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(72) Inventors:
• **Park, Taegyun**
153-802 Seoul (KR)
• **Yoo, Sanghoon**
153-802 Seoul (KR)
• **Lee, Eungyul**
153-802 Seoul (KR)

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(74) Representative: **Vossius & Partner**
Patentanwälte Rechtsanwälte mbB
Siebertstrasse 3
81675 München (DE)

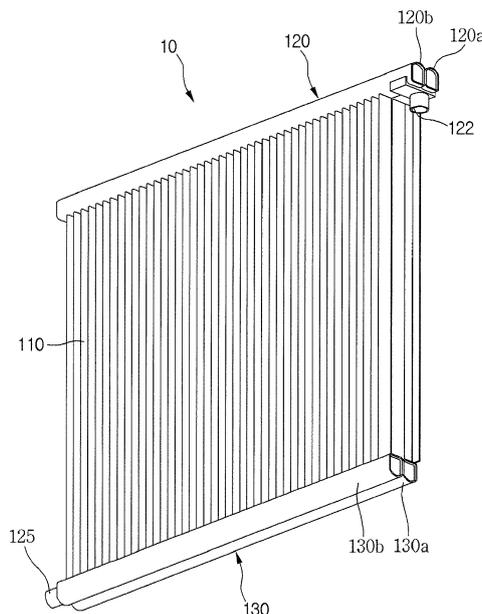
(71) Applicant: **LG Electronics Inc.**
Yeongdeungpo-gu
Seoul 150-721 (KR)

(54) **Heat exchanger**

(57) A heat exchanger is provided. The heat exchanger includes a refrigerant tube through which a refrigerant flows, the refrigerant tube being arranged in a plurality of rows, a first header on which a refrigerant inflow part is disposed, the first header being coupled to one side of the plurality of refrigerant tubes, a first partition part for partitioning an inner space of the first header, a second header on which a refrigerant discharge part is

disposed, the second header being coupled to the other side of the plurality of refrigerant tubes, a second partition part for partitioning an inner space of the second header, and a baffle coupled to the first or second partition part, the baffle guiding a flow of the refrigerant from the header to the plurality of refrigerant tubes. The refrigerant discharge part of the second header is disposed lower than the refrigerant inflow part of the first header.

Fig. 1



EP 2 930 454 A1

Description

BACKGROUND

[0001] The present disclosure relates to a heat exchanger.

[0002] In general, a heat exchanger is a part that is used in a heat-exchanging cycle. The heat exchanger may serve as a condenser or evaporator to heat-exchange a refrigerant flowing therein with an external fluid.

[0003] The heat exchanger is largely classified into a fin-and-tube type heat exchanger and a micro-channel type heat exchanger according to its shape. The fin-and-tube type heat exchanger includes a plurality of fins and a tube passing through the fins and having a circular shape or a shape similar to the circular shape. The micro-channel type heat exchanger includes a plurality of flat tubes through which a refrigerant flows and a fin disposed between the plurality of flat tubes.

[0004] Also, the fin-and-tube type heat exchanger and the micro-channel type heat exchanger exchange heat between an external fluid and a refrigerant flowing into the tube or flat tube. Here, the fins may increase a heat exchange area between the external fluid and the refrigerant flowing into the tube or the flat tube.

[0005] The micro-channel type heat exchanger according to the related art includes a header coupled to a plurality of refrigerant tubes. The header is provided in plurality. A first header of the plurality of headers is coupled to one side of the plurality of refrigerant tubes, and a second header of the plurality of headers is coupled to the other side of the plurality of refrigerant tubes. For example, the first header may be coupled to an upper side of the plurality of refrigerant tubes, and the second header may be coupled to a lower side of the plurality of refrigerant tubes. Thus, the first header may be called an "upper header" of the heat exchanger, and the second header may be called a "lower header" of the heat exchanger.

[0006] A refrigerant inflow part through which the refrigerant is introduced into the heat exchanger and a refrigerant discharge part through which a refrigerant heat-exchanged within the heat exchanger is discharged may be disposed on the first header. The refrigerant introduced into the first header through the refrigerant inflow part is divided into the plurality of refrigerant tubes to flow and then returns to the second header to flow again toward the first header. Then, the refrigerant is discharged to the outside of the heat exchanger through the refrigerant discharge part.

[0007] When such a heat exchanger according to the related art acts as a condenser, while a gaseous refrigerant is introduced into the heat exchanger to phase-change into the liquid phase, an upward flow of the liquid refrigerant from a lower portion of the heat exchanger by overcoming the gravity may be restricted.

[0008] Also, when the refrigerant discharge part is disposed on the upper header of the heat exchanger, the

refrigerant discharged from the refrigerant discharge part is reduced in flow rate, and thus the refrigerant (particularly, the liquid refrigerant) may not be smoothly discharged. As a result, a supercooling degree of the refrigerant passing through the heat exchanger may not be sufficiently secured to deteriorate heat exchange efficiency.

SUMMARY

[0009] Embodiments provide a heat exchanger having improved heat exchange efficiency.

[0010] In one embodiment, a heat exchanger including: a refrigerant tube through which a refrigerant flows, the refrigerant tube being arranged in a plurality of rows; a first header on which a refrigerant inflow part is disposed, the first header being coupled to one side of the plurality of refrigerant tubes; a first partition part for partitioning an inner space of the first header; a second header on which a refrigerant discharge part is disposed, the second header being coupled to the other side of the plurality of refrigerant tubes; a second partition part for partitioning an inner space of the second header; and a baffle coupled to the first or second partition part, the baffle guiding a flow of the refrigerant from the header to the plurality of refrigerant tubes, wherein the refrigerant discharge part of the second header is disposed lower than the refrigerant inflow part of the first header.

[0011] The first header may be coupled to an upper side of the plurality of refrigerant tubes, and the second header may be coupled to a lower side of the plurality of refrigerant tubes.

[0012] The first header may include a first front part and a first rear part, and the first front part and the first rear part may be partitioned by the first partition part.

[0013] The refrigerant inflow part may be disposed on a bottom surface of the first front part.

