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(54) **Cooking apparatus**

(57) An apparatus for cooking a food comprises a cooking chamber (2) and a humidifying device (4) for producing humidity in the cooking chamber (2), the humidifying device (4) comprising a movable element (5) suitable for conveying a liquid to the cooking chamber (2) and dispersing means (6) suitable for receiving the liquid from the movable element (5) to nebulize this liquid.

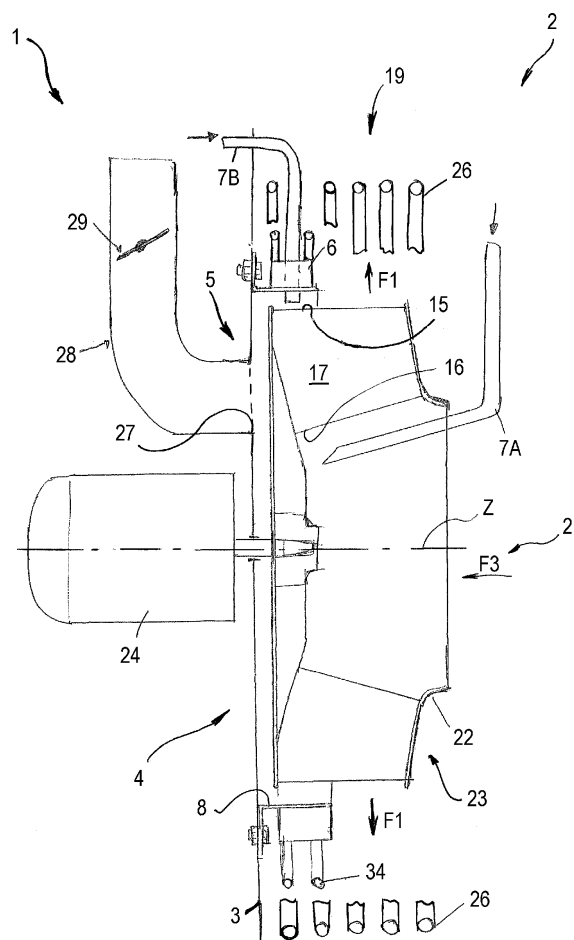


Fig. 1

Description

[0001] The invention relates to an apparatus for cooking a food, in particular an oven for professional use provided with a humidifying device.

[0002] It is known that humidity significantly influences the cooking of a food. Accordingly, it is important to monitor and regulate the humidity present in a cooking chamber of a cooking apparatus.

[0003] Cooking apparatuses are known that are provided with a humidifying device comprising water supply means suitable for introducing water into the cooking chamber, such water passing from the steam state through the effect of the air temperature in the cooking chamber. The passage from water to steam is further encouraged by the fact that the water is nebulized.

[0004] EP 0457971 discloses an apparatus for steam cooking in which the water supply means comprises a conduit that terminates near an air inlet of a fan, in particular of radial type, provided in the cooking apparatus and suitable for promoting the circulation of air so as to promote the transfer of heat from a suitable heating element, which envelops the fan, to the food to be cooked. The water, coming from a discharge opening of the conduit, is conveyed to a further discharge opening and from here it is divided by a flow of air generated by the rotated fan.

[0005] A drawback of the aforementioned cooking apparatuses is that the blades of the fan do not nebulize the water in an effective manner. In fact, the number of blades of the fan is generally low, this is in order that the fan should have good efficiency, and the water is not therefore divided into sufficiently small drops. Accordingly, a consistent part of the drops of water is unable to get transformed into steam and remains in liquid state. This may entail insufficient steam production, especially when the cooking temperature is relatively low, i.e. when the quantity of heat made available by the air in the cooking chamber is limited. In order to increase the quantity of steam, the quantity of water introduced into the cooking chamber has to be increased, with the risk that, if the quantity of water introduced is excessive, the temperature in the cooking chamber decreases, thus entailing a great expenditure of energy, in addition to a great expenditure of water.

[0006] DE 10347614 discloses a cooking apparatus in which the conduit, provided in the water supply means, terminates in a nebulizing nozzle inside the cooking chamber, near the heating element.

[0007] The nebulizing nozzle, although it improves water nebulization, has to operate at rather high water pressure, so the performance thereof declines if there is low pressure in the mains water supply to which the conduit is connected. Furthermore, in view of the normal flow rates used in these types of cooking apparatuses, the passage sections for the water provided in the nozzle are always very small, this causing the nozzle to be clogged by impurities or calcareous deposits.

[0008] From WO 03/046438 a further cooking apparatus is known in which the humidifying device comprises, in addition to the conduit provided in the water supply means, an atomising element connected to the fan and rotated by the fan.

[0009] The atomising element comprises a covering disc in the shape of a circular crown, adjacent to the fan in the zone in which the blades are provided. The conduit dispenses a jet of water against the covering disc, rotated by the fan, and through the effect of the centrifugal force a thin film of water travels along the covering disc to an external edge thereof, where drops of water develop and are projected by the fan to the cooking chamber.

[0010] The atomising element, although simple and cheap, still has limited efficacy. In fact, the dimensions of the drops of water produced by the atomising element are still too great to be effectively transformed into a steam state.

[0011] In other cooking apparatuses, like the one disclosed in US 5,530,223, the atomising element comprises a spherical element mounted on a rotation shaft of the fan in an air inlet region of the fan. The conduit dispenses a jet of water onto the spherical element that, by rotating together with the fan, divides the water into small drops that are projected, by a centrifugal effect, to the blades of the fan and from the latter to a zone of the cooking chamber in which the heating element is arranged.

[0012] Although the drops of water produced by the spherical element are then projected to the blades of the fan, where they are further divided into further drops, the latter are not yet of sufficiently small dimensions, in particular for producing steam at a relatively low temperature.

[0013] In fact, as for the known cooking apparatuses disclosed above, the number of blades of the fan is generally rather low, this causing a number of blows to the drops of water that is insufficient for obtaining further drops of small dimensions.

[0014] In DE 10330250 a cooking apparatus is disclosed in which the humidifying device comprises a supply pipe for the water that delivers water inside an air conduit. The air conduit is provided with a valve upstream of the supply pipe for the water that regulates the quantity of air that is introduced into the air conduit. The air conduit is thus traversed by air, generally having low humidity inasmuch as it comes from the external environment, and by water coming from the water supply pipe, this air conduit delivering air and water to a zone of the cooking chamber near the fan. The water coming from the water supply pipe is partially nebulized by the flow of air in the air conduit. The fan is furthermore provided with rear blading that, being arranged near the air conduit, produces a vacuum that promotes the flow of air and water from the air conduit to the cooking chamber and further nebulization of the water entering the cooking chamber.

[0015] A drawback of the humidifying device disclosed above is that, when the valve in the air conduit is open, the humidity in the cooking chamber increases in a limited

manner as the quantity of water introduced is balanced by the quantity of dry air that enters together with the water. Furthermore, the air inlet causes a simultaneous escape of humid air from the cooking chamber through a further suitable outlet conduit. Vice versa, when the valve in the air conduit is shut, the partial nebulization caused by the air does not occur and the flow of the water to the cooking chamber is greatly diminished if not totally prevented.

[0016] Accordingly, this humidifying device does not enable a high degree of humidity in the cooking chamber to be obtained.

[0017] An object of the invention is to improve the humidifying devices in cooking apparatuses of known type.

[0018] Another object is to produce a humidifying device that enables the humidity in the cooking chamber to be increased effectively.

[0019] Still another object is to obtain a humidifying device that effectively nebulizes a humidifying liquid, so as to promote the transformation thereof from liquid to steam even at relatively low temperatures.

[0020] According to the invention there is provided an apparatus for cooking a food comprising a cooking chamber and a humidifying device for producing humidity in said cooking chamber, characterised in that said humidifying device comprises a movable element suitable for conveying a liquid in said cooking chamber and dispersing means suitable for receiving said liquid from said movable element for nebulizing said liquid.

[0021] Owing to the invention, it is possible to effectively nebulize the liquid to produce the desired humidity.

[0022] Owing to the invention, it is furthermore possible to limit the quantity of liquid to be transformed into a steam phase, with consequent saving of the liquid itself and of energy.

[0023] Furthermore, the humidifying device is able to produce humidity even at relatively low temperatures.

[0024] The invention can be better understood and implemented with reference to the attached drawings that show some embodiments thereof by way of non-limitative example, in which:

Figure 1 is a schematic section of a portion of an apparatus for cooking a food provided with a humidifying device;

Figure 2 is a view like the one in Figure 1 showing an alternative embodiment of the humidifying device;

Figure 3 is a schematic section of an apparatus for cooking foods provided with an alternative embodiment of the humidifying device in Figure 1;

Figures 4 and 5 are schematic sections like the one in Figure 3 showing alternative embodiments of the apparatus for cooking foods;

Figure 6 is a perspective view of dispersing means with which the humidifying device is provided;

Figures 7 to 9 are alternative embodiments of the dispersing means in Figure 6;

Figure 10 is a perspective view of an embodiment

of the humidifying device in Figure 1;

Figure 11 is a view like the one in Figure 10 showing a further embodiment of the humidifying device in Figure 1;

Figure 12 is a perspective view of an embodiment of a flow diverter with which the cooking apparatus in Figure 3 is provided;

Figure 13 is an embodiment of the diverter in Figure 12.

