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(19) **United States**(12) **Patent Application Publication**
Lee(10) **Pub. No.: US 2011/0232315 A1**(43) **Pub. Date: Sep. 29, 2011**(54) **REGENERATIVE EVAPORATIVE COOLER,
COOLING SYSTEM AND CORE MODULE
THEREOF**(52) **U.S. Cl. 62/314**(76) **Inventor: Dae-Young Lee, Seoul (KR)**(57) **ABSTRACT**(21) **Appl. No.: 13/130,321**(22) **PCT Filed: Nov. 19, 2009**(86) **PCT No.: PCT/KR2009/006827**§ 371 (c)(1),
(2), (4) Date: **May 20, 2011**(30) **Foreign Application Priority Data**

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A regenerative evaporative cooler (REC) including: a plurality of dry channel units allowing indoor air to pass through; a plurality of wet channel units formed to extract a portion of air, which has passed through the dry channel units, and formed to heat-exchange with the dry channel units; an evaporation water supply unit disposed at an upper portion of the wet channel units and supplying the wet channel units with evaporation water; and dry channel shields formed at an upper side of the dry channel units, allowing evaporation water supplied from the evaporation water supply unit to be introduced into the wet channel units, and shielding the upper portions of the dry channel units. The dry channel shield effectively prevents evaporation water sprinkled by the evaporation water supply unit from being introduced into the wet channels and simplifies the configuration of the evaporation water supply unit.