[0014] The second header may include a second front part and a second rear part, and the second front part and the second rear part may be partitioned by the second partition part.

[0015] The refrigerant discharge part may be disposed on a side surface of the second rear part.

[0016] The plurality of refrigerant tubes may include a front tube and a rear tube, which are arranged in a front/rear direction, wherein the front tube may be coupled to the first and second front parts, and the rear tube may be coupled to the first and second rear parts.

[0017] The baffle may include: a first baffle disposed in the front part to partition an inner space of the first front part; and a second baffle disposed in the second rear part to partition an inner space of the second rear part.

[0018] The first and second baffles may be respectively coupled to one side surface and the other side surface of the first partition part, wherein the one side surface and the other side surface may face to each other.

[0019] The first header may include: one side portion on which the refrigerant inflow part is disposed; and the

other side portion facing the one side portion, wherein the first baffle may be disposed more adjacent to one side portion of the first header than the second baffle, and the second baffle is disposed more adjacent to the other side portion of the first header than the first baffle.

[0020] A guide hole for guiding a flow of the refrigerant may be defined in the first partition part, wherein the guide hole may be defined in a position that is more adjacent to the refrigerant discharge part than the refrigerant inflow part with respect to the refrigerant passage defined from the refrigerant inflow part to the refrigerant discharge part.

[0021] The guide hole may guide the refrigerant so that the refrigerant in the first front part flows toward the first rear part or is branched to flow into the plurality of refrigerant tubes.

[0022] The baffle may include a plurality of baffles coupled to one side and the other side of the second partition part, and a plurality of through holes separated by the plurality of baffles may be defined in the second partition part.

[0023] The plurality of baffles may include: fourth and sixth baffles disposed spaced apart from each other within the second rear part; and third and fifth baffles disposed spaced apart from each other within the second front part.

[0024] The plurality of through holes may include: a plurality of first through holes defined between one side portion of the second header and the third and fourth baffles; a plurality of second through holes defined between the third and fourth baffles and the fifth and sixth baffles; and a plurality of third through holes defined between the fifth and sixth baffles and the other side portion of the second header, wherein the plurality of second through holes may be defined between the plurality of first through holes and the plurality of third through holes.

[0025] In another embodiment, a heat exchanger includes: a refrigerant tube through which a refrigerant flows, the refrigerant tube being arranged in a plurality of rows; a first header coupled to an upper side of the plurality of refrigerant tubes to extend in a horizontal direction; a first partition part for partitioning an inner space of the first header; a second header coupled to a lower side of the plurality of refrigerant tubes to extend in the horizontal direction; a second partition part for partitioning an inner space of the second header; a baffle coupled to the first or second partition part, the baffle guiding a flow of the refrigerant from the header to the plurality of refrigerant tubes; a refrigerant inflow part disposed on a bottom surface of the first header to guide upward introduction of the refrigerant; and a refrigerant discharge part disposed on a side surface of the second header to guide lateral discharge of the refrigerant.

[0026] The first header may include a first front part and a second rear part partitioned from each other by the first partition part, and the baffle may include: a first baffle for partitioning an inner space of the first front part, the first baffle being coupled to one side surface of the first partition part; and a second baffle for partitioning an

inner space of the first rear part, the second baffle being coupled to the other side surface of the first partition part.

[0027] A through hole may pass through at least one side portion of the first partition part and may be defined at a position that is more adjacent to a downstream side than an upstream side of a refrigerant passage with respect to the refrigerant passage defined from the refrigerant inflow part to the refrigerant discharge part.

[0028] The second header may include a second front part and a second rear part partitioned from each other by the second partition part, and the baffle may include: third and fifth baffles for partitioning an inner space of the second front part, the third and fifth baffles being coupled to one side surface of the second partition part; and fourth and sixth baffles for partitioning an inner space of the second rear part, the fourth and sixth baffles being coupled to the other side surface of the second rear part.

[0029] The third and fourth baffles may be arranged in a line with respect to the second partition part, and the fifth and sixth baffles are arranged in a line with respect to the second partition part.

[0030] A plurality of through holes separated from each other by the third and fourth baffles or the fifth and sixth baffles may be defined in the second partition part.

[0031] The details of one or more embodiments are set forth in the accompanying drawings and the description below. Other features will be apparent from the description and drawings, and from the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032]

Fig. 1 is a perspective view of a heat exchanger according to an embodiment.

Fig. 2 is a perspective view of a first header according to the first embodiment.

Fig. 3 is a side cross-sectional view of the heat exchanger according to an embodiment.

Fig. 4 is a perspective view of a second header according to an embodiment.

Fig. 5 is a view illustrating a flow of a refrigerant within the heat exchanger according to an embodiment.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0033] Hereinafter, reference will now be made in detail to the embodiments of the present invention, examples of which are illustrated in the accompanying drawings. The invention may, however, be embodied in many different forms and should not be construed as being limited to the embodiments set forth herein; rather, that alternate embodiments included in other retrogressive inventions or falling within the spirit and scope of the inventive concept will fully convey the concept of the invention to those skilled in the art.

[0034] Fig. 1 is a perspective view of a heat exchanger according to an embodiment, Fig. 2 is a perspective view

of a first header according to the first embodiment, Fig. 3 is a side cross-sectional view of the heat exchanger according to an embodiment, and Fig. 4 is a perspective view of a second header according to an embodiment.

[0035] Referring to Figs. 1 to 4, a heat exchanger 10 according to an embodiment includes headers 120 and 130 each of which extends in a predetermined length in a transversal or horizontal direction and a plurality of flat tubes 110 coupled to the headers 120 and 130 to extend in a vertical direction.

[0036] Also, the heat exchanger 10 includes a plurality of heat dissipation fins disposed between the plurality of flat tubes 110 to increase a heat-exchange area between the plurality of flat tubes 110 and air. For example, the air may flow from one side of the plurality of flat tubes 110 to pass through the outside of each of the plurality of flat tubes 110 and then be discharged to the other side of the plurality of flat tubes 110.

[0037] The headers 120 and 130 may be called "horizontal type headers" in that the headers 120 and 130 extend in a horizontal direction.

