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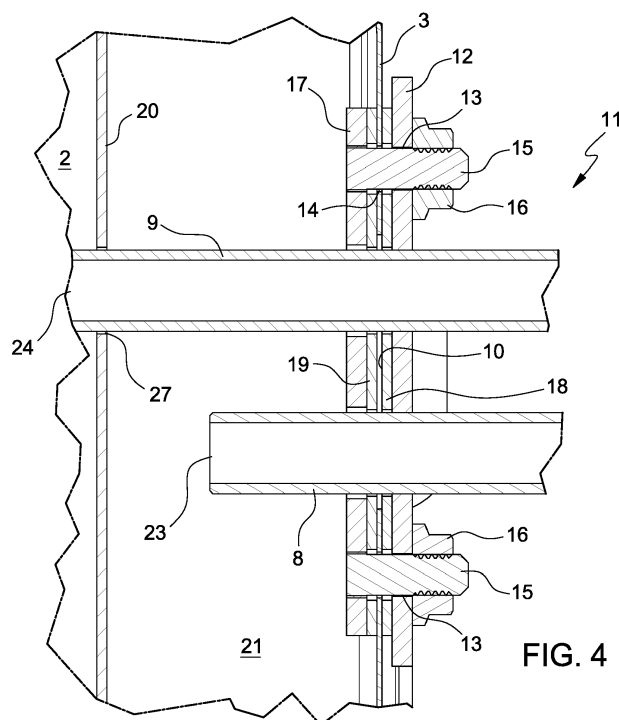
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(54) **OVEN MUFFLE COMPRISING FLANGE ASSEMBLY PROVIDED WITH STEAM AND WATER DUCTS**

(57) An oven muffle, wherein the muffle comprises: a cooking chamber having an opening and comprising a back wall opposite the opening, a roof wall, a floor wall and two side walls; a first duct comprising a first end in the cooking chamber for introducing steam into the cooking chamber; a second duct comprising a first end in the cooking chamber for introducing water into the cooking

chamber; an inner wall inside the cooking chamber facing and spaced from one of the walls of the cooking chamber, preferably the back wall, to divide the cooking chamber into a first chamber between the cooking chamber wall and the inner wall and a second chamber beyond the inner wall; wherein the first end of the first duct is located inside the first chamber.



Description

Cross-reference to related applications

[0001] This patent application claims priority from Italian patent application no. 102022000004844 filed on March 14, 2022, the entire disclosure of which is incorporated herein by reference.

Technical field

[0002] The present invention relates to an oven muffle. Hence, the reference technical field of the invention is the one of (household and industrial) ovens for cooking or heating food. More specifically, the technical field of the invention relates to oven muffles, in which steam and water can be introduced into the cooking chamber through suitable ducts in order to perform steam cooking and cleaning cycles, respectively. The invention further provides the presence of an inner wall inside the cooking chamber so as to create a pre-chamber, which accommodates a fan. In this context, the invention deals with problem concerning how the ducts are arranged relative to the pre-chamber.

State of the art

[0003] As it is known, household or industrial ovens for cooking or heating food comprise a particular inner structure known as muffle, which defines the cooking chamber. On the outside of the muffle there is an outer frame and between the muffle and said frame there is an air gap where the devices used for the correct operation of the oven are arranged. The muffle comprises a plurality of walls connected to one another or directly manufactured as one single piece. In particular, the muffle comprises a back wall, a roof wall, a floor wall and two side walls. A front door is added to this structure. As is known, the door is movable (usually hinged to a side wall or to the floor wall) between a first position, in which it closes the cooking chamber in order to reduce the dispersion of cooking heat, and a second position, in which it allows users to access the cooking chamber.

