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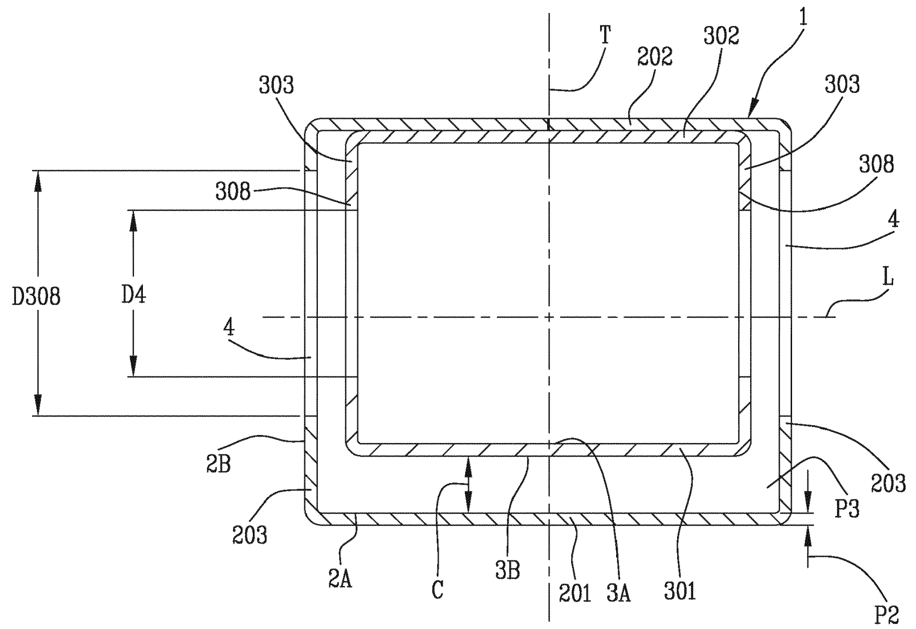
(54) **RADIANT MODULE FOR FORMING A RADIANT BODY**

(57) A radiant module (1) comprising: a first hollow body (3) defined by a front wall (301), a rear wall (302), two sides (303), a first top end (304) having a pair of holes (308) made on the corresponding sides (303) and a bottom end (305) having a pair of holes (308) made on the corresponding sides (303); the first hollow body (3) defines a component, in use, for the passage of a heat carrier fluid, a second hollow body (2) or cover casing inside of which is entirely contained the first hollow body (3); the second hollow body (2) has a front wall (201), a rear wall (202), two sides (203), a top (204), having an air discharge section (B) and a pair of holes (4) made on the corresponding sides (203) and a bottom (210) having an air intake section (A) and a pair of holes (4) made on the corresponding sides (203), the second hollow body (2) is configured for generating an inner zone which is able to define a channel (C2) for controlled flow of the air from the intake section (A) of the bottom towards the discharge section (B) of the top (204).

Fig.2C



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Description

[0001] This invention relates to a radiant module for the formation of a radiant body.

[0002] A radiant body is a known apparatus which, positioned inside a confined space or inside room, is designed to increase or maintain a predetermined temperature in the room.

[0003] More specifically, the radiant bodies comprise, usually, a plurality of modules side by side (the number depending on the total size of the radiant body and the desired operating capacity) and connected to each other in a sealed fashion.

[0004] A heat carrier fluid, heated to a predetermined temperature by a thermal energy source, such as, for example, a boiler, flows inside the modules of the radiant body.

[0005] The radiant body therefore forms part of a water circuit in which the heat carrier fluid circulates.

[0006] The current hydraulic circuits comprise a thermal energy source, such as, for example a boiler, which heats the heat carrier fluid, which is then made to circulate in the radiant body.

[0007] In the majority of the applications, the heat carrier fluid is water and the circulation of the heat carrier fluid is actuated thanks to the use of a pump.

[0008] As already mentioned, in the technical field in question, there are prior art radiant bodies consisting of several modules, coupled with each other in such a way as to provide a suitable heat exchange surface as a function of the volume of the room to be heated.

[0009] More specifically, the modules can be connected permanently, by welding, or coupled to each other during assembly through a connection element and a plurality of seals. In the latter case, the connecting elements are tubular conduits which also act as conduits for supplying and discharging the heat carrier fluid.

[0010] There are prior art modules for forming a radiant body consisting of two heads, a lower and an upper, and a plurality of conduits, from one to three for example, which connect the two heads. The lower heads of the individual modules are connected to each other by welding or by a tubular conduit, equipped with seals, which passes through the individual modules. Similarly, the upper heads of the individual modules are connected to each other by welding or by a tubular conduit, equipped with seals, which passes through the individual modules. In the embodiment provided with tubular conduits, one of these, usually the one which connects the lower heads, is the conduit for supplying the heat carrier fluid, whilst the other is the conduit for discharging the heat carrier fluid.

[0011] In these types of prior art radiant bodies, the heat exchange occurs between the free air (at a low air) surrounding the radiant body and the heat carrier fluid (at a higher temperature than the free air) contained in the radiant body. This direct heat exchange configuration determines two important constraints in the design of the radiant body.

[0012] The first constraint relates to the shape of the modules of the radiant body: This restraint derives from the fact that the exchange surface between the heat carrier fluid and air is not determined according to predetermined directions, but occurs freely depending on the current flows of the air present in the room.

[0013] One should therefore always take into account in the design of the modules of the radiant body shapes which are able to obtain forced air passage zones combined with the appearance of the radiant body. Consequently, a pleasing appearance might, however, reduce the performance in terms of heat exchange or vice versa.

[0014] The second constraint concerns the structure of the modules of the radiant body. This constraint derives from the fact that, even though the use of material with a high coefficient of heat exchange would improve the performance of the radiant body, the latter, in to obtain a high thermal efficiency, could reach temperatures which are too high, with high operating costs and possible wear of the radiant body in a short time.

[0015] Moreover, the current constructional configuration of modules forming the radiant body with direct heat exchange determines a major drawback: the heat dispersion due to the susceptibility of the air to be heated by the external events (irregular flows of air around the radiant body).

[0016] In effect, the external events cause turbulent motions of the air, which interfere with the natural convective motions due to the heating of the air: this reduces the efficiency of the radiant body in the room in which it is applied.

[0017] The aim of this invention is to provide a module for a radiant body which overcomes the above-mentioned drawbacks.

[0018] A further aim of this invention is to provide a module for the formation of a radiant body which can increase the performance in terms of heat exchange.

[0019] Another aim of this invention is to provide a module for the formation of a radiant body which is able to modify and improve the external design independently of the thermal efficiency and the heat exchange surface area.

[0020] Another aim of this invention is to provide a module for the formation of a radiant body wherein the choice of the materials of the module is independent of the safety problems of the rooms in which it is applied.

[0021] These aims are fully achieved by the module for forming a radiant body according to this invention as characterised in the appended claims.

[0022] The features of the invention will become more apparent from the following detailed description of a preferred, non-limiting embodiment of it, illustrated by way of example in the accompanying drawings, in which:

- Figure 1 illustrates a perspective view of a radiant module for forming a radiant body according to the invention;

- Figures 2A, 2B and 2C illustrate, respectively, a side section, a front section and a cross-section through line A-A of the radiant module of Figure 1, referred to the inner Figure 2B;
- Figures 3A and 3B illustrate, respectively, a side section and a plan view from above of a second hollow body forming part of the radiant module of the preceding drawings;
- Figures 4A and 4B illustrate, respectively, a side section and a plan view from above of a first hollow body forming part of the radiant module of the preceding drawings;
- Figure 5 illustrates a perspective view of a radiant body formed by a plurality of radiant modules of the preceding drawings;
- Figure 6 illustrates a cross section of a spacer and sealing bushing forming part of the radiant body;
- Figure 7 illustrates a transversal cross-section of a radiant body equipped with a plurality of spacer and sealing bushings of Figure 6;
- Figure 7A illustrates an enlarged detail of Figure 7.