[0038] In detail, the headers 120 and 130 include a first header 120 coupled to one end of each of the plurality of flat tubes 110 and a second header 130 coupled to the other end of each of the flat tubes 110. For example, the first header 120 may be understood as an "upper header" coupled to an upper side of the flat tube 110, and the second header 120 may be understood as a "lower header" coupled to a lower side of the flat tube 110.

[0039] The first and second headers 120 and 130 guide a flow of a refrigerant to switch a flow direction of the refrigerant. In detail, a flow space for the refrigerant is defined in each of the first and second headers 120 and 130. The refrigerant within the first or second header 120 or 130 may be introduced into the flat tubes 110, and a flow direction of the refrigerant flowing into the flat tubes 110 may be switched within the first or second header 120 or 130.

[0040] For example, a flow of the refrigerant flows downward from the first header 120 through the flat tube 110 may be switched in the second header 130 to flow upward, and a flow of the refrigerant flows upward through the flat tube 110 may be switched in the first header 100 to flow downward. Thus, at another point of view, the first or second header 120 or 130 may be called a "return header".

[0041] The heat exchanger 10 includes a refrigerant inflow part 122 through which the refrigerant is introduced into the heat exchanger 10 and a refrigerant discharge part 125 through which the refrigerant heat-exchanged within the heat exchanger 10 is discharged.

[0042] The refrigerant discharge part 125 is disposed lower than the refrigerant inflow part 122. In detail, the refrigerant inflow part 122 may be disposed on the first header 120, and the refrigerant discharge part 125 is disposed on the second header 130. Also, the refrigerant inflow part 122 may be disposed on a bottom surface of the first header 120, and the refrigerant discharge part

125 is disposed on a side surface of the second header 130. Thus, the refrigerant may be introduced into the first header 120 while flowing upward through the refrigerant inflow part 122 and be discharged from the second header 130 while flowing through the refrigerant discharge part 125 in a side direction.

[0043] The heat exchanger 10 may function as a condenser or an evaporator. For example, the heat exchanger 10 according to the current embodiment may act as a condenser for condensing a gaseous refrigerant compressed with a high pressure into a liquid refrigerant.

[0044] The high-pressure gaseous refrigerant may be introduced into the first header 120, that is the upper header through the refrigerant inflow part 122 and be condensed into the liquid refrigerant while passing through the heat exchanger 10. Also, the condensed refrigerant may be discharged from the second header 130, i.e., the lower header, through the refrigerant discharge part 125.

[0045] Since the high-pressure gaseous refrigerant has a relatively low specific gravity, the refrigerant has a high flow rate. On the other hand, since the liquid refrigerant generated while the refrigerant is condensed has a relatively high specific gravity, the flow rate of the refrigerant is low. In particular, when the refrigerant flows upward from the second header 130 toward the first header 120, the refrigerant may be deteriorated in flow performance.

[0046] Since an amount of liquid refrigerant is relatively greater than that of gaseous refrigerant in the refrigerant passage adjacent to the refrigerant discharge part 125, the refrigerant may be deteriorated in flow performance in the refrigerant passage that is more adjacent to the refrigerant discharge part 125 than the refrigerant discharge part 122.

[0047] Thus, in the current embodiment, the refrigerant discharge part 125 may be disposed on the lower header to improve flow (flow rate) performance of the refrigerant, particularly, the liquid refrigerant discharged through the refrigerant discharge part 125.

[0048] The flat tubes 110 may be provided in plurality between the first header 120 and the second header 130. The plurality of flat tubes 110 are spaced apart from each other in a horizontal direction.

[0049] The first header 120 is provided in two rows. In detail, the first header 120 includes a first front part 120a on which the refrigerant inflow part 122 is disposed and a first rear part 120b coupled to the first front part 120a. In the present disclosure, front and rear directions may be defined as a direction in which the first front part 120a and the first rear part 120b are aligned. The first rear part 120b is coupled to a rear side of the first front part 120a.

[0050] Also, a first partition part 140 for partitioning an inner space of the first header 120 into front and rear sides is disposed in the first header 120. That is, the inner spaces of the first front and rear parts 120a and 120b are partitioned from each other by the first partition part 140.

[0051] A plurality of baffles 151 and 152 for partitioning

the inner space of the first header 120 into a left/right side is disposed in the first header 120. The plurality of baffles 151 and 152 may guide the refrigerant so that the refrigerant is introduced from the first header 120 into the plurality of flat tubes 110.

[0052] The plurality of baffles 151 and 152 includes a first baffle 151 disposed in an inner space of the first front part 120a and a second baffle 152 disposed in an inner space of the first rear part 120b.

[0053] A portion on which the refrigerant inflow part 122 is disposed may be called "one side portion" of the first header 120 with respect to a horizontal direction of the first header 120, and a portion opposite to the one side portion may be called "the other side portion" of the first header 120. Here, the first baffle 151 may be disposed more adjacent to the one side portion of the first header 120 than the second baffle 152. Also, the second baffle 152 may be disposed more adjacent to the other side portion of the first header 120 than the first baffle 151.

[0054] The inner space of the first front part 120a may be partitioned into two regions by the first baffle 151, and the inner space of the first rear part 120b may be partitioned into two regions by the second baffle 152. The first baffle 151 is disposed on one side surface of the first partition part 140, and the second baffle 152 is disposed on the other side surface of the first partition part 140. Also, the one side surface and the other side surface may face each other.

[0055] Due to the position of the first baffle 151, a region of the partitioned two regions of the first front part 120a, which is adjacent to the one side portion of the first header 120 may have a size less than that of a region of the partitioned two regions of the first front part 120a, which is adjacent to the other side portion of the first header 120. According to a position of the second baffle 152, a region of the partitioned two regions of the first rear part 120b, which is adjacent to the one side portion of the first header 120 may have a size greater than that of a region of the partitioned two regions of the first rear part 120b, which is adjacent to the other side portion of the first header 120.

