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(54) **TURBULATOR COMPONENT FOR HEATING EQUIPMENTS**

(57) The present invention refers to a turbulator component designed to be inserted into a pipe for conveying (2) the combustion fumes of a heat exchanger of a heating apparatus (3).

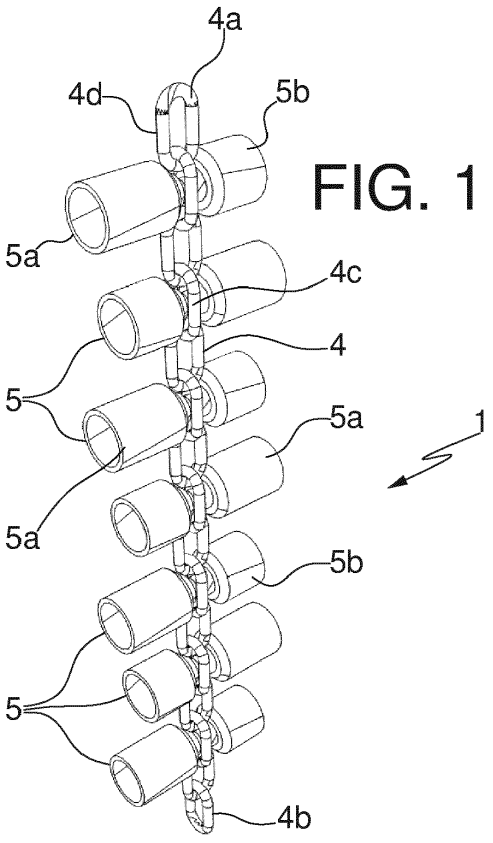


FIG. 1

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## Description

### TECHNICAL FIELD OF THE INVENTION

**[0001]** The present invention relates to a turbulator component arranged to be inserted in a pipe for conveying combustion fumes of heating apparatuses, as well as a heating apparatus comprising one or more of these turbulator components.

### STATE OF THE PRIOR ART

**[0002]** Some heating apparatuses, such as for example home heat generators and the like, supplied for example with pellets or other fuel, include, as it is known, heat exchanger, sometimes also known as a monobloc, which comprises a plurality of exhaust ducts or pipes, through which the combustion fumes are passed.

**[0003]** The aforementioned exhaust pipes are housed inside a chamber, with a carrier fluid, usually water, being circulated therein.

**[0004]** In known heating apparatuses, elements called turbulators are normally inserted inside the exhaust pipes, whose function is to transform the flow of combustion fumes from laminar to turbulent.

**[0005]** The turbulators in fact slow down the flow of combustion fumes, improving the speed of heat transfer from these fumes to the carrier fluid and making heating by the exchanger more homogeneous.

**[0006]** The turbulators of the type currently used are rigid and arranged along a respective substantially straight exhaust pipe.

**[0007]** To clean the exhaust pipes with a respective tool, such as a brush, it is necessary to remove the turbulator and for this purpose one or more special technical inspection openings are required, which can be usually accessed by removing at least one cover panel arranged to conceal the technical opening.

**[0008]** With the aim of removing the cover panel, which makes it possible to access to the technical opening, tools are generally required, especially in case the removal of the panel exposes electrical parts of the apparatus.

**[0009]** Moreover, if one wants to reach the turbulators, tools for unscrewing/tightening are usually required for intervening on the technical openings. In this regard, the technical opening must be closed tightly once the respective panel has been repositioned, this requiring adequate tightening force/torque applied by a tool.

### OBJECTS OF THE INVENTION

**[0010]** An object of the present invention is to provide a new turbulator component for heating apparatuses.

**[0011]** Another object of the present invention is to provide a turbulator component that can be easily and quickly inserted/removed into/from a pipe for conveying combustion fumes of any shape.

**[0012]** Another object of the present invention is to provide a turbulator component simple and easy to be obtained.

**[0013]** Another object of the present invention is to provide a new heating apparatus.

**[0014]** Another object of the present invention is to provide a heating apparatus in which it is possible to clean the pipe or pipes for conveying combustion fumes easily and quickly.

**[0015]** Another object of the present invention is to provide a heating apparatus in which it is possible to easily inspect respective zones of conveyance of combustion fumes.

**[0016]** In accordance with an aspect of the invention, a turbulator component according to claim 1 is provided.

**[0017]** The dependent claims refer to preferred and advantageous embodiments of the invention.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0018]** Other characteristics and advantages of the invention will be more evident from the description of an embodiment of a turbulator component and of a heating apparatus, illustrated only by way of example in the accompanying drawings in which:

- figures 1 and 2 are perspective views which illustrate a turbulator component according to the present invention;
- figures 3 and 4 show details on an enlarged scale of the turbulator component of figure 1;
- figure 5 is an exploded view of a projecting element of the turbulator component of figure 1;
- figure 6 is a perspective view slightly from above of a heating apparatus according to the present invention;
- figures 7 to 13 are views of details of the heating apparatus of figure 6 on an enlarged scale and with parts removed.

**[0019]** In the attached drawings equal parts or components are marked by the same reference numbers.

### EMBODIMENTS OF THE INVENTION

**[0020]** With reference to the attached figures, a turbulator component 1 has been illustrated which is designed to be inserted in a pipe for conveying combustion fumes 2 of a heat exchanger of a heating apparatus 3, such as a stove, a boiler or the like, if desired for home use.

**[0021]** This turbulator component 1 comprises at least a folding or flexible element or switchable in different trims 4 on which a plurality, for example any number between three and ten or more, if desired six, seven or eight projecting elements or protuberances or flow deflector elements 5 are mounted, which designed to slow down and divert the flow of combustion fumes so as to transform the flow of the latter from laminar to turbulent, thereby improving the speed of heat transfer from these to a car-

rier fluid, such as water or air and making it more homogeneous heating by the respective exchanger.

**[0022]** The protruding elements 5 are each mounted at a respective portion of the length of the flexible element 4, so that the protruding elements 5 are distributed along the extension or, preferably, along the entire extension of the folding or flexible or switchable in different trims element 4. If desired, one or both of the end sections 4a, 4b of the flexible element 4 can be free of protruding elements. Preferably, the projecting elements 5 are fixed on the flexible element 4, so as not to slide over the latter and therefore in a position substantially fixed with respect to the length of the flexible element 4.

**[0023]** More particularly, the foldable or flexible or switchable element 4 can be bent or flexed or switched, elastically or not, between several trims so as to vary the arrangement of the projecting elements 5 one with respect to the other, thereby making it possible to insert or remove the turbulator component 1 into/from curved sections or mutually inclined sections of conveying pipes 2 of heating apparatuses 3.