[0025] In Figure 1 a portion of an apparatus 1 for cooking foods is shown comprising a cooking chamber 2 having a substantially parallelepipedon shape, as the Figures 3 to 5 show. In the cooking chamber 2 a cooking zone 18 is provided inside which there are arranged the foods ordered on trays 20 and a heating zone 19 adjacent to the cooking zone 18. In the heating zone 19 there is situated a fan wheel 22, for example of the centrifugal type, of a fan 23 driven by a motor 24. Still in the heating zone heating means is provided suitable for heating the inside of the cooking chamber 2. In particular, on the periphery of the fan wheel 22 a set of electrical resistances 26 is arranged.

[0026] Alternatively, there can be provided an assembly of pipes, inside which an operating fluid passes, for example combustion gas produced by a burner of fuel gas that is not shown.

[0027] An opening 27 obtained in a wall 3 of the cooking chamber 2 in the heating zone 19 enables the entry of air from a supply conduit 28 connected to an environment outside the cooking chamber 2 by means of a valve 29. The air in the cooking chamber 2 is pushed in a centrifugal direction indicated by the arrows F1 to the set of electrical resistances 26, through the rotation action of the fan wheel 22. The flow of air is subsequently deviated to the cooking zone 18 in a direction indicated by the arrows F2 in Figure 3. The apparatus 1 furthermore comprises a flow conveying screen 49 (Figures 3, 4 and 5) that enables the air, which has been heated, to flow easily to the cooking zone 18.

[0028] After transferring heat to the food in the cooking zone 18, the air is sucked by the fan wheel 22 to an axial inlet 21 of the fan 23, in a direction F3.

[0029] The apparatus 1 is provided with a humidifying device 4 for producing humidity in a cooking chamber 2 comprising a movable element 5 suitable for conveying a liquid, in particular water, to the cooking chamber 2 and dispersing means 6 suitable for receiving the water from the movable element 5 to nebulize it.

[0030] With reference to the embodiment in Figure 1, the action of the movable element 5 is conducted by the fan wheel 22, which receives a jet of water coming from an inlet conduit 7A. The inlet conduit 7A extends into the cooking chamber 2 as far as the axial inlet 21, in such a way as to release water into an internal edge 16 of blades 17 of the fan wheel 22. In particular, the inlet conduit 7A terminates at a distance from a rotation axis Z of the fan wheel 22 less than the distance between the internal

edge 16 and the rotation axis Z.

[0031] Alternatively, or additionally, to the inlet conduit 7A a further inlet conduit 7B can be provided that introduces water in a radial direction near to an external edge 15 of the blades 17.

[0032] The dispersing means 6 comprises a dispersing element 8, fixed to the wall 3, shaped in such a way as to at least partially surround the movable element 5, i.e. the fan wheel 22.

[0033] With reference to Figure 10, the dispersing element 8 comprises a ring-shaped base 9, that is substantially cylindrical in shape, on which openings 10 are obtained and from which fins 11 protrude to the exterior. The ring-shaped base 9 can, for example, be obtained from sheet metal shaped so as to form a cylindrical surface on which the fins 11 have been obtained by cutting and subsequent folding. The openings 10 are substantially equal to one another and are distributed at a substantially constant angular pitch. Similarly, also the fins 11, each of which protrudes from an edge of a respective opening 10, are substantially equal to one another and are distributed according to a substantially constant angular pitch and which is equal to the pitch of the openings 10.

[0034] An edge of the ring-shaped base 9 comprises plates 12, provided with holes 13 for fixing the dispersing element to the wall 3 of the cooking chamber 2 through removable connecting means, for example screws or bolts.

[0035] In Figures 6 to 8 alternative embodiments of the dispersing means 6 are shown in which the dispersing means 6 comprises a plurality of dispersing elements 8', each dispersing element 8' comprising a curved base 9', in particular shaped like a portion of cylinder, on which the openings 10' are obtained, which have a substantially rectangular plan shape and are substantially equal to and equidistant from one another.

[0036] Alternatively, as provided in the embodiment in Figure 8, the curved base 9' can be provided with circular openings 10".

[0037] In the embodiment in Figure 7 fins 11 are fixed to respective edges 25 of the openings 10' that protrude from a convex part of the curved base 9' to the outside of the curved base 9'. Each fin 11 is arranged so as to be substantially radial, i.e. comprised in a plane passing through the axis of the portion of cylinder that defines the curved base 9'. In this way, each fin 11 forms an angle of about 90° with a plane tangent to the curved base 9' and passing through the edge 25.

[0038] In an embodiment that is not shown, the fins 11 can be fixed to the edge 25 in such a way as to be tilted by a desired angle, other than 90°, with respect to the plane tangent to the curved base 9' and passing through the edge 25.

[0039] In the alternative embodiment in Figure 6, the curved base 9' can be devoid of fins 11.

[0040] Each dispersing element 8' is mounted adjacent to, or distanced from, a subsequent dispersing ele-

ment 8' so that the plurality of dispersing elements 8' at least partially surround the movable element 5.

[0041] In Figure 9 an alternative embodiment of the plurality of dispersing elements 8" is shown, in which each dispersing element 8" comprises a base 9" having a polygonal profile 14. The base 9" can furthermore be obtained by drawing flat bases close to each other so as to define the polygonal profile 14. The flat bases can also be mounted distanced from one another so that the polygonal profile 14 is defined by ideally extending each flat base until the extension of a subsequent flat base.

[0042] In an alternative embodiment, shown in Figure 11, the dispersing means 6 comprises a plurality of further blades 30, fixed to the wall 3 at a constant angular pitch so as to surround the movable element 5 at least partially. Each further blade 30 is provided with an internal surface 31 that is concave and an external surface 32 that is convex. Between the internal surface 31 of a first further blade 30a and the external surface 32 of a second further blade 30b, near the first further blade 30a, a passage 33 is defined that is traversable by a fluid, in particular a mixture of air and water, pushed by the movable element 5.

[0043] During operation, the water coming from the inlet conduit 7A, and/or from the further inlet conduit 7B, hits the movable element 5 and is conveyed by the latter to the dispersing means 6, which is fixed.

[0044] The movable element 5 initially divides the water into drops and produces, through the effect of the centrifugal rotation, drops of water that are provided not only with a radial speed component, but also with a tangential speed component. When the drops of water hit the dispersing means 6, the tangential speed component is substantially cancelled in the blow and the corresponding kinetic energy is used to cause the division of each drop of water into further drops of extremely small dimensions.

[0045] The fins 11, or the further blades 30, increase the surface against which the drops of water impact and thus increase nebulization thereof.

[0046] The further drops are conveyed to the cooking chamber 2 by a flow of air produced by the fan wheel 22 through the plurality of openings 10, 10', 10". A mixture of nebulized water and air is then conveyed to the set of electrical resistances 26 where the transformation of the water into steam substantially occurs.

[0047] Owing to the dispersing means 6 it is possible to obtain very effective nebulizing that promotes subsequent transformation of the water into steam, in particular also at relatively low temperatures, i.e. less than the boiling point of water.

[0048] A further advantage compared with some known solutions consists of the fact that high water supply pressures are not required. The humidifying device 4 is not therefore negatively influenced by any low pressure that may occur in a mains supply, to which the inlet conduit 7A, 7B, can be connected by, for example, a flow governor.

[0049] Furthermore, the end part of the inlet conduit 7A, or of the further inlet conduit 7B, does not provide for a nebulizing nozzle, as in certain known apparatuses, thus preventing this end part being able to become clogged due to encrustation or dirt.

[0050] The apparatus 1 can furthermore be provided with a heating element 34, arranged in such a way as to surround the dispersing means 6 at least partially. The heating element 34 can be substantially configured like the heating means, in particular like the set of electrical resistances 26, but with lower heating power. In particular, the heating element 34 is proportioned so as to provide the heat necessary to transform water into steam.

[0051] A control unit, that is not shown, controls the set of electrical resistances 26 and the heating element 34 in an independent manner therefrom.

[0052] In cooking apparatuses of known type, during cooking of a food, the set of electrical resistances 26 having great power are not driven to produce heat in a continuous manner but at preset intervals of time during which a desired temperature of the food and/or in the cooking chamber is reached and maintained. At intervals of operating time of the set of electrical resistances 26, intervals of time alternate during which the control unit activates and deactivates the set of electrical resistances 26. Thus in the long intervals of time in which the set of electrical resistances 26 remain deactivated, part of the nebulized water may not receive sufficient heat to be transformed into steam.