[0023] As illustrated in the accompanying drawings, and in particular in Figure 1, the reference numeral 1 denotes in its entirety a radiant module according to the invention and which can be used for the formation of a radiant body 5 designed to increase or maintain a predetermined temperature in the room in which it is positioned.

[0024] In an embodiment illustrated, the radiant module 1 comprises a first hollow body 3.

[0025] The first hollow body 3 is defined by a front wall 301, a rear wall 302, two sides 303, a top end 304 having a pair of holes 308 made on the corresponding sides 303 and a bottom end 305 having a pair of holes 308 made on the corresponding sides 303.

[0026] This first hollow body 3 defines the component, in use, for the passage of a heat carrier fluid.

[0027] As illustrated, the radiant module 1 comprises a second hollow body 2 or cover casing inside of which is entirely contained the first hollow body 3.

[0028] The second hollow body 2 has a front wall 201, a rear wall 202, two sides 203, a top 204, having an air discharge section B and a pair of holes 4 made on the corresponding sides 203 and a bottom 210 having an air intake section A and a pair of holes 4 made on the corresponding sides 203.

[0029] The second hollow body 2 is configured for generating an inner zone which is able to define a channel C2 for controlled flow of the air from the intake section A of the bottom towards the discharge section B of the top 204.

[0030] In other words, each module 1 has a first hollow body 3 with the function of a radiant element (the heat carrier fluid passes through this element), whilst the second hollow body 2 acts as a convertor of air from the bottom upwards (as described in more detail below) with a "flue" effect so that the low temperature air flows from the bottom and the heated air flows from the top.

[0031] As shown in Figures 1, the radiant module 1 according to the invention allows three axes of extension to be identified:

- a longitudinal axis of extension (axis V), of maximum extension of the radiant module 1;
- a transversal axis of extension L, perpendicular to the longitudinal axis V, (parallel to the axis of a fluid supply conduit 501 of the radiant body 5),
- an axis of extension in depth or thickness T, perpendicular to both the longitudinal axis V and the transversal axis L.

[0032] As also shown in Figures 2A, 2B and 2C, an embodiment of the first hollow body 3 comprises a upper chamfer 306 which connects the front wall 301 to the top end 304 and a lower chamfer 306' which connects the front wall 301 to the bottom end 305.

[0033] Again according to an embodiment, the first hollow body 3 comprises four vertices 307. The first hollow body 3 defines an inner surface 3A, represented by the sum of the surfaces facing the inner volume of the first hollow body 3, an outer surface 3B represented by the sum of the surfaces facing towards the second hollow body 2, and a thickness p3.

[0034] As mentioned above, the first hollow body 3 has a pair of passage holes 308 made on its opposite sides 303 and in the upper part defining the first top end 304, and in such a way as to be opposite and coaxial with each other.

[0035] The first hollow body 3 also has two other passage holes 308, which are made on its opposite sides 303 in the lower part, defining the second bottom end 305, and in such a way as to be opposite and coaxial with each other (see also Figures 4A and 4B).

[0036] These passage holes 308 are configured for being coupled with the supply conduit 501 and with a discharge conduit 502 of the heat carrier fluid. In order to perform this coupling with a hydraulic seal the first hollow body 3 comprises, at the passage holes 308, a corresponding seat for housing the seals (not illustrated) of the two supply 501 and discharge 502 conduits.

[0037] According to a preferred (non-limiting) embodiment of the invention, the first hollow body 3 has a substantially parallelepiped shape.

[0038] According to another alternative embodiment, the first hollow body 3 has a substantially tubular shape folded back on itself in such a way as to form a coil which increases the heat exchange surface (not illustrated).

[0039] According to an embodiment, the first hollow body 3 comprises a material with a high coefficient of heat exchange in such a way as to increase the heat exchange efficiency without running the risks of the high temperatures which can be reached (thanks to the cover of the second hollow body 2).

[0040] As mentioned previously, the second hollow body 2 comprises a front wall 201, a rear wall 202, two sides 203, a top 204 and a bottom 210.

[0041] Preferably, the bottom 210 of the second hollow body 2 has an inlet section A which is larger than the discharge section B of the top 204 for drawing in the air from the room and forcing it to flow into the flow canal of C2 identified by the respective walls of the first 3 and second 2 hollow body in the direction F which proceeds from the intake section A to the discharge section B.

[0042] In light of this, the bottom 210 is fully open in such a way as to obtain an intake section A as large as possible.

[0043] According to an embodiment, the second hollow body 2 comprises a chamfer 205 which connects the front wall 201 to the top 204. According to an embodiment, the module 1 comprises six vertices 206.

[0044] It should be noted that the second hollow body 2 has the pair of passage holes 4 made on the corresponding opposite sides 203 in the upper part defining the top 204, and in such a way as to be opposite and coaxial with each other.

[0045] The second hollow body 2 also has two other passage holes 4 made on the corresponding opposite sides 203 in the lower part, defining the base 210, and in such a way as to be opposite and coaxial with each other.

[0046] In light of this, the first 3 and the second 2 hollow body have the two pairs of holes 308, 4 made on the corresponding top end 304, top 204 and bottom end 305, bottom 210 positioned, with the module 1 assembled, coaxial with each other to define a corresponding single through channel which can be engaged by the supply conduits 501 and discharge conduits 502 of the heat carrier fluid.

[0047] It should be noted that the two pairs of holes 4 of the second hollow body 2 have a diameter D4 greater than the diameter D308 of the corresponding two pairs of holes 308 of the first hollow body 3 (see Figure 2C).

[0048] This feature makes it possible to always verify the sealed closing zones (and the seals, as described in more detail below) of the first hollow body 3 when engaged by the supply and discharge conduits of the heat carrier fluid.

[0049] According to an embodiment, the second hollow body 2 comprises a material with a low coefficient of heat exchange in such a way as to reduce the thermal losses. According to an embodiment, the second hollow body 2 may also be made of wood.

[0050] It should be noted that the second hollow body 2 defines an inner surface 2A, represented by the sum of the surfaces facing the inner volume of the second hollow body 2, an outer surface 2B represented by the sum of the surfaces facing towards the outside of the radiant module 1, and a thickness p2.

[0051] As already mentioned, the second hollow body 2 comprises an intake section A and a discharge section B of the air.

[0052] The intake section A is greater than the discharge section B in such a way as to favour the "flue" effect, which makes it possible to draw in cold air from the base of the radiant module 1 and covey it upwards towards the discharge section B.

[0053] According to a preferred embodiment, the intake section A has a surface extension equal to that of the entire bottom 210 of the second hollow body 2. According to another embodiment, the intake section A is less than the surface of the bottom 210 of the second radiant body 2.

[0054] According to a preferred embodiment, the discharge section B is identified by slots 207, substantially rectangular in shape but with half circles instead of the short sides, made on the head 204. According to this embodiment, the maximum direction of extension of the slot 207 corresponds to the transversal extension L module 1. According to another embodiment, not illustrated, the intake section B is identified by a plurality of circular slots.

[0055] The first hollow body 3 and the second hollow body 2 are associated at least at one point and are integral with each other.

[0056] As illustrated in Figure 2A, according to an embodiment the outer surface of the rear wall 302 of the first hollow body 3, is constrained with the inner surface of the rear wall 202 of the second hollow body 2. According to a preferred embodiment, the surface of the rear wall 302 of the first hollow body 3 is less than the surface of the rear wall 202 of the second hollow body 2.

[0057] According to another embodiment (not illustrated), the first hollow body 3 could be hung from the head 204 of the second hollow body 2 in such a way as to have a greater heat exchange surface.

[0058] The first hollow body 3 and the second hollow body 2 are connected in such a way as to identify an inner chamber C characterised by a volume equal to the difference between the volume of the second hollow body 2 and the volume of the first hollow body 3.