**[0024]** Preferably, the folding or flexible or switchable element 4 can be folded or flexed or switched, elastically or not, at a plurality of portions thereof.

**[0025]** If desired, the folding or flexible or switchable element 4 can be folded or flexed or switched between a first substantially straight trim or elongated configuration and several substantially curved or with mutually inclined segments trims or in a retracted or shortened configuration.

**[0026]** In this regard, the first trim can be a rest or normal trim in a condition without constraints, for example outside a respective conveying pipe or in any case within a straight conveying pipe.

**[0027]** Preferably, the folding or flexible or switchable in a plurality of trims element 4 comprises a chain, a rope, a plurality of hooks connected to each other, a catenary structure, an elastic band, an elastic wire or bar, for example metallic, or a spring, such as a helical spring.

**[0028]** As regards instead the projecting elements or protuberances or flow deflector elements 5, they can be mounted, for example removably, on the flexible element 4 so as to protrude on one side or on two opposite sides of the same.

**[0029]** If desired, the projecting elements or protuberances 5 extend transversely or orthogonally with respect to the flexible element 4 or better to the respective portion of the flexible element 4 on which they are mounted.

**[0030]** The protrusions or projecting elements 5 can have an extension between about 2 and about 10 cm.

**[0031]** In order to define a side of the flexible element, one can consider the flexible element in a first substantially rectilinear trim or in an elongated configuration and consider one of the directions orthogonal to the longitudinal or main extension axis of the flexible element. Moreover, a solid face of the flexible element 4 is not to be intended as side, considering for example that in the case of a chain no faces are provided with such meaning.

**[0032]** If desired, the projecting elements 5 are mounted on the flexible element 4 so as to protrude from a first side of the same to a greater or equal extent with respect to a second side, if desired opposite to the first.

**[0033]** In this regard, some projecting elements 5 can be mounted on the flexible element 4 so as to protrude only from a first side or to a greater extent from the first side of the flexible element 4 itself with respect to a second side, if desired opposite to the first, while others projecting elements 5 can be mounted on the flexible element 4 so as to protrude from the second side only or to a greater extent from the second side with respect to the first side.

**[0034]** With reference to this aspect, adjacent and subsequent projecting elements 5 can be mounted so as to protrude from a first side only or to a greater extent, if desired between 1.5 and 3 times, from a first side of the flexible element 4 itself with respect to a second side and the other so as to protrude from the second side only or to a greater extent, if desired between 1.5 and 3 times, from the second side with respect to the first side.

**[0035]** This measure clearly improves the effectiveness of the turbulator component 1.

**[0036]** The projecting elements 5 can for example have a cylindrical or hollow or solid parallelepiped configuration or even an irregular shape or any other shape other than the previous ones.

**[0037]** If desired, the projecting elements 5 comprise a first tubular component 5a and a second tubular component 5b clamped to each other by means of a pin or screw or nail 5c passing through the flexible element 4 and, if desired, tightened by means of a respective nut 5d, providing for example also a washer or spacer 5e.

**[0038]** With reference to the non-limiting embodiment illustrated in the figures, the flexible element 4 is a chain, while the first 5a and the second 5b tubular components are tightened to each other by means of a pin or screw 5c passing through a link 4c of the chain 4.

**[0039]** In this regard, the tubular components 5a, 5b can have a first main section 5f which is substantially tubular, if desired cylindrical and a tapered end section 5g, if desired frusto-conical shaped or with multiple diameters, and are assembled with respective tapered end sections 5g facing each other and if desired abutted one towards the other at the slot defined by a link 4c of the chain 4.

**[0040]** The first main section 5f of the first tubular component 5a can have a length greater, for example between 1.5 and 3 times the length of the first main section 5f of the second tubular component 5b.

**[0041]** Still with reference to the non-limiting embodiment illustrated in the figures, two adjacent and successive projecting elements 5 on the flexible element 4 are mounted one with a first tubular component 5a extending from a first side of the flexible element 4 and the other with the first tubular component 5a extending from the second side of the flexible element 4. This may apply to each pair of adjacent projecting elements 5.

**[0042]** An object of the present invention is also a heating apparatus 3 comprising or better delimiting a combustion chamber 6 and then including at least one heat exchanger or monobloc 7 between a carrier fluid to be heated, such as water or air or diathermic oil or a different carrier fluid, and the combustion fumes generated by the heating apparatus in the combustion chamber 6.

**[0043]** Of course, the apparatus 3 is delimited by a frame 3a with a door 3b which can be opened so as to access the combustion chamber 6.

**[0044]** The heat exchanger 7 can comprise at least one boiler or chamber 8 for containing a fluid to be heated and at least one conveying pipe 2 of combustion fumes extending through the containment chamber 8. The containment chamber 8 can enclose in whole or at least partly the combustion chamber 6.

**[0045]** In this regard, the containment chamber 8 can be delimited between a main side wall 9 delimiting the combustion chamber and an intermediate or external wall or by sections of intermediate or external wall 10 enclosing the main side wall 9, as well as clearly by one or more respective sections of lower wall 11, if desired C-shaped or L-shaped, and one or more sections of upper wall 12, if desired C-shaped or L-shaped, of the frame 3a of the heating apparatus 3.

**[0046]** Clearly, the containment chamber 8 is in fluid communication, by means of inlet and outlet openings 13a, 13b, if desired made on the back of the containment chamber 8, as well as one or more respective ducts 13c with a network servicing users.

**[0047]** The apparatus 3 further comprises at least one turbulator component 1 arranged within a respective conveying pipe 2. If desired, a plurality of conveying pipes 2 are provided, for example two, three, four or more, each arranged at a respective portion of the main side wall 9, at the sides and/or the back of the same, and a turbulator component 1 is inserted in each conveying pipe 2.

**[0048]** The conveying pipes 2 can have any section, for example circular, ellipsoidal, square or rectangular.

**[0049]** Moreover, one or more of the conveying pipes 2 can have a straight configuration or even, as shown in the figures, a L-shape, with a lower main vertical section 2a and an upper terminal section 2b inclined or orthogonal with respect to the main vertical section 2a. Clearly, one or more of the conveying pipes 2 can have a different configuration, if desired curved. In this case, in order to insert a turbulator component 1 into a conveying pipe, it is necessary to bend or flex or switch, for example at the joint sections of the links of a chain, the respective flexible element in order to make it to cross an elbow or bent section of a respective conveying pipe 2.

**[0050]** The apparatus 3 or the main side wall 9 further delimits at least one opening 14 for inserting or removing the turbulator component 1 into/from the conveying pipe 2. If desired, the upper end section 2b of one or each conveying pipe opens into one or a respective opening for inserting or removing 14.