[0056] The plurality of flat tubes 110 are arranged in two rows in front and rear directions. As illustrated in Fig. 3, when the heat exchanger 10 is laterally viewed, the flat tube 110 includes a front tube 110a disposed at the front side (a right side of Fig. 3) and a rear tube 110b disposed at a rear side (a left side of Fig. 3) of the front tube 110a. The first and second tubes 110a and 110b may be provided in plurality and thus be respectively coupled to the first and second headers 120 and 130.

[0057] The first front part 120a of the first header 120 and a second front part 130a of the second header 130 are coupled to an upper side and a lower side of the front tube 110a, respectively. Also, the first rear part 120b of the first header 120 and a second rear part 130b of the second header 130 may be coupled to an upper side and a lower side of the rear tube 110b, respectively.

[0058] A guide hole 145 for guiding the refrigerant in

the first front part 120a to the first rear part 120b is defined in the first partition part 140. The guide hole 145 passes through at least one side portion of the first partition part 140.

5 **[0059]** The first partition part 140 extends from one side portion of the first header 120 toward the other side portion of the first header 120. Also, the guide hole 145 may be defined at a position adjacent to the other side portion of the first partition part 140. The guide hole 145 may be provided in plurality.

10 **[0060]** That is, the guide hole 145 may be defined in a position that is more adjacent to the refrigerant discharge part 125 than the refrigerant inflow part 122, i.e., a position that is more adjacent to a downstream side than an upstream side of the refrigerant passage, with respect to the refrigerant passage defined from the refrigerant inflow part 122 to the refrigerant discharge part 125.

15 **[0061]** Thus, in the refrigerant flowing through the guide hole 145, an amount of liquid refrigerant is greater than that of gaseous refrigerant. Also, the refrigerant passing through the guide hole 145 passes through the inner space of the first rear part 120b to flow downward to the rear tube 110b. The refrigerant heat-exchanged while flowing in the rear tube 110b may be introduced into the second header 130 and discharged to the outside of the heat exchanger 10 through the refrigerant discharge part 125.

20 **[0062]** The second header 130 is provided in two rows. In detail, the second header 130 includes the second front part 130a and the second rear part 130b on which the refrigerant discharge part 125 is disposed, the second rear part being coupled to the second front part 130a.

25 **[0063]** Also, a second partition part 160 for partitioning an inner space of the second header 130 into front and rear sides is disposed in the second header 130. That is, the inner spaces of the first front and rear parts 130a and 130b are partitioned from each other by the second partition part 160.

30 **[0064]** A plurality of baffles 153, 154, 155, and 156 for partitioning the inner space of the second header 130 into a left/right side is disposed in the second header 130. The plurality of baffles 153, 154, 155, and 156 may be disposed at the front and rear sides of the second partition part 160.

35 **[0065]** The plurality of baffles 153, 154, 155, and 156 may guide the refrigerant from one of the second front and rear parts 130a and 130b to the other one of the second front and rear parts 130a and 130b or guide the refrigerant in the second header 130 to the flat tube 110.

40 **[0066]** In detail, the plurality of baffles 154, 154, 155, and 156 includes a third baffle 153 and a fifth baffle 155 disposed in the second front part 130a. The third and fifth baffles 153 and 155 may be disposed spaced apart from each other. Also, the inner space of the second front part 130a may be partitioned into three regions by the third and fifth baffles 153 and 155.

45 **[0067]** A portion of the second header 130, which faces the one side portion of the first header 120 with respect

to the flat tube 110 may be called "one side portion" of the second header 130, and a portion opposite to the one side portion of the second header 130 may be called "the other side portion" of the second header 130. Thus, the refrigerant discharge part 125 may be disposed on the second rear part 130b at the other side portion of the second header 130.

[0068] The third baffle 153 may be disposed more adjacent to the one side portion of the second header 130 than the fifth baffle 155. Also, the fifth baffle 155 may be disposed more adjacent to the refrigerant discharge part 125 than the third baffle 153.

[0069] The plurality of baffles 153, 154, 155, and 156 includes a fourth baffle 154 and a sixth baffle 156 disposed in the second rear part 130b. The fourth and sixth baffles 154 and 156 may be disposed spaced apart from each other. Also, the inner space of the second rear part 130b may be partitioned into three regions by the fourth and sixth baffles 154 and 156.

[0070] The fourth baffle 154 may be disposed more adjacent to the one side portion of the second header 130 than the sixth baffle 156. Also, the sixth baffle 156 may be disposed more adjacent to the refrigerant discharge part 125 than the fourth baffle 154.

[0071] The third and fourth baffles 153 and 154 may be aligned in a line and disposed on the virtual same plane (a first surface). Also, the fifth and sixth baffles 155 and 156 may be aligned in a line and disposed on the virtual same plane (a second surface). In other words, the fourth baffle 154 is disposed at a position opposite to the third baffle 153 with respect to the second partition part 160, and the sixth baffle 156 is disposed at a position opposite to the fourth baffle 154 with respect to the second partition part 160.

[0072] A plurality of through holes 161, 162, and 163 for guiding a flow of the refrigerant from one of the second front and rear parts 130a and 130b to the other one of the second front and rear parts 130a and 130b is defined in the second partition part 160. The plurality of through holes 161, 162, and 163 may be separated from each other by the third to sixth baffles 153, 154, 155, and 156

[0073] The plurality of through holes 161, 162, and 163 includes a plurality of first through holes 161 defined between the one side portion of the second header 130 and the third and fourth baffles 153 and 154, a plurality of second through holes 162 defined between the third and fourth baffles 153 and 154 and the fifth and sixth baffles 155 and 156, and a plurality of third through holes 163 defined between the fifth and sixth baffles 155 and 156 and the other side portion of the second header 130. The plurality of through holes 162 may be defined between the plurality of first through holes 161 and the plurality of third through holes 163.

[0074] Each of the first through holes 161 may guide the refrigerant in the second front part 130a to the second rear part 130b, and each of the second through holes 162 may guide the refrigerant in the second rear part 130b to the second front part 130a. Also, each of the third

through holes 163 may guide the refrigerant in the second front part 130a to the second front part 130b.

[0075] Hereinafter, the flow of the refrigerant within the heat exchanger 10 according to the current embodiment will be described with reference to the accompanying drawings.

