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(54) **IMPROVED FLUID DISTRIBUTOR**

(57) A fluid distributor assembly, in particular for a refrigerant fluid, for use in a heat exchanger comprising:
- a head unit coupled to a tube plate and comprising an inlet configured to receive the fluid fed into the exchanger;
- a plate-shaped lamination unit comprising one or more openings to allow the inlet fluid to pass therethrough,
wherein the head unit is provided with a seat adapted to receive said lamination unit in such a way that the fluid sequentially crosses a first collecting chamber and a second mixing chamber, and wherein direction means provided with an impact surface is configured so as to direct the fluid outflowing from the lamination unit along a substantially orthogonal direction with respect to a fluid inlet direction into apertures of the tube plate.

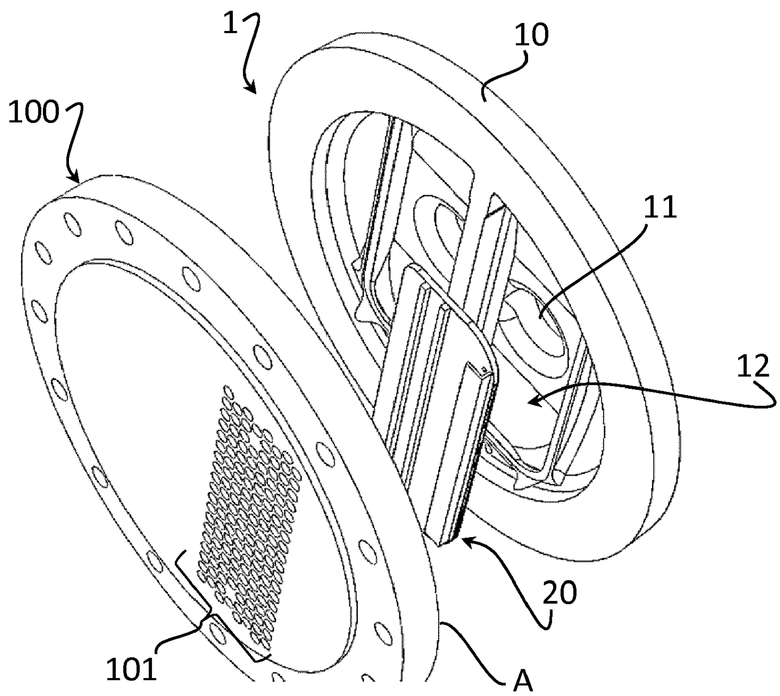

Fig. 1

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Description

Technical Field of the Invention

[0001] The present invention relates to the field of aeraulic systems, in particular of conditioning systems.

[0002] The present invention, more specifically, relates to a fluid distributor assembly suitable for use in a heat exchanger, in particular an evaporator.

Background

[0003] Heat exchangers used in conditioning systems are devices that, in the most general terms, comprise a casing - or mantle - inside which is housed a tube bundle. Within the tube bundle, a service fluid flows to exchange heat with a process fluid at a different temperature.

[0004] In some heat exchangers, such as evaporators, the service fluid is typically an evaporating refrigerant fluid that circulates inside the tube bundle and cools the process fluid. The latter passes externally to the tube bundle housed within the mantle, passing through the heat exchanger.

[0005] Generally, a supply pipe feeds the heat exchanger with refrigerant fluid, engaging it at a head unit - or manifold - thereof. In order to canalize the refrigerant fluid into the tube bundle, the exchanger is generally equipped with a dedicated distributor device.

[0006] Structurally, the known distributor devices typically provide a plurality of fed conduits each engaging a respective tubular element of the tube bundle. Solutions of this type however have the drawback of being constructively complex due to expensive and sophisticate mechanical machining of the fed conduits connecting structure in order to maintain desired outlet conditions while conveying the fluid in each tube of the bundle.

[0007] Moreover, such solution often does not guarantee uniform distribution of the flow of refrigerant fluid in the tube bundle, significantly decreasing the performance of the heat exchanger in which the above mentioned type of distributors are mounted.

Summary of the Invention

[0008] The technical problem placed and solved by the present invention is then to provide a fluid distributor assembly, in particular a refrigerant fluid, within the tube bundle of a heat exchanger that allows to overcome the above-illustrated drawbacks with reference to the prior art.

[0009] This problem is solved by a distributor assembly according to claim 1.

[0010] Additional preferred features of the present invention are defined in the depending claims.

[0011] The fluid distributor assembly according to present invention is structurally simple and economical to be realized, due to the presence of a lamination unit housed in a seat of the head unit in such a way that, a mixing chamber of refrigerant fluid that feeds the latter is defined.

[0012] More in detail, the fluid distributor assembly comprises direction means provided with an impact surface and configured so as to direct the fluid outflowing from said lamination unit along a substantially orthogonal direction with respect to a fluid inlet direction into apertures of the tube plate engaging the tube bundle of the exchanger.

[0013] This solution overcome the need to provide complex, tricky and high-costly working process of single-engagements conduits intended to engage a respective tubular element of the tube bundle to feed each tube individually.

[0014] Furthermore, the presence of said direction means allows to create fluid agitation conditions in the mixing chamber prior to its entry into the tube bundle.

[0015] Particularly, said orthogonal flow to the fluid inlet direction into the tube plate is generated so as to sequentially lick the tube plate apertures and to allow each tube to suck the required amount of refrigerant, according to a kind of dynamical "self-regulation".

[0016] In this way, a uniform distribution of the fluid flow into the tube bundle is favored and the efficiency of the exchanger in which the fluid distributor assembly according to the present invention is mounted significantly improves.

[0017] Other advantages, features and operation modes of the present invention will be made apparent from the following detailed description of some embodiments thereof, given by way of example and not for limitative purposes.

Brief Description of the Figures

[0018] Reference will be made to the figures of the annexed drawings, wherein:

- figure 1 shows an exploded view of a preferred embodiment of a fluid distributor assembly according to the present invention;

- figure 2 shows an enlarged view of a section of figure 1, wherein a first component - the lamination unit - of the distributor assembly is partially housed in the latter;

- figure 3 shows a side view of a portion of the distributor assembly according to the present invention shown in figure 1;

- figure 4 shows a front view of the distributor assembly of figure 1;

- figures 5 and 6 show a section of a portion of a side view of the distributor assembly of figure 1 respectively in a uncoupled and coupled condition;

- figures 7 and 8 respectively show an exploded view of a further embodiment of a fluid distributor assembly according to the present invention and a section of a portion of a side view of the distributor assembly of figure 7 in a coupled condition;

- Figures 9 and 10 respectively show an exploded view of a further embodiment of a fluid distributor assembly according to the present invention and a section of a portion of a side view of the distributor assembly of figure 9 in a coupled condition.

Detailed description of preferred embodiments

[0019] The present invention will be described hereinafter by referring to the above-mentioned figures.

[0020] By referring to figure 1, an exploded view of a preferred embodiment of a fluid distributor assembly 1, in particular a refrigerant fluid, according to the present invention is illustrated by way of example and not for limitative purposes.

[0021] The distributor assembly 1 of the present invention is intended for a preferred use in heat exchangers, preferably evaporators, such as direct evaporators.

