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M. L. LINDENBERG

2,737,786

FREEZING ELEMENT FOR REFRIGERATION SYSTEMS

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FIG. 1

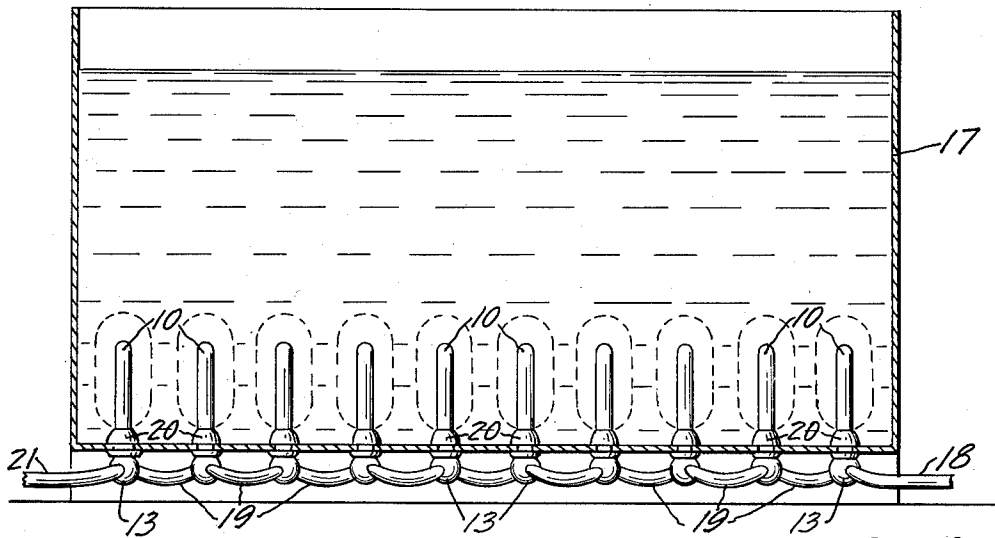


FIG. 3

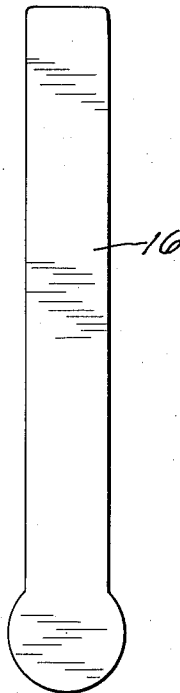


FIG. 4



FIG. 2

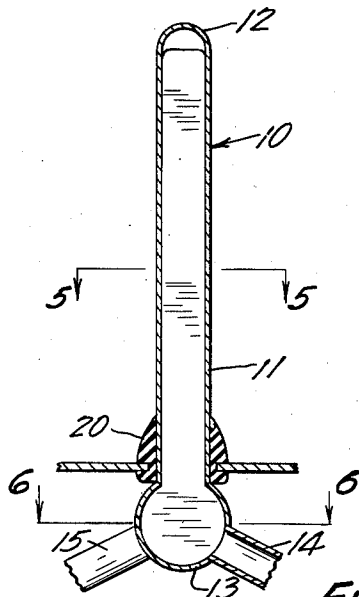


FIG. 5

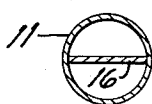
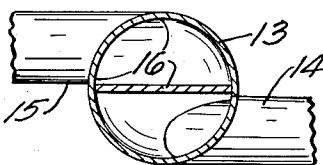


FIG. 6



INVENTOR.

MILTON L. LINDENBERG
BY

Williamson & Williamson
ATTORNEYS

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2,737,786

FREEZING ELEMENT FOR REFRIGERATION SYSTEMS

Milton L. Lindenberg, Beloit, Wis.

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1 Claim. (Cl. 62—126)

This invention relates generally to an evaporator for a refrigeration system particularly adapted for freezing clear ice cubes.

It is an object of my present invention to provide an evaporator for a refrigeration system having a plurality of hollow upstanding freezing elements interconnected in series and adapted to minimize the restriction to circulation of refrigeration gas or other refrigeration fluid therethrough.

It is another object to provide a freezing element for a refrigeration evaporator particularly adapted to be connected in series with similar elements and consisting in an upstanding hollow member closed at the top and sealingly divided longitudinally thereof to define an inlet passage and an outlet passage.

More specifically, it is an object to provide a hollow evaporator element of the class described having a closed top with a dividing partition extending in sealed relation from the bottom of said element into relatively closely spaced relation to the sealed top thereof to divide said element into a pair of passages constituting an inlet passage and an outlet passage and causing substantially free circulation of a refrigerant fluid through said passages to cool the entire external area of said hollow element and permit substantially unrestricted flow of fluid.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views and in which;

Fig. 1 is a vertical sectional view through the water-confining tank of an ice cube machine and showing my evaporator elements mounted in the bottom of the tank;

Fig. 2 is an enlarged longitudinal vertical sectional view of one of said elements with a fragmentary portion of the tank bottom shown at the lower portion of said element;

Fig. 3 is a front elevational view of the divider partition for said evaporator element;

Fig. 4 is an edge elevational view of said partition;

Fig. 5 is a transverse horizontal sectional view taken substantially along the line 5—5 of Fig. 2; and

Fig. 6 is a second horizontal sectional view taken substantially along the line 6—6 of Fig. 2.