[0059] The inner chamber C comprises an intake zone C1, represented by the portion of the inner chamber C close to the intake section A of the second hollow body 2 and to the bottom 305 of the first hollow body 3. In the intake zone C1 the air is drawn in due to the "flue" effect and it continues towards the flow channel C2.

[0060] More specifically, the rear wall 302 of the first hollow body 3 is associated with and positioned in contact with the rear wall 202 of the second hollow body 2.

[0061] In this case, the flow channel C2 is identified by the gap between the respective front walls 301, 201) and the sides 303, 203 of the first 3 and second 2 hollow body.

[0062] In short, the flow channel C2 has a longitudinal extension calculated along a direction parallel to the axis of longitudinal extension V of the module 1, which identifies the length l of the flow channel C2 and a transversal extension, which identifies, with the extension in depth, an air flow section C'.

[0063] In light of this, the length l of the flow channel C2 is equal to the dimension of the first hollow body 3 calculated along the longitudinal extension V of the module 1.

[0064] It should be noted that the flow channel C2 is identified by the dimensional differences of the two hollow bodies 2, 3 calculated along the axes of extension T and L (depth and dimension transversal). According to a preferred embodiment, the flow channel C2 has a cross section C' substantially in the shape of a "U". The section C' comprises a portion made between the front walls 201 and 301 of the first hollow body 3 and the second hollow body 2, and two portions, symmetrical with respect to a transversal axis of the radiant module 1, made between the two sides 203 and 303 of the first hollow body 3 and the second hollow body 2.

[0065] Preferably, the length l of the flow channel C2 is equal to the size of the first hollow body 3 along its longitudinal extension.

[0066] The inner chamber C comprises a discharge zone C3 represented by the portion of the inner chamber C close to the discharge section B of the second hollow body 2 and to the head 304 of the first hollow body 3.

[0067] According to an embodiment, the thickness p2 of the second hollow body 2 is greater than the thickness p3 of the first hollow body 3, which must reasonably be smaller to increase the heat exchange between the air and the heat carrier fluid.

[0068] The invention also provides a radiant body 5 obtained with a plurality of radiant modules 1 according to the invention.

[0069] Figure 5 illustrates the radiant body 5, comprising a plurality of radiant modules 1.

[0070] According to an embodiment, each radiant module 1 is connected with the others by a conduit (single piece) for supplying 501 heat carrier fluid and by a conduit (single piece) for discharging 502 heat carrier fluid.

[0071] The supply conduit 501 passes through the passage holes 4 of the radiant module 1 and through the passage holes 308 of the first hollow body 3. The supply conduit 501 comprises a plurality of holes (visible in Figure 7) positioned at the portion of the conduit positioned inside the inner volume of the first hollow body 3. The holes on the supply conduit 501 are at least one for each of the radiant modules 1 and allow a hydraulic connection between the supply conduit 501 and the inner volume of the first hollow body 3.

[0072] The discharge conduit 502 passes through the passage holes 4 of the radiant module 1 and through the passage holes 308 (having seals on each hole 308) of the first hollow body 3. The discharge conduit 502 comprises a plurality of holes located at the portion of conduit inside the inner volume of the first hollow body 3. The passage holes on the discharge conduit are at least one for each of the radiant modules 1 and allow a hydraulic connection between the discharge conduit 502 and the inner volume of the first hollow body 3.

[0073] The radiant body 5 comprises a plurality of hydraulic sealing elements between the supply conduit 501 and the discharge conduit 502 and the first hollow body 3 of the radiant module 1.

[0074] According to an embodiment illustrated in Figures 7 and 7a, these sealing elements comprise sealing bushes 400 which act, in use, also as spacers between preceding and successive modules 1.

[0075] Each bushing 400 is formed by two tubular elements 400A positioned in a coaxial manner inside each other (see Figure 6).

[0076] According to an embodiment, each bushing 400 is shaped at the two open ends with a corresponding annular recess 400C.

[0077] The external diameter D400E of each bushing 400 is slightly smaller than the diameter D4 of the holes 4 of the second body 2, whilst the internal diameter D400N of each bushing 400 (defining the through channel of the bushing 400) is slightly smaller than the diameter D308 of the holes 308 of the first body 3 in such a way as to coup[le with the supply and discharge conduits 501 and 502, whilst the outer surface of each bushing 400 engages the hole 4 of the second body 2 and comes into contact on the outer walls of the first body 3.

[0078] A sealing ring 400B is positioned at each annular recess 400C of each bushing 400.

[0079] In use, each sealing ring 400C is interposed and in contact with the end recess 400C of the bushing 400, the outer wall of the first body 3 and the outer surface of the supply or discharge conduit 501 or 502.

[0080] In this way, each bushing 400 has the double function of a spacer between modules 1 before and after each other and of fluid sealing element, as it keeps (thanks to the sealing rings) each first body 3 and the supply and discharging conduits 501 and 502 (in which the fluid flows) insulated by the corresponding second bodies 2.

[0081] According to an embodiment not illustrated, the radiant body 5 also comprises a fixing unit, for constraining the radiant body 5 to a supporting wall. According to another embodiment, the radiant body 5 is resting on a treadable surface and comprises a plurality of spacers which allow the air to enter from below, keeping the second hollow body 2 raised with respect to a treadable surface.

[0082] The preset aims are achieved thanks to a radiant module structured in this way.

[0083] The combination of a first body designed for the circulation of the heat carrier fluid and of a second body with the function of casing of the first body and at the same time operating as "flue" for the flow of air from the bottom upwards, gives various advantages:

- optimisation of the air flow with an increase in efficiency of the radiant body even at lower temperatures of the fluid;
- reduction of the external factors on the flow of air being heated;
- greater freedom in the external appearance of the embodiment of the radiant body;
- possibility of using different materials on the two bodies with different characteristics of the heat exchange

coefficients to allow an optimisation of heat exchange on the flow of air.

Claims

1. A radiant module (1) comprising a first hollow body (3) defined by a front wall (301), a rear wall (302), two sides (303), a first top end (304) having a pair of holes (308) made on the corresponding sides (303) and a bottom end (305) having a pair of holes (308) made on the corresponding sides (303); the first hollow body (3) defining the component, in use, for the passage of a heat carrier fluid, **characterised in that** it comprises a second hollow body (2) or cover casing inside of which is entirely contained the first hollow body (3); the second hollow body (2) having a front wall (201), a rear wall (202), two sides (203), a top (204), having an air discharge section (B) and a pair of holes (4) made on the corresponding sides (203) and a bottom (210) having an air intake section (A) and a pair of holes (4) made on the corresponding sides (203), the second hollow body (2) being configured for generating an inner zone which is able to define a channel (C2) for controlled flow of the air from the intake section (A) of the bottom towards the discharge section (B) of the top (204).

2. The radiant module according to claim 1, wherein the bottom (210) of the second hollow body (2) has an inlet section (A) which is larger than the discharge section (B) of the top (204) for drawing in the air from the room and forcing it to flow into the flow canal of (C2) identified by the respective walls of the first (3) and second (2) hollow body in the direction (F) which proceeds from the intake section (A) to the discharge section (B).

3. The radiant module according to claim 1 or 2, wherein the rear wall (302) of the first hollow body (3) is constrained to and positioned in contact with the rear wall (202) of the second hollow body (2) and wherein the flow channel (C2) is identified by the gap between the respective front walls (301, 201) and the sides (303, 203) of the first (3) and second (2) hollow body.

4. The radiant module according to any one of the preceding claims, wherein the flow channel (C2) has a longitudinal extension calculated along a direction parallel to the axis of longitudinal extension (V) of the module (1), which identifies the length (l) of the flow channel (C2) and an air flow section (C'), wherein the length (l) is equal to the dimension of the first hollow body (3) calculated along the longitudinal extension (V) of the module (1).