[0053] The heating element 34, on the other hand, remains in operation in substantially continuous mode, in this mode ensuring constant formation of steam during cooking, even when the set of electrical resistances 26 is deactivated.

[0054] Owing to the heating element 34, it is furthermore possible to obtain steam even when it is desired to cook with steam at a relatively low temperature, generally between 70°C and 90°C. In fact, owing to the limited power of the heating element 34, it is possible to run the heating element 34 without the desired temperature inside the cooking chamber 2 being exceeded. In this way, it is possible to obtain in the cooking chamber 2 the humidity desired for steam cooking even at a relatively low temperature.

[0055] With reference to Figure 2, there is shown an embodiment of the apparatus 1 in which the movable element 5 is obtained on a rear disc 35 of the fan 23 and comprises blading 36, for example provided with radial blades. The dispersing means 6, which can be shaped according to any of the embodiments disclosed above, is arranged so as to surround the blading 36 at least partially.

[0056] In this embodiment, the inlet conduit 7C for the water inlet is arranged so as to inject water near the blading 36 in an axial direction. Alternatively, or in addition to the inlet conduit 7C, a further inlet conduit 7D can be provided arranged so as to inject water to the periphery of the blading 36 in a substantially radial direction. The

blading 36 divides a jet of water coming from the inlet conduit 7C, 7D into drops and project these drops to the dispersing means 6, which divides the drops further into very small drops.

[0057] In this embodiment, the supply conduit 28 to suck the air from the outside is located so that the opening 27 faces the cooking chamber 2 substantially at the blading 36. The blading 36 produces a vacuum near the opening 27 that promotes a flow of air from the supply conduit 28 to the cooking chamber 2. To diminish the humidity content inside the cooking chamber 2, it is thus sufficient to open the valve 29 and introduce external air, having a low humidity content.

[0058] Compared to prior-art apparatuses, in which the water is nebulized directly inside the supply conduit 28, the nebulization and conveying of the nebulized water to the heating element occur regardless of the presence of a flow of air in the air supply conduit.

[0059] In the embodiments illustrated in Figures 3 to 5, the movable element 5 is separated from the fan 23 but is nevertheless rotated by the same motor 24 that drives the fan wheel 22.

[0060] In the embodiment in Figure 3, the movable element 5 comprises a series of blades 37 mounted on a shaft that connects the motor 24 to the fan 23. The series of blades 37 is interposed between the rear disc 35 of the fan 23 and the wall 3. The series of blades 37 accelerates the jet of water coming from the inlet conduit 7C to project it against the fixed diffusing means 6. Similarly to the embodiment in Figure 2, the series of blades 37 comprises radial blades and may furthermore contribute to sucking outside air from the supply conduit 28.

[0061] Owing to this embodiment it is possible to choose the dimensions of the series of blades 37, in particular the maximum diameter, in an independent manner from the diameter of the rear disc 35. In particular, the external diameter of the series of blades 37 may be greater than the external diameter of the fan 23.

[0062] In the embodiment in Figure 4 the movable element 5, mounted on the same shaft that connects the motor 24 to the fan 23, is arranged in a chamber 38 adjacent to the cooking chamber 2, in particular adjacent to the wall 3, this chamber 38 being connected to the cooking chamber 2 through connecting openings 39 obtained in the wall 3. The chamber 38 is delimited by further walls 40 that may be dismantled from the wall 3. The supply conduit 28 for sucking external air is in this case connected to the chamber 38 so as to obtain a sucking effect that is similar to that disclosed with reference to Figure 3.

[0063] Owing to this embodiment, the movable element 5 and the dispersing means 6, being arranged outside the cooking chamber 2, are less stressed thermally and are furthermore less subject to calcareous encrustations.

[0064] Also in the embodiment in Figure 5 the movable element 5 is arranged in the chamber 38, separated from the cooking chamber 2 by a portion of wall 3 and con-

nected to the cooking chamber 2 by means of the connecting openings 39. This movable element 5 is not mounted on the shaft of the motor 24, but is driven by the latter by means of a mechanical transmission organ 41 of known type, for example a belt, chain, gear transmission, through clutch wheels means or other means.

[0065] Owing to the mechanical transmission member 41, the rotation speed of the movable element 5 may be different, in particular greater, than the rotation speed of the motor 24. This enables the movable element 5 to be constructed with dimensions that are significantly reduced compared to the dimensions of the fan wheel 22 without nevertheless reducing the performance of the movable element 5.

[0066] In all the embodiments of the apparatus 1 disclosed above, an outlet pipe 42 is provided from which air and steam can exit from the cooking chamber 2. The outlet pipe 42 can be connected to a discharge conduit 43, provided in a bottom portion of the cooking zone 18 from which cooking residues such as, for example, fats or oils, are removed from the chamber 2, as the embodiments in Figures 3 to 5 show.

[0067] Alternatively, a further outlet pipe 42' can be connected to one of the vertical walls of the cooking chamber 2, in particular to the wall 3, i.e. to the wall of the cooking chamber 2 near which the movable element 5 is mounted, as the embodiment in Figure 3 shows.

[0068] The further outlet pipe 42' and the outlet pipe 42 can also both be present.

[0069] Alternatively, the outlet pipe 42, can be arranged in a top portion of the cooking chamber 2.

[0070] Near the further outlet pipe 42' a conveyor 44 is mounted that is suitable for promoting the escape of the steam from the cooking chamber 2.

[0071] In the embodiment in Figure 3, the conveyor 44 is mounted in a peripheral region of the dispersing means 6 and extends to a peripheral zone of the heating means so that a part of the of the mixture of air and steam, present in the cooking chamber 2, is diverted to enter the further outlet pipe 42'.

[0072] With reference to Figures 12 and 13, the conveyor 44 comprises a hollow body 45, that is concave in shape that is arranged so that it has, facing the dispersing means 6, a first hole 46, from which the mixture of air and drops of water enters, and furthermore comprises a second hole 47 for enabling the escape of the aforementioned mixture from the cooking chamber 2. Lastly, a plate 48 is provided that enables the conveyor 44 to be fixed to the wall of the cooking chamber 2. The second hole 47 is positioned at a third hole 50 obtained in the wall 3, so as to connect the conveyor 44 to the further outlet pipe 42'.

[0073] Owing to the conveyor 44, it is possible to increase the quantity of steam evacuated from the cooking chamber 2 and thus effectively regulate the quantity of steam present in the cooking chamber 2.

[0074] The conveyor 44, which may have a different shape from those disclosed and shown in Figures 12 and

13, substantially performs the function of a diverting screen suitable for diverting a part of the mixture of air and steam to the further outlet pipe 42'.

[0075] In a further embodiment, which is also not shown, the conveyor 44 can be obtained in a terminal portion of the further outlet pipe 42', this terminal portion protruding inside the cooking chamber 2 in the peripheral region of the dispersing means 6. This terminal portion is in this case provided with a hole from which to remove the mixture of air and steam from the cooking chamber 2.

[0076] In an embodiment that is not shown, the movable element 5 is of the axial and non-centrifugal type. In this case, the dispersing means 6 is arranged opposite the movable element 5 so as to receive a flow of water or drops of water generated by the movable element 5.

[0077] Lastly, the movable element 5 can be obtained in a single piece of metal, metal alloy or plastics or be obtained through assembly of a plurality of elements.

Claims

1. Apparatus for cooking a food comprising a cooking chamber (2) and a humidifying device (4) for producing humidity in said cooking chamber (2), **characterised in that** said humidifying device (4) comprises a movable element (5) suitable for conveying a liquid in said cooking chamber (2) and dispersing means (6) suitable for receiving said liquid from said movable element (5) for nebulizing said liquid.
2. Apparatus according to claim 1, wherein said dispersing means (6) is fixed.
3. Apparatus according to claim 1, or 2, wherein said dispersing means (6) surrounds said movable element (5) at least partially.
4. Apparatus according to claim 3, wherein said dispersing means (6) comprises a dispersion surface (9) provided with a circular profile.
5. Apparatus according to claim 3, wherein said dispersing means (6) comprises a surface (9'') having a polygonal profile (14).
6. Apparatus according to claim 3, wherein said dispersing means (6) comprises a plurality of dispersing elements (8'; 8''; 30) arranged according to a defined angular pitch around said movable element (5).
7. Apparatus according to claim 6, wherein said dispersing elements (8'') of said plurality of dispersing elements (8'; 8''; 30) are substantially flat.
8. Apparatus according to claim 6, wherein said dispersing elements (8') of said plurality of dispersing elements (8'; 8''; 30) are substantially curved.