[0022] In the embodiments illustrated, the distributor assembly 1 is shown in association with a tube plate 100, the latter being an element to which the distributor assembly 1 is intended to be coupled.

[0023] The tube plate 100 is a plate with a circular geometry, exemplifying the tubular plates used in the considered technical field. However, the tube plate 100 shown is not limitative for the purposes of the present invention.

[0024] In particular, the distributor assembly 1 comprises a head unit 10 - or manifold - configured to receive the refrigerant fluid inletting the heat exchanger and is intended to be coupled to the tube plate 100 at a coupling surface - denoted with reference A - thereof.

[0025] The head unit 10 therefore comprises at least one inlet 11 port, in fluid communication with the inlet refrigerant fluid flow, which allows the latter to enter said head unit 10.

[0026] Internally, the head unit 10 is thus a hollow element, that is an element in which is defined a transit region 12 through which the inlet fluid flow passes towards the tube plate 100.

[0027] In the showed examples, the inlet 11 in the head unit 10 are intended to be two, however, in other embodiments, said inlet can be different in numbers, for example one or four, depending on the operating modes of the exchanger in which the distributor assembly according to the present invention will be mounted.

[0028] Typically, the coupling surface A - also with reference to the shown examples - is a peripheral region of the head unit 10 and of the respective tube plate 100, shaped so as to flange the above-mentioned two elements together.

[0029] In the illustrated examples, this peripheral region defines a circular crown, however, different coupling geometries are possible.

[0030] In any case, and as well-known to the skilled person in the field, the tube plate 100 of a heat exchanger comprises a zone having a plurality of apertures - or housings 101 - configured to put in fluid communication said head inlet 11 and tubes of the exchanger.

[0031] That is, each aperture of said plurality is suitable for coupling with respective tubular elements (not shown in the figures) within which, in use, the refrigerant fluid flows.

[0032] The plurality of housings 101 - which in the examples are a plurality of through holes 101 a of the plate 100 - are configured to allow the refrigerant fluid inletting the head unit 10 passing towards tubular elements which typically engage with their terminal end the plate 100 at said housings, and which form the tube bundle housed within the exchanger's casing.

[0033] For the sake of an easy depiction, in showed examples said housings 101 are obtained only on a portion of the plate 100, particularly on the portion corresponding to one of the two inlet 11 of the head unit 10. However, it is to be understood that the distributor assembly 1 can be coupled with a tube plate 100 having a housings distribution different from that one illustrated.

[0034] Also with reference to figure 5 and 6, the head unit 10 is further provided with a seat 13 adapted to receive a lamination unit 20, in particular of a plate-shaped geometry, which lamination unit 20 is positioned in said seat 13 so as to divide the transit region 12 of the head unit 10 in a first collecting chamber 14 and in an outlet region 15 of the refrigerant fluid.

[0035] The plate-shaped lamination unit 20 comprises an inlet surface 21, an outlet surface 22 and one or more openings 23 to allow the fluid entering the head unit 10 to pass there through.

[0036] The first collecting chamber 14 is comprised between the inlet 11 adapted to receive the fluid entering the head unit 10 and said inlet surface 21.

[0037] The outlet surface 22 of the plate-shaped lamination unit 20 faces toward said outlet region 15 of the refrigerant fluid.

[0038] Said one or more openings 23 are appropriately sized to obtain a pressure drop across the lamination unit 20.

[0039] The overall configuration of the distributor assembly 1 being such that, in condition of said head unit 10 coupled to the tube plate 100, a second mixing chamber 30 is defined at said outlet region 15 among said coupling surface A, said lamination unit 20 and the tube plate 100, so that the fluid, in use, sequentially crosses the first collecting chamber 14, the one or more openings 23 in the lamination unit 20 and subsequently the second mixing chamber 30.

[0040] The fluid is so administered into tubes connected to the tube plate 100.

[0041] The first collecting chamber 14 and the second mixing chamber 30 are preferably consecutive with each other and said outlet region 15 is adjacent to said outlet surface 22.

[0042] In particular, the first collecting chamber 14 and the second mixing chamber 30 are preferably arranged in sequence with respect to a fluid flow direction α as defined by the head inlet 11.

[0043] Under operating conditions of the distributor assembly 1, the lamination unit 20 thus allows expansion of the refrigerant fluid in the second mixing chamber 30 with respect to the condition in which the fluid is in the first collecting chamber 14.

[0044] More in detail, and with reference to figure 2 and 6, the refrigerant fluid flow F entering the inlet 11 of the head unit 10 reaches the lamination unit 20 and crosses said one or more openings 23 of the latter being subjected to a pressure drop causing it to expand into the second mixing chamber 30 and to generate a turbulent flow regime.

[0045] The presence of said mixing chamber 30 permits to improve the refrigerant fluid flow F' conditions before its inlet into the exchanger tube bundle, namely achieving a uniform mixing of the latter entering the through holes 101 a of the tube plate 100.

[0046] The lamination unit 20, as shown in the examples, is locked to the seat 13 of the head unit 10 onto shoulders 13a thereof. It is preferably fixed to the latter in a removable manner, by means of fastening means known to the skilled person in the field.

[0047] According to one embodiment a spacer is configured to allow the fastening of the lamination unit 20 to the seat 13, wherein said spacer comprises a first and a second portion.

[0048] The first portion is internally hollow and configured to engage a through hole 101 a of the tube plate 100 and the second portion remains outside of the tube plate in such a way as to maintain the lamination unit in abutment onto said shoulders 13a of the head unit 10, spaced from the tube plate 100.

[0049] On a side of said second portion, an opening in fluid communication with said first portion is obtained, in order to allow the refrigerant fluid flowing toward the through hole 101 a to enter thereof.

[0050] More than one spacer can be provided, the number of which is function of the operative condition of the distributor. Preferably, said spacers are provided in a homogeneous chessboard-like distribution.

[0051] In a preferred embodiment, the lamination unit 20 is however secured in such a way as to make the collecting chamber 14 hermetic, to avoid possible undesired fluid leaks towards the second mixing chamber 30.

[0052] In other embodiments, the lamination unit 20 can also be made in a single piece with the head unit 10 at said seat 13.

[0053] Preferably, with reference to the examples illustrated in the figures, the plate-shaped lamination unit 20 - or at least its outlet surface 22 - lies on a plane substantially parallel to the coupling surface A with the tube plate 100.

[0054] According to said configuration, advantageously the fluid F' outflows from the lamination unit 20 at equidistant points from the through holes 101 a of said tube plate 100, further favoring a uniform mixing of the fluid F' entering the latter.

[0055] With reference to figure 2 and 6, said one or more openings of the lamination unit 20, are denoted by reference 23. In the examples illustrated, said openings 23 comprise a plurality of circular geometric through holes, and are apt to put in fluid communication the first collecting chamber 14 with the second mixing chamber 30.

[0056] Alternative embodiments can also provide that at least one of said one or more openings 23 comprise an elongated shape, for examples like a single slot, or through holes of other geometric shapes than the circular shape.