5. The radiant module according to any one of the preceding claims, wherein the first hollow body (3) has a pair of the passage holes (308) made on its opposite sides (303) and in the upper part defining the first top end (304), and in such a way as to be opposite and coaxial with each other, and wherein the other two passage holes (308) are made on opposite sides (303) of the first hollow body (3) in the lower part, defining the second bottom end (305), and in such a way as to be opposite and coaxial with each other.

6. The radiant module according to any one of the preceding claims, wherein the second hollow body (2) has a pair of the passage holes (4) made on the corresponding opposite sides (203) in the upper part defining the top (204), and in such a way as to be opposite and coaxial with each other, and wherein the other two passage holes (4) are made on the corresponding opposite sides (203) of the second hollow body (2) in the lower part, defining the base (210), and in such a way as to be opposite and coaxial with each other.

7. The radiant module according to claim 5 or 6, wherein the first (3) and the second (2) hollow body have the two pairs of holes (308, 4) made on the corresponding top ends (304, 204) and bottom end (305, 210) positioned, with the module (1) assembled, coaxial with each other to define a corresponding single through channel.

8. The radiant module according to any one of the preceding claims, wherein the pair of holes (308) on the corresponding sides (303) of the first hollow member (3) have a diameter (D308) which is smaller than the diameter (D4) of the pair of holes (4) on the corresponding sides (202) of the second hollow body (2).

9. The radiant module according to any one of the preceding claims, wherein the bottom (210) of the second hollow body (2) is fully open in such a way as to identify the intake section (A) whilst the top (204) of the second hollow body (2) comprises at least one slot (207) in such a way as to identify the discharge section (B).

10. A radiant body comprising a system for feeding the heat carrier fluid, a system for discharging the heat carrier fluid and at least one radiant module (1) according to claims 1 to 9.

11. The radiant body according to claim 10, comprising a plurality of radiant modules (1) positioned alongside each other.

12. The radiant body according to claim 10 or 11, wherein the feed system is a single tubular feed element (501), intersecting the radiant module (1) and passing through two pairs of passage holes (308, 4) of

each radiant module (1) positioned coaxially to each other.

13. The radiant body according to claim 10 or 11 or 12, wherein the discharging system is a single tubular element (502) positioned parallel to the single tubular feed element (502), intersecting each radiant module (1) and passing through the other two pairs of passage holes (308, 4) of each radiant module (1) coaxial with each other.

14. The radiant body according to any one of claims 10 to 13, comprising a plurality of spacer and sealing bushings (400) for the fluids; each bushing (400) being connected coaxially to the feeding system (501) and to the discharging system (502) and partly housed inside each second hollow body (2) of two successive modules (1) placed side by side; each bushing (400) being configured to keep spaced apart from each other the modules (1) and obtain the seal between the holes (308) of the first hollow body (3) and the discharge system (502) and the feed system (501).

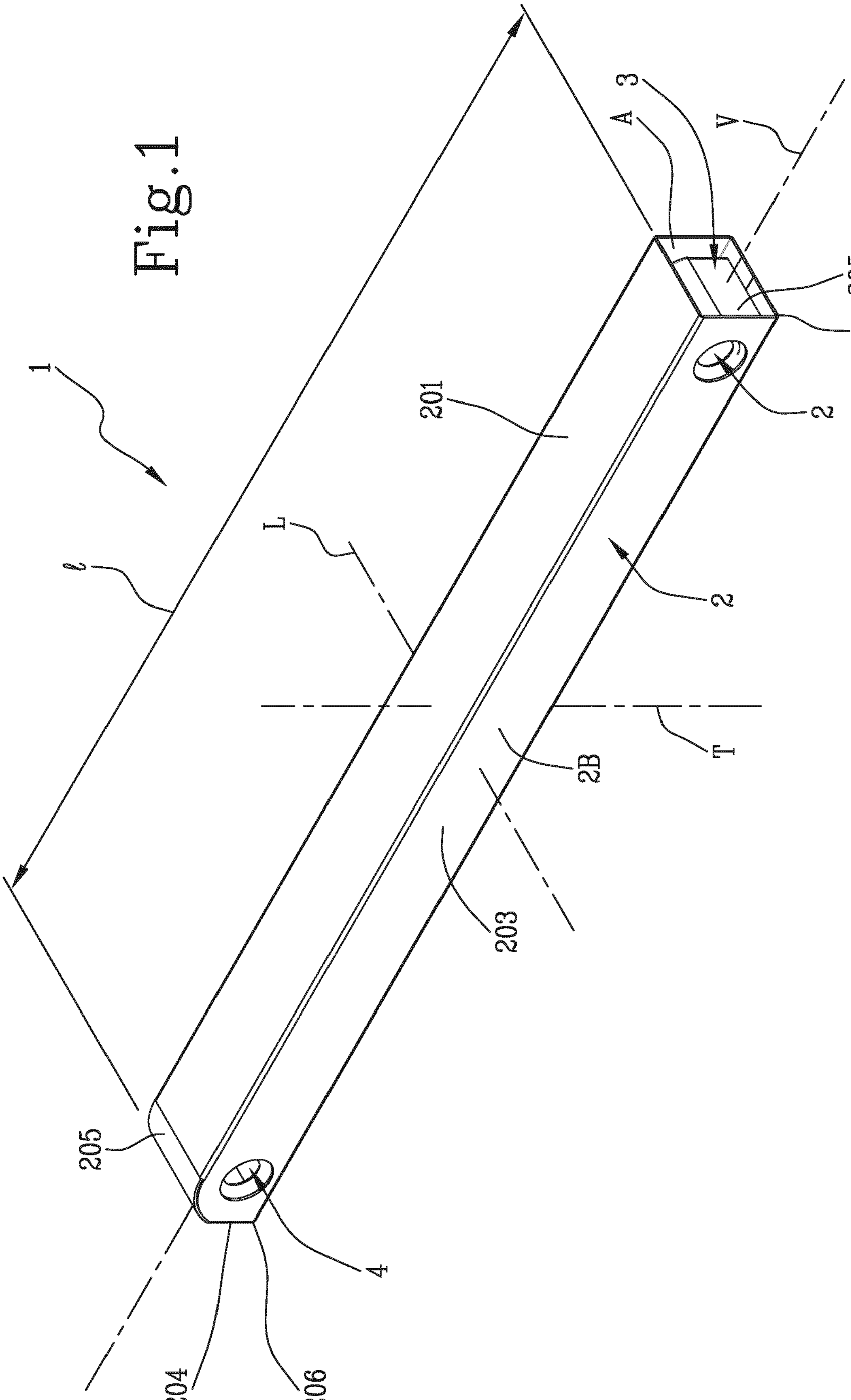
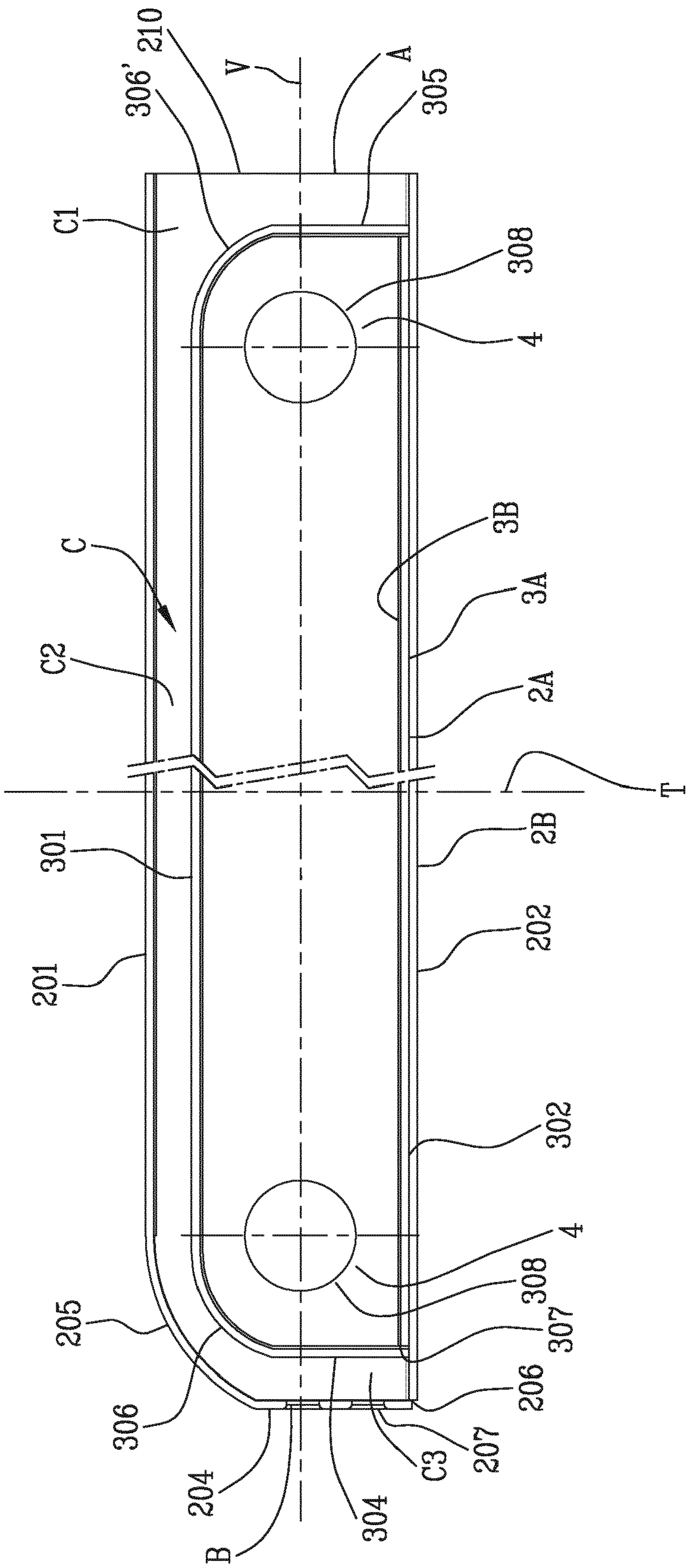