9. Apparatus, according to any preceding claim, wherein said dispersing means (6) comprises opening means (10; 10'; 10"; 33) intended to be traversed by said liquid.
10. Apparatus, according to any preceding claim, wherein said dispersing means (6) comprises a plurality of fins (11; 30).
11. Apparatus according to claim 10, as appended to claim 9, wherein each fin (11) of said plurality of fins protrudes from an edge of said opening means (10; 10'; 10") to the outside of said dispersing means (6).
12. Apparatus according to claim 10, or 11, wherein said plurality of fins (11; 30) comprises radial fins (11), each radial fin being fixed to a base (9; 9'; 9") of said dispersing means (6) and arranged on a plane substantially orthogonal to a further plane tangent to said base (9; 9'; 9") near said radial fin.
13. Apparatus according to claim 10, or 11, wherein said plurality of fins (11; 30) comprises fins (30), each fin being fixed to a base (9; 9'; 9") of said dispersing means (6) and arranged on a plane tilted with respect to a further plane tangent to said base (9; 9'; 9") near said fin.
14. Apparatus according to claim 10, or 11, wherein said plurality of fins (11; 30) comprises curved fins (30).
15. Apparatus, according to any preceding claim, wherein said movable element (5) is included in a fan wheel (22; 36; 37).
16. Apparatus according to claim 15, wherein said fan wheel (22; 36; 37) is of centrifugal type (22).
17. Apparatus according to claim 15, or 16, wherein said fan wheel (22; 36; 37) comprises a radial blading (36; 37).
18. Apparatus according to any one of claims 15 to 17, and furthermore comprising fan means (23), arranged to enable the circulation in said cooking chamber (2) of a primary operating fluid intended for cooking said food, wherein said fan wheel (22; 36; 37) defines a blading (36) of said fan means (23), said blading (36) being near a wall (3) of said cooking chamber (2) and facing an inlet (27) for said primary operating fluid into said cooking chamber (2).
19. Apparatus, according to any one of claims 15 to 18, wherein said fan wheel (36; 37) is arranged in a chamber (38) adjacent to said cooking chamber (2).
20. Apparatus according to claim 18 or 19, and furthermore comprising conduit means (28) arranged for introducing said primary operating fluid into said cooking chamber (2) near said fan wheel (22; 36; 37).
21. Apparatus, according to any one of claims 15 to 20, and furthermore comprising further conduit means (7A; 7B; 7C; 7D) arranged for dispensing said liquid near said fan wheel (22; 36; 37).
22. Apparatus according to claim 21, wherein said further conduit means (7A; 7B; 7C; 7D) is arranged for dispensing said liquid in a substantially radial direction of said fan wheel (22; 36; 37) near a peripheral edge (15) of said fan wheel (22; 36; 37).
23. Apparatus according to claim 21, wherein said further conduit means (7A; 7B; 7C; 7D) is arranged for dispensing said liquid in a substantially axial direction of said fan wheel (22; 36; 37).
24. Apparatus according to claim 21, wherein said further conduit means (7A) comprises an end extending in a suction section (21) of said fan means (23).
25. Apparatus according to claim 24, wherein said end is arranged at a distance from a rotation axis (Z) of said fan wheel (22) less than a further distance between an inlet edge of blades (17) of said fan wheel (22) and said rotation axis (Z).
26. Apparatus according to claim 18, or according to claim 19 or 20, as claim 19 is appended to claim 18, or according to any one of claims 21 to 25 as claim 21 is appended to claim 18, or to claim 19 or 20 as claim 19 is appended to claim 18, wherein said fan wheel (22; 36; 37) and said fan means (23) are rotated by the same motor (24).
27. Apparatus according to claim 26, wherein said fan wheel (22; 36; 37) and said fan means (23) are mounted on the same rotation shaft.
28. Apparatus according to claim 26, wherein between said fan wheel (22; 36; 37) and said motor (24) mechanical transmission members (41) are interposed to enable said fan wheel (22; 36; 37) to rotate at a speed which is different from the rotation speed of said fan means (23).
29. Apparatus, according to any one of claims 15 to 28, and furthermore comprising outlet conduit means (42') for enabling said liquid, coming from said dispersing means (6), to exit from said cooking chamber (2), said outlet conduit means (42') being arranged near a peripheral region of said fan wheel (22; 36; 37).
30. Apparatus according to claim 29, wherein in said peripheral region flow diverting means (44) is arranged

for diverting said liquid to said outlet conduit means (42').

31. Apparatus according to claim 30, wherein said flow diverting means (44) comprises a hollow body (45) provided with a hole (46) traversable by said liquid, said hole facing said peripheral region. 5
32. Apparatus according to claim 31, wherein said hollow body (45) comprises a further hole (47) connecting said hollow body (45) to said outlet conduit means (42'). 10
33. Apparatus, according to any one of claims 30 to 32, wherein said flow diverting means (44) is obtained in an extension of said outlet conduit means (42'), said extension protruding into said peripheral region. 15
34. Apparatus, according to any preceding claim, wherein said humidifying device (4) furthermore comprises heating means (26) suitable for increasing the temperature in said cooking chamber (2) and further heating means (34) arranged near said dispersing means (6) for transforming said liquid into steam. 20
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35. Apparatus according to claim 34, wherein said further heating means (34) is arranged so as to surround said dispersing means (6) at least partially.
36. Apparatus according to claim 34, or 35, wherein said further heating means (34) has less thermal power than said heating means (26). 30
37. Apparatus according to claim 36, wherein said heating means (26) and said further heating means (34) are controlled independently by a control unit arranged for controlling the cooking of said food. 35

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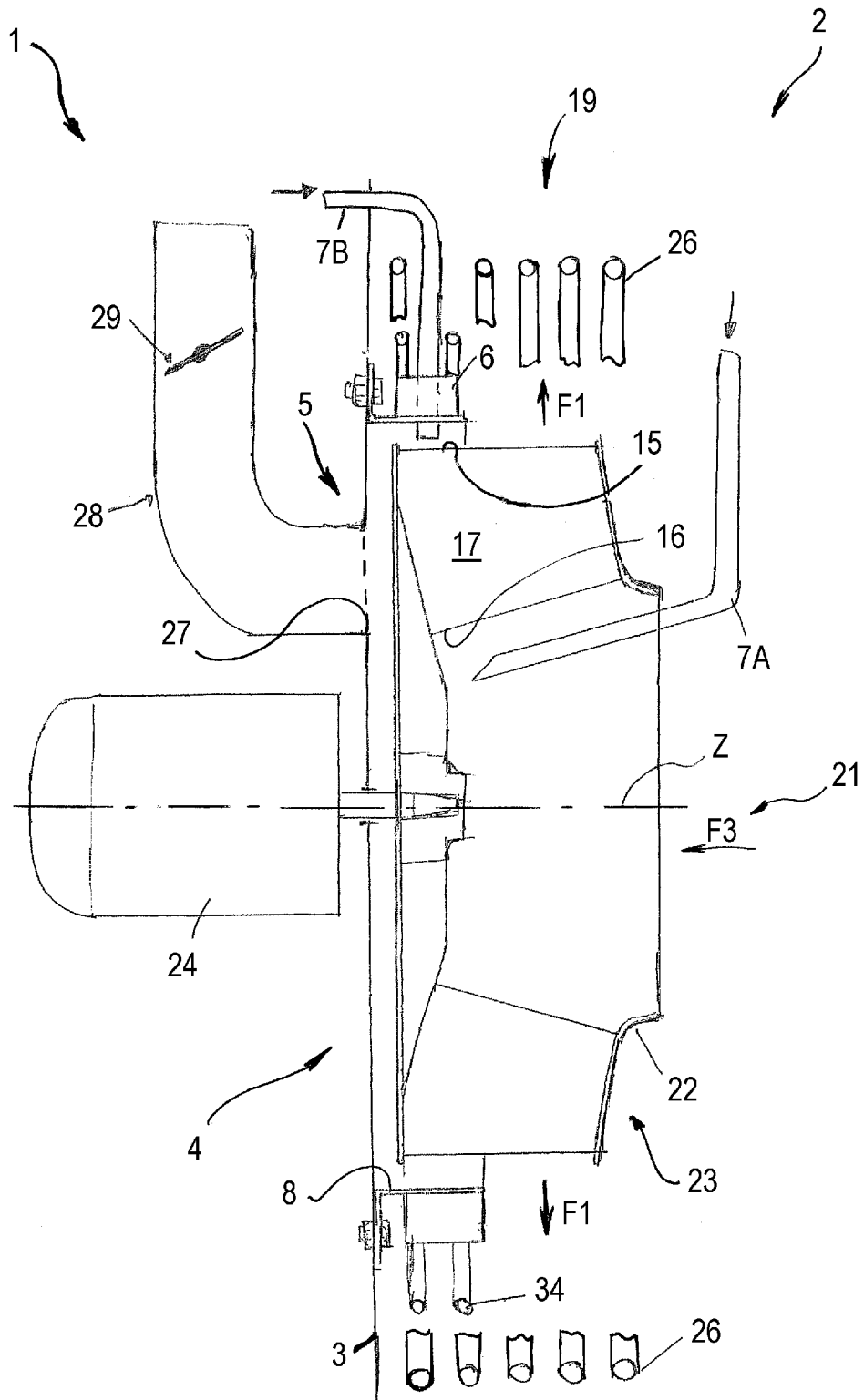