**[0051]** Advantageously, the opening for inserting or removing 14 opens at the top of the combustion chamber 6, this opening 14 being also designed to allow the combustion fumes to entry into a respective conveying pipe 2. If desired, a plurality, for example four of openings for inserting or removing 14 are provided, each for a respective conveying pipe 2 and each delimited at a respective top section of the combustion chamber.

**[0052]** The conveying pipes 2 can then open into a collector area 15, if desired below or above and/or on the side of the containment chamber 8 and a respective first fan 16 is then provided, as well as a discharge opening 17 delimited by one of the walls delimiting the collector area 15, for example from the intermediate or external wall 10, so that the combustion fumes can be suctioned from the collector area 15 towards the outside of the latter or of the apparatus 3. Of course, the first fan 16 could not be present, this occurring for example in a fireplace equipped with a boiler.

**[0053]** According to the embodiment shown in the figures, the lower, in use, end of the conveying pipe(s) 2 is mounted on the lower wall portion 11 and the lower collector area 15 is provided under the containment chamber 8 in which all the conveying pipes 2 actually open.

**[0054]** The lower collector area 15 can extend around all or at least partly of the combustion chamber 6, in particular around a lower portion of the latter.

**[0055]** Moreover, the lower collector area 15 can be delimited between a lower part 9a of the main side wall 9, part of the intermediate or external wall 10, the lower wall section 11 and a bottom wall section 19 of the frame 3a of the heating apparatus 3.

**[0056]** Clearly, the containment chamber 8 and the lower collector area 15 are isolated and not in fluid communication with respect to each other.

**[0057]** Moreover, a deflector 20 can be provided in the lower collector area 15, which deflector 20 is arranged in such a way as to divert the combustion fumes of the conveying pipes 2 opening at the discharge opening 17, so as to prevent the combustion fumes from immediately reaching the discharge opening 17 once they have exited from these conveying pipes 2 in the collector area 15.

**[0058]** If desired, the lower part 9a of the main side wall 9 delimiting the lower collector area 15 can be disassembled, by means of locking/unlocking means, for the inspection and possible cleaning of this area 15.

**[0059]** Thus, for example, the locking/unlocking means can comprise a plate 21 integral with a block 22 defining an opening or protuberance which can be engaged by means of a tool, such as an Allen key, which plate 21 is mounted for rotation on the lower part 9a or on a panel 9b of this lower part 9a, so that the block 22 opens into the combustion chamber 6.

**[0060]** On the other hand, the bottom wall portion 19 can have an L-shaped end 19a such as to interfere with the plate 21 in a first trim, for example vertical or with vertical length and so as not to interfere with it when it is in a second trim, for example horizontal or with horizontal length.

**[0061]** With such a structure, while the plate 21 is in the first trim, if one pulls the block 22 and therefore the part 9a, the plate 21 hits the L-end 19a and the lower edge of the side wall 9 and it is not possible to dismount the part 9a, while controlling the rotation of the plate 21 from the first to the second trim, by pulling the block 22 it is possible to remove the lower part 9a and dismount it from the frame 3a for the inspection of the lower collector area 15.

**[0062]** In addition, the lower part 9a can be composed of several panels 9b which can be dismounted each separately from the other, for example by means of a mechanism as described above, so as to expose the lower collector area 15 for its entire extension.

**[0063]** Clearly, the panels 9b are connected in a fluid sealing manner with one another, with the remaining portion of the main side wall 9 and with the L-shaped end 19a.

**[0064]** The heating apparatus 3 can be powered by biomass, if desired pellets or wood, but also by other fuels other than biomass, such as fossil fuels.

**[0065]** In this regard, it can be equipped with a manual or automatic fuel loading system, which can open into the combustion chamber 6 by means of a suitable loading duct 18.

**[0066]** The apparatus then has a brazier 23, for example mounted on the bottom of the combustion chamber 6.

**[0067]** This brazier 23 can also delimit a plurality of small holes or slots 24, in fluid communication with a suitable source of supply of a comburent fluid, such as air.

**[0068]** Clearly, other arrangements may also be provided for feeding comburent fluid, for example air, into the combustion chamber 6, such as suitable conduits opening into the combustion chamber 6, as well as means for pushing or the like of the comburent fluid, for example one or more fans.

**[0069]** According to the non-limiting embodiment shown in the figures, the brazier 23 can have a box-like shape and delimit a cavity 25 opening outwards or better into the combustion chamber 6 by means of the small holes 24 and then an supply duct 26 is provided, on one side, opening into the cavity 25 and, on the other side, opening to the outside or the environment, if desired under or inside the apparatus 3.

**[0070]** In this regard, since the fan 16 sucks the combustion fumes from the combustion chamber 6, after passing through the conveying pipe(s) 2, a depression is generated in the combustion chamber 6 which draws air into the brazier 23 after passing in the supply duct 26.

**[0071]** The brazier 23 or at least a lower body of the same can also be removable from the drawer so that is can be easy cleaned.

**[0072]** The apparatus 3 can then comprise at least one component for coupling/release the flexible element 4, if desired a bracket component 27, for example a component for coupling/release the top of a flexible element 4. According to the non-limitative embodiment shown in the figures, the bracket component 27 can delimit a slot, if desired vertical 27a and open upwards, with an end portion of the flexible element 4 houseable therein, if desired a portion of a link 4d of a respective chain 4 for example at an end portion 4a, 4b of the latter.

**[0073]** The bracket component 27 can be fixed, in a high or upper section, if desired an upper terminal section 2b of a conveying pipe 2.

**[0074]** The coupling/release component of the flexible element 4 can be close to or in any case accessible from one or a respective opening for inserting or removing 14.

**[0075]** The apparatus can also comprise a conduit 28 for transporting a fluid, such as air, at the top of the combustion chamber 6, which conduit 28 can open on the front of the apparatus 3, is desired at an upper grid 29. In this regard, a second fan 30 for sucking and pushing air within said transport duct 28 can be provided, so as to deliver hot air within the environment where the heating apparatus 3 is installed.

**[0076]** Of course, the apparatus also includes one or more motors for driving the various components, as well as a control unit.

**[0077]** As will be understood, a turbulator component 1 according to the present invention can be easily inserted and removed from a respective conveying pipe 2, since it is possible to bend such a turbulator component 1 as desired, thus being it possible to insert it also through curved pipes and, with reference to the embodiment illustrated in the figures in an L-shaped conveying pipe 2.

**[0078]** However, owing to the present invention, inspection openings are not necessary as according to the state of the art, so there is no need for tools for removing the cover panel thereof.

