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(54) VIBRATING TANK MACHINE FOR DRYING AND POLISHING CUTLERY

MASCHINE MIT SCHWINGENDEM BEHÄLTER ZUM TROCKNEN UND POLIEREN VON BESTECK
MACHINE À CUVE VIBRANTE POUR SÉCHAGE ET POLISSAGE DE COUTELLERIE

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Description

[0001] The present invention relates to a vibrating tank machine for drying and polishing cutlery.

[0002] Machines for drying and polishing cutlery after washing it are known. These machines are usually constituted by a box-like support and containment structure, which usually has substantially the shape of a parallelepiped and supports, by means of springs, a treatment tank intended to contain a drying and polishing material and the cutlery to be treated. A motorized vibrating unit, usually constituted by an electric motor with eccentric masses, is connected to the treatment tank and can be operated to vibrate the treatment tank so that as a consequence of this vibration the drying and polishing material interacts with the cutlery, drying and polishing it.

[0003] In these machines, the treatment tank is open upwardly and is provided internally with a rising channel that extends from the bottom of the treatment tank to an outlet that is defined proximate to the top of the treatment tank and is connected to an unloading outlet. The cutlery to be dried is introduced in the treatment tank through a loading inlet, which is usually defined in the upper part of the support and containment structure that lies above the treatment tank. As a consequence of the vibration to which the treatment tank is subjected, the cutlery, introduced in the treatment tank, advances progressively, together with the drying and polishing material, along the rising channel until it reaches the unloading outlet, through which the dried and polished cutlery is unloaded. The last portion of the rising channel is perforated so as to achieve separation of the drying and polishing material from the cutlery before it is unloaded outside the treatment tank.

[0004] These machines suffer the drawback of having a relatively bulky and heavy structure even in the case of machines intended for small users. The bulk arises mainly from the support and containment structure, which in addition to supporting the treatment tank accommodates the parts of the machine that are required for its operation.

[0005] US3 777 770 discloses a machine as defined in the preamble of claim 1.

[0006] The aim of the present invention is to provide a vibrating tank machine for drying and polishing cutlery having such a structure that, for an equal loading capacity, is less bulky and heavy than machines of the known type.

[0007] Within this aim, an object of the invention is to provide a machine that can be manufactured with costs that are lower than those of currently commercially available machines.

[0008] Another object of the invention is to provide a machine that offers the greatest assurances of safety and reliability in use.

[0009] This aim, as well as these and other objects that will become better apparent hereinafter, are achieved by a vibrating tank machine for drying and polishing cutlery,

comprising:

- a footing provided with resting feet intended to rest, when the machine is in conditions for use, on a substantially horizontal supporting surface;
 - a treatment tank, intended to contain a drying and polishing material, connected to an inlet for loading the cutlery to be dried and polished and to an outlet for unloading the dried and polished cutlery; said treatment tank being open upwardly and said outlet being defined in an upper region of the lateral walls of said treatment tank;
 - a rising channel, which is extended, with the machine in conditions for use, around a substantially vertical axis, from the bottom of said treatment tank to said unloading outlet;
 - a lid, which can rotate about the corresponding pivoting axis with respect to said treatment tank in order to open or close said treatment tank in an upper region; said loading inlet being defined in said lid;
 - elastic suspensions, interposed between said footing and said treatment tank;
 - at least one motorized vibrating unit connected to said treatment tank,
- characterized in that said rising channel is connected to the internal walls of said treatment tank (49, said lid is hinged to said treatment tank (4), and in that on the outer side of the machine, between said footing (2) and said treatment tank (4), there is a protective band (14) made of elastically deformable material.

[0010] Further characteristics and advantages will become better apparent from the detailed description of a machine according to the invention, illustrated by way of nonlimiting example in the accompanying drawings, wherein:

Figure 1 is a front elevation view of the machine;
 Figure 2 is a top plan view of the machine;
 Figure 3 is a schematic sectional view of Figure 2, taken along the line III-III;
 Figure 4 is an enlarged-scale sectional view of a detail of Figure 3, related to the pivoting of the lid to the treatment tank;
 Figure 5 is a schematic sectional view of Figure 3, taken along the line V-V;
 Figure 6 is a schematic sectional view of Figure 5, taken along the line VI-VI;
 Figure 7 is a schematic sectional view of Figure 5, taken along the line VII-VII;
 Figure 8 is a perspective view of the treatment tank alone.

[0011] With reference to the figures, the machine according to the invention, generally designated by the reference numeral 1, comprises a footing 2, which is provided with resting feet 3 that are intended to rest, when

the machine is in the conditions for use, on a substantially horizontal supporting surface.

[0012] The footing 2 supports a treatment tank 4, which is intended to contain a drying and polishing material, of a known type, for example a material based on corn cobs. The treatment tank 4 is connected to an inlet 5 for loading the cutlery to be dried and polished and to an outlet 6 for unloading the dried and polished cutlery. The treatment tank 4 preferably has a substantially cylindrical shape with a lateral expansion 4a that has a substantially trapezoidal shape and is open upwardly. The unloading outlet 6 is defined in an upper region of the lateral walls of the treatment tank 4.

[0013] A rising channel 7 is connected to the internal walls of the treatment tank 4 and is extended from the bottom of the treatment tank 4 to the unloading outlet 6 around an axis 8 which, with the machine in the conditions for use, is substantially vertical.

[0014] A lid 9 is hinged directly to the treatment tank 4 and can rotate about the corresponding pivoting axis 10 with respect to the treatment tank 4 in order to close in an upper region the treatment tank 4 during its normal operation or open it during cleaning or maintenance interventions.

[0015] The loading inlet 5 is defined in the lid 9 and, when the lid is closed, lies above the lateral expansion 4a of the treatment tank 4.

[0016] The footing 2 supports the treatment tank 4 by means of elastic suspensions 11, constituted by helical springs, which are interposed between the base of the footing 2 and the bottom of the treatment tank 4.

[0017] Moreover, a motorized vibrating unit 12 is fixed to the bottom of the treatment tank 4 and can be constituted, in a per se known manner, by an electric motor with eccentric masses, which can be operated to vibrate the treatment tank 4.

[0018] An electric resistance heater 13 is fixed to the bottom of the treatment tank 4 and can be supplied with power in order to heat the drying and polishing material introduced in the treatment tank 4.

[0019] Conveniently, on the outer side of the machine, between the footing 2 and the treatment tank 4, there is a protective band 14 made of elastically deformable material. The protective band 14 has the function of covering substantially completely the gap that exists between the treatment tank 4 and the footing 2, so as to prevent the user from inserting his/her fingers accidentally in this gap during use of the machine.

