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(54) HEAT EXCHANGER WITH FILTER, FOR REFRIGERANT FLUID LOOP

(57) The invention relates to a heat exchanger for a refrigerant fluid loop, the heat exchanger comprising at least one inlet configured to allow a refrigerant fluid to enter in the heat exchanger and at least one outlet (122) configured to allow the refrigerant fluid to exit the heat exchanger, the heat exchanger comprising at least one manifold (123) arranged at an end of a heat exchange area (125) of the heat exchanger, at least the outlet (122) being arranged in the at least one manifold (123), the manifold (123) extending mainly along a first axis (A1) between a first end and a second end, characterized in that the heat exchanger (120) comprises at least one filtering baffle (200) adapted to filter at least part of the refrigerant fluid, in that the filtering baffle (200) is arranged in the manifold (123) of the heat exchanger and in that the filtering baffle (200) is arranged closer to the outlet (122) than to the first end or the second end of the manifold (123).

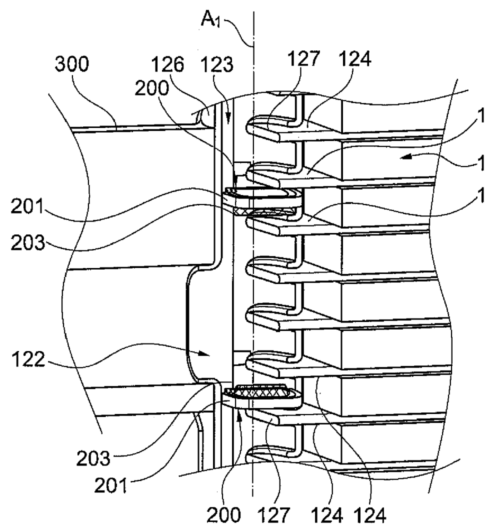

Fig. 2

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Description

[0001] The present invention relates to the domain of heat exchangers designed for refrigerant fluid loops. More specifically, the present invention concerns devices for filtering the refrigerant fluid that flows through such heat exchangers.

[0002] A refrigerant fluid loop generally comprises at least two heat exchangers, at least one compressor and at least one expansion device. The compressor and the expansion device are both fragile and comprise movable elements that can easily break. It is therefore important that only the refrigerant fluid enters this compressor or the expansion device. In order to achieve that goal, it is already known to filter the refrigerant fluid before it reaches one of these components.

[0003] However, some particles may be inside heat exchangers, for instance due to manufacturing processes or default in the cleaning system of such heat exchanger. The cleaning of such particles appears to be really expensive and complex. And even with all the care that can be given to this cleaning, some of those particles, especially particles that have a diameter smaller than 60μm can remain in those heat exchangers and can then be dragged by the refrigerant fluid to finally damage the compressor, the expansion device or any other element in which this refrigerant fluid could flow.

[0004] As a result, automotive suppliers are more and more concerned with this filtration, and they aim to filter even smaller particles than what is already filtered.

[0005] The present invention solves at least this issue, by providing a heat exchanger for a refrigerant fluid loop, the heat exchanger comprising at least one inlet configured to allow a refrigerant fluid to enter in the heat exchanger and at least one outlet configured to allow the refrigerant fluid to exit the heat exchanger, the heat exchanger comprising at least one manifold arranged at an end of a heat exchange area of the heat exchanger, at least the outlet being arranged in the at least one manifold, the manifold extending mainly along a first axis between a first end and a second end. According to the invention, the heat exchanger comprises at least one filtering baffle adapted to filter at least part of the refrigerant fluid, the filtering baffle is arranged in the manifold of the heat exchanger and the filtering baffle is arranged closer to the outlet than to the first end or the second end of the manifold. In other words, the filtering baffle is arranged in the vicinity of the outlet. According to the invention, the heat exchange area is a part of the heat exchanger wherein a heat exchange occurs, for instance between the refrigerant fluid and an airflow that flows through such heat exchange area or between the refrigerant fluid and another fluid flowing through another loop, the heat exchanger of the invention being then arranged at an interface between the two loops.

[0006] According to an aspect of the present invention, the filtering baffle is arranged upstream the outlet of the heat exchanger with respect to a direction along which the refrigerant fluid flows. As the filtering baffle is arranged in the manifold of the heat exchanger, the filtering baffle is thus arranged between the heat exchange area and the outlet. In other words, at least part of, advantageously all, the refrigerant fluid that exits the heat exchanger through its outlet has previously crossed the filtering baffle. Especially, the closer the filtering baffle is to the outlet, the more of the refrigerant fluid is filtered.

[0007] According to the invention, the filtering baffle comprises at least one frame and one meshed element, the frame surrounding, at least partially, the meshed element. Advantageously, a first part of the meshed element is configured to filter the refrigerant fluid and a second part of the meshed element is configured to cooperate with the frame.

