



(51) International Patent Classification:

F25B 5/02 (2006.01)

F25D 11/02 (2006.01)

(21) International Application Number:

PCT/EP2021/062546

(22) International Filing Date:

11 May 2021 (11.05.2021)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

202010441261.2

22 May 2020 (22.05.2020)

CN

(71) Applicant: BSH HAUSGERÄTE GMBH [DE/DE]; Carl-

Wery-Str. 34, 81739 München (DE).

(72) Inventors: HUANG, Yegui; 208 Yao xin Road, Nan-

jing, Jiangsu 210046 (CN). ZHANG, Ming; Sudetenweg 6,

89075 Ulm (DE). ZHU, Qiwu; West district, Tian'andushi

garden, Chuzhou City, Anhui 239000 (CN).

(81) Designated States (unless otherwise indicated, for every

kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,

CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,

DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,

HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN,

KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD,

ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO,
NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW,
SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every

kind of regional protection available): ARIPO (BW, GH,

GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,

UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,

TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,

EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,

MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,

TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,

KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: DRYING ASSEMBLY AND REFRIGERATION DEVICE

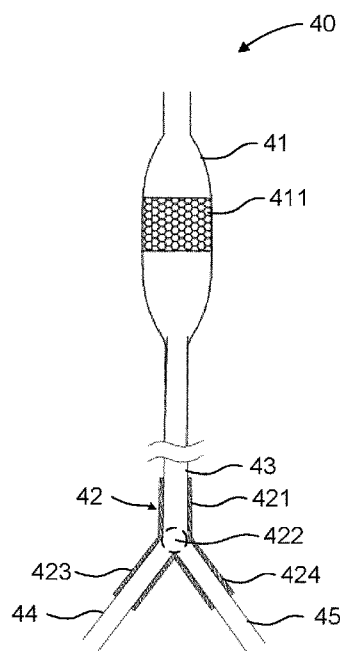


FIG. 3

(57) Abstract: Embodiments of the present invention provide a drying assembly and a refrigeration device. The drying assembly includes: a drying tube, adapted to dry a refrigerant; and a splitter, in communication with the drying tube and dividing the refrigerant from the drying tube, so that the refrigerant simultaneously flows into at least two output branches in a liquid phase state, a gas phase state, or a hybrid gas-liquid state. Compared with the prior art, the drying assembly provided in the embodiments of the present invention may make the refrigerant simultaneously flow to the at least two output branches in the same phase, so as to ensure that the refrigerant is evenly distributed in the at least two output branches, thereby balancing the refrigeration effect of each compartment in the refrigeration device.



DRYING ASSEMBLY AND REFRIGERATION DEVICE

BACKGROUND

Technical Field

The present invention relates to the field of household appliance technologies, and in particular, to a drying assembly and a refrigeration device.

Related Art

In an existing refrigeration device, a refrigerant is usually filtered by a drying tube, then divided by a plurality of capillary tubes, and finally enters different compartments for refrigeration. However, when the refrigerant enters the plurality of capillary tubes, distribution of the refrigerant in the capillary tubes is often very unbalanced. Some capillary tubes are mainly filled with the liquid-phase refrigerant, while some other capillary tubes are mainly filled with the gas-phase refrigerant. As a result, refrigeration effects of the compartments in the refrigeration device are unbalanced.

SUMMARY

An objective of embodiments of the present invention is to provide an improved drying assembly and refrigeration device.

The drying assembly provided in the embodiments of the present invention includes: a drying tube, adapted to dry a refrigerant; and a splitter, in communication with the drying tube and dividing the refrigerant from the drying tube, so that the refrigerant simultaneously flows into at least two output branches in a liquid phase state, a gas phase state, or a hybrid gas-liquid state.

Optionally, the splitter includes an input end and at least two output ends in communication with each other, the input end is in communication with the drying tube, and the at least two output ends are respectively in communication with the at least two output branches.

Optionally, at least a part of at least one output end of the at least two output ends is formed by at least one output branch of the at least two output branches.

Optionally, cross sections of the at least two output branches are the same.

Optionally, the splitter further includes a communicating junction in communication with the input end and at least two output ends, and the refrigerant from the drying tube flows into the communicating junction through the input end and simultaneously flows into the at least two output ends through the communicating junction.

Optionally, a volume of the communicating junction is set so small that when the communicating junction is filled up with the refrigerant from the drying tube, the refrigerant is only in a liquid state, a gas state, or a uniform gas-liquid mixed state.

Optionally, the volume of the communicating junction is less than or equal to 0.5 cubic centimeters.

Optionally, the input end of the splitter is in communication with the drying tube through an input branch.

Optionally, a cross-sectional area or tube diameter of the input branch or the input end is set so small that when the refrigerant from the drying tube flows through the input branch or the input end, the refrigerant is only in a liquid state, a gas state, or a uniform gas-liquid mixed state.

Optionally, the cross-sectional area is less than or equal to 0.09π square centimeters.

Optionally, the cross-sectional area is less than or equal to 0.01π square centimeters.

Optionally, the input end is formed by at least a part of the input branch.

Optionally, the splitter includes two output branches, and the splitter is in a shape of an inverted Y or an inverted T.

Optionally, the splitter comprises tube sections defining an input end and at least two output ends.

