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(54) **A soundproof box for a centrifugal fan**

Schalldichtbehälter für einen Radiallüfter

Box d'insonorisation pour un ventilateur radial

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Description

[0001] The present invention relates to a soundproof box for a centrifugal fan.

[0002] Essentially, a centrifugal fan consists of a scroll, of a wheel arranged inside the scroll, and of an electric motor for driving the wheel directly or through a transmission. Air is intaked by the effect generated by the wheel that is rotated by the electric motor, is therefore centrifuged towards the outside by the wheel, and the scroll, the profile of which is so shaped as a wound nozzle, collects the air discharged from the periphery of the wheel and send it the outlet mouth with a greater pressure and a predetermined speed, with the the aim of developing industrial processes such as drying, transport of materials and other.

[0003] Therefore, the source of noise of the fan can be divided into:

- noise associated with the electric motor (friction of the air entering and coming out from the fan arranged on the back, that cools the motor itself);
- noise associated with the case of the fan (friction of the air entering and coming out as a result of the rotation of the wheel);
- noise associated with the inlet mouth (friction of the air entering with a predetermined speed);
- noise associated with the discharge outlet (friction of the air coming out with a predetermined speed).

[0004] Usually, known soundproof boxes for industrial fans consist of a case adapted to contain the fan, which is formed by sheet panels that are covered inside by a soundproof material.

[0005] However, such a known solution has the drawback of being little versatile, so that a soundproof box made for a specific electric fan can not be fitted with other different electric fan configurations, or it can be adapted only to a few kinds of electric fans similar to that for which it has been designed.

[0006] Effectively, the factors to be taken into account in the design of a fan are many, from which the configuration of the fan itself strongly depend.

[0007] One of such factors consists of the presence or not of pipes connected to the inlet and/or outlet mouths, depending on the type of intended use: for example, the Inlet mouth can be connected to a pipe for intaking air fom a zone far from the fan, and the outlet mouth can be connected to an other pipe or to a circuit for discharging air in an other zone far from the fan; or, the inlet mouth can be free (such as in fans applied to burners), the fan inletting air from the environment and discharging it in a circuit (in this case the intaked air can be or not filtered by suitable filters); or, the outlet mouth can be free, the fan sucking air from a circuit and discharging it In the environment (such as in the case of industrial vacuum cleaners).

[0008] Another parameter at stake consists of the ar-

rangement of the scroll. UNI specifications recognize eight different angular orientations of the scroll with respect to the axis of rotation of the wheel, that are spaced 45° one to the other. Moreover, the scroll can be over-turned of 180° in order to be fitted to a right-handed or a left-handed wheel.

[0009] An other factor consists of the kind of installation of the electric fan.

[0010] Usually, a support structure is provided, so-called chair, that on the one hand acts as a base for the electric motor and, on the other hand, allows the scroll to be fixed. However, other configurations lacking in the chair exist, in which the scroll is fixed to a different support, or configurations in which the chair supports a shaft connected to the wheel, which shaft receives the motion through a transmission from an electric motor arranged close to the chair.

[0011] Other design parameters are the diameter and the width of the scroll, as a function of the flow rate and pressure required for the fan. The flow rate depends on the duty to be carried out by the fan. The pressure depends on the length and configuration of the pipes connected to the inlet and/or outlet mouths, as well as on the kind of duty required. Each fan has a wheel diameter that, combined with the speed of rotation, generates a predetermined pressure; moreover, the width of the scroll is strictly linked with the flow rater. This means that two fans having the same diameter, one of which is wide the double of the other, indicatively have the same pressure at the outlet mouth, but the one has a flow rate double with respect to the other.

[0012] From what stated above, the fact that fans may have an extremely great numbers of range of configurations derives. Known soundproof boxes are not suitable to be fitted to a great number of fan versions. In practice, the box need to be custom-made when the configuration of the fan to which it is directed is know.

[0013] US-4 279 325-A discloses a soundproof box comprising a support frame that supports outside a motor of the fan and holds up a scroll of the fan, a parallelepiped soundproof scroll case containing the scroll and comprising a pair of end walls as well as a plurality of side walls mounted between the end walls, and connecting means that allow the scroll case to be mounted on the support frame, which are positioned between the support frame and at least one of the end walls of the scroll case.

[0014] An object of the invention is that of proposing a soundproof box that is so shaped as to allow a high structural modularity to be achieved, and that allow therefore a mass production by industry to be achieved.

[0015] Such an object is reached, according to the invention, by a soundproof box as defined in the appended claim 1.

[0016] In a box according to such an idea of solution, the scroll case can be rotated as a result of the various orientations of the fan, and it can be arranged both in the right-handed and in the left-handed configuration, while the sidewalls can be replaced in order to allow different

widths of the scroll to be fitted and in order to allow filters, partition walls and possible further fittings to be installed. More in general, the various members of the box can be manufactured as a series of parts that can be combined in several manners as a result of the requirements.

[0017] Particular embodiments of the invention are the subject of the depending claims, the content of which should be considered as an integrating part of the present description.

[0018] Further characteristics and advantages of the invention will appear from the following detailed description, provided as a purely non-limitative example, with reference to the appended drawings in which:

- figure 1 is a perspective view from the motor side, of a centrifugal electric fan provided with a soundproof box according to the invention;
- figure 2 is a view similar to figure 1, from which cover members of the motor covering have been removed;
- figure 3 is a perspective view from the scroll side, of the motor of the fan of figure 1 and of the respective covering;
- figure 4 is a view similar to figure 3, from which the motor has been removed;
- figure 5 is a view similar to figure 4, from which an inner partition wall has been further removed;
- figure 6 is a perspective view from the scroll side, of the fan of figure 1;
- figure 7 is a view similar to figure 6, from which a terminal wall has been removed;
- figure 8 is a view similar to figure 7, from which a noise reducing plenum associated with the discharge outlet of the fan has been further removed;
- figure 9 is a view similar to figure 8, from which the scroll of the fan has been further removed;
- figure 10 is a perspective view from the motor side, of the scroll case of the fan of figure 1;
- figure 11 is a view similar to figure 10, from which a terminal wall has been removed;
- figure 12 is a view similar to figure 11, from which a noise reducing plenum associated with the outlet mouth of the fan has been further removed;
- figure 13 is a view similar to figure 12, from which the wheel of the fan has been further removed;
- figure 14 is a perspective view of a second embodiment of the soundproof box according to the invention;
- figure 15 is an elevational view from the motor side, of a scroll case of the box of figure 14;
- figure 16 is a perspective view from the scroll side, of the scroll case of figure 15; and
- figure 17 is a view similar figure 16, from which a terminal wall has been removed.

[0019] With reference to figures 1 to 13, a soundproof box for a centrifugal fan is indicated 10 as a whole. The fan conventionally comprises a scroll C, that can be seen for example in figure 7, a wheel (not shown) arranged

inside the scroll C, and an electric motor M for driving the wheel G, that can be seen for example in figure 2. The shaft A projecting from the electric motor M, on which the fan wheel is fast, can be seen for example in figure 3.

5 **[0020]** In the following description the terms "front" and "rear" are referred to a direction from the scroll to the electric motor.

[0021] The soundproof box 10 according to the invention comprises a soundproof motor covering 20, adapted to encircle the electric motor M of the fan, and a soundproof scroll case 30, adapted to contain the scroll C of the fan.

[0022] With particular reference to figures 1 to 5, the motor covering 20 is applied on a support frame 201, commonly called "chair", acting as a base for the electric motor M, on the one side, and allowing the scroll C to be assembled, on the other side, as it will be clarified in the following.

[0023] The chair 201 comprises a pair of side frames 203 arranged at opposite sides of the motor M, each of which comprises a pair of uprights 205 and a pair of crosspieces 207, connecting the uprights 205 to each other at opposite ends thereof. The side frames 203 are connected to each other by a pair of lower interconnection crosspieces 211, arranged at the base of the chair 201, by an upper interconnection crosspiece 213, arranged close to the top of the chair 201 at the rear side thereof, and by a bracket 215 arranged at a middle height of the chair 201. Such a bracket 215 serves as a support base for the electric motor M.

[0024] The chair 201 described above is made in order to be fitted to different heights of the motor, by changing the height of assembly of the bracket 215.

[0025] The motor covering 20 comprises a plurality of covering members fixed to the chair 201 so as to surround the motor M. Such covering members consist in general of sheet panels sheathed by soundproof material on the inner side of the motor covering 20. In particular, a pair of side panels 221 respectively fixed on the side frames 203 of the chair 201, an upper panel 223 fixed on the top of the chair 201, and a rear covering 225 fixed on the rear side of the chair 201, which extends in height from the top of the chair 201 to below the bracket 215, are provided.

[0026] A convex portion of the rear covering 225, indicated 227 in the figures, projects rearwardly so as to form a cavity between it and a flat partition wall 229 that can be seen in figure 4, which is also fixed on the rear side of the chair 201 and extend between the upper interconnection crosspiece 213 and the bracket 215. In the partition wall 229, that is sheathed by soundproof material, is formed an opening 229a through which the rear portion of the electric motor M projects, that is therefore arranged in the cavity between the convex portion 227 of the rear covering 225 and the partition wall 229. Therefore, the partition wall 229 separates the inner space of the motor covering 20 into two separated cavities, one of which contains the rear portion of the motor, and the other, ar-

ranged above the bracket 215, contains all the remaining portion of the motor. Therefore, the convex portion 227 of the rear covering 225 and the partition wall 229 form a noise trap arranged behind the motor M that, beyond reducing the noise, separates the air intake of the cooling fan (not shown) of the motor with respect to the outlet so that the motor M does not receive already warm air, but always cool air. The cooling fan of the motor, conventionally arranged at its rear side, sucks cool air through slits 227a formed on the convex portion 227 of the rear covering 225, and directs it along the outer surface of the case of the motor M through the opening 229a in the partition wall 229. Air warmed by contact with the motor M is therefore discharged through slits 221a formed on the side panels 221.

[0027] The chair 201 has the function, beyond that of supporting the motor and the covering members, of allowing the box to be lifted and palletized, as well as to allow cables to enter the motor.

[0028] With particular reference to figures 6 to 13, the scroll case 30 has a substantially prismatic shape and comprises a pair of terminal walls 301 and a plurality of sidewalls 303 mounted between such terminal walls. The terminal walls 301 and the sidewalls 303 consist in general of sheet panels sheathed by soundproof material on the inner side of the scroll case 20. Depending on the requirements, and as in the example shown, some of the sidewalls may have openings at which planar filters 303a are mounted. Air intaked to the electric fan enters through the filters 303a. A partition wall (not shown) sheathed by soundproof material, arranged between the scroll C and the terminal wall 301 on the front side, that may be provided for dampening the noise associated with the inlet mouth, which partition wall makes in the substance a double wall on the front side.

[0029] In the example shown, the inlet mouth BA of the fan is free, that is lacks in any pipe connected to it, so that it sucks air directly from the surrounding environment. In the case in which sucking takes place through a pipe, the terminal wall 301 on the front side is provided with an opening for connection to such an intake pipe.