[0008] According to a variant of the first embodiment of the invention, the frame and the meshed element both comprise a metal alloy. Advantageously, the filtering baffle can thus be brazed to the wall defining the manifold. The brazing operation prevents any refrigerant fluid leakage, that is to say that the refrigerant fluid that reaches the filtering baffle is either filtered through the meshed element, and more precisely through the first part of such meshed element, or guided to the heat exchange area.

[0009] According to any of the embodiments cited above, the heat exchanger according to the invention can comprise at least two filtering baffles. According to an aspect of the invention, the two filtering baffles are arranged on both sides of the outlet along the first axis. It is thus understood that the refrigerant fluid that reaches the manifold between the two filtering baffles is not filtered before exiting the heat exchanger. Anyway, the refrigerant fluid that is not filtered represents only a small part of the total amount of the refrigerant fluid that exits the heat exchanger. In other words, the majority of the refrigerant fluid that exits the heat exchanger has been previously filtered. It is also understood that a distance measured between the two filtering baffles along the first axis must be as short as possible in order to improve the efficiency of the filtration.

[0010] According to a second embodiment of the invention, the frame extends mainly along the first axis along which extends the manifold, this frame carrying the meshed element, and the frame comprising at least one baffle arranged at one extremity of the frame along the first axis, said baffle extending mainly along a second axis that intersects the first axis. Advantageously, the second axis is perpendicular to the first axis. According to an aspect of this second embodiment, at least the frame comprises a metal alloy and said frame is brazed to the wall defining the manifold. The brazing operation prevents any refrigerant fluid leakage, that is to say that the refrigerant fluid that reaches the at least one baffle is either filtered through the meshed element, and more precisely through the first part of such meshed element, or guided to the heat exchange area.

[0011] According to a first variant of this second embodiment of the invention, the first part of the meshed element fits the outlet of the heat exchanger and the at least one baffle is adapted to guide the refrigerant fluid to the heat exchange area of the heat exchanger.

[0012] According to a second variant of the second embodiment, the first part of the meshed element fits the outlet of the heat exchanger and the at least one baffle comprises another meshed element adapted to filter the refrigerant fluid.

[0013] According to a third variant of the second embodiment, the first part of the meshed element fits the outlet of the heat exchanger and the at least one baffle is perforated in order to define an opening configured to allow the circulation of the refrigerant fluid.

[0014] For the purpose of this specification, "the first part of the meshed element fits the outlet" means that said first part of the meshed element presents similar shape and dimension than the shape and dimension of the outlet.

[0015] Optionally, a first baffle is arranged at a first extremity of the frame and a second baffle is arranged at a second extremity of the frame, the first extremity and the second extremity being opposed to one another along the first axis, the first baffle extending along the second axis and the second baffle extending along a third axis that intersects the first axis. Advantageously, the second and the third axis can be parallel to each other. Optionally those second and third axis can be perpendicular to the first axis. According to the first variant of the second embodiment of the invention, both baffles are configured to guide the refrigerant fluid to the heat exchange area of the heat exchanger. According to the second variant of the second embodiment, both baffles comprise the other meshed element adapted to filter the refrigerant fluid. According to the third variant of the second embodiment, both baffles are perforated in order to allow the circulation of the refrigerant fluid.

[0016] According to the invention, the meshed element is configured to filter particles that present a diameter bigger than 30μm. More precisely, at least the first part of this meshed element is configured to retain particles that presents a diameter bigger than 30μm.

[0017] According to the invention, the heat exchanger can be used as a condenser. For instance, the heat exchanger is a tubular heat exchanger. In other words, the heat exchange area of such heat exchanger comprises tubes adapted to the circulation of the refrigerant fluid. For instance, the heat exchanger can comprise stacked plates which define those tubes.

[0018] Other features, details and advantages of the invention can be inferred from the specification of the invention given hereunder. Various embodiments are represented in the figures wherein:

- Figure 1 is a schematic representation of a refrigerant fluid loop comprising at least one heat exchanger according to the invention, this heat exchanger comprising at least one filtering baffle;
- Figure 2 is a perspective view of a manifold of the heat exchanger according to a first embodiment of the invention;
- Figure 3 is a perspective view of a manifold of the heat exchanger according to a second embodiment of the invention;
- Figures 4 and 5 are perspective views of the filtering baffle according, respectively, to the first and to the second embodiment of the invention.

[0019] In the following specification, the words "upstream" and "downstream" both refer to a direction of circulation of a refrigerant fluid in the concerned object.

[0020] Figure 1 is a schematic view of a refrigerant fluid loop 100 intended to be accommodated in a motor vehicle. This refrigerant fluid loop 100 comprises at least a compressor 110 configured to increase the pressure of a refrigerant fluid R circulating through the loop 100, a first heat exchanger 120 configured to undertake a heat exchange between the refrigerant fluid R and a first airflow AF1, an expansion device 130 configured to decrease the pressure of the refrigerant fluid R and a second heat exchanger 140 configured to undertake a heat exchange between the refrigerant fluid R and a second airflow AF2. For instance, the first airflow AF1 is taken outside the motor vehicle in which the refrigerant fluid loop 100 is accommodated, and the second airflow AF2 is reserved to be sent in a passenger compartment of said motor vehicle.