Optionally, a branch is formed of a piece of capillary tube.

Optionally, the outer diameter of the input branch substantially matches the inner diameter of the input end.

Optionally, the outer diameter of an output branch substantially matches the inner diameter of an output end.

Optionally, a section of the input branch overlaps a section of input end along length direction.

Optionally, a section of each output branches overlaps a section of an output end along length direction. An advantage of this embodiment is that the splitter can be formed and tested independently from an assembly line connecting ends and branches, such that the junction is free of clogging material. Another advantage is that the splitter and the branches can be soldered in an assembly line without risk of solder material clogging the junction.

An embodiment of the present invention further provides a refrigeration device, including a refrigeration system. The refrigeration system is provided with the foregoing drying assembly.

Compared with the prior art, the technical solutions of the embodiments of the present invention have the following beneficial effects. For example, the drying assembly provided in the embodiments of the present invention may make the refrigerant simultaneously flow to the at least two output branches in the same phase, so as to ensure that the refrigerant is evenly distributed in the at least two output branches, thereby balancing the refrigeration effect of each compartment in the refrigeration device.

In another example, the input branch, and the input end and the communicating junction of the splitter provided in the embodiments of the present invention may be set so small that when the refrigerant from the drying tube flows through the input branch, the input end, and the communicating junction, the refrigerant is only in a liquid state, a gas state, or a uniform gas-liquid mixed state and no phase change occurs, so that the refrigerant may simultaneously flow to the at least two output branches in the same phase.

In another example, the drying assembly has a simple structure and low costs, and is universal for refrigeration devices.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic structural diagram of a refrigeration device according to an embodiment of the present invention;

FIG. 2 is a schematic diagram of a refrigeration loop of a refrigeration system according to an embodiment of the present invention;

FIG. 3 is a schematic structural diagram of a drying assembly according to an embodiment of the present invention;

FIG. 4 is another schematic structural diagram of a drying assembly according to an embodiment of the present invention;

FIG. 5 is a schematic structural diagram of a splitter according to an embodiment of the present invention;

FIG. 6 is another schematic structural diagram of a splitter according to an embodiment of the present invention;

FIG. 7 is a schematic diagram of a first working state of a drying assembly according to an embodiment of the present invention;

FIG. 8 is a schematic diagram of a second working state of a drying assembly according to an embodiment of the present invention;

FIG. 9 is a schematic diagram of a third working state of a drying assembly according to an embodiment of the present invention; and

FIG. 10 is a schematic diagram of a fourth working state of a drying assembly according to an embodiment of the present invention.

DETAILED DESCRIPTION

In an existing refrigeration device, when a refrigerant enters a plurality of capillary tubes after filtered by a drying tube, distribution of the refrigerant in the capillary tubes is often very unbalanced. Some capillary tubes are mainly filled with the liquid-phase

refrigerant, while some other capillary tubes are mainly filled with the gas-phase refrigerant. As a result, refrigeration effects of the compartments in the refrigeration device are unbalanced.

Unlike the prior art, in the technical solutions provided in the embodiments of the present invention, a drying assembly includes: a drying tube, adapted to dry a refrigerant; and a splitter, in communication with the drying tube and dividing the refrigerant from the drying tube, so that the refrigerant simultaneously flows into at least two output branches in a liquid phase state, a gas phase state, or a hybrid gas-liquid state.

Compared with the prior art, the drying assembly provided in the embodiments of the present invention may make the refrigerant simultaneously flow to the at least two output branches in the same phase, so as to ensure that the refrigerant is evenly distributed in the at least two output branches, thereby balancing the refrigeration effect of each compartment in a refrigeration device.

In the embodiments of the present invention, the refrigeration device may include at least two compartments. For ease of description, two compartments are taken as an example for illustration below.

To make the objectives, features, and beneficial effects of the embodiments of the present invention more comprehensible, the specific embodiments of the present invention are described in detail with reference to the accompanying drawings.

FIG. 1 is a schematic structural diagram of a refrigeration device according to an embodiment of the present invention.

As shown in FIG. 1, a refrigeration device 1 includes a first compartment 10 and a second compartment 20.

In this embodiment of the present invention, the refrigeration device 1 further includes a refrigeration system.

FIG. 2 is a schematic diagram of a refrigeration loop of a refrigeration system according to an embodiment of the present invention.

As shown in FIG. 2, a refrigeration system 30 includes a compressor 31, a condenser 32, evaporators, and a drying assembly 40.

Specifically, the compressor 31, the condenser 32, the drying assembly 40, the evaporators, and the compressor 31 are connected in sequence to form a refrigeration loop applicable to circulation of a refrigerant.

In the refrigeration loop, the compressor 31 is adapted to compress a low-temperature and low-pressure gas refrigerant from the evaporators into a high-temperature and high-pressure gas refrigerant, the condenser 32 is adapted to condense the high-temperature and high-pressure gas refrigerant from the compressor 31 into a low-temperature and high-pressure liquid refrigerant, the drying assembly 40 is adapted to remove moisture and impurities from the low-temperature and high-pressure liquid refrigerant from the condenser 32 and throttle and depressurize the low-temperature and high-pressure liquid refrigerant to a low-temperature and low-pressure liquid refrigerant, and the evaporators are adapted to evaporate the low-temperature and low-pressure liquid refrigerant from the drying assembly 40 into a low-temperature and low-pressure gas refrigerant.