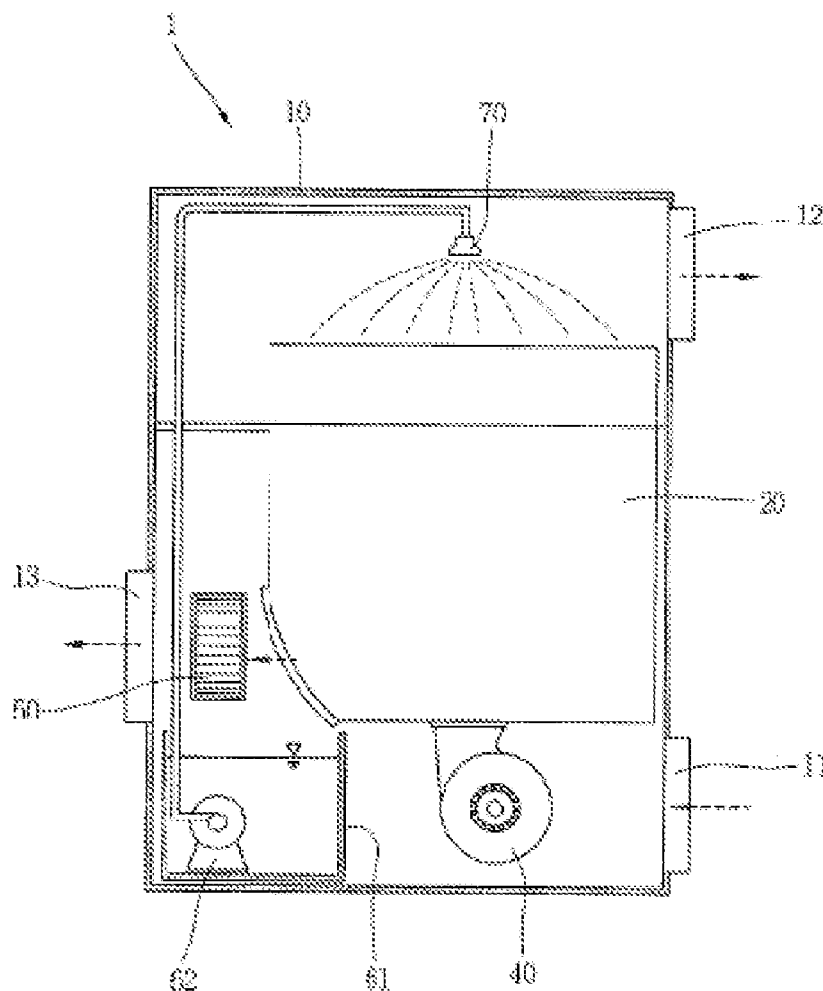


FIG. 1

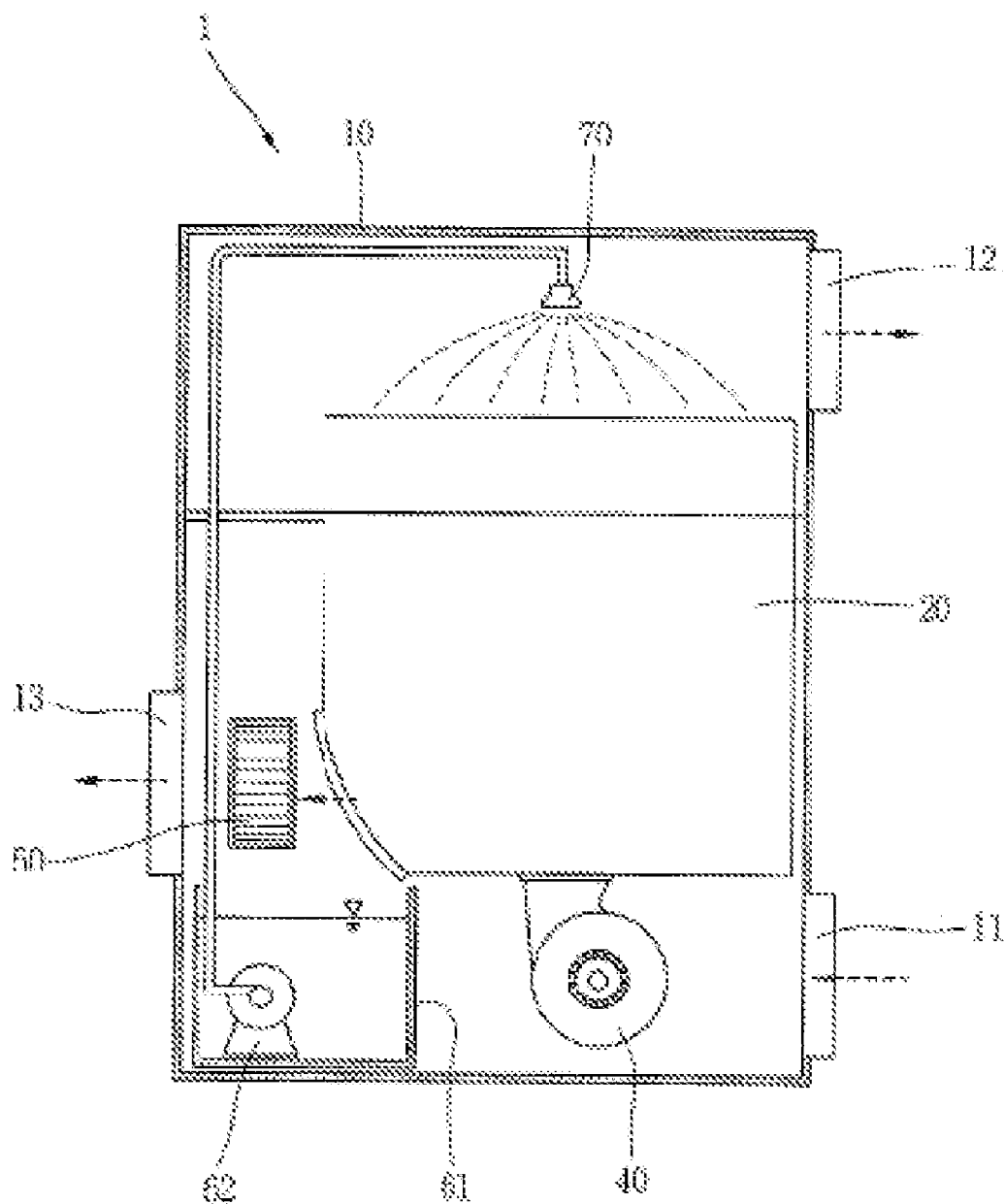


FIG. 2

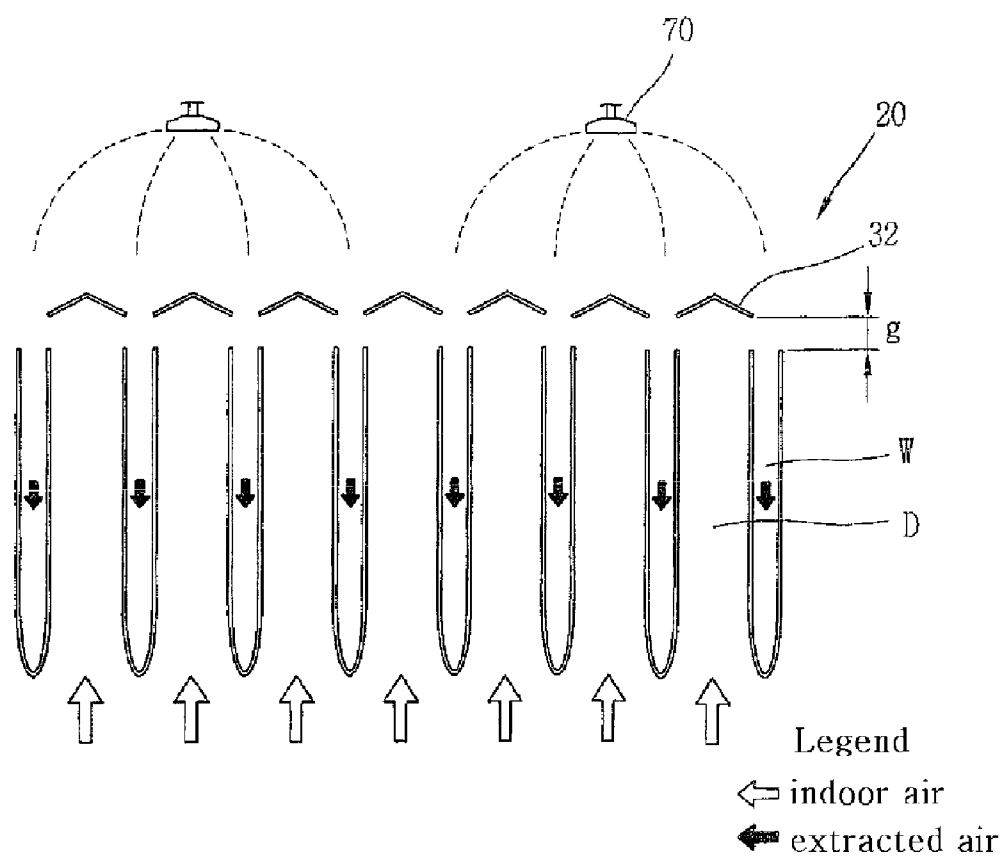


FIG. 3

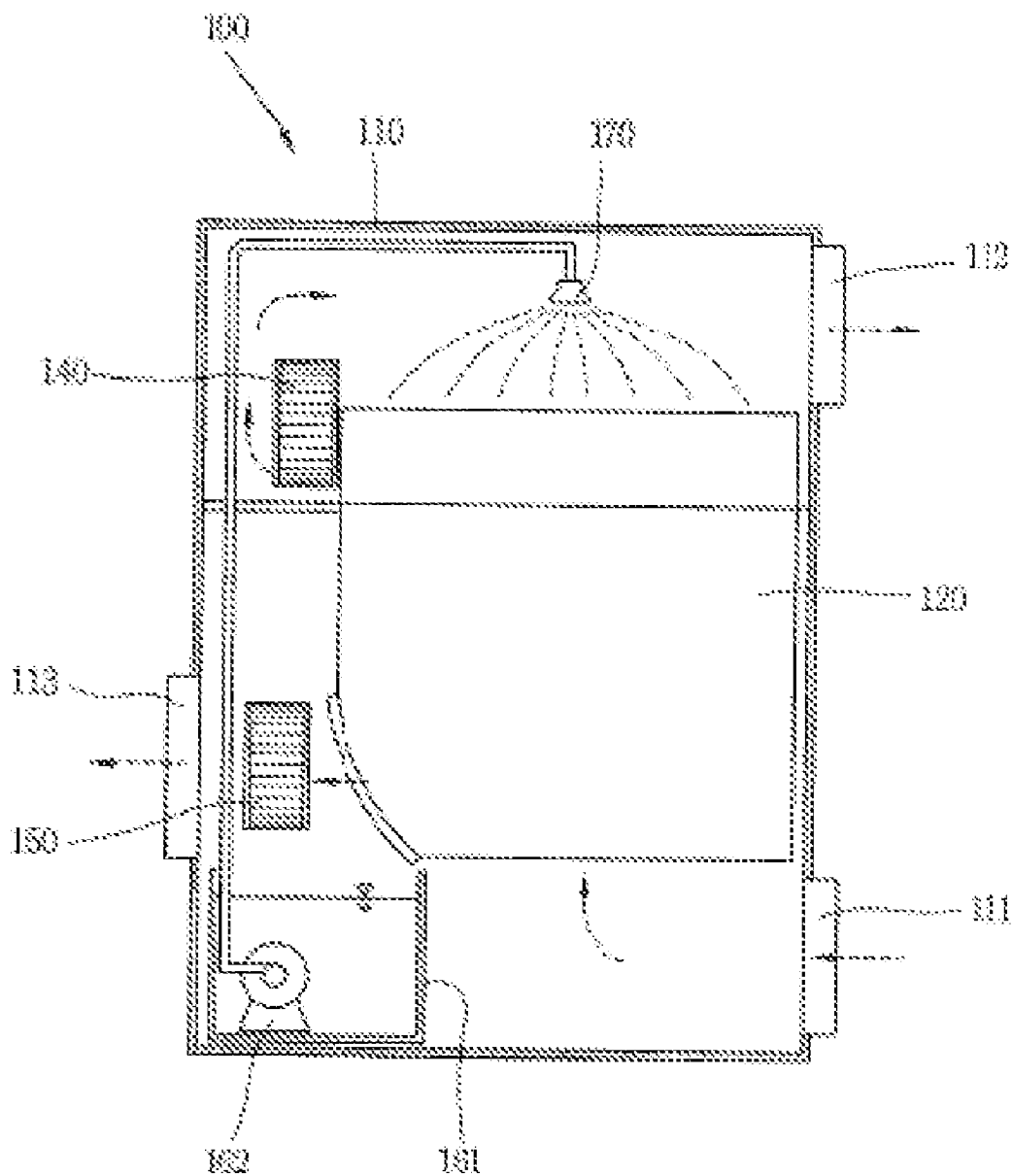


FIG. 4

