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L. B. FRENCH ET AL
REFRIGERATING APPARATUS

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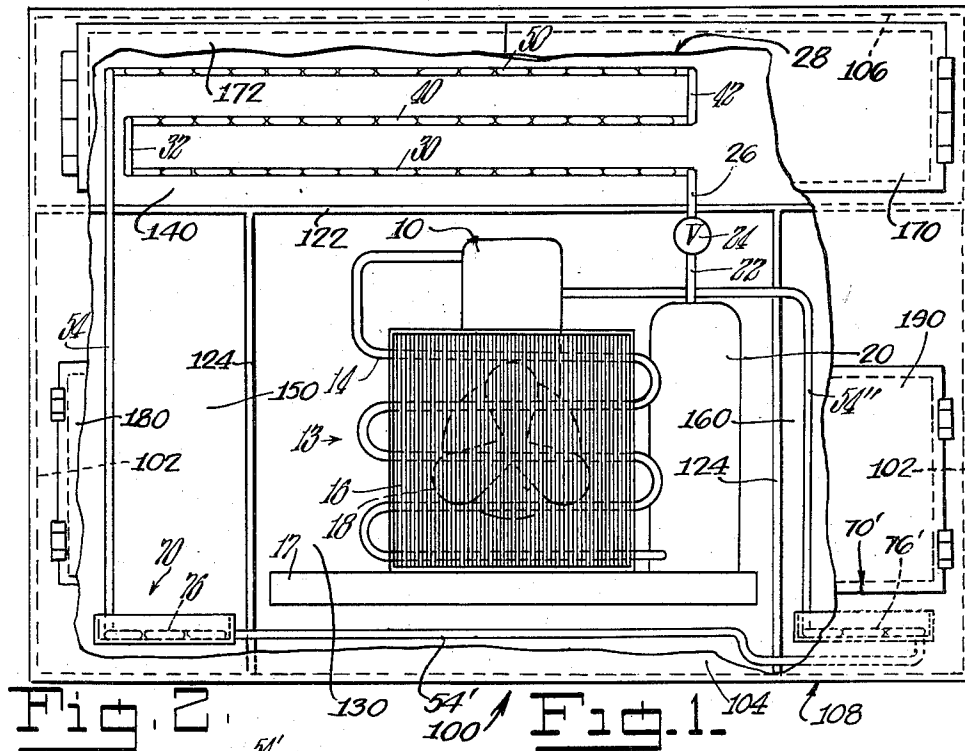


Fig. 2

Fig. 1

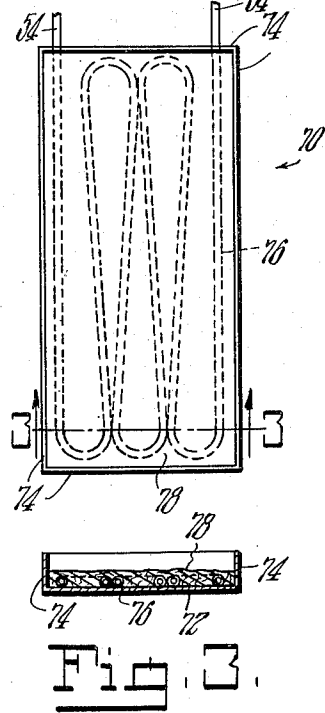


Fig. 3

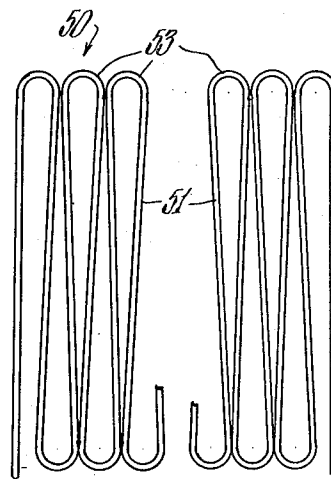


Fig. 4

INVENTOR.
Leon B. French and
BY *John H. Sweeney*
Ross & Ross
Attys.

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REFRIGERATING APPARATUS

Leon B. French, Springfield, and John F. Sweeney, Chicopee, Mass.

