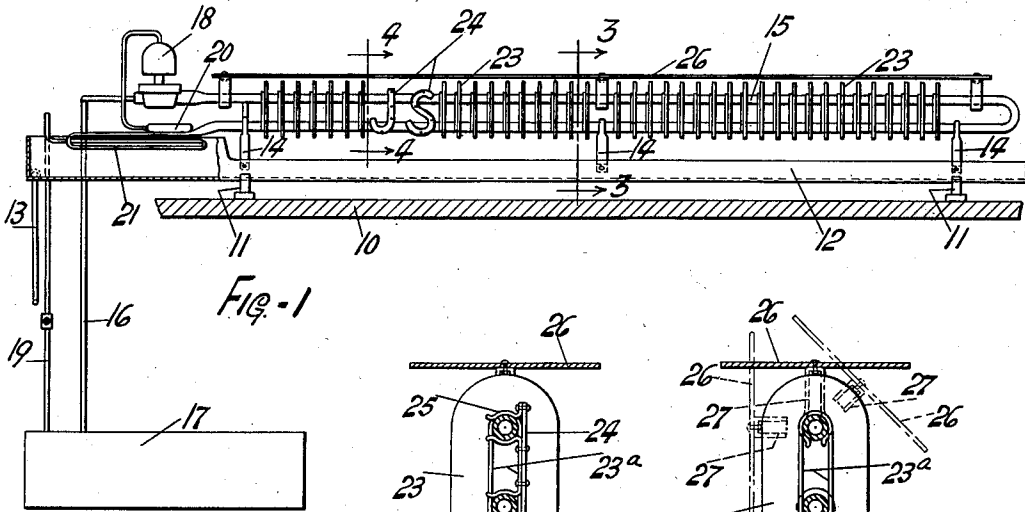


Fig. 1

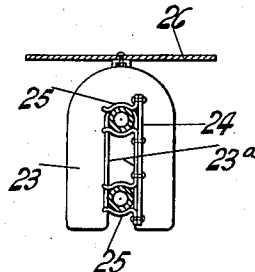


Fig. 4

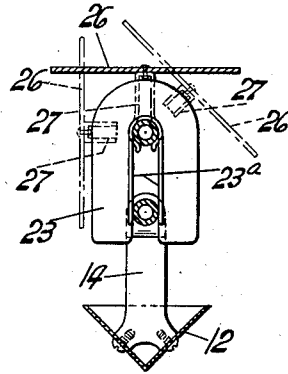


Fig. 3

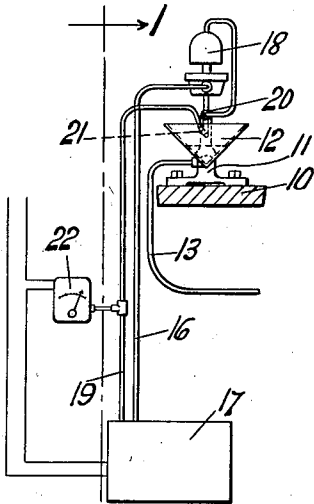


Fig. 2

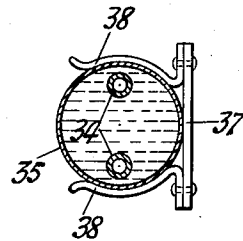


Fig. 7

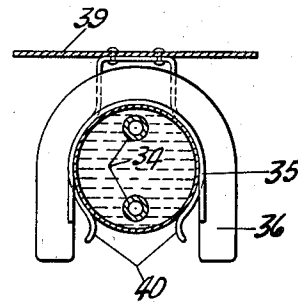


Fig. 6

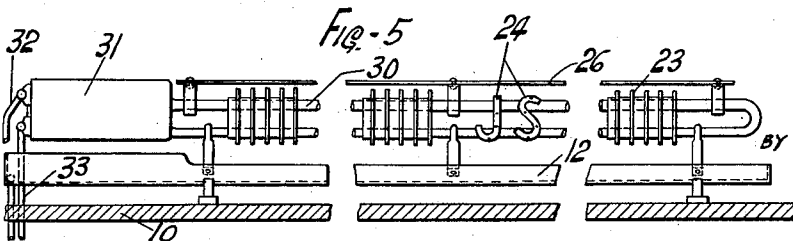


Fig. 5

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AIR CONDITIONING OR FROSTED DISPLAY
DEVICE

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7 Claims. (Cl. 62—1)

This invention relates to air conditioning or frosted display devices.