Fig. 1

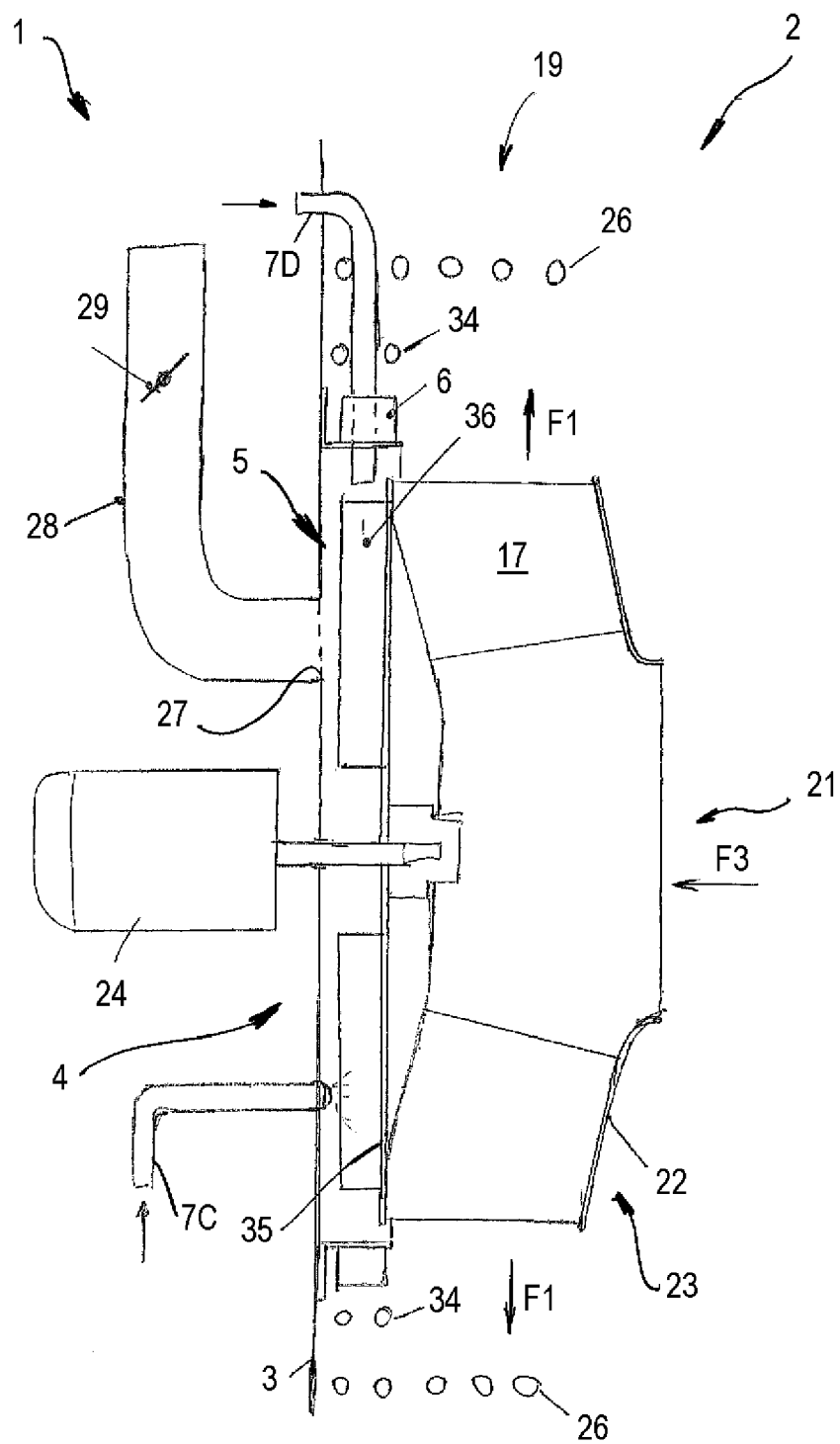


Fig. 2

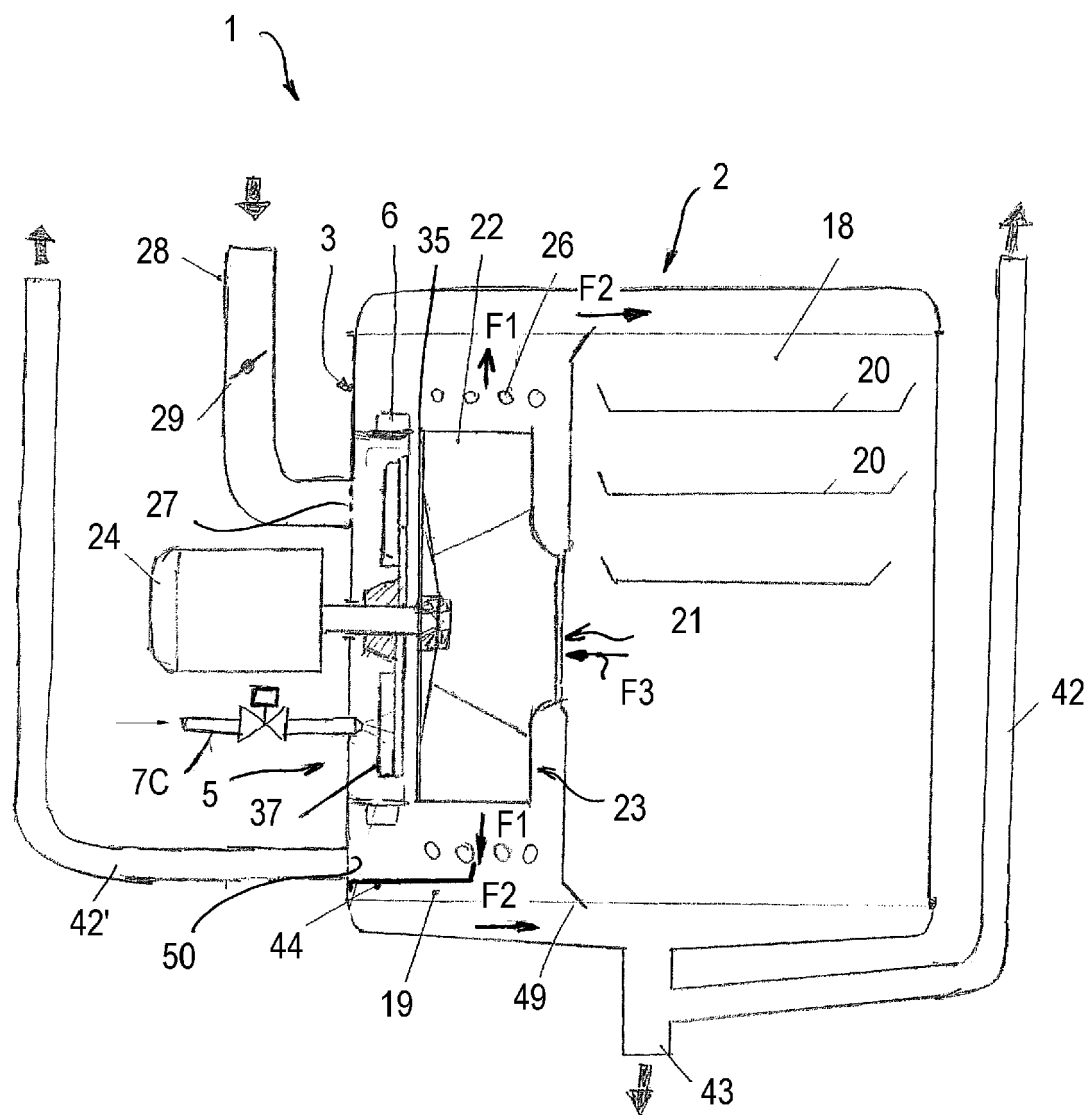


Fig. 3