[0021] According to the illustrated embodiment, the first heat exchanger 120 is realized according to the invention and comprises at least one filtering baffle 200 located in the vicinity of an outlet 122 of the first heat exchanger 120.

[0022] First, the refrigerant fluid R exits the compressor 110 in a gaseous state and reaches the first heat exchanger 120, and more precisely it reaches an inlet 121 of the first heat exchanger 120. Once the refrigerant fluid R has entered the first heat exchanger 120, a transfer of calories is undertaken between said refrigerant fluid R circulating in this first heat exchanger 120 and the first airflow AF1 that flows through it. More precisely, the refrigerant fluid R gives calories to the first airflow AF1 and liquefies. In other words, the first heat exchanger 120 acts, in this particular example, as a condenser. As a result, the refrigerant fluid R exits the first heat exchanger 120 in a liquefied state and reaches a pipe 101 of the refrigerant fluid loop 100. Then the refrigerant fluid R goes through the expansion device 130 in which its pressure is reduced before it reaches the second heat exchanger 140. In this second heat exchanger 140, the refrigerant fluid R takes calories from the second airflow AF2 and evaporates. The second airflow AF2 can then be sent to the passenger compartment to drop the temperature of this compartment and the refrigerant fluid R, which is again in a gaseous state, can again reach the compressor

110 to start a new cycle.

[0023] Generally speaking, the first heat exchanger 120 and the second heat exchanger 140 are similar and both comprise at least two manifolds or header tanks arranged at one end or at both ends of a heat exchange area wherein the heat exchange between the refrigerant fluid and the first or the second airflow AF1, AF2 takes place. The outlet 122 of the first heat exchanger 120 is arranged in one of its manifolds, and the inlet 121 of this first heat exchanger 120 is arranged in the other one. According to the invention, the at least one filtering baffle 200 is arranged in the manifold in which is arranged the outlet 122 of the first heat exchanger 120. In other words, said filtering baffle 200 is arranged upstream the outlet 122 of the first heat exchanger 120 and downstream the heat exchange area. It is thus understood that the filtering baffle 200 is adapted to filter the refrigerant fluid that has already exchanged heat with the first airflow AF1, and before it reaches the rest of the refrigerant fluid loop 100. As a result, the refrigerant fluid R that reaches the expansion device 130 is cleared of the biggest particles that can be dragged along its flows through the heat exchange area. For instance, the filtering baffle 200 can be configured to retain particles that present a diameter bigger than 30μm.

[0024] According to an aspect of the invention, the heat exchange area comprises tubes adapted to the circulation of the refrigerant fluid R. As explained below, each of those tubes comprise a first end which extends in the manifold in which the outlet 122 is arranged and a second end which extends in the manifold in which the inlet 121 is arranged. Optionally, those tubes can be formed by stacked plates.

[0025] With references to figures 2 and 3, we are now going to describe with more details the manifold 123 of the first heat exchanger in which the outlet 122 is arranged. For the rest of the specification, the words "first heat exchanger" and "heat exchanger" will be used with no distinction. It is understood that the filtering baffle 200 arranged in the vicinity of the outlet 122 arranged the manifold 123 of the first heat exchanger could be placed at an outlet of the second heat exchanger without departing from the scope of the invention.

[0026] Figures 2 and 3 illustrate, in perspective views, the manifold 123 of the heat exchanger in which the outlet 122 is arranged according, respectively, to a first embodiment and to a second embodiment of the invention. For the sake of comprehension, the word "manifold" is, in the rest of the specification used to designate the manifold of the heat exchanger in which is arranged the outlet of such heat exchanger. As illustrated on both figures 2 and 3, the manifold 123 extends mainly along a first axis A1. This manifold 123 also comprises a first end and a second end opposed to each other along the first axis A1, those first and second ends being hidden on the figures. In the present document, the terms "in the vicinity of the outlet" must be understood as "closer to the outlet than to any of the first or the second ends of the manifold".

[0027] These figures 2 and 3 both make visible the tubes 124 which are part of the heat exchange area 125 of the heat exchanger. More precisely, these figures 2 and 3 make visible the first ends 127 of those tubes 124 which extend in the manifold 123 in which is arranged the outlet 122. As shown, those tubes 124 all ends in the manifold 123. In other words, the refrigerant fluid flows in those tubes 124 wherein it exchanges heat with the first airflow and then reaches said manifold 123. Depending on the tube 124 from which the refrigerant fluid reaches the manifold 123, this refrigerant fluid is then directed to another tube 124 to continue the heat exchange, or it is directed to the outlet 122 in order to exit the heat exchanger 120. As illustrated on both figures 2 and 3, the at least one filtering baffle 200 is arranged in order to filter, at least part of, the refrigerant fluid before it exits the heat exchanger 120. In other words, the filtering baffle 200 is arranged upstream the outlet 122, according to both the first and the second embodiments.