[0057] Said one or more openings may have, for example, a passageway configured so as to impart a substantially orthogonal direction to the fluid F' outflowing from the outlet surface 22 with respect to the direction of the fluid F inletting the lamination unit 20.

[0058] In any case, the amount and geometry of said one or more openings is a function of the operating conditions of the exchanger and of the desired fluid F pressure drop across the lamination unit 20.

[0059] Said one or more openings 23 are preferably distributed along a peripheral edge of the plate-shaped lamination unit 20, preferably in such a way as to do not directly face one or more of the through holes 101 a of the tube plate 100, as provided by the embodiment of figures 7 and 8.

[0060] Preferably, said one or more openings 23 are arranged laterally with respect to an input fluid flow F having a direction α as imparted by said head inlet 11.

[0061] It is to be appreciated that the fluid distributor assembly 1 further comprises direction means provided with an impact surface 241, 26 configured so as to direct the fluid outflowing from said outlet surface 22 along a substantially orthogonal direction with respect to a fluid inlet direction β into said apertures 101.

[0062] Said direction means allow to generate an orthogonal flow F' with respect to the fluid inlet direction β into the tube plate 100 so as to sequentially lick said apertures 101.

[0063] Each tube of the tube bundle of the exchanger is therefore able to suck the required amount of refrigerant, according to a kind of dynamical "self-regulation".

[0064] In general terms, said orthogonal flow F' with respect to said direction β is achieved by providing an antagonistic element positioned downstream the expansion of the flow outflowing the outlet surface 22.

[0065] With reference to the embodiment shown in figures 7 and 8, the apertures 101 of the tube plate 100 are arranged laterally with respect to a positioning of each of said one or more openings 23 of the lamination unit 20.

[0066] According to said positioning, said direction means comprises an impact surface 26 of the tube plate

100 facing toward said second mixing chamber 30.

[0067] In other words, the mutual position of each of said apertures 101 and each of said one or more openings 23 is such that they do not directly face to each other, namely said one or more openings 23 face directly towards a portion of the tube plate 100 lacking of apertures 101 a.

[0068] The flow outflowing from the latter collides with the impact surface 26 that is configured to give to the flow F' an orthogonal direction to the fluid inlet direction β into the apertures 101.

[0069] Preferably said impact surface 26 of the tube plate 100 comprises said coupling surface A or lies in a plane comprising the latter, as illustrated with reference to the embodiment shown in figure 8.

[0070] In one embodiment - not illustrated - the surface of the tube plate 100 facing toward the second mixing chamber 30 is provided with apertures 101 distributed on opposite sides. In this case, said impact surface 26 is positioned in a central region of the tube plate 100, namely between said apertures 101.

[0071] Accordingly to this embodiment, the one or more openings 23 of the lamination unit 20 are arranged in such a way as to face said central region of the tube plate 100.

[0072] Preferably, the impact surface 26 is arranged along a substantially orthogonal direction with respect to a fluid inlet direction into said apertures 101.

[0073] According to this feature, the direction of the refrigerator fluid flow entering the apertures 101 is identifiable by a coordinate system of three axes mutually orthogonal to each other, as shown in the figures.

[0074] The fluid inlet direction β into the apertures 101 is parallel to axis z that is substantially orthogonal to axis x and *y* which comprise the plane containing the fluid F' direction, as directed by the impact surface 26.

[0075] Although in the examples the refrigerant fluid flow F enters the inlet 11 along the direction α that coincides with a direction parallel to the z axis, other embodiments may have different directions of the fluid flow F that enters the inlet 11 than the one shown.

[0076] Referring now to figure 3 and 4, wherein in the latter figure said tube plate 100 is represented in transparency to show the lamination unit 20.

[0077] In this example, referring also to figures 5 and 6, the positioning of the openings 23 is such that the they directly faces towards one or more of the through holes 101 a of the tube plate 100.

[0078] According to this embodiment, said direction means comprises flow deviation members 24, 25 arranged onto the outlet surface 22 of said lamination unit 20.

[0079] Preferably, said flow deviation members comprises a wall 24 configured in such a way as to prevent a direct channeling of the fluid F' into the through holes 101 a of the tube plate 100.

[0080] With further reference to figure 2, said wall 24 protrudes from the outlet surface 22 of the lamination unit 20 in correspondence of its openings 23, specifically it is arranged laterally to said one or more openings 23.

[0081] Preferably, the wall 24 comprises said impact surface 241 positioned in front of said one or more openings and in such a way as to hinder the fluid flow - outflowing from said one or more openings 23 - to directly enter into at least one of the through holes 101.

[0082] Preferably, said wall 24 has a "L"-shaped geometry, provided with a proximal lateral portion 242 connected to the impact surface 241.

[0083] The impact surface 241 is configured as a distal portion of said "L"-shaped geometry facing toward said one or more openings and arranged substantially parallel to and spaced from the outlet surface 22.

[0084] In this example, the flow direction of the fluid F' is forced into a region of the second mixing chamber 30 comprising the openings 23 and only one of the sides of the plane comprised by the x, *y* axis, as defined by the interception with the proximal lateral portion 242.

[0085] In other words, said proximal lateral portion 242 operates such as a barrier.

[0086] Different geometries of said wall 24 are possible. Preferably the wall 24 is configured so as to confer to the fluid F' a direction substantially parallel to the development direction of the outlet surface 22.

[0087] In a further embodiment - not shown in the figures - said flow deviation members comprise an impact surface provided with one or more connecting portions configured to connect the impact surface to said outlet surface 22 in such a way as to allow the fluid F' outflowing along each of the direction comprised in the x, *y* plane.

[0088] For example, the impact surface can be positioned in front of and spaced from the openings 23, in such a way as to cover them entirely. Said impact surface can be connected to the outlet surface 22 by means of two end opposite walls.

[0089] Preferably, each of said two end opposite walls develops along a direction parallel to each other and to x axis and/or along an orthogonal direction with respect to the distribution of the openings 23.

[0090] More preferably, said impact surface can be connected to the outlet surface 22 by means of said two end opposite walls and by a further wall interposed between them, also in order to confer a structural reinforcement to the connection.

[0091] Advantageously, in this way the fluid F' is therefore allowed to outflowing from the lamination unit along a substantially orthogonal direction with respect to the fluid inlet direction β into apertures of the tube plate 100, without being blocked by side walls that narrow its circulation inside the second mixing chamber 30.

[0092] In any case, embodiments may be provided with said wall 24 even though said one or more openings 23 of the lamination unit 20 are arranged such as to do not directly face the through holes 101 a of the tube plate 100 when the distributor assembly 1 is flanged to the latter.

[0093] Preferably, said flow deviation members further comprises one or more ridges 25 - or turbo-stroke ridges - embossed on the outlet surface 22 of the lamination unit 20.

[0094] Said one or more ridges 25 are preferably arranged along an orthogonal transvers direction relative to the direction of fluid outflowing from said one or more openings 23 of the lamination unit 20.

[0095] Said one or more ridges 25 may protrude from the outlet surface 22 with different heights and have sections with polygonal or curvilinear geometries.

[0096] Said ridges can also be made in a single piece with the lamination unit 20 or fixed to the latter, the amount of which is function of the desired outlet conditions to be conferred to the fluid flow F'.