[0004] Inside the cooking chamber there is a fan, which is coupled to one of the walls, usually the back wall, and is configured to create a forced movement of air in the cooking chamber. In order to protect the fan, it is known to provide a suitable inner wall, which faces and is spaced apart from a wall supporting the fan, so that the cooking chamber is divided into a first chamber between the cooking chamber and the inner wall (which houses the fan) and a second chamber beyond the inner wall (which defines the usable portion of the cooking chamber). The two chambers can communicate with one another in different ways. For example, openings can be provided in the central part of the wall or in the peripheral parts.

[0005] Starting from this known structure, the market currently offers muffles which are equipped, on the out-

side, usually on the outside of the back wall, with a water tank, which is provided with a first duct to deliver steam to the cooking chamber and with a second duct to deliver water to the cooking chamber. In particular, each duct has a first delivering end of its in the cooking chamber and a second supplying end on the outside of the cooking chamber, supplied with steam and water, respectively. The steam is generated by a small electric boiler, which heats part of the water present in the tank, while part of the water is supplied, when requested, to the relative duct by a suitable pump.

[0006] The information disclosed above is known and, therefore, a person skilled in the art does not need further details for the correct understanding of the general introduction of the present invention.

[0007] Nowadays, there is a need to improve the current configuration of muffles provided with a fan with relative separation wall and with the two ducts to supply steam and water to the cooking chamber.

Description of the invention

[0008] Therefore, starting from this known prior art, the object of the invention is to provide an oven muffle provided with ducts for introducing steam and water into the cooking chamber, which is capable of offering a new and alternative solution.

[0009] According to these objects, the invention relates to a novel oven muffle, wherein said muffle comprises a cooking chamber with a substantially box-like shape and with a front opening (as known). Hence, the cooking chamber is delimited by:

- a back wall (opposite the opening), a roof wall, a floor wall, two side walls (and, if necessary, a door hinged to a side wall or to the floor wall in the area of the opening).

[0010] Besides the cooking chamber, the muffle according to the invention further comprises:

- a first duct for introducing steam into the cooking chamber, which is provided with a first steam delivering end in the cooking chamber;
- a second duct for introducing water into the cooking chamber, which is provided with a first water delivering end in the cooking chamber;
- an inner wall inside the cooking chamber facing and spaced apart from one of the walls of the cooking chamber, preferably the back wall, to divide the cooking chamber into a first chamber between the cooking chamber wall and the inner wall and a second chamber beyond the inner wall.

[0011] For the purposes of the invention, the steam source and the water source supplying the first and the second duct, respectively, can be independent or can comprise a common tank, which can be refilled with water

and is located on the outside of the cooking chamber. In any case, both the first and the second duct comprise a first end inside the cooking chamber and a second end on the outside of the cooking chamber, which is directly or indirectly connected to the steam and water sources. How the ducts are connected to the relative outer tank or tanks does not concern the invention since there are, to this aim, procedures that are known to a person skilled in the art.

[0012] Starting from the information disclosed above, the main aspect of the invention relates to how the two ducts enter the cooking chamber and where the corresponding first steam and water delivering ends are located relative to the inner wall. In particular, the first end of the first steam delivering duct is located inside the first chamber between the wall of the cooking chamber and the inner wall.

[0013] The muffle preferably comprises a fan accommodated in said first chamber, where steam is delivered, so as to force steam to flow from the first chamber to the cooking chamber beyond the inner wall.

[0014] To this aim, the inner wall preferably comprises at least one opening to allow steam to flow from the first to the chamber of the cooking chamber.

[0015] The first end of the second water delivering duct is preferably located inside the second chamber so as to directly deliver water beyond the inner wall.

[0016] Both ducts enter the chamber by going through the same wall, namely the back wall, facing the inner wall. The second duct, in this case, necessarily has an extension that is such as to go beyond the first chamber and reach the second chamber, going through a hole obtained in the inner wall.

[0017] Since one single opening is obtained in the muffle for the passage of both ducts, the invention provides the presence of a single flange assembly, which supports both ducts in place astride the opening and seals the latter.