[0028] We also note that, according to the first embodiment of the invention illustrated on figure 2, a block 300 is connected to the outlet 122, and more precisely downstream the outlet 122. In other words, the refrigerant fluid that exits the heat exchanger through its outlet 122 reaches such block 300 before reaching the rest of the refrigerant fluid loop as explained above.

[0029] According to an example of the first embodiment of the present invention illustrated on figure 2, the heat exchanger comprises two filtering baffles 200. It is understood that this is only an example of application of the invention and that the heat exchanger 120 could comprise only one filtering baffle 200 or more than two filtering baffles 200 within the scope of the invention. According to the first embodiment of the invention, both the filtering baffles 200 are identical and the description given under about one of them is directly transposable to the other one.

[0030] As shown, each filtering baffle 200 is arranged between two immediately adjacent tubes 124 of the heat exchange area 125. More precisely, each filtering baffle 200 is arranged between the first ends 127 of such tubes 124. We note that the filtering baffles 200 are arranged on both sides of the outlet 122, along the first axis A1. As a result, the refrigerant fluid that reaches the manifold 123 by the tubes 124 arranged in front of the outlet 122 is not filtered before it exits the heat exchanger. It is understood that the refrigerant fluid that exits the heat exchanger without previous filtration only represents a very small amount of the refrigerant fluid that exits said heat exchanger. As detailed below, the refrigerant fluid that reaches the manifold anywhere else than between the two filtering baffles 200 is either filtered by one of them, or guided again to the heat exchange area. It is thus understood that a distance measured parallel to the first axis A1 between the two filtering baffles 200 must be as short as possible in order to maximise the amount of refrigerant fluid filtered.

[0031] According to the first embodiment of the invention, the filtering baffle 200 comprises at least a meshed element 203 surrounded, at least partially, by a frame 201. The filtering baffle 200 can either be brazed to a wall 126 defining the manifold 123 or a sealing device can be interposed between the filtering baffle 200 and the wall 126 of the manifold 123.

[0032] According to the second embodiment of the invention illustrated on figure 3, the filtering baffle 200 comprises a frame 201 that carries the meshed element 203. As illustrated, this frame 201 extends mainly along the first axis A1 along which also extends the manifold 123. Advantageously the meshed element 203 faces the outlet 122 of the heat exchanger. More precisely, the meshed element 203 presents a dimension Dme measured along the first axis A1 bigger than a dimension Do of the outlet 122 also measured along this first axis A1. In other words, according to the second embodiment of the invention, the meshed element 203 completely covers the outlet 122. As a result, all the refrigerant fluid that exits the heat exchanger 120 is previously filtered.

[0033] We also note that the frame 201 carries a first baffle 204 arranged at a first extremity 211 of the frame 201 and a second baffle 205 arranged at a second extremity 221 of the frame 201. The first baffle 204 extends mainly along a second axis A2 that intersects the first axis A1 and the second baffle 205 mainly extends along a third axis A3 that also intersects the first axis A1. According to the example illustrated, those second and third axis A2, A3 are parallel to each other and perpendicular to the first axis A1. It is understood that this is only an example of the invention and that the frame could carry only one of those baffles 204, 205 within the scope of the invention. According to the invention, the first and the second baffles 204, 205 can carry another meshed element adapted to filter the refrigerant fluid or they can form walls adapted to guide the refrigerant fluid to the heat exchange area 125. In other words, when the baffles 204, 205 form walls guiding the refrigerant fluid, only the refrigerant fluid that exit the heat exchange area 125 through tubes 124 that end in front of the outlet 122 is directly filtered by the meshed element 203. Alternately, as illustrated on figure 3, the first and the second baffles 204, 205 can be perforated in order to allow the circulation of the refrigerant fluid. In other words, according to this alternative, the first and the second baffles 204, 205 each defines an opening 214, 215 adapted to the circulation of the refrigerant fluid.

[0034] Figure 4 illustrates, in a perspective view, one of the filtering baffle 200 according to the first embodiment of the invention. According to this first embodiment of the invention, the filtering baffle 200 presents a shape adapted to the shape of the manifold to which it is intended. As illustrated, the filtering baffle 200 according to the first embodiment of the invention present a general oblong shape. We also note that a periphery of this oblong shape presents two notches 241 adapted to cooperate with corresponding shapes in the manifold.