[0097] Said ridges can be also designed for the purpose to gain a structural reinforcement of the lamination unit 20 and eventually can be configured as spacer between the tube plate 100 and the outlet surface 22.

[0098] With now reference to the embodiment shown in figure 9 and 10, ridges 25' are arranged along a longitudinal direction with respect to the flow F'. The flow F' is orthogonal to the fluid inlet direction β into the tube plate 100 so as to sequentially lick said apertures 101.

[0099] Accordingly to this embodiment, said ridges 25' are spaced from and parallel to each other in such a way as to define a plurality of lanes 25".

[0100] Each of said ridges 25' has a length preferably shorter than the length of the lamination unit 20, considering the latter length comprised between the shoulders 13a of the head unit 10 and parallel to the direction of the fluid flow F'.

[0101] In the example depicted there are three ridges 25' defining four lanes 25".

[0102] However, other embodiments may be provided with different numbers of ridges 25' and therefore different number of lanes 25".

[0103] In other words, the ridges 25' allow to divide the second mixing chamber 30 in such a way as to constrain the fluid F', outflowing from said one or more openings 23, in a plurality of delimited regions.

[0104] Each region of said plurality preferably developing along a main developing direction that is substantially parallel to the direction x, as above defined and also with reference to figure 2 and 10.

[0105] Whereas a uniform mixture of the fluid is achieved after the expansion through the lamination unit 20 and, for example, under those particular operating conditions wherein the fluid does not reach quickly the through holes 101 a of the tube plate 100, the presence of ridges 25' advantageously allows to avoid the fluid to move towards and stagnate into an area 15' of the second mixing chamber 30 which is far located from the openings 23 of tube plate 100.

[0106] At the same time, a configuration of the ridges 25' as above described allows the fluid to reach every point of the second mixing chamber 30 as well. Accordingly, each of the ridges 25' preferably projects from the outlet surface 22 in such a way as to maintain the latter and the tube plate 100 spaced therebetween.

[0107] Said spacing, advantageously, allows the fluid to reach every tubular member of the tube bundle even in case of a bad distribution upstream of said one or more openings 23.

[0108] As well as described for a particular embodiment of ridges 25, also ridges 25' can be configured as spacer between the tube plate 100 and the outlet surface 22. Said spacing can be obtained, for example, by providing a battlement shape along the length of ridges 25' properly dimensioned to contact in selected points the tube plate 100.

[0109] The present invention has hereto been described with reference to preferred embodiments thereof. It is understood that other embodiments might exist, all falling within the concept of the same invention, as defined by the protective scope of the claims hereinafter.

Claims

1. A fluid distributor assembly (1), in particular for a refrigerant fluid, for use in a heat exchanger, which fluid distributor (1) comprises:

    - a head unit (10), comprising a head inlet (11) configured to receive the fluid fed into the exchanger;
    - a tube plate (100) coupled to said head unit (10) at a coupling surface (A) thereof and provided with apertures (101) configured to put in fluid communication said head inlet (11) and tubes of the exchanger;
    - a plate-shaped lamination unit (20) having an inlet surface (21) and an outlet surface (22) and further comprising one or more openings (23) to allow the inlet fluid to pass therethrough,

    wherein the head unit (10) is provided with a seat (13) which fixedly receives said lamination unit (20), the overall configuration of the distributor assembly (1) being such that the fluid sequentially crosses a first collecting chamber (14) defined between said inlet surface (21) and said head inlet (11), said one or more openings (23) and a second mixing chamber (30) defined between said coupling surface (A) and said outlet surface (22), and it is so administered into the tubes of said tube plate (100),
    and wherein the fluid distributor assembly (1) further comprises direction means provided with an impact surface (241, 26) and configured so as to direct the fluid outflowing from said outlet surface (22) along a substantially orthogonal direction with respect to a fluid inlet direction into said apertures (101).

2. The fluid distributor assembly (1) according to claim 1, wherein said apertures (101) are arranged laterally with respect to a positioning of said one or more

openings (23), and wherein said impact surface (26) is a surface of the tube plate (100) facing toward said second mixing chamber (30).

3. The fluid distributor assembly (1) according to claim 2, wherein said impact surface (26) is arranged along a substantially orthogonal direction with respect to a fluid inlet direction into said apertures (101).

4. The fluid distributor assembly (1) according to claim 2 or 3, wherein said impact surface (26) lies on a plane comprising said coupling surface (A).

5. The fluid distributor assembly (1) according any one of the preceding claims, wherein said direction means comprises flow deviation members (24, 25, 25’) arranged onto the outlet surface (22) of said lamination unit (20).

6. The fluid distributor assembly (1) according to claim 5, wherein said flow deviation members comprise a wall (24) arranged laterally to said one or more openings (23) and configured in such a way as to confer to the fluid a motion having a direction substantially parallel to said outlet surface (22).

7. The fluid distributor assembly (1) according to claim 6, wherein said wall (24) is substantially "L" shaped and comprises said impact surface (241).

8. The fluid distributor assembly (1) according to claim 5, wherein said flow deviation members comprise two opposite end walls configured to connect said impact surface to said outlet surface (22), said two opposite connecting walls developing along a direction parallel to each other and/or orthogonal with respect to a distribution of said one or more openings (23).

9. The fluid distributor assembly (1) according to any claim from 5 to 8, wherein said flow deviation members comprises one or more ridges (25) arranged along an orthogonal transverse direction relative to a direction of fluid outflowing as defined by said one or more openings (23).

10. The fluid distributor assembly (1) according to any claim from 5 to 8, wherein said flow deviation members comprises one or more ridges (25’) arranged along a longitudinal transverse direction relative to a direction of fluid outflowing as defined by said one or more openings (23), wherein said one or more ridges (25’) are spaced from and parallel to each other in such a way as to define a plurality of lanes (25") therebetween.

11. The fluid distributor assembly (1) according to any one of the preceding claims, wherein said one or more openings (23) are distributed along a peripheral edge of said lamination unit (20).

12. The fluid distributor assembly (1) according to any one of the preceding claims, wherein said one or more openings (23) are arranged laterally with respect to an input fluid flow as directed by said head inlet (11).

13. The fluid distributor assembly (1) according to any one of the preceding claims, wherein said one or more openings (23) comprise holes with a circular geometry.

14. The fluid distributor assembly (1) according to any one of the preceding claims, wherein at least one of said one or more openings 23 comprise an elongated shape, in particular a single slot.

15. The fluid distributor assembly (1) according to any one of the preceding claims, wherein said lamination unit (20) is a plate-shaped element made in a single piece with said head unit (10).

16. The fluid distributor assembly (1) according to any one of the preceding claims, wherein the plate-shaped lamination unit (20) lies on a plane substantially parallel to a plane comprising the coupling surface (A).

17. The fluid distributor assembly (1) according to any one of the preceding claims, wherein said first chamber (14) is a hermetic chamber.

18. The fluid distributor assembly (1) according to any one of the preceding claims, wherein said first collecting chamber (14) and said second mixing chamber (30) are arranged in sequence with respect to a fluid flow direction as defined by the head inlet (11).