[0018] In this case, the flange assembly preferably comprises an outer flange integral to the ducts and configured to be coupled to the opening on the outside of the muffle. The joining of the ducts to the outer flange can be directly obtained during the production phase, thus creating one single piece, or the ducts and the flange can be connected through welding.

[0019] Furthermore, the outer flange is preferably provided with holes, which, in use, are in the area of holes made in the wall of the muffle, so that the flange and the muffle are coupled through threaded bodies.

[0020] Furthermore, the flange assembly preferably comprises an inner flange configured to be coupled to the opening inside the cooking chamber and provided with holes to receive the aforesaid threaded bodies and with holes for the passage of the ducts.

[0021] Preferably, in the area of the opening between the wall of the muffle and the inner and outer flanges there are provided an inner plate or seal and an outer plate or seal, respectively. Said plates or seals are pro-

vided with holes for receiving the threaded bodies (which, hence, pack the entire flange assembly together) and with holes for the passage of the ducts.

[0022] The inner and outer flanges are preferably made of a metal material.

[0023] The plates or seals are preferably made of a metal material or rubber.

[0024] The invention also applies to an oven comprising a muffle as described above.

Brief description of the drawings

[0025] Further features and advantages of the invention will be best understood upon perusal of the following description of a non-limiting embodiment thereof, with reference to the accompanying drawings, wherein:

- figures 1 and 2 are schematic views of an embodiment of the muffle according to the invention;
- figure 3 is an enlarged view of the portion indicated with III of the muffle of figure 2;
- figure 4 is a cross section view of the detail of figure 3, in which the cross section plane is parallel to the side walls of the muffle.

Description of an embodiment of the invention

[0026] With reference to the accompanying figures, figure 1 shows an example of an oven muffle according to the invention indicated, as a whole, with number 1. Said muffle 1, as it is known, defines a cooking chamber 2 having an opening and delimited by a back wall 3 opposite the opening, a roof wall 4, a floor wall 5 and two side walls 6, 7. The muffle of figure 1 is a muffle configured to deliver steam to the cooking chamber, in order to cook food with steam, as well as water to perform cleaning cycles. To this aim, in the example of figure 1, the muffle comprises a water loading cup 30 accessible from the front and, at the back, a water tank connected to a small boiler for the generation of steam as well as a suction pump. These last elements are only partly visible in figure 1 and are generically indicated with number 31. In figure 1, the back wall 3 is not visible or is only partly visible due to the presence of an inner wall 20 facing and spaced apart from the back wall 3. As explained more in detail below, the inner wall 20 divides the cooking chamber into a first chamber between the back wall 3 and the inner wall 20 and a second chamber beyond the inner wall 20 towards the opening of the muffle 1. The references 25 of figure 1 indicate possible concentric circular openings, which are a mere example of a possible fluid connection between the two chambers.

[0027] Figure 2 shows a different perspective view of the muffle of figure 1, in which the inner wall 20 was removed. Figure 2 shows a detail of the back wall 3 indicated with III, a portion that is shown in figure 3 in an enlarged view. In these figures, number 8 relates to a first duct configured to introduce steam into the cooking

chamber and number 9 relates to a second duct configured to introduce water into the cooking chamber. In figure 2, number 28 relates to a fan and, as shown, the ducts and the fan are associated with the same back wall 3. The invention does not deal with how the ducts 8 and 9 are supplied with steam and water, since this subject-matter is known to a person skilled in the art. The figures show an embodiment of the invention, namely they show how both ducts 8, 9 enter the cooking chamber 2 going through a common opening 10 obtained, in this example, in the back wall 3 of the muffle 1. In this example, the opening is a slot and the ducts 8, 9 are arranged at the ends thereof. Number 11 of figure 3 identifies the flange assembly arranged in the area of the opening 10, in which one single flange assembly supports both ducts 8, 9 in place and seals the opening 10. However, for the purposes of the invention, how the ducts cooperate with the wall 3 is an important, though not primary aspect, since the primary aspect is the relationship between the ducts and the inner wall 20.