[0030] Advantageously, the scroll case 30 comprises a main portion having the geometry of an octagonal prism provided with angles of 45° , which correspond geometrically to the positions admitted for orientation of the scroll C, and an outlet portion so shaped as to receive the outlet mouth BM of the scroll. Effectively, the scroll case 30 loses the octagonal geometry at the outlet mouth, since its shape fits the outlet mouth BM of the scroll 30. In the example shown in figures 1 to 13, the cross-sectional profile of the main portion of the scroll case 30 is defined by a regular octagon portion having six equal sides and six equal angles of 45° .

[0031] The sidewalls 303 of the main portion of the scroll case 30 that has an octagonal geometry, are mounted in the following manner. A pair of linear interconnection members 305 is mounted at each side corner of the octagonal prism, said members being arranged at

opposite sides of the corner, which interconnect the terminal panels 301 of the scroll case 30. Each corner is covered by a bent covering plate 307 that is fixed to the respective pair of linear interconnection members 305 of the corner.

[0032] The two linear interconnection members 305 associated with each side face of the octagonal prism, serve as an assembly frame for the sidewalls 303 of the scroll case 30.

[0033] Of course, in the case in which the inlet mouth is connected to a pipe, the filters 303a and the double wall are not present. In such a case, since the double wall is absent and therefore there is not any axial obstacle caused by it, the scroll case can be sized so that it has a reduced width, simply by choosing the linear interconnection members 305 so that they have a smaller length, and sidewalls so that they have 303 a smaller width.

[0034] The sidewalls of the scroll case 30, at the outlet portion of such a case, consist of a plurality of panels, some of which are folded at an angle, which are connected to each other and are arranged in such a manner as to leave an opening at the outlet mouth BM of the scroll. Moreover, the sidewalls at the outlet portion of the scroll case 30 are arranged in such a manner to define a shelf or seat, at which a noise reducing plenum 311 of a known type is mounted, in order to attenuate the noise connected with the outlet mouth of the electric fan. In the case in which the outlet mouth is not free but is connected to a pipe, such a noise reducing plenum is not applied.

[0035] Connection means are provided for mounting the scroll case 30 on the motor covering 20, which are positioned between the chair 201 and the rear terminal wall 301 of the scroll case 30. In particular, such connection means comprise a set of screw studs 321, that can be seen in particular in figure 11, which are applied on the rear wall of the scroll C, and are arranged circumferentially around the opening AI formed in such a wall and provided for introduction of the shaft A of the electric motor M.

[0036] The screw studs 321 are adapted to engage corresponding sets of through holes 323, 325, that can be seen in figures 9 and 3, which are formed on the rear terminal wall 301 of the scroll case 30 and on the front uprights 205 of the chair 201, respectively. The screw studs 321 of the scroll C are conventionally arranged according to an octagonal symmetry around the axis of rotation of the wheel of the electric fan. The number of the through holes 323 of the rear terminal wall 301 of the scroll case 30 is equal to the number of the screw studs 321, and such holes are arranged in the same manner as the screw studs 321. The through holes 325 on the front upright 205 of the chair 201 are instead four, and they are arranged according to a rectangular diagram. In the installed condition, the screw studs 321 of the scroll C pass through the through holes 323 of the rear terminal wall 301 of the scroll case 30, and four of them pass also through the through holes 325 on the front uprights 205 of the chair 201. At the side opposite to the scroll, fixing

of the scroll C, the scroll covering 30 and the chair 201 is conventionally completed by bolts screwed on the screw studs 321 (as an alternative, fixing of the scroll, the scroll case and the chair may be carried out by welding).

[0037] Therefore, the arrangement of the screw studs 321 and the holes 323, 325 allows the scroll C and the scroll case 30 fast to it, to be selectively mounted according to a plurality of different angular orientations with respect to the chair 201, according to the axis of rotation of the wheel of the electric fan. Moreover, the chair 201 has the favorable effect of stiffening the scroll C.

[0038] Therefore, the box according to the invention can be shaped according to the different scroll orientations defined by UNI specifications. Moreover, the box can be so shaped as to be fitted to a right-handed or left-handed scroll. This can be carried out simply by overturning each terminal wall 301 of the case of 180°, and by arranging consequently the soundproof material on the face of each of them that is arranged on the inner side of the scroll case 30.

[0039] Therefore, according to the invention it is possible to preset a series of different sizes of the terminal walls 301, each of which can receive several similar diameters of wheel, and therefore of the scroll. In order to shape the box for fans designed for the same difference of pressure, but for different flow rate, it is sufficient to choose the linear interconnection members 305 and the sidewalls 303 so that their length and their width, respectively, is adapted to receive a scroll having the desired width. Effectively, a series of fans having the same difference of pressure but different flow rate, can be received in the same box, only by changing the linear interconnection members and the sidewalls.

[0040] In synthesis, in the box according to the invention, the scroll case can be rotated in order to be fitted to different orientations of the fan, and it can be arranged both according to a right-handed or left-handed configuration, the chair can be composed for different sizes of the motor, and the sidewalls can be replaced in order to be adapted with different widths of the scroll, and to allow filters, possible partition walls and further fittings to be installed. In practice, it is possible to manufacture upstream series of details that, arranged in several manners, allow different possible configurations to be obtained.

[0041] With reference to figures 14 to 17, a second embodiment of the soundproof box according to the invention will be described. The elements corresponding to those of the previous embodiment have been indicated by the same numeral references, and they will not be further described.

[0042] Such a second embodiment mainly differs from the previous one in the shape of the scroll case 30 and in the presence of an outer noise trap associated with the inlet of the fan.

[0043] Also in this case, the scroll case 30 comprises a main portion having the geometry of an octagonal prism

provided with angles of 45°, that correspond geometrically to the orientation positions admitted for the scroll C, as well as an outlet portion so shaped as to receive the outlet mouth BM of the scroll. In the example shown in figures 14 to 17, the cross-sectional profile of the main portion of the scroll case 30 is defined by an octagon portion having four equal sides and six equal angles of 45°. Such a profile is designed starting from a nominal octagon, from which a pair of parallel sides extend, and from which furthermore one of such extended sides and one of the other sides perpendicular to it extend, until they are connected to each other. Therefore, a heptagon having six equal angles of 45° and an angle of 90° is obtained, in which four sides are equal to each other, while the two sides adjacent to the angle of 90° and the remaining side parallel to one of the sides adjacent to the angle of 90°, have a length greater than that of the four equal sides (see in particular figure 15). The portion adjacent to the angle of 90° is intended to receive the outlet mouth BM of the scroll.

[0044] As stated above, moreover, an outer noise trap is associated with the inlet of the fan. Therefore, the scroll case 30 lacks in any inlet openings on the sidewalls 303, while an opening 331 aligned with the inlet mouth BA of the scroll (see figure 17) is formed on the front terminal wall 301. A noise trap 341 that surrounds the opening 331 is fixed on the terminal wall 301, at such an opening.

[0045] The noise trap 341 has a substantially prismatic shape and comprises a pair of terminal walls 342 and a plurality of side walls 343 mounted between the terminal walls 342. The rear terminal wall 342 of the trap is fixed to the front terminal wall 301 of the scroll case 30. The terminal walls 342 and the side walls 343 consist in general of sheet panels sheathed by soundproof material on the inner side of the trap 341. According to the requirements, and such as in the example shown, some of the sidewalls may have openings at which planar filters to you 343a are mounted. Entry of inlet air to the electric fan takes place through the filters 343a.

[0046] Moreover, in figure 14 it can be seen that shaped slits 251 are formed on the side panels 221 of the motor covering, in order to allow the chair 201 to be hooked and transported by a lifting system (not shown).

[0047] Moreover, a pair of support beams 253 fixed on opposite sides of the chair 201 can be seen, which extend below the scroll case 30 and the outer noise trap 341 in order to provide a support for them.

[0048] The boxes described can be fitted to other installation configurations different from those shown, in particular, they can be fitted to a configuration in which the chair supports a shaft connected to the wheel, which shaft receives the motion through a transmission from an electric motor also supported by the chair. In this case, the scroll case is similar to those described above, and it is mounted on the chair. Instead, the motor covering can be made such as a soundproof box applied to the chair around the motor only, or such as a larger case surrounding both the motor and the whole chair.

Claims

1. A soundproof box for a centrifugal fan, comprising:

- a support frame (201) for supporting a motor (M) of the fan on one side and holding up a scroll (C) of the fan on the other side,
 - a soundproof scroll case (30) adapted to contain the scroll, said scroll case having a substantially prismatic shape and comprising a pair of end walls (301) and a plurality of side walls (303) mounted between said end walls, and
 - connecting means (321, 323, 325) for mounting the scroll case on the support frame, said connecting means being positioned between the support frame and one of the end walls of the scroll case,

characterized in that said soundproof scroll case (30) additionally comprises a soundproof motor covering (20) applied on the support frame (201) and adapted to surround the motor (M), said motor covering being separated from said scroll case (30), and **in that** said connecting means (321, 323, 325) are arranged in such a manner as to allow the scroll case (30) to be selectively mounted according to a plurality of different angular orientations relative to the support frame (201), around the axis of rotation of the fan wheel, which correspond to respective angular orientations of the scroll (C).

2. A box according to claim 1, wherein said support frame comprises a pair of side frames (203), between which a bracket (215) is mounted adapted to serve as a support base for the motor, and wherein said motor covering comprises a plurality of covering members (221, 223, 225, 229) fixed to the support frame so as to surround the motor, said covering members consisting of panels sheathed by a soundproof material on the inner side of the motor covering (20).
3. A box according to claim 2, wherein said covering members comprise a rear covering (225) on the side opposite to the scroll, from which a convex portion (227) protrudes so as to form a cavity adapted to house a rear portion of the motor, and a flat partition wall (229) interposed between said cavity and a further cavity containing the remaining portion of the motor, said convex portion of the rear covering (225) and said partition wall (229) forming a noise trap for the motor and defining a separation between an inlet (227a) and an outlet (221a) for air cooling the motor.
4. A box according to any one of the preceding claims, wherein said scroll case comprises a main portion having an octagonal prism geometry with angles of 45°, and an outlet portion so shaped to house the

outlet mouth (BM) of the scroll of the motor.

