

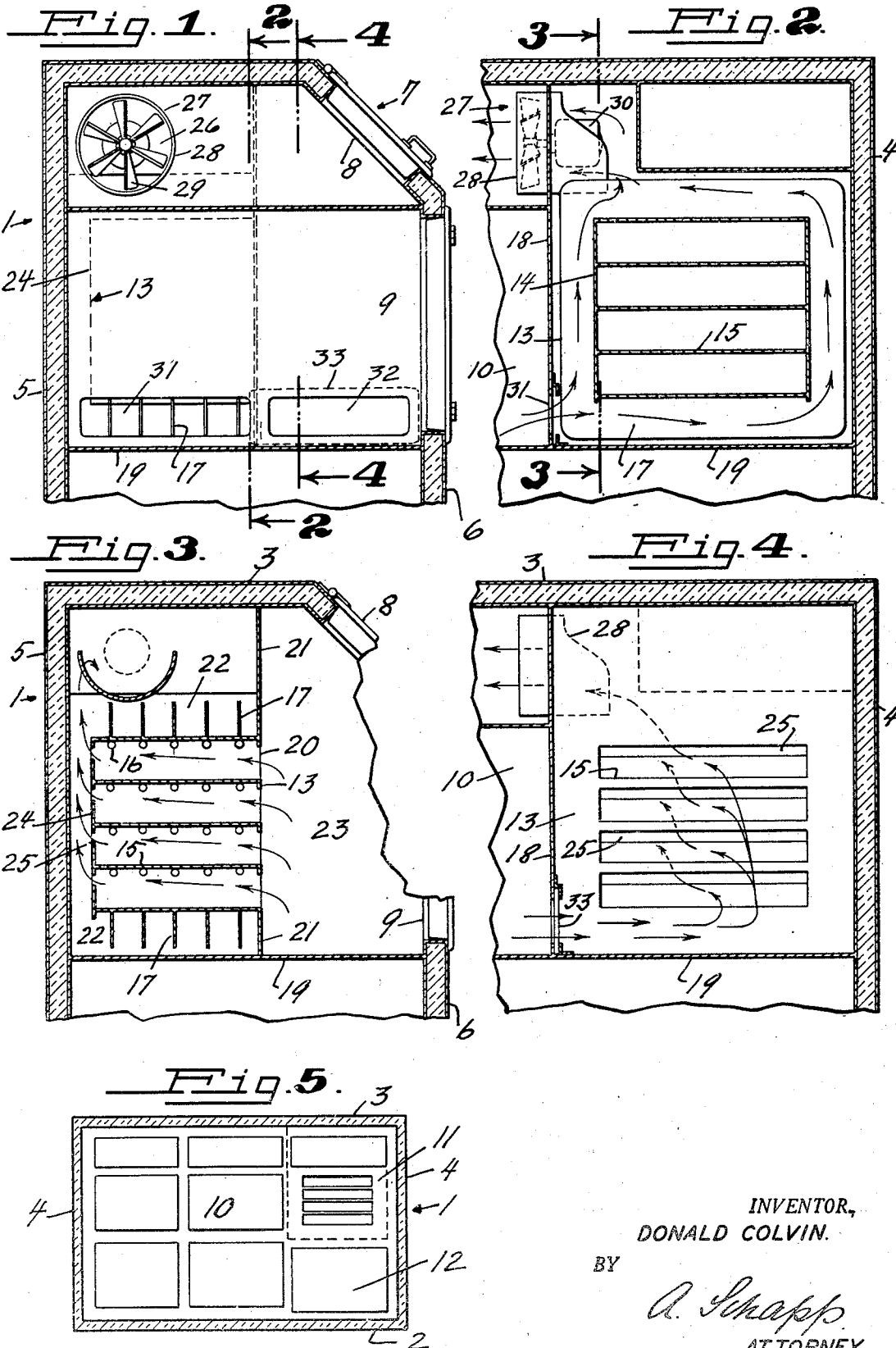
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REFRIGERATION UNIT

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REFRIGERATION UNIT

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The present invention relates to improvements in a refrigeration unit, and has particular reference to a unit of the character described in which storage space and an ice-maker are combined in the same cabinet.