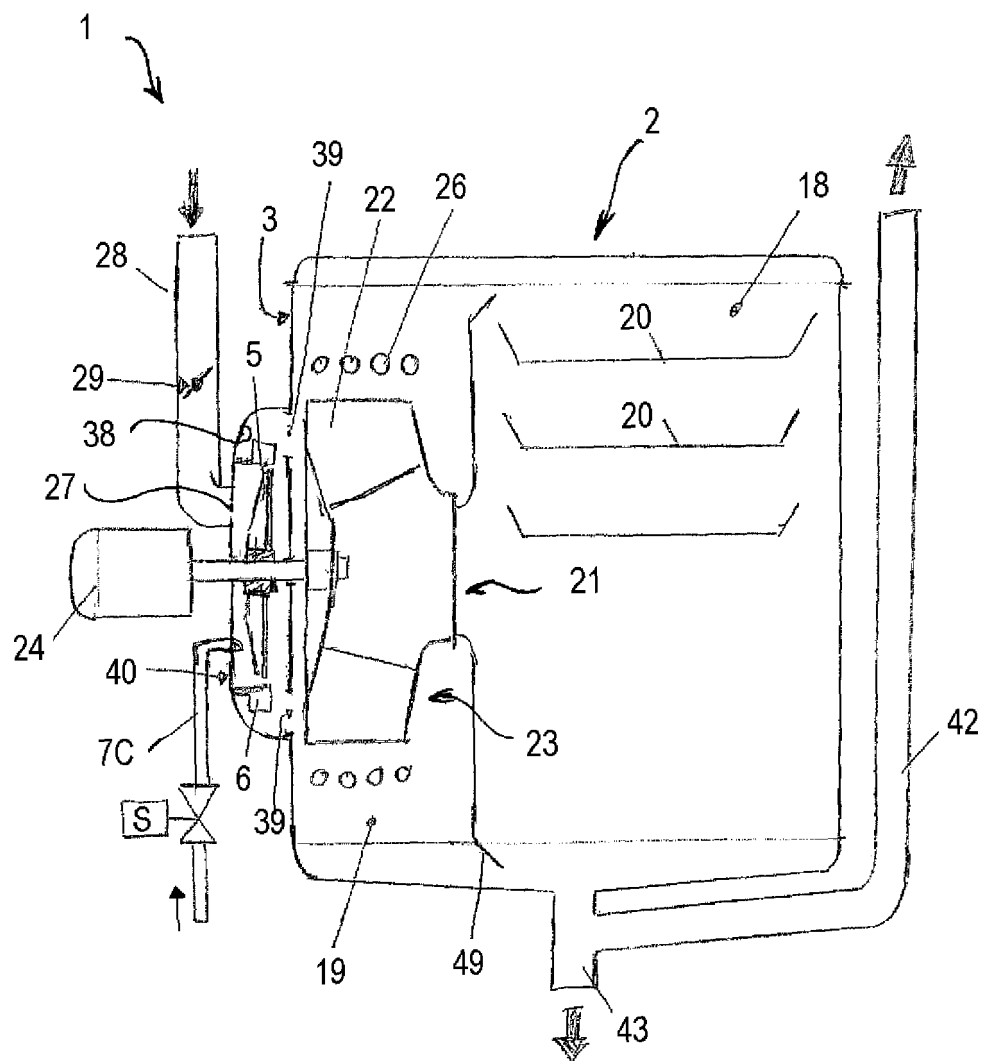


Fig. 4

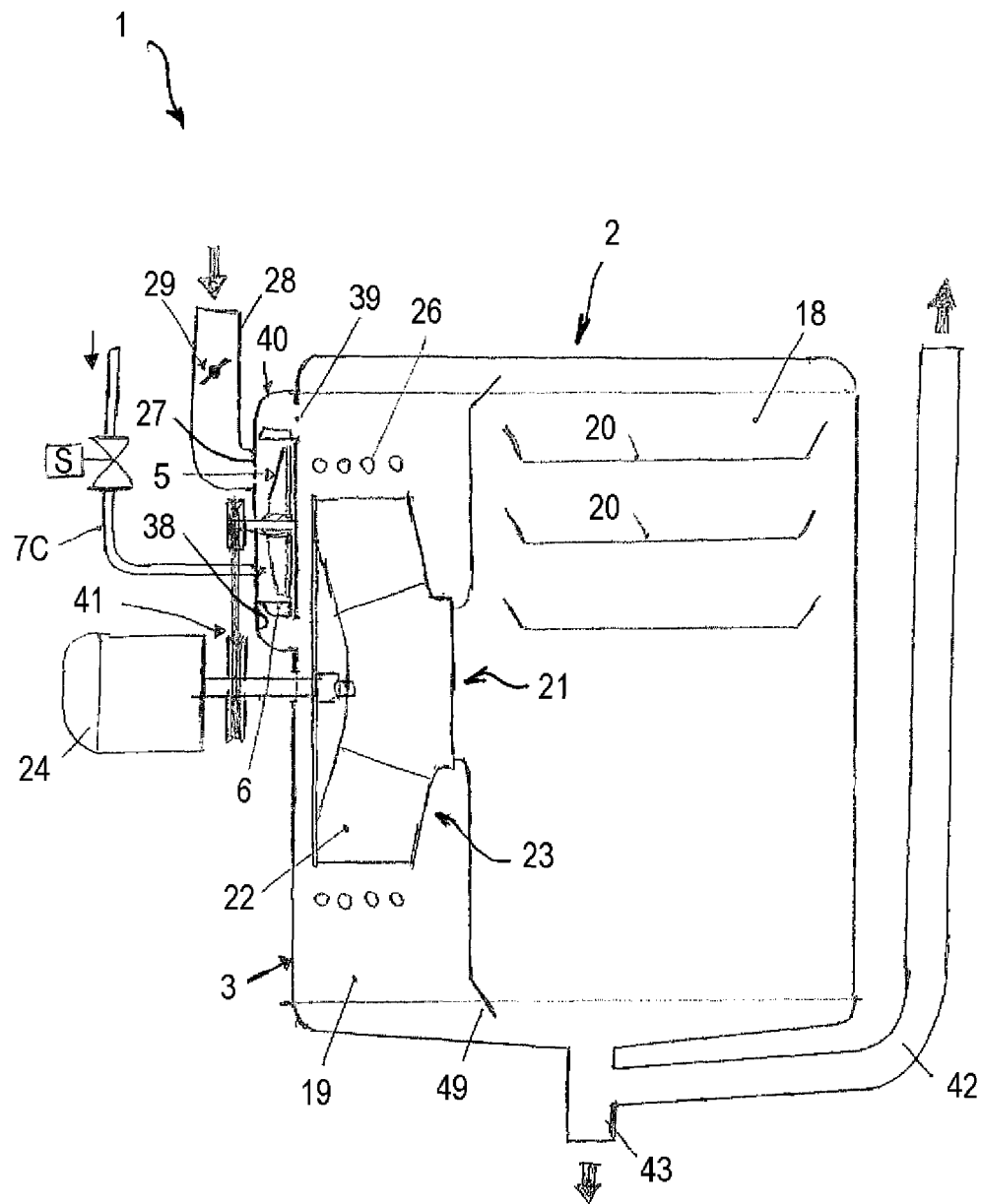
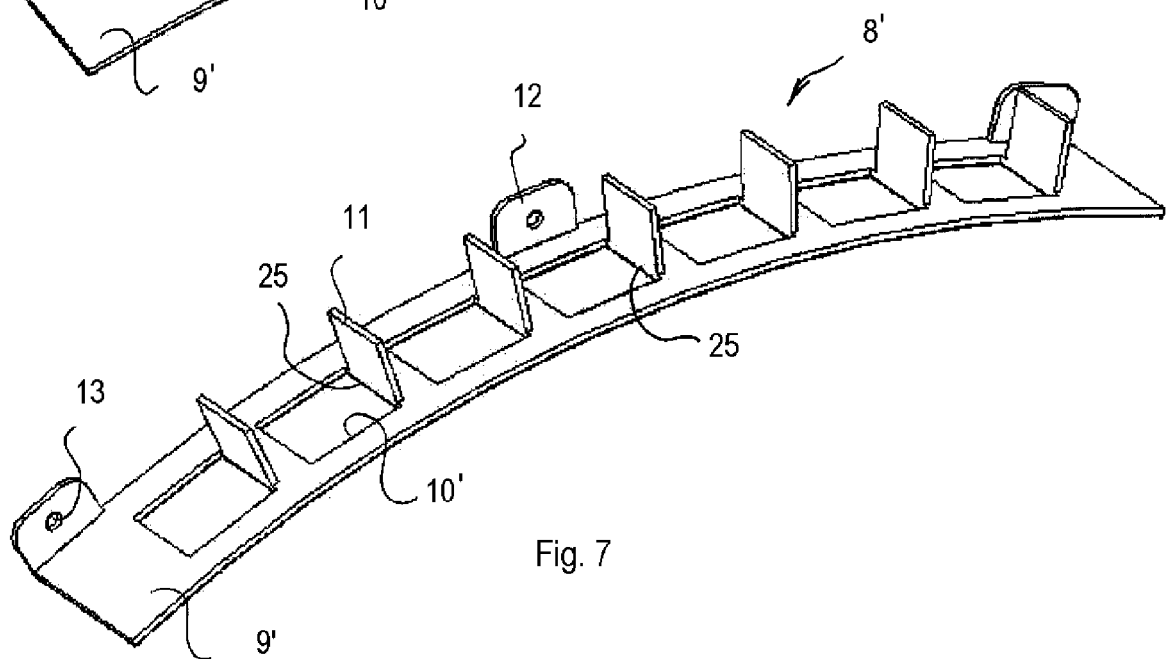