[0020] Conveniently, at least one part of the outer lateral surface of the treatment tank 4, in particular the part located proximate to the electric resistance heater 13, is covered by means of a thermal protection and heat dissipation band 15. The band 15 is conveniently perforated in order to allow adequate heat dissipation.

[0021] Preferably, the rising channel 7 is extended along a cylindrical helix around the axis 8 and can have a stepped bottom in order to contrast the descent of the drying and polishing material and of the cutlery.

[0022] The rising channel 7 has an initial segment that is extended from the bottom of the treatment tank 4 and an end segment 7a which, proximate to the unloading outlet 6, is extended on a plane that is substantially perpendicular to the axis 8 and is at least partly perforated, with holes the dimensions of which are greater than those of the drying and polishing material but smaller than those of the cutlery, so as to allow the fall in a downward region of the drying and polishing material alone upstream of the unloading outlet 6.

[0023] The end portion of the end segment 7a of the rising channel 7 protrudes from the unloading outlet 6 outside the treatment tank 4 and is shaped like a chute that is inclined downwardly, i.e., toward the footing 2.

[0024] Advantageously, proximate to the end segment 7a of the rising channel 7, the lid 9 supports, on its lower face, a fan 16, which is oriented so that when it is activated it strikes with a stream of air, oriented in the opposite direction with respect to the unloading outlet 6, the cutlery and the drying and polishing material that are arranged on the end segment 7a of the rising channel 7, thus preventing the drying and polishing material from escaping from the unloading outlet 6 together with the dried and polished cutlery.

[0025] Conveniently, the parts of the treatment tank 4 that are intended to make contact with the cutlery are made and/or lined with material suitable for contact with food products. In particular, the treatment tank 4 is preferably made with a stainless steel base and with the remaining part, as well as the rising channel 7, made of polypropylene.

[0026] Advantageously, a safety microswitch 17 is connected to the lid 9 and prevents the operation of the machine if the lid 9 is not closed correctly.

[0027] The lid 9 can be locked in the closed position by means of a nut 18 that engages a screw 19, which protrudes upwardly from the treatment tank 4 at the axis 8, passing through a hole 20 provided for this purpose at the center of the lid 9.

[0028] The loading inlet 5 is conveniently provided like a hopper so as to facilitate the loading of the cutlery into the treatment tank 4.

[0029] For the sake of completeness in description, it should be noted that on the front side of the footing 2 there is a button 21 for turning the machine on or off.

[0030] Operation of the machine according to the invention is as follows. The cutlery is loaded into the treatment tank 4 through the loading inlet 5.

[0031] The cutlery rests in the drying and polishing material introduced beforehand in the treatment tank 4. The activation of the treatment tank 4 with a vibrating motion, caused by the activation of the motorized vibrating unit 12, causes the rubbing of the drying and polishing material against the cutlery and simultaneously the cutlery and such material advance along the rising channel 7 from the bottom of the treatment tank 4 toward the unloading outlet 6.

[0032] Moving along the end segment 7a of the rising

channel 7, the drying and polishing material passes through the holes of the end segment 7a and falls in a lower region, thus remaining within the treatment tank 4, while the cutlery, by now dried and polished, continues its advancement toward the unloading outlet 6, through which it is progressively poured outside the machine. It should be noted that along the end segment 7a of the rising channel 7 the air stream emitted by the fan 16 prevents any drying and polishing material that might remain on the rising channel 7 from reaching the unloading outlet 6.

[0033] Due to the fact that the machine according to the invention does not have a box-like support and containment structure, since the treatment tank 4 is supported directly by the footing 2 and the lid 9 is hinged directly to the treatment tank 4, it is possible to achieve, for the machine according to the invention, an extremely limited space occupation and weight.

[0034] Furthermore, thanks to this particular structure, the machine according to the invention has a reduced number of components and can be manufactured and assembled with lower costs than those of machines of the known type.

[0035] In practice it has been found that the machine according to the invention achieves fully the intended aim and objects, since for an equal loading capacity it can have a reduced space occupation and weight with respect to machines of the known type.

[0036] Furthermore, thanks to its structural simplicity, it can be manufactured with reduced costs without reducing the degree of safety and reliability in use.

[0037] In practice, the materials used, as long as they are compatible with the specific use, as well as the dimensions, may be any within the scope of the appended claims.

Claims

1. A vibrating tank machine for drying and polishing cutlery, comprising:
 - a footing (2) provided with resting feet (3) intended to rest, when the machine is in conditions for use, on a substantially horizontal supporting surface;
 - a treatment tank (4), intended to contain a drying and polishing material, connected to an inlet (5) for loading the cutlery to be dried and polished and to an outlet (6) for unloading the dried and polished cutlery; said treatment tank (4) being open upwardly and said outlet (6) being defined in an upper region of the lateral walls of said treatment tank (4);
 - a rising channel (7), which is extended, with the machine in conditions for use, around a substantially vertical axis (8), from the bottom of said treatment tank (4) to said unloading outlet (6),

- a lid (9), which can rotate about the corresponding pivoting axis (10) with respect to said treatment tank (4) in order to open or close said treatment tank (4) in an upper region; said loading inlet (5) being defined in said lid (9);
- elastic suspensions (11), interposed between said footing (2) and said treatment tank (4);
- at least one motorized vibrating unit (12) connected to said treatment tank (4), **characterized in that** said rising channel is connected to the internal walls of said treatment tank (4), said lid is hinged to said treatment tank (4), and **in that** on the outer side of the machine, between said footing (2) and said treatment tank (4), there is a protective band (14) made of elastically deformable material.

2. The machine according to claim 1, **characterized in that** at least part of the outer lateral surface of said treatment tank (4) is covered with a thermal protection and heat dissipation band (15).
3. The machine according to one or more of the preceding claims, **characterized in that** said rising channel (7) is extended along a cylindrical helix around said axis (8).
4. The machine according to one or more of the preceding claims, **characterized in that** the end segment (7a) of said rising channel (7), proximate to said unloading outlet (6), is extended on a plane that is substantially perpendicular to said axis (8) and is at least partially perforated in order to allow the fall, in a lower region, of the drying and polishing material upstream of said unloading outlet (6),
5. The machine according to one or more of the preceding claims, **characterized in that** proximate to said end segment (7a) of the rising channel (7) said lid (9) supports a fan (16) that can be operated to strike with an air stream, oriented in the opposite direction with respect to said unloading outlet (6), the cutlery and the drying and polishing material arranged on said end segment (7a) of the rising channel (7),
6. The machine according to one or more of the preceding claims, **characterized in that** it comprises an electric resistance heater (13) that is connected to said treatment tank (4) in order to heat said drying and polishing material.
7. The machine according to one or more of the preceding claims, **characterized in that** the end portion of said end segment (7a) of the rising channel (7) protrudes from said unloading outlet (6) outside said treatment tank (4) and is shaped like a chute that is inclined toward said footing (2)

8. The machine according to one or more of the preceding claims, **characterized in that** said motorized vibrating unit (12) is accommodated in said footing (2) and is connected to the bottom of said treatment tank (4).
9. The machine according to one or more of the preceding claims, **characterized in that** the parts intended to make contact with the cutlery are made of and/or covered with material suitable for contact with food products.