In the process of evaporating the low-temperature and low-pressure liquid refrigerant into the low-temperature and low-pressure gas refrigerant, heat inside the refrigeration device 1 may be constantly absorbed, thereby achieving refrigeration inside the refrigeration device 1.

In some specific examples, the evaporators include a first evaporator 33 adapted to refrigerate the first compartment 10 and a second evaporator 34 adapted to refrigerate the second compartment 20. The first evaporator 33 and the second evaporator 34 are connected in parallel and connected between the drying assembly 40 and the compressor 31 in series.

Therefore, the refrigeration loop may include a first refrigeration loop adapted to refrigerate the first compartment 10 and a second refrigeration loop adapted to refrigerate the second compartment 20. The first refrigeration loop is formed by the compressor 31, the condenser 32, the drying assembly 40, the first evaporator 33, and

the compressor 31 connected in sequence. The second refrigeration loop is formed by the compressor 31, the condenser 32, the drying assembly 40, the second evaporator 34, and the compressor 31 connected in sequence.

In the process of evaporating the low-temperature and low-pressure liquid refrigerant into the low-temperature and low-pressure gas refrigerant in the first refrigeration loop, heat inside the first compartment 10 may be constantly absorbed, thereby achieving refrigeration inside the first compartment 10.

In the process of evaporating the low-temperature and low-pressure liquid refrigerant into the low-temperature and low-pressure gas refrigerant in the second refrigeration loop, heat inside the second compartment 20 may be constantly absorbed, thereby achieving refrigeration inside the second compartment 20.

Referring to FIG. 2, the refrigeration system 30 may further include valves connected between the drying assembly 40 and the evaporators. The valves are adapted to adjust a flow rate of the refrigerant flowing through the drying assembly 40 to the evaporators, and/or are adapted to control opening or close of the refrigeration loop.

In some specific examples, the valves may include a first valve 35 disposed in the first refrigeration loop and a second valve 36 disposed in the second refrigeration loop.

FIG. 3 is a schematic structural diagram of a drying assembly according to an embodiment of the present invention, and FIG. 4 is another schematic structural diagram of a drying assembly according to an embodiment of the present invention.

As shown in FIG. 3 and FIG. 4, the drying assembly 40 provided in the embodiments of the present invention includes a drying tube 41 and a splitter 42.

Specifically, the drying tube 41 is provided therein with a desiccant 411. The desiccant 411 is adapted to dry the refrigerant from the condenser 32 and remove impurities of the refrigerant.

The splitter 42 is in communication with the drying tube 41 and is adapted to divide the refrigerant from the drying tube 41, so that the refrigerant simultaneously flows into at least two output branches in a liquid phase state, a gas phase state, or a hybrid

gas-liquid state.

Referring to FIG. 3 and FIG. 4, the splitter 42 includes an input end 421 and at least two output ends in communication with each other. The input end 421 is in communication with the drying tube 41, and the at least two output ends are respectively in communication with the at least two output branches.

In some specific examples, at least a part of at least one output end of the at least two output ends may be formed by at least one output branch of the at least two output branches.

For example, each output end may be integrally formed by an output branch in communication with thereof. That is, an output end and an output branch in communication with each other may be the same tube that is integrally formed.

In some other specific preferred examples, cross sections of the at least two output branches are the same. In this way, frictional resistances between tube walls and the refrigerant when the refrigerant flows through the at least two output branches may be the same, so as to prevent the frictional resistances between the tube walls and the refrigerant from causing different influences on the flow velocity of the refrigerant flowing through the at least two output branches.

In the embodiments of the present invention, a specific quantity of the at least two output ends and a specific quantity of the at least two output branches are both related to a quantity of compartments of the refrigeration device 1.

Specifically, each of the at least two output ends is connected to an output branch, each of the at least two output branches is connected to an evaporator, and each evaporator is adapted to refrigerate a compartment of the refrigeration device 1.

Referring to FIG. 3, in some specific examples, the at least two output branches include a first output branch 44 and a second output branch 45. The at least two output ends include a first output end 423 and a second output end 424. The first output end 423 is in communication with the first output branch 44. The second output end 424 is in communication with the second output branch 45.

Referring to FIG. 4, in some other specific examples, the at least two output branches include a first output branch 44, a second output branch 45, and a third output branch 46. The at least two output ends include a first output end 423, a second output end 424, and a third output end 425. The first output end 423 is in communication with the first output branch 44, the second output end 424 is in communication with the second output branch 45, and the third output end 425 is in communication with the third output branch 46.

To facilitate description and understanding, a drying assembly including two output ends is taken as an example for illustration below.

FIG. 5 is a schematic structural diagram of a splitter according to an embodiment of the present invention.

As shown in FIG. 5, the splitter 42 including the first output end 423 and the second output end 424 may be in a shape of an inverted Y.

FIG. 6 is another schematic structural diagram of a splitter according to an embodiment of the present invention.

As shown in FIG. 6, the splitter 42 including the first output end 423 and the second output end 424 may alternatively be in a shape of an inverted T.