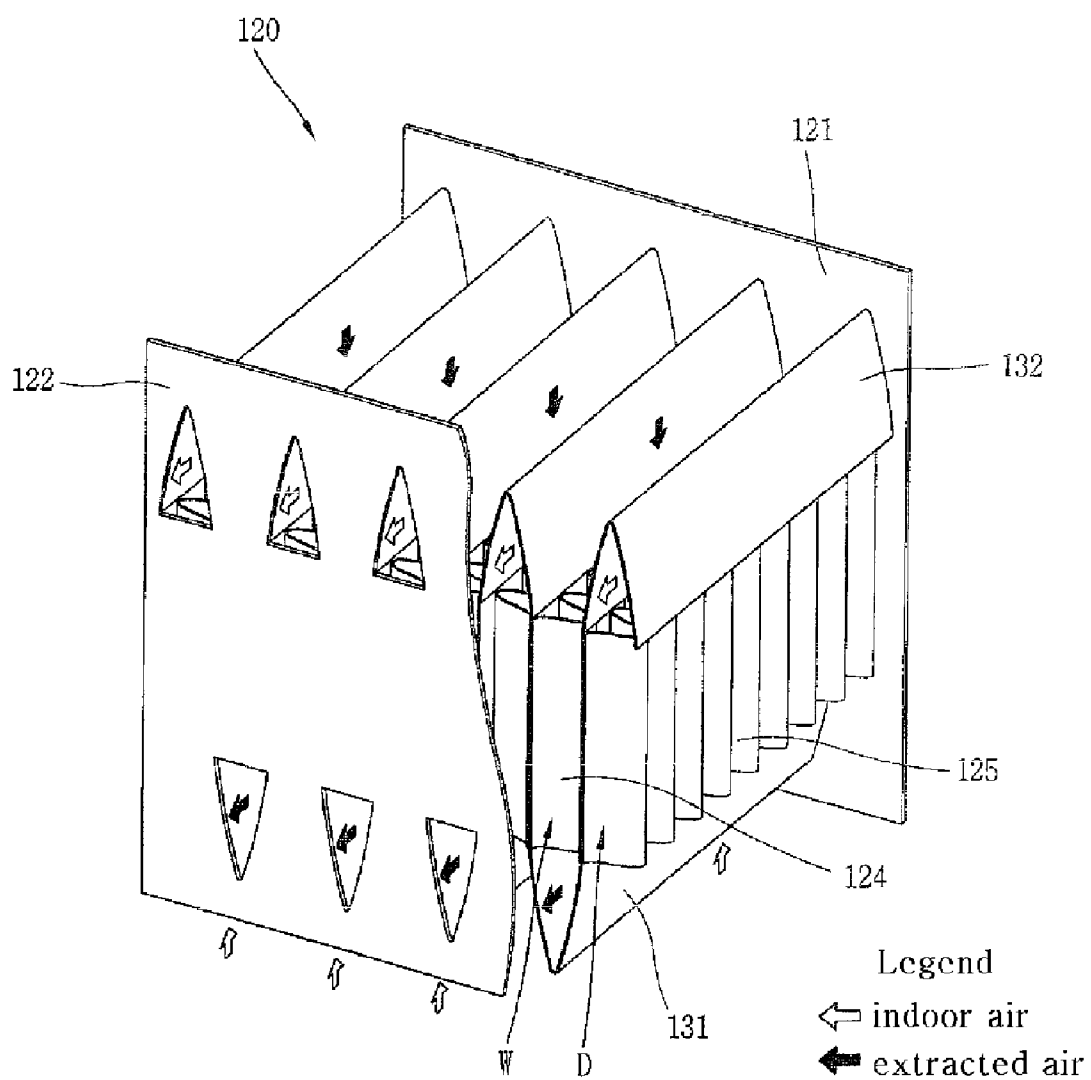


FIG. 5

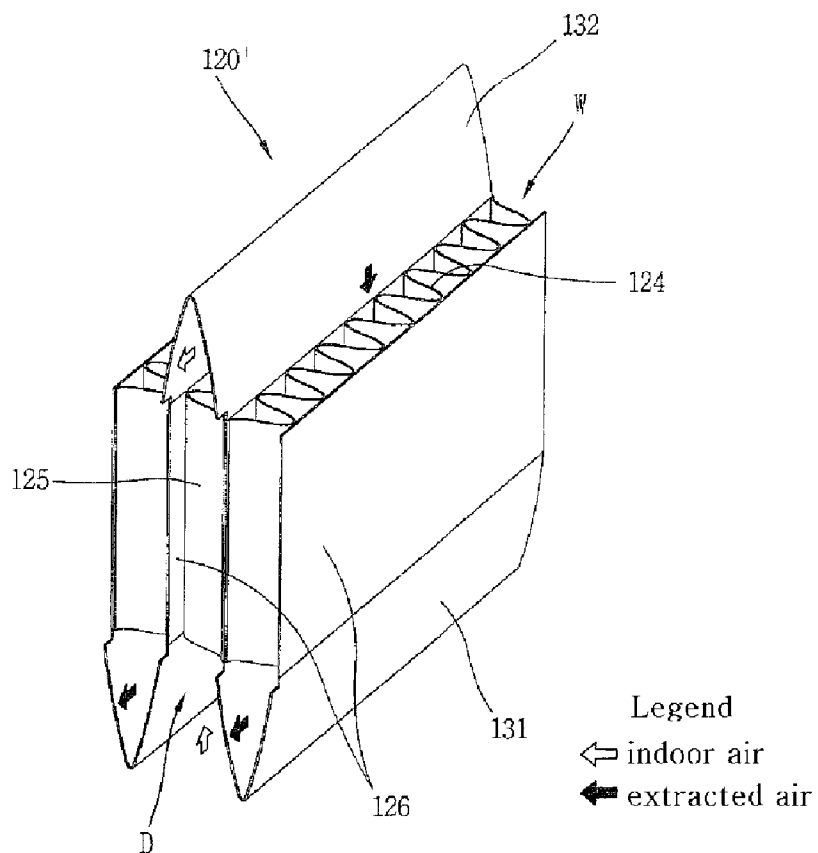


FIG. 6

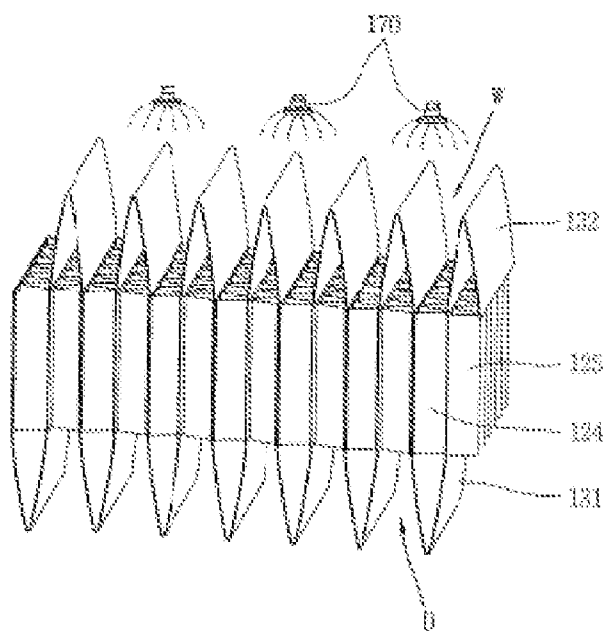
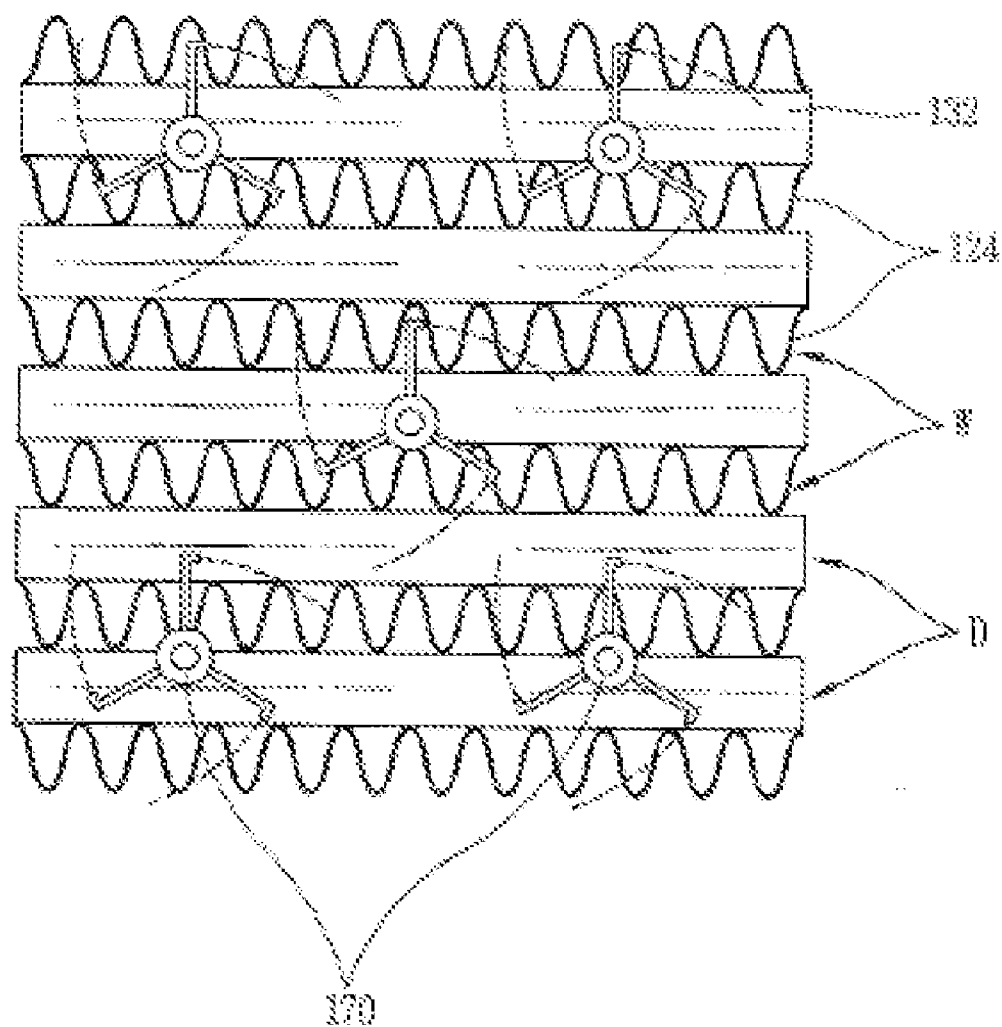


FIG. 7



REGENERATIVE EVAPORATIVE COOLER, COOLING SYSTEM AND CORE MODULE THEREOF

FIELD OF THE INVENTION

[0001] The present invention relates to an evaporation water supply structure of a regenerative evaporative cooler and a structure of a core module thereof.