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1 Claim. (Cl. 62—115)

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Our invention relates to improvements in refrigerating apparatus and more particularly to devices of that type which are especially adapted for use in cooling bottled beverages or the like.

It is an object of our invention to provide a bottled beverage refrigerating cabinet as well as an ice making cabinet. It is another object to provide a device which will quickly cool beverages in such quantities as are ordinarily required by a retail dealer or restaurant owner or the like and in which the bottles are easily placed so that they are readily accessible when it is desired to withdraw the same and which will also make ice in the usual manner for such of the usual needs and requirements as the vendor may have.

Our invention further contemplates the construction of a cooling means which is simple and compact in form, neat and attractive in appearance, relatively inexpensive in manufacture and otherwise well adapted for the purposes for which the same is intended.

With the foregoing and various other novel features and advantages and other objects of our invention as will become more apparent as the description proceeds, the invention consists in certain novel features of construction and in the combination and arrangement of parts as will be hereinafter more particularly pointed out in the claim hereunto annexed and more fully described and referred to in connection with the accompanying drawings wherein:

Fig. 1 is a front elevational view of the device of our invention with parts broken away for clearness;

Fig. 2 is a top plan view of the brine pan of our invention;

Fig. 3 is a sectional elevational view along the line 3—3 of Fig. 2; and

Fig. 4 is a plan view of a cooling coil of our invention.

Referring now to the drawings more in detail, the invention may be fully described.

There is shown a refrigerating unit consisting of a compressor 10 and a condenser generally indicated by 13 and being comprised of a circulating coil 14 which extends in a circuitous route through a plurality of radiating fins 15 which are mounted on a base 17 and are cooled by a fan member 18 which may be operated from the drive shaft of the compressor 10 as desired.

The compressor is driven by a motor which, for purposes of clarity, is not shown.

By means of the compressor and condenser the refrigerant is compressed and condensed in the familiar manner and is then forwarded to a

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liquid receiver 20 for storage until desired for use in the evaporating system about to be described.

The receiver 20 is connected by a line 22 to an expansion valve 24 which in turn is connected to a supply pipe 26 which permits circulation of the liquid refrigerant from the receiver 20 through the valve member 24 to the cooling unit generally designated by the numeral 28.

The cooling unit 28 comprises a cooling coil which is a refrigerant conduit in the form of a continuous and preferably jointless tube of comparatively small diameter arranged in a plurality of planes, extending in serpentine fashion back and forth in each plane lengthwise of the cooling chamber in which the unit is disposed, and the extremities of the piping in each plane being connected with the extremities in the planes above and below to accomplish the desired continuity.

That is to say, as shown in Fig. 1, the cooling unit consists of a cooling coil wherein a section 30 of the same follows a serpentine path along a lower horizontal plane commencing at one extremity which is connected to the supply pipe 26 and terminating at its opposite extremity by connection with a vertically extending connecting section 32. Section 32 connects sections 30 and 40, which section 40 follows a serpentine path along an intermediate horizontal plane commencing at the extremity which connects with section 32 and terminating at its opposite extremity by connection with a vertically extending connecting section 42. Section 42 connects sections 40 and 50, which section 50 follows a similar serpentine path along an upper horizontal plane commencing at the extremity which connects with section 42 and terminating at its opposite extremity by connection with a supply line 54.

Ice making trays of the conventional type, not shown in the drawing, may be disposed between the various planes of the coil.

It will be understood that as one form of our invention the supply line 54 may be returned to the compressor 10 as shown by the dot-dash lines in Fig. 1 thereby completing the cooling cycle, although in the preferred form of our invention the supply line 54 serves as a conduit to lead the liquid to one or more brine pans, generally indicated by the numerals 70 and 70' and about to be described.

The brine pan member 70 consists of a shallow metallic pan having a bottom wall 72 and upright side and end walls 74 as shown in Figs. 2 and 3.

A serpentine-like continuous coil 76 which lays

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in a horizontal plane is disposed in the pan member and placed upon the bottom wall 72 as shown in Fig. 3. The coil 76 is connected at one of its ends to the supply line 54 and the other of its ends to another supply line 54'.