[0028] This particular aspect is shown in figure 4, which shows a cross section view of the detail of figure 3, in which the cross section plane is parallel to the side walls of the muffle. This cross section shows the components making up the flange assembly 11 as well as the extensions of the ducts in the cooking chamber. In this example, according to the main definition of the present invention, the first end 23 of the first duct 8 (from which steam is dispensed) is located inside the first chamber 21 between the back wall 3 and the inner wall 20, whereas the first end 24 of the second duct 9 (from which water is dispensed) is located inside the second chamber 26 beyond the inner wall 20. In other words, both ducts enter the cooking chamber 2 by going through the same wall 3 facing the inner wall 20, however only the second duct has an extension that is such as to go beyond the first chamber 21, going through a hole 27 made in the inner wall 20.

[0029] In the example of figure 4, the flange assembly 11 comprises:

- an outer flange 12 coupled at the opening 10 on the outside of the muffle;
- an inner flange 17 coupled at the opening 10 on the inside of the muffle;
- two plates or seals 18, 19 interposed between the wall 3 of the muffle and the flanges 12 and 17.

[0030] In this example, the outer flange 12 is manufactured as one single piece together with the ducts 8, 9, whereas the inner flange 17 and the plates or seals 18, 19 are provided with holes configured to allow the passage of the ducts 8, 9.

[0031] The fixing in place and the fastening of the flange assembly 11 is carried out by means of threaded bodies 15, 16 coupled to respective holes made in the wall 3 of the muffle, in the flanges 12 and in the plates 18, 19.

[0032] Finally, it is clear that the invention described herein can be subjected to changes and variations, without for this reason going beyond the scope of protection of the appended claims.

Claims

1. An oven muffle (1), wherein the muffle (1) comprises:

- a cooking chamber (2) provided with an opening and comprising a back wall (3) opposite the opening, a roof wall (4), a floor wall (5), and two side walls (6, 7);
- a first duct (8) comprising a first end (22) in the cooking chamber (2) for introducing steam into the cooking chamber (2);
- a second duct (9) comprising a first end (23) in the cooking chamber (2) for introducing water into the cooking chamber (2);
- an inner wall (20) inside the cooking chamber (2) facing and spaced from one of the walls of the cooking chamber (2), preferably the back wall (3), to divide the cooking chamber (2) into a first chamber (21) between the cooking chamber wall (2) and the inner wall (20) and a second chamber (26) beyond the inner wall (20);

wherein:

- both ducts enter the cooking chamber (2) going through a common opening (10) obtained in the wall (3) facing the inner wall (20), there being provided a single flange assembly (11) that supports in place both ducts (8, 9) and seals the opening (10);
- the first end (23) of the first duct (8) is located inside the first chamber (21);
- the second duct (9) having an extension that is such as to go beyond the first chamber (21) going through a hole (27) obtained in the inner wall (20), so that the first end (24) of the second duct (9) is located inside the second chamber (26).

2. Muffle as claimed in claim 1, wherein the muffle comprises a fan (28) housed in the first chamber (21) to force the passage of steam from the first chamber (21) to the cooking chamber (2) by passing the inner wall (20).

3. Muffle as claimed in claim 2, wherein the inner wall (20) comprises at least one opening (25) for passing steam from the first chamber (21) to the cooking chamber (2) beyond the inner wall (20).