Referring to FIG. 3 again, the drying assembly 40 may further include an input branch 43. Two ends of the input branch 43 are respectively in communication with the drying tube 41 and the input end 421 of the splitter 42. The input branch 43 is adapted to allow the refrigerant from the drying tube 41 to flow into the splitter 42 through the input branch 43.

In some specific examples, the input end 421 of the splitter 42 may further be formed by at least a part of the input branch 43.

For example, the input end 421 of the splitter 42 may be entirely formed by using the input branch 43. That is, the input end 421 and the input branch 43 in communication with each other may be the same tube that is integrally formed.

In an ideal state, the refrigerant flowing through the drying tube 41 should remain

in a single liquid state. However, in actual applications, due to insufficient condensation, an insufficient amount of the refrigerant and other factors, a gas-state refrigerant flowing through the drying tube 41 may occur.

In the embodiments of the present invention, a cross-sectional area or tube diameter of the input branch 43 is set so small that when the refrigerant from the drying tube 41 flows through the input branch 43, the refrigerant is only in a liquid state, a gas state, or a uniform gas-liquid mixed state.

In some specific preferred examples, the cross-sectional area of the input branch 43 may be less than or equal to 0.09π square centimeters.

Further, the cross-sectional area of the input branch 43 may be less than or equal to 0.01π square centimeters.

In the embodiments of the present invention, a cross-sectional area or tube diameter of the input end 421 is also set so small that when the refrigerant from the drying tube 41 flows through the input end 421, the refrigerant is only in a liquid state, a gas state, or a uniform gas-liquid mixed state.

In some specific preferred examples, the cross-sectional area of the input end 421 may be less than or equal to 0.09π square centimeters.

Further, the cross-sectional area of the input end 421 may be less than or equal to 0.01π square centimeters.

Referring to FIG. 3 again, the splitter 42 further includes a communicating junction 422 in communication with the input end 421, the first output end 423, and the second output end 424. The refrigerant from the drying tube 41 flows into the communicating junction 422 through the input end 421, and simultaneously flows into the first output end 423 and the second output end 424 through the communicating junction 422.

In the embodiments of the present invention, a volume of the communicating junction 422 is set so small that when the communicating junction 422 is filled up with the refrigerant 50 from the drying tube 41, the refrigerant is only in a liquid state, a gas state, or a uniform gas-liquid mixed state.

In some specific preferred examples, the volume of the communicating junction 422 may be set to less than or equal to 0.5 cubic centimeters.

According to the foregoing technical solutions provided in the embodiments of the present invention, when the refrigerant from the drying tube 41 flows through the input branch 43, the input end 421, and the communicating junction 422, the refrigerant is only in a liquid state, a gas state, or a uniform gas-liquid mixed state and no phase change occurs, so that the refrigerant can simultaneously flow to the at least two output branches in the same phase, ensuring that the refrigerant is evenly distributed in the at least two output branches, thereby balancing the refrigeration effect of each compartment in the refrigeration device 1.

In the embodiments of the present invention, the same phase includes a single liquid state, a single gas state, or a gas-liquid mixed state.

In the embodiments of the present invention, the phase transition means that the refrigerant changes from a liquid state to a gas state, or the refrigerant changes from a gas state to a liquid state.

FIG. 7 to FIG. 10 are schematic diagrams of four different working states of a drying assembly according to the embodiments of the present invention. FIG. 7 to FIG. 10 may show schematic timing diagrams of the drying assembly 40 in a continuous working state.

In some specific examples, from the example shown in FIG. 7 to the example shown in FIG. 10, the refrigerant 50 in the refrigeration loop decreases sequentially.

In the embodiments of the present invention, when the refrigerant in the refrigeration loop is sufficient, the refrigerant 50 flowing into the drying tube 41 is also sufficient. When the refrigerant in the refrigeration loop is insufficient, the refrigerant 50 flowing into the drying tube 41 is also insufficient.

Referring to FIG. 7, when the refrigeration loop starts to work, the refrigerant 50 flows into the input branch 23 after drying and impurity removal by the drying tube 41.

In the embodiments of the present invention, because a cross-sectional area or tube

diameter of the input branch 43 may be set to be sufficiently small, when the refrigerant from the drying tube 41 flows through the input branch 43, the refrigerant may be only in a liquid state, a gas state, or a uniform gas-liquid mixed state and no phase change occurs.

Referring to FIG. 8, the refrigerant 50 from the drying tube 41 flows through the input branch 43 and then enters the input end 421 and the communicating junction 422 in sequence.

In the embodiments of the present invention, because a cross-sectional area or tube diameter of the input end 421 may be set to be sufficiently small, when the refrigerant from the drying tube 41 flows through the input end 421, the refrigerant may be only in a liquid state, a gas state, or a uniform gas-liquid mixed state and no phase change occurs.

Referring to FIG. 9, the refrigerant 50 from the drying tube 41 flows through the input branch 23 and the input end 421 in sequence, and then enters the communicating junction 422 and fills the communicating junction 422.

In the embodiments of the present invention, because a volume of the communicating junction 422 may be set to be sufficiently small, when the communicating junction 422 is filled up with the refrigerant 50 from the drying tube 41, the refrigerant may be only in a liquid state, a gas state, or a uniform gas-liquid mixed state and no phase change occurs.

Referring to FIG. 10, the refrigerant 50 flowing through the communicating junction 422 simultaneously flows into the first output branch 44 and the second output branch 45 in the same phase.