Fig.1

Fig.2A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305
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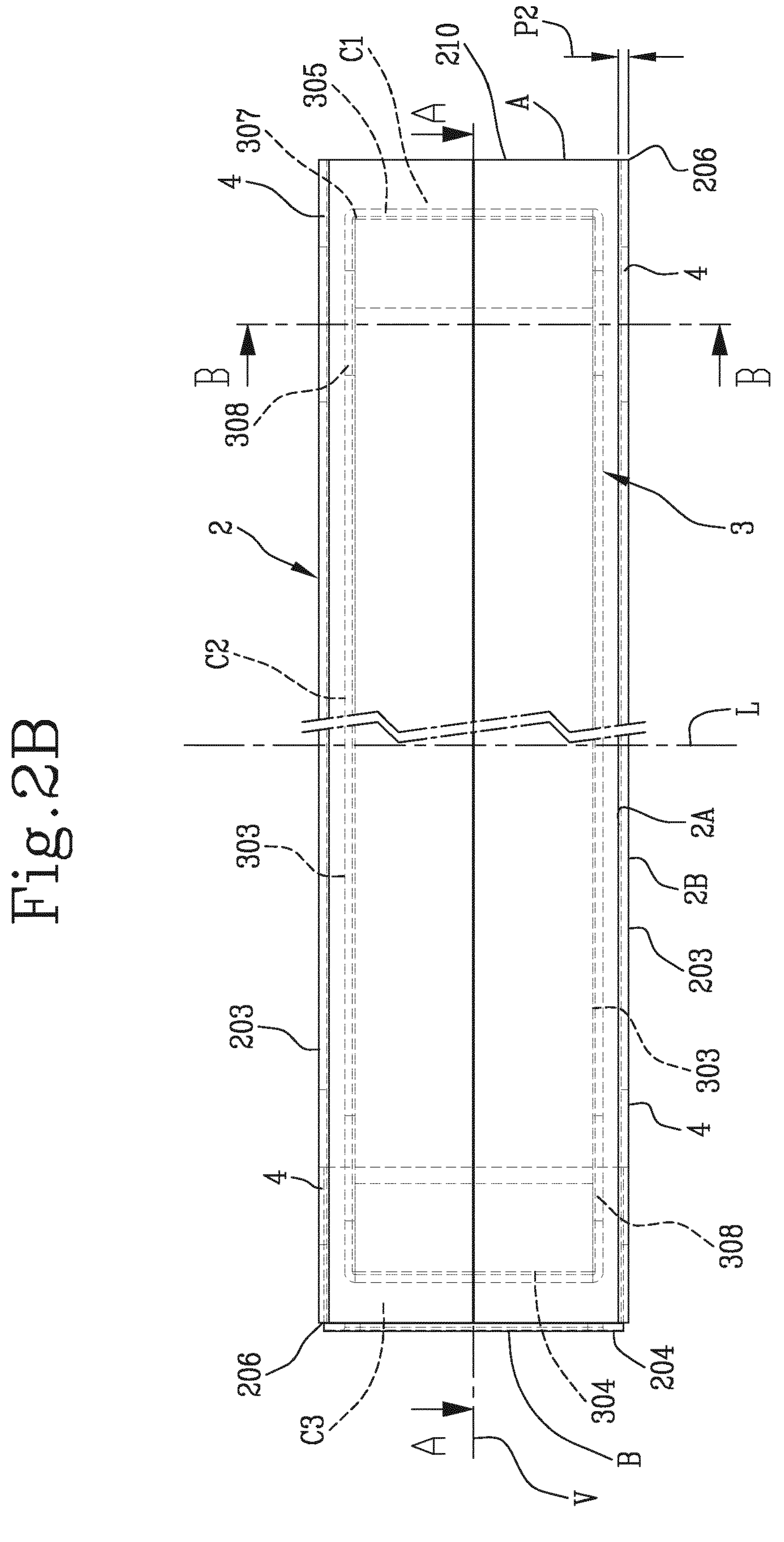
Fig.2B
P2
210
A
C1
305
307
A
4
206
4
B
B
308
2
3
C2
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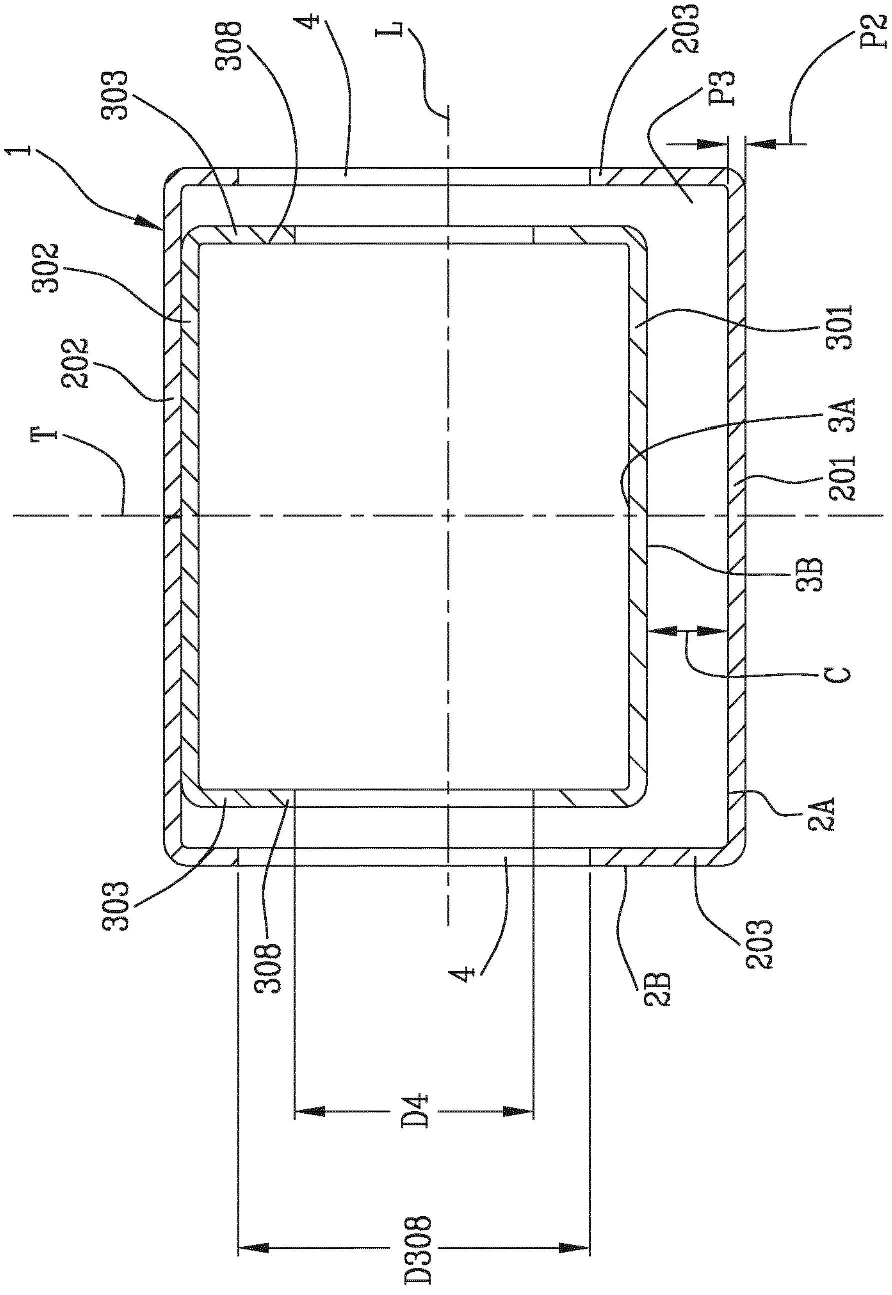
Fig.2C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2B
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D4
D308