In units of this character, means are usually provided for cooling the storage space by the circulation of air around the ice-maker, and through the storage space. In such an arrangement it becomes necessary from time to time to de-frost the ice-maker, and it has been customary to do this by shutting off the refrigeration apparatus and allowing the temperature in the ice-maker to slowly rise, which rise was accompanied by corresponding increase in the temperature prevailing in the storage compartment.

Such de-frosting required a considerable length of time, usually about six hours or more, and since the rise in temperature during such period was quite considerable, it would take a long time after the starting of the refrigeration apparatus to restore the storage compartment to a desired normal temperature.

In the present invention, I propose to provide means whereby the time period for de-frosting is reduced considerably and a quarter of an hour is usually sufficient to effect the desired results. This makes it possible to do the de-frosting at any convenient time, and with a comparatively little raise in temperature in the storage compartment.

More particularly, it is proposed to effect rapid de-frosting through suitable control of air circulation. While normally, the air is circulated in such a manner that it passes around the ice-maker and through the storage compartment, it is proposed in the present invention to provide a second path for the air, which causes the latter to travel right through the interior of the ice-maker and thence through the storage compartment.

In this manner a much more rapid heat exchange is provided between the ice-maker and the storage compartment, and as a result, the temperature in the ice-maker rises rapidly, while the storage compartment substantially retains its temperature, the more rapid exchange making up, in part at least, for the loss due to the stopping of the refrigeration apparatus.

It is further proposed to provide a very simple arrangement, whereby the air circulation may be shifted from one path to the other without any effort.

Further objects and advantages of my invention will appear as the specification proceeds and the novel features thereof will be fully set forth in the claims hereto appended.

The preferred form of my invention is illustrated in the accompanying drawing, in which:

Figure 1 shows a vertical section through my refrigeration unit;

Figure 2, a vertical section taken along line 2-2 of Figure 1;

Figure 3, a vertical section taken along line 3-3 of Figure 2;

Figure 4, a vertical section taken along line 4-4 of Figure 1; and

Figure 5, a schematic front elevation of a unit, with the wall shown in section.

While I have shown only the preferred form of my invention, I wish to have it understood that various changes or modifications may be made within the scope of the claims hereto attached, without departing from the spirit of the invention.

Referring to the drawing in detail, my cabinet 1 may be of any suitable form, and comprises a bottom 2, a top 3, sides 4, a rear 5, and a front 6.

The front preferably tapers into the top, as shown at 7, and may be formed with suitable doors, as indicated at 8 and 9.

In its principal parts, the cabinet is divided into three sections, a storage compartment 10 occupying the major portion of the cabinet, the left side, as viewed in Figure 5; an ice-making compartment 11, occupying the upper portion of the right side of the cabinet, and a compartment 12 below the ice-making compartment for accommodating the compressor unit or refrigeration apparatus.

The ice-making compartment contains the ice-maker 13, which may be of conventional construction, and which comprises, as here shown, a box 14 having a plurality of shelves 15 arranged on the inside thereof and being provided with cooling coils 16 underneath the shelves, the cooling coils being suitably connected to the refrigerating apparatus accommodated in the compartment underneath, and not shown in the drawing.

The box 14 is provided with annular fins 17 which run parallel to the front and rear walls of the cabinet.

The ice-maker occupies only the rear portion of the right-hand upper compartment, and is separated from the storage compartment by a vertical partition 18, and from the lower compartment by a horizontal partition 19. The front of the ice-maker is generally open, as at 20, to allow of insertion of conventional trays, and is provided with a flange 21, which fits against the walls of the compartment so as to separate the chamber 22 surrounding the ice-maker from the chamber 23 disposed in front thereof.

The rear wall 24 of the ice-maker is spaced from the rear wall of the cabinet, and is provided with apertures 25 which connect the inside of the ice-maker with the air shaft behind the same.

The vertical partition 18 is formed in its upper

rear portion, and above the ice-maker, with an opening 26 in which is mounted a fan unit 27 comprising a housing 28, a fan 29, and a motor 30, the fan being adapted to draw air from the ice-making compartment and to discharge the same into the storage compartment for cooling the latter. The cooled air, which is discharged into the upper section of the storage compartment, gravitates downwardly and is sucked back again into the ice-making compartment through a slot 31 formed in the lower portion of partition 18 opposite the chamber 22 accommodating the ice-maker.