4. Muffle as claimed in claim 1, wherein the flange assembly (11) comprises:

- an outer flange (12) integral with the ducts (8, 9) and configured to be coupled to the opening (10) outside of the muffle;
 - a inner flange (17) configured to be coupled to the opening (10) inside the muffle and provided with holes for the passage of the ducts (8, 9). 5
5. Muffle as claimed in claim 4, wherein the wall (3), outer flange (12) and inner flange (17) are provided with holes for receiving threaded bodies (15, 16) for clamping the assembly onto the wall (3). 10
6. Muffle as claimed in claim 5, wherein between the wall (3) and the inner and outer flanges (17, 12) an inner plate or seal (18) and an outer plate or seal (19) are provided; the plates or seals (18, 19) being provided with holes for receiving the threaded bodies (15, 16) and holes for the passage of the ducts (8, 9). 15
7. Oven comprising: 20
- a muffle according to any one of the preceding claims;
 - a steam source and a water source, which supply the first and the second duct, respectively; 25
- wherein the first and the second duct comprise a second end on the outside of the cooking chamber, which is directly or indirectly connected to the steam and water sources. 30
8. Oven as claimed in claim 7, wherein, on the outside of the cooking chamber, the oven comprises:
- a tank, which can be refilled with water and is located on the outside of the cooking chamber, to supply the steam source and the water source, 35
 - a boiler for the generation of steam; 40
 - and a water suction pump. 45
- 50
- 55

