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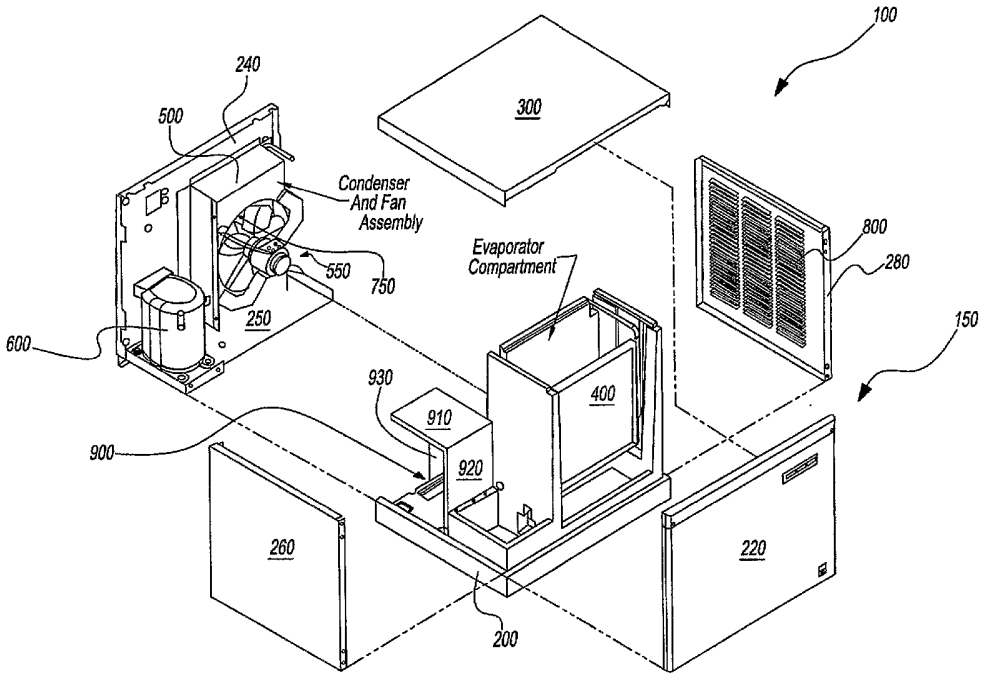

(57) Abstract: An ice cube-making machine that is characterized by substantially noiseless operation at the location where ice cubes are dispensed and a lightweight configuration for ease of installation. The ice cube-making machine has a support structure that substantially isolates the compressor from the atmosphere to reduce the transmission of noise and vibration.

WO 2004/102087 A2

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

ICE MAKING APPARATUS

FIELD OF INVENTION

[0001] This invention relates to an ice cube-making machine and, in particular, an ice cube-making machine having noise and/or vibration reduction.

BACKGROUND OF INVENTION

[0002] Ice cube-making machines generally comprise an evaporator, a water supply and a refrigerant/warm gas circuit that includes a condenser and a compressor. The evaporator is connected to the water supply and to a circuit that includes the condenser and the compressor. Valves and other controls control the evaporator to operate cyclically in a freeze mode and a harvest mode.

[0003] During the freeze mode, the water supply provides water to the evaporator and the circuit supplies refrigerant to the evaporator to cool the water and form ice cubes. During the harvest mode, the circuit diverts warm compressor discharge gas to the evaporator, thereby warming the evaporator and causing the ice cubes to loosen and fall from the evaporator into an ice bin or hopper.

[0004] Referring to Fig. 1, an ice cube-making machine 10 without noise reducing features includes a support structure 15, an evaporator 40, a condenser 50 and a compressor 60. The support structure 15 has a base 20, a base pan 25, and front, back, left side, right side and top panels 22, 24, 26, 28 and 30. Evaporator 40 is disposed on base 20. Condenser 50, with a fan assembly 55, is secured to back panel 24. Compressor 60 is secured to back

panel 24 and/or base pan 25. Base 20 and front, back, left side, right side and top panels 22, 24, 26, 28 and 30 are secured to each other to form support structure 15 for the ice cube-making machine 10.

