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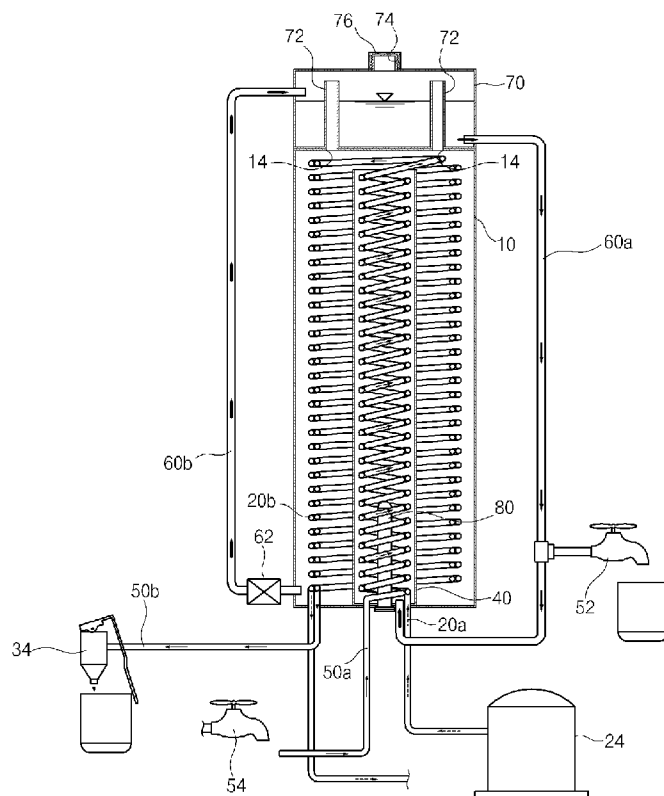
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(54) Title: MULTILATERAL CONTINUOUS UNIFORM RAPID COOLING DEVICE OF DOUBLE COOLING STRUCTURE

[Fig. 4]



(57) Abstract: Provided is a multilateral continuous uniform rapid cooling device of a double cooling structure in which drinking water such as a beverage or liquor can be rapidly and uniformly discharged without a limitation of amount immediately at an optimum cooling temperature to drink and can be drunken. The device includes: a cooling external tube in which a pair of cooling water pipes respectively are connected to one side and the other side that is opposite to the one side, of the cooling external tube and a cooling internal tube installed in the cooling external tube; a plurality of refrigerant circulating pipes, which are continuously installed inside and outside the cooling internal tube in a spring shape, extend thereto and have ends connected as a refrigerant circulating path of a cooling cycle through a bottom portion of the cooling internal tube and a bottom portion of the cooling external tube; and a plurality of drinking water pipes, which are adjacent to the refrigerant circulating pipes and are continuously installed inside and outside the cooling internal tube and in which drinking water is flowed in an end of the cooling internal tube, is rapidly cooled and is discharged into an end of the cooling external tube.

Description

MULTILATERAL CONTINUOUS UNIFORM RAPID COOLING DEVICE OF DOUBLE COOLING STRUCTURE

Technical Field

- [1] The present invention relates to a multilateral continuous uniform rapid cooling device in which drinking water can be rapidly and uniformly cooled through cooling circulation using a drinking water pipe that is constituted separately from a refrigerant circulating pipe and a cooling water pipe, and more particularly, to a multilateral continuous uniform rapid cooling device of a double cooling structure in which drinking water such as a beverage or liquor can be rapidly and continuously discharged without limitation of amount immediately at an optimum cooling temperature to drink and can be drunken.

[2]

Background Art

- [3] Generally, a water cooler and heater is constituted to allow direct water (original water) that is basically clean or purified water that is purified using an additional filter to be flowed in a cold water tank (water tank) and a hot water tank (water tank) and to discharge water in a cold or hot water state into an exhaust tap by performing an exhaust operation of the exhaust tap.
- [4] In particular, the need for a cooling device that allows purified water stored in a cold water tank to be maintained in a cooling state within a shortest time is very important. In an indirect cooling method of the related art, a refrigerant pipe is wound around the outside of the cold water tank to a predetermined length and functions as an evaporator so that water stored in the cold water tank can be cooled.
- [5] However, in the indirect cooling method, as water flowed into the cold water tank as much as water flowed out toward the outside of the cold water tank increases, some water is stored in the cold water tank according to the capacity of a water tank. However, inflow water and outflow water are mixed with each other, and the temperature of water rises rapidly. Also, due to the indirect cooling method, a difference in the temperature of water exists between inside and outside of the cold water tank and upper and lower portions of the cold water tank.
- [6] In addition, in order to solve a problem of the indirect cooling method, in the related direct cooling method, water that is stored in the cold water tank and purified by installing a cooling rod (heat absorption cylinder) having the refrigerant pipe in the cold water tank can be directly heat-exchanged by using the cooling rod. Unlike the indirect cooling method, cooling heat that is transferred from the refrigerant pipe can be used,

and thus, cooling efficiency is higher than in the indirect cooling method.