Absorbing material represented by numeral 73 such as rock wool or the like is placed around the exposed surfaces of the coil 76 so as to cover the same and in preparation for operation the material 73 is saturated with a solution of 24 ounces of water for every 4 ounces of anti-freeze solution. We have found through considerable experimentation that the best results are achieved when these parts are added to each one-half pound of rock wool.

It will be understood that if desired the supply line 54' may serve to lead the refrigerant in a return to the compressor 10 although in the preferred embodiment of our invention it is used to lead the refrigerant to a secondary brine pan 70' of a construction and purpose identical with the construction and purpose shown and described in the case of pan member 70.

As shown, a supply line 54'' leads the refrigerant back to the compressor 10.

As a special feature in the construction of our invention, a new and novel arrangement of the coils in the cooling systems is provided wherein the various brine pans may be used in combination with each other or singly, all as may be desired.

In the case of each of the planes of cooling unit 28 as shown in the case of the upper plane 53 in Fig. 4, the plane may consist of a plurality of substantially straight sections or runs 51 and a plurality of U-shaped sections or convolutions 53 connecting adjacent runs in such manner that each run connects with two adjacent sections or convolutions.

The convolutions of the coil are held vertically spaced as to each other and the runs are so staggered that adjacent runs are caused to converge upon each other at their ends opposite from the ends where they are connected by a section 53 all as shown in Fig. 4. As will be seen and appreciated by such arrangement air is permitted to pass upwardly around the runs whereby efficiency is increased.

It is desired that the temperature of the unit 28 be maintained within a range from 0° to 15° F. for the purpose of forming ice or ice cubes which may be accomplished by placing cube trays between the runs of said unit. The temperature of the pans will be preferably in a range from 30° to 48° F. for cooling containers of beverages and the like.

It has been found that where absorbing material around coils 76 and 76' contains brine of ordinary form and an anti-freeze solution that the brine is more or less like snow and does not freeze solid so as to function for cooling beverages without freezing. One anti-freeze which may be used is known by the trade-name "Glydol" and four ounces thereof in twenty-four ounces of water has been found to be satisfactory.

As is best shown in Fig. 1, a compartmentized refrigerator is generally indicated by the numeral 100 wherein are provided the conventional side walls 102, front wall 104, top wall 106, bottom wall 108, and back wall (not shown). Inner walls disposed within the interior of the unit provide various compartments for the different elements.

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Compartment 130 contains the compressor 10 and condensor, a horizontal wall 122 extending between the opposite side walls 102 and a pair of vertical walls 124 extending from member 122 to the bottom wall 108, as shown, enclosing this compartment. Compartment 140 contains the cooling unit 28, it being separated from the remainder of the refrigerator by the wall member 122 so as to be enclosed within the uppermost portion of the refrigerator. Compartment 150 contains the brine pan member 70 and is separated from the remainder of the refrigerator by the horizontal wall 122 and one of the vertical walls 124. Compartment 160 contains the brine pan member 70' and is separated from the remainder of the refrigerator by the horizontal wall 122 and the other of the vertical walls 124. Doors of the conventional design such as those represented by the numerals 170, 172, 180 and 190, afford access to the compartments 140, 150 and 160 respectively, as shown.

The invention may be embodied in other specific forms without departing from the essential characteristics thereof. Hence, the present embodiments are therefore to be considered in all respects merely as being illustrative and not as being restrictive, the scope of the invention being indicated by the appended claim rather than by the foregoing description, and all modifications and variations as fall within the meaning and purview and range of equivalency of the appended claim are therefore intended to be embraced therein.

What it is desired to claim and secure by Letters Patent of the United States is:

The combination of a freezing and cooling apparatus having plural compartments and a compressor with, an ice freezing unit disposed within a compartment for maintaining a temperature ranging between 0° F. and 15° F. and consisting of a serpentine-like cooling coil in the form of a continuous tube arranged in a plurality of planes having one extremity thereof connected to the condensor; a cooling unit disposed within another compartment for maintaining a temperature ranging between 30° F. and 48° F. and consisting of a coil disposed in a brine pan containing an absorbing material disposed around the coil having one extremity of the coil connected to the compressor, and a connecting coil between the coil of said freezing unit and the coil of said cooling unit.

LEON B. FRENCH.
JOHN F. SWEENEY.

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