Sept. 25, 1934. W. B. SANDERSON 1,975,066

REFRIGERATING UNIT

Filed Nov. 4, 1931 2 Sheets-Sheet 1

Fig.1.

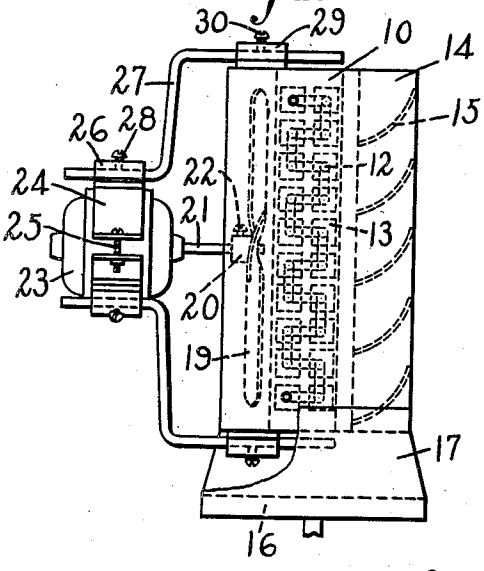


Fig.2.

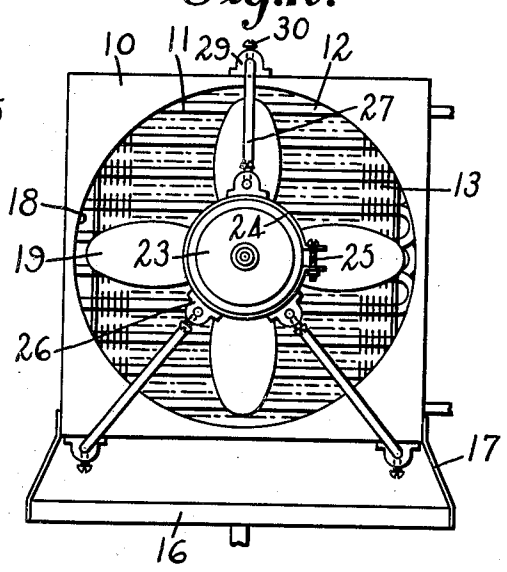
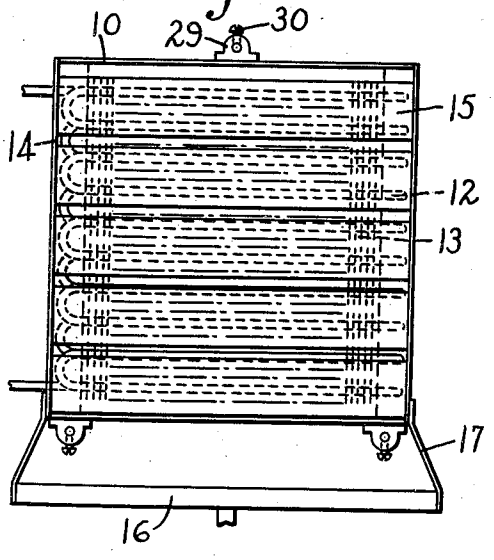


Fig.3.



Inventor

William B. Sanderson

By Rockwell & Parchilow

Attorneys

Sept. 25, 1934. W. B. SANDERSON 1,975,066

REFRIGERATING UNIT

Filed Nov. 4, 1931 2 Sheets-Sheet 2

Fig. 4.