**[0079]** It is understood that with such a solution, the maintenance of the exhaust conveying pipes can be carried out by means of a simple brush or other devices and for this purpose it would be sufficient to open the leaf or door of the apparatus, if desired to remove one or more turbulator components 1, for example starting from the opening 14.

**[0080]** Amendments and variations of the invention are possible within the scope defined by the claims.

## Claims

1. Turbulator component designed to be inserted in a conveying pipe (2) of combustion fumes of a heat exchanger of a heating apparatus (3), said turbulator component comprising at least one folding or flexible or switchable in different trims element (4) on which a plurality of projecting elements or protuberances or flow deflector elements (5) are mounted, designed to slow down and divert the flow of combustion fumes so as to transform the flow of the latter from laminar to turbulent, wherein said at least one folding or flexible or switchable element (4) can be folded or bent or switched between several trims so as to vary the arrangement of the projecting elements (5) one with respect to the others, thus allowing the insertion or

removal of said turbulator component into/from curved sections or mutually inclined sections of conveying pipes (2) of a heat exchanger of a heating apparatus (3).

**2.** Turbulator component according to claim 1, wherein said at least one folding or flexible or switchable element (4) can be bent between a first substantially straight trim or elongated configuration and several substantially curved or with mutually inclined segments trims or in a retracted or shortened configuration.

**3.** Turbulator component according to claim 1 or 2, wherein said at least one folding or flexible or switchable element (4) comprises a chain, a rope, a plurality of hooks connected to each other, a catenary structure, an elastic band, a wire or a bar, for example metallic, or a spring, such as a helical spring.

**4.** Turbulator component according to any one of the preceding claims, wherein said projecting elements or protuberances or flow deflector elements (5) are mounted on said at least one folding or flexible or switchable element (4) so as to protrude on one side or on two opposite sides thereof.

**5.** Turbulator component according to claim 4, wherein said projecting elements (5) are mounted on said at least one folding or flexible or switchable element (4) so as to protrude from a first side of said folding or flexible or switchable element (4) to a greater or equal extent with respect to a second side thereof, possibly opposed to the first one.

**6.** Turbulator component according to claim 6, wherein some adjacent and successive projecting elements (5) are mounted on said at least one folding or flexible or switchable element (4) so as to protrude only from a first side or to a greater extent from a first side of said at least one folding or flexible or switchable element (4) with respect to a second side thereof, possibly opposed to the first one, while other projecting elements (5) are mounted on said at least one folding or flexible or switchable element (4) so as to protrude only from the second side or to a greater extent from the second side of said folding or flexible or switchable element (4) with respect to the first side.

**7.** Turbulator component according to any one of the preceding claims, wherein said projecting elements (5) have a hollow or solid cylindrical, parallelepiped configuration, or any other shape different from the previous ones.

**8.** Turbulator component according to any one of the preceding claims, wherein said projecting elements (5) comprise a first tubular component (5a) and a second tubular component (5b) clamped to one another by means of a pin or screw (5c) passing through said at least one folding or flexible or switchable element (4).

**9.** Turbulator component according to claim 8, wherein said at least one folding or flexible or switchable element is a chain (4) and said first (5a) and second (5b) tubular components are clamped one to the other by means of a pin or screw (5c) passing through a link (4c) of said chain (4).

**10.** Heating apparatus comprising a combustion chamber (6), at least one heat exchanger (7) between a fluid to be heated and the combustion fumes generated by said heating apparatus, said heat exchanger (7) comprising at least one containment chamber (8) of a fluid to be heated and at least a conveying pipe (2) of combustion fumes extending through said at least one containment chamber (8), said apparatus further comprising at least one turbulator component according to any one of the preceding claims arranged within said at least one conveying pipe (2), said apparatus delimiting at least one opening for inserting or removing (14) said at least one turbulator component into/from said conveying pipe (2).

**11.** Apparatus according to claim 10, wherein said at least one opening for insertion or removal (14) opens at the top of said combustion chamber (6), such an opening (14) being also designed to allow the combustion fumes to entry into said at least one conveying pipe (2).

**12.** Apparatus according to claim 10 or 11, wherein said at least one containment chamber (8) of a fluid to be heated encloses at least in part said combustion chamber (6).

**13.** Apparatus according to claim 10, 11 or 12, wherein said at least one conveying pipe (2) has a curved or L-shaped configuration defining an elbow or bent section.

**14.** Apparatus according to any one of claims 10 to 13, wherein said at least one conveying pipe (2) opens into a collector area (15) below or above and/or to the side of the containment chamber (8) and at least a first fan (16) is then provided, as well as at least one discharge opening (17) delimited by one of the boundary walls of the collector area (15), so that the combustion fumes can be suctioned from the collector area (15) towards the outside of the latter or of the apparatus (3).

**15.** Apparatus according to any one of claims 10 to 14, wherein the lower part (9a) of the main side wall (9) for delimiting the collector area (15) can be disas-

sembled by locking/unlocking means, for inspection and possible cleaning of such a collector area (15).

**16.** Apparatus according to any one of claims 10 to 15, comprising a brazier (23) mounted on the bottom of the combustion chamber (6) and delimiting a plurality of small holes or slots (24) in fluid communication with a suitable source of supply of a comburent fluid.

**17.** Apparatus according to claim 16, wherein said brazier (23) has a box-like shape and delimits a cavity (25) opening into the combustion chamber (6) by means of said plurality of small holes or slots (24) and a supply duct (26) is then provided opening into the cavity (25) on one side and into the environment on the other side.

**18.** Apparatus according to any one of claims 10 to 17, comprising at least one coupling/release component of the folding or flexible or switchable element (4).

**19.** Apparatus according to claim 18, wherein said at least one coupling/release component comprises a bracket component (27) delimiting a slot for housing an end section of said folding or flexible or switchable element (4).