Patentansprüche

1. Eine Maschine mit schwingendem Behälter zum Trocknen und Polieren von Besteck, die Folgendes umfasst:

- einen Sockel (2), ausgestattet mit Standfüßen (3), dazu bestimmt, wenn die Maschine sich im Nutzungszustand befindet, auf einer im Wesentlichen horizontalen Standfläche zu stehen;
- einen Behandlungstank (4), dazu bestimmt, ein Trocknungs- und Poliermaterial aufzunehmen, verbunden mit einem Einlass (5) zum Hineingeben des zu trocknenden und zu polierenden Bestecks und mit einem Auslass (6) zum Herausnehmen des getrockneten und polierten Bestecks; wobei der Behandlungstank (4) nach oben offen und der Auslass (6) in einem oberen Bereich der Seitenwände des Behandlungstanks (4) bestimmt ist;
- einen aufsteigenden Kanal (7), der sich, wenn die Maschine im Nutzungszustand ist, um eine im Wesentlichen vertikale Achse (8), vom Boden des Behandlungstanks (4) zum Auslass (6), erstreckt,
- einen Deckel (9), der sich mit Bezug auf den Behandlungstank (4) um die entsprechende Schwenkachse (10) drehen kann, um den Behandlungstank (4) in einem oberen Bereich zu öffnen oder zu schließen, wobei der Einlass (5) in dem Deckel (9) bestimmt ist;
- elastische Aufhängungen (11), angeordnet zwischen dem Sockel (2) und dem Behandlungstank (4);
- mindestens eine motorisierte Schwingeinheit (12), verbunden mit dem Behandlungstank (4);

dadurch gekennzeichnet, dass der aufsteigende Kanal mit den Innenwänden des Behandlungstanks (4) verbunden ist, der Deckel schwenkbar mit dem Behandlungstank (4) verbunden ist, und dadurch, dass sich an der Außenseite der Maschine, zwischen dem Sockel (2) und dem Behandlungstank (4), ein Schutzband (14) aus elastisch verformbarem Material befindet.

2. Die Maschine gemäß Anspruch 1, **dadurch gekennzeichnet, dass** zumindest ein Teil der äußeren Seitenfläche des Behandlungstanks (4) mit einem Wärmeschutz- und -ableitungsband (15) bedeckt ist.
3. Die Maschine gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** der aufsteigende Kanal (7) sich entlang einer zylindrischen Helix um die Achse (8) erstreckt.
4. Die Maschine gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** das Endsegment (7a) des aufsteigenden Kanals (7), nahe dem Auslass (6), sich auf einer Ebene erstreckt, die im Wesentlichen senkrecht zu der Achse (8) ist, und zumindest teilweise perforiert ist, um das Fallen des Trocknungs- und Poliermaterials stromaufwärts von dem Auslass (6) in einen unteren Bereich zu ermöglichen.
5. Die Maschine gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** der Deckel (9) nahe dem Endsegment (7a) des aufsteigenden Kanals (7) einen Ventilator (16) trägt, der betrieben werden kann, um mit einem Luftstrom, ausgerichtet in die dem Auslass (6) entgegengesetzte Richtung, das Besteck und das Trocknungs- und Poliermaterial zu treffen, das auf dem Endsegment (7a) des aufsteigenden Kanals (7) angeordnet ist.
6. Die Maschine gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** sie eine Widerstandsheizung (13) umfasst, die zum Erhitzen des Trocknungs- und Poliermaterials mit dem Behandlungstank (4) verbunden ist.
7. Die Maschine gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** der Endabschnitt des Endsegments (7a) des aufsteigenden Kanals (7) aus dem Auslass (6), außerhalb des Behandlungstanks (4), herausragt und wie eine Rutsche geformt ist, die zu dem Sockel (2) hin geneigt ist.
8. Die Maschine gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die motorisierte Schwingeinheit (12) in dem Sockel (2) untergebracht und mit dem Boden des Behandlungstanks (4) verbunden ist.
9. Die Maschine gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die Teile, die dazu bestimmt sind, in Kontakt mit dem Besteck zu stehen, aus Material bestehen und/oder damit bedeckt sind, das für den Kontakt mit Lebensmitteln geeignet ist.

Revendications

1. Machine à cuve vibrante pour sécher et polir des couverts, l'appareil comprenant :

- une base (2) pourvue de pieds (3) destinés à reposer sur une surface d'appui essentiellement horizontale lorsque la machine est en état d'utilisation,

- une cuve de traitement (4) destinée à contenir un matériau absorbant et polissant, raccordée à une entrée (5) de chargement des couverts à sécher et polir et à une sortie (6) de déchargement des couverts séchés et polis, ladite cuve de traitement (4) étant ouverte vers le haut et ladite sortie (6) étant définie dans une zone supérieure des parois latérales de ladite cuve de traitement (4),

- un canal ascendant (7) qui est étendu, avec la machine en état d'utilisation, autour d'un axe essentiellement vertical (8) depuis le fond de ladite cuve de traitement (4) à ladite sortie de déchargement (6),

- un couvercle (9) qui peut pivoter autour de l'axe de pivotement correspondant (10) par rapport à ladite cuve de traitement (4) de sorte à ouvrir ou fermer ladite cuve de traitement (4) dans une zone supérieure, ladite entrée de chargement (5) étant définie dans ledit couvercle (9),

- des suspensions élastiques (11) entreposées entre ladite base (2) et ladite cuve de traitement (4),

