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(54) **ICE MAKING AND UNFREEZING CONTROL DEVICE FOR AN ICE-MAKING MACHINE**

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(57) **ABSTRACT**

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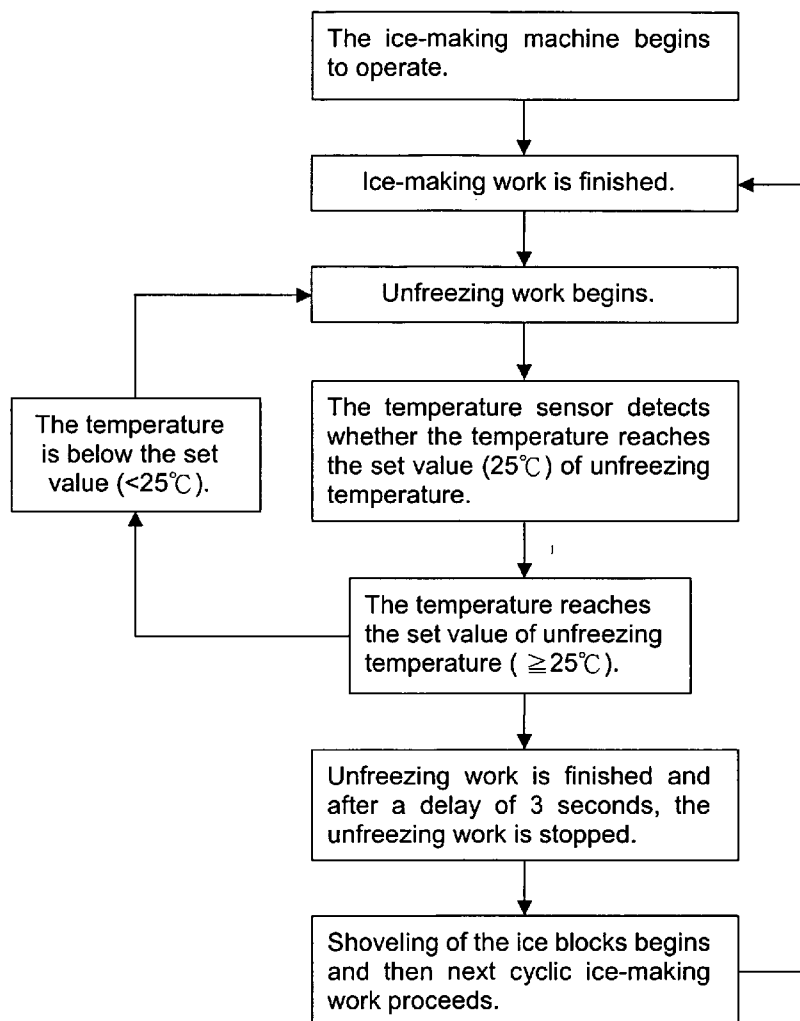
An ice making and unfreezing control device for an ice-making machine includes a compressor, a condenser, an electric magnetic valve, a dryer, a vaporizer, a liquid reservoir and a temperature sensor. The vaporizer has its underside provided with plural ice-making rods. The temperature inductor is positioned on the exit pipe of the vaporizer. By so designing, ice blocks can be made quickly, and when the temperature of the exit pipe of the vaporizer, detected by the temperature sensor, reaches the set value of unfreezing temperature, all the ice blocks will be separated from the ice-making rods, and the unfreezing work will be stopped and the electric magnetic valve will be turned off. Then, shoveling of the ice blocks begins and next cyclic ice-making work proceeds, able to quickly make ice blocks with a same size and shape and convenient to carry out unfreezing.