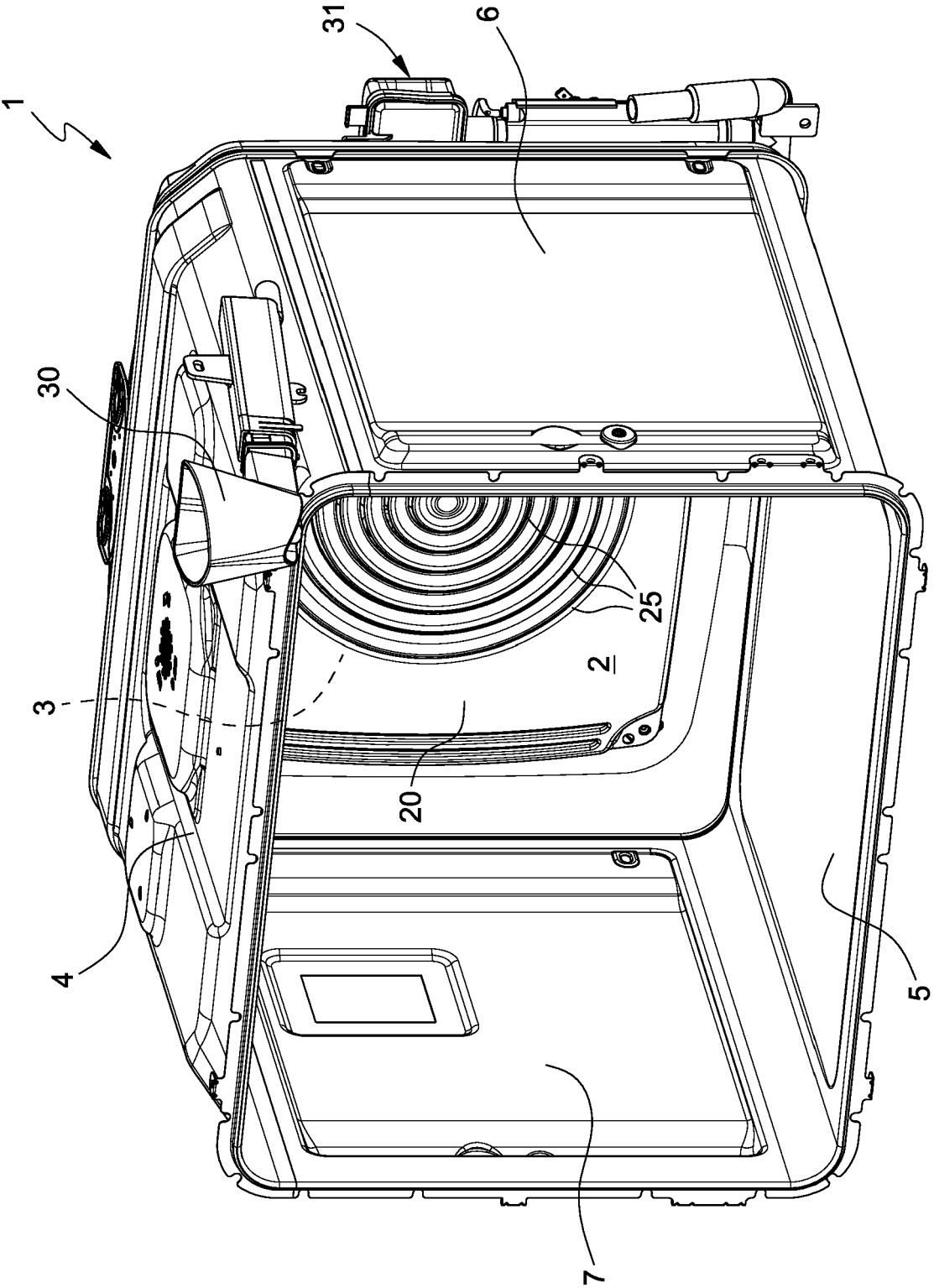


FIG. 1

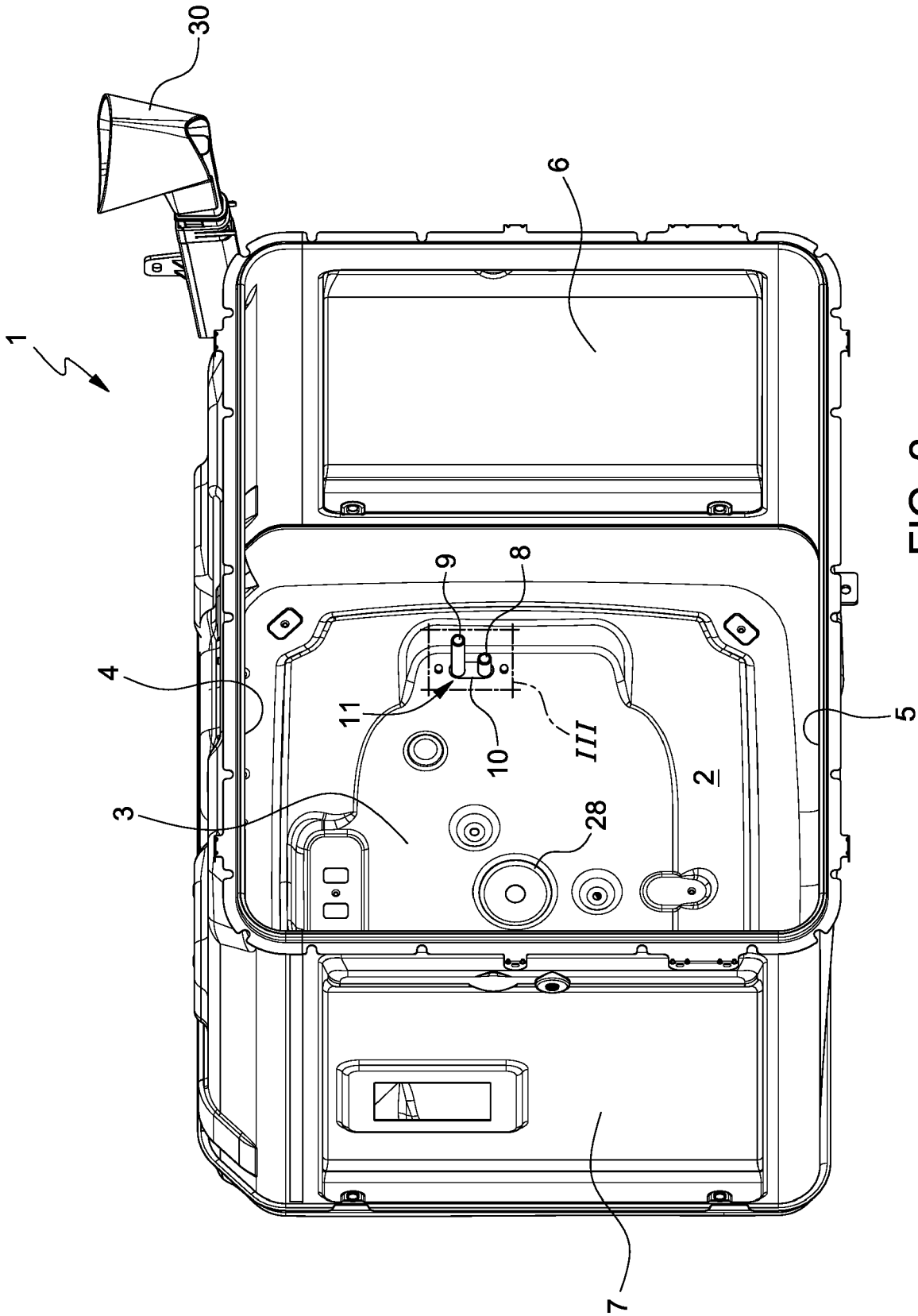
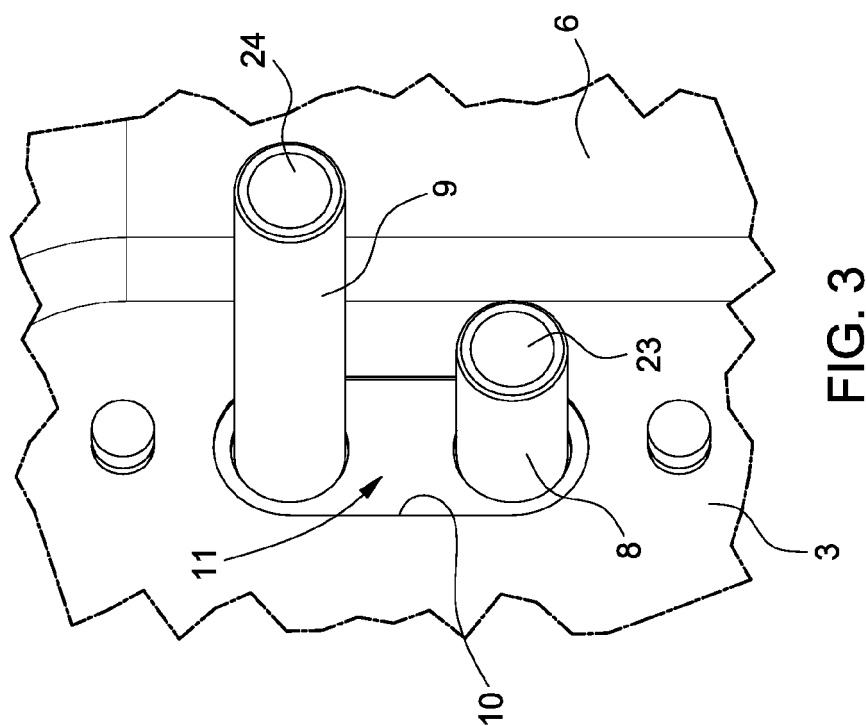
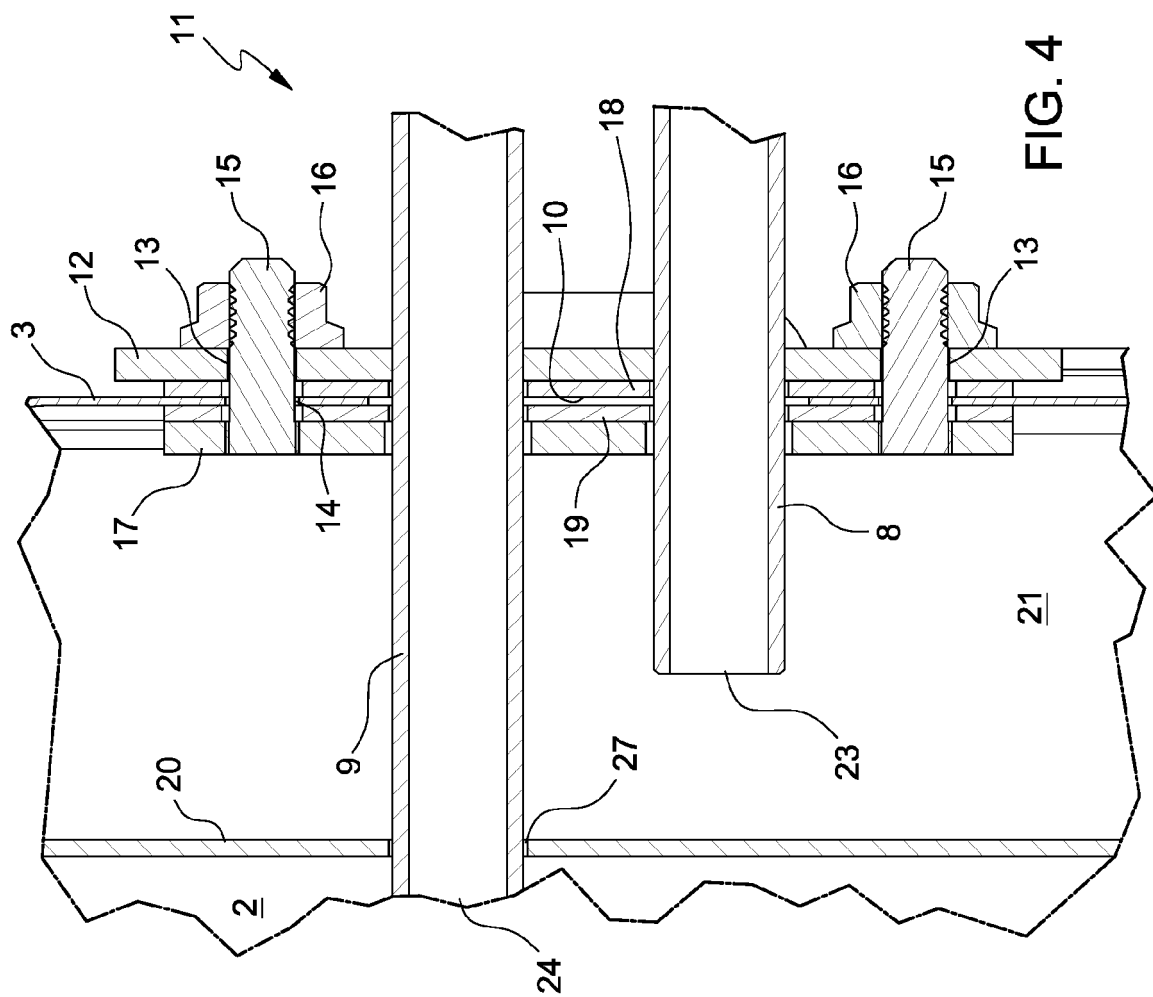


FIG. 2





EUROPEAN SEARCH REPORT

Application Number

EP 23 16 1453

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 2 273 200 A1 (RATIONAL AG [DE]) 12 January 2011 (2011-01-12) * paragraphs [n0034], [0039], [0041]; figure 1 *	1-8	INV. F24C15/32 F24C14/00
A	WO 2021/246975 A1 (FEMAS METAL SAN VE TIC A S [TR]) 9 December 2021 (2021-12-09) * figure 2 *	1-8	
A	WO 2013/098018 A1 (ARCELIK AS [TR]; ARSLANTEKIN IHSAN [TR]) 4 July 2013 (2013-07-04) * figures *	1-8	
			TECHNICAL FIELDS SEARCHED (IPC)
			F24C A21B A47J H05B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		19 June 2023	Verdoodt, Luk
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EP 23 16 1453

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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19-06-2023

10	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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REFERENCES CITED IN THE DESCRIPTION

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