[0076] Fig. 5 is a view illustrating a flow of a refrigerant within the heat exchanger according to an embodiment. A solid arrow represents the refrigerant flowing through the first rear part 120b of the first header 120 and the second rear part 130b of the second header 130. A dotted arrow represents the refrigerant flowing through the first front part 120a of the first header 120 and the second front part 130a of the second header 130.

[0077] Referring to Fig. 5, the refrigerant may be introduced into the first front part 120a of the first header 120 through the refrigerant inflow part 122. Here, the introduced refrigerant may be a high-pressure gaseous refrigerant compressed in the compressor.

[0078] The refrigerant introduced into the first front part 120a flows downward toward the plurality of front tubes 110a. Here, the first baffle 151 may prevent the refrigerant from flowing toward the other side portion of the first header 120.

[0079] The refrigerant flowing through the plurality of front tubes 110a may be introduced into the second front part 130a of the second header 130. Also, the refrigerant in the second front part 130a may be introduced into the second rear part 130b of the second header 130 through the first through hole 161. Here, the third baffle 153 may prevent the refrigerant in the second front part 130a from flowing toward the other side portion of the second header 130.

[0080] The refrigerant in the second rear part 130b flows upward toward the plurality of rear tubes 110b. Here, the fourth baffle 154 may prevent the refrigerant in the second rear part 130a from flowing toward the other side portion of the second header 130.

[0081] The refrigerant flowing through the plurality of rear tubes 110b may be introduced into the first rear part 120b of the first header 120 to flow toward the other side portion of the first header 120. Here, the refrigerant may flow toward the other side portion of the first header 120 until the refrigerant reaches the second baffle 152.

[0082] The refrigerant in the first rear part 120b flows downward toward the plurality of rear tubes 110b and is then introduced into the second rear part 130b of the second header 130. The refrigerant in the second rear part 130b flows to the inner space of the second front part 130a through the second through hole 162.

[0083] Also, the fifth baffle 155 may prevent the refrigerant in the second front part 130a from flowing toward the other side portion of the second header 130. The refrigerant in the second front part 130a flows upward through the plurality of front tubes 110a.

[0084] The refrigerant flowing through the plurality of front tubes 110a may be introduced into the first front part 120a of the first header 120. Also, a portion of the

refrigerant existing in the first front part 120a flows downward toward the plurality of front tubes 110a. Also, the rest of the refrigerant flows to the first rear part 120b through the guide hole 145. That is, the refrigerant in the first front part 120a is divided into the plurality of front tubes 110a and the first rear part 120b to flow.

[0085] The refrigerant flows to the first rear part 120b flows downward through the plurality of rear tubes 110b and is then introduced into the second rear part 130b. This flow may be called flow A. Also, the refrigerant flow to the plurality of front tubes 110a is introduced into the second rear part 130b through the third through hole 163. This flow may be called flow B.

[0086] The flow A and flow B are combined with each other, and the combined refrigerant may be discharged to the outside of the heat exchanger 10 through the refrigerant discharge part 125. Here, the combined refrigerant may be discharged toward a lateral side of the second rear part 130b of the second header 130.

[0087] As describe above, the gaseous refrigerant introduced from the refrigerant inflow part 122 may be condensed while flowing through the first front and rear parts 120a and 120b of the first header 120, the front and rear tubes 110a and 110b, and the first front and rear parts 130a and 130b of the second header 130.

[0088] Thus, an amount of liquid refrigerant of the refrigerant flowing adjacent to the refrigerant discharge part 125 with respect to the refrigerant passage from the refrigerant inflow part 122 to the refrigerant discharge part 125 may be greater than that of liquid refrigerant of the refrigerant flowing adjacent to the refrigerant inflow part 122.

[0089] Since the liquid refrigerant has a specific gravity greater than that of the gaseous refrigerant, the flow rate of the refrigerant adjacent to the refrigerant discharge part 125 may be less than that of the refrigerant adjacent to the refrigerant inflow part 122.

[0090] However, as suggested in the current embodiment, since the refrigerant discharge part 125 is disposed on the second header which is the lower header, the refrigerant, particularly, the liquid refrigerant discharged through the refrigerant discharge part 125 may smoothly flow to increase the flow rate thereof. Also, the refrigerant may smoothly flow from the refrigerant discharge part 125 to improve flow (flow rate) performance of the entire refrigerant flowing in the heat exchanger 10.

[0091] According to the proposed embodiments, since the refrigerant discharge part is disposed on the lower header of the heat exchanger, when the heat exchanger acts as the condenser, the refrigerant may smoothly flow in the region that is adjacent to the refrigerant discharge part, i.e., in the region in which the relatively large amount of liquid refrigerant exists. Also, the refrigerant may smoothly flow in the refrigerant discharge part to improve the flow (flow rate) performance of the refrigerant in the whole heat exchanger.

[0092] As a result, the refrigerant may smoothly flow or be smoothly discharged to secure the supercooling

degree of the refrigerant, thereby improving the heat exchange efficiency.

[0093] Also, since the refrigerant tube and the header are provided in two rows at the front and rear sides, and the partition part for partitioning the front side from the rear side is disposed in the header, the passage of the refrigerant may be sufficiently secured while the refrigerant flows in the front and rear tubes and the header.

[0094] Also, since the plurality of through holes are defined in the partition part, the gaseous refrigerant may be mixed with the liquid refrigerant while the refrigerant passes through the plurality of through holes, and thus the non-uniformity of the refrigerant may be prevented. That is, the phenomenon in which the gaseous refrigerant flows through one refrigerant tube, and the liquid refrigerant flows through the other refrigerant tube may be prevented.