5. A box according to claim 4, wherein the main portion of the scroll case has a cross-sectional profile defined by a portion of regular octagon having six equal sides and six equal angles of 45°.
6. A box according to claim 4, wherein the scroll case has a cross-sectional profile defined by a heptagon having six angles of 45° and an angle of 90°, in which four sides are equal to each other, while the two sides adjacent to the angle of 90° and the remaining side parallel to one of the sides adjacent to the 90° angle, have a length greater than that of the four equal sides.
7. A box according to any one of claims 4 to 6, wherein a pair of linear interconnecting members (305) is mounted in the main portion of the scroll case, at each side corner of the octagonal prism, said linear interconnecting members being that are arranged on opposite sides of the corner and interconnect the terminal panels (301) of the scroll case (30), and wherein the linear interconnecting members (305) associated with each single side face of the octagonal prism serve as an assembly frame for a respective side wall (303) of the scroll case (30).
8. A box according to claim 7, wherein each side corner of the octagonal prism is covered by a bent covering plate (307), which is fixed to the respective pair of linear interconnecting members (305) of the side corner.
9. A box according to any one of the preceding claims, wherein a partition wall sheathed by a soundproof material is arranged inside the scroll case, said partition wall being interposed between the scroll (C) and the end wall (301) of the scroll case (30) on the side opposite to the motor.
10. A box according to any one of claims 4 to 9, in which a noise reducing plenum (311) is fixed to the outlet portion of the scroll case.
11. A box according to any one of the preceding claims, wherein an opening (331) aligned with the inlet mouth (BA) of the scroll is formed on the terminal wall (301) on the side opposite to the motor, and wherein an outer noise trap (341) surrounding the opening is fixed at said opening, said outer noise trap having a substantially prismatic shape and comprising a pair of terminal walls (342) and a plurality of side walls (343) mounted between said terminal walls, in which said terminal walls and said side walls consists of panels sheathed by a soundproofing material on the inner side of the outer noise trap.

12. A box according to any one of the preceding claims, wherein said connection means comprise a set of screw studs (321) applied circumferentially to one of the terminal walls of the scroll (C), said screw studs being adapted to engage corresponding sets of through holes (323, 325) formed on one of the end walls of the scroll case (30) and on the support frame (201), respectively.

Patentansprüche

1. Schallgedämmtes Gehäuse für ein Zentrifugalgebläse umfassend:

- ein Traggestell (201) für einen Motor (M) des Gebläses auf einer Seite und zur Aufnahme einer Schnecke (c) des Gebläses auf der anderen Seite,
- ein schallgedämmtes Schneckengehäuse (30), das die Schnecke aufnimmt und das eine im wesentlichen prismatische Form mit zwei Endwänden (301) und mehreren Seitenwänden (303) hat, die zwischen den Endwänden (301) angebracht sind,
- Verbindungsmittel (321, 323, 325) zur Befestigung des Schneckengehäuses (30) an dem Traggestell (201), die zwischen dem Traggestell und den Endwänden des Schneckengehäuses angeordnet sind,

dadurch gekennzeichnet, dass das schallgedämmte Schneckengehäuse (30) zusätzlich eine schallgedämmte Motorabdeckung (20) hat, die an dem Traggestell (201) angebracht ist, den Motor (M) einhüllt und von dem Schneckengehäuse (30) getrennt ist, und dass die Verbindungsmittel (321, 323, 325) so angeordnet sind, dass das Schneckengehäuse (30) wahlweise in verschiedenen Winkelstellungen relativ zu dem Traggestell (201) um die Drehachse des Gebläserades montierbar ist, welche den zugeordneten Winkelstellungen der Schnecke (c) entsprechen.

2. Gehäuse nach Anspruch 1, **dadurch gekennzeichnet, dass** das Traggestell zwei seitliche Rahmen (203) hat, zwischen denen eine Konsole (215) angebracht ist, die als Trägerplatte für den Motor dient, wobei die Motorabdeckung aus Abdeckelementen (221, 223, 225, 229) zusammengesetzt ist, die an dem Traggestell so befestigt sind, dass sie den Motor einschließen, und die aus Platten bestehen, die an der Innenseite der Motorabdeckung (20) mit einem schalldämmenden Material beschichtet sind.
3. Gehäuse nach Anspruch 2, **dadurch gekennzeichnet, dass** die Abdeckelemente auf der der Schnecke gegenüberliegenden Seite ein hinteres Abdeckele-

ment (225) aufweisen, von dem ein konvexer Abschnitt (227) absteht, der einen Hohlraum zur Aufnahme eines hinteren Teils des Motors bildet, sowie eine flache Trennwand (229) zwischen dem Hohlraum und einem weiteren, den restlichen Teil des Motors aufnehmenden Hohlraum, wobei der konvexe Abschnitt des hinteren Abdeckelementes (225) und die Trennwand (229) eine Geräuschfalle für den Motor sowie eine Trennung zwischen dem Eintritt (227a) und dem Austritt (221a) der Motorkühlluft bilden.

4. Gehäuse nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Schneckengehäuse (30) einen Hauptteil hat, der der Geometrie eines achteckigen Prismas mit Winkeln von 45° entspricht, sowie einen Austrittsteil, der so geformt ist, dass er die Austrittsöffnung (BM) der Motorschnecke bildet.
5. Gehäuse nach Anspruch 4, **dadurch gekennzeichnet, dass** der Hauptteil des Schneckengehäuses ein Querschnittsprofil hat, das definiert ist durch einen Abschnitt eines regelmäßigen Achtecks mit sechs gleichen Seiten und sechs Winkeln von jeweils 45°.
6. Gehäuse nach Anspruch 4, **dadurch gekennzeichnet, dass** das Schneckengehäuse (30) ein Querschnittsprofil hat, das definiert ist durch ein Siebeneck mit sechs Winkeln von je 45° und einem Winkel von 90° und vier untereinander gleichen Seiten, während die beiden an den Winkel von 90° angrenzenden Seiten sowie die verbleibende Seite, die parallel zu einer der an den rechten Winkel angrenzenden Seiten verläuft, eine größere Länge als die vier gleichen Seiten haben.
7. Gehäuse nach einem der Ansprüche 4 bis 6, **dadurch gekennzeichnet, dass** im Hauptteil des Schneckengehäuses (30) im Bereich jeder Seitenkante des achteckigen Prismas ein Paar linearer Verbindungselemente (305) angebracht ist, die auf gegenüberliegenden Seiten der Kante liegen und die Endwände (301) des Schneckengehäuses (30) miteinander verbinden, wobei die linearen Verbindungselemente (305), die jeder einzelnen Seitenfläche des achteckigen Prismas zugeordnet sind, als Montagerahmen für die entsprechende Seitenwand (303) des Schneckengehäuses (30) dienen.
8. Gehäuse nach Anspruch 7, **dadurch gekennzeichnet, dass** jede Seitenkante des achteckigen Prismas durch eine abgekantete Deckplatte (307) abgedeckt ist, die an dem zugehörigen Paar der linearen Verbindungselemente (305) der Kante befestigt ist.
9. Gehäuse nach einem der vorhergehenden Ansprü-

che, **dadurch gekennzeichnet, dass** in dem Schneckengehäuse eine mit schalldämmendem Material beschichtete Trennwand angeordnet ist, die zwischen die Schnecke (c) und die Endwand (301) des Schneckengehäuses (30) auf der dem Motor gegenüberliegenden Seite eingesetzt ist.

10. Gehäuse nach einem der Ansprüche 4 bis 9, **dadurch gekennzeichnet, dass** an dem Austrittsteil des Schneckengehäuses eine schallschluckende Kammer (Plenum) (311) angebracht ist.

11. Gehäuse nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** in die dem Motor gegenüberliegende Seite der Endwand (301) eine Öffnung (331) eingearbeitet ist, die mit der Ausgangsöffnung (BA) der Schnecke fluchtet, wobei im Bereich dieser Öffnung eine äußere Geräuschfalle (341) angebracht ist, die diese Öffnung umgibt und die eine im wesentlichen prismatische Form mit zwei Endwänden (342) und mehreren, zwischen diesen angebrachten Seitenwänden (343) hat, wobei die Endwände und die Seitenwände an der Innenseite der äußeren Geräuschfalle aus mit einem schalldämmenden Material beschichteten Platten bestehen.

12. Gehäuse nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Verbindungsmittel aus einer Reihe von Stiftschrauben (321) bestehen, die in eine der Endwände der Schnecke (c) über den Umfang verteilt eingesetzt sind und in entsprechende Durchgangsbohrungen (323, 325) eingreifen, welche in eine der Endwände des Schneckengehäuses (30) und in das Traggestell (201) eingearbeitet sind.

Revendications

1. Un caisson d'insonorisation pour un ventilateur centrifuge, comprenant:

- un châssis de support (201) pour supporter un moteur (M) du ventilateur d'un côté et pour maintenir en place une volute (C) du ventilateur de l'autre côté,
- un boîtier de volute insonorisé (30) adapté pour contenir la volute, ledit boîtier de volute ayant une forme sensiblement prismatique et comprenant une paire de parois d'extrémité (301) et une pluralité de parois latérales (303) montées entre lesdites parois d'extrémité, et
- des moyens de liaison (321, 323, 325) pour monter le boîtier de volute sur le châssis de support, lesdits moyens de liaison étant positionnés entre le châssis de support et une des parois d'extrémité du boîtier de volute,

caractérisé en ce que ledit boîtier de volute insonorisé (30) comprend en outre un capot de moteur insonorisé (20) appliqué sur le châssis de support (201) et adapté pour entourer le moteur (M), ledit capot de moteur étant séparé dudit boîtier de volute (30), et **en ce que** lesdits moyens de liaison (321, 323, 325) sont agencés de manière à permettre au boîtier de volute (30) d'être sélectivement monté selon une pluralité d'orientations angulaires différentes par rapport au châssis de support (201), autour de l'axe de rotation de la roue de ventilateur, qui correspondent à différentes orientations angulaires de la volute (C).

2. Un caisson selon la revendication 1, dans lequel ledit châssis de support comprend une paire de châssis latéraux (203), entre lesquels une étagère (215) est montée, adaptée pour servir d'embase de support pour le moteur, et dans lequel ledit capot de moteur comprend une pluralité d'éléments couvrants (221, 223, 225, 229) fixés au châssis de support de manière à entourer le moteur, lesdits éléments couvrants comprenant des panneaux revêtus d'un matériau insonorisé sur le côté intérieur du capot de moteur (20).

3. Un caisson selon la revendication 2, dans lequel lesdits éléments couvrants comprennent un élément couvrant arrière (225) sur le côté opposé à la volute, depuis lequel une partie convexe (227) fait saillie de manière à former une cavité destinée à loger une partie arrière du moteur et une paroi de séparation plane (229) interposée entre ladite cavité et une autre cavité contenant la partie restante du moteur, ladite partie convexe de l'élément couvrant arrière (225) et ladite paroi de séparation (229) formant un piège à bruit pour le moteur et définissant une séparation entre une entrée (227a) et une sortie (221a) pour de l'air de refroidissement du moteur.

4. Un caisson selon l'une quelconque des revendications précédentes, dans lequel ledit boîtier de volute comprend une partie principale ayant une géométrie en prisme octogonal avec des angles de 45°, et une partie de sortie conformée de manière à contenir la bouche de sortie (BM) de la volute du moteur.

5. Un caisson selon la revendication 4, dans lequel la partie principale du boîtier de volute présente un profil en section transversale défini par une partie en octogone régulier ayant six côtés égaux et six angles égaux de 45°.