- [7] However, in both the related direct and indirect cooling methods, when a large amount of cooled water stored in the cold water tank is flowed out within a short time, there is a limitation of a cooling structure in which uncooled and tepid water is flowed out. This is because there is a limitation of a direct cooling function due to a cooling plate that is disposed in a horizontal direction and protrudes from a plurality of spiral layers based on a cooling rod (heat absorption cylinder) that is installed in a vertical direction and in the middle of the most space of the cold water tank in which water is stored.
- [8] In other words, in the related art, water is cooled by inserting or winding the refrigerant pipe in or around the inside or outside of the cold water tank. In the related cooling device, cooling effect occurs only in a portion where water contacts the refrigerant pipe. Thus, the amount of cold water is small, and time required for cooling water again increases. Thus, excessive energy is wasted, and as such, energy efficiency is lowered.
- [9] Meanwhile, in Korean Patent Laid-open Publication No. 10-0770093 (entitled Multilateral Continuous Uniform Rapid Cooling Device) which has been already filed by the present applicant and of which registration has been decided, that is, in a cooling device in which, when a refrigerant pipe through which a refrigerant passes and is circulated is installed in a cooling rod 40 of a cold water, a plurality of separation plates 30 that disperse the flow of water are installed outside the cooling rod 40 at regular intervals, as shown in FIG. 1, a horizontal refrigerant pipe 20a and an eddy current direction refrigerant pipe 20b in which a flow path of the refrigerant is continuously formed are installed as a single body in the cooling rod 40, and a bottom end of the eddy current direction refrigerant pipe 20b of the cooling rod 40 is connected to refrigerant pipes 22a and 22b, which are installed along the separation plates 30 installed outside the cooling rod 40.
- [10] Also, the refrigerant pipes 22a and 22b are installed along the separation plates 30 to have the same radius from downwards to upwards, do not overlap with each other from upwards to downwards, and pass through a lower portion of a cold water tank 10. Also, owing to construction in which an inlet 12a and an outlet 12b are perforated so that water is flowed in top and bottom ends of the cooling rod 40 and passes through the cold water tank 10, purified water that is flowed in the cold water tank 10 directly and continuously contacts the refrigerant of the refrigerant pipes 22a and 22b in a multilateral shape and can be rapidly cooled within a short time.
- [11] However, in the above-mentioned technology by the present applicant, the refrigerant pipe in which a cold refrigerant is circulated is installed uniformly inside the cooling rod and the cold water tank so that purified water that is flowed in the cold water

directly and continuously contacts the refrigerant of the refrigerant pipe in a multilateral shape and can be rapidly cooled within a short time. However, drinking water such as a beverage or liquor needs to be cooled immediately and to be drunken, and the related cooling device does not provide a cooling structure in which drinking water passes and is cooled.

[12]

Disclosure of Invention

Technical Problem

[13]

While using a fundamental cooling principle as invention technology that has been filed by the present applicant, the present invention provides a new-concept multilateral continuous uniform rapid cooling device in which drinking water such as a beverage or liquor can be rapidly and uniformly discharged without a limitation of amount immediately at an optimum cooling temperature to drink and can be drunken, and more particularly, a multilateral continuous uniform rapid cooling device of a double cooling structure in which drinking water such as a beverage or liquor, separately from pure water can be rapidly and uniformly cooled without a limitation of the amount of water that is immediately discharged through a drinking water pipe that is constituted separately from a refrigerant circulating pipe and a cooling water pipe.

[14]

The present invention also provides a multilateral continuous uniform rapid cooling device of a double cooling structure having a cooling water drinking function which is a fundamental function of a related cooling device (water cooler and heater) that conveniently discharges and drinks cooling water in which drinking water is secondarily heat-exchanged, separately from primary heat exchange with a refrigerant, as well as a fundamental function of immediately cooling drinking water by using a drinking water pipe.

[15]

Technical Solution

[16]

According to one aspect of the present invention, there is provided a multilateral continuous uniform rapid cooling device of a double cooling structure, the device including: a cooling external tube to which a pair of cooling water pipes respectively are connected and a cooling internal tube installed in the cooling external tube; a plurality of refrigerant circulating pipes, which are continuously installed inside and outside the cooling internal tube in a spring shape, extend thereto and have ends connected as a refrigerant circulating path of a cooling cycle through a bottom portion of the cooling internal tube and a bottom portion of the cooling external tube; and a plurality of drinking water pipes, which are adjacent to the refrigerant circulating pipes and are continuously installed inside and outside the cooling internal tube and in which

drinking water is flowed in an end of the cooling internal tube, is rapidly cooled and is discharged into an end of the cooling external tube.

- [17] The cooling water pipes may include: a circulating pump installed in a middle of one of the cooling water pipes so that cooling water from the cooling external tube can be discharged and supplied to an auxiliary tank installed above the cooling external tube; and a faucet installed at the other one of the cooling water pipes so that circulated cooling water can be discharged and drunken.
- [18] The auxiliary tank may include: an air inlet protruding from a bottom portion of the auxiliary tank installed above and communicating with an upper portion of the cooling external tube so that cooling water filled in the cooling external tube can be smoothly circulated and supplied through the cooling water pipes; and a water supply hole formed in the upper portion of the auxiliary tank and being open or closed by using a sealing stopper so as to supplement or discharge water (cooling water).
- [19] The cooling internal tube may include: a temperature sensor sensing a change of a predetermined temperature of cooling water that is circulated and supplied through the cooling water pipes and controlling the temperature; and a plurality of spiral separation plates (dispersion diaphragms) formed outside the cooling internal tube and protruding between the refrigerant circulating pipes and the drinking water pipes so that mass of cooling water that is a fluid is dispersed and multilateral continuous contact between the refrigerant circulating pipes and the drinking water pipes is increased.
- [20] According to the other aspect of the present invention, , there is provided a multilateral continuous uniform rapid cooling device of a double cooling structure, the device including: a cooling internal tube to which one end of one of a plurality of cooling water pipes is connected and a cooling external tube to which one end of the other one of the cooling water pipes is connected through a lateral connection portion that is separated from a bottom side of the cooling external tube; a plurality of refrigerant circulating pipes, which are continuously installed inside and outside the cooling internal tube in a spring shape, extend thereto and have ends connected as a refrigerant circulating path of a cooling cycle through a bottom portion of the cooling internal tube and a bottom portion of the cooling external tube; and a plurality of drinking water pipes, which are adjacent to the refrigerant circulating pipes and are continuously installed inside and outside the cooling internal tube and in which drinking water is flowed in an end of the cooling internal tube, is rapidly cooled and is discharged into an end of the cooling external tube.
- [21] The device further comprises a plurality of bypass holes, which are formed in a bottom portion of the cooling internal tube and through which the cooling internal tube and the cooling external tube communicate with each other.
- [22] And the other end of the cooling water pipe is connected to an upper side of the

cooling external tube so that cooling water flowed through the cooling water pipe is accommodated in the cooling external tube.