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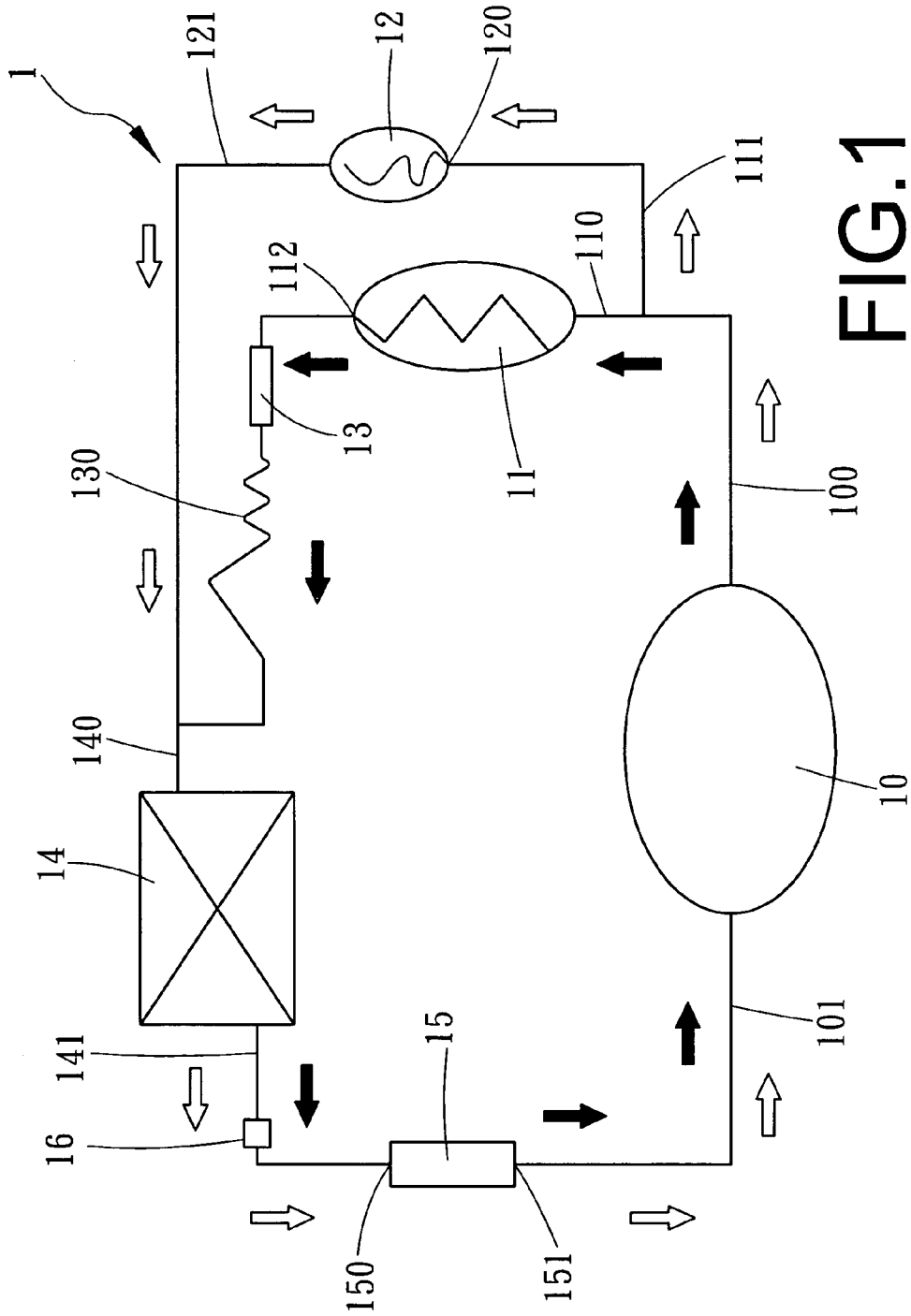