6. Un caisson selon la revendication 4, dans lequel le boîtier de volute présente un profil en coupe transversale défini par un heptagone ayant six angles de 45° et un angle de 90°, dans lequel quatre côtés sont égaux les uns avec les autres, tandis que les deux

côtés adjacent à l'angle de 90° et le côté restant parallèle à l'un des côtés adjacents à l'angle de 90°, ont une longueur supérieure à celle des quatre côtés égaux.

7. Un caisson selon l'une quelconque des revendications 4 à 6, dans lequel une paire d'éléments d'interconnexion linéaires (305) est montée dans la partie principale du boîtier de volute, à chaque coin du côté du prisme octogonal, lesdits éléments d'interconnexion linéaires étant disposés sur des côtés opposés dudit coin et viennent en interconnexion avec les panneaux terminaux (301) du boîtier de volute (30), et dans lequel les éléments d'interconnexion linéaires (305) associés à chaque face latérale unique du prisme octogonal servent de cadre de montage pour une paroi latérale (303) respective du boîtier de volute (30). 5
10
15
8. Un caisson selon la revendication 7, dans lequel chaque coin latéral du prisme octogonal est recouvert par une plaque coudée de recouvrement (307), qui est fixée à la paire respective d'éléments d'interconnexion linéaires (305) dudit coin latéral. 20
25
9. Un caisson selon l'une quelconque des revendications précédentes, dans lequel une paroi de séparation recouverte par un matériau d'insonorisation est agencée à l'intérieur du boîtier de volute, ladite paroi de séparation étant interposée entre la volute (C) et la paroi d'extrémité (301) du boîtier de volute (30) sur le côté opposé au moteur. 30
10. Un caisson selon l'une quelconque des revendications 4 à 9, dans lequel un plenum (311) de réduction de bruit est fixé à la partie de sortie du boîtier de volute. 35
11. Un caisson selon l'une quelconque des revendications précédentes, dans lequel une ouverture (331) alignée avec la bouche d'entrée (BA) de la volute est formée sur la paroi terminale (301) sur le côté opposé au moteur, et dans lequel un piège à bruit externe (341) entourant l'ouverture est fixé à ladite ouverture, ledit piège à bruit externe ayant une forme sensiblement prismatique et comprenant une paire de parois terminales (342) et une pluralité de parois latérales (343) montées entre lesdites parois terminales, lesdites parois terminales et lesdites parois latérales étant composées de panneaux recouverts par un matériau insonorisant sur le côté intérieur du piège à bruit externe. 40
45
50
12. Un caisson selon l'une quelconque des revendications précédentes, dans lequel lesdits moyens de liaison comprennent un ensemble de goujons (321) formant vis, appliqués circonférentiellement à l'une des parois terminales de la volute (C), lesdits gou-

jons formant vis étant adaptés pour venir en engagement avec des ensembles correspondants de trous traversants (323, 325) formés sur une des parois d'extrémité du boîtier de volute (30) et sur le châssis de support (201), respectivement.