[23]

Brief Description of Drawings

[24] The above and other aspects of the present invention will become more

[25] apparent by describing in detail exemplary embodiments thereof with reference to the attached drawings in which:

[26] FIG. 1 illustrates a structure of a related multilateral uniform rapid cooling device;

[27] FIG. 2 illustrates a basic structure of a multilateral continuous uniform rapid cooling device of a double cooling structure according to an embodiment of the present invention;

[28] FIG. 3 illustrates a structure of a refrigerant pipe and a drinking water pipe, which are installed at a water external tube and a cooling internal tube illustrated in the multilateral continuous uniform rapid cooling device of a double cooling structure of FIG. 2;

[29] FIG. 4 illustrates a structure of the multilateral continuous uniform rapid cooling device of a double cooling structure illustrated in FIG. 2;

[30] FIG. 5 illustrates a structure of a multilateral continuous uniform rapid cooling device of a double cooling structure according to another aspect of the present invention; and

[31] FIG. 6 illustrates a structure of a multilateral continuous uniform rapid cooling device of a double cooling structure according to another aspect of the present invention.

Best Mode for Carrying out the Invention

[32] The construction and operating principle of a multilateral continuous uniform rapid cooling device of a double cooling structure according to the present invention will now be described more fully with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown. Also, the detailed relationship between a power supply portion, a controller, and a sensing portion that allow the cooling device of the present invention to operate will be omitted for the convenience of the drawing and description.

[33] FIGS. 2 and 3 illustrate a basic structure of a multilateral continuous uniform rapid cooling device of a double cooling structure according to an embodiment of the present invention and a structure of a refrigerant pipe and a drinking water pipe, which are installed at a water external tube and a cooling internal tube illustrated in the multilateral continuous uniform rapid cooling device of a double cooling structure of FIG. 2, respectively, and FIG. 4 illustrates a structure of the multilateral continuous uniform

rapid cooling device of a double cooling structure illustrated in FIG. 2.

[34] Referring to FIGS. 2, 3, and 4, the multilateral continuous uniform rapid cooling device of a double cooling structure according to the current embodiment includes a cooling external tube 10 in which cooling water pipes 60a and 60b are connected to one side and the other side that is opposite to the one side, of the cooling external tube 10, a cooling internal tube 40 installed in the cooling external tube 10, a plurality of refrigerant circulating pipes 20a and 20b, which are continuously installed inside and outside the cooling internal tube 40 in a spring shape, extend thereto and have ends connected as a refrigerant circulating path of a cooling cycle through a bottom portion of the cooling internal tube 40 and a bottom portion of the cooling external tube 10, and a plurality of drinking water pipes 50a and 50b, which are adjacent to the refrigerant circulating pipes 20a and 20b and are continuously installed inside and outside the cooling internal tube 40 and in which drinking water is flowed in an end of the cooling internal tube 40, is rapidly cooled and is discharged into an end of the cooling external tube 10. Drinking water such as a beverage or liquor is flowed in the drinking water pipe 50a, is heat-exchanged in a double manner by using the refrigerant circulating pipes 20a and 20b that are equally installed in the space of the cooling internal tube 40 and the cooling external tube 10 in a spiral shape and by using cooling water that is cooled by heat exchange of the refrigerant circulating pipes 20a and 20b in which the refrigerant is circulated and supplied so that drinking water can be uniformly and rapidly cooled in a multilateral shape by using the double cooling structure of the present invention.

[35] In other words, unlike the related cooling device, in the present invention, a plurality of refrigerant pipes of a general cooling cycle are equally installed in the cooling external tube 10 and the cooling internal tube 40 that constitute a cooling water tank, in a spring shape so that one end and the other end of each of the refrigerant pipes are again connected to the cooling cycle. Basically, additional drinking water pipes 50a and 50b in which drinking water is supplied and circulated are installed at the cooling external tube 10 and the cooling internal tube 40 together with the refrigerant circulating pipes 20a and 20b. Direct water or purified water is supplied and circulated in the cooling external tube 10 and the cooling internal tube 40, is cooled, and is stored as cooling water of a predetermined temperature.

[36] Firstly, the cooling internal tube 40 may be installed in a vertical direction in the middle of the cooling external tube 10, and a plurality of bypass holes may be formed in the bottom portion of the cooling internal tube 40 together with the cooling external tube 10 so that the cooling water pipes 60a and 60b as well as the refrigerant circulating pipes 20a and 20b and the drinking water pipes 50a and 50b, respectively, communicate with the cooling internal tube 40. In particular, the cooling water pipe

60b may be installed at an outlet of the cooling external tube 10, and the cooling water pipe 60a may be installed at an inlet of the cooling external tube 10 so that cooling water stored in the cooling external tube 10 can be circulated and supplied to an auxiliary tank 70. One end of each of the cooling water pipes 60a and 60b is connected to the cooling external tube 10, and the other end thereof is connected to the auxiliary tank 70.

- [37] One end of each of the refrigerant circulating pipes 20a and 20b including a compressor 24, in which the refrigerant is circulated in a general cooling cycle is connected to the cooling internal tube 40 and extends thereto, and the other end of each of the refrigerant circulating pipes 20a and 20b that extend through the cooling external tube 10 is again connected to the refrigeration pipe in the cooling cycle. Referring to FIGS. 2, 3, and 4, the refrigerant circulating pipes 20a and 20b are primarily installed in the cooling internal tube 40 in a spring shape, are secondarily installed in the cooling external tube 10 and are positioned in the cooling space of the cooling internal tube 40 and the cooling external tube 10 in a spiral shape.
- [38] In addition, in order to supply and cool drinking water such as liquor or various kinds of beverages immediately when the refrigerant circulating pipes 20a and 20b in which the refrigerant is circulated in the cooling cycle are separately used, a beverage pipe 20a which is one of the refrigerant circulating pipes 20a and 20b is primarily installed in a vertical direction in the cooling internal tube 40 in a spring shape to have the same structure as the refrigerant circulating pipes 20a and 20b, and subsequently, the beverage pipe 20a installed in the cooling internal tube 40 is also continuously installed in the cooling external tube 10, and the beverage pipe 20b which is the other one of the refrigerant circulating pipes 20a and 20b, extends to the external through the cooling space of the cooling internal tube 40, and the cooling external tube 10 and an exhaust tap 34 is installed at an end of the beverage pipe 20b so that drinking water of room temperature that is supplied immediately can be uniformly heat-exchanged in a multilateral shape in a double manner by using the refrigerant circulating pipes 20a and 20b and cooling water that is filled in the cooling internal tube 40 and the cooling external tube 10 and can be discharged in a rapidly-cooled state.
- [39] In addition, both ends of the cooling water pipes 60a and 60b are connected to the cooling external tube 10 and the cooling internal tube 40 in which the refrigerant circulating pipes 20a and 20b and the drinking water pipes 50a and 50b form the entire cooling space in a spring shape. The cooling water pipe 60b which is connected to one side of the cooling external tube 10 and extends thereto, is connected to one side of the auxiliary tank 70 installed on the cooling external tube 10, and an end of the cooling water pipe 60a which is connected from the other side of the auxiliary tank 70 and extends thereto, is connected to the other side of the cooling internal tube 40.