19. A heat exchanger (100) comprising a fluid distributor assembly (1) according to any one of the preceding claims.

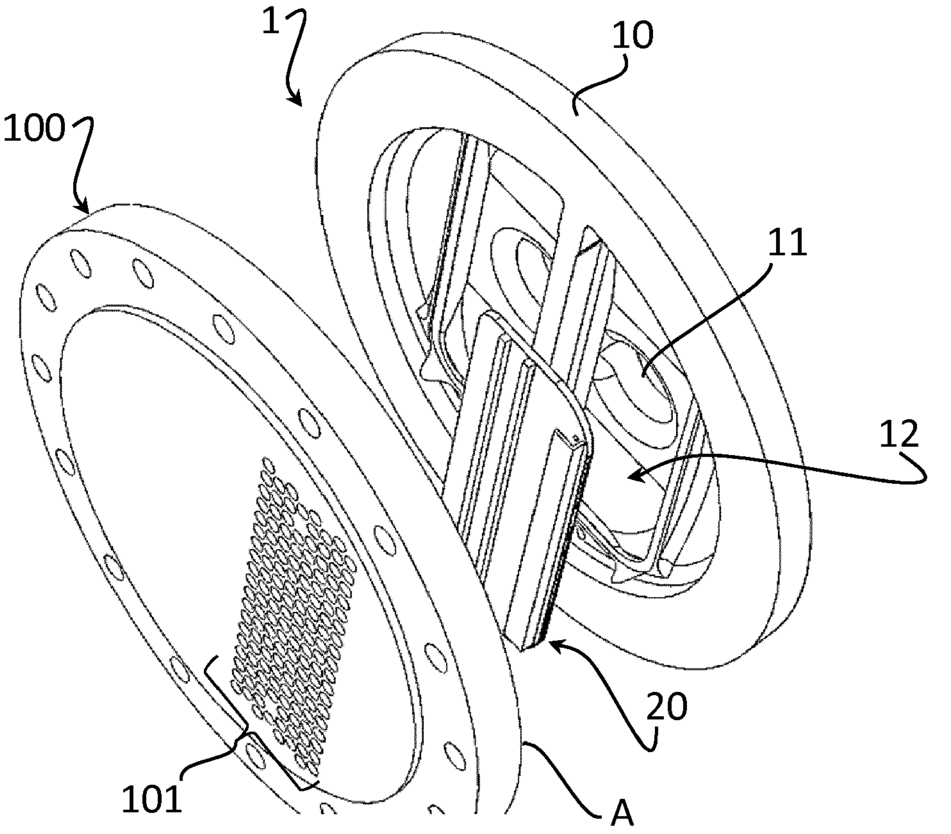
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Fig. 1

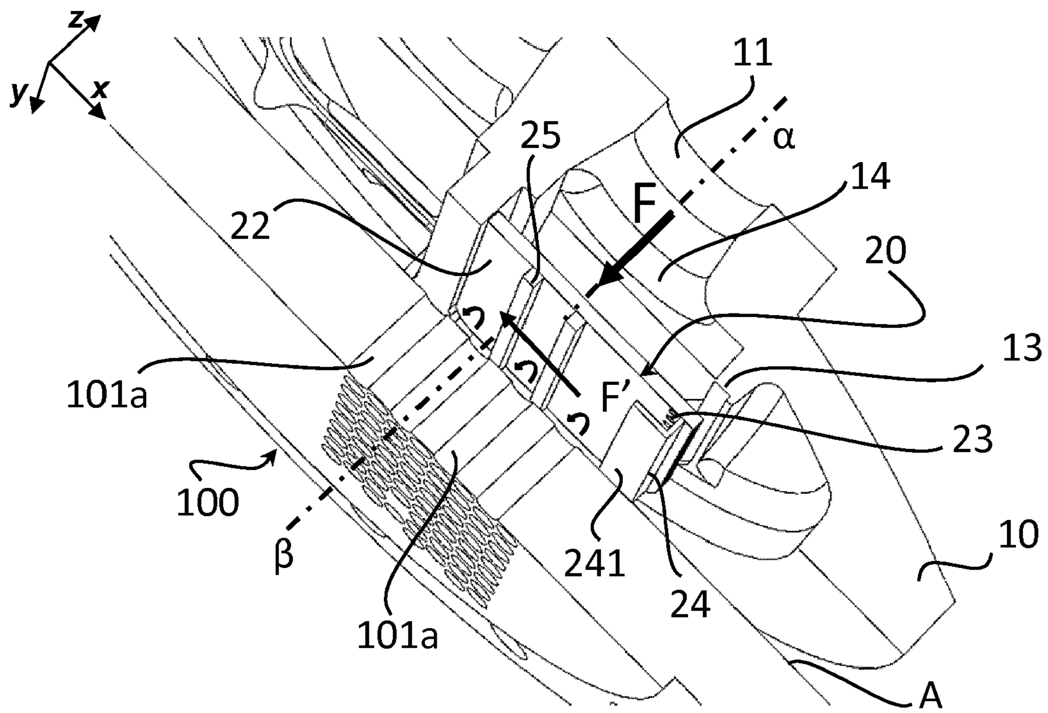
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Fig. 2