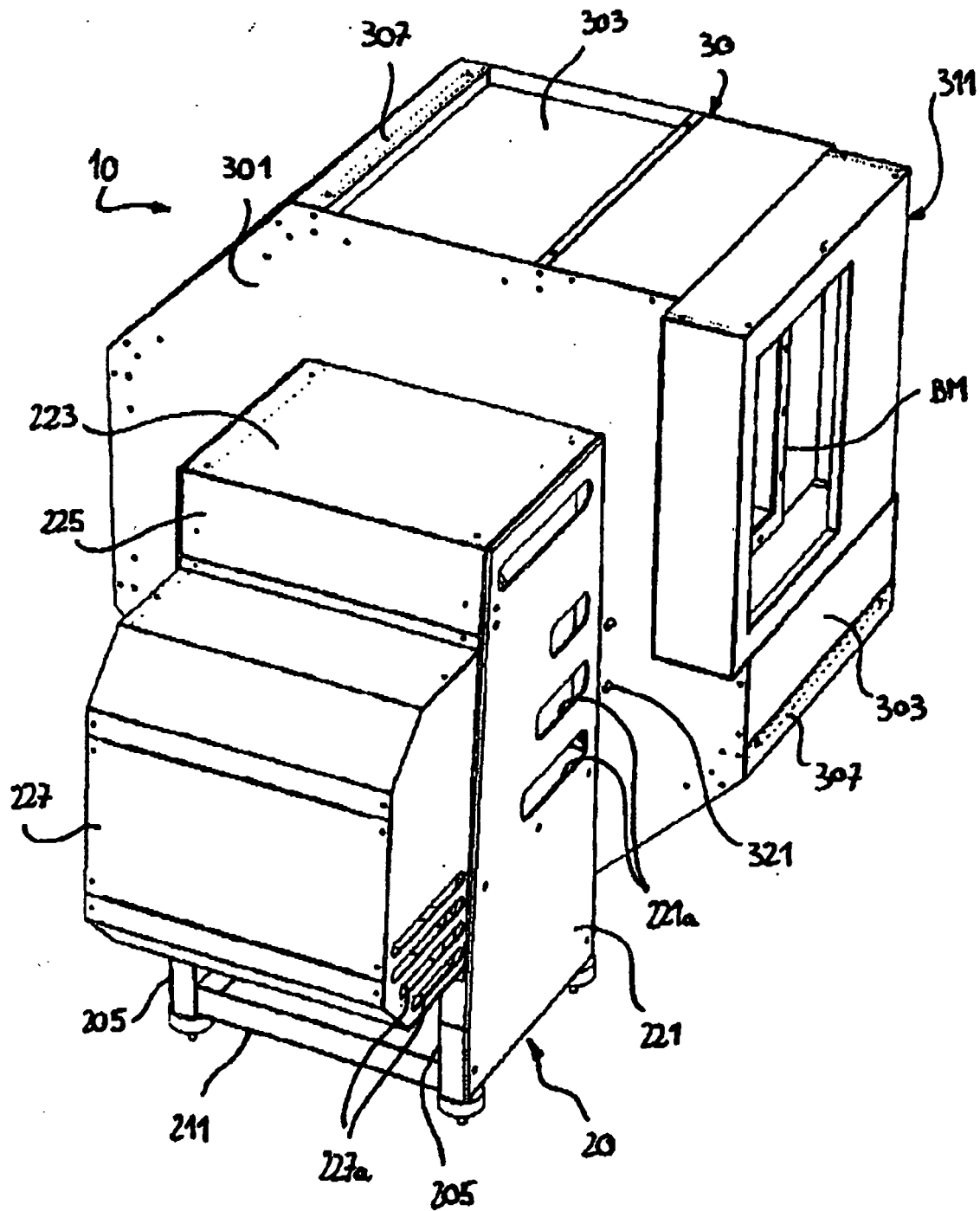


Fig. 1

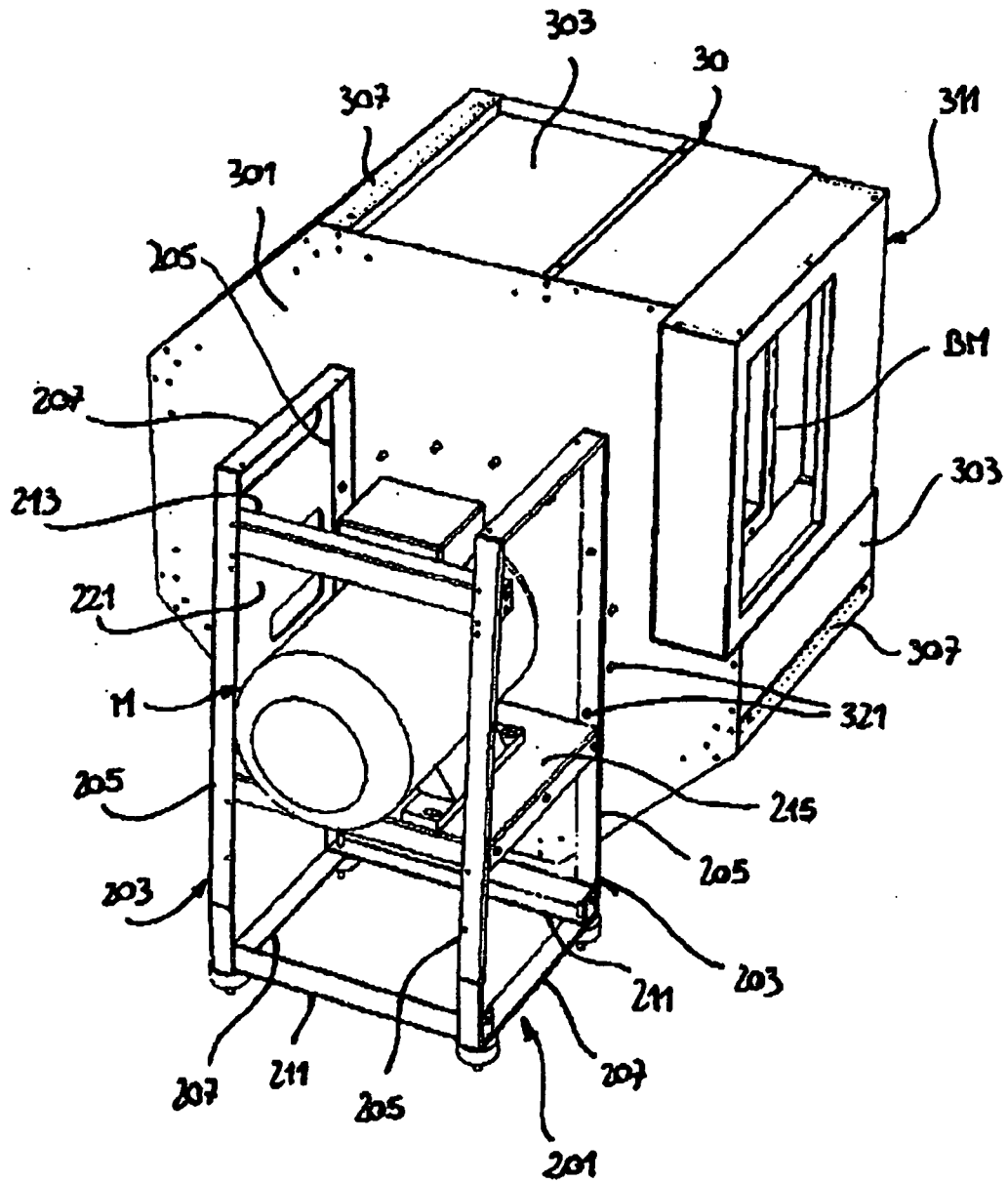


Fig. 2

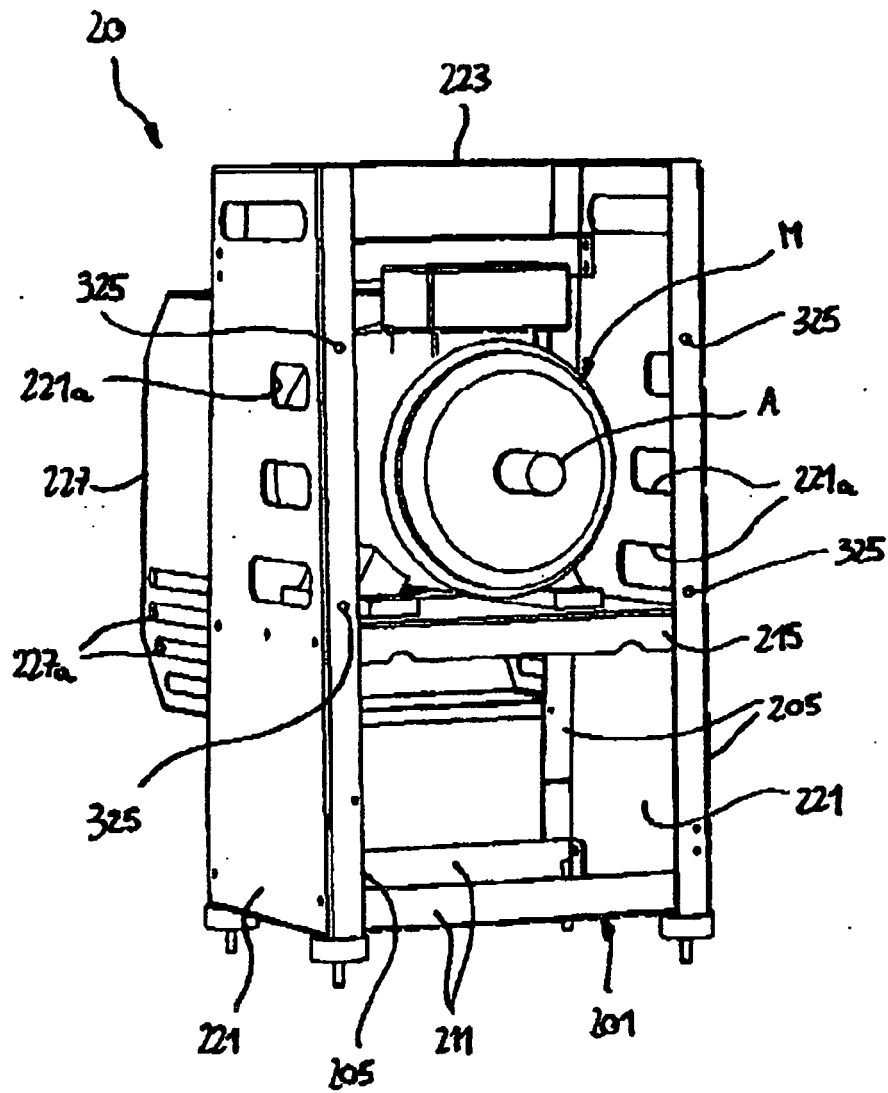


Fig. 3

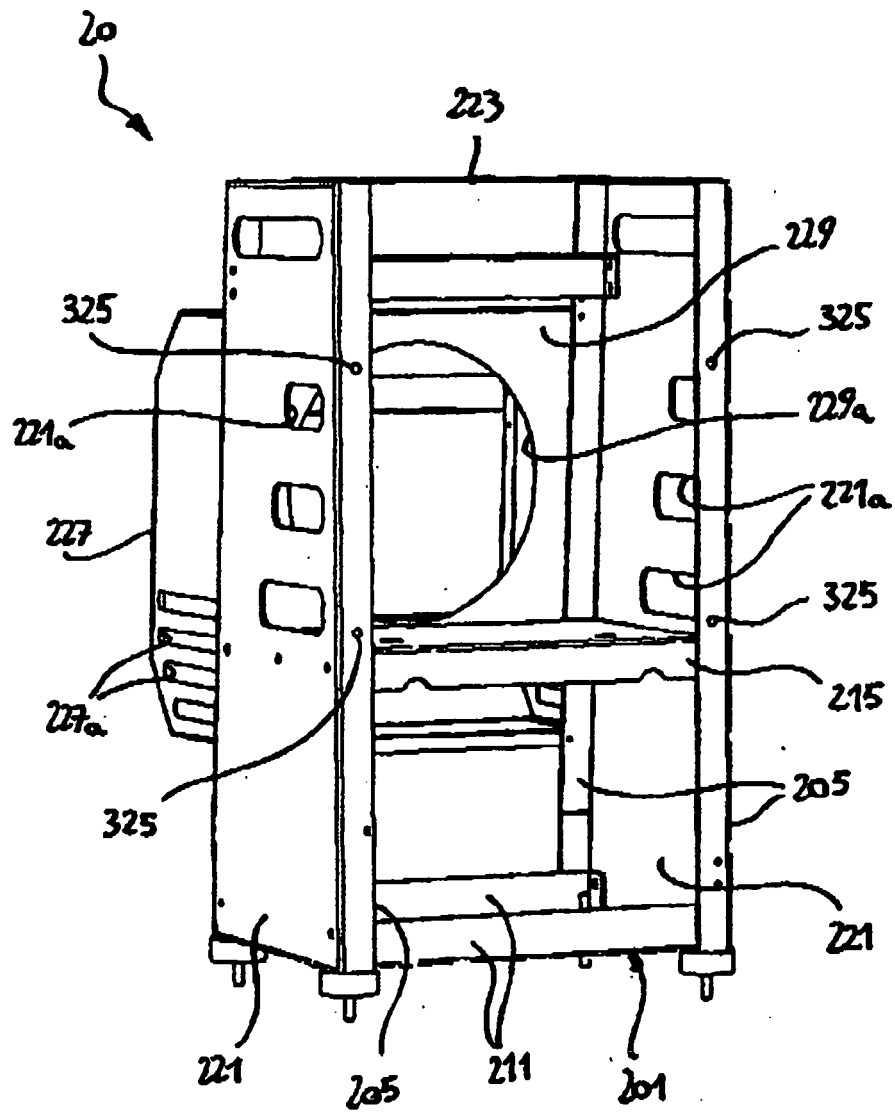


Fig. 4

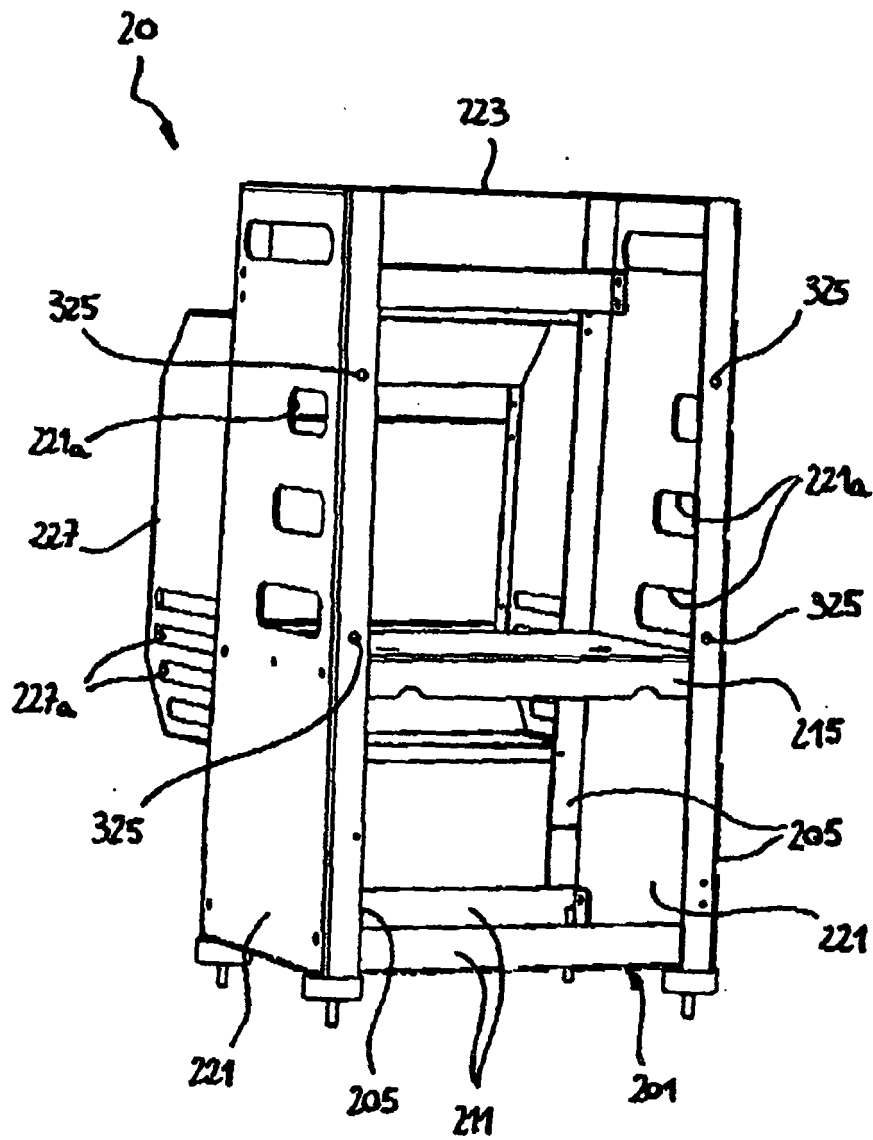