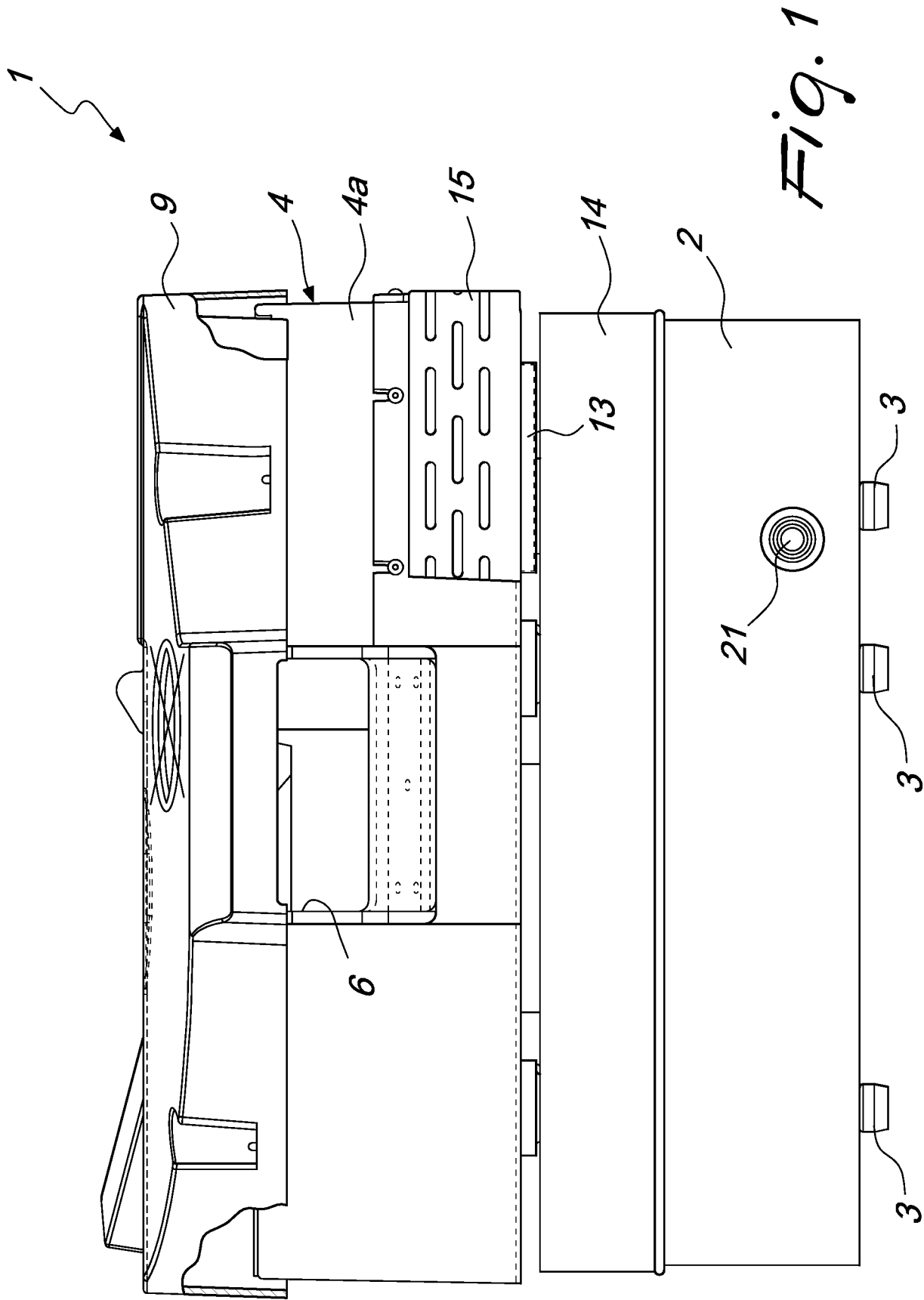
- au moins une unité de vibration motorisée (12) reliée à ladite cuve de traitement (4),

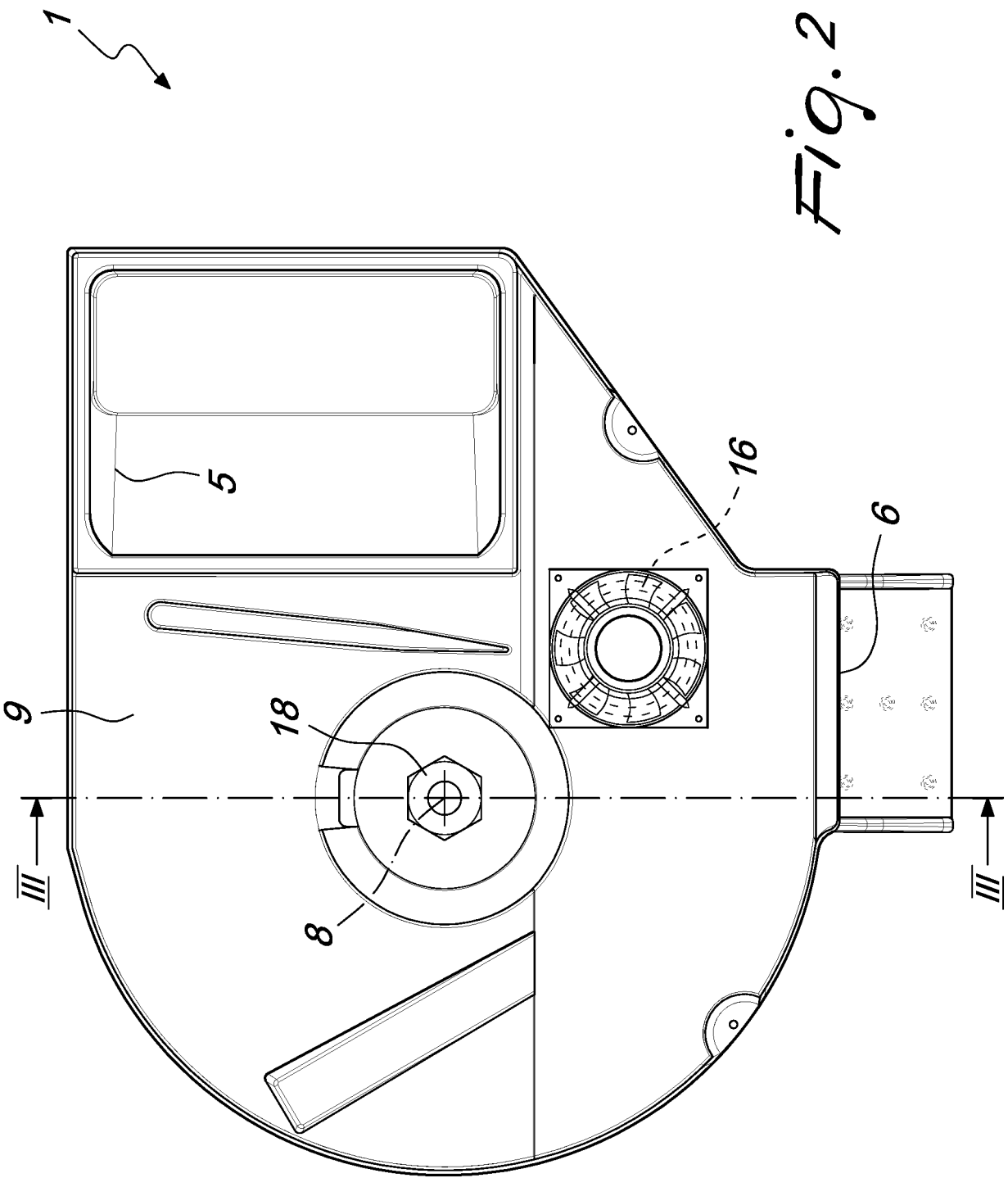
caractérisé en ce que ledit canal ascendant est relié aux parois internes de ladite cuve de traitement (4), ledit couvercle est articulé à ladite cuve de traitement (4), et **en ce que** sur le côté externe de la machine, entre ladite base (2) et ladite cuve de traitement (4), il y a une bande protectrice (14) fabriquée dans un matériau élastiquement déformable.