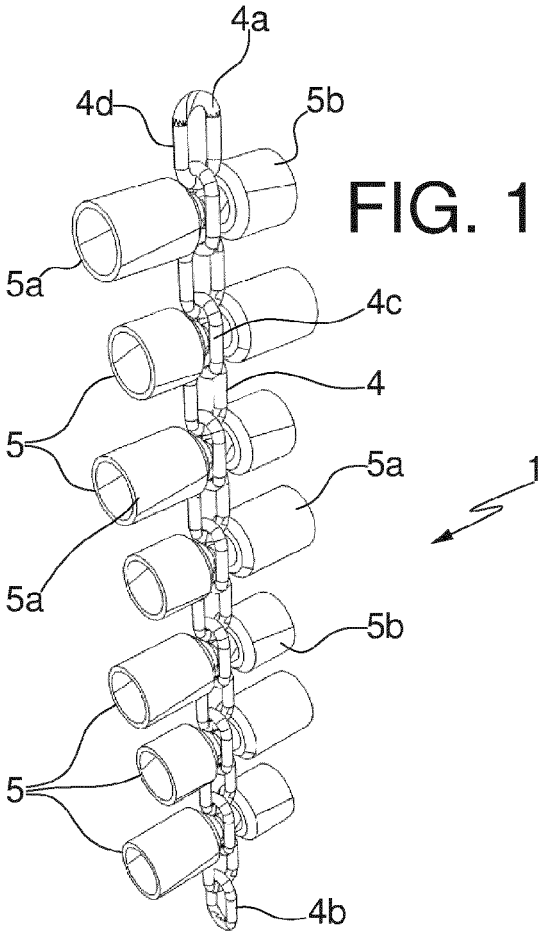



FIG. 1

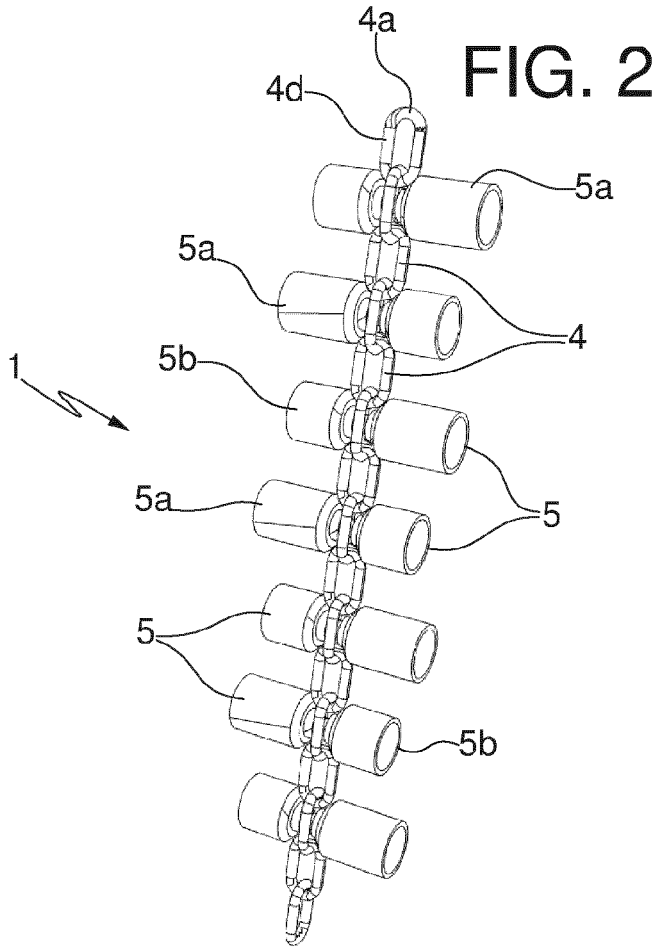



FIG. 2

FIG. 3

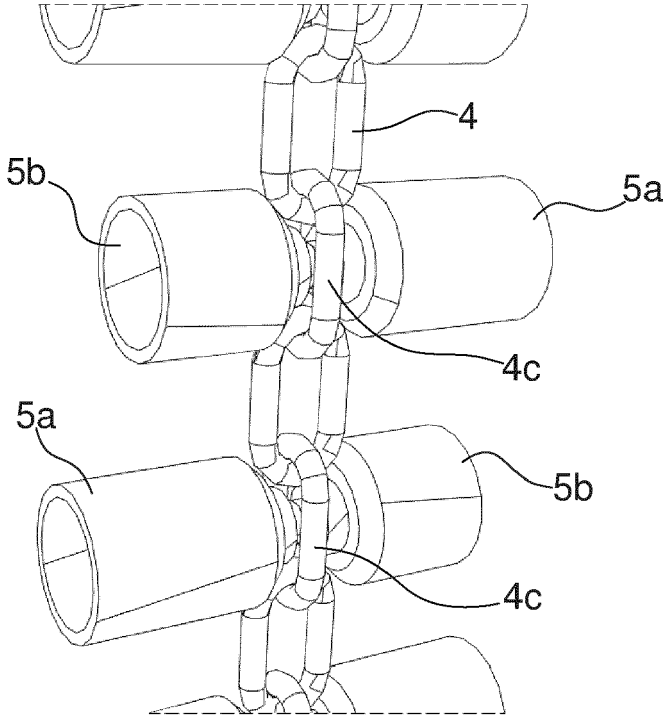
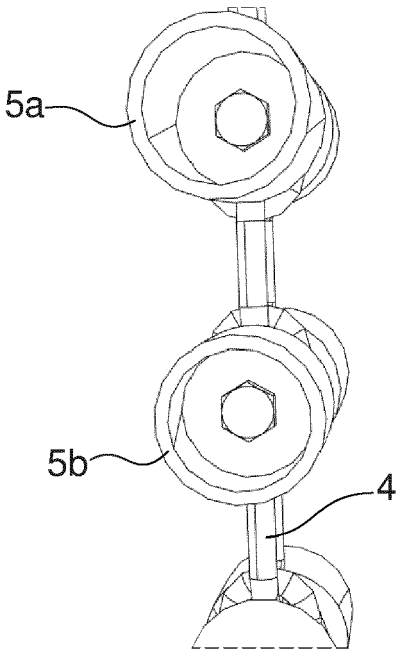