The air thus entering the ice-making compartment passes around the ice-maker, some along the near side and some along the far side, as indicated in Figure 2, and after being cooled by the ice-maker, returns to the fan to be again discharged into the storage chamber for cooling the latter and absorbing heat units therefrom.

In the normal process of operation, the air circulates continuously around the ice-maker and through the storage compartment, without coming into contact with the inside of the ice-maker.

For de-frosting operations, I provide a second slot 32 in the lower portion of partition 18, the second slot being in line with the slot 31 and being in substance, a continuation of the latter into the front chamber 23.

A slide 33 is movably mounted with respect to the two slots 31 and 32, so as to cover one thereof. If the slide 33 is in the position indicated in Figure 1, the air circulation proceeds normally in the manner previously described, as indicated in Figure 2.

But if the slide 33 is moved backwards to close the slot 31, and to open the slot 32, the air returning from the storage compartment, is cut off from direct communication with the ice-making chamber 22 and instead, passes through slot 32 into the front chamber 23.

From there its only approach to the fan is through the interior of the ice-maker and the opening in the rear wall thereof, as indicated in Figure 3. Thus the relatively warm air coming from the storage compartment, passes in direct contact with the coils, and melts the ice formed thereon quite rapidly.

If the trays are on the shelves, the ice therein will also melt away from the conventional cells used in the trays, so that they may be more easily emptied.

In operation, the only adjustment required, is the pushing backward or forward of the slide 33. When the latter is in its forward position, circulation takes place through the slot 31 and around the ice-maker.

When the slide is in its rearward position, circulation takes place through the slot 32 and through the interior of the ice-maker in a fore and aft direction.

I have found in actual experience, that the ice-maker may be readily de-frosted in a period of about fifteen minutes when the air circulation is changed to pass through the ice-maker instead of around the same, while the refrigerating apparatus is being stopped. I have also found that during this period, the temperature rise in the storage compartment is relatively negligible due to the fact that the rapid de-frosting requires more heat units than would be absorbed in the conventional slow de-frosting.

I claim:

1. In a refrigeration unit, a storage compartment, an ice maker comprising a box open in the front and the rear, means for moving air to circulate through the unit in heat-exchange relation with the ice maker for cooling the storage compartment, and control means for selectively guiding the air around or through the ice maker box.

2. In a refrigeration unit, a cabinet having a partition therein to provide two compartments, one being a storage compartment and the other an ice-making compartment, an ice-maker in the latter compartment, the partition having openings therein, means for moving air to circulate through the openings and the compartments for transferring heat units from one compartment to the other, and control means for one of the openings for guiding the air selectively either around or through the ice maker.

3. In a refrigerator unit, a cabinet having a partition therein to provide two compartments, one being a storage compartment and the other an ice-making compartment, an ice-maker in the latter compartment and being open in the front and rear and closed on the sides, the partition having openings in the upper and lower portions thereof, air moving means in the upper opening for causing air to circulate through the two compartments and the openings, and control means for the lower opening for selectively guiding the air to pass around the closed sides of the ice maker or through the open front and rear thereof.

4. In a refrigerator unit, a cabinet having a partition dividing the same into a storage compartment and an ice-making compartment, an ice-maker in the rear section of the latter compartment and being open in the front and rear, the partition having an opening in the upper rear portion thereof and a second opening in the lower front portion thereof, and an air moving means causing air to circulate from the ice-making compartment through the upper opening to the storage compartment and back from the latter to the former through the lower opening, the openings being positioned to guide air through the ice-maker in a fore and aft direction.

5. In a unit of the character described, a compartment having an intake opening and an exhaust opening, an ice-maker in the compartment, two passages connecting the intake and the exhaust openings, one leading around the ice-maker and the other through the ice-maker, and means for closing either of the passages.

6. In a unit of the character described, a compartment having an intake opening and an exhaust opening, an ice-maker in the compartment, two passages connecting the intake and the exhaust openings, one leading around the ice-maker and the other through the ice-maker, and a common control element movable for closing one or the other of the said passages.

7. In a unit of the character described, an ice-making compartment having an intake opening and an exhaust opening, means for causing a draft of air from one opening to the other, an ice-maker in said compartment and adjustable guide means for selectively leading the draft through or around the ice-maker.

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