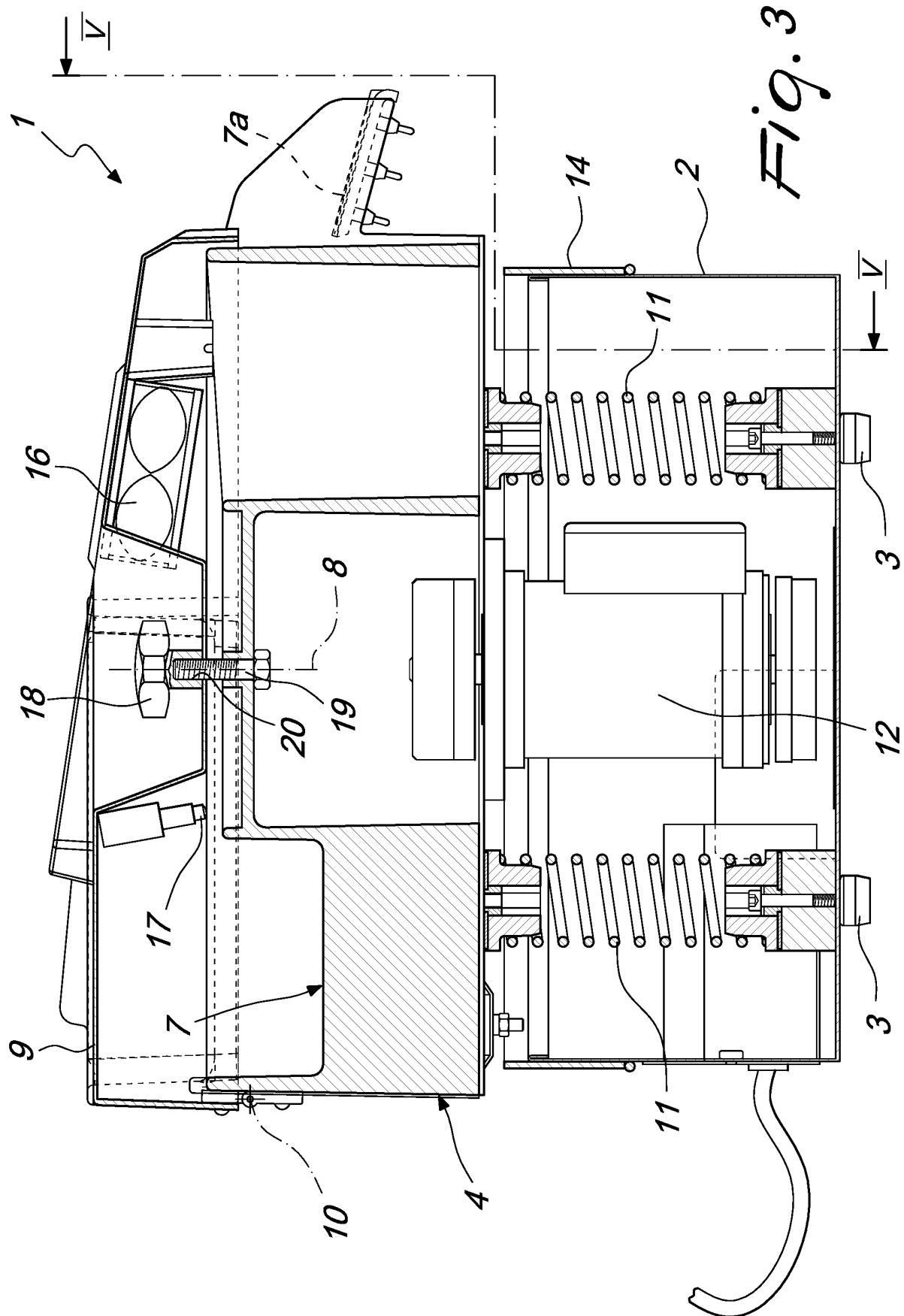
2. Machine suivant la revendication 1, **caractérisée en ce qu'**au moins une partie de la surface latérale externe de ladite cuve de traitement (4) est recouverte d'une bande de protection thermique et de dissipation thermique (15).
3. Machine suivant une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit canal ascendant (7) est étendu le long d'une hélice cylindrique autour dudit axe (8).
4. Machine suivant une ou plusieurs des revendications précédentes, **caractérisée en ce que** le segment d'extrémité (7a) dudit canal ascendant (7), à proximité de ladite sortie de déchargement (6) est

étendu sur un plan qui est essentiellement perpendiculaire audit axe (8) et au moins partiellement perforé de manière à permettre la chute, dans une zone inférieure, du matériau absorbant et polissant en amont de ladite sortie de déchargement (6).

5. Machine suivant une ou plusieurs des revendications précédentes, **caractérisée en ce qu'**à proximité dudit segment d'extrémité (7a) du canal ascendant (7) ledit couvercle (9) supporte un ventilateur (16) qui peut fonctionner de manière à frapper avec un courant d'air, orienté dans la direction opposée à ladite sortie de déchargement (6), les couverts et le matériau absorbant et polissant étant disposés sur ledit segment d'extrémité (7a) du canal ascendant (7).
6. Machine suivant une ou plusieurs des revendications précédentes, **caractérisée en ce qu'**elle comprend un générateur de chaleur à résistance électrique (13) qui est relié à ladite cuve de traitement (4) de manière à chauffer ledit matériau absorbant et polissant.
7. Machine suivant une ou plusieurs des revendications précédentes, **caractérisée en ce que** la partie d'extrémité dudit segment d'extrémité (7a) du canal ascendant (7) fait saillie depuis ladite sortie de déchargement (6) à l'extérieur de ladite cuve de traitement (4) et présente la forme d'une glissière inclinée vers ladite base (2).
8. Machine suivant une ou plusieurs des revendications précédentes, **caractérisée en ce que** ladite unité de vibration motorisée (12) est logée dans ladite base (2) et reliée au fond de ladite cuve de traitement (4).
9. Machine suivant une ou plusieurs des revendications précédentes, **caractérisée en ce que** les parties destinées à entrer en contact avec les couverts sont fabriquées en/ou recouvertes d'un matériau adapté à être en contact avec des produits alimentaires.