[0005] The inner volume of support structure 15 contains the evaporator 40, the condenser 50 and the compressor 60 in communication with each other and in contact or communication with the atmosphere through at least the fan duct 75 disposed through back panel 24 and the louvers 80 disposed along the right side panel 28. The fan duct 75 supplies air to the fan assembly 55, and louvers 80 provide additional access to the atmosphere for the inner volume of the support structure 15 for assistance in cooling.

[0006] In operation, the prior art ice cube-making machine 10 transmits noise to the atmosphere through fan duct 75 and/or louvers 80. Additionally, the compressor 60 transmits vibrations to the other components of the ice-cube making machine 10. The noise is undesirable in consumer and other locations. The vibrations can be damaging to the various components, require more maintenance, and can create additional unwanted noise. Thus, there is a need for a quiet ice cube-making machine with noise reduction and/or vibration reduction features.

SUMMARY OF INVENTION

[0007] The ice cube-making machine of the present invention provides a noise reducing and/or vibration reducing structure that isolates or substantially isolates the compressor from the atmosphere and substantially reduces the travel of compressor noise out of the ice machine via ventilation louvers disposed in the side walls of the ice machine.

[0008] The ice-making machine of the present invention provides a support structure having a compressor, wherein the support structure substantially isolates the compressor from the atmosphere to reduce transmission of noise from the compressor to the atmosphere. The support structure has disposed therein an isolation chamber and the compressor is disposed within the isolation chamber.

[0009] The isolation chamber can be at least partially defined by one or more panels disposed in an inner volume of the support structure. The panels can have sound dampening properties that reduce or eliminate transmission of noise from the compressor through the panels. The panels can be insulated or non-insulated. The panels can be formed of a heat resistant material, such as metal, plastic, glass, etc. The isolation chamber can be partially defined by at least a portion of the support structure. That portion of the support structure can also have sound dampening properties to assist in reducing or eliminating transmission of noise from the compressor.

[0010] The ice-making machine also has an evaporator and a condenser that are disposed within the support structure. The compressor can be substantially isolated from the evaporator and the condenser by means of the panels. The ice-making machine can also have a fan in communication with the atmosphere through a fan duct opening, wherein the compressor is isolated from the fan duct opening.

BRIEF DESCRIPTION OF DRAWINGS

[0011] Other and further objects, advantages and features of the present invention will be understood by reference to the following specification in conjunction with the accompanying drawings, in which like reference characters denote like elements of structure and:

[0012] Fig. 1 is an exploded perspective view of a prior art ice cube-making machine of the present invention; and

[0013] Fig. 2 is an exploded perspective view of an ice cube-making machine of the present invention having noise reduction capabilities.

DESCRIPTION OF THE INVENTION

[0014] The present invention can best be described by reference to Fig. 2, wherein a preferred embodiment of an ice-making machine of the present invention is shown and generally represented by reference numeral 100. Ice-making machine 100 has a support structure 150, an evaporator 400, a condenser 500 and a compressor 600.

[0015] Support structure 150 has a base 200, a base pan 250 and front, back, left side, right side and top panels 220, 240, 260, 280, and 300. Evaporator 400 is disposed on base 200. Condenser 500, with a fan assembly 550, is secured to back panel 240. Compressor 600 is secured to back panel 240 and/or base pan 250. It will be appreciated by those skilled in the art that evaporator 400, condenser 500 and compressor 600 suitably include various valves and other components of an ice cube-making machine.

[0016] Base 200 and front, back, left side, right side and top panels 220, 240, 260, 280 and 300 are secured to each other to form support structure 150 for the ice-making machine 100. Support structure 150 also includes a compressor compartment 900 that is defined by isolation walls or panels 910, 920 and 930, and portions of base 200, back panel 240 and left side panel 260.