FIG. 4



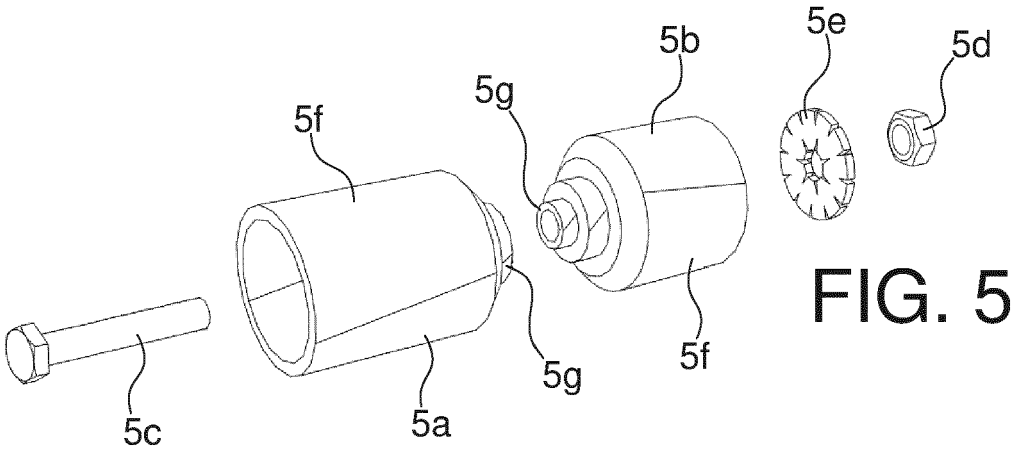




FIG. 5

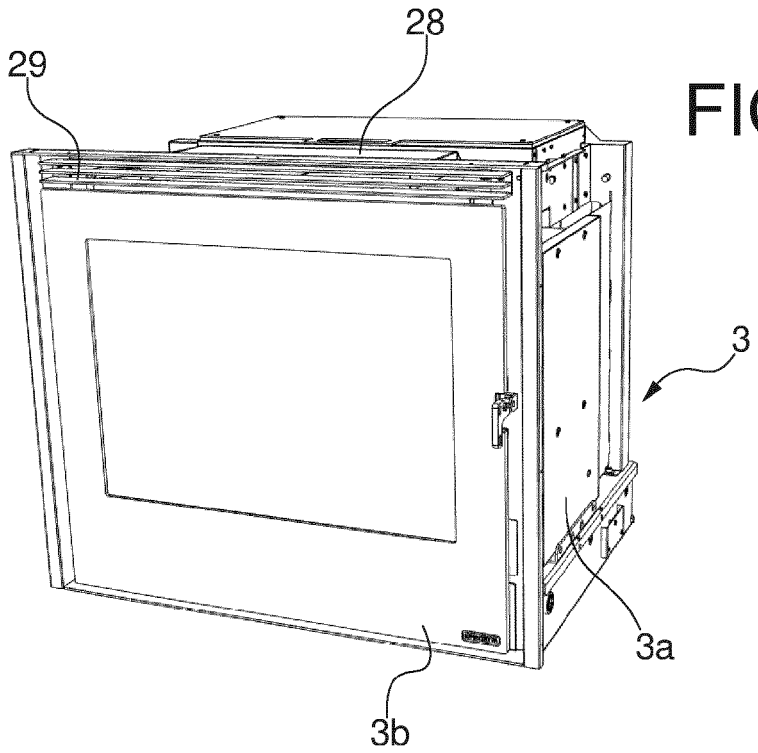



FIG. 6

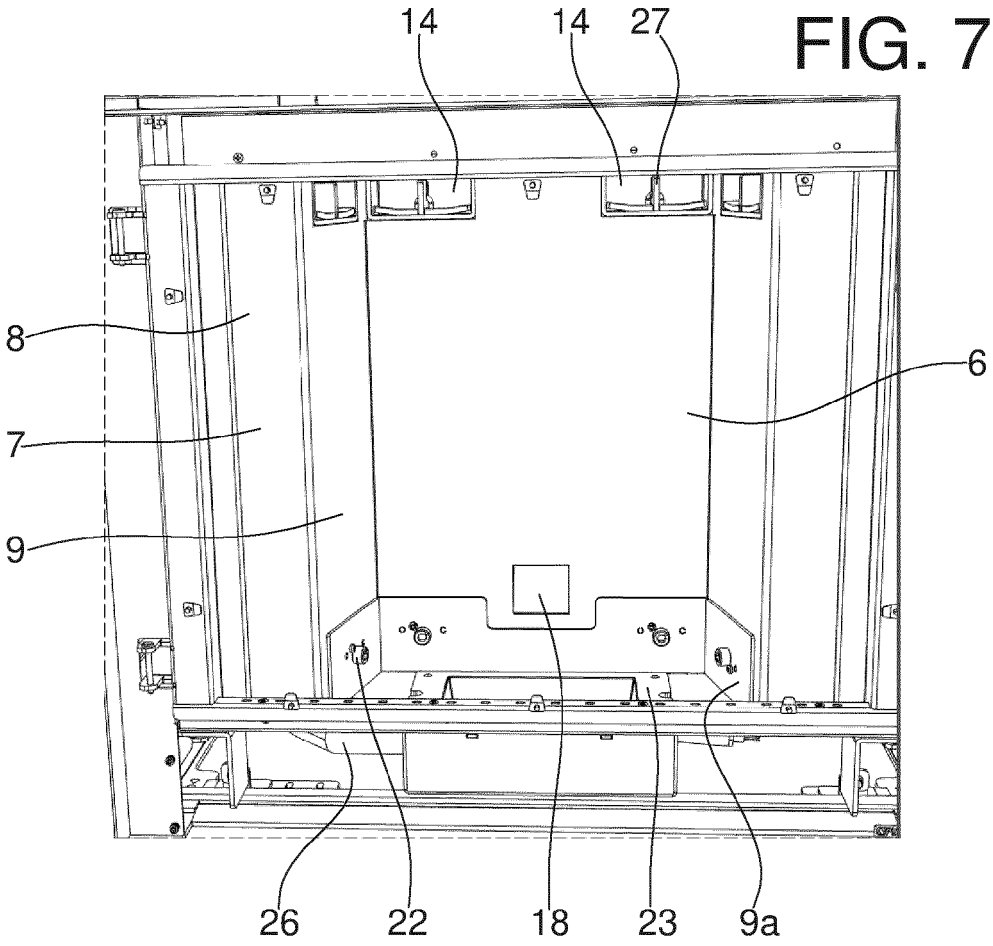



FIG. 7

FIG. 8

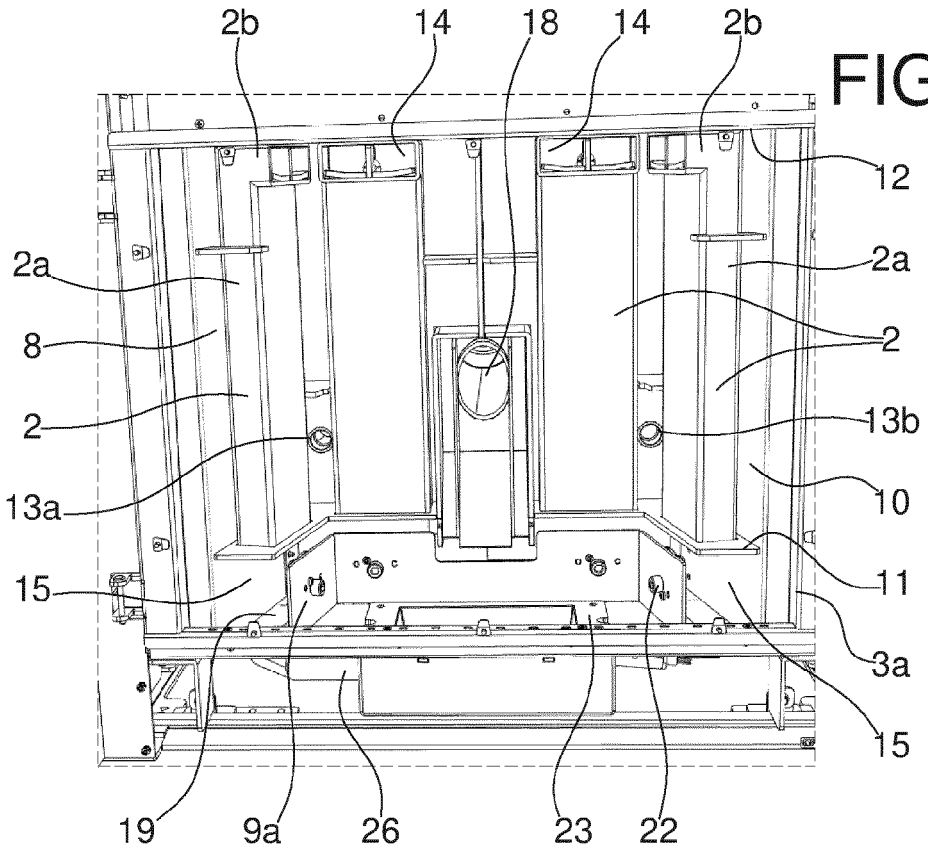

2b
14
18
14
2b
12
2a
2a
8
2
2
13b
13a
10
15
11
3a
15
19
9a
26
23
22

FIG. 9