DESCRIPTION OF THE RELATED ART

[0002] As demand for a cooler using the existing refrigerant is on the rise, energy consumption is sharply increasing, which results in depletion of ozone layer, global warming, or the like, by refrigerants.

[0003] A regenerative evaporative cooler (REC) is proposed as an alternative for solving the problem.

[0004] The REC operates according to a scheme in which a portion of air which has passed through a dry channel is extracted to a wet channel to induce water evaporation to cool the dry channel air. Water is evaporated from the surface of the wet channel to cool the wet channel surface, and heat is absorbed from air of the dry channel having a relatively high temperature. Thus, air passing through the dry channel can be cooled up to a maximum dew point temperature without increasing humidity.

[0005] In order to continuously supply evaporation water to the wet channel, an evaporation water supply pipe is required. When a flow rate of the evaporation water increases, cooling performance of the REC is reduced, so it is important to uniformly supply a small amount of evaporation water. Also, as the number of wet channels for supplying evaporation water is increased, the device for uniformly supplying evaporation water constantly becomes complicated, degrading cooling efficiency.

SUMMARY OF THE INVENTION

[0006] An aspect of the present invention provides a regenerative evaporative cooler (REC) capable of uniformly supplying evaporation water to a wet channel constantly.

[0007] Another aspect of the present invention provides a regenerative evaporative cooler (REC) which has a simple evaporation water supply structure, thus facilitating fabrication and reducing a production cost, a system, and a core module thereof.

[0008] According to an aspect of the present invention, there is provided a regenerative evaporative cooler (REC) including: a plurality of dry channel units allowing indoor air to pass therethrough; a plurality of wet channel units formed to extract a portion of air, which has passed through the dry channel units, and formed to heat-exchange with the dry channel units; an evaporation water supply unit disposed at an upper portion of the wet channel units and supplying the wet channel units with evaporation water; and dry channel shields formed at an upper side of the dry channel units, allowing evaporation water supplied from the evaporation water supply unit to be introduced into the wet channel units, and shielding the upper portions of the dry channel units.

[0009] The dry channel shields may be disposed at a position spaced apart from an upper end of the dry channel units.

[0010] The dry channel shield may be disposed at each dry channel unit, and gaps between the dry channel shields and the upper ends of the dry channel units communicate with each other.

[0011] The dry channel shield may be disposed at each dry channel unit, and each dry channel shield has a duct-like shape.

[0012] The wet channel units and the dry channel units may be alternately disposed in an overlap manner.

[0013] The wet channel units and the dry channel units may include a fin having a waveform section.

[0014] A heat transfer plate may be disposed between the wet channel units and the dry channel units.

[0015] The cooler may further include: a wet channel guide duct attached at a lower end of the wet channel unit to guide extracted air passing through the wet channel unit.

[0016] The evaporation water supply unit may be formed in a sprinkler type to sprinkle evaporation water in various directions.

[0017] The cooler may further include: an extracted air blower for discharging extracted air to the outside.

[0018] The cooler may further include: an air blower for pressure-transferring indoor air to be cooled to a lower portion of each of the dry channel units.

[0019] The dry channel units may be formed to allow indoor air to move in an upward direction, and the wet channel units may be formed to allow extracted air to move in a downward direction.

[0020] According to another aspect of the present invention, there is provided a regenerative evaporative cooler (REC) including: a dry channel unit allowing sucked indoor air to pass therethrough; a wet channel unit formed to extract a portion of air which has passed through the dry channel unit, and configured to be wet by evaporation water; and an air blower disposed at an exit of the dry channel unit and blowing air, which has passed through the dry channel unit, toward an indoor area and the wet channel unit.

[0021] According to another aspect of the present invention, there is provided a core module of a cooler including stacked unit modules each being comprised of a pair of a dry channel unit and a wet channel unit, wherein the unit module comprising: a wet channel fin attached to the interior of the wet channel unit; a heat transfer plate disposed between the wet channel unit and the dry channel unit; a dry channel fin attached to an outer surface of the heat transfer plate; a wet channel guide duct attached to an exit of the wet channel unit to guide extracted air passing through the wet channel unit; and a dry channel shield formed at an upper side of the dry channel unit, allowing evaporation water supplied from an evaporation water supply unit to flow into the wet channel unit, and shielding an upper portion of the dry channel unit.

[0022] The dry channel shields may be disposed at a position spaced apart from an upper end of the dry channel units.

[0023] The dry channel shield may be disposed at each dry channel unit, and each dry channel shield is formed in the form of a duct.

[0024] According to another aspect of the present invention, there is provided a regenerative evaporative cooling system including: a system for introducing indoor air to the dry channel unit by maintaining the exit of the dry channel unit at a low pressure compared with that of the entrance of the dry channel unit and supplying air, which has passed through the dry channel unit, to an indoor area; a system for extracting a portion of indoor air which has passed through the dry channel unit to the wet channel unit wet by evaporation water; a system for cooling the dry channel unit through

evaporation of evaporation water; and a system for supplying evaporation water to the wet channel unit to continuously wet the wet channel unit.

[0025] The dry channel unit and the wet channel unit may be configured to allow air passing through the dry channel unit and air passing through the wet channel unit to heat-exchange in a counterflow manner.

[0026] According to the REC, since the dry channel guide duct is installed to be separated from the wet channel unit at an upper side of the dry channel unit, an introduction of evaporation water sprinkled by the evaporation water supply unit can be effectively prevented, and the configuration of the evaporation water supply unit can be simplified.

[0027] Also, since the air blower is disposed at an exit of the dry channel unit, indoor air can be uniformly supplied to the dry channel unit. In addition, since the air blower transmits extracted air to the wet channel unit, a configuration for extracting indoor air to the wet channel unit can be reduced.

[0028] Also, since the dry channel unit and the wet channel unit heat-exchange in a counterflow manner, heat-exchanging can be accelerated and the cooling performance can be improved.