- [40] As such, cooling water from the cooling internal tube 40 and the cooling external tube 10, respectively, can be discharged into the auxiliary tank 70 through the cooling water pipes 60b and 60a and subsequently can be flowed in the cooling internal tube 40 and the cooling external tube 10 and can be circulated. In particular, a circulating pump 62 is installed in the middle of the cooling water pipe 60b connected to one side of the cooling external tube 10 so that cooling water from the cooling external tube 10 can be smoothly flowed in the auxiliary tank 70 and subsequently can be supplied and circulated to the cooling internal tube 40.
- [41] In particular, a faucet 52 may be installed at the cooling water pipe 60a which is one of the cooling water pipes 60a and 60b connecting the cooling external tube 40 and the cooling internal tube 10 to the auxiliary tank 70 so that cold drinking water and cooling water can be discharged and drunk during using.
- [42] Meanwhile, an air inlet 72 may protrude from the bottom portion of the auxiliary tank 70 installed above the cooling external tube 40 and may communicate with the upper portion of the cooling external tube 10 so that cooling water filled in the cooling external tube 10 can be smoothly circulated and supplied through the cooling water pipes 60a and 60b, and a water supply hole 74 may be formed in the upper portion of the auxiliary tank 70 and may be open or closed by using a sealing stopper 76 so as to supplement or discharge water (cooling water). An air entering hole 14 may be perforated in the upper portion of the cooling external tube 40 in the same position as the air inlet 72 of the auxiliary tank 70.
- [43] In addition, a temperature sensor 80 is installed to sense a change of temperature of cooling water and control the temperature so that cooling water stored and circulated in the cooling internal tube 40 and the cooling external tube 10 can be maintained at an appropriate cooling temperature. If cooling water exceeds a predetermined, appropriate temperature, constructions of the general cooling cycle operate automatically, and refrigerant supply and circulation of the refrigerant circulating pipes 20a and 20b installed at the cooling internal tube 40 and the cooling external tube 10 can be automatically controlled and smooth heat exchange can be performed.
- [44] Furthermore, an additional circulating pump may be installed so that drinking water can be smoothly supplied and circulated over the cooling external tube 40 and the cooling internal tube 10 through the drinking water pipes 50a and 50b. Unexplained reference numeral 54 denotes a faucet through which drinking water can be supplied to the drinking water pipe 50a which is one of the drinking water pipes 50a and 50b, and the construction relationship and operating principle of the present invention is not limited thereto.
- [45] In addition, a plurality of spiral separation plates (dispersion diaphragms) may be formed outside the cooling internal tube 40 and may protrude between the refrigerant

circulating pipes 20a and 20b and the drinking water pipes 50a and 50b so that mass of cooling water that is a fluid can be dispersed and multilateral continuous contact between the refrigerant circulating pipes 20a and 20b and the drinking water pipes 50a and 50b can be increased. Also, according to another embodiment, by using FIG. 1 as the related art that has been filed by the present applicant as a basic embodiment, the separation plates may be installed in a horizontal direction in a spiral shape by using the cooling internal tube 40 as a medium, and a plurality of wing diaphragms may be installed on the separation plates at regular intervals so that the speed of water that is dropped along the cooling internal tube 40 can be dispersed and delayed and time required for heat exchange contact between the drinking water pipes 50a and 50b through which drinking water passes can be extended.

[46] When the refrigerant circulating pipes of the cooling cycle are used as a heating means, the multilateral continuous uniform rapid cooling device of the double cooling structure according to the present invention in which drinking water can be rapidly and uniformly cooled through cooling circulation using a drinking water pipe that is constituted separately from a refrigerant circulating pipe and a cooling water pipe, can be used as a multilateral continuous uniform rapid heating device of a double heating structure for immediately heating contents.

[47] FIG. 5 illustrates a structure of a multilateral continuous uniform rapid cooling device of a double cooling structure according to another aspect of the present invention.

[48] Hereinafter, a detailed description of the same structure as that of FIG. 2 will be omitted, and a different portion from that of FIG. 2 will be described.

[49] Referring to FIG. 5, the multilateral continuous uniform rapid cooling device of a double cooling structure according to the current embodiment includes a cooling internal tube 140, a cooling external tube 110, a plurality of refrigerant circulating pipes 120a and 120b, a plurality of drinking water pipes 150a and 150b, and a plurality of cooling water pipes 160a and 160b.

[50] One end of one (the cooling water pipe 160a) of the cooling water pipes 160a and 160b is connected to the cooling internal tube 140, and one end of the other one (the cooling water pipe 160b) of the cooling water pipes 160a and 160b is connected to the cooling external tube 110 through a lateral connection portion 110a that is separated from the bottom side of the cooling external tube 110.

[51] One end of the refrigerant circulating pipe 120a is connected to a bottom side of the cooling internal tube 140, and one end of the refrigerant circulating pipe 120b is connected to a side that is separated from a bottom side of the cooling external tube 110.

[52] In the multilateral continuous uniform rapid cooling device of a double cooling

structure according to the current embodiment, the refrigerant circulating pipe 120b is connected through a lateral connection portion 110a that is separated from the bottom side of the cooling external tube 110. As such, the flow amount of cooling water of portion A that is positioned at a lower side of the lateral connection portion 110a of cooling water inside the cooling external tube 140 is remarkably reduced compared to that of cooling water that is positioned at an upper side of the lateral connection portion 110a, and cooling water around the refrigerant circulating pipe 120b is gradually changed into ice. A region in which cooling water is changed into ice gradually extends to the drinking water pipes 150a and 150b.