Fig. 5

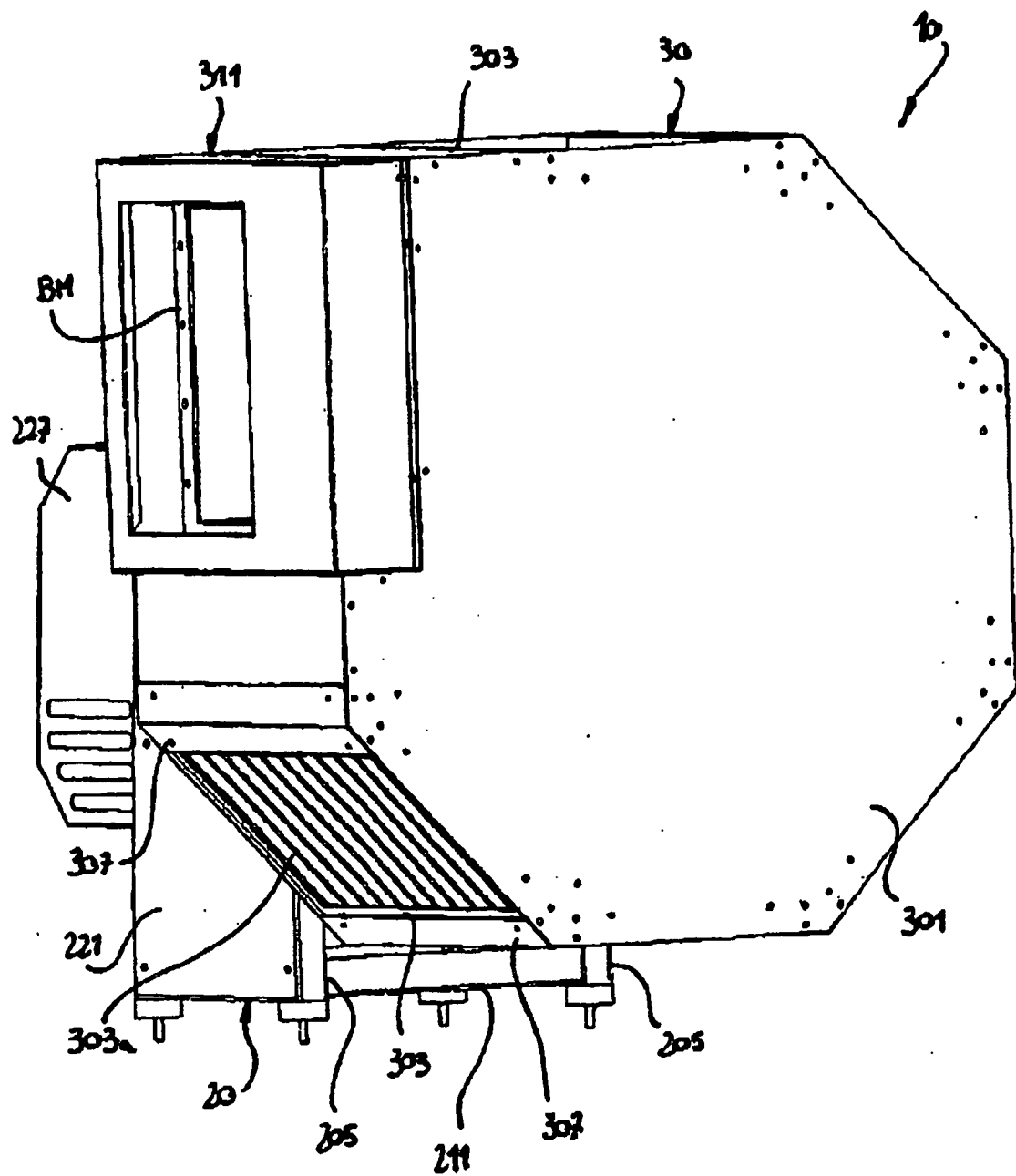


Fig. 6

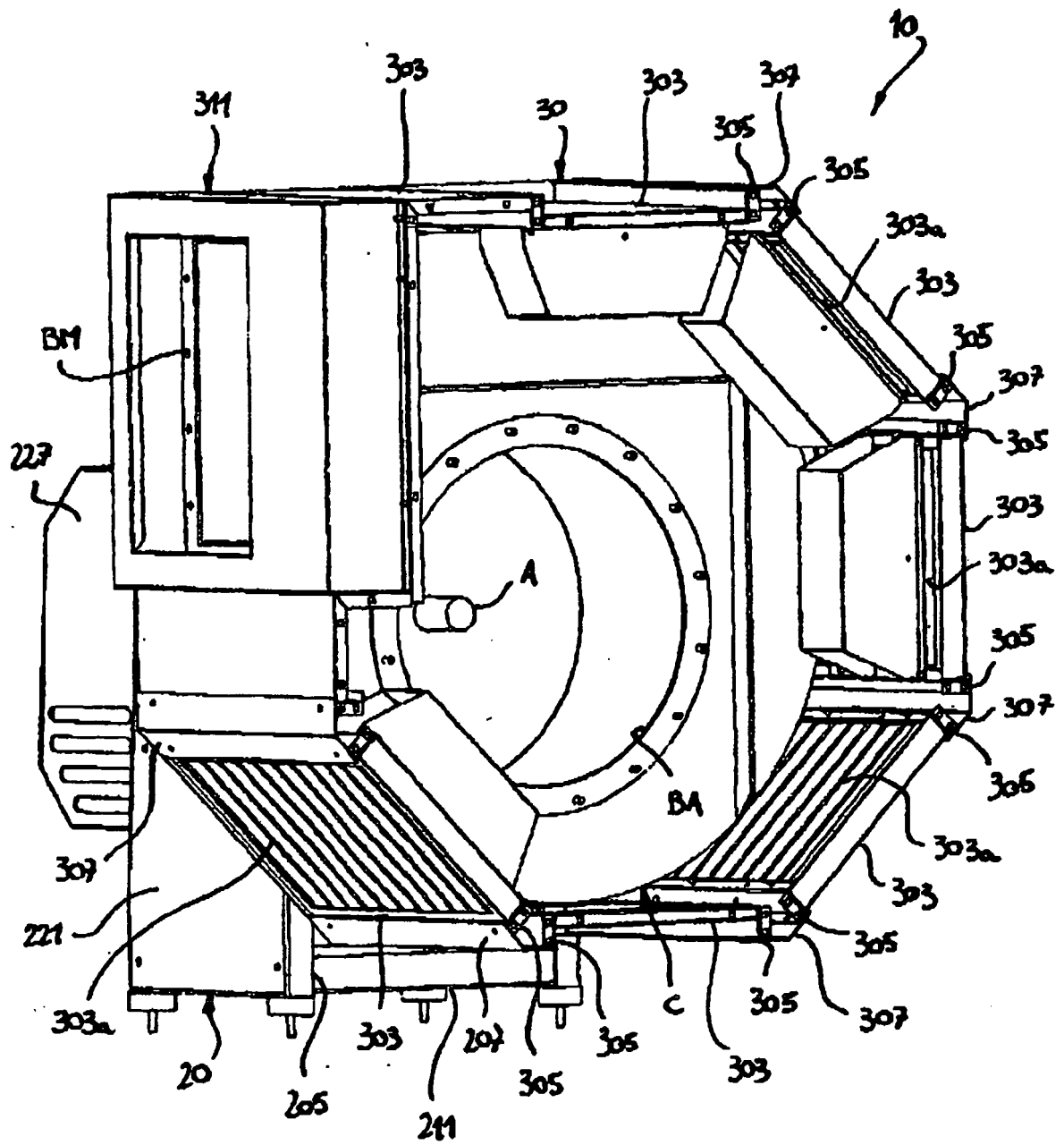


Fig. 7

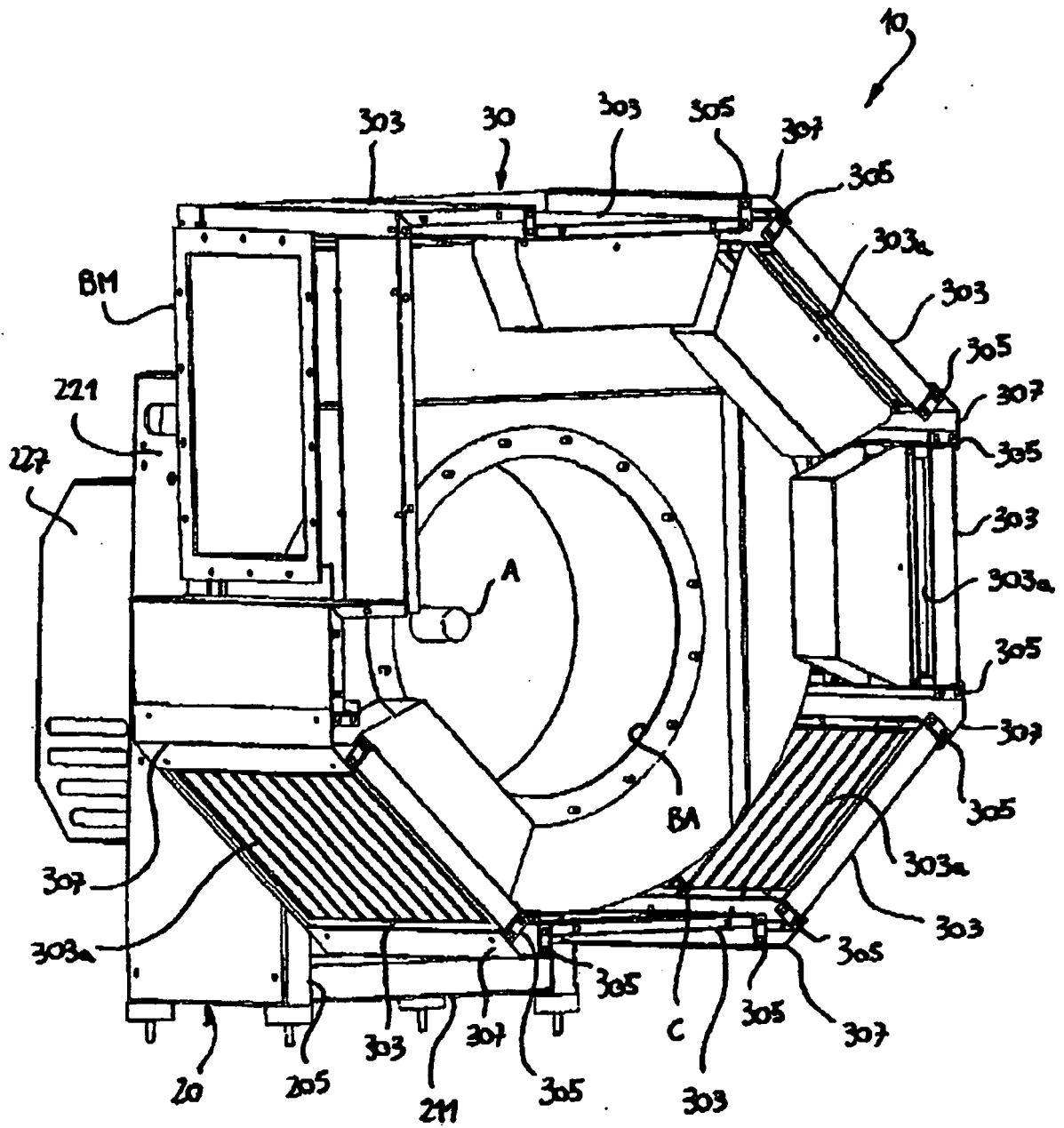


Fig. 8

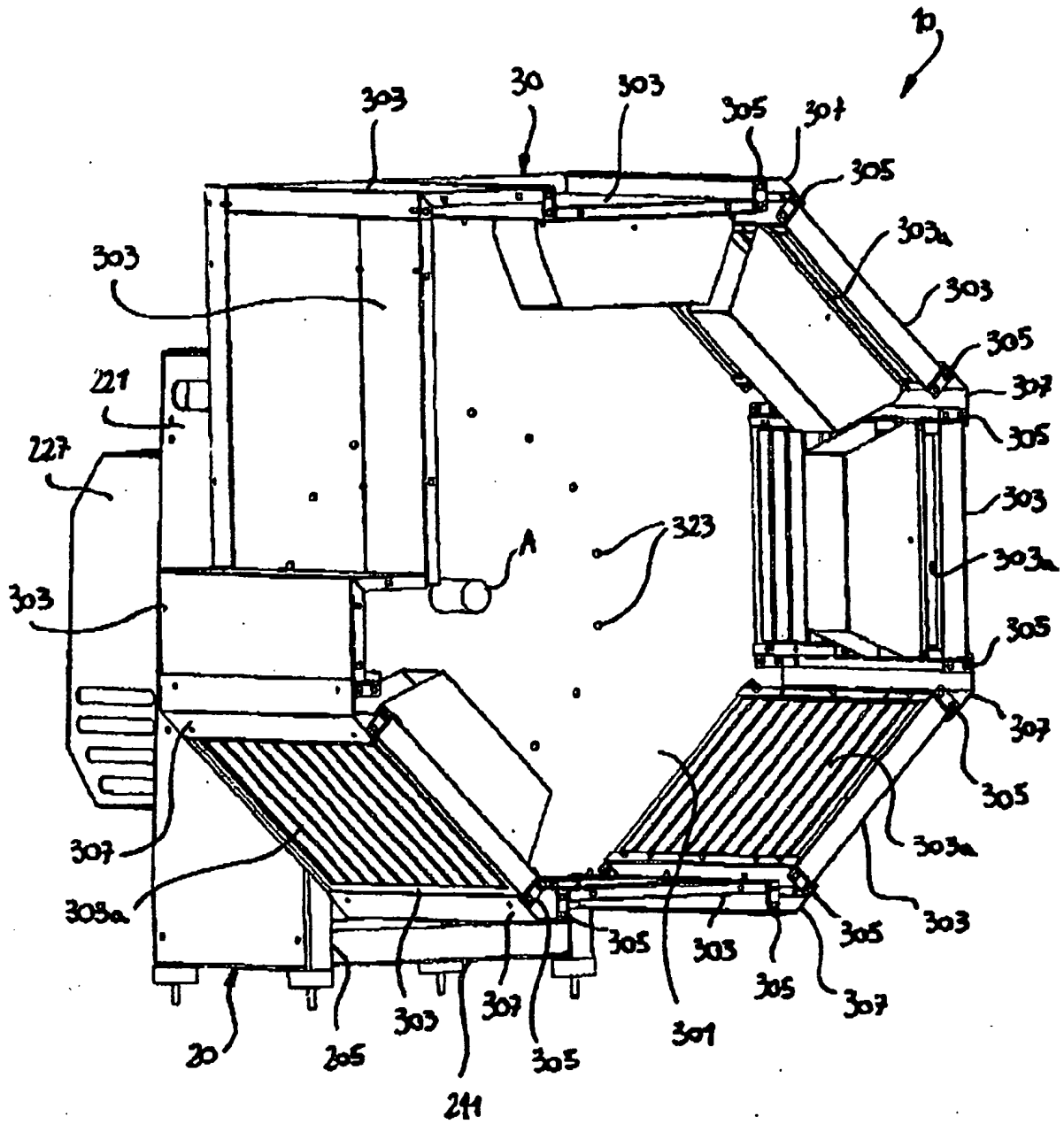


Fig. 9

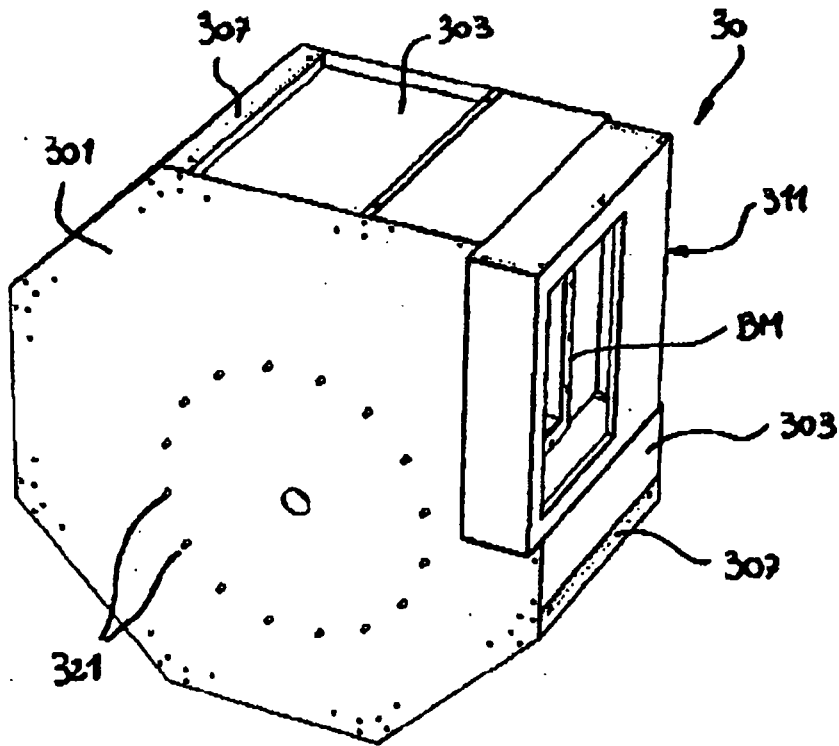