[0029] The foregoing and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] FIG. 1 is a side view showing a schematic configuration of a regenerative evaporative cooler (REC) according to an exemplary embodiment of the present invention;

[0031] FIG. 2 is a schematic side view of a core module and an evaporation water supply unit in FIG. 1;

[0032] FIG. 3 is a side view showing a schematic configuration of a regenerative evaporative cooler (REC) according to another exemplary embodiment of the present invention;

[0033] FIG. 4 is a perspective view of a core module which may be mounted in a cooler;

[0034] FIG. 5 is a perspective view of a unit module constituting a core module;

[0035] FIG. 6 is a schematic perspective view showing the configuration of the core module and an evaporation water supply unit in FIG. 4; and

[0036] FIG. 7 is a plan view showing an upper configuration of the core module in FIG. 4.

DETAILED DESCRIPTION OF THE INVENTION

[0037] A regenerative evaporative cooler (REC), a cooling system, and a core module thereof according to an exemplary embodiment of the present invention will now be described with reference to the accompanying drawings. In the following description, usage of suffixes such as 'module', 'part' or 'unit' used for referring to elements is given merely to facilitate explanation of the present invention, without having any significant meaning by itself.

[0038] FIG. 1 is a side view showing a schematic configuration of a regenerative evaporative cooler (REC) according to an exemplary embodiment of the present invention.

[0039] With reference to FIG. 1, the REC 1 includes a core module 20 for cooling air in the space to be cooled (referred to as 'indoor air', hereinafter), an air blower 40 supplying indoor air to the interior of the cooler 1, an evaporation water

supply unit 70 supplying evaporation water to the core module 20 to allow for the core module 20 to use evaporating latent heat, and an extracted air blower 50 extracting air heat-exchanged with the indoor air to the outside.

[0040] The REC 1 includes a case 10 to constitute an external appearance, and a suction system of indoor air, a discharge system of extracted air, and a supply system of evaporation water may be configured to be included in the case 10. A suction unit 11 of indoor air, an exit 12 of the indoor air, and an exit 13 of extracted air are formed at one side of the case 10. A control panel for manipulating the cooler 1 may be provided to a particular position of the case 10.

[0041] In order to continuously supply evaporation water, a tank 61 storing evaporation water may be installed at one side of the case 10, and a pump 62 is included in the tank 61 in order to deliver evaporation water to the evaporation water supply unit 70. Water stored in the tank 61 is continuously evaporated through the evaporation water supply unit 70, so a storage state of the evaporation water may be informed to the user through an indicator unit formed on the external manipulation panel of the case 10 of the cooler 1, or an automatic water supply system may be provided to supplement water.

[0042] The core module 20 is configured to cool indoor air by evaporating latent heat of evaporation water supplied from the evaporation water supply unit 70. A detailed configuration of the core module 20 and supplying evaporation water to the core module 20 will be described in detail with reference to FIG. 2.

[0043] FIG. 2 is a schematic side view of a core module and an evaporation water supply unit in FIG. 1.

[0044] With reference to FIG. 2, the core module 20 is configured such that a plurality of wet channel units W and a plurality of dry channel units D are alternately disposed. A lower end of the wet channel units W is in the form of a duct, allowing evaporation water which has been finished for heat exchange to flow to a portion of the ground in a vertical direction.

[0045] Dry channel shields 32 are provided to shield an upper portion of each of the dry channel units D and allow evaporation water supplied from the evaporation water supply unit 70 to be introduced to the wet channel units W. The dry channel shields 32 are disposed at positions spaced apart by a certain distance g from the dry channel units D, and heat-exchanged indoor air goes out through the space between the dry channel shields 32 and the dry channel units D. The dry channel shields 32 may be fixed by a header plate (See 122 in FIG. 4) for fixing the dry channel units D and the wet channel units W.

[0046] The dry channel shields 32 may be disposed at every dry channel in order to prevent evaporation water from being introduced to the dry channel units D and allow the evaporation water to be distributed to the wet channel units W. The dry channel shields 32 may be formed to have a wedge-like shape or a rounded roof-like shape, and the end of each of the dry channel shield 32 may be formed to extend to have a certain length in a vertical direction. Grooves may be repeatedly formed at certain intervals to form patterns on an upper surface of the dry channel shields 32 in order to allow evaporation water sprayed (or sprinkled) onto the dry channel shields 32 to be evenly distributed. The structure of the cooler 1 including the dry channel shields 32 can be simply fabricated and a fabrication cost thereof can be reduced.

[0047] An evaporation water supply unit 70 is installed at an upper side of the core module 20 in order to supply evapo-

ration water to the wet channel units W. The evaporation water supply unit 70 is formed to spray evaporation water in various directions. The evaporation water supply unit 70 may include a plurality of nozzles rotatable at a fixed position. The number of evaporation water supply units 70 or the amount of evaporation water gushed out through the nozzles of each of the evaporation water supply units 70 may vary according to the capacity of the core module 20. Also, the evaporation water supply unit 70 may be configured to be linearly moved or reciprocally moved. The evaporation water supply unit 70 may be configured to reciprocally move in the form of a pendulum based on a certain shaft.

[0048] FIG. 3 is a side view showing a schematic configuration of a regenerative evaporative cooler (REC) according to another exemplary embodiment of the present invention.

[0049] With reference to FIG. 3, a regenerative evaporative cooler (REC) 100 includes a core module 120 for cooling indoor air to be cooled, an air blower 140 for supplying cooled air to an indoor area, an evaporation water supply unit 170 for supplying evaporation water to the core module 120, and an extracted air blower 150 for extracting air heat-exchanged with indoor air to the outside. In particular, unlike the air blower 40 in FIG. 1 which is disposed under the core module 20 and pressure-transfers indoor air to the interior of the core module 20, in the present embodiment, the air blower 140 is disposed at an upper side of the core module 120. Similar reference numerals are used for the elements corresponding to those of FIG. 1, and a detailed description thereof will be omitted.

[0050] FIG. 4 is a perspective view of a core module which may be mounted in a cooler, and FIG. 5 is a perspective view of a unit module constituting a core module.

[0051] With reference to FIGS. 4 and 5, the core module 120 is configured such that unit modules 120' made up of a pair of a dry channel unit D and a wet channel unit W are stacked and fixed by both header plates 121 and 122.