[0017] The inner volume of support structure 150 contains the evaporator 400 and the condenser 500 in communication with each other and in contact or communication with the atmosphere through a fan duct 750 disposed through back panel 240 and louvers 800 disposed along the right side panel 280. The fan duct 750 supplies air to the fan assembly 550, and louvers 800 provide additional access to the inner volume of support structure 150 for assistance in cooling.

[0018] Compressor 600 is contained in compressor compartment 900, which isolates the compressor from the atmosphere to reduce the noise that is emitted by ice-making machine 100. Compressor 600 is in isolation from the evaporator 400, the condenser 500 and the inner volume of support structure 150 due to isolation walls or panels 910, 920 and 930.

[0019] Also, the compressor is in isolation from the atmosphere due to portions of base 200, back panel 240 and left side panel 260. As a result of the isolation or substantial isolation of compressor 600 within compressor compartment 900, compressor 600 is limited or prevented from transmitting or emitting noise to the atmosphere through support structure 150, fan duct 750 and/or louvers 800.

[0020] It will be appreciated by those skilled in the art that support structure 150 and compressor compartment 900 may take on alternative forms and shapes as dictated by particular design requirements. Compressor

compartment 900, including those portions of support structure 700 as shown in Fig. 2, can be made of a variety of materials, which helps reduce or eliminate the transmission of noises and vibrations from the compressor 600, such as, for example, foam or other material having sound dampening properties.

[0021] Also, such sound dampening materials can be secured to compressor compartment 900 to reduce or eliminate the transmission of noises and vibrations from the compressor 600. Other embodiments of the present invention could include, but are not limited to, alternative structures to reduce or eliminate noise and vibration escaping or being transmitted to the atmosphere, which surround the compressor 600 so that the compressor is not in communication with any louvers or openings to the atmosphere.

[0022] The interconnection structure that connects evaporator 400, condenser 500 and compressor 600 in a circuit for the circulation of refrigerant and warm gas, preferably includes appropriate fittings that further reduce the transmission of noise and vibration from the compressor to the atmosphere. The interconnection structure may suitably include pipes or tubing and appropriate joining junctions having sound and vibration dampening characteristics.

[0023] The present invention having been thus described with particular reference to the preferred forms thereof, it will be obvious that various changes and modifications may be made therein without departing from the spirit and scope of the present invention as defined in the appended claims.

WHAT IS CLAIMED IS:

1. An ice-making machine comprising:

a support structure having a compressor, wherein said support structure substantially isolates said compressor from the atmosphere to reduce transmission of noise from said compressor to the atmosphere.

2. The ice-making machine of claim 1, wherein said support structure has an isolation chamber, and wherein said compressor is disposed within said isolation chamber.

3. The ice-making machine of claim 2, wherein said isolation chamber is at least partially defined by one or more panels disposed in an inner volume of said support structure.

4. The ice-making machine of claim 3, wherein said one or more panels have sound dampening properties that reduce or eliminate transmission of noise from said compressor through said one or more panels.

5. The ice-making machine of claim 2, wherein said isolation chamber is partially defined by at least a portion of said support structure.

6. The ice-making machine of claim 5, wherein said at least a portion of said support structure has sound dampening properties that reduce or eliminate transmission of noise from said compressor through said at least a portion of said support structure.

7. The ice-making machine of claim 1, further comprising an evaporator and a condenser, wherein said evaporator and said condenser are disposed on said support structure.

8. The ice-making machine of claim 7, wherein said compressor is substantially isolated from said evaporator and said condenser.

9. The ice-making machine of claim 8, further comprising a fan in communication with the atmosphere through a fan duct opening, wherein said compressor is isolated from said fan duct opening.