[0035] This filtering baffle 200 comprises a frame 201 and the meshed element 203 adapted to filter the refrigerant fluid, this frame 201 being intended to be interposed between the wall defining the manifold and the meshed element 203. According to the invention, the meshed element 203 comprises at least a first part 213 configured to filter the refrigerant fluid and a second part 223 configured to cooperate with the frame 201. According to the example of the first embodiment illustrated here, the first part 213 of the meshed element 203 extends in the direction of the other filtering baffle when both filtering baffles 200 are positioned in the manifold, but it is understood that this first part 213 could extend in an opposite direction within the scope of the invention. As previously mentioned, the refrigerant fluid that reaches the manifold can either directly exit the heat exchanger if it reaches the manifold thanks to tubes that extends in front of the outlet, or it can reach the first part 213 of the meshed element 203 in which it is filtered before reaching the outlet and exiting the heat exchanger. As a result, except for the refrigerant fluid that reaches the manifold by tubes arranged in front of the outlet, all the refrigerant fluid that exits the heat exchanger is previously filtered.

[0036] According to a variant of the first embodiment of the invention, the meshed element 203 and the frame 201 both comprise a metal alloy, the frame 201 thus carrying such meshed element 203. According to this variant of the first embodiment, the filtering baffle 200 is brazed to the wall defining the manifold.

[0037] Figure 5 illustrates, in a perspective view, the filtering baffle 200 according to the second embodiment of the invention. According to this second embodiment of the invention, the frame 201 of the filtering baffle 200 carries the meshed element 203 and extends mainly along the first axis A1. As previously mentioned, the first baffle 204 is arranged at the first extremity 211 of the frame 201 and the second baffle 205 is arranged at the second extremity 221 of the frame 201. As illustrated, the meshed element 203, according to this second embodiment of the present invention, comprises the first part 213 configured to filter the refrigerant fluid and the second part 223 which cooperates with the frame 201. The first part 213 of the meshed element extends in the direction of the tubes 124 when the filtering baffle 200 is positioned in the manifold, and this first part 213 has an oblong shape which mainly extends along the first axis A1. We note that, according to the second embodiment illustrated on figure 3, the second part 223 of the meshed element 203 totally surrounds the first part 213 of this meshed element 203. Obviously, this is only an example of the invention, and the first part 213 could present a different shape and extend in a different direction within the scope of the invention as long as it is adapted to filter the refrigerant fluid upstream the outlet.

[0038] Advantageously, the first part 213 of the meshed element 203 fits the outlet of the heat exchanger, that is to say that this first part 213 presents similar shape and dimension than the shape and dimension of the outlet of the heat exchanger. For instance, the biggest dimension Df of the first part 213 measured parallel to the first axis A1 is identical, or roughly identical, to the dimension Do of the outlet measured along the same first axis A1, this dimension Do of the outlet being for instance illustrated on figure 3.

[0039] Figure 5 more precisely illustrates a first variant of the second embodiment wherein the first baffle 204 and the second baffle 205 form solid walls adapted to guide the refrigerant fluid to the heat exchange area of the heat exchanger.

[0040] According to a second variant of the second embodiment not illustrated here, the first baffle and the second baffle both comprise another meshed element adapted to filter to refrigerant fluid. In other words, according to this second variant, the refrigerant fluid can be filtered twice, a first time when it reaches the first or the second baffle and a second time just before exiting the heat exchanger, that is to say when it reaches the outlet of this heat exchanger. Obviously, the refrigerant fluid that reaches the manifold thanks to tubes that are arranged in front of the outlet of the heat exchanger is only filtered once.

[0041] According to a third variant of the second embodiment illustrated on figure 3 and previously described, both baffles of the filtering baffle can be perforated in order to allow the circulation of the refrigerant fluid. In other words, according to this third variant of the second embodiment, all the refrigerant fluid is only filtered by the first part of the meshed element before it exits the heat exchanger.

[0042] It will be understood from the foregoing that the present invention provides a simple, easily adaptable and easily replaceable means to filter the refrigerant fluid that exit a heat exchanger accommodated on a refrigerant fluid loop so as to prevent any damage on other components of such a refrigerant fluid loop.

[0043] Obviously, the features that have been described with respect to one of the embodiments illustrated here are directly applicable to the other embodiments within the scope of the invention.

[0044] However, the invention cannot be limited to the means and configurations described and illustrated herein, and it also extends to any equivalent means or configurations and to any technically operative combination of such means. In particular, the shape and arrangement of the frame, the meshed element and the baffle(s) of the filtering baffle(s) can be modified insofar as they fulfil the functionalities described in the present document.

Claims

1. Heat exchanger (120) for a refrigerant fluid loop (100), the heat exchanger (120) comprising at least one inlet (121) configured to allow a refrigerant fluid (R) to enter in the heat exchanger (120) and at least one outlet (122) configured to allow the refrigerant fluid (R) to exit the heat exchanger (120), the heat exchanger (120) comprising at least one manifold (123) arranged at an end of a heat exchange area (125) of the heat exchanger (120), at least the outlet (122) being arranged in the at least one manifold (123), the manifold (123) extending mainly along a first axis (A1) between a first end and a second end, **characterized in that** the heat exchanger (120) comprises at least one filtering baffle (200) adapted to filter at least part of the refrigerant fluid (R), **in that** the filtering baffle (200) is arranged in the manifold (123) of the heat exchanger (120) and **in that** the filtering baffle (200) is arranged closer to the outlet (122) than to the first end or the second end of the manifold (123).