[0095] Although embodiments have been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the spirit and scope of the principles of this disclosure. More particularly, various variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the disclosure, the drawings and the appended claims. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

Claims

1. A heat exchanger (10) comprising:

a refrigerant tube (110) through which a refrigerant flows, the refrigerant tube (110) being arranged in a plurality of rows;

a first header (120) on which a refrigerant inflow part (122) is disposed, the first header (120) being coupled to one side of the plurality of refrigerant tubes (110);

a first partition part (140) for partitioning an inner space of the first header (120);

a second header (130) on which a refrigerant discharge part (125) is disposed, the second header (130) being coupled to the other side of the plurality of refrigerant tubes (110);

a second partition part (160) for partitioning an inner space of the second header (130); and
a baffle (151, 152, 153, 154, 155, 156) coupled to the first or second partition part (140, 160), the baffle (151, 152, 153, 154, 155, 156) guiding a flow of the refrigerant from the first or the second header (120, 130) to the plurality of refrigerant tubes (110),

wherein the refrigerant discharge part (125) of

- the second header (130) is located below the refrigerant inflow part (122) of the first header (120).
2. The heat exchanger (10) according to claim 1, wherein the first header (120) is coupled to an upper side of the plurality of refrigerant tubes (110), and the second header (130) is coupled to a lower side of the plurality of refrigerant tubes (110).
 3. The heat exchanger (10) according to claim 1 or 2, wherein the first header (120) comprises a first front part (120a) and a first rear part (120b), and the first front part (120a) and the first rear part (120b) are partitioned by the first partition part (140).
 4. The heat exchanger (10) according to claim 3, wherein the refrigerant inflow part (122) is disposed on a bottom surface of the first front part (120a).
 5. The heat exchanger (10) according to any of claims 1 to 4, wherein the second header (130) comprises a second front part (130a) and a second rear part (130b), and the second front part (130a) and the second rear part (130b) are partitioned by the second partition part (160).
 6. The heat exchanger (10) according to claim 5, wherein the refrigerant discharge part (125) is disposed on a side surface of the second rear part (130b).
 7. The heat exchanger (10) according to claim 5, wherein the plurality of refrigerant tubes (110) comprises a front tube (110a) and a rear tube (110b), which are arranged in front and rear direction, wherein the front tube (110a) is coupled to the first and second front parts, and the rear tube (110b) is coupled to the first and second rear parts (120b, 130b).
 8. The heat exchanger (10) according to any of claims 3 to 7, wherein the baffle (151, 152, 153, 154, 155, 156) comprises:
 - a first baffle (151) disposed in the first front part (120a) to partition an inner space of the first front part (120a); and
 - a second baffle (152) disposed in the first rear part (120b) to partition an inner space of the first rear part (120b).
 9. The heat exchanger (10) according to claim 8, wherein the first and second baffles (151, 152) are respectively coupled to one side surface and the other side surface of the first partition part (140), wherein the one side surface and the other side surface face face to each other.
 10. The heat exchanger (10) according to claim 8 or 9, wherein the first header (120) comprises one side portion on which the refrigerant inflow part (122) is disposed and the other side portion facing the one side portion, wherein a distance from the first baffle (151) to the one side portion of the first header (120) is less than that from the second baffle (152) to the one side portion of the first header (120), and a distance from the second baffle (152) to the other side portion of the first header (120) is less than that from the first baffle (151) to the other side portion of the first header (120).
 11. The heat exchanger (10) according to any of claims 1 to 10, wherein a guide hole (145) for guiding a flow of the refrigerant is defined in the first partition part (140), wherein the guide hole (145) is defined in a position that is more adjacent to the refrigerant discharge part (125) than the refrigerant inflow part (122) with respect to a refrigerant passage defined from the refrigerant inflow part (122) to the refrigerant discharge part (125).
 12. The heat exchanger (10) according to claim 11, wherein the guide hole (145) guides the refrigerant such that the refrigerant in the first front part (120a) flows toward the first rear part (120b) or is branched to flow into the plurality of refrigerant tubes (110).
 13. The heat exchanger (10) according to any of claims 1 to 12, wherein the baffle (151, 152, 153, 154, 155, 156) comprises a plurality of baffles (153, 154, 155, 156) coupled to one side and the other side of the second partition part (160), and a plurality of through holes (161, 162, 163) separated by the plurality of baffles (153, 154, 155, 156) are defined in the second partition part (160).
 14. The heat exchanger (10) according to claim 13, wherein the plurality of baffles (153, 154, 155, 156) comprise:
 - fourth and sixth baffles (154, 156) disposed spaced apart from each other within the second rear part (130b); and
 - third and fifth baffles (153, 155) disposed spaced apart from each other within the second front part (130a).
 15. The heat exchanger (10) according to claim 14, wherein the plurality of through holes (161, 162, 163) comprise:
 - a plurality of first through holes (161) defined

between one side portion of the second header (130) and the third and fourth baffles (153, 154); a plurality of second through holes (162) defined between the third and fourth baffles (153, 154) and the fifth and sixth baffles (155, 156); and a plurality of third through holes (163) defined between the fifth and sixth baffles (155, 156) and the other side portion of the second header (130), wherein the plurality of second through holes (162) are located between the plurality of first through holes (161) and the plurality of third through holes (163).