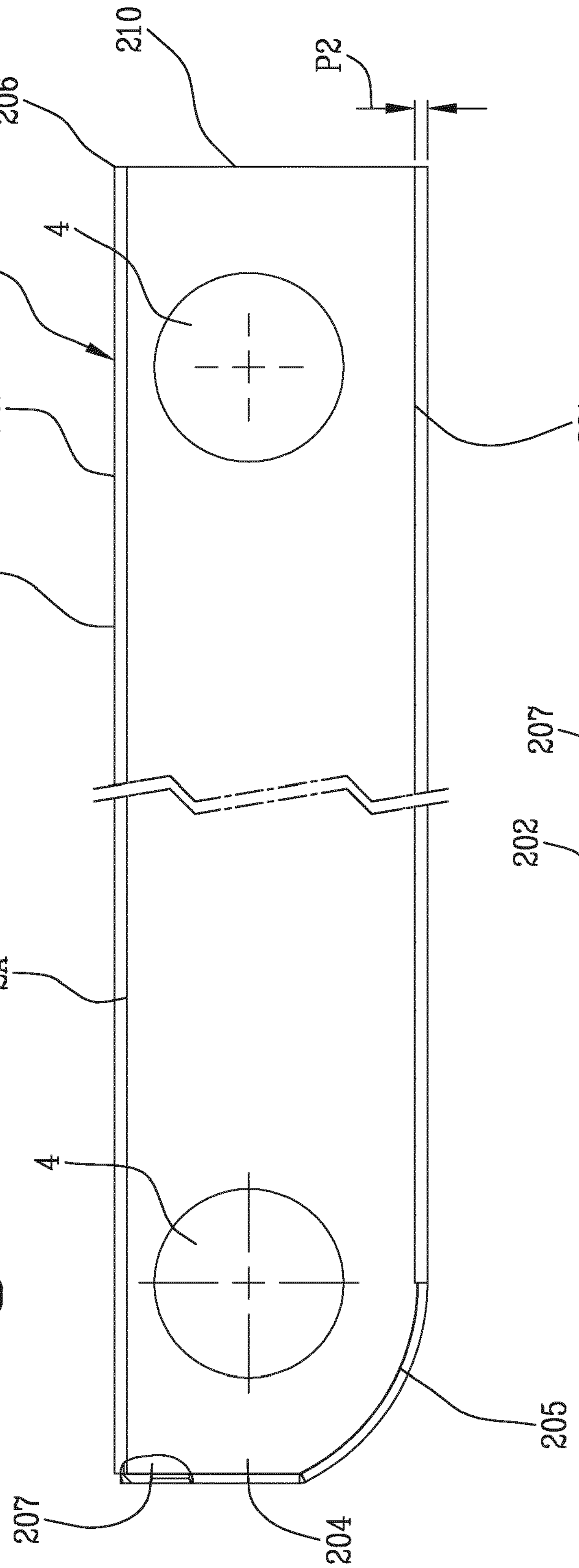


Fig.3A

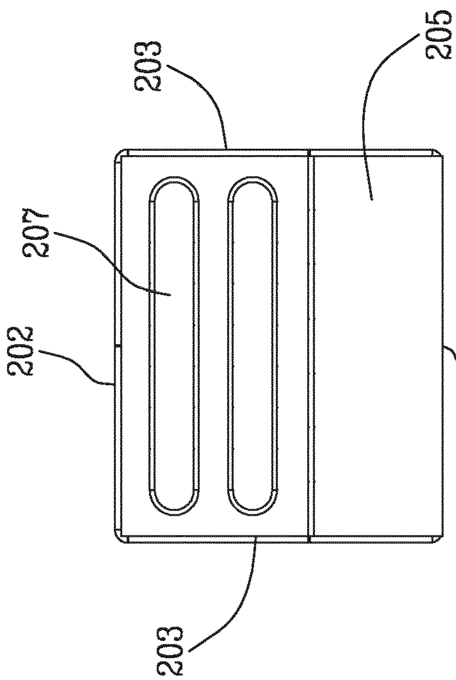
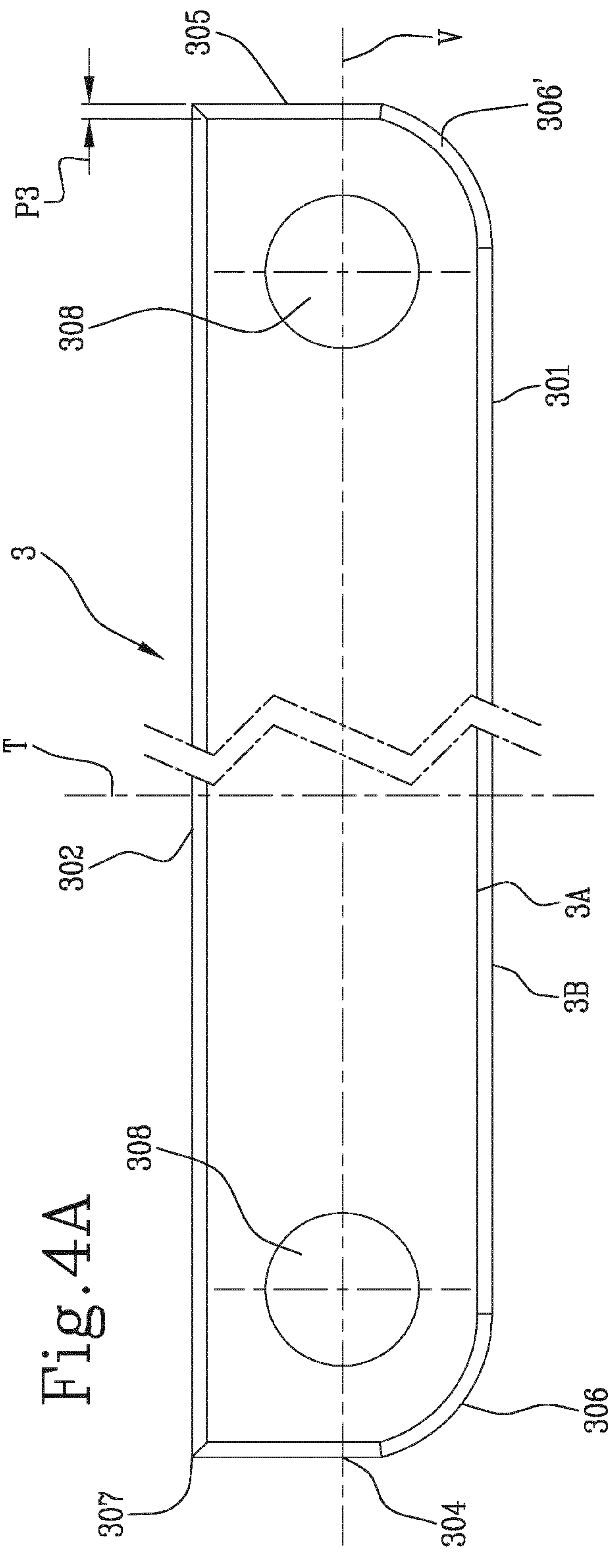