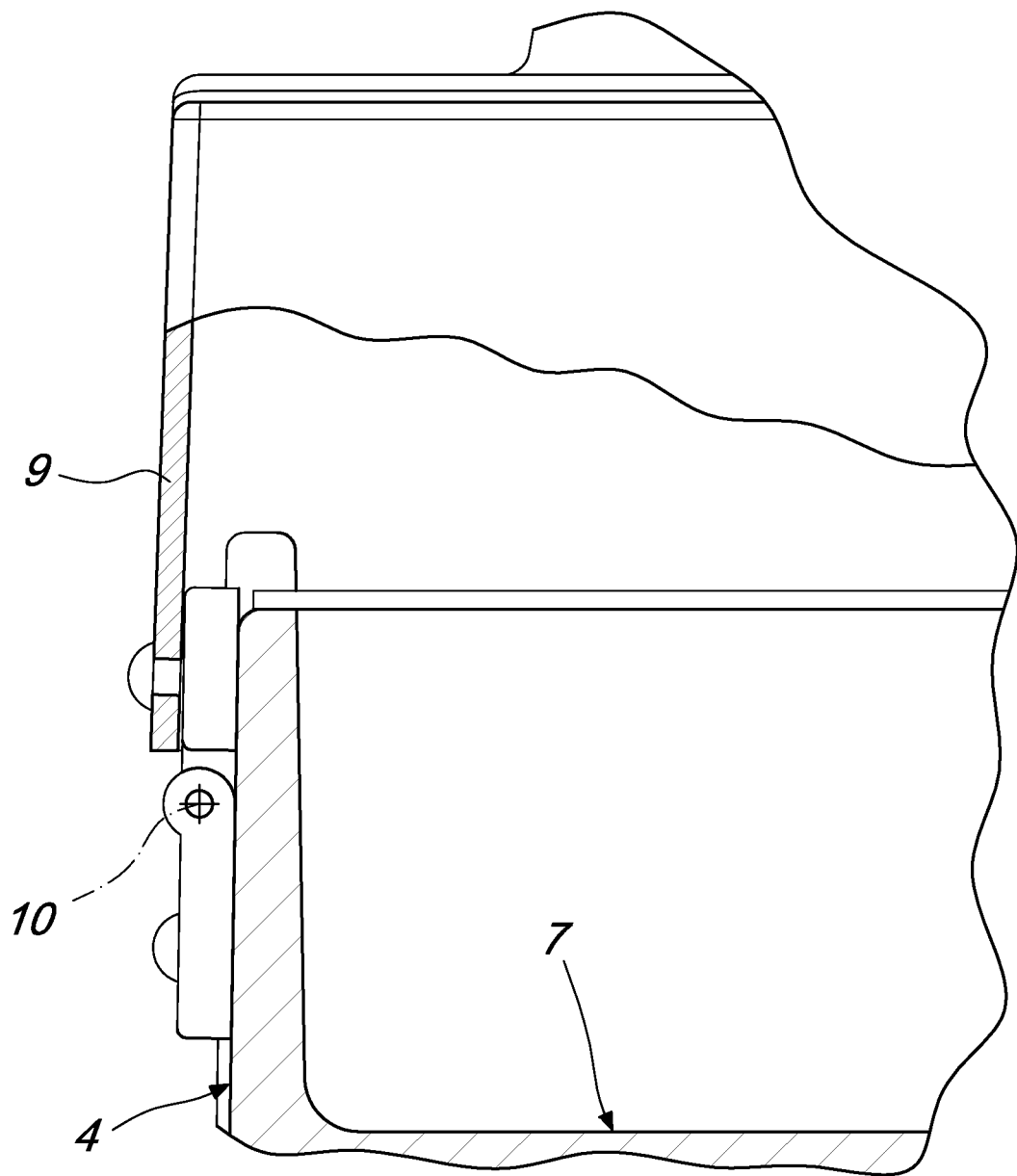
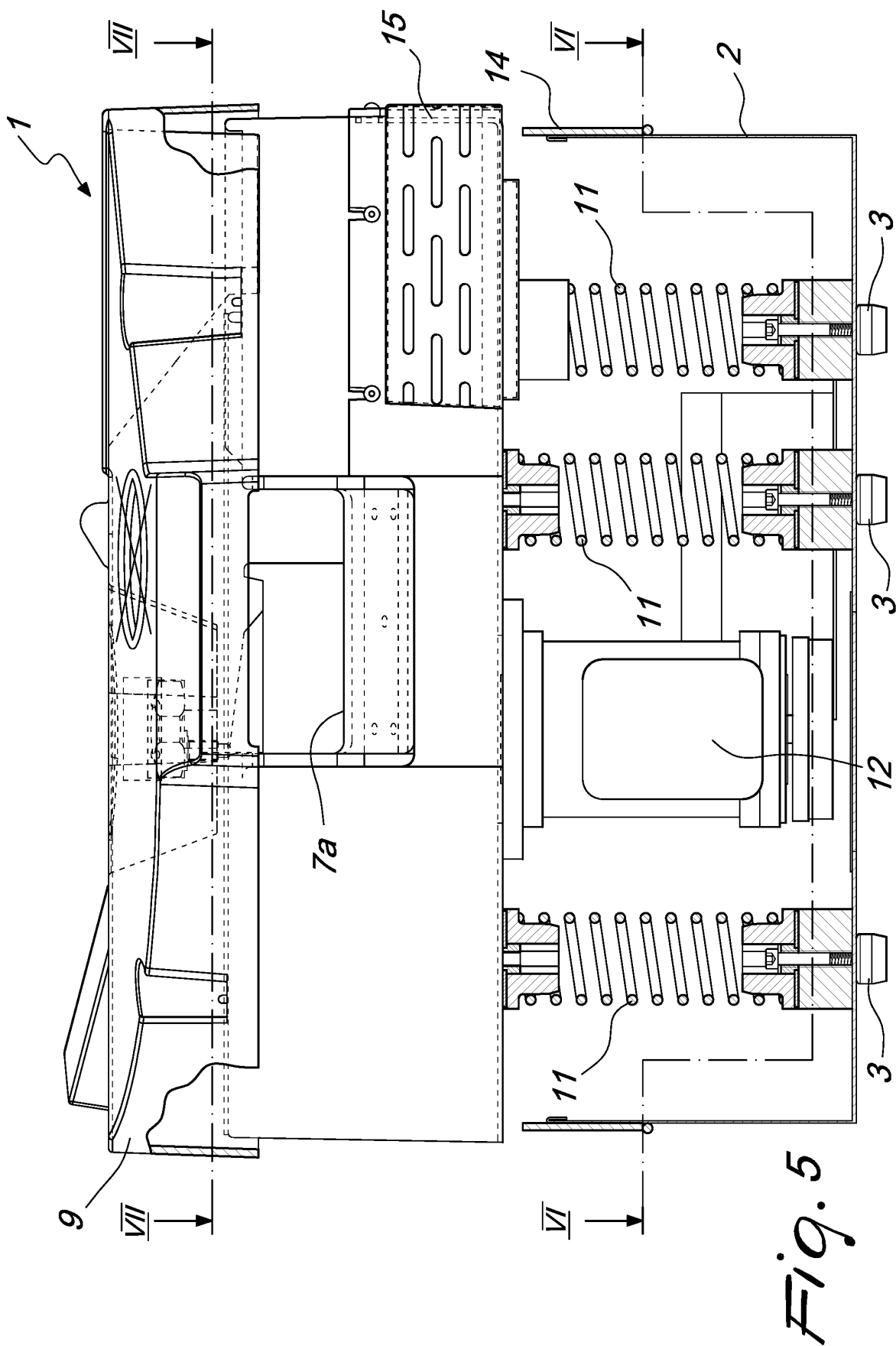