- [53] Cooling water that is positioned in an upper position than the lateral connection portion 110a of the cooling external tube 110 is continuously circulated and thus is not changed into ice. That is, when the temperature of cooling water is 3 degrees below zero that is less than a freezing point, cooling water briskly flows in an uncooled state at the upper side of the lateral connection portion 110a of the cooling external tube 110 and is heat-exchanged with the drinking water pipes 150a and 150b. However, cooling water that is positioned at the lower side of the lateral connection portion 110a of the cooling external tube 10 is not smoothly circulated, and when the temperature of cooling water is 3 degrees below zero that is less than a freezing point, cooling water is changed into ice.
- [54] In this case, drinking water that flows through the drinking water pipes 150a and 150b is heat-exchanged with cooling water at the upper side of the lateral connection portion 110a and is cooled. Simultaneously, the temperature of cooling water that is heat-exchanged with drinking water rises relatively.
- [55] Cooling water of the rising temperature moves toward the lower side of the lateral connection portion 110a, is heat-exchanged with ice that is formed around the refrigerant circulating pipe 120a and is cooled again. Meanwhile, drinking water that is cooled by using cooling water filled at the upper side of the lateral connection portion 110a moves downwards along the drinking water pipes 150a and 150b, is heat-exchanged with cooling water that is cooled by using ice and is cooled again. In this case, cooling water is cooled by using latent heat of cooling water that is changed into ice, and drinking water is cooled by using cooled cooling water so that drinking water can be more efficiently cooled.
- [56] Cooling water that is changed into ice and is positioned around the refrigerant circulating pipes 120a and 120b is gradually changed into water, and the temperature of cooling water rises gradually. Cooling water of the rising temperature moves toward the inside of the cooling internal tube 140 through a plurality of bypass holes 140a formed in the bottom portion of the cooling internal tube 140 and then is mixed with cooling water that is flowed through the refrigerant circulating pipes 120a and 120b, is

cooled and then moves upwards and is continuously circulated in a cooled state in the cooling internal tube 140 and the cooling external tube 110.

[57] Cooling water that flows through a cooling water pipe through the lateral connection portion 110a of the cooling external tube 110 moves along the cooling water pipe by using a pump and then is directly supplied to the upper side of cooling water that is accommodated in the cooling external tube 110.

[58] As cooling water that is supplied through the cooling water pipe drops and is fallen into the upper side of cooling water of the cooling external tube 110, severe flow occurs in the upper portion of cooling water of the cooling external tube 110. Thus, heat-exchange efficiency inside the cooling external tube 110 is further improved.

[59] FIG. 6 illustrates a structure of a multilateral continuous uniform rapid cooling device of a double cooling structure according to another aspect of the present invention. The multilateral continuous uniform rapid cooling device of a double cooling structure according to the current embodiment includes a cooling internal tube 240, a cooling external tube 210, a plurality of refrigerant circulating pipes 220a and 220b, a plurality of drinking water pipes 250a and 250b, a plurality of cooling water pipes 260a and 260b, a heat exchanger 300, and a ventilation fan 310.

[60] The structure of the cooling internal and external tubes 210 and 240, the refrigerant circulating pipes 220a and 220b, and the drinking water pipes 250a and 250b is the same as that of FIG. 2, and thus, a description thereof will be omitted, and a difference between FIGS. 2 and 6 will be described in detail.

[61] The multilateral continuous uniform rapid cooling device of a double cooling structure according to the current embodiment further includes a first branch pipe 261 that is diverged from the middle of the cooling water pipe 260b, and the first branch pipe 261 is connected to an inlet port of the heat exchanger 300. The cooling water pipe 260a includes a second branch pipe 262 that is diverged from the middle of the cooling water pipe 260a, and the second branch pipe 262 is connected to an outlet port of the heat exchanger 300.

[62] A ventilation fan 310 is positioned at a side of the heat exchanger 300. Owing to the ventilation fan 310, forcible flow of the air that passes through the heat exchanger 300 is well performed, and heat exchange efficiency of cooling water that flows in the heat exchanger 300 is improved, and simultaneously, the cooled air is supplied to a predetermined position in which cold wind is required so that cold wind effect can be shown.

[63] The operation of the multilateral continuous uniform rapid cooling device of a double cooling structure according to the current embodiment will be described in greater detail. Approximately half cooling water that flows through the cooling water pipe 260b is flowed in the heat exchanger 300 through the first branch pipe 261, and

cooling water that is flowed in the heat exchanger 300 is heat-exchanged with the air and is used to cool the air and then flows in the cooling water pipe 260a through the second branch pipe 262. Cooling water that flows in the cooling water pipe 260a is flowed in the cooling external tube 210, is again cooled in the cooling external tube 210 and the cooling internal tube 240 and moves toward the cooling water pipe 260b and is continuously circulated.

[64] The air that passes through the heat exchanger 300 is sufficiently cooled by cooling water that passes through the heat exchanger 300, and the cooled air is supplied by the ventilation fan 310 to the outside so that cold wind effect can be shown.

[65] Accordingly, the multilateral continuous uniform rapid cooling device of a double cooling structure according to the present invention has an advantage of having a function of a wind cooler that cools the air and supplies the air to a predetermined position in which cold wind is required, by installing further heat exchanger without an additional cooling system.

[66]

Industrial Applicability

[67] As described above, in the multilateral continuous uniform rapid cooling device of a double cooling structure according to the present invention, drinking water such as a beverage or liquor can be immediately supplied through an additional drinking water pipe and can be rapidly and uniformly discharged without a limitation of amount immediately at an optimum cooling temperature to drink and can be drunken.