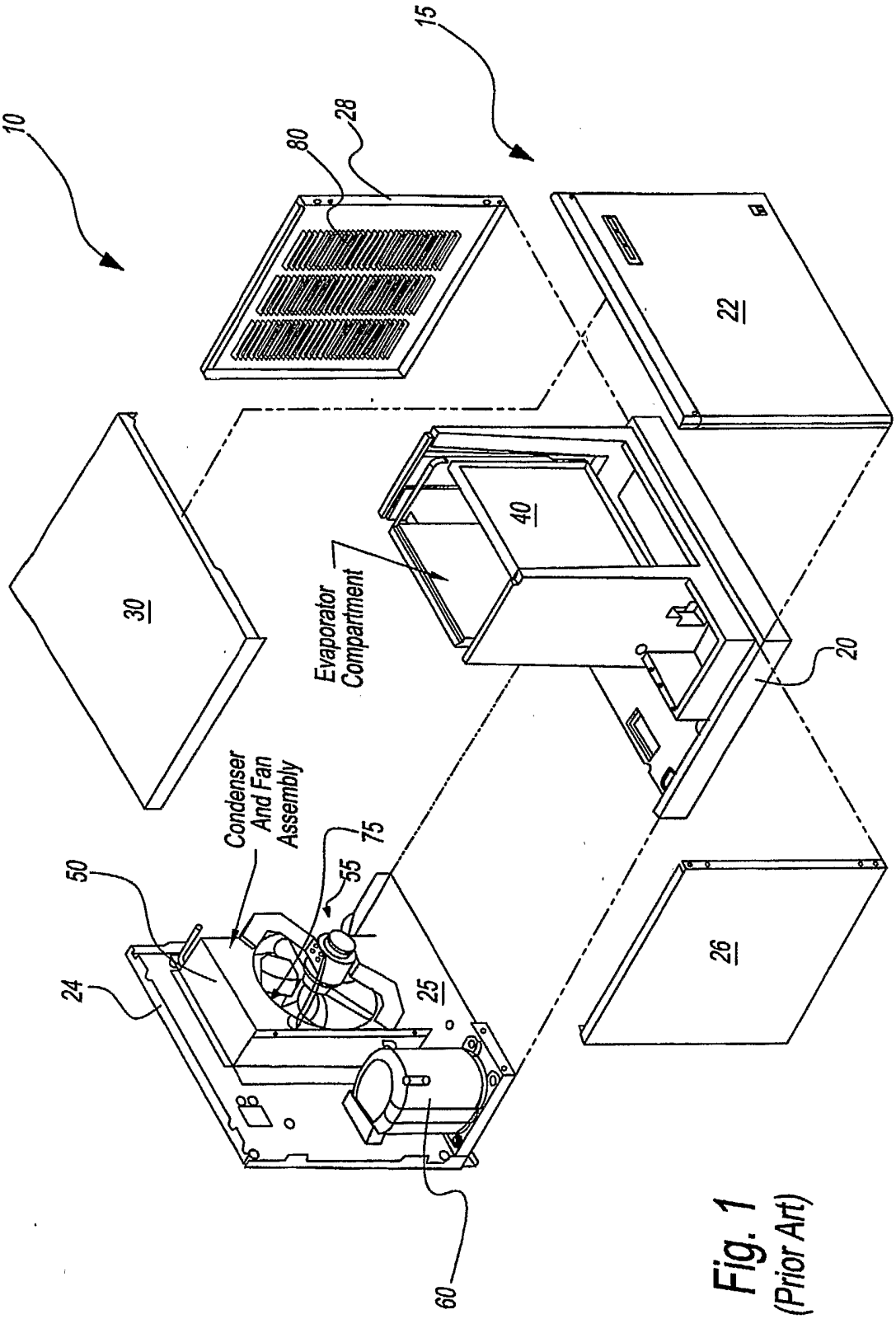

Fig. 1
(Prior Art)