FIG. 1

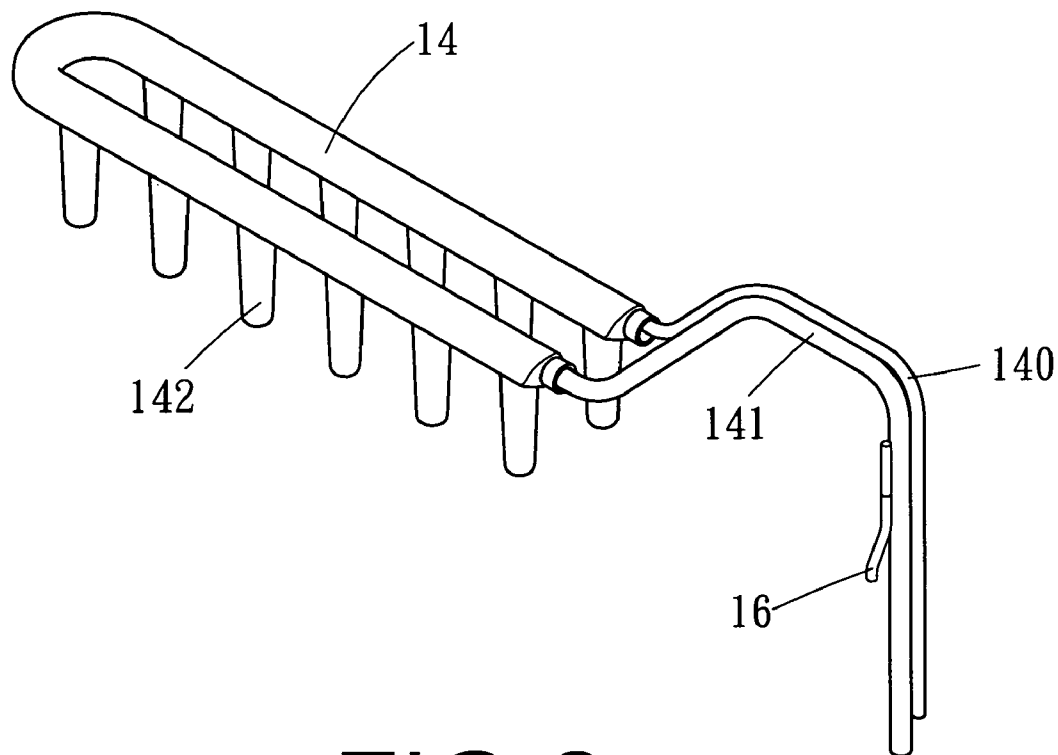


FIG.2

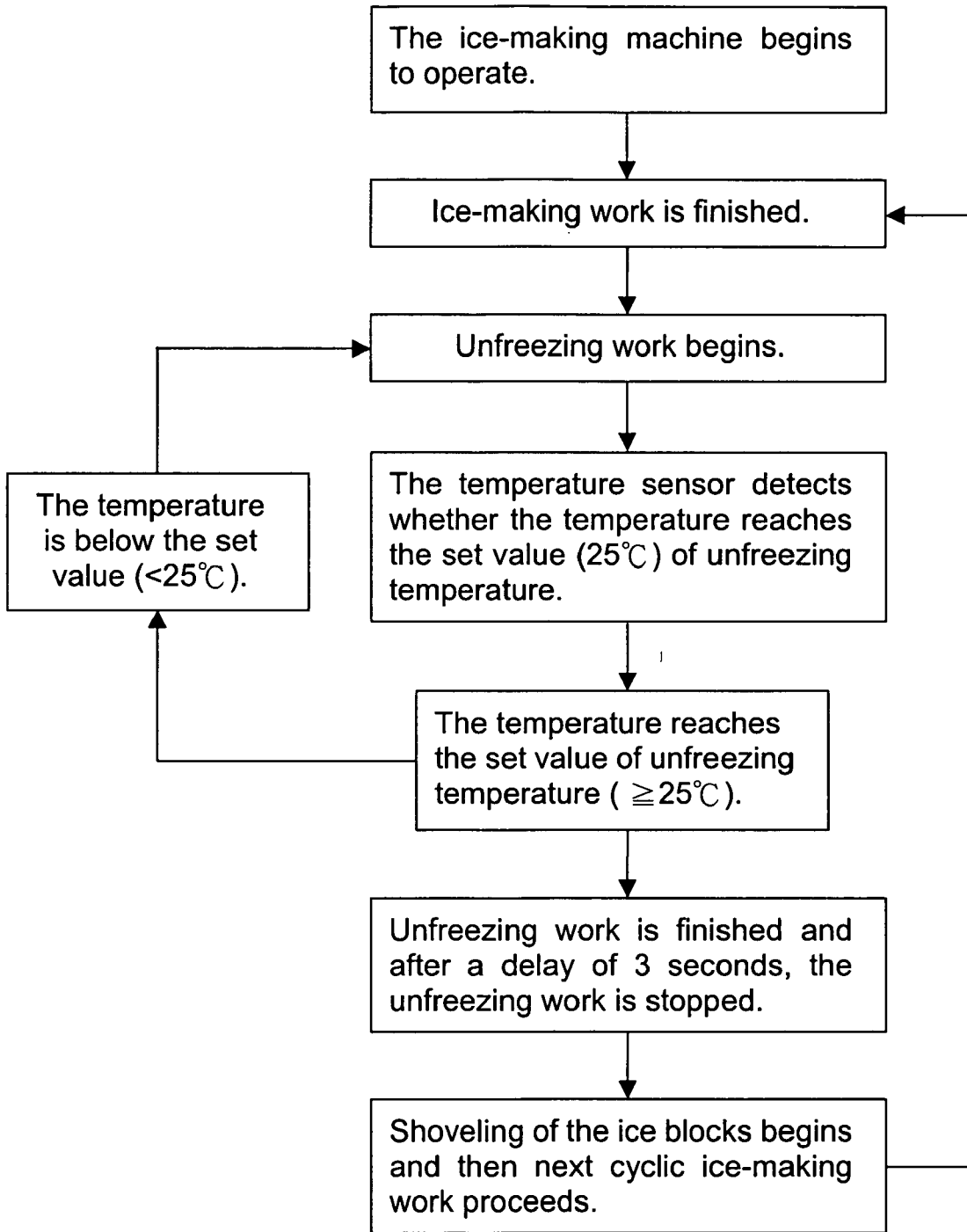


FIG. 3

ICE MAKING AND UNFREEZING CONTROL DEVICE FOR AN ICE-MAKING MACHINE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention relates to an ice making and unfreezing control device for an ice-making machine, particularly to one composed of a compressor, a condenser, an electric magnetic valve, a dryer, a vaporizer, a liquid reservoir and a temperature sensor. The vaporizer has its underside provided with a plurality of ice-making rods, disposed with an entrance pipe and an exit pipe. The temperature inductor is assembled on the exit pipe of the vaporizer. By so designing, ice blocks can be made quickly and during ice unfreezing, when the temperature sensor detects that the temperature of the exit pipe of the vaporizer reaches the set value of unfreezing temperature, it indicates that all the ice blocks are completely separated from the ice-making rods. At this time, the unfreezing work is stopped and the electric magnetic valve is turned off and, after shoveling of the ice blocks, next cyclic operation of ice making will proceed, able to quickly make ice blocks with a same shape and size, and convenient to separate the ice blocks from the ice-making rods.

[0003] 2. Description of the Prior Art

[0004] Ice blocks are widely used in homes. They can be used for concocting drinks, freezing food or temporarily keeping food fresh, or even used for reducing a swelling or fever. A common method for making ice blocks in a family is to pour water into an ice-making box and then put the ice-making box in the freezing compartment of a refrigerator for making ice blocks.

[0005] However, in addition to being used for making ice blocks, a family refrigerator is mainly employed for preserving food; therefore, in an ice making process, the water in the ice-making box may absorb various flavors of food in the refrigerator. In addition, it always takes a long time to make ice blocks in a conventional family refrigerator and the amount of the ice blocks made in the refrigerator is limited, unable to make ice blocks for immediate use.

[0006] Additionally, if there are no ice-making boxes for making ice blocks in a family refrigerator, other kinds of containers have to be used instead, but the ice blocks made in these containers are different in size and difficult to be separated from the containers, resulting in much embarrassment in use.