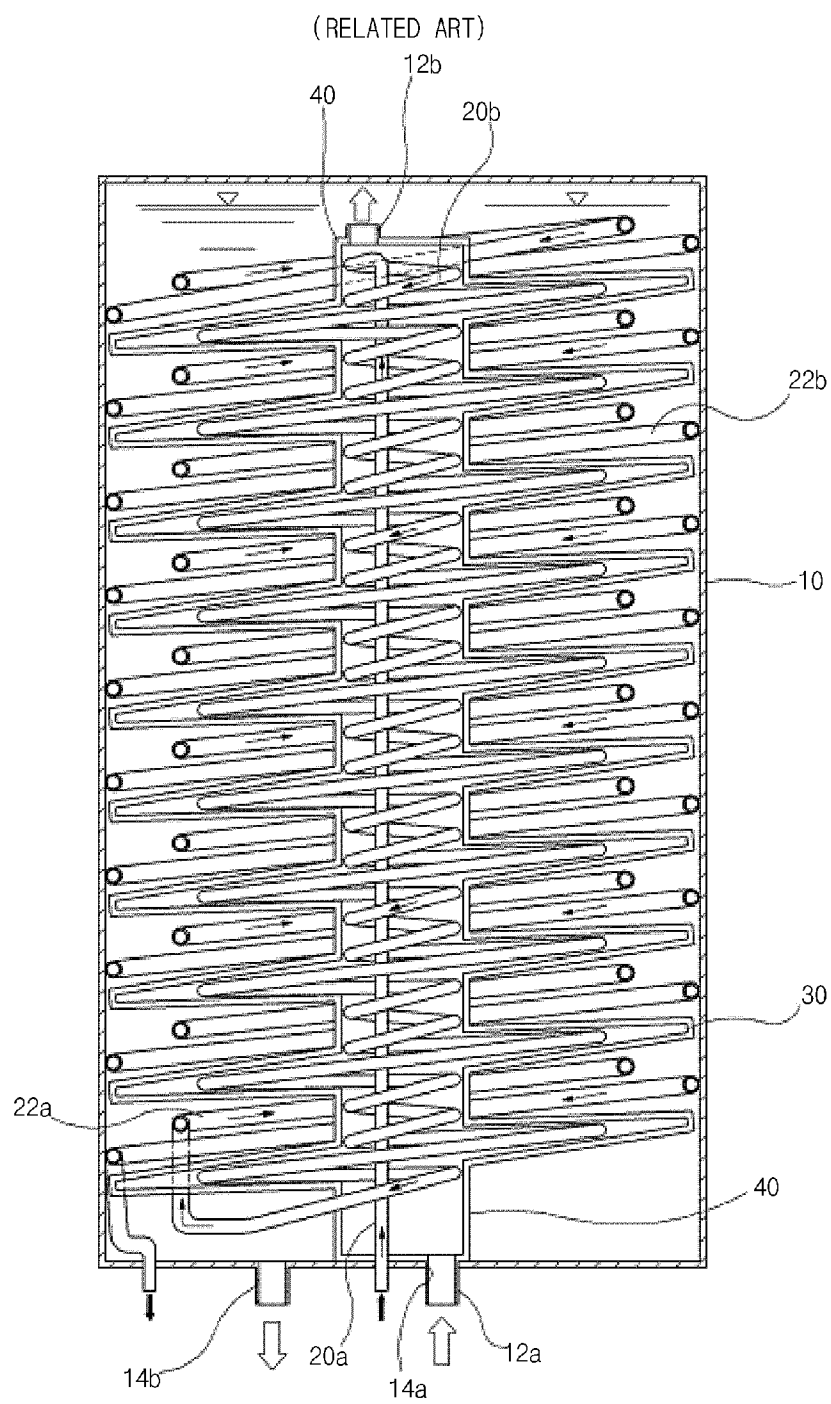
[68] In addition, the present invention can provide various effects to have a cooling water drinking function, which is a fundamental function of a related cooling device (water cooler and heater), that provides cooling water used to cool drinking water together with a fundamental function of immediately cooling drinking water by using a drinking water pipe. As a result, drinking water does not need to be kept in a refrigerator in bottle-basis, and various kinds of drinking water can be rapidly and continuously cooled without a limitation of amount and can be conveniently drunken.

Claims

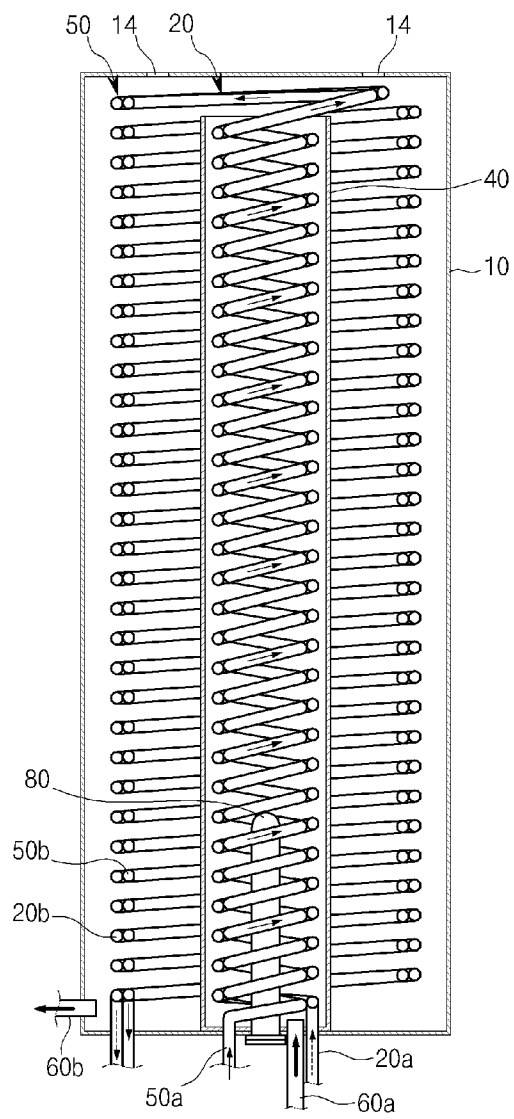
- [1] A multilateral continuous uniform rapid cooling device of a double cooling structure, the device comprising:
a cooling external tube to which a pair of cooling water pipes respectively are connected and a cooling internal tube installed in the cooling external tube;
a plurality of refrigerant circulating pipes, which are continuously installed inside and outside the cooling internal tube in a spring shape, extend thereto and have ends connected as a refrigerant circulating path of a cooling cycle through a bottom portion of the cooling internal tube and a bottom portion of the cooling external tube; and
a plurality of drinking water pipes, which are adjacent to the refrigerant circulating pipes and are continuously installed inside and outside the cooling internal tube and in which drinking water is flowed in an end of the cooling internal tube, is rapidly cooled and is discharged into an end of the cooling external tube.
- [2] The device of claim 1, wherein the cooling water pipes comprises:
a circulating pump installed in a middle of one of the cooling water pipes so that cooling water from the cooling external tube can be discharged and supplied to an auxiliary tank installed above the cooling external tube; and
a faucet installed at the other one of the cooling water pipes so that circulated cooling water can be discharged and drunk.
- [3] The device of claim 1 or 2, wherein the auxiliary tank comprises:
an air inlet protruding from a bottom portion of the auxiliary tank installed above and communicating with an upper portion of the cooling external tube so that cooling water filled in the cooling external tube can be smoothly circulated and supplied through the cooling water pipes; and a water supply hole formed in the upper portion of the auxiliary tank and being open or closed by using a sealing stopper so as to supplement or discharge water (cooling water).
- [4] The device of claim 1 or 2, wherein the cooling internal tube comprises:
a temperature sensor sensing a change of a predetermined temperature of cooling water that is circulated and supplied through the cooling water pipes and controlling the temperature; and
a plurality of spiral separation plates (dispersion diaphragms) formed outside the cooling internal tube and protruding between the refrigerant circulating pipes and the drinking water pipes so that mass of cooling water that is a fluid is dispersed and multilateral continuous contact between the refrigerant circulating pipes and the drinking water pipes is increased.