As illustrated in the accompanying drawings, I provide a freezing element or evaporator element particularly adapted for use where a series of said elements are to be connected as in an ice cube maker, shown in Fig. 1. These freezing or evaporator elements are designated as an entirety by the numeral 10 and constitute an upstanding hollow tubular body portion 11 with a closed top such as the dome shaped top 12. In the form shown, a bulb or generally spherical lower portion 13 is sealingly interconnected with the bottom of the tube 11 and a pair of conduit connectors 14 and 15 are respectively connected in communication with the interior of said bulb portion 13.

A divider partition, designated as an entirety by the numeral 16, is inserted into the tube 11 and is sealed to the walls thereof as by a sweating soldering process con-

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ventionally used in sealing two copper members together. The base of the partition 16 is enlarged to be closely embraced by the inner walls of the spherical bulb portion and is sealed thereto by a similar sweating process and forms an imperforate partition between the two conduit connectors 14 and 15. The upper end of the divider partition 16 terminates in slightly spaced relation to the upper extremity 12 of tube 11 to form an inlet passage on one side of said partition communicating with an outlet passage on the other side of said partition only at the top 12 of the tubular portion 11 above the upper end of partition 16. The dome shape of top 12 forms a smoothly contoured surface around which the refrigeration fluid is permitted to freely travel, thus providing efficient cooling of the entire outer surface of the tube 11 and dome shaped top 12. It will be seen that the fluid is permitted substantially unrestricted passage upwardly on one side of partition 16 and downwardly on the other side thereof and thence out through the outlet conduit connector 15.

In Fig. 1, a plurality of freezing or evaporator elements 10 are interconnected in a series in the lower portion of a water-containing tank 17. The refrigeration fluid is cooled in any conventional manner and travels into the first freezing element 10 through an inlet conduit 18. Interconnection conduits 19 interconnect adjacent freezing elements 10 to produce an entire bank of said interconnected freezing or evaporator elements. In the form shown, the elements 10 are sealingly mounted in the bottom of tank 17 as by the rubber grommets 20. A suction conduit 21 carries the refrigeration fluid back to the compressor for subsequent compression and cooling. It should be noted that the cross-sectional areas of the inlet conduit 18, interconnection conduits 19 and suction conduit 21 are all substantially equal to the cross-sectional area of the inlet passages and outlet passages of the tubes 11 in order to prevent unnecessary restriction to flow of the refrigeration fluid therethrough.

It will be seen that I have provided a highly efficient, relatively simple freezing element structure adapted to permit substantially unrestricted flow of freezing fluid therethrough while guiding said fluid into contact with substantially the entire inside surface area of the tubular freezing element to permit efficient cooling of a relatively long bank of freezing elements without materially reducing the cooling efficiency of the elements toward the discharge end of said bank. Also, during the reverse cycle of operation when the frozen bodies are sought to be removed from the upstanding freezing elements, efficient and unrestricted passage of hot gas through the evaporator elements is also permitted.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of my invention which, generally stated, consists in the matter shown and described herein and set forth in the appended claim.

What I claim is:

A freezing unit for a refrigeration system comprising a hollow generally tubular upstanding element providing a freezing chamber therein having a dome shaped closure provided in the upper end thereof, a manifold member connected at the bottom end thereof and having a spherical segment to form a circular cross-sectional shape of larger diameter than the freezing element and provided with spaced apart inlet and outlet openings, a continuous integral dividing partition having an enlarged lower generally circular segment interposed between said inlet and outlet openings to divide the manifold member into an inlet chamber and an outlet chamber and conforming to the circular cross-sectional shape of the manifold member to positively prevent upward shifting movement of said

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partition and extending upwardly therefrom within the hollow freezing element with the edges thereof in sealed relation to the inside wall of said freezing element to divide the same into an inlet passage and an outlet passage respectively communicating with said inlet and outlet manifold chambers, the upper end of said partition terminating in slightly spaced relation to the upper end of said freezing element, the inlet chamber of said manifold having only the inlet and the opening communicating with the inlet passage formed therein to cause circulation of all of the fluid supplied through the inlet conduit through the inlet and outlet passages of the freezing element, and conduit means connected with said inlet and outlet openings and being so disposed to direct the refrigeration fluid against the curved inside surface portions of said manifold to smoothly conduct the fluid into and out of the freezing chamber formed by said inlet and outlet passages, said curved dome shaped top closure of said hollow freezing element smoothly carrying the fluid from the inlet passage to the outlet passage to produce only a minimum of turbulence in said flowing fluid.

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eration fluid against the curved inside surface portions of said manifold to smoothly conduct the fluid into and out of the freezing chamber formed by said inlet and outlet passages, said curved dome shaped top closure of said hollow freezing element smoothly carrying the fluid from the inlet passage to the outlet passage to produce only a minimum of turbulence in said flowing fluid.

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