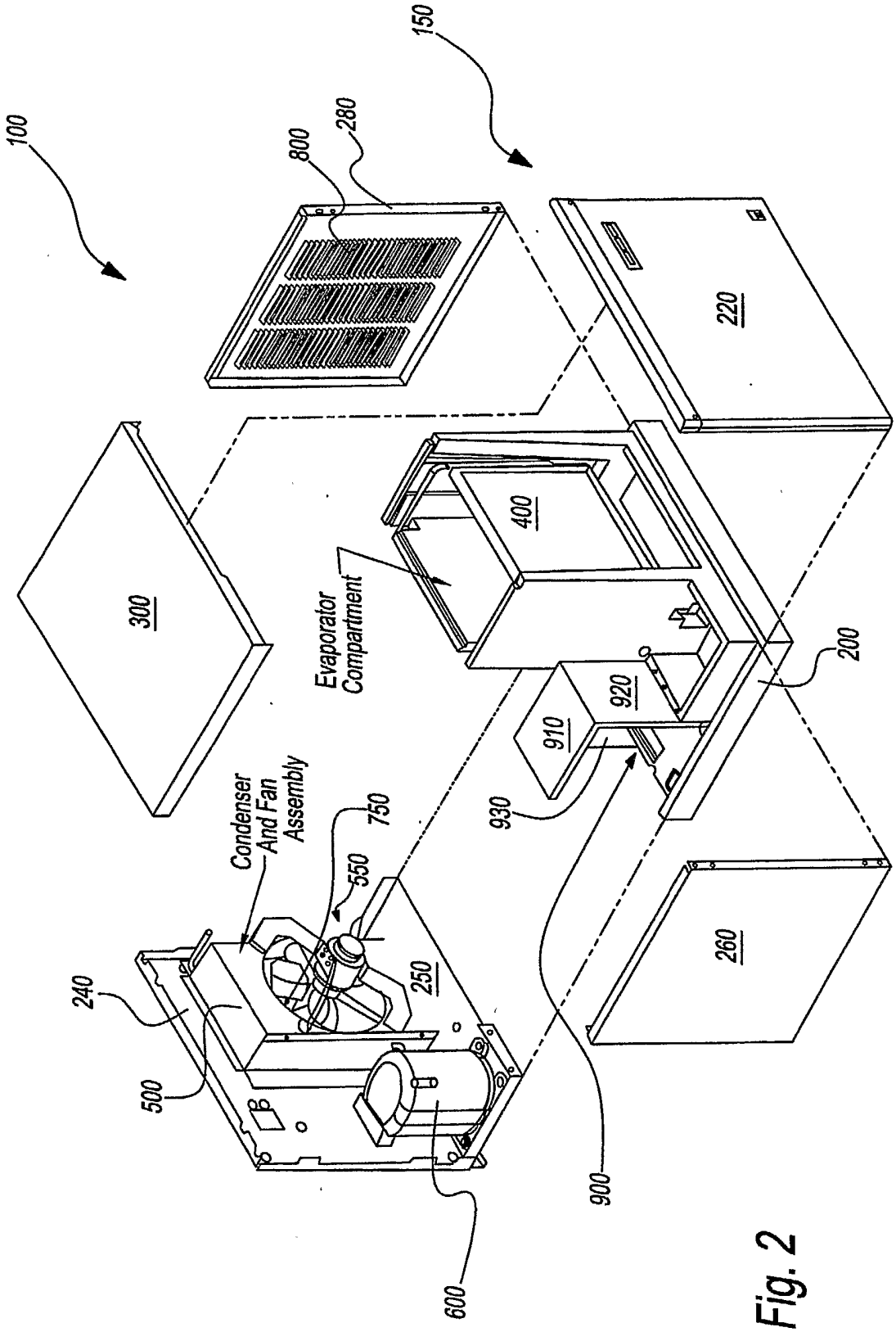
100
150
280
800
220
300
400
Evaporator Compartment
200
910
920
930
Condenser And Fan Assembly
750
550
240
250
500
260
900
600

Fig. 2