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Fig. 1

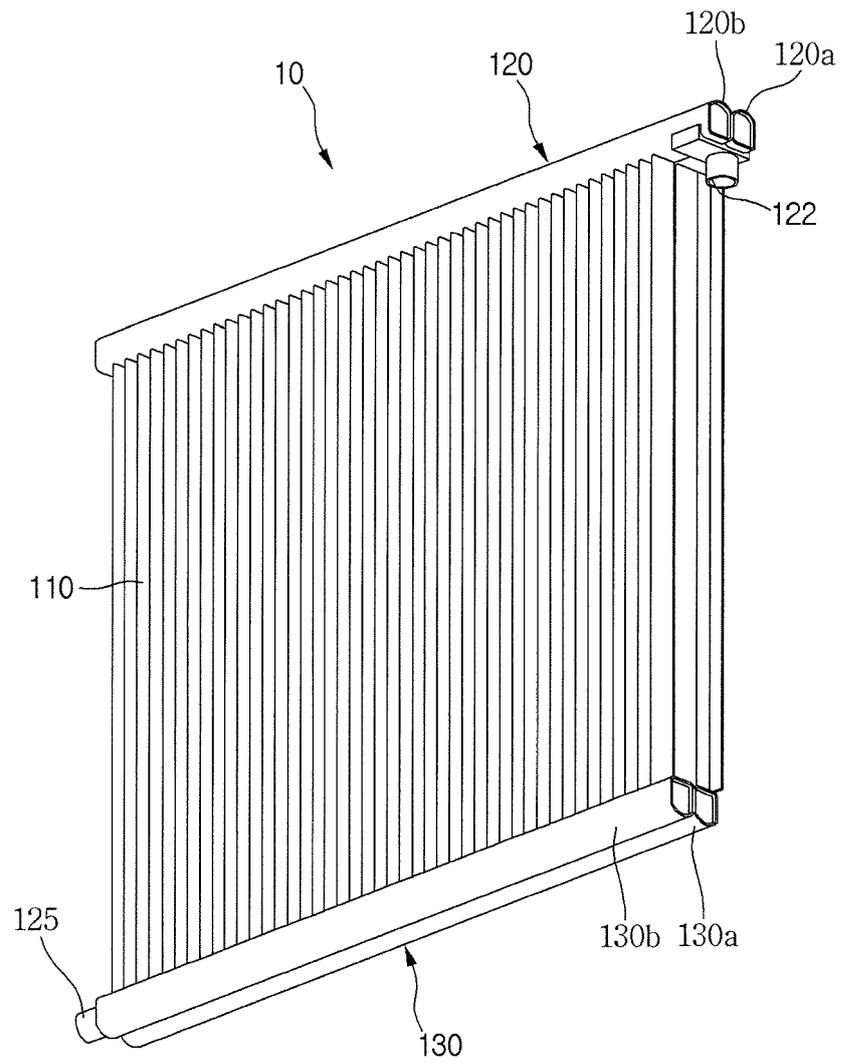


Fig. 2

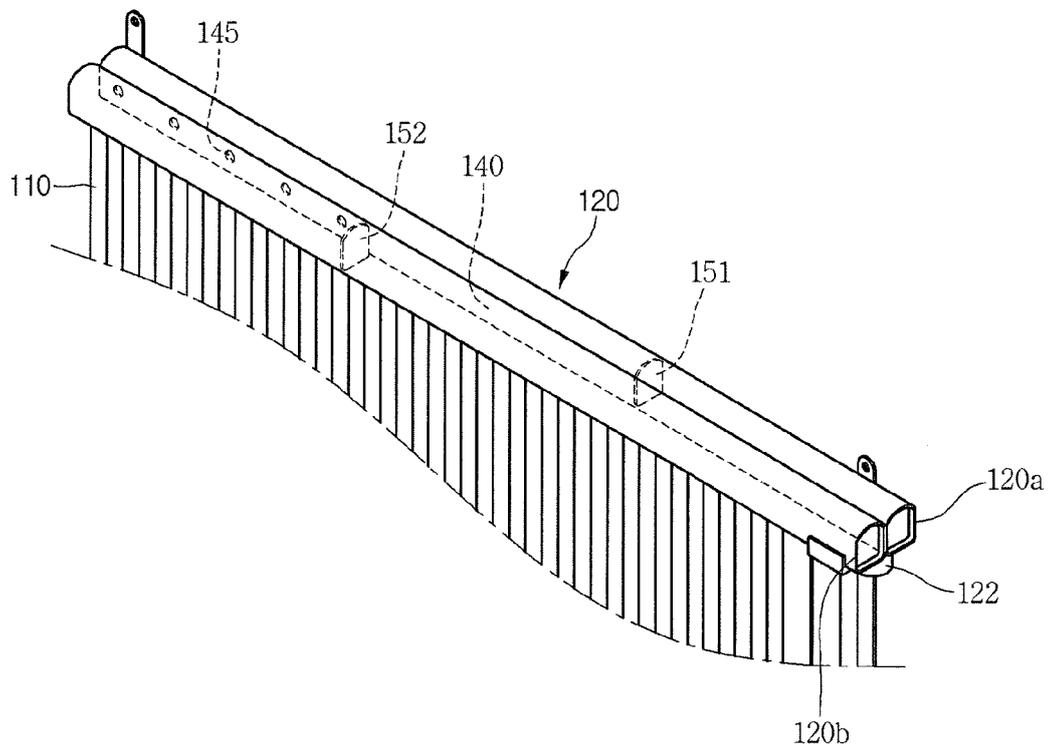


Fig. 3