SUMMARY OF THE INVENTION

[0007] The objective of this invention is to offer an ice making and unfreezing control device for an ice-making machine, able to quickly make ice blocks of a same shape and size, and convenient to separate the ice blocks from the ice-making rods.

[0008] The ice making and unfreezing control device for an ice-making machine in the present invention includes a compressor, a condenser, an electric magnetic valve, a dryer, a vaporizer, a liquid reservoir and a temperature sensor. The vaporizer has its underside provided with a plurality of ice-making rods and is disposed with an entrance pipe and an exit pipe. The temperature inductor is positioned on the exit pipe of the vaporizer.

BRIEF DESCRIPTION OF DRAWINGS

[0009] This invention will be better understood by referring to the accompanying drawings, wherein:

[0010] FIG. 1 is a disposition view of an ice making and unfreezing control device for an ice-making machine in the present invention;

[0011] FIG. 2 is a perspective view of a vaporizer in the present invention; and

[0012] FIG. 3 is a block diagram of an ice unfreezing flow process in the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0013] A preferred embodiment of an ice making and unfreezing control drive for an ice-making machine in the present invention, as shown in FIGS. 1, 2 and 3, includes an ice-making circuit unit 1 composed of a compressor 10, a condenser 11, an electric magnetic valve 12, a dryer 13, a vaporizer 14, a liquid reservoir 15 and a temperature sensor 16.

[0014] The compressor 10 is provided with an exit connecting pipe 100 and an entrance connecting pipe 101. The exit connecting pipe 100 is connected with the condenser 11 and the entrance connecting pipe 101 is connected with the liquid reservoir 15.

[0015] The condenser 11 has its entrance connected with a compressor connecting pipe 110 and an electric magnetic valve connecting pipe 111.

[0016] The electric magnetic valve 12 has its entrance connected with the condenser 11 and its exit connected with a vaporizer connecting pipe 121 for connecting the vaporizer 14.

[0017] The dryer 13 has one end connected with the exit of the condenser 11 and the other end connected with a capillary tube 130 having its outer end linked with the vaporizer connecting pipe 121 of the electric magnetic valve 12 and connected with the entrance pipe 140 of the vaporizer 14.