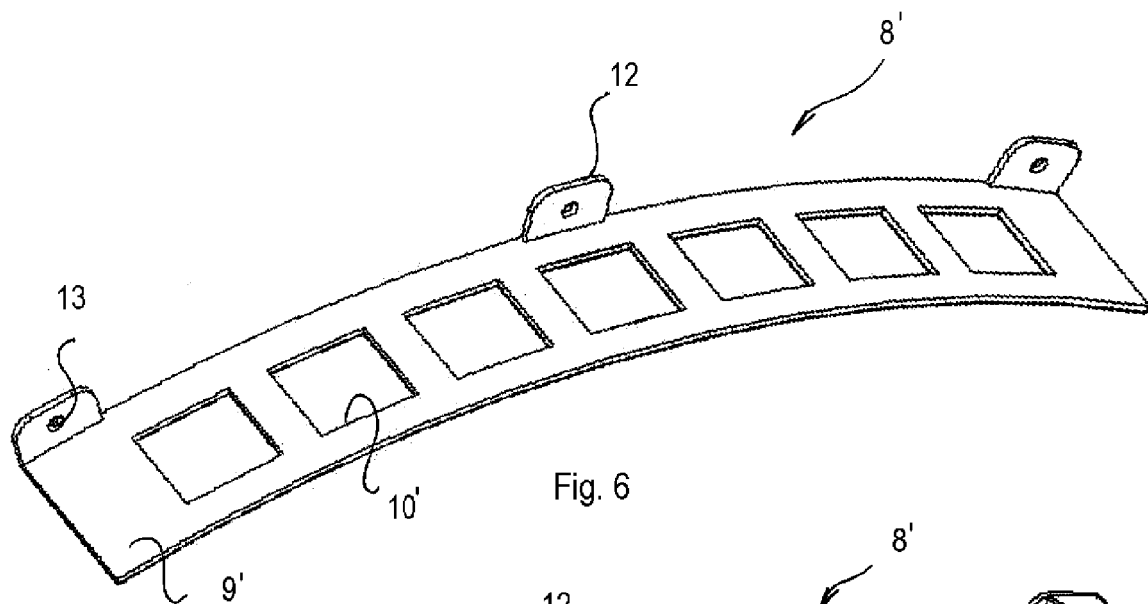
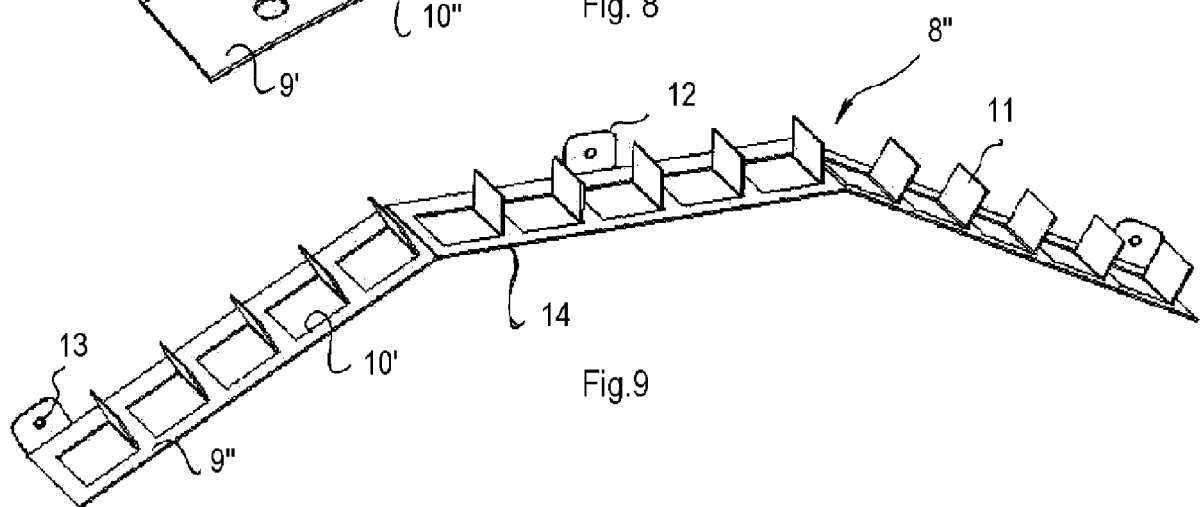
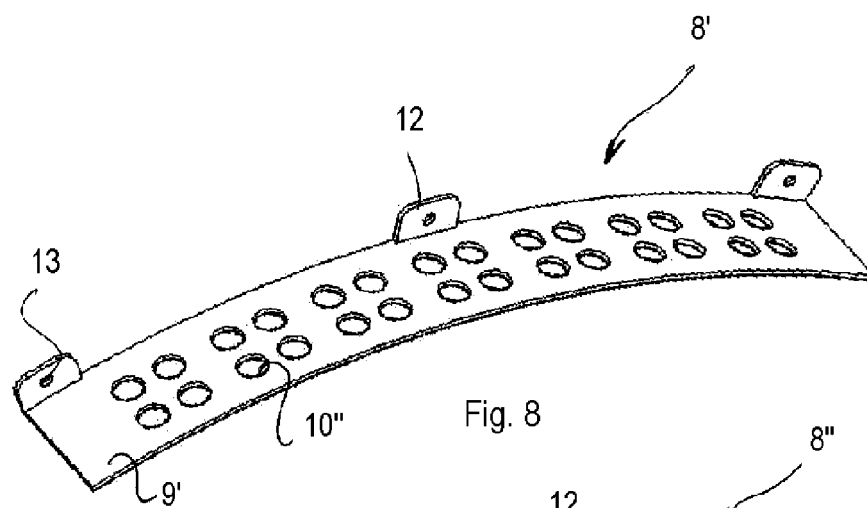