- [5] A multilateral continuous uniform rapid cooling device of a double cooling structure, the device comprising:
a cooling internal tube to which one end of one of a plurality of cooling water pipes is connected and a cooling external tube to which one end of the other one of the cooling water pipes is connected through a lateral connection portion that is separated from a bottom side of the cooling external tube;
a plurality of refrigerant circulating pipes, which are continuously installed inside and outside the cooling internal tube in a spring shape, extend thereto and have ends connected as a refrigerant circulating path of a cooling cycle through a bottom portion of the cooling internal tube and a bottom portion of the cooling external tube; and
a plurality of drinking water pipes, which are adjacent to the refrigerant circulating pipes and are continuously installed inside and outside the cooling internal tube and in which drinking water is flowed in an end of the cooling internal tube, is rapidly cooled and is discharged into an end of the cooling external tube.
- [6] The device of claim 5, further comprising a plurality of bypass holes, which are formed in a bottom portion of the cooling internal tube and through which the cooling internal tube and the cooling external tube communicate with each other.
- [7] The device of claim 5, wherein the other end of the cooling water pipe is connected to an upper side of the cooling external tube so that cooling water flowed through the cooling water pipe is accommodated in the cooling external tube.
- [8] The device of claim 5, further comprising:
first and second branch pipes diverged from the cooling water pipes respectively;
a heat exchanger having an inlet port and an outlet port connected to the first and second branch pipes respectively; and
a ventilation fan positioned at a side of the heat exchanger and discharging the air that is cooled by using cooling water passing through the heat exchanger.

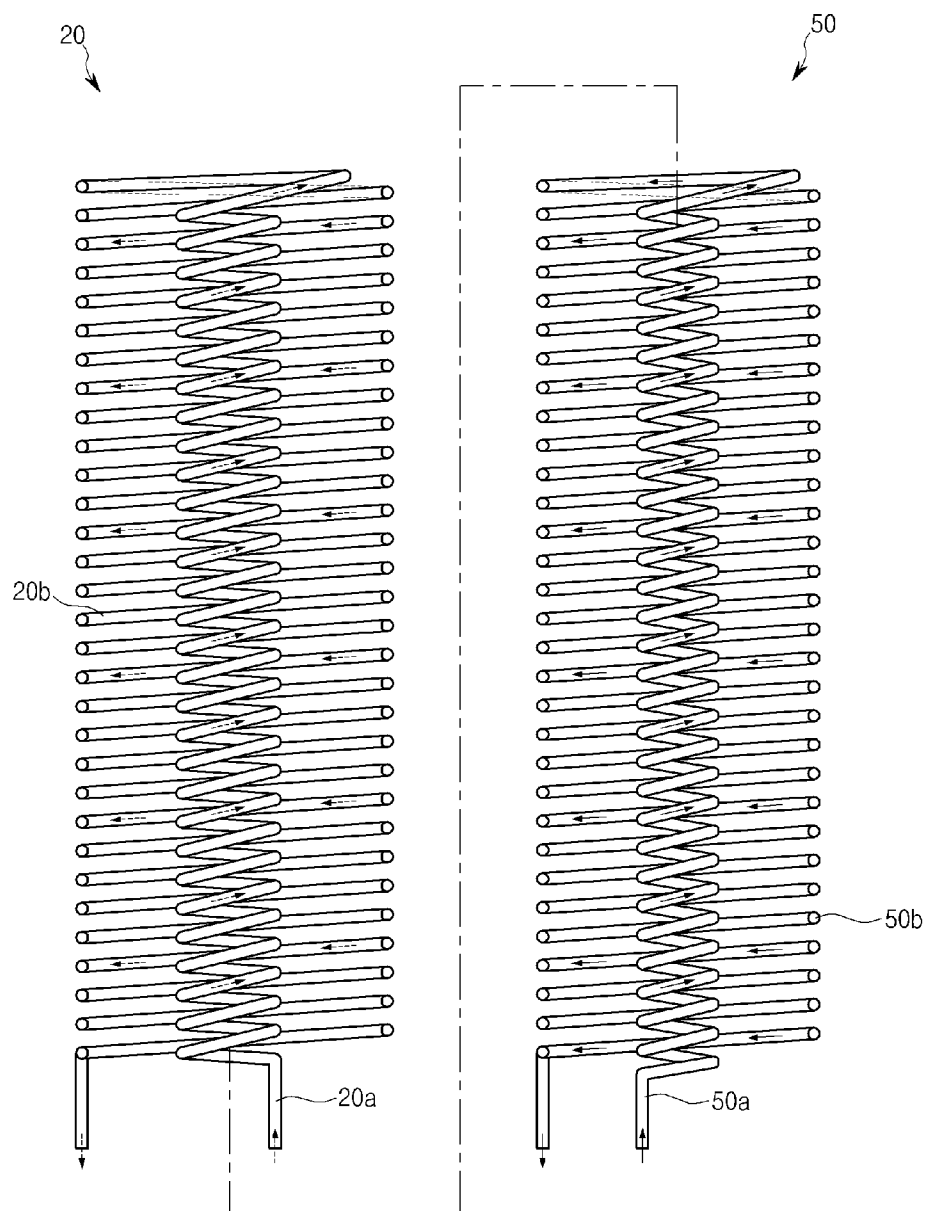
[Fig. 1]