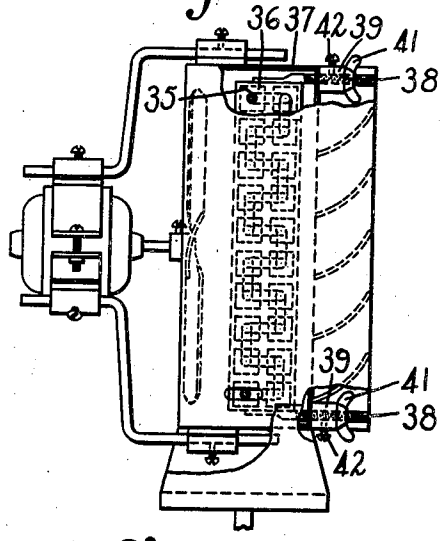
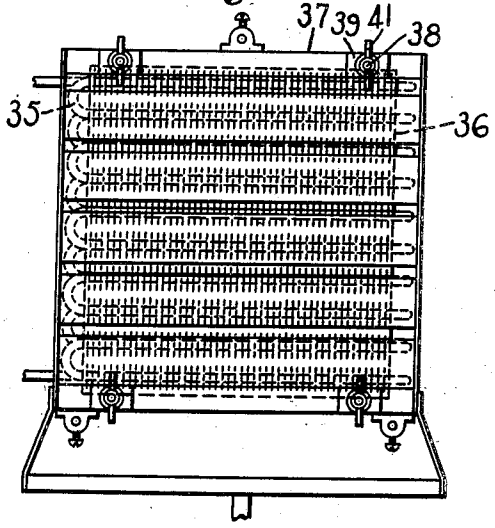


Fig. 5.



Inventor

William B. Sanderson

By Rockwell & Barthelow

Attorneys

Patented Sept. 25, 1934 1,975,066

UNITED STATES PATENT OFFICE

1,975,066

REFRIGERATING UNIT

William B. Sanderson, West Haven, Conn., assignor, by mesne assignments, to The Humidi-Cooler Corporation, West Haven, Conn.

Application November 4, 1931, Serial No. 572,938

9 Claims. (Cl. 62—171)

This invention relates to cooling units for cooling and refrigeration purposes and more especially to the type of such devices usually referred to and known in the trade as a "unit cooler".

A cooling unit or unit cooler of the type illustrated in this application comprises a coil through which a refrigerant is circulated and serves to effect its cooling function by cooling the air which comes in contact with the coils.

These coolers are useful in a good many relations such as to cool the air of a room or to cool the air within refrigerators particularly those refrigerators of large size such as used in meat markets or the like, and wherein cooling rooms are provided of sufficient size to allow a person to enter. They may, of course, be used also in connection with ordinary refrigerators.

It is often desirable, particularly when the unit is installed in a relatively large refrigerator or in a room to be cooled, to provide a fan or other means to keep the air in circulation so that it will pass over the coils and thus keep all parts of the room or refrigerator at the desired temperature. For this purpose a fan or blower may be provided in a position adjacent the coils so as to blow the air thereover.

It is well known that in the use of such devices, when the air comes in contact with the coils containing the refrigerant, which are very cold, the moisture in the air will be condensed upon the coils and clings thereto in the form of frost. If the coils are not below the freezing point, the moisture will nevertheless be condensed from the air, and will drip from the coils in the form of water. This results in removing considerable of the moisture from the air in the room and lowers the relative humidity of this air greatly. As a result, meats, vegetables or any product which is kept in the refrigerator will be dried out and the result is that the appearance as well as the quality of these products will be harmfully affected.

I have found, therefore, that it is desirable to regulate the relative humidity of the air within the room or refrigerator which is cooled so as to maintain the relative humidity of this air at a desired point, and I have discovered that this can be efficiently and easily accomplished by mounting a fan or blower adjacent the cooling coils so that the distance between the fan and the coils may be regulated or adjusted.

I have ascertained that when the fan is closer to the coils, and, therefore, when the air is driven over the coils more rapidly and a greater air turbulence created in the vicinity of the coils, less moisture will be condensed and remain upon the coils than when the fan is at a greater distance therefrom and the relative humidity of the air in the room or chamber will be higher. Therefore, by regulating the distance between the fan or blower and the coils, the relative humidity of the air within the refrigerator or room to be cooled may be maintained at substantially any desired point regardless of the state of the atmospheric air.