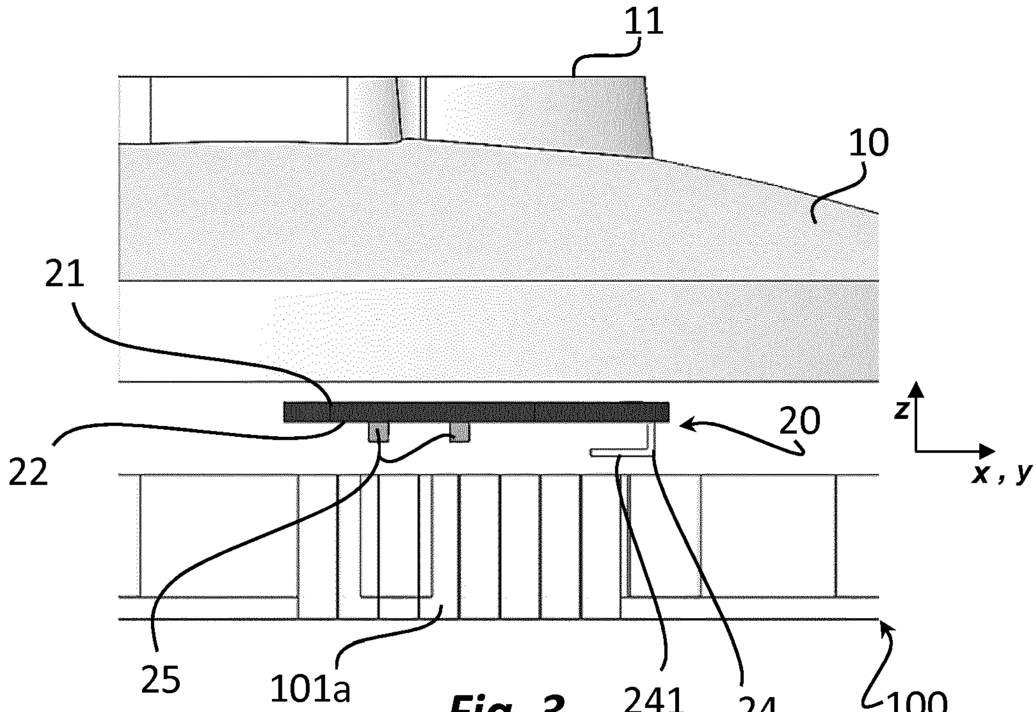


Fig. 3

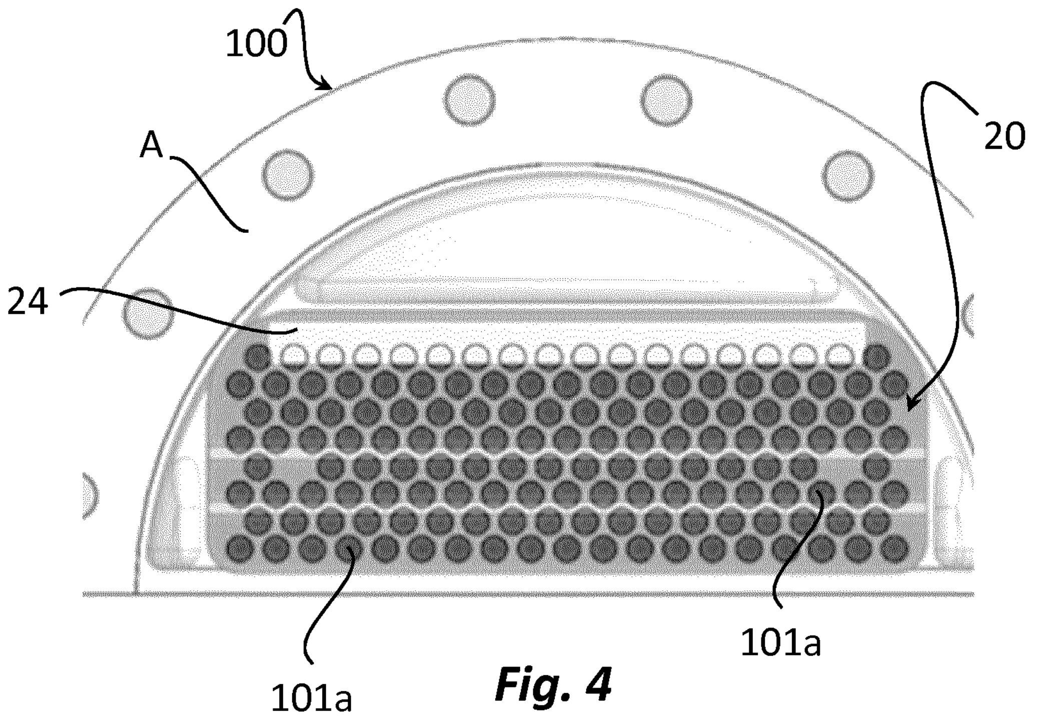
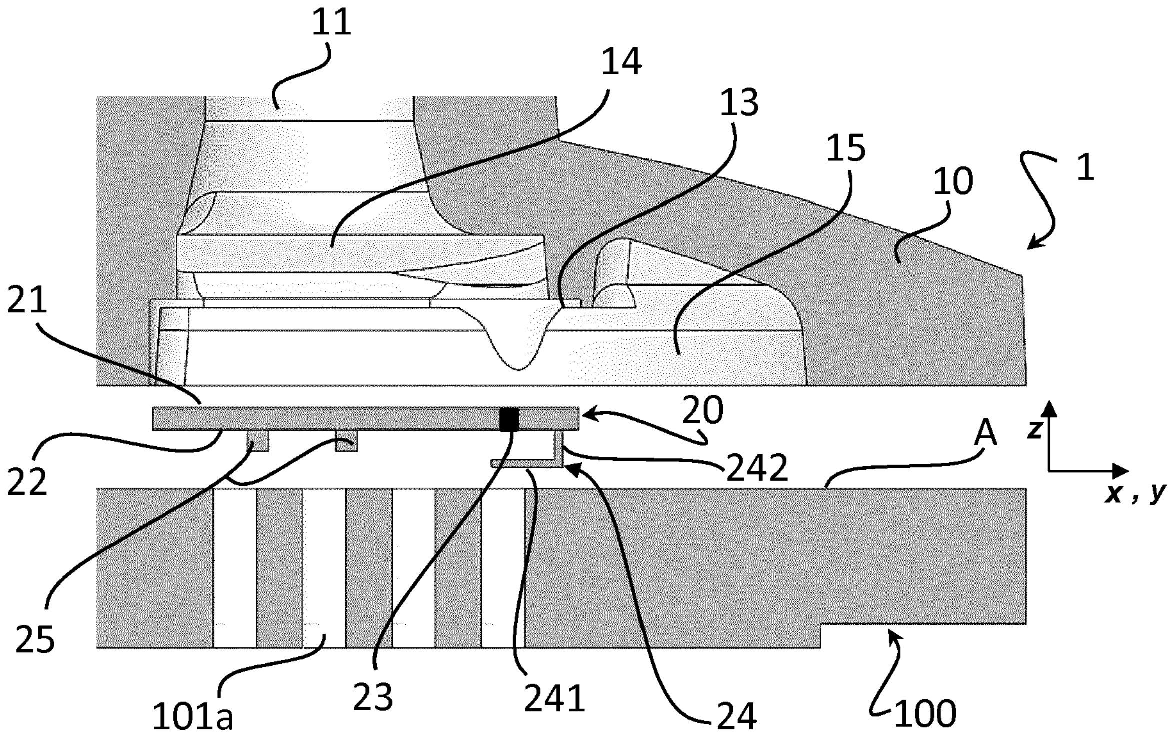