[0052] Each of the unit modules 120' include a wet channel fin 124 attached to the interior of the wet channel unit W, a heat transfer plate 126 disposed between the wet channel unit W and the dry channel unit D, a dry channel fin 126 attached to an outer surface of the heat transfer plate 126, a wet channel guide duct 131, and a dry channel guide duct 132, and the like.

[0053] The wet channel fin 124, the dry channel fin 125, and the heat transfer plate 126 are formed by processing a plate member having excellent heat transfer efficiency to allow indoor air, passing through the dry channel unit D, to be easily cooled according to evaporation of evaporation water included in the wet channel unit W. For example, the wet channel fin 124, the dry channel fin 125, and the heat transfer plate 126 may be made of aluminum or copper. The wet channel fin 124 and the dry channel fin 125 may be bonded through a brazing method, or the like.

[0054] The wet channel fin 124 and the dry channel fin 125 may have a sectional shape of a waveform in order to allow indoor air or a flow to proceed in a uniform direction and increase a surface area. To this end, a fin having a thin plate form may be bent in zigzags. Alternatively, the wet channel fin 124 and the dry channel fin 125 may have a louver structure.

[0055] The surface of the wet channel fin 124 is processed to be wet by evaporation water. In an embodiment, a porous material may be coated or attached to the surface of the wet channel fin 124 in order to increase wettability. Also, fine holes, slots, grooves may be formed on the wet channel fin

124 or the wet channel fin 124 may be embossed to allow evaporation water to evenly spread to the entire area of the wet channel fin 125.

[0056] The thusly fabricated wet channel fin 124 and the dry channel fin 125 are attached to both sides of the heat transfer plate 126. The wet channel unit W is formed by the wet channel fin 124 and the heat transfer plate 126, and the dry channel unit D is formed by the dry channel fin 125 and the heat transfer plate 126. The wet channel unit W and the dry channel unit D are alternately disposed in an overlap manner.

[0057] Evaporation water and extracted air flow across the wet channel unit W and indoor air flows across the dry channel unit D. In FIG. 5, indoor air flows in an upward direction along the dry channel unit D, and extracted air flows in a downward direction along the wet channel unit W. In this manner, the extracted air and evaporation water of the wet channel unit W and the indoor air of the dry channel unit D flow in a counterflow manner to perform heat exchanging.

[0058] With reference to FIGS. 4 and 5, the wet channel guide duct 131 is disposed at a lower end of the wet channel unit W to guide only extracted air so as not to be mixed with indoor air. The wet channel guide duct 131 may be formed to have a streamlined shape or a wedge-like shape in a direction in which indoor air is introduced to the dry channel unit D in order to reduce flow resistance when indoor air flows into the dry channel unit D. Also, since evaporation water included in the wet channel fin 124 may flow in a downward direction to gather to the wet channel guide duct 131, a bottom surface of the wet channel guide duct 131 may be formed to have a slope allowing evaporation water to flow toward a tank 161.

[0059] Extracted air, which has passed through the exit of the wet channel unit W, gathers to one side by the wet channel guide duct 131 and discharged.

[0060] A dry channel guide duct 132 may be formed at an upper end of the dry channel unit D in order to separate the dry channel unit D from the wet channel unit W to prevent an inflow of evaporation water sprayed toward the wet channel unit W. The dry channel guide duct 132 has an effect of remarkably reducing the structure of the evaporation water supply unit 170 and a required number of the evaporation water supply units 170.

[0061] Indoor air flowing along the dry channel guide duct 132 is supplied to an indoor area again by the air blower 140 or a portion of the indoor air is extracted toward the wet channel unit W.

[0062] The dry channel guide duct 132 and the wet channel guide duct 131 may be formed at every unit module 120' constituting the core module 120, and the edge of the unit module 120' and the edges of the dry channel guide duct 132 and the wet channel guide duct 131 may be formed in male and female type or may have a concavo-convex form so that the dry channel guide duct 132 and the wet channel guide duct 131 can be easily inserted to the unit module 120'.

[0063] The dry channel guide duct 132 may have a wedge-like shape or a streamlined structure to allow evaporation water sprayed from the evaporation water supply unit 170 to spread to the wet channel unit W so as to flow in, and an outer surface of the dry channel guide duct 132 may have a valley or groove structure to help flow water. In addition, the outer surface of the dry channel guide duct 32 may be processed or have an attachment thereon in order to improve wettability of evaporation water.

[0064] FIG. 6 is a schematic perspective view showing the configuration of the core module and an evaporation water

supply unit in FIG. 4. Indoor air sucked into the core module 120 flows upward through the dry channel unit D.

[0065] Extracted air obtained by extracting a portion of indoor air which has passed through the dry channel unit D flows downward along the wet channel unit W. The wet channel unit W is wet by evaporation water sprayed from the evaporation water supply unit 170. Thus, while the extracted air moves downward along the wet channel unit W, the wet channel unit W induces evaporation water to be evaporated, and due to the difference in temperature lowered according to the evaporation of the evaporation water, the wet channel unit W heat-exchanges with the dry channel unit D.

[0066] The evaporation water supply unit 170 is disposed at an upper side of the wet channel unit W, and sprays evaporation water to the wet channel unit W to wet the wet channel unit W. The dry channel guide duct 132 prevents the evaporation water sprayed by the evaporation water supply unit 170 from being introduced to the dry channel unit D and separates the dry channel unit D from the wet channel unit W. The wet channel guide duct 131 is installed at a lower portion of the wet channel unit W in order to guide extracted air and evaporation water passing through the wet channel unit W. The extracted air is extracted, along the wet channel guide duct 131, to the outside.

[0067] FIG. 7 is a plan view showing an upper configuration of the core module in FIG. 4. The evaporation water supply unit 170 is installed at an upper side of the core module 120 in order to supply evaporation water to the wet channel unit W. In FIG. 5, the evaporation water supply unit 170 is formed as a sprinkler type to spray evaporation water in various directions. The evaporation water supply unit 170 may include a plurality of nozzles rotatable at a fixed position. The number of evaporation water supply units 170 or the amount of evaporation water gushed out through the nozzles of each of the evaporation water supply units 170 may vary according to the capacity of the core module 120. Also, the evaporation water supply unit 170 may be configured to be linearly moved or reciprocally moved. The evaporation water supply unit 170 may be configured to reciprocally move in the form of a pendulum based on a certain shaft.