One object of this invention, therefore, is to provide a cooling unit or unit cooler by which the relative humidity of the air within the refrigerated chamber may be regulated.

Another object of the invention is the provision of a cooling unit provided with a cooling coil and a fan and so arranged that the distance between the fan and cooling unit may be adjusted to regulate the relative humidity of the air within the chamber in which the cooling unit is installed.

To these and other ends, the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a side elevational view of a cooling unit embodying my invention;

Fig. 2 is a front elevational view of the same;

Fig. 3 is a rear view of the cooling unit;

Fig. 4 is a side elevational view of a construction of somewhat modified form, and

Fig. 5 is a front view of the device shown in Fig. 4.

To illustrate a preferred embodiment of my invention, I have shown in Figs. 1 to 3 of the drawings a unit cooler comprising a coil adapted to be installed in the chamber or room to be cooled, and a blower or fan adjustably mounted with respect to the coil whereby the distance of the blower from the coil may be regulated.

The frame of the cooling unit is shown at 10 and mounted in this frame is a core 11 comprising a number of tubes 12 upon which may be provided fins 13. At its forward portion, the sides of the frame may be extended to provide side wings 14 between which extend baffles 15 to direct upwardly the air blown over the coils.

In some instances when the air within the chamber becomes excessively humid, it may be desirable to condense some moisture therefrom. A drip pan 16 is provided below the coils and is suspended from the frame 10 by the side members 17.

As shown particularly in Fig. 2, an opening 18 is provided at the back of the frame 10, and positioned opposite this opening is a blower

or fan 19 having a hub 20 adjustably mounted on the shaft 21, and secured in any desired position of adjustment by means of the set screw 22.

The shaft 21 is the shaft of the motor 23 and extends forwardly from the motor to a considerable extent as shown in Fig. 1 so as to provide for a considerable range of adjustment of the fan upon this shaft.

The motor may be, and preferably is, adjustably mounted with respect to the frame 10 of the cooling unit. In the embodiment of my invention illustrated, the motor is embraced by a clamping ring 24, the free ends of which are drawn together by the bolt 25. This clamping ring is provided with perforated lugs 26 through the perforations of which are extended the ends of the Z-shaped supporting members 27. Any number of these supporting members may be provided as will be found necessary to properly support the motor.

It will be observed that the ends of the supporting members 27 which extend through the lugs 26 are of considerable length and set screws 28 are threaded in the lugs 26 to secure the motor in place. It will be understood that the motor is thus slidably mounted on the ends of the supporting members or hangers 27, and may be adjusted to and from the coils and secured in adjusted position by the set screws 28. Likewise the other ends of the supporting members 27 are slidably mounted in perforated lugs 29 secured to the frame 10 and are secured in the desired position within these lugs by the set screws 30, whereby the ends of these arms or hangers remote from the motor may be adjusted with respect to the cooling unit to adjust the distance of the motor from the frame.

It will be noted, therefore, that the distance of the fan or blower from the coils may be adjusted at three points, namely, the fan, itself, may be adjusted on the shaft 21; the arms of the hangers 27 may be adjusted relatively to the frame 10 through the lugs 29; and the motor may be adjusted on the opposite ends of the hangers 27 by means of the lugs 26 and set screws 28. In some installations it may be that one adjustment only will be required, but the structure shown offers a wide range of adjustment which will suit practically any condition encountered in the use of the cooling device.

I have ascertained that, in general, the more remote the position of the blower with respect to the coils, the lower will be the relative humidity maintained in the air in the refrigerator chamber or room. The humidity of this air will depend, of course, to some extent upon the humidity of the atmospheric air, and also upon the stocking of the room with fresh products such as meat, vegetables and the like which will contain a considerable amount of moisture. The blower, however, can be adjusted so as to maintain the relative humidity of the air in the cooled chamber at substantially any desired point, regardless of the amount of moisture the air in the chamber may originally contain, for, with any given setting of the fan, the excess moisture will be collected upon the coils, and will be removed from the air, while at the same time the unit will be prevented from removing an excess of the moisture from the room by placing the fan at the proper position with respect to the cooling coils.