Fig. 4


11
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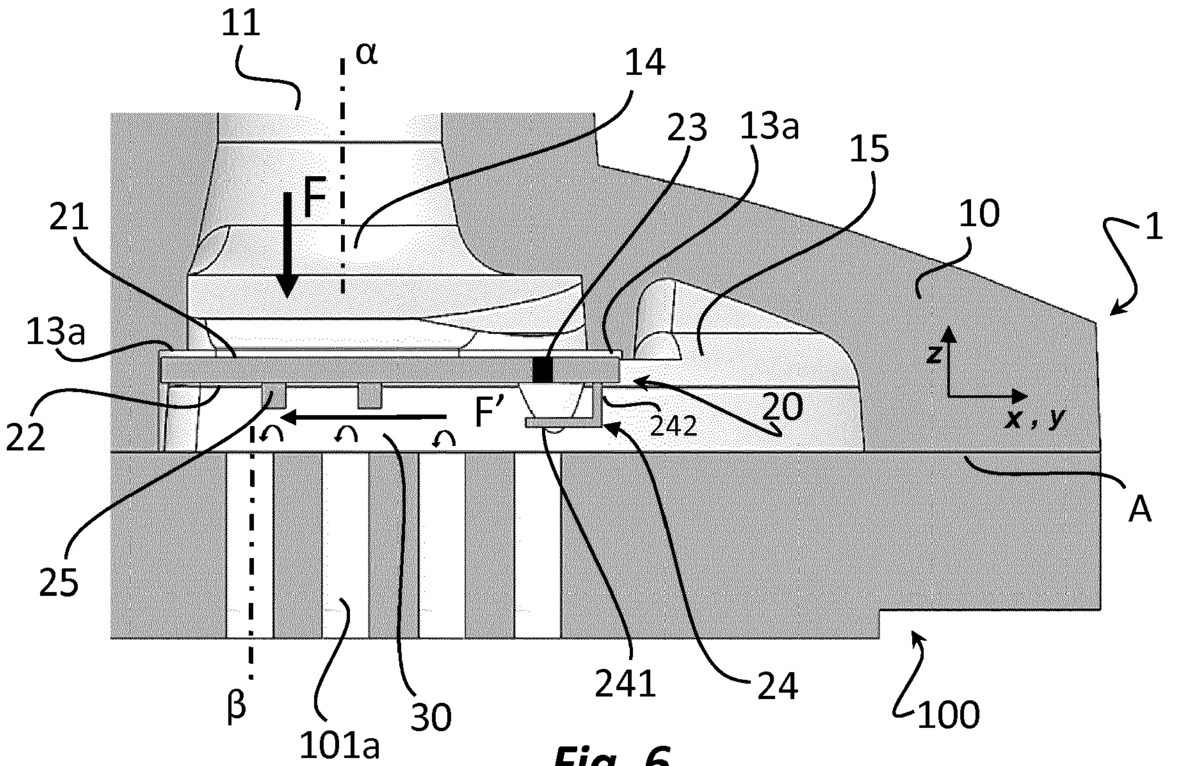
100

Fig. 5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α
14
23
13a
15
F
21
10
1
13a
z
22
F'
20
242
x , y
A
25
β
101a
30
241
24
100

Fig. 6

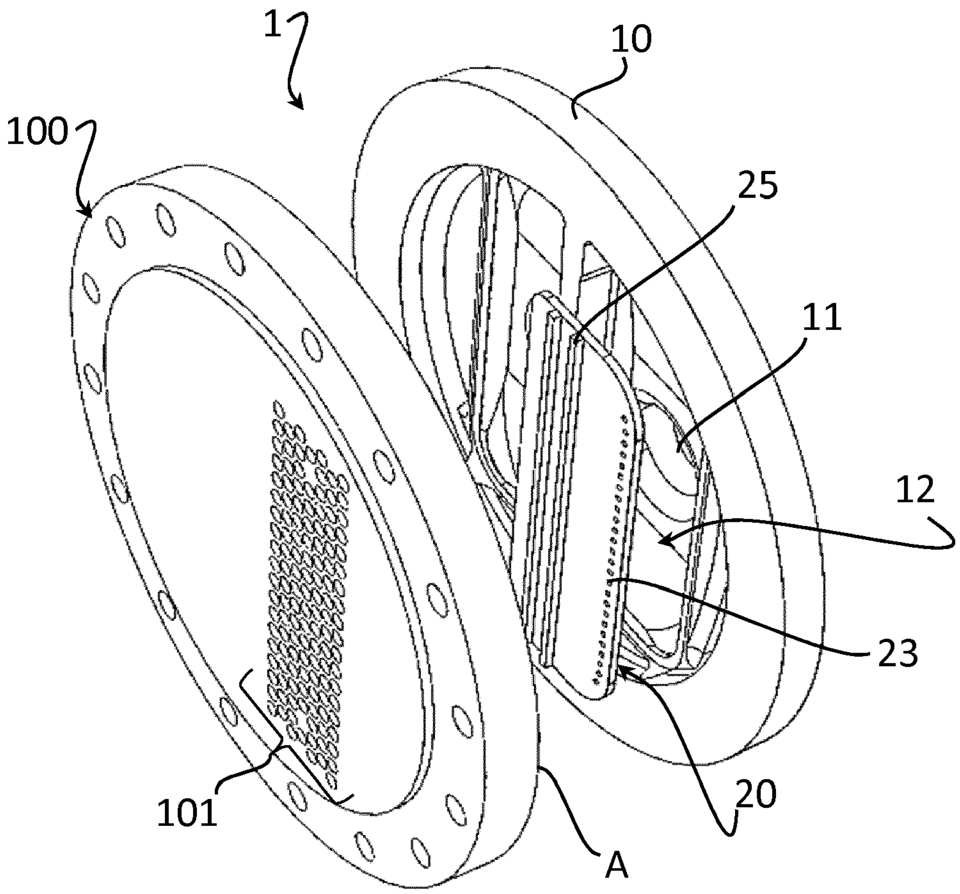
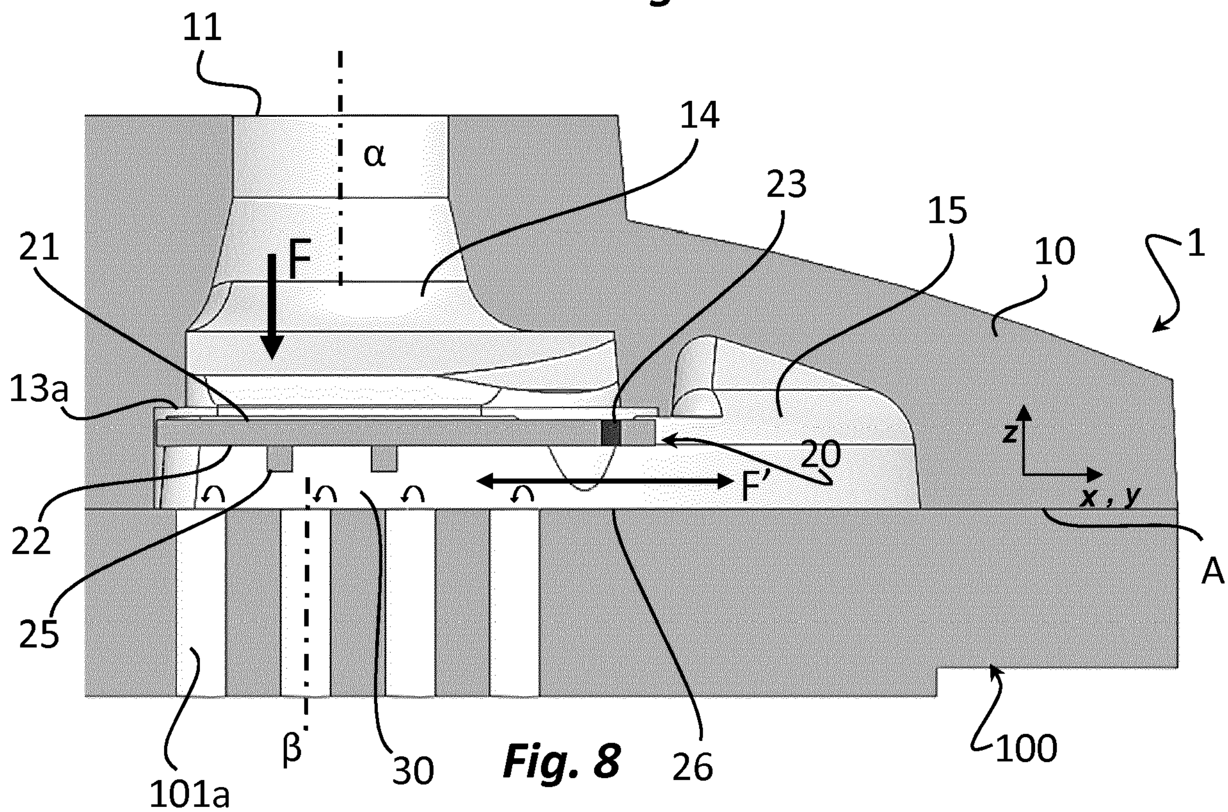