Fig.3B


305
V
306'
P3
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301
3
T
302
3A
3B
308
306
307
304

Fig.4A

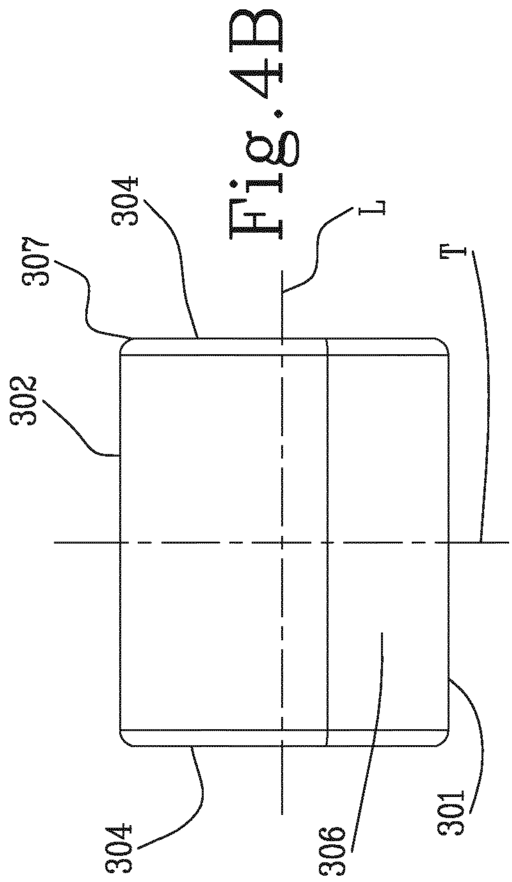
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Fig.4B