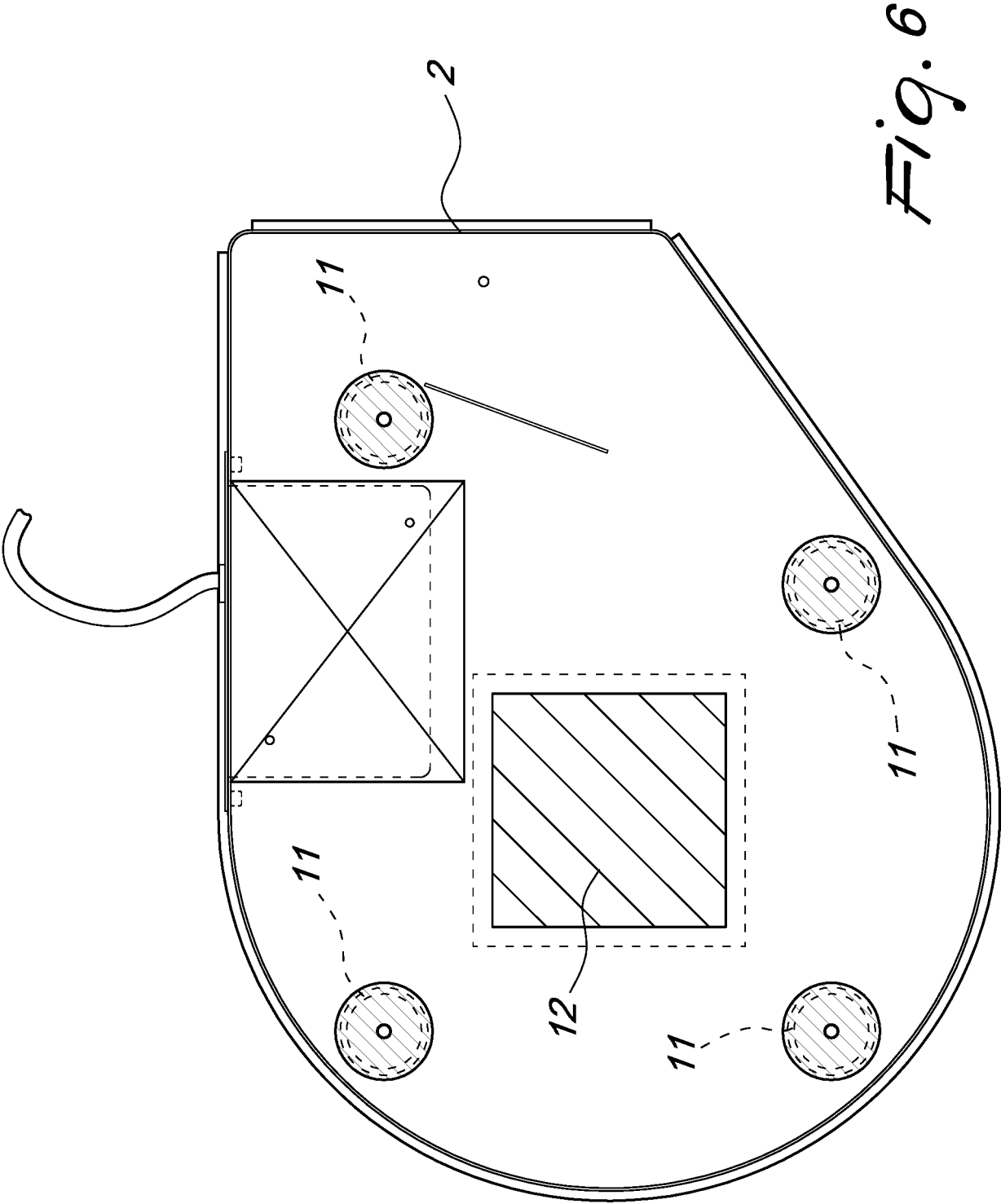
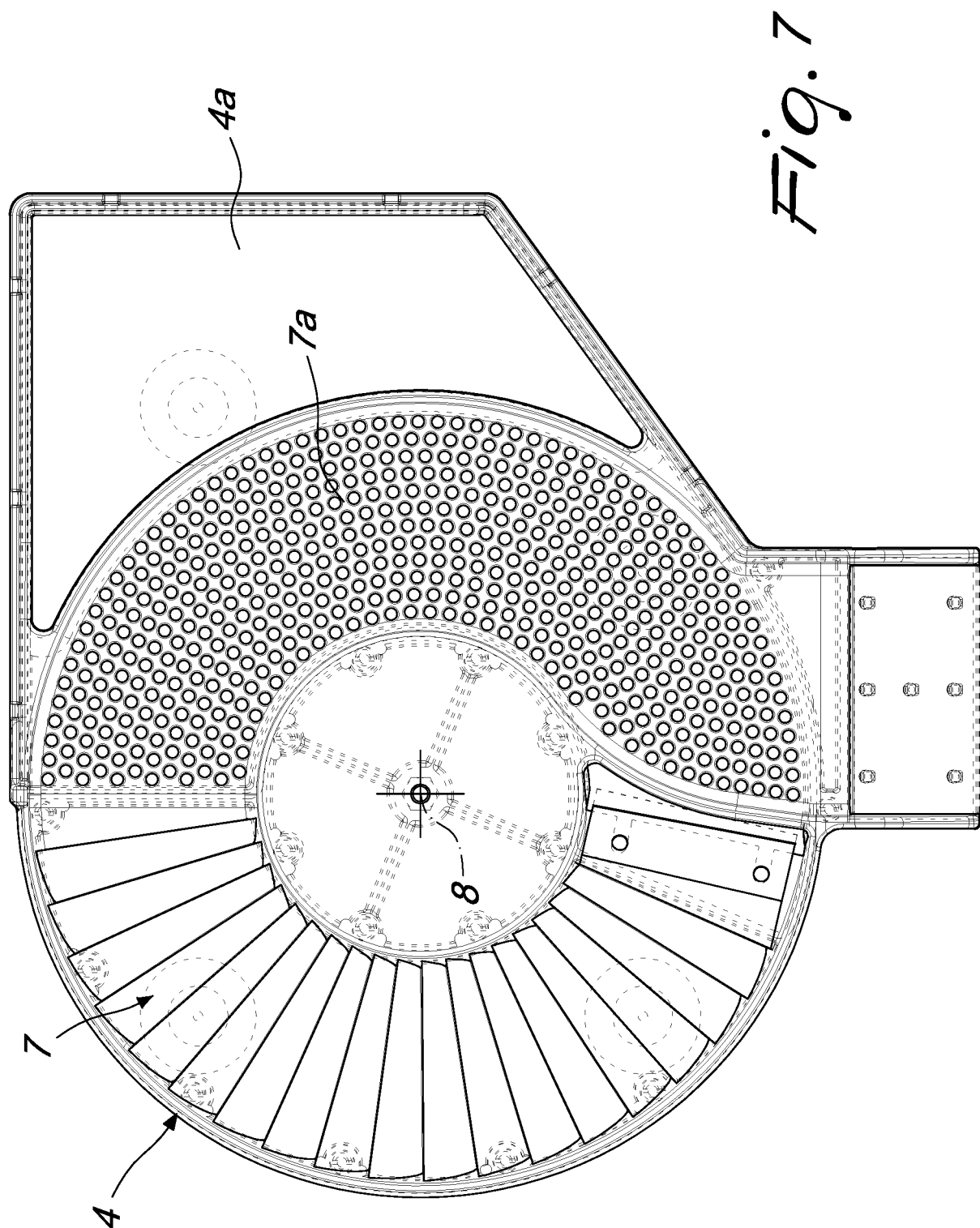