The general purpose of the invention is to provide an air conditioning or display device for use in counters, windows or other suitable places.

One particular purpose of the invention is to provide an improved refrigerating system for maintaining air in counters or other display places at the most advantageous conditions of temperature and humidity.

Another particular purpose of the invention is to provide an advertising or display means utilizing frosted elements such as letters, figures or other designs which can be changed or replaced at will without disturbing any part of a refrigerating system by which said letters, figures or designs are maintained in a frosted condition, the design elements being adapted, if desired, to vary or modify the air conditioning effect of such a system as referred to in the preceding paragraph.

The foregoing and other purposes of the invention are attained by the apparatus illustrated in the accompanying drawing and described below. It is to be understood that the invention is not limited to the specific form thereof shown and described.

Of the accompanying drawing,

Figure 1 is an elevation on line 1—1 of Figure 2, in part diagrammatic, of apparatus embodying the invention;

Figure 2 is a left end elevation of the apparatus as shown in Figure 1;

Figure 3 is an enlarged section on line 3—3 of Figure 1;

Figure 4 is an enlarged section on line 4—4 of Figure 1;

Figure 5 is a view similar to Figure 1 illustrating the embodiment of the invention in a different type of refrigerating system;

Figure 6 is a section through still another type of refrigerating system showing the adaptation of the invention thereto; and

Figure 7 is a similar view showing the adaptation of letters or designs to the system as illustrated in Figure 6.

Referring to the drawing, the numeral 10 designates a suitable support such as a shelf or bottom of a display counter or window upon which a device embodying the invention may be mounted. As shown in Figures 1 and 2, the device is preferably constructed as a single unit which may have legs 11, 11 supporting an elongated trough 12 preferably of insulating material or provided with a heat insulating backing and to

which is connected preferably at one end a drain pipe 13. The unit may, of course, be otherwise supported as by being suspended on hangers. A number of supports 14, 14 preferably of heat insulating material are mounted in trough 12, these being so constructed as not to interfere with flow of water along the trough and upon these supports is mounted a refrigerating coil 15 preferably of elongated U-shape. This coil may be arranged in a dry expansion refrigerating system by connecting a liquid line 16 leading from a condensing unit 17 through a thermostatic expansion valve 18 to one end of the coil and by connecting a suction line 19 to the other end of the coil.

The valve 18 may be controlled by a temperature responsive element 20 arranged adjacent the end of the coil to which suction line 19 is connected and line 19 may be looped as at 21 over the trough 12 so that any freezing beyond the control element 20 will be taken up in the loop until the expansion valve has time to restrict the flow of the refrigerant so that the suction pipe to the condensing unit will be free of frost at all times. As shown in Figure 2 the condensing unit may be controlled by a pressure switch 22 on the suction line 19.

The operation of such a cooling unit in a space such as in a display counter will cause the moisture in the air to congeal upon the surface of the coil. In accordance with the present invention the degree to which the moisture is thus removed from the air to condition the air may be varied by varying the effective cooling surface of the coil as required by the provision of detachable fins 23, 23 of heat conducting material which may be constructed of U-shape as shown in Figures 3 and 4 whereby one or more of the fins may be engaged over the coil and in contact therewith, these fins preferably having flanges 23^a for snugly embracing the coil.

Letters, figures or other designs such as indicated at 24 may be employed either with or without the fins 23 to be attached to the refrigerating coil to provide the required cooling surface or to provide a display or for both purposes. These letters, figures or designs are of heat-conducting material and may be provided with spring clips 25, 25 for snapping onto the stretches of the cooling coil.

As a further means for varying the effect of the refrigerating coil, a shield 26 may be mounted thereon as by spring clips 27, 27 secured on the upper stretch of the coil whereby the shield may be adjusted to various positions about the coil

(see Figure 3). The shield deflects the circulation of air over the coil, as desired. By placing it in the full line position shown circulation can be retarded. By placing it in the vertical position shown circulation of air past the coil may be facilitated and by placing at various angles many variations in air circulation may be secured. This means may be used independently of or in association with the fins or design elements to adjust the unit to any desired conditions.

As shown in Figure 5, the invention may be embodied in a flooded type refrigerating system in which the coil 30 similar to coil 15 is connected with a float trap 31 to which a suction line 32 and liquid line 33 are connected from the condensing unit.