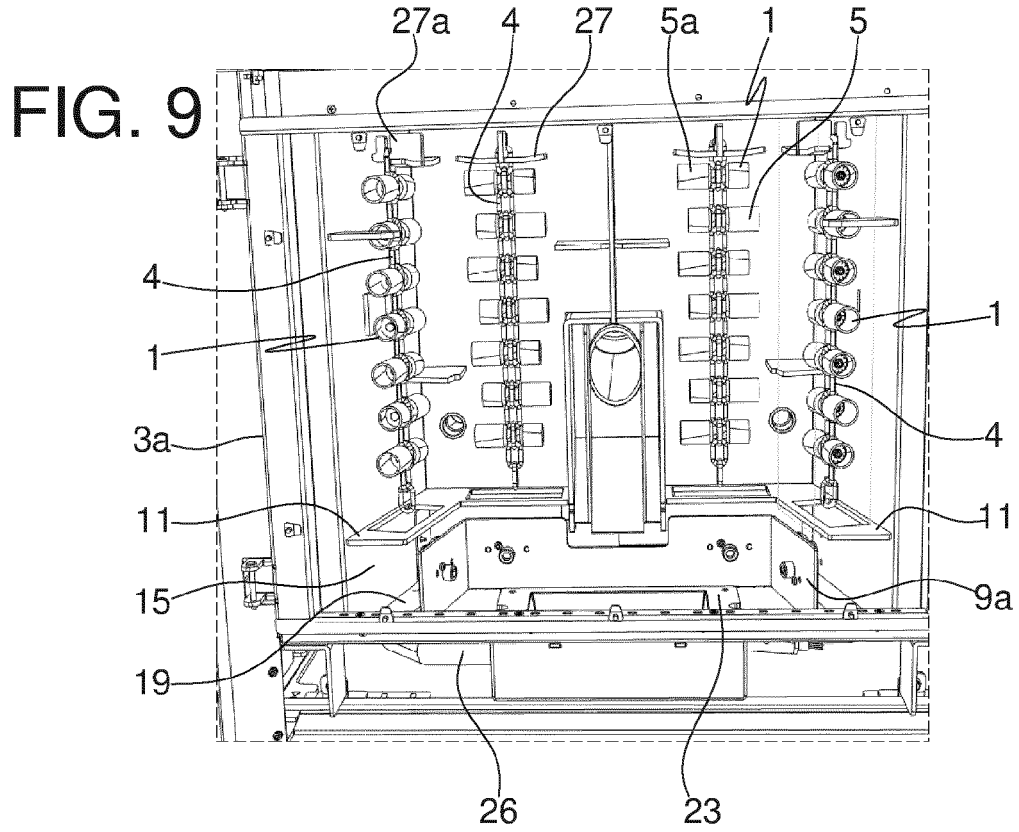

27a
4
27
5a
1
5
4
1
1
3a
4
11
11
15
9a
19
26
23

FIG. 10

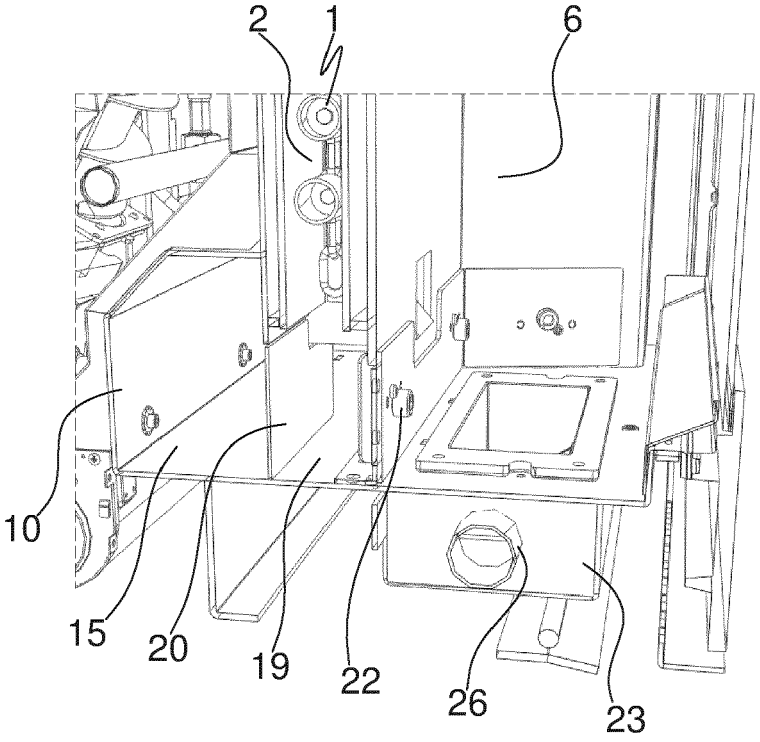
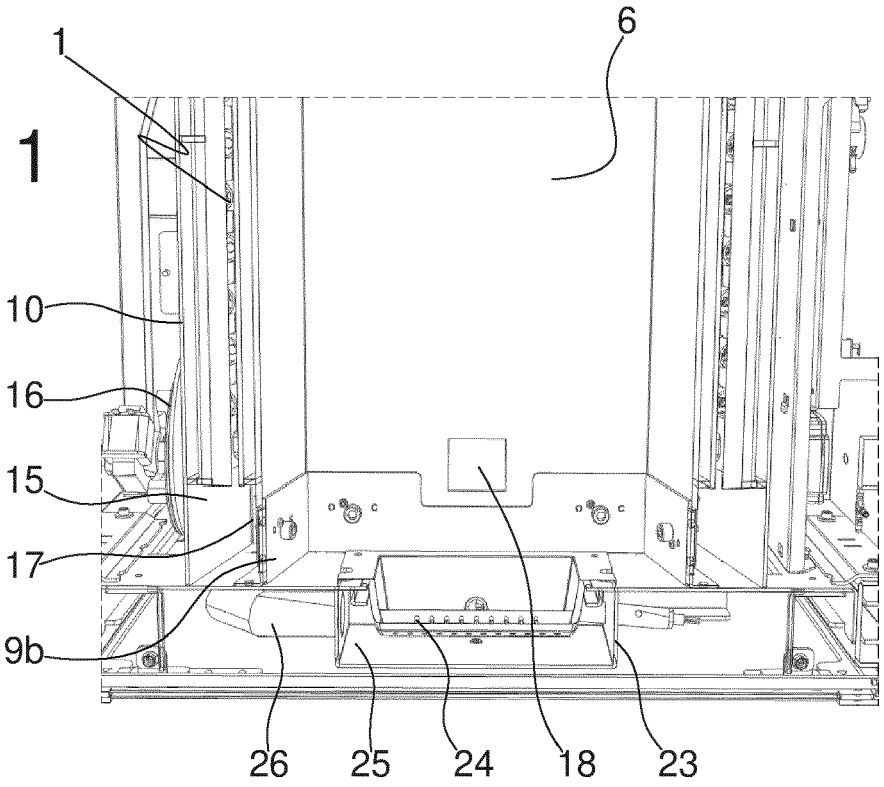



FIG. 11



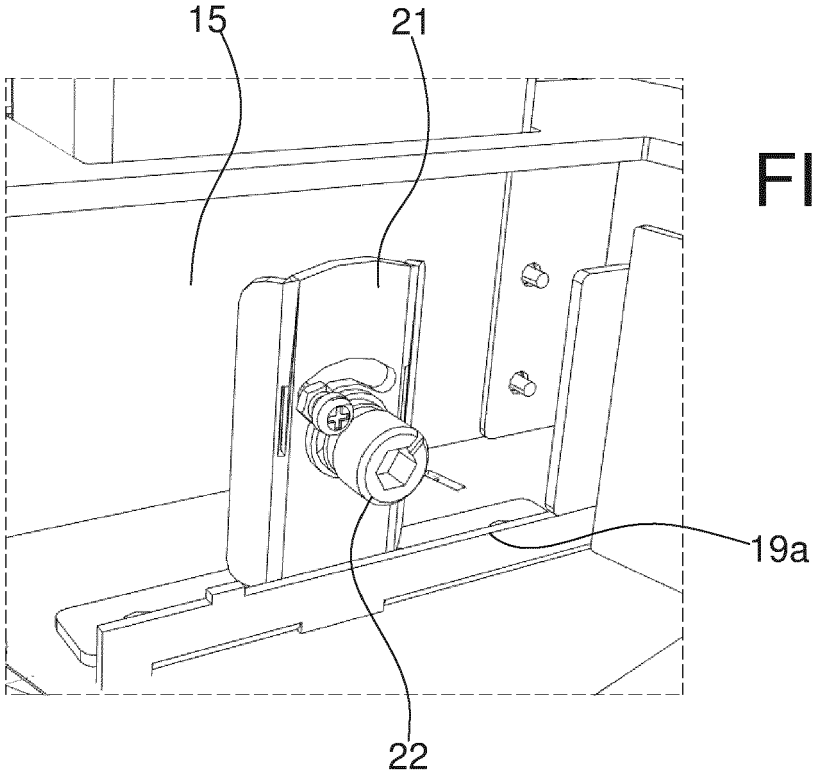
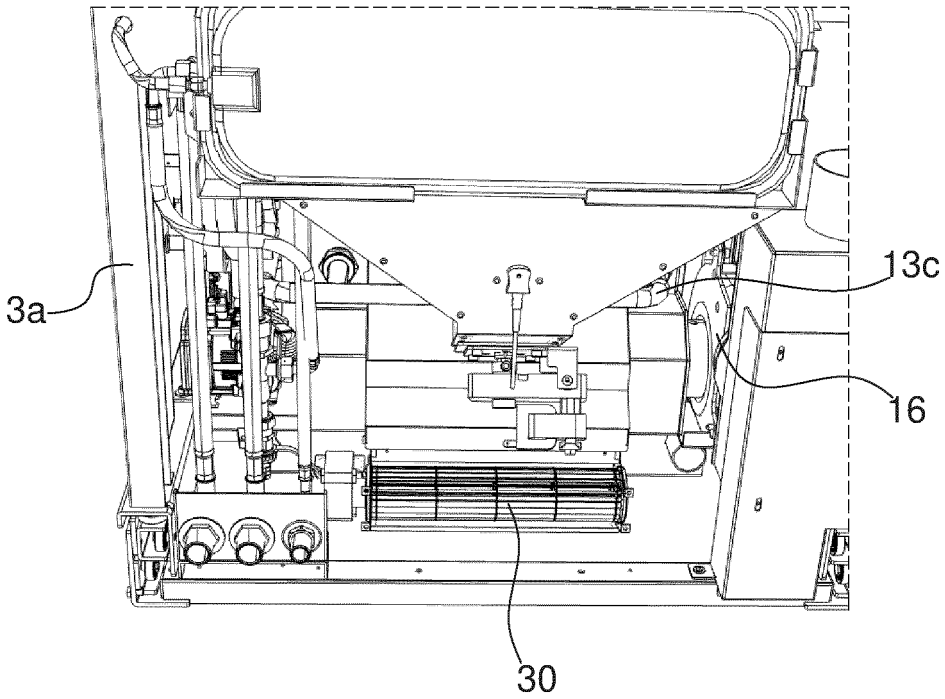



FIG. 12

FIG. 13



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Application Number
EP 20 17 0462

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F28F
F24H

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 27 August 2020 | Mellado Ramirez, J |

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