[0068] A cooling system of the REC having the foregoing configuration will now be described.

[0069] The cooling system includes a system I for introducing indoor air to the dry channel unit D by maintaining the exit of the dry channel unit D at a low pressure compared with that of the entrance of the dry channel unit D and supplying air, which has passed through the dry channel unit D, to an indoor area, a system II for extracting a portion of indoor air which has passed through the dry channel unit D to the wet channel unit wet by evaporation water, a system III for cooling the dry channel unit D through evaporation of evaporation water, and a system IV for supplying evaporation water to the wet channel unit W to continuously wet the wet channel unit W.

[0070] The air blower 140 may be used for the dry channel unit D in order to set such that the exit of the dry channel unit D has pressure lower than that of the entrance in an atmospheric state. Such a disposition of the air blower 140 can allow indoor air to be evenly introduced to the entire area, compared with a case in which the air blower is disposed at the entrance of the dry channel unit D, and reduce the configuration and power for the extraction.

[0071] The air blower 140 extracts a portion of the indoor air cooled through the dry channel unit D. The extracted air

mixed with external air flows along the wet channel unit W to help evaporation water evaporate.

[0072] As the wet channel fin 124 installed in the wet channel unit W is cooled according to the evaporation of evaporation water, the heat transfer plate 126 and the dry channel fin 125 installed at the dry channel unit D are also cooled, resulting in that indoor air passing through the dry channel unit D is cooled. In order to increase the cooling efficiency, the indoor air passing through the wet channel unit and the extracted air passing through the dry channel unit may be configured in a counterflow manner.

[0073] Evaporation water, supplied by the evaporation water supply unit 170, wets the entire surface along the wet channel fin 124 having high wettability. The evaporation water flows downward according to gravity, gathers to a lower portion of the wet channel unit W, and flows to the tank 161.

[0074] The REC, the cooling system, and its core module as described above are not limited to be applied to the configurations and methods of the embodiments described above, but the entirety or a portion of the respective embodiments may be selectively combined to be configured into various modifications.

[0075] As the present invention may be embodied in several forms without departing from the characteristics thereof, it should also be understood that the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its scope as defined in the appended claims, and therefore all changes and modifications that fall within the metes and bounds of the claims, or equivalents of such metes and bounds are therefore intended to be embraced by the appended claims.

What is claimed is:

1. A regenerative evaporative cooler (REC) comprising:
 - a plurality of dry channel units allowing indoor air to pass therethrough;
 - a plurality of wet channel units formed to extract a portion of air, which has passed through the dry channel units, and formed to heat-exchange with the dry channel units;
 - an evaporation water supply unit disposed at an upper portion of the wet channel units and supplying the wet channel units with evaporation water; and
 - dry channel shields formed at an upper side of the dry channel units, allowing evaporation water supplied from the evaporation water supply unit to be introduced into the wet channel units, and shielding the upper portions of the dry channel units.
2. The cooler of claim 1, wherein the dry channel shields are disposed at a position spaced apart from an upper end of the dry channel units.
3. The cooler of claim 2, wherein the dry channel shield is disposed at each dry channel unit, and gaps between the dry channel shields and the upper ends of the dry channel units communicate with each other.
4. The cooler of claim 1, wherein the dry channel shield is disposed at each dry channel unit, and each dry channel shield has a duct-like shape.
5. The cooler of claim 1, wherein the wet channel units and the dry channel units are alternately disposed in an overlap manner.
6. The cooler of claim 5, wherein the wet channel units and the dry channel units comprise a fin having a waveform section.

7. The cooler of claim 5, wherein a heat transfer plate is disposed between the wet channel units and the dry channel units.

8. The cooler of claim 1, further comprising:

a wet channel guide duct attached at a lower end of the wet channel unit to guide extracted air passing through the wet channel unit.

9. The cooler of claim 1, wherein the evaporation water supply unit is formed in a sprinkler type to sprinkle evaporation water in various directions.

10. The cooler of claim 1, further comprising:

an extracted air blower for discharging extracted air to the outside.

11. The cooler of claim 1, further comprising:

an air blower for pressure-transferring indoor air to be cooled to a lower portion of each of the dry channel units.

12. The cooler of claim 1, wherein the dry channel units are formed to allow indoor air to move in an upward direction, and the wet channel units may be formed to allow extracted air to move in a downward direction.

13. A regenerative evaporative cooler (REC) comprising:

a dry channel unit allowing sucked indoor air to pass there-through;

a wet channel unit formed to extract a portion of air which has passed through the dry channel unit, and configured to be wet by evaporation water; and

an air blower disposed at an exit of the dry channel unit and blowing air, which has passed through the dry channel unit, toward an indoor area and the wet channel unit.

14. A core module of a cooler including stacked unit modules each being comprised of a pair of a dry channel unit and a wet channel unit, wherein the unit module comprising:

a wet channel fin attached to the interior of the wet channel unit;

a heat transfer plate disposed between the wet channel unit and the dry channel unit;

a dry channel fin attached to an outer surface of the heat transfer plate;

a wet channel guide duct attached to an exit of the wet channel unit to guide extracted air passing through the wet channel unit; and

a dry channel shield formed at an upper side of the dry channel unit, allowing evaporation water supplied from an evaporation water supply unit to flow into the wet channel unit, and shielding an upper portion of the dry channel unit.

15. The module of claim 14, wherein the dry channel shields are disposed at a position spaced apart from an upper end of the dry channel units.

16. The module of claim 14, wherein the dry channel shield is disposed at each dry channel unit, and each dry channel shield is formed in the form of a duct.

17. A regenerative evaporative cooling system comprising:

a system for introducing indoor air to the dry channel unit by maintaining the exit of the dry channel unit at a low pressure compared with that of the entrance of the dry channel unit and supplying air, which has passed through the dry channel unit, to an indoor area;

a system for extracting a portion of indoor air which has passed through the dry channel unit to the wet channel unit wet by evaporation water;

a system for cooling the dry channel unit through evaporation of evaporation water; and

a system for supplying evaporation water to the wet channel unit to continuously wet the wet channel unit.

18. The system of claim 17, wherein the dry channel unit and the wet channel unit are configured to allow air passing through the dry channel unit and air passing through the wet channel unit to heat-exchange in a counterflow manner.

* * * * *