In this way, it may be ensured that the refrigerant 50 is evenly distributed in the first output branch 44 and the second output branch 45, so that refrigeration effects of the first compartment 10 and the second compartment 20 in the refrigeration device 1 are balanced.

Although specific implementations are described above, the implementations are not intended to limit the scope disclosed in the present invention, even if only a single

implementation is described relative to specific features. The feature examples provided in the present invention are intended to be illustrative rather than limiting, unless different expressions are made. During specific implementation, according to an actual requirement, in a technically feasible case, the technical features of one or more dependent claims may be combined with the technical features of the independent claims, and the technical features from the corresponding independent claims may be combined in any appropriate manner instead of using just specific combinations listed in the claims.

Although the present invention is disclosed above, the present invention is not limited thereto. A person skilled in the art can make various changes and modifications without departing from the spirit and the scope of the present invention. Therefore, the protection scope of the present invention should be subject to the scope defined by the claims.

CLAIMS

What is claimed is:

1. A drying assembly (40), characterized by comprising:
a drying tube (41), adapted to dry a refrigerant (50); and
a splitter (42), in communication with the drying tube (41) and dividing the refrigerant (50) from the drying tube (41), so that the refrigerant (50) simultaneously flows into at least two output branches (44, 45, 46) in a liquid phase state, a gas phase state, or a hybrid gas-liquid state.
2. The drying assembly (40) according to claim 1, characterized in that the splitter (42) comprises an input end (421) and at least two output ends (423, 424, 425) in communication with each other, the input end (421) is in communication with the drying tube (41), and the at least two output ends (423, 424, 425) are respectively in communication with the at least two output branches (44, 45, 46).
3. The drying assembly (40) according to claim 2, characterized in that at least a part of at least one output end (423, 424, 425) of the at least two output ends (423, 424, 425) is formed by at least one output branch (44, 45, 46) of the at least two output branches (44, 45, 46).
4. The drying assembly (40) according to any one of claims 1 to 3, characterized in that cross sections of the at least two output branches (44, 45, 46) are the same.
5. The drying assembly (40) according to claim 2, characterized in that the splitter (42) further comprises a communicating junction (422) in communication with the input end (421) and at least two output ends (423, 424, 425), and the refrigerant (50) from the drying tube (41) flows into the communicating junction (422) through the input end (421) and simultaneously flows into the at least two output ends (423, 424, 425) through the communicating junction (422).
6. The drying assembly (40) according to claim 5, characterized in that a volume of the communicating junction (422) is set so small that when the communicating junction (422) is filled up with the refrigerant (50) from the drying tube (41), the refrigerant is

only in a liquid state, a gas state, or a uniform gas-liquid mixed state.

7. The drying assembly (40) according to claim 6, characterized in that the volume of the communicating junction (422) is less than or equal to 0.5 cubic centimeters.

8. The drying assembly (40) according to any one of claims 5 to 7, characterized in that the input end (421) of the splitter (42) is in communication with the drying tube (41) through an input branch (43).

9. The drying assembly (40) according to claim 8, characterized in that a cross-sectional area or tube diameter of the input branch (43) or the input end (421) is set so small that when the refrigerant (50) from the drying tube (41) flows through the input branch or the input end, the refrigerant is only in a liquid state, a gas state, or a uniform gas-liquid mixed state.

10. The drying assembly (40) according to claim 9, characterized in that the cross-sectional area is less than or equal to 0.09π square centimeters.

11. The drying assembly (40) according to claim 10, characterized in that the cross-sectional area is less than or equal to 0.01π square centimeters.

12. The drying assembly (40) according to any one of claims 8 to 11, characterized in that the input end (421) is formed by at least a part of the input branch (43).

13. The drying assembly (40) according to any one of claims 1 to 12, characterized in that the splitter (42) comprises two output branches (44, 45), and the splitter (42) is in a shape of an inverted Y or an inverted T.

14. The drying assembly (40) according to any one of claims 1 to 13, characterized in that the splitter (42) comprises tube sections defining an input end (421) and at least two output ends (423, 424).

15. A refrigeration device (1), comprising a refrigeration system (30), characterized in that the refrigeration system (30) is provided with the drying assembly (40) according to any one of claims 1 to 13.