In Figures 6 and 7 there is illustrated a refrigerating system including a coil 34 similar to coils 15 and 30 arranged in a tube 35 containing brine or other refrigerant, the invention being adapted to this system by fins 36 similar to fins 23 for fitting over the tube by letters or designs 37 similar to the letters or designs 24 and having spring clips 38, 38 thereon for attaching the letters or designs to the tube and by shield 39 having spring clip 40 thereon for attaching onto the tube to be adjustable to various angles about the same.

The air conditioning function of the device involves the maintenance of suitable temperature and humidity. It is well known in refrigeration work that these conditions depend on three factors, namely, (1) coil temperature, (2) coil surface area, (3) air circulation. For example, a given temperature of air can be maintained with small coil surface and low coil temperature or large coil surface and comparatively high coil temperature. The first condition will result in very dry air, the second in relatively moist, for the reason that the small low temperature coil will rapidly condense and hold the moisture as frost, while the large warmer coil will allow moisture to be re-taken up from its surface between compressor runs. In case of continuous running, the dryness of the air will be determined by the relative humidity corresponding to the air temperature immediately in contact with the coil, that is, the colder the coil the dryer the air (assuming a fairly tight case). Leakage of moist air into the case will raise the humidity, of course, but the degree will depend on coil temperature, as above. It is obviously impossible to control both temperature and humidity of the air by adjusting coil temperature alone, since with given surface, higher temperature will cause higher humidity. To control both independently, it must be possible to adjust both temperature and surface. The first can be done with the pressure control and expansion valve. The second is made possible by the system of detachable fins or letters. Another valuable feature of the fins or design pieces is the possibility of carrying lower temperatures in certain localities of the cases by placing greater numbers of fins at those points. Taking up the third factor, that of air circulation, it is obvious that the faster the circulation over a pipe of given temperature, the lower the general temperature of the space being cooled. By restricting circulation a lower pipe temperature and consequently lower humidity can be maintained without lowering the general temperature. Conversely, increasing circulation allows higher pipe (coil) temperature and higher humidity

with no change in general temperature. Thus the shield, by which the circulation can be varied at will, gives an additional means of temperature and humidity adjustment in connection with the pressure switch and expansion valve. This adjustment feature can be used to a limited extent to take the place of the fins, and can be used to a very great advantage in combination with them. The shield can be used to good advantage with the advertising letters, either to serve as a background or to enable the coil to be carried at a spectacularly frosting temperature without too much general cooling, which latter may cause glass to steam or fog on warm humid days. The invention has been found to be very useful in the conditioning of air in candy counters, such candies as peanut brittle being made available throughout the year and the discoloring of chocolates and the like being overcome thereby.

The many advantageous uses of the interchangeable frosted letters or designs are too obvious to need setting forth here. This feature can be used in the open, or even in front of stores, theaters, etc., as well as in counters or other display places, with any desired message conveyed in frosted letters, changed at will. To operate this feature, the coil need only be defrosted, the letters clipped in place, and the switch turned on.

Modifications of the invention other than those disclosed herein may be resorted to without departing from the spirit thereof or the scope of the appended claims.

What is claimed is:—

1. The combination with an elongated refrigerating unit of designed display pieces such as letters of heat conducting material adapted to be removably and replaceably secured thereon, said pieces being adapted to be arranged along the unit to provide an advertising sign of frosted elements.

2. The combination with a refrigerating unit of a shield mounted on the unit so as to be adjusted about the unit to various positions to vary the circulation of air about the unit.

3. The combination with a refrigerating unit of means for controlling the operating temperature thereof, and means for varying the circulation of air about the unit, comprising a deflecting shield attached to the unit and adapted to be adjusted to various positions about the unit.

4. An air conditioning unit comprising an elongated trough, an elongated refrigerating element supported on the trough, a drain from the trough, and means attached to the refrigerating element for varying the circulation of air thereabout.

5. A display symbol formed of heat conducting material having a surface adapted to make contact with a refrigerating element, and spring means for holding said surface in contact with the refrigerating element.

6. A display symbol formed of heat conducting material having a surface adapted to make contact with a refrigerating element, and spring means for removably holding said surface in contact with the refrigerating element.

7. In a display device the combination of a refrigerating element, a plurality of display symbols of heat conducting material removably attached thereto, and a deflecting shield carried by said refrigerating element and adapted to be adjustably positioned about said element.

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