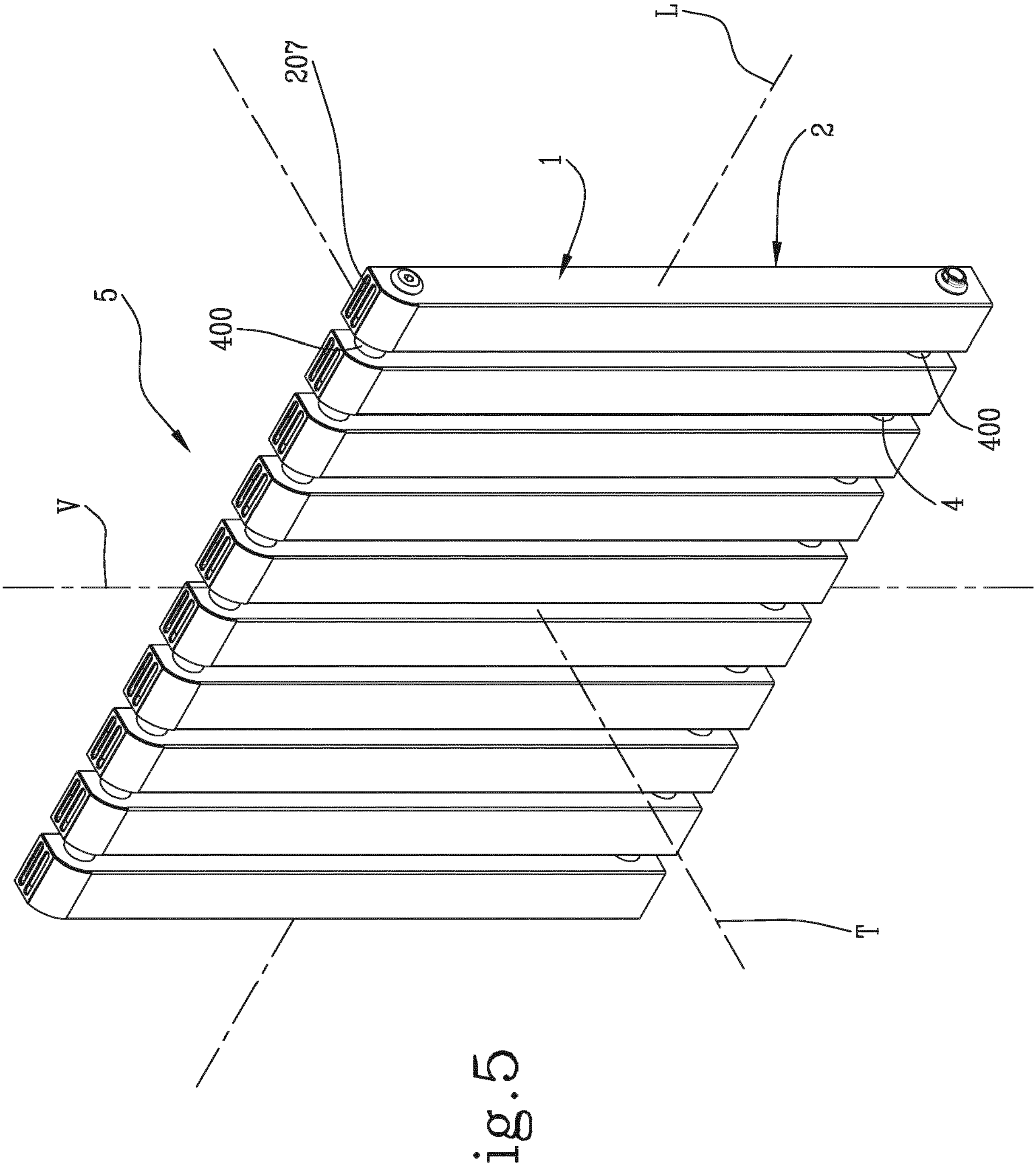

Fig.5

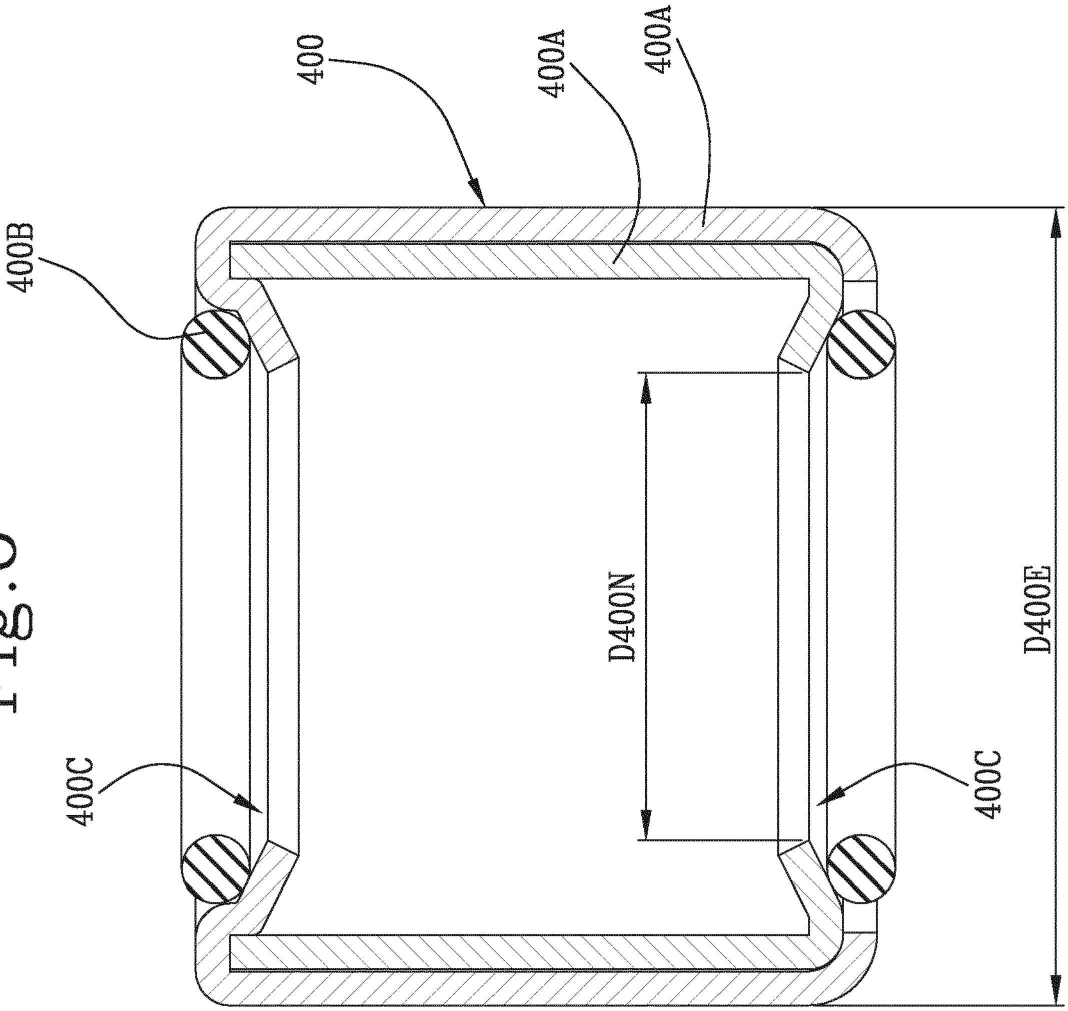

Fig.6

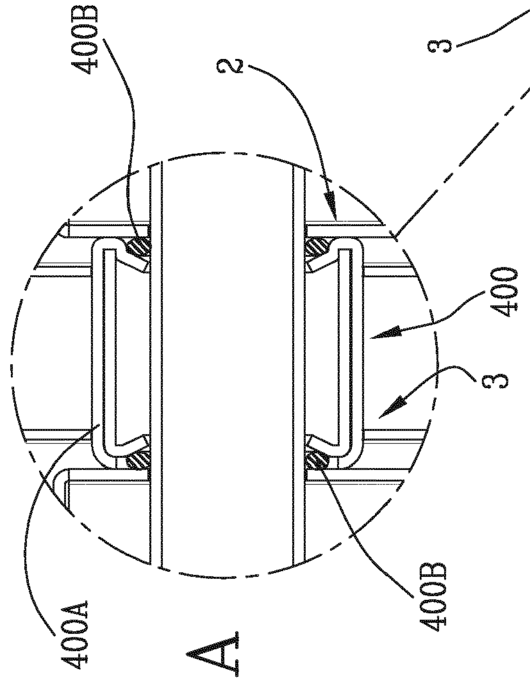

Fig.7A

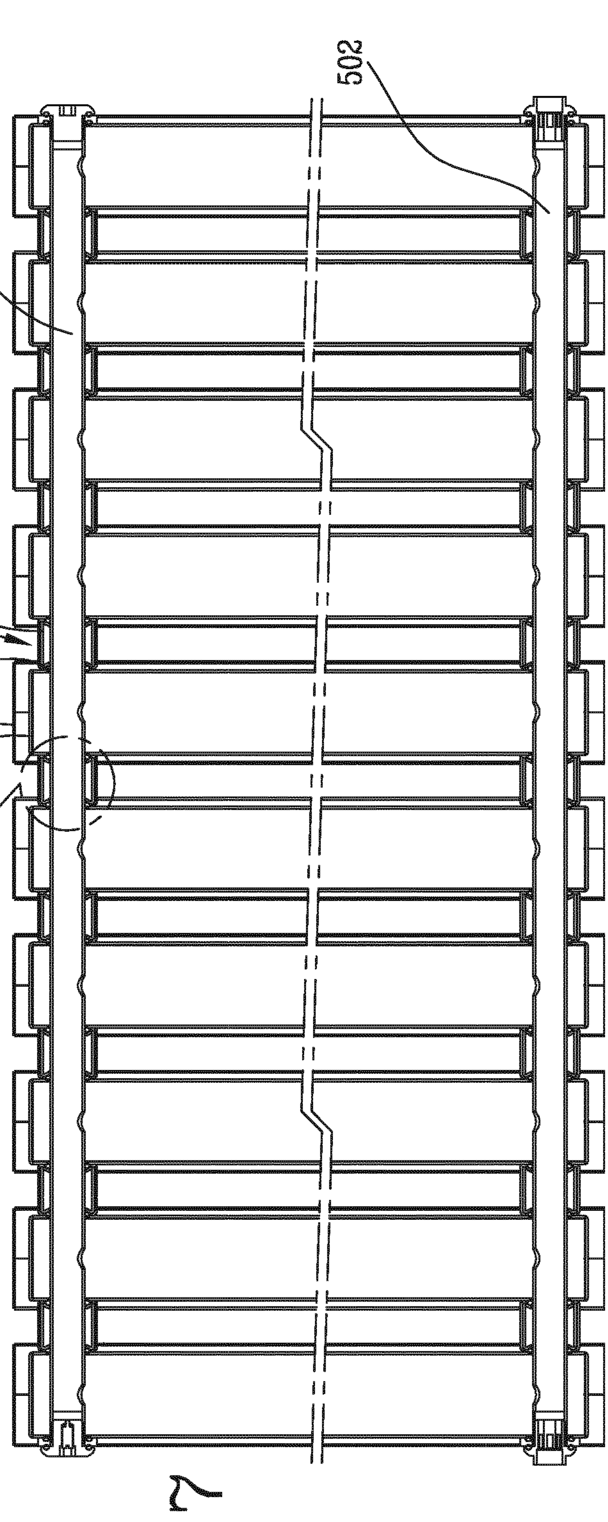

Fig.7

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EUROPEAN SEARCH REPORT

Application Number
EP 18 17 3805

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 0 227 572 A1 (DEL BLANCO LOMBAS FELIX) 1 July 1987 (1987-07-01) * page 2, line 21 - page 3, line 13 * * page 5, line 9 - line 15 * * figure 7 * -----	1-14	INV. F24D19/06
A	US 3 942 587 A (FAVIER MICHEL) 9 March 1976 (1976-03-09) * figure 5 * -----	1-14	
A	EP 2 642 233 A1 (DE LONGHI APPLIANCES SRL [IT]) 25 September 2013 (2013-09-25) * figure 2 * -----	1-14	
			TECHNICAL FIELDS SEARCHED (IPC)
			F24D F28D

The present search report has been drawn up for all claims

1

Place of search	Date of completion of the search	Examiner
Munich	16 July 2018	Bain, David

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16-07-2018

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