2. Heat exchanger (120) according to the preceding claim, wherein the filtering baffle (200) is arranged upstream the outlet (122) of the heat exchanger (120) with respect to a direction along which the refrigerant fluid (R) flows.

3. Heat exchanger (120) according to any of the preceding claims, wherein the filtering baffle (200) comprises at least one frame (201) and one meshed element (203), the frame (201) surrounding, at least partially, the meshed element (203).

4. Heat exchanger (120) according to any of the preceding claims, wherein a first part (213) of the meshed element (203) is configured to filter the refrigerant fluid (R) and a second part (223) of the meshed element (203) is configured to cooperate with the frame (201).

5. Heat exchanger (120) according to any of claims 3 or 4, wherein the frame (201) and the meshed element (203) both comprise a metal alloy.

6. Heat exchanger (120) according to the preceding claim, wherein the filtering baffle (200) is brazed to a wall (126) defining the manifold (123).

7. Heat exchanger (120) according to any of the preceding claims, comprising at least two filtering baffles (200).

8. Heat exchanger (120) according to the preceding claim, wherein the two filtering baffles (200) are arranged on both sides of the outlet (122) along the first axis (A1).

9. Heat exchanger (120) according to claim 3 or 4, wherein the frame (201) extends mainly along the first axis (A1) along which extends the manifold (123), this frame (201) carrying the meshed element (203), the frame (201) comprising at least one baffle (204, 205) arranged at one extremity (211, 221) of the frame (201) along the first axis (A1), said baffle

(204, 205) extending mainly along a second axis (A2) that intersects the first axis (A1).

10. Heat exchanger (120) according to the preceding claim, wherein at least the frame (201) comprises a metal alloy and wherein the frame (201) is brazed to a wall (126) defining the manifold (123).

11. Heat exchanger (120) according to any of claims 9 or 10 in combination with claim 4, wherein the first part (213) of the meshed element (203) fits the outlet (122) of the heat exchanger (120) and wherein the at least one baffle (204, 205) is adapted to guide the refrigerant fluid (R) to the heat exchange area (125) of the heat exchanger (120).

12. Heat exchanger (120) according to any of claims 9 or 10 in combination with claim 4, wherein the first part (213) of the meshed element (203) fits the outlet (122) of the heat exchanger (120) and wherein the at least one baffle (204, 205) comprises another meshed element adapted to filter the refrigerant fluid (R).

13. Heat exchanger (120) according to any of claims 9 or 10 in combination with claim 4, wherein the first part (213) of the meshed element (203) fits the outlet (122) of the heat exchanger (120) and wherein the at least one baffle (204, 205) is perforated in order to define an opening (214, 215) configured to allow the circulation of the refrigerant fluid (R).

14. Heat exchanger (120) according to any of claims 9 to 13, wherein a first baffle (204) is arranged at a first extremity (211) of the frame (201) and a second baffle (205) is arranged at a second extremity (221) of the frame (201), the first extremity (211) and the second extremity (221) being opposed to one another along the first axis (A1), the first baffle (204) extending along the second axis (A2) and the second baffle (205) extending along a third axis (A3) that intersects the first axis (A1).

15. Heat exchanger (120) according to any of the preceding claims, wherein the meshed element (203) is configured to filter particles that present a diameter bigger than 30μm.

16. Heat exchanger (120) according to any of the preceding claims, wherein the heat exchanger (120) is used as a condenser.

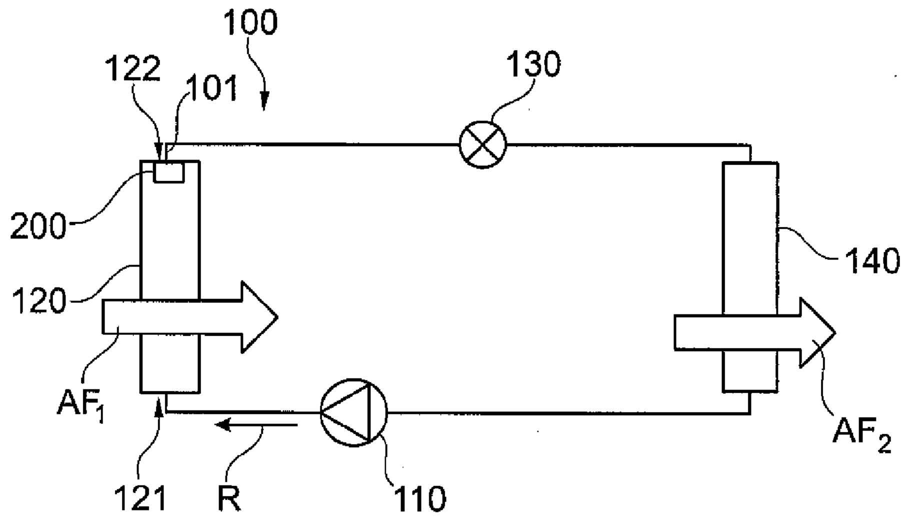
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Fig. 1