Fig. 4







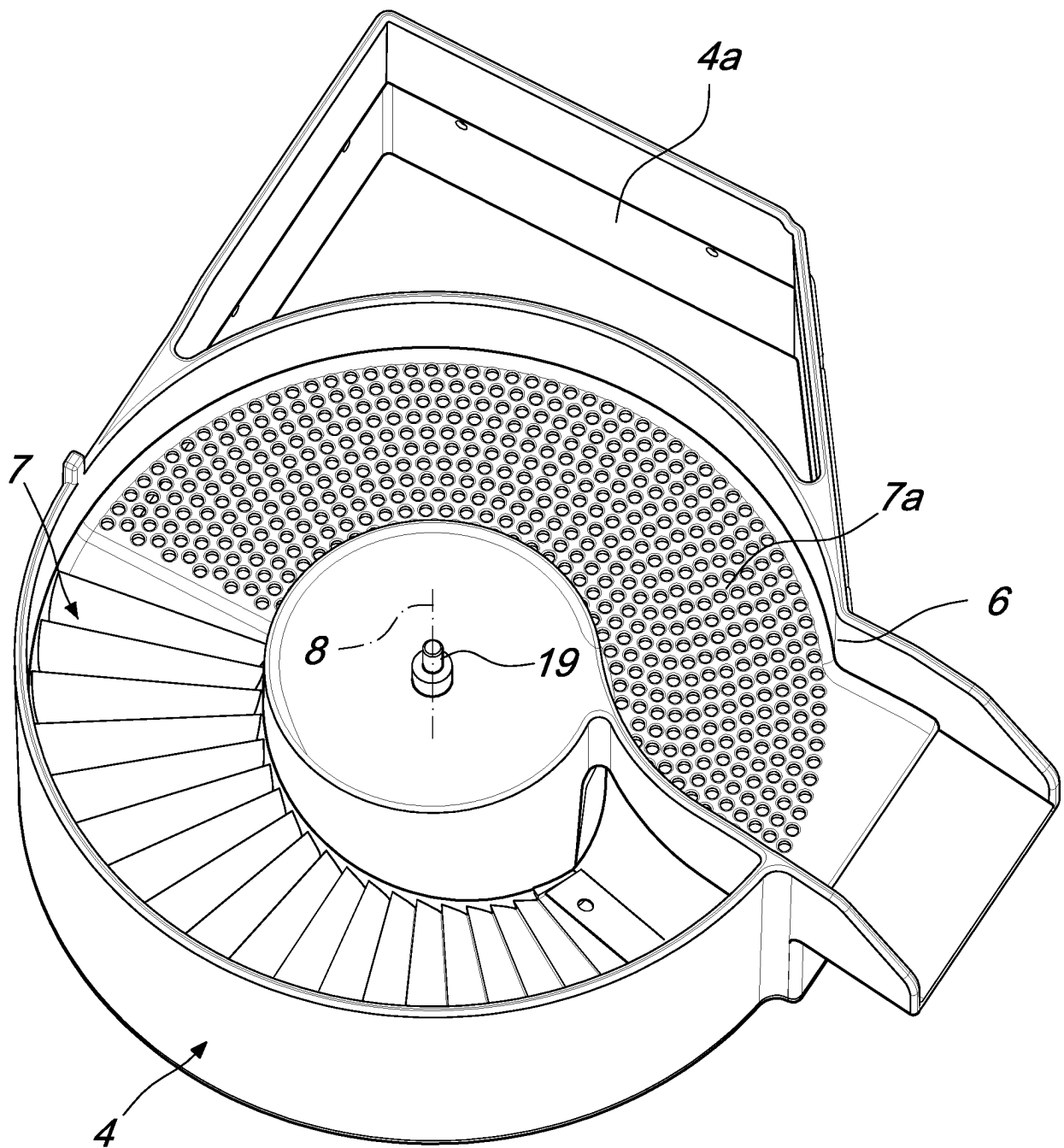


Fig. 8

REFERENCES CITED IN THE DESCRIPTION

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