In Figs. 4 and 5 of the drawings I have shown a somewhat modified form of my invention wherein the coil 35 is mounted in supporting members 36 to form a core which is adjustably mounted in the frame 37. Secured to the supporting members 36 are threaded bolts 38 adapted to pass through lugs 39 secured on the frame 37. Upon the outer ends of the bolts 38 are mounted wing nuts 41 by which the bolts may be drawn through the lugs 39. Set screws 42 are secured in these lugs and are adapted to hold the core in any given adjusted position.

In this modified form of the invention, the motor is mounted in substantially the same way as is shown in Figs. 1 to 3 so that not only is the coil adjustable to vary its distance from the fan or blower, but also the motor and the fan, itself, are adjustable.

It will, of course, be understood that in both forms of the invention, the frames which support the cooling coil will be suspended or otherwise secured in a proper position in the chamber or room to be cooled.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the appended claims.

What I claim is:

1. In a cooling unit, a cooling coil, a blower to force a current of air over said coil, and means for adjusting one of said members relatively to the other in a direction to vary the distance therebetween to effect control of the humidity of the air passing over the coil, said coil being of relatively shallow depth in the direction of the air flow thereover.

2. Mechanism for cooling the air in a room or chamber comprising a supporting frame, a coil of relatively shallow depth mounted in said frame, a motor and a blower secured on the shaft thereof to force a current of air over the coil, and means for controlling the relative humidity of the air in the chamber independently of the temperature thereof comprising mechanism for supporting the motor from said frame for adjustment toward and from the coil.

3. A cooling mechanism adapted to be placed in a chamber to be cooled, said mechanism comprising a relatively shallow coil through which a refrigerant may be circulated, and a blower to impel the air of the chamber over said coil, and means for controlling the amount of moisture of the air condensed upon the coil comprising mechanism for effecting a relative adjustment of the blower and coil, one to the other, to vary the distance therebetween.

4. The method of controlling the relative humidity of the air in a room or chamber having therein a relatively shallow cooling coil and a blower to create a current of air over the coil, which comprises controlling the amount of moisture collected upon the coil by varying the turbulence of the air passing over the coil.

5. The method of cooling and controlling the relative humidity of the air in a chamber having therein a cooling coil of relatively shallow depth which comprises creating a circulation of air over the coil to maintain the temperature of the air in the chamber within predetermined limits, and varying the velocity of the air passing over the coil.

6. The method of cooling and controlling the relative humidity of the air in a room or chamber having therein a cooling coil of relatively shallow depth and a blower to create a circulation of air thereover, which comprises maintain-

ing the temperature of the air in the chamber within predetermined limits, and varying the distance between the blower and coil.

7. Mechanism for cooling the air in a room or chamber comprising a relatively shallow cooling coil, a blower and motor to drive the same mounted adjacent said coil to force a current of air thereover, and means for varying the velocity of the air passing over the coil to control the relative humidity of the air in the chamber independently of the temperature of the chamber.

8. Mechanism for cooling the air in a room or chamber comprising a relatively shallow cooling coil, a blower and motor to drive the same mounted adjacent the coil to force a current of air thereover, and means for varying the turbulence of the stream of air passing over the coils independently of the flow of the refrigerant through the coil to control the amount of moisture in the air in the chamber.

9. Mechanism for cooling the air in a room or chamber comprising a relatively shallow cooling coil, a blower and motor to drive the same mounted adjacent said coil to force a current of air thereover, and means for varying the volume of air passing over the coil in a given time to control the relative humidity of the air in the chamber independently of the temperature thereof.

WILLIAM B. SANDERSON.