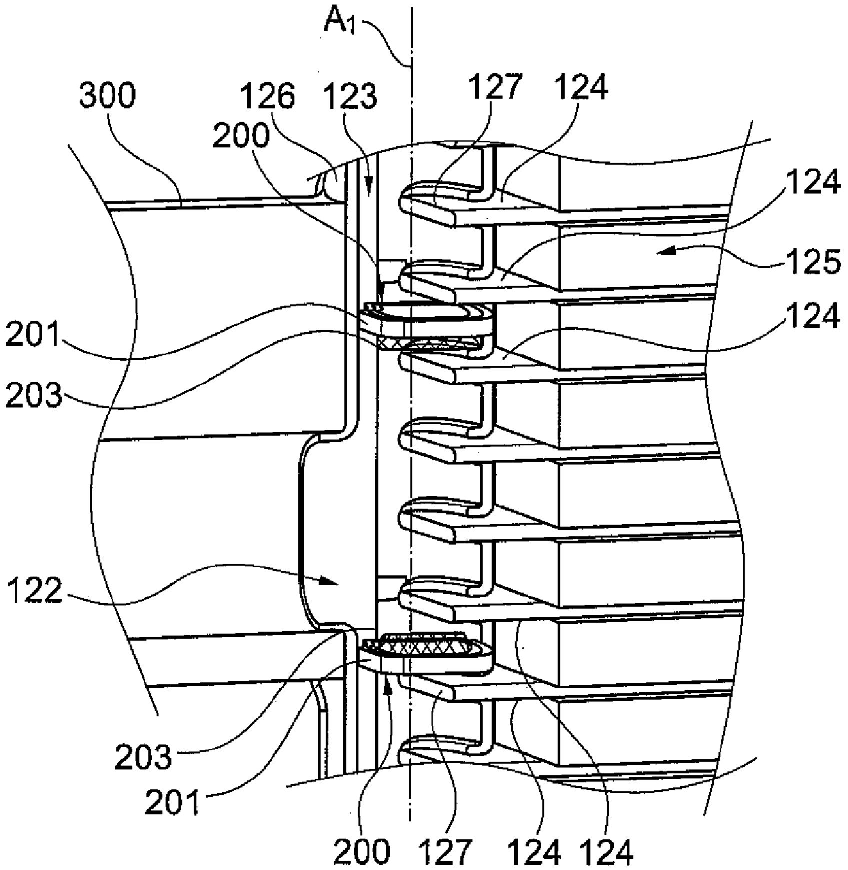
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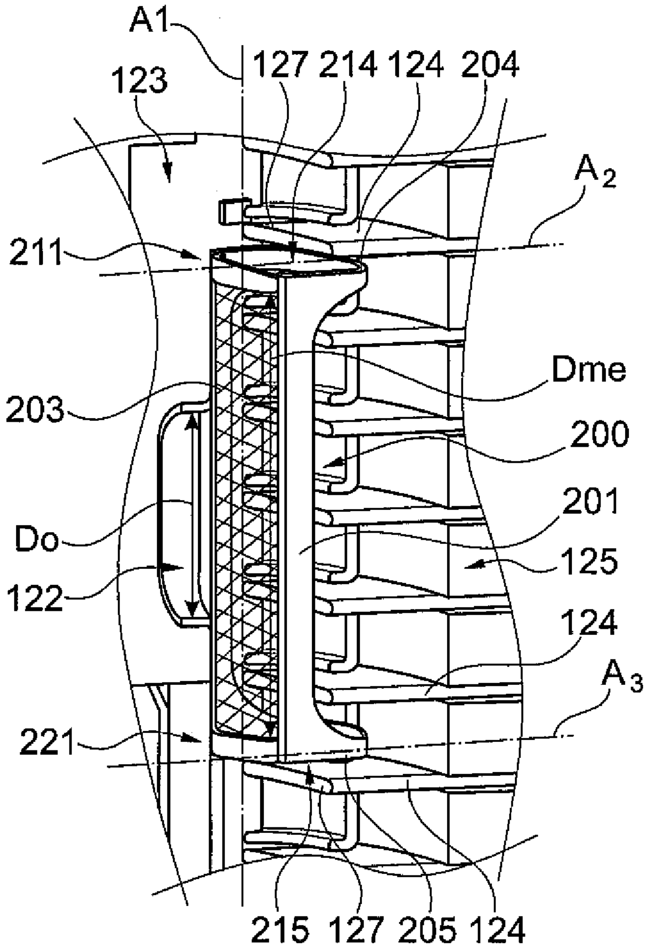
Fig. 2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A3
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Fig. 3