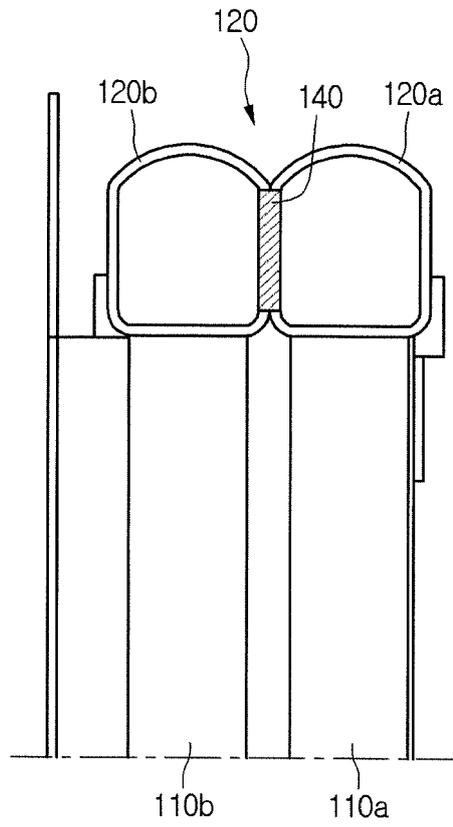


Fig. 4

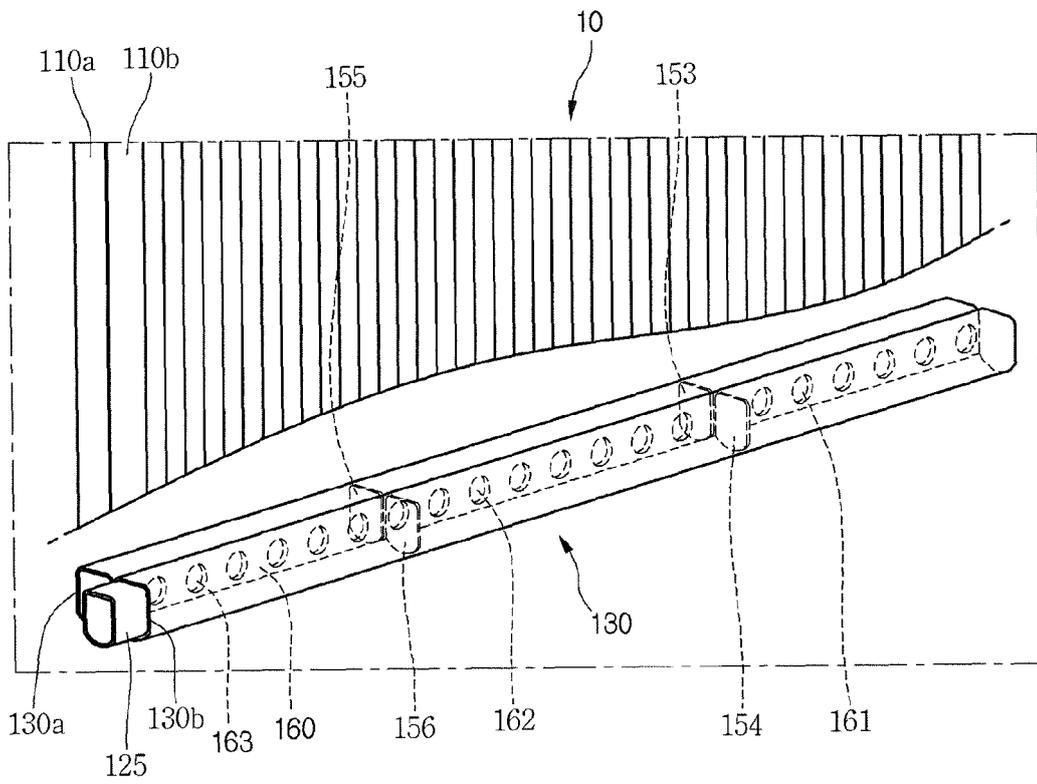
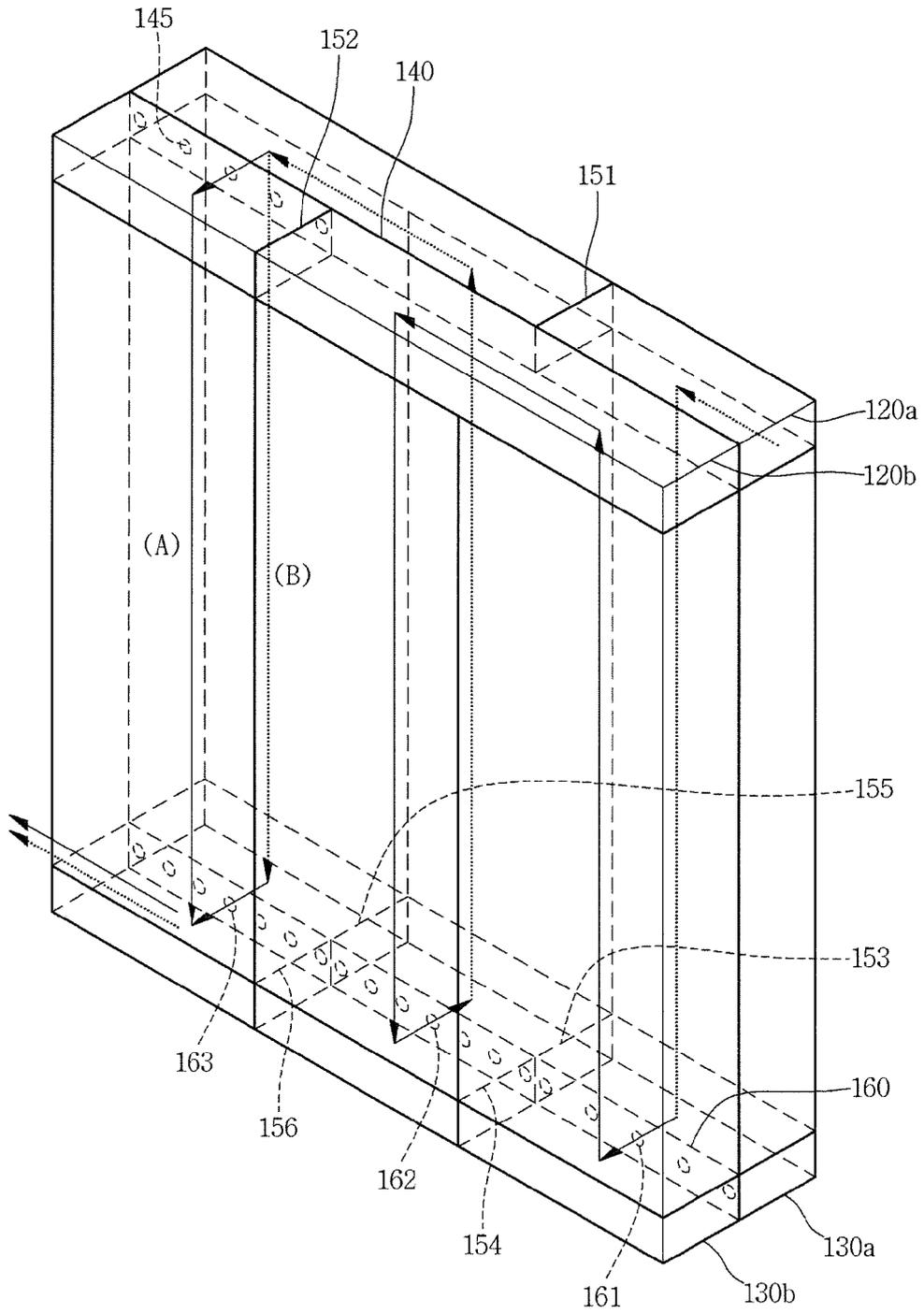


Fig. 5





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