Fig. 5





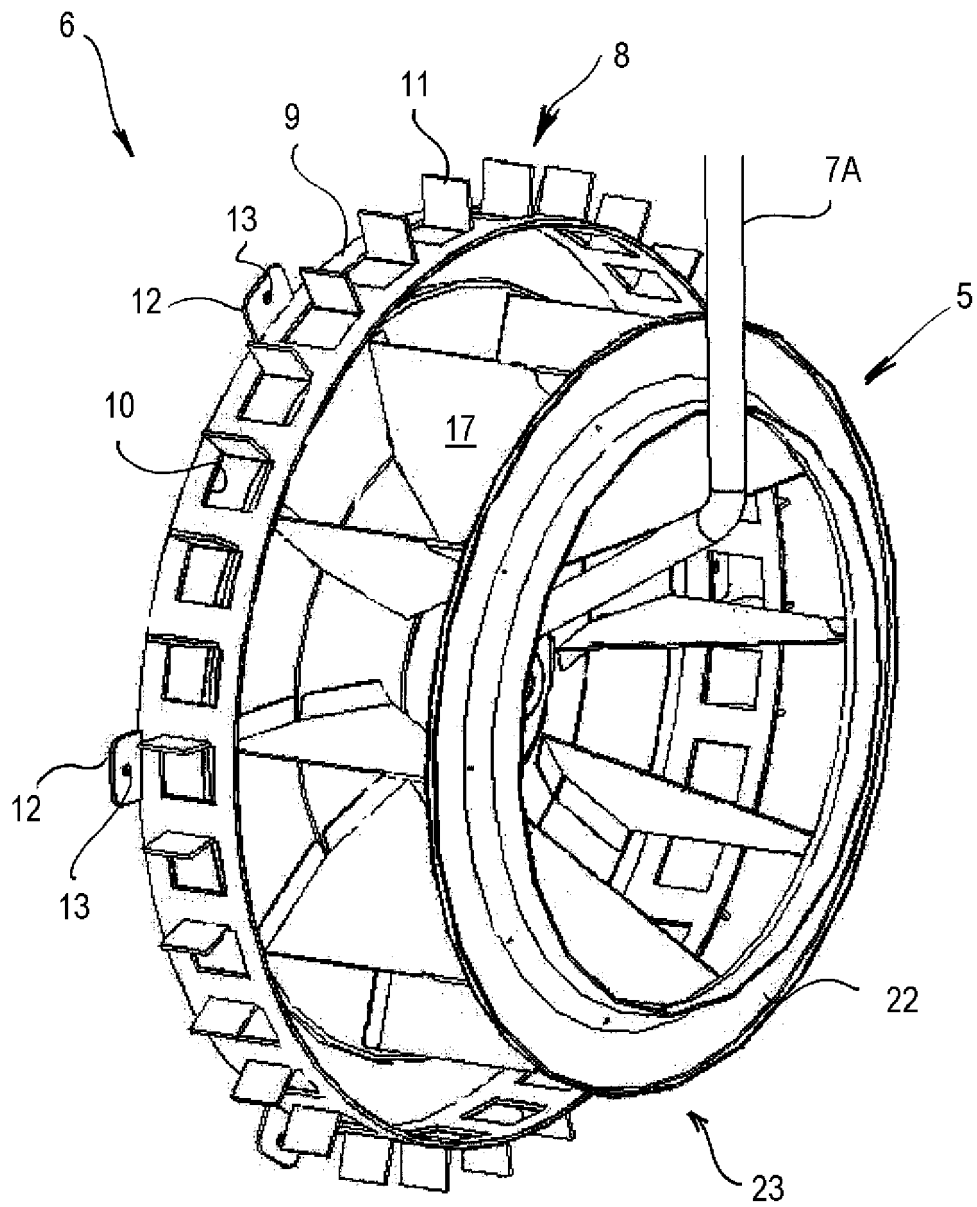


Fig. 10

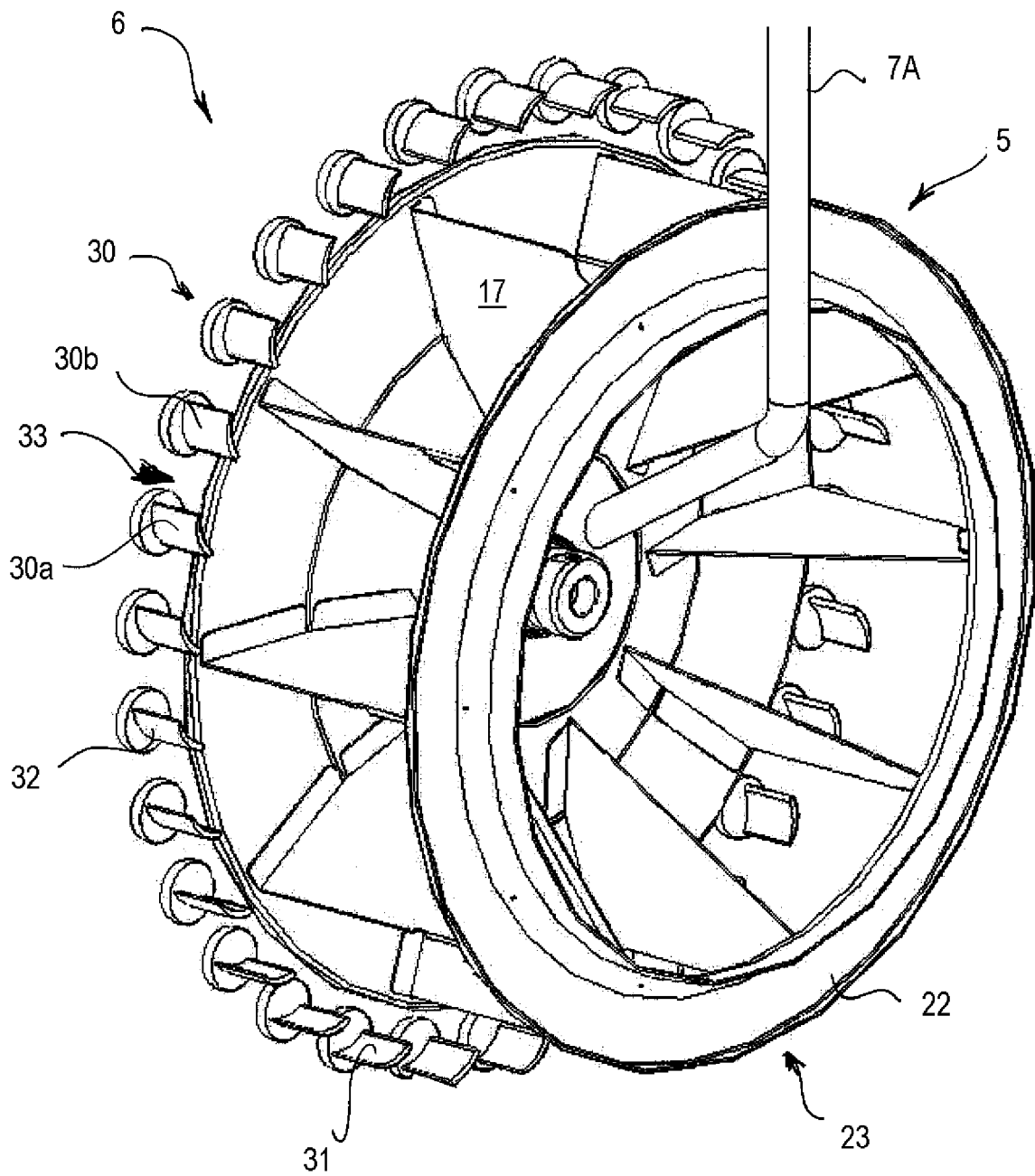


Fig. 11

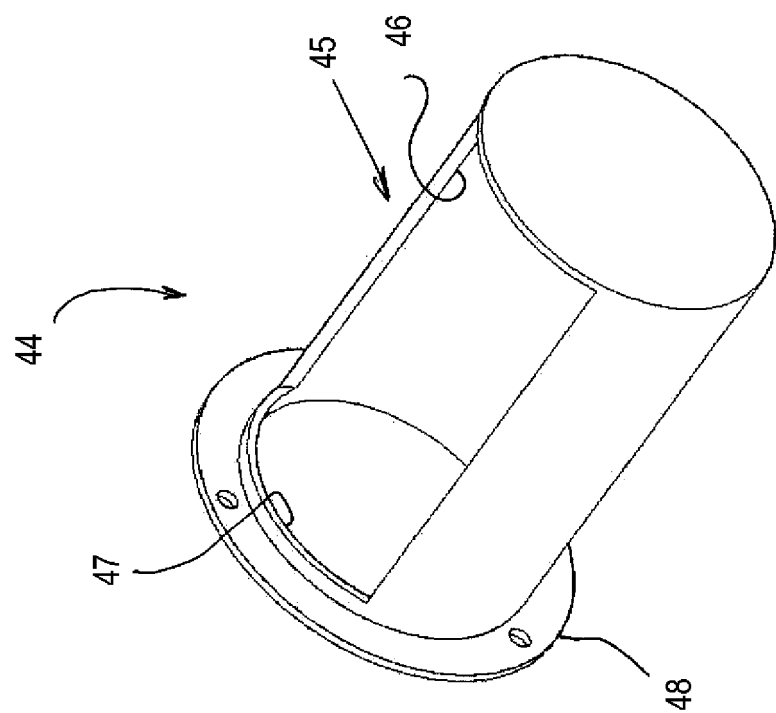


Fig. 13

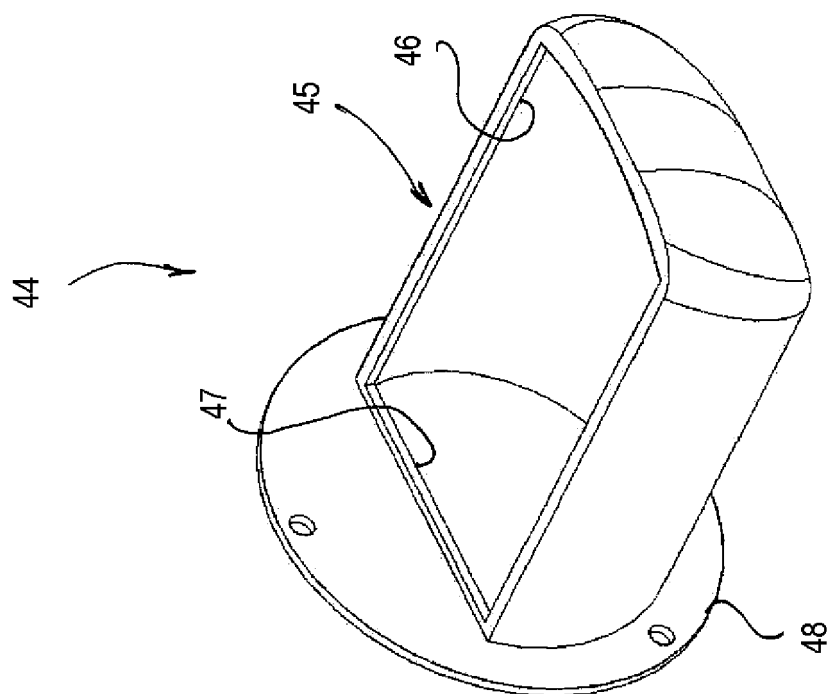


Fig. 12

REFERENCES CITED IN THE DESCRIPTION

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