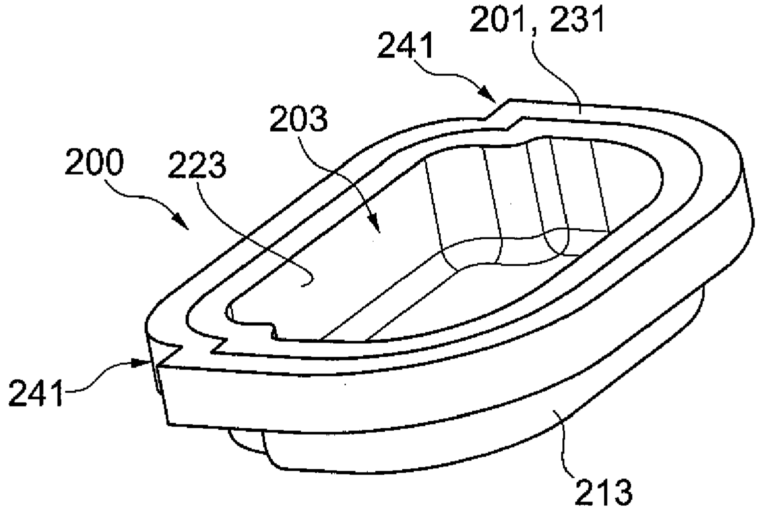
201, 231
241
203
200
223
241
213

Fig. 4

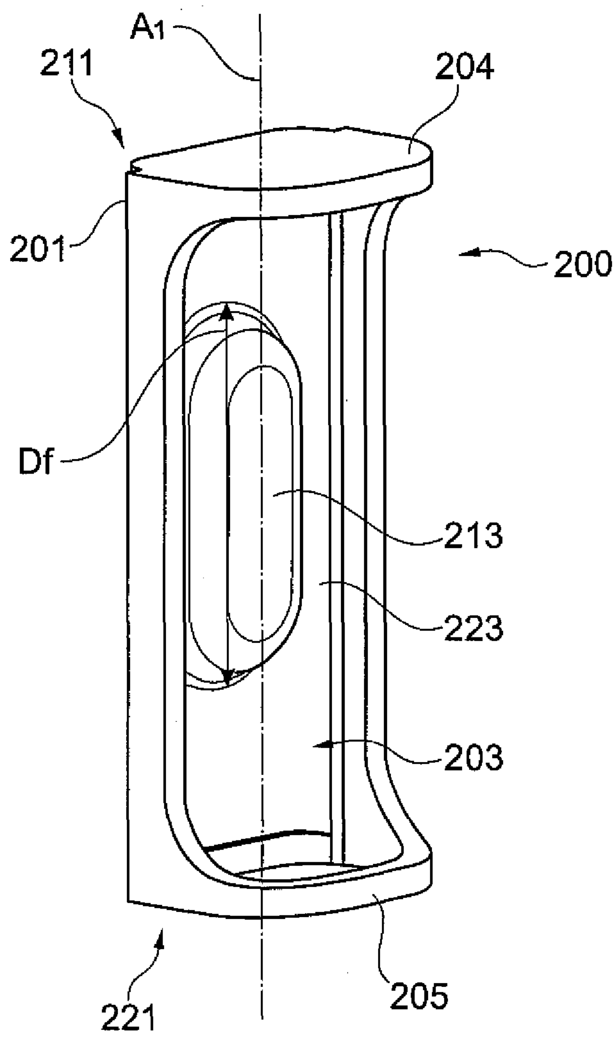

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 18 46 1643

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y A	US 6 622 517 B1 (WHITLOW GREG A [US] ET AL) 23 September 2003 (2003-09-23) * columns 1-4; figures 1,2,5 * -----	1-4,7, 15,16 5,6 8-14	INV. F25B39/04 B60H1/00 F25B43/00 F28F19/01 F28B1/06
X	JP H02 267478 A (HITACHI LTD) 1 November 1990 (1990-11-01) * abstract; figure 11 * -----	1,2,16	
Y	US 6 694 773 B1 (SNOW JAMES D [US] ET AL) 24 February 2004 (2004-02-24) * column 7, line 59 - column 8, line 9; figures 11,12 * -----	5,6	

TECHNICAL FIELDS SEARCHED (IPC)

F25B
B60H
F28F
F28B

The present search report has been drawn up for all claims

1

Place of search	Date of completion of the search	Examiner
Munich	17 June 2019	Lepers, Joachim

CATEGORY OF CITED DOCUMENTS

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17-06-2019

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 6622517	B1	23-09-2003	DE	10329297 A1	22-01-2004
			GB	2390148 A	31-12-2003
			US	6622517 B1	23-09-2003
JP H02267478	A	01-11-1990	CA	2013377 A1	05-10-1990
			JP	H02267478 A	01-11-1990
			JP	H07122533 B2	25-12-1995
US 6694773	B1	24-02-2004	NONE		

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82