Fig. 10

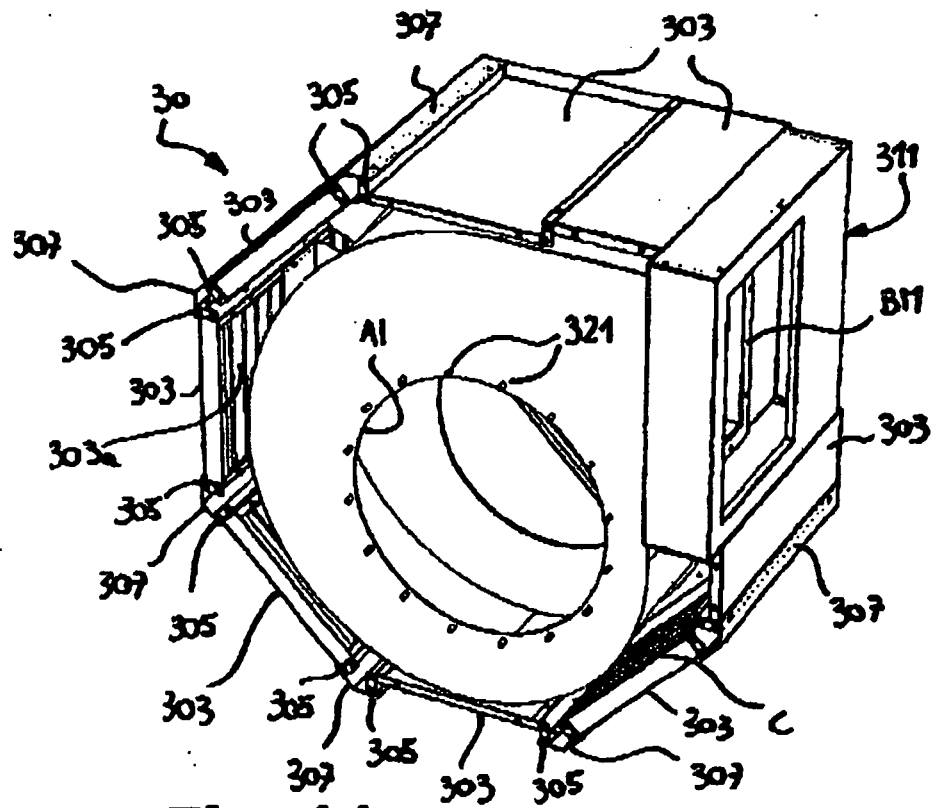


Fig. 11

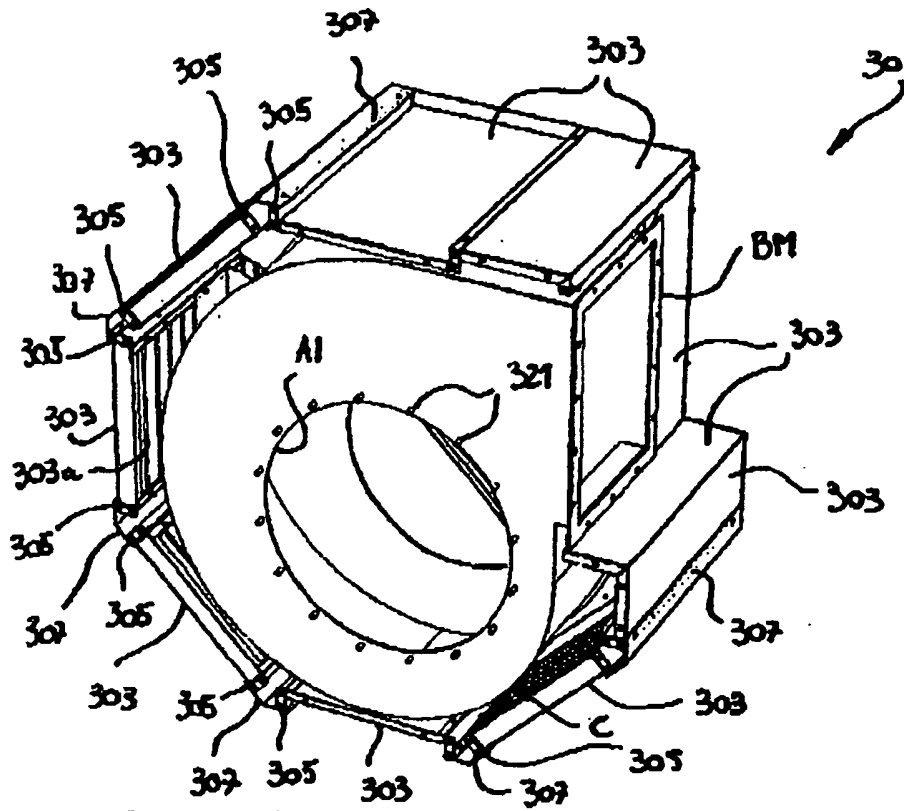


Fig. 12

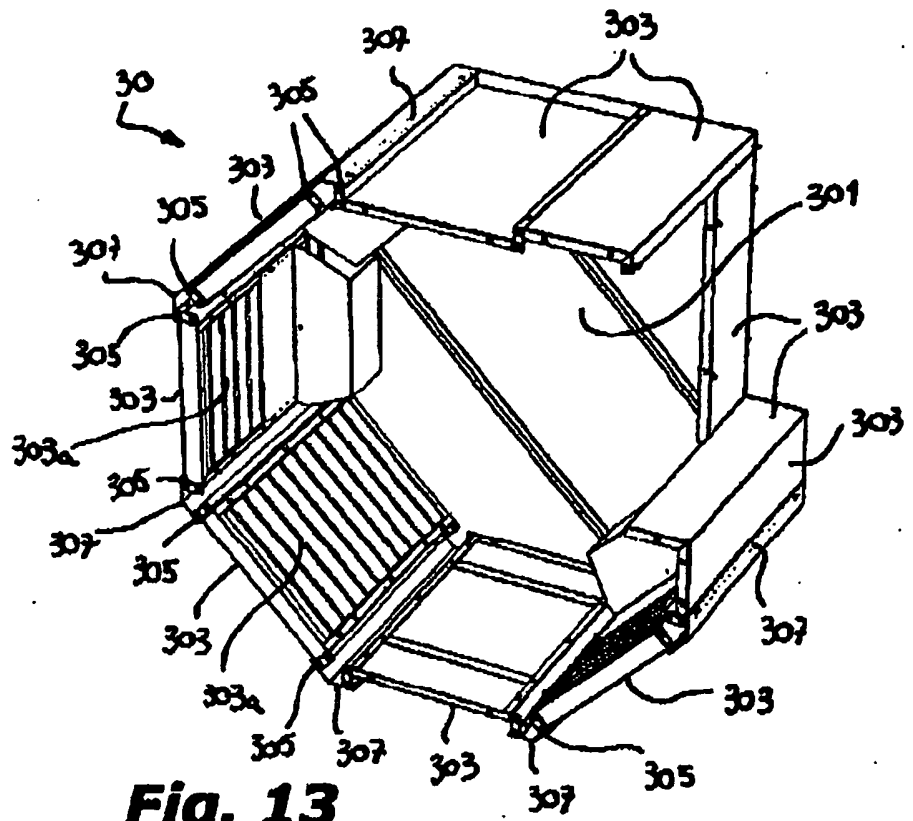


Fig. 13

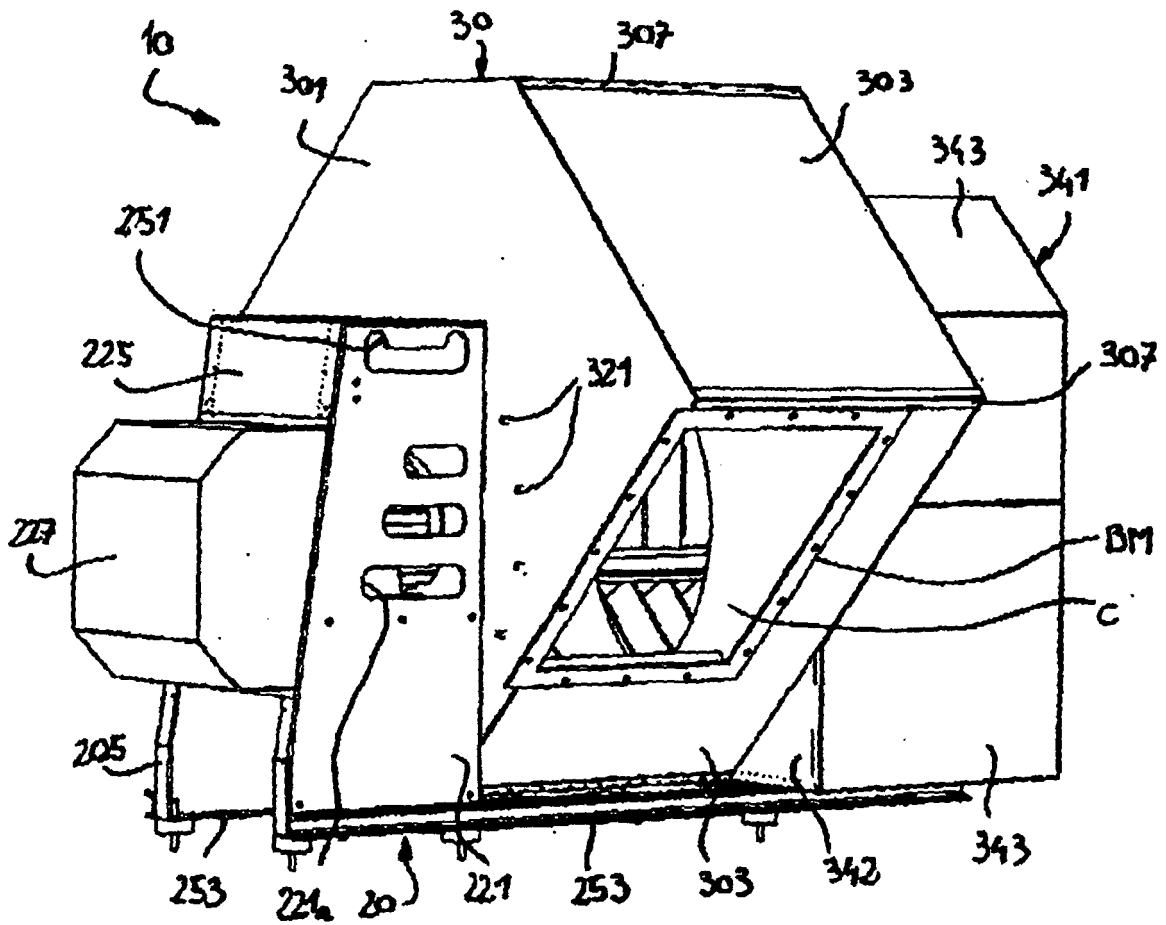


Fig. 14