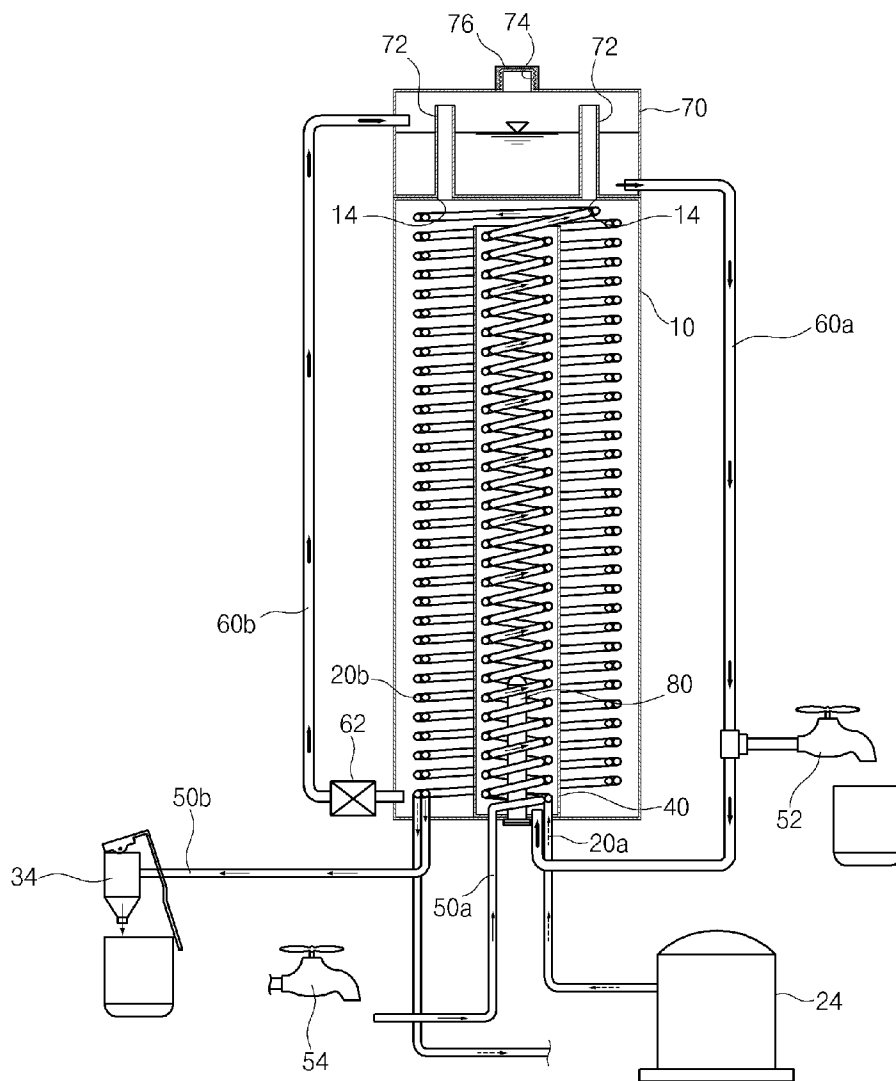
[Fig. 2]



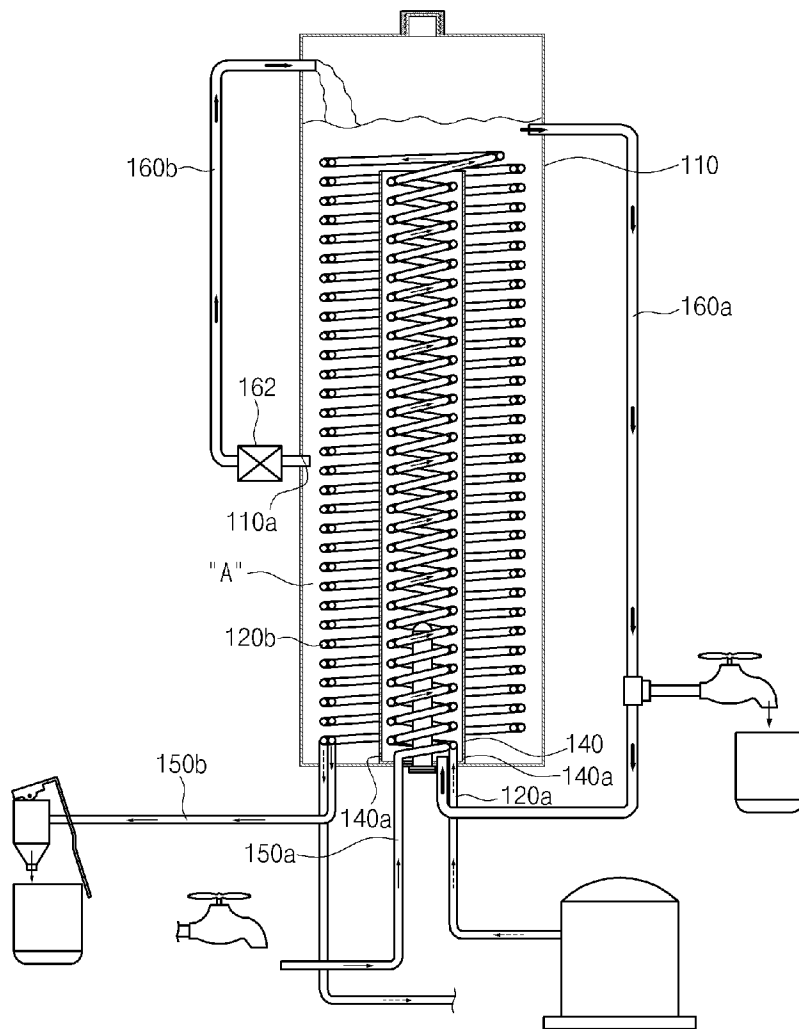
[Fig. 3]



[Fig. 4]



[Fig. 5]



[Fig. 6]