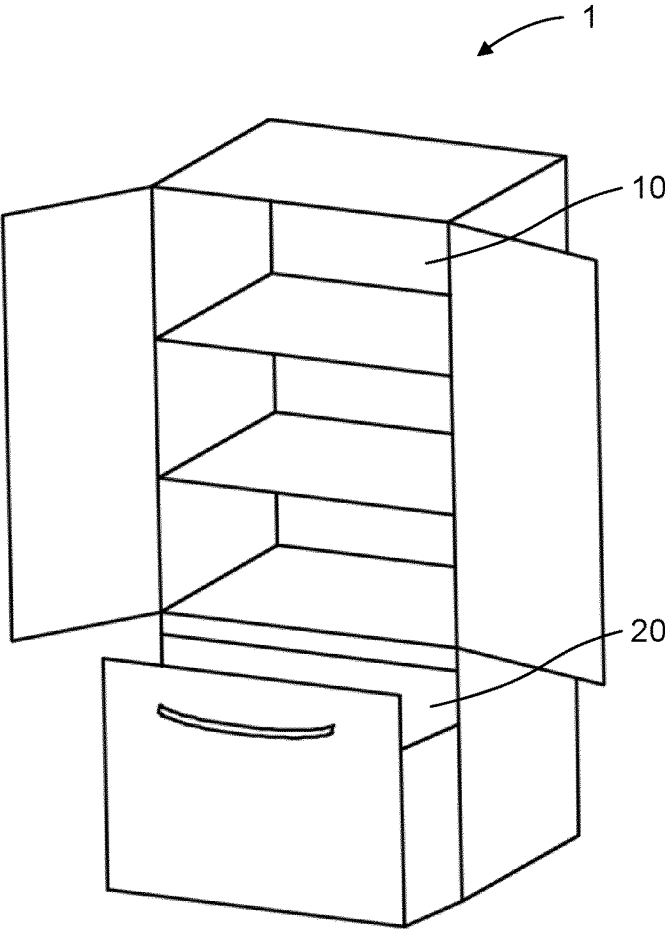


FIG. 1

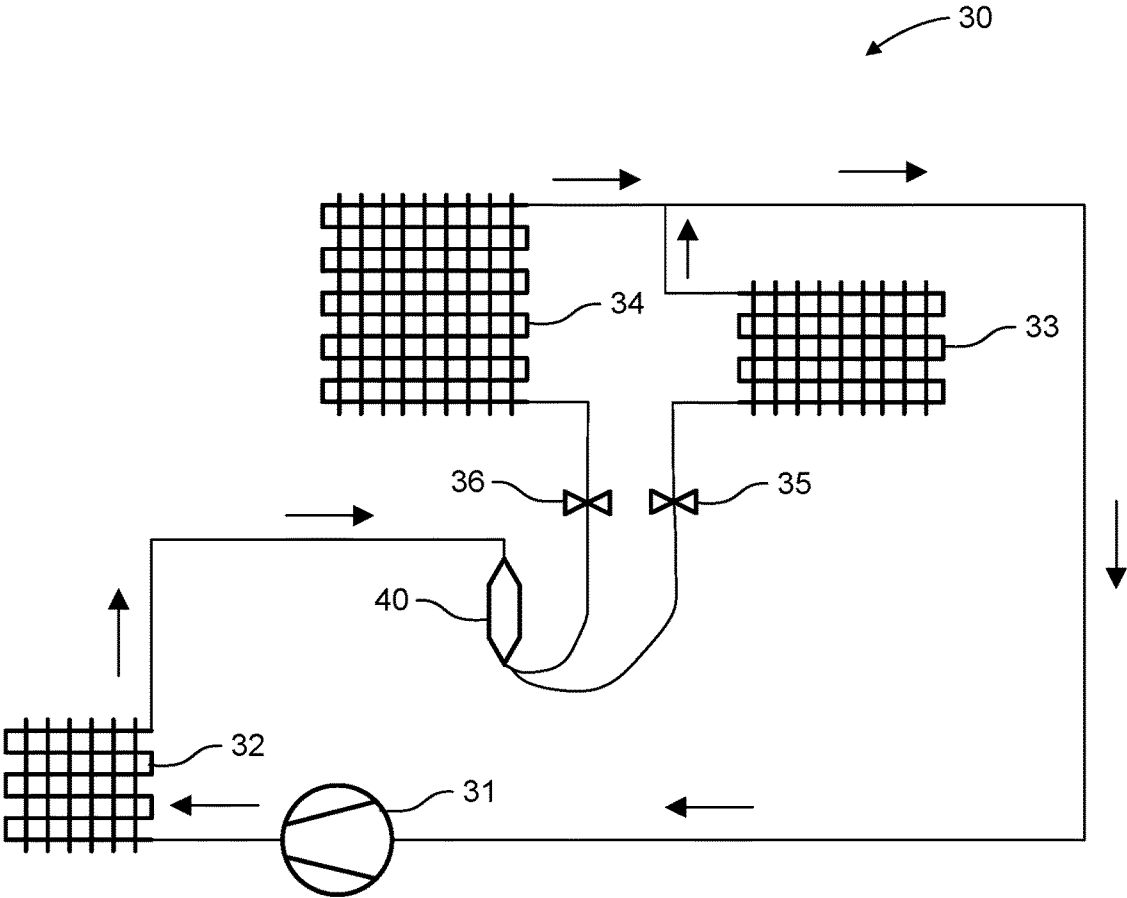


FIG. 2

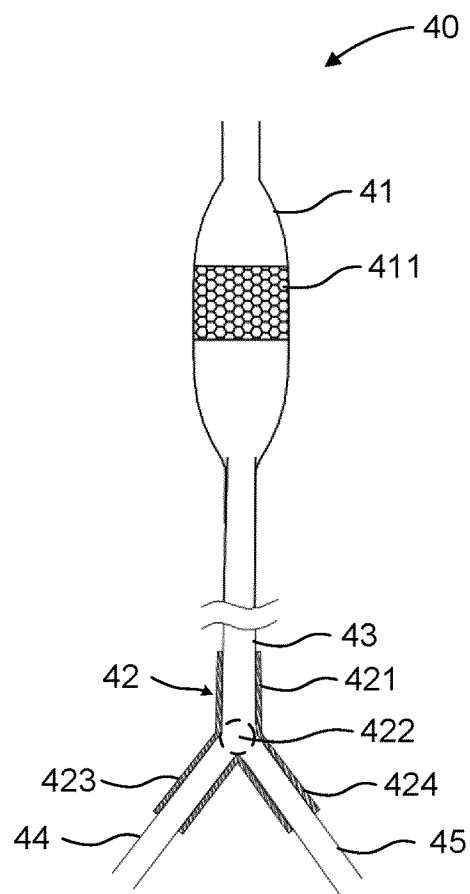


FIG. 3

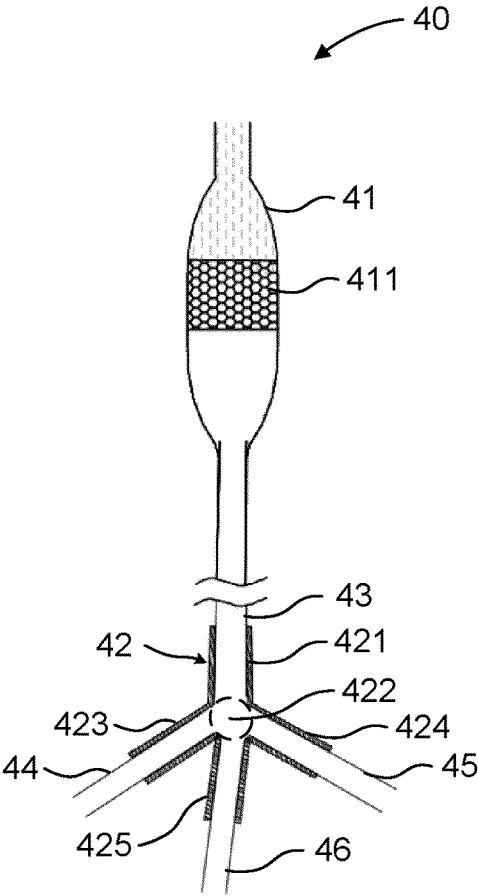


FIG. 4

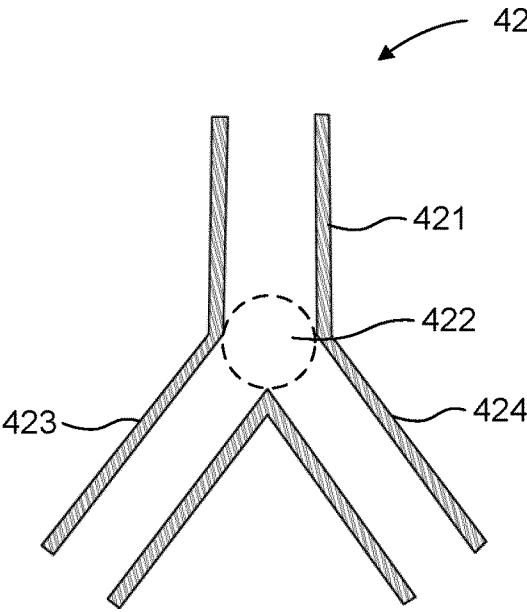


FIG. 5

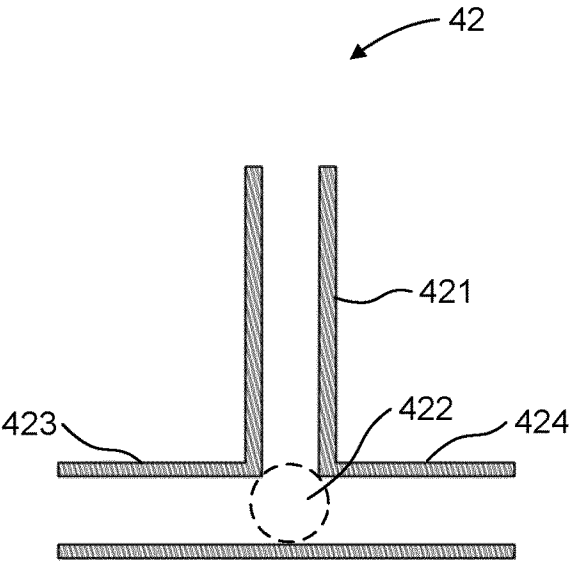


FIG. 6

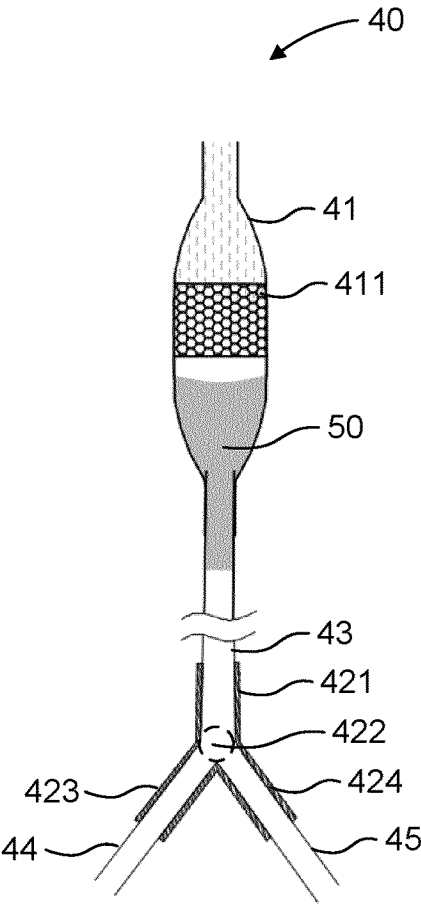


FIG. 7

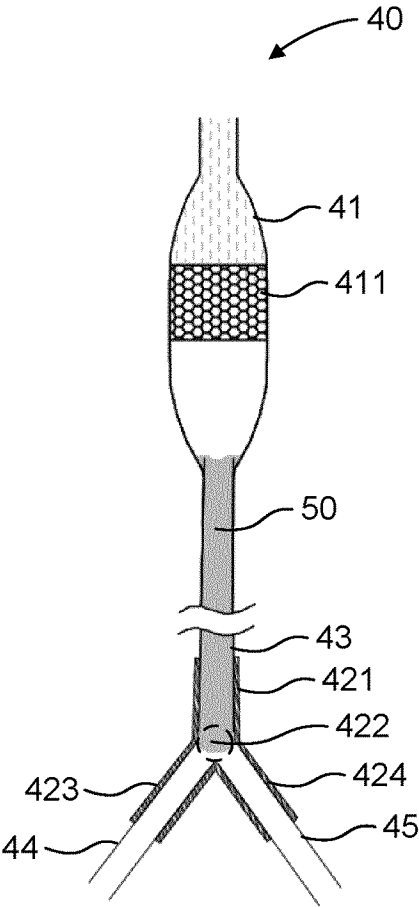


FIG. 8

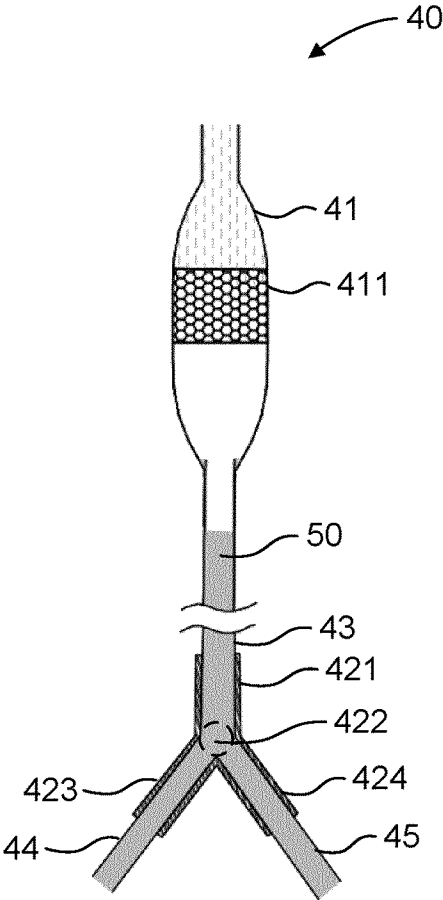


FIG. 9

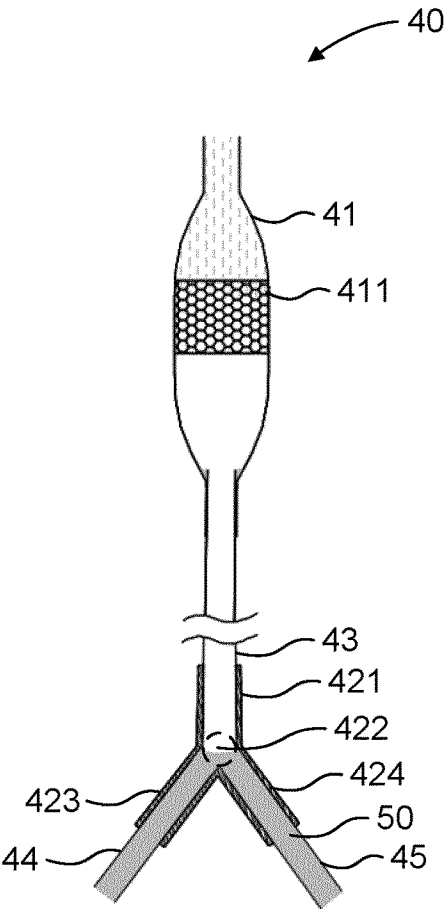


FIG. 10

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2021/062546

A. CLASSIFICATION OF SUBJECT MATTER
INV. F25B5/02 F25D11/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F25B F25D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 086 555 A (ELECTROLUX AB) 12 May 1982 (1982-05-12) column 1, line 5 - column 2, line 100; figure 1	1-15
X	----- US 2015/121927 A1 (LEE SANGBONG [KR] ET AL) 7 May 2015 (2015-05-07) paragraphs [0027] - [0038], [0126]; figures 1, 12	1-15
X	----- KR 2005 0003772 A (WINIAMANDO INC) 12 January 2005 (2005-01-12) page 2; figures 1, 2 -----	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

30 July 2021

Date of mailing of the international search report

09/08/2021

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Amous, Moez

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2021/062546

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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			FR 2493491 A1 07-05-1982
			GB 2086555 A 12-05-1982
			SE 432663 B 09-04-1984

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			US 2015121927 A1 07-05-2015

KR 20050003772	A	12-01-2005	NONE