[0018] The vaporizer 14 has the other end provided with an exit pipe 141 connected with the liquid reservoir 15 and has its underside provided with a plurality of ice-making rods 142 extending in an ice-making water groove (not shown). The temperature sensor 16 is positioned on the exit pipe 141 of the vaporizer 14.

[0019] The liquid reservoir 15 has its entrance 150 connected with the vaporizer 14 and its exit 151 connected with the compressor 10.

[0020] In operation of making ice, as shown in FIGS. 1, 2 and 3, firstly, the ice-making water groove of the ice-making machine is filled up with water, and then start the compressor 10 to pump refrigerant into the condenser 11. (The circulation direction of the refrigerant is shown by the black arrows in FIG. 1 and at this time, the electric magnetic valve 12 is turned off). Subsequently, the refrigerant is conveyed to the vaporizer 14 through the dryer 13 and the capillary tube 130 to let the water around the circumferences of the ice-making rods quickly frozen into ice blocks. After the ice

blocks are completely frozen in shape, unfreezing work will begin to separate the ice blocks from the ice-making rods.

[0021] During unfreezing, as shown in FIGS. 1 and 3, the electric magnetic valve 12 is started to let the refrigerant, which is sucked in the compressor 10 from the liquid reservoir 15, circulate along two routes, as shown by the black and the hollow arrows in FIG. 1. Since the high-temperature and high-pressure refrigerant pumped out by the compressor 10 and passing through the electric magnetic valve 12 is in a comparatively large quantity and its heat energy is higher than that of the refrigerant passing through the capillary tube 130; therefore, it can carry out unfreezing. When the temperature of the pipe of the vaporizer 14 rises and attains to an extent of unfreezing, the ice blocks can be separated from the ice-making rods 142. Simultaneously, the temperature sensor 16 will detect whether the temperature of the exit pipe 141 of the vaporizer 14 reaches the set value of unfreezing temperature. If the temperature of complete unfreezing is set to be 25° C., when the temperature of the exit pipe 141 of the vaporizer 14, detected by the temperature sensor 16, is below the set value (<25° C.), unfreezing work will continue, that is, the high-temperature and high-pressure refrigerant will be continuously conveyed to the vaporizer 14 through the electric magnetic valve 12. If the temperature of the exit pipe 141 of the vaporizer 14, detected by the temperature inductor 16, reaches the set value ($\geq 25^{\circ}$ C.), it indicates that all the ice blocks are completely separated from the ice-making rods 142, and after a delay of about 3 seconds, the unfreezing work is stopped and the electric magnetic valve 12 is turned off. At this time shoveling of the ice blocks begins and then next cyclic ice-making work proceeds.

[0022] The ice making and unfreezing control device of this invention is provided with the temperature sensor 16 for inducing temperature and turning on or turning off the electric magnetic valve 12; therefore, unfreezing work can be really completed and ice-making work can be carried out smoothly.

[0023] While the preferred embodiment of the invention has been described above, it will be recognized and under-

stood that various modifications may be made therein and the appended claims are intended to cover all such modifications that may fall within the spirit and scope of the invention.

What is claimed is:

1. An ice making and unfreezing control device for an ice-making machine comprising a compressor, a condenser, an electric magnetic valve, a dryer, a vaporizer, a liquid reservoir and a temperature inductor, said vaporizer having its underside provided with a plurality of ice-making rods, said vaporizer provided with an entrance pipe and an exit pipe, said temperature inductor positioned on said exit pipe of said vaporizer.

2. The ice making and unfreezing control device for an ice-making machine as claimed in claim 1, wherein said compressor is provided with an exit connecting pipe connected with said condenser and an entrance connecting pipe connected with said liquid reservoir, said condenser having its entrance connected with a compressor connecting pipe and an electric magnetic valve connecting pipe, said electric magnetic valve having its entrance connected with said condenser and its exit provided with a vaporizer connecting pipe connected with said vaporizer, said condenser having its exit connected with said dryer, said dryer having the other end connected with a capillary tube, said capillary tube having its outer end linked with said vaporizer connecting pipe of said electric magnetic valve and connected with the entrance pipe of said vaporizer, said vaporizer having its exit pipe connected with said liquid reservoir.

3. The ice making and unfreezing control device for an ice-making machine as claimed in claim 1, wherein the set value of unfreezing temperature of said vaporizer is $\geq 25^{\circ}$ C., and when the temperature of said exit pipe of said vaporizer, detected by said temperature inductor, reaches said set value of unfreezing temperature, it indicates that all the ice blocks are completely separated from said ice-making rods, and synchronously the unfreezing work is stopped and said electric magnetic valve is turned off.

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