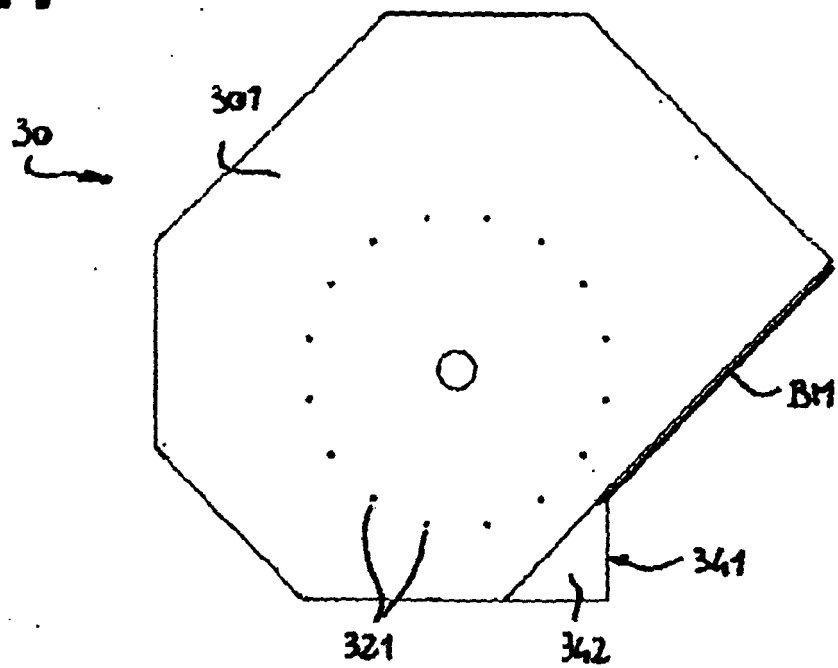


Fig. 15

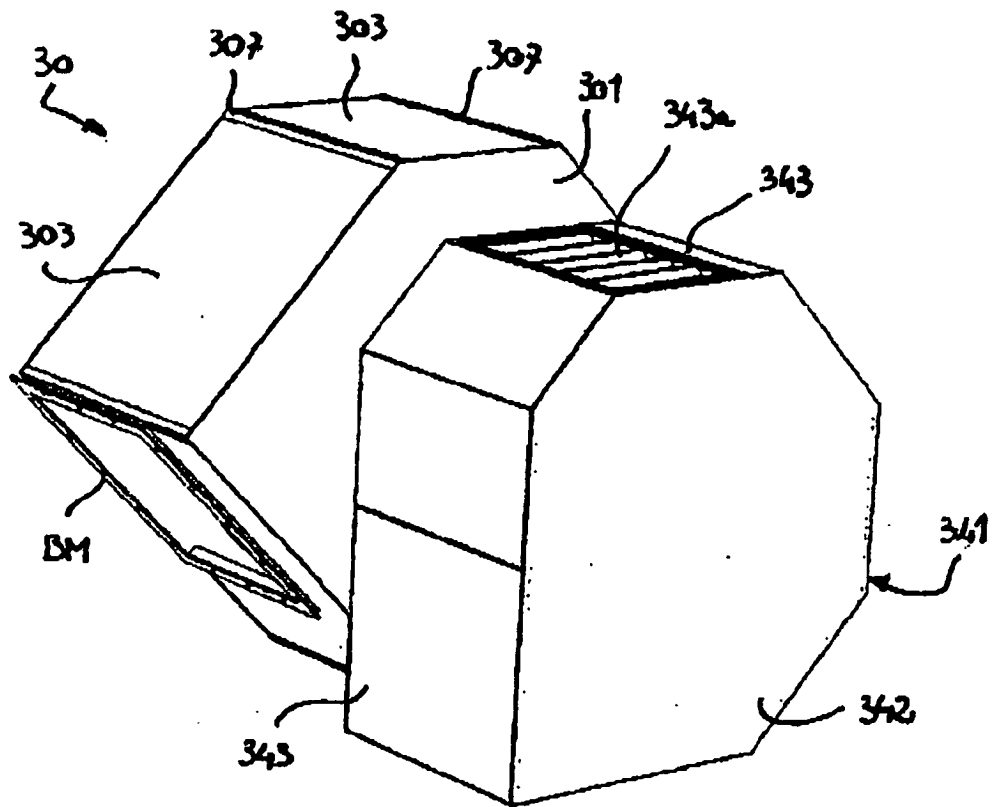


Fig. 16

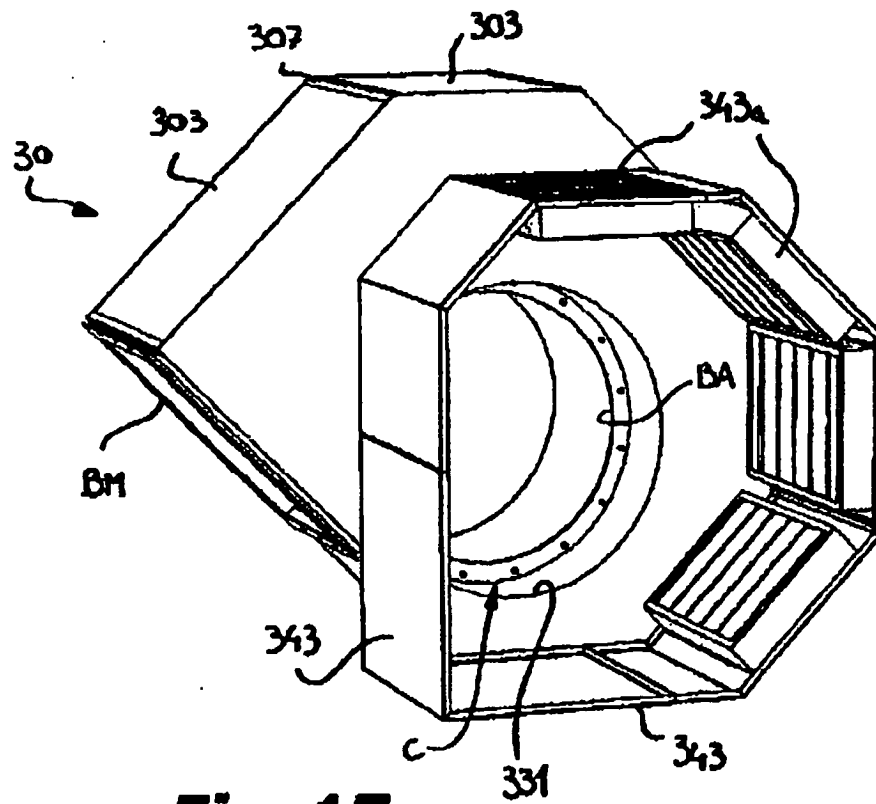


Fig. 17

REFERENCES CITED IN THE DESCRIPTION

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