1
10
100
25
11
12
23
20
101
A

Fig. 7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23
15
21
F
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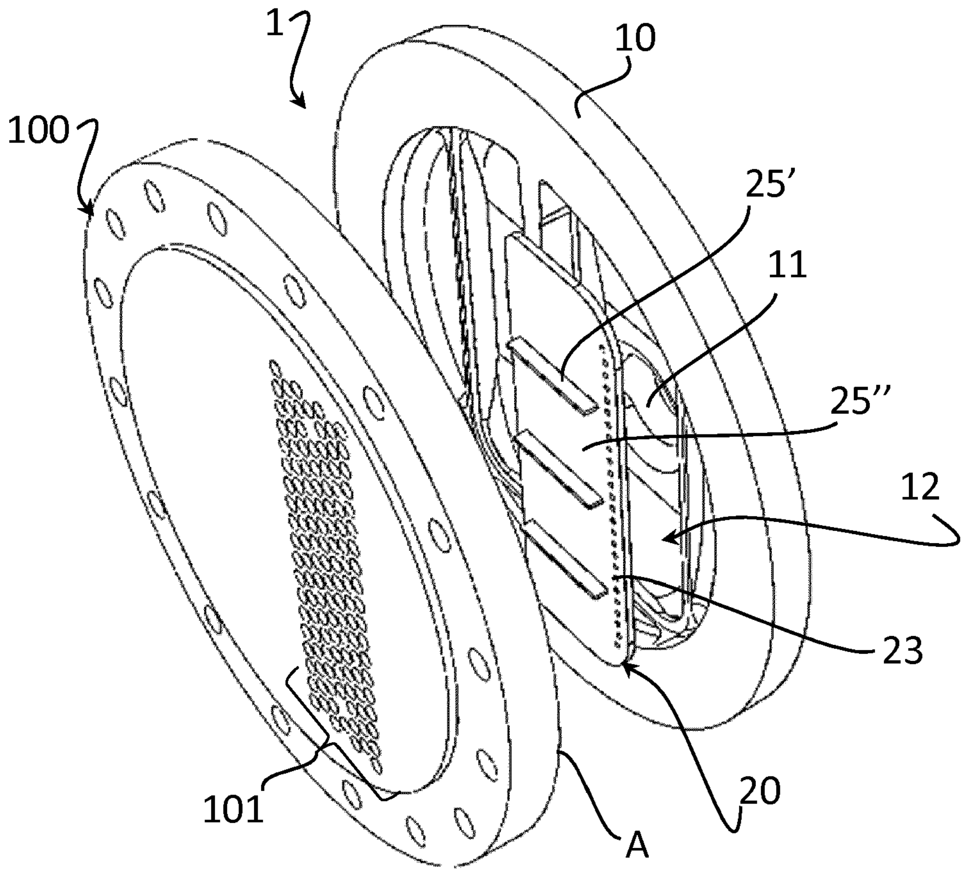
13a
20
z
F'
x , y
22
A
25
101a
β
30
26
100

Fig. 8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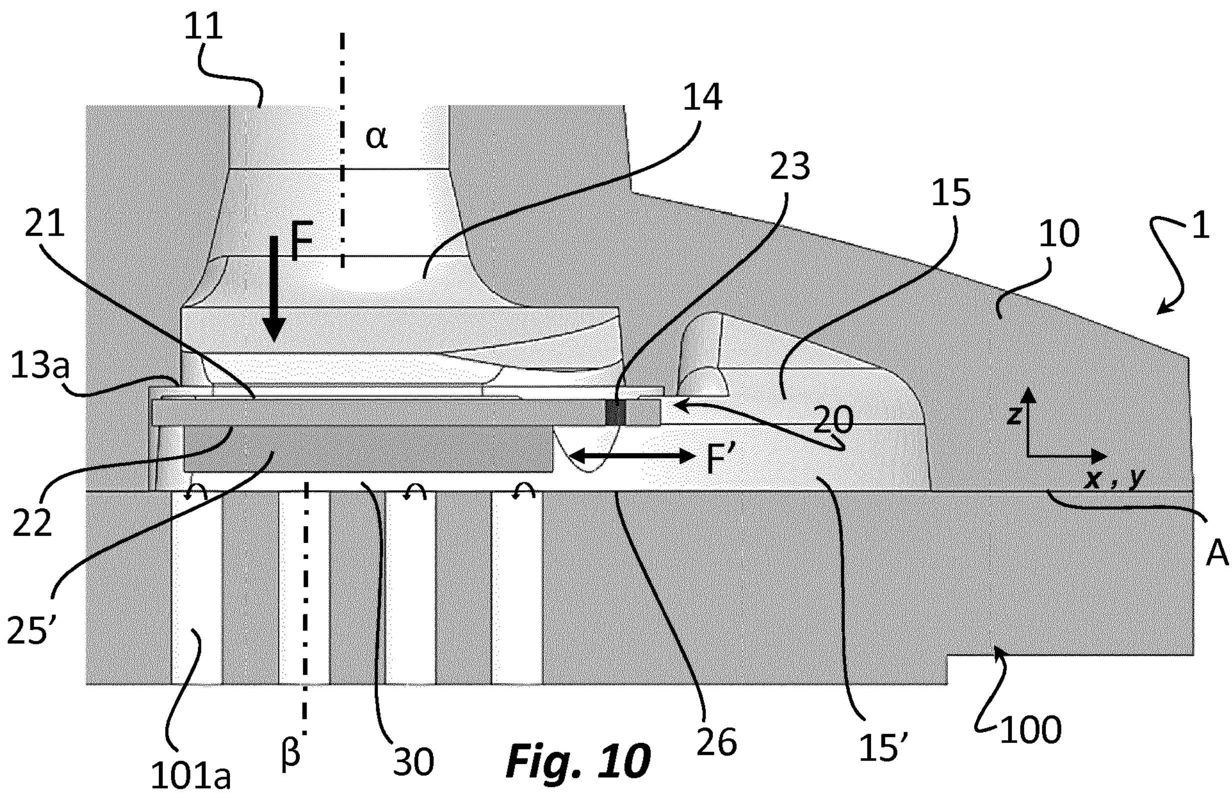
10
100
25'
11
25''
12
23
20
101
A

Fig. 9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α
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15
21
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10
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13a
20
z
F'
x , y
22
A
25'
101a
β
30
26
15'
100

Fig. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 17 18 4287

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The present search report has been drawn up for all claims

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Place of search	Date of completion of the search	Examiner
Munich	16 January 2018	Louchet, Nicolas

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