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(54) Scroll type manifold, particularly for fans for use in extractor hoods

(57) There is described a manifold, in particular a scroll type manifold, which is intended to constitute the housing of a radial impeller (2) of a fan, comprising a delivery cross-section (4) with a delivery flow direction (Y) which is substantially perpendicular to the axis (X) of rotation of the impeller (2) and at least an intake cross-section (5) which extends coaxially relative to the axis of rotation (X), the manifold comprising a first and a second manifold portion (7, 8) which can be connected to each other at a coupling profile (P), the delivery cross-section (4) being defined in the first manifold portion (7), the impeller being rotatably supported on the second manifold portion(8). The delivery cross-section (4) is integrally formed in the first manifold portion (7) and is developed axially over at least a portion in the delivery flow direction (Y), and the projection of the coupling profile (P) defines, in a plane (Q) which is parallel with the direction of flow and which extends through the axis of rotation (X) of the impeller, a discontinuous line (L) including, starting from the delivery cross-section (4), at least a first portion (16) which extends transversely relative to the axis (X) of the impeller as far as a location adjacent to the axis itself, and at least a second portion (18) which extends away from the axis of the impeller and transversely relative thereto, the second portion (18) being spaced apart from the first portion (16) in a direction towards the intake cross-section (4), in such a manner that the first and the second manifold portions (7, 8) are able to be mutually coupled/uncoupled, along the profile (P), with a main relative movement being brought about substantially in the axial direction of the delivery flow, even with the impeller being held so as to be supported on the second manifold portion (8).

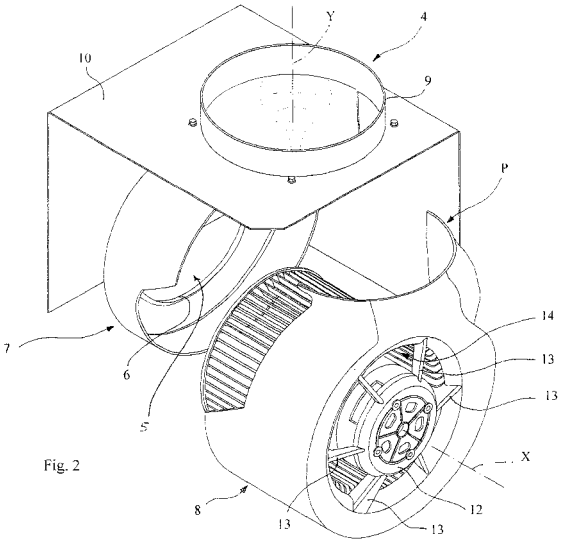

Fig. 2

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Description

[0001] The present invention relates to a manifold, in particular a scroll type manifold, which is intended to constitute the housing of the impeller of a fan, particularly for fans of extractor hoods, having the features set out in the preamble of the main claim.

[0002] The invention is used particularly, though not exclusively, in the construction of ventilation units for hoods for extracting air-like gases from domestic environments.

[0003] In that context, the construction of scroll type manifolds in two separate portions is commonly used in the specific sector for constructing ventilation units for extractor hoods or similar extraction devices for fumes or other gases. In such applications, a first portion of the manifold, also referred to using the term "cochlea", is fixed to the frame of the extractor hood or a portion thereof, the impeller is positioned therein with the shaft being rotatably supported on one or more supports and, finally, the scroll type manifold is closed by positioning the second portion on the first, to which it is fixed by connection means of the removable type in order to allow any subsequent disassembly. The volute of the manifold, by its very nature, is provided with a delivery cross-section which is directed tangentially with a delivery flow direction which is substantially perpendicular relative to the direction of the axis of rotation of the radial impeller, and one or more open intake cross-sections in the manifold coaxially relative to the axis of rotation of the impeller.

[0004] One of the main problems encountered in those applications involves the need to have adequate access and sufficient space inside the extractor hoods in order to carry out the operations for assembling and disassembling the ventilation unit, in particular in order to put together and take apart the manifold portions so as to gain access to the motor/impeller unit which is received therein.

[0005] Typically, the arrangement of the ventilator unit in extractor hoods makes it necessary for the manifold to be arranged with the delivery flow axis having a substantially vertical direction so as to promote the discharge of the gases drawn in. Such a structural approach can in some cases limit, in phases for installing or maintaining the fan, the ease of access and handling required by the operator, making that type of intervention extremely laborious and complex.

[0006] A main object of the invention is to overcome those limits by means of a manifold which is configured in such a manner as to allow an operator to be readily and quickly able to couple and uncouple the manifold portions so as to be afforded access to the motor/impeller unit, with greater overall simplification of the assembly/disassembly operations.

[0007] This object and other objects which will be appreciated more clearly below are achieved by a manifold, in particular a scroll type manifold constructed in accordance with the appended claims.

[0008] Further features and advantages of the invention will be better understood from the following detailed description of a preferred embodiment thereof which is illustrated, by way of non-limiting example, with reference to the appended drawings, in which:

- Figure 1 is a perspective view of a scroll type manifold according to the invention,
- Figure 2 is an exploded perspective view of the scroll type manifold of Figure 1,
- Figure 3 is a front elevation of the scroll type manifold of the preceding Figures,
- Figure 4 is a front elevation with cut-away portions of the manifold of the preceding Figures,
- Figure 5 is a front elevation of a construction variant of the manifold according to the invention.

[0009] With reference to the Figures mentioned, a scroll type manifold is generally designated 1 and is provided in order to constitute a housing for a radial impeller 2 of a fan which is rotated by a motor 3 about an axis of rotation which is indicated with an X.

[0010] In the manifold 1 there are defined a delivery cross-section 4, in which the delivery flow direction indicated by the axis Y in the Figures is perpendicular relative to the axis of rotation X, and a main intake cross-section 5 comprising a lateral opening 6 which is formed in the manifold and which is coaxial with the axis of the impeller. The delivery cross-section 4 and intake cross-section 5 are preferably circular in shape, as clearly illustrated in the Figures.

[0011] The manifold 1 further comprises a first and a second manifold portion which are designated 7 and 8, respectively, and which can be connected to each other at a coupling profile P by removable connection means, for example, screw type means.

[0012] In greater detail, in the first manifold portion 7 there is formed the opening 6 of the main intake cross-section which is coaxial with the axis X of the impeller. A mouth 9, which has a closed circular contour and which defines the discharge cross-section of the delivery flow 4 generated by the fan, is further formed in an integral manner in that portion.

[0013] That delivery mouth 9 is developed, over at least a portion, in the axial direction Y of the delivery flow and is provided in order to be coupled to a corresponding tubular pipe (which is not illustrated) in order to convey the flow which is drawn in and directed to the exhaust.

[0014] The portion 7 of the manifold is further provided in order to be fixed, in a removable manner, to a portion 10 of the support frame of an extractor hood, which is only partially illustrated in the Figures.

[0015] The second portion 8 of the manifold is provided in order to support, in a rotatable manner thereon, both the impeller 2 and the motor unit 3 for actuating the impeller 2. As illustrated in the Figures, the motor 3 is supported in a projecting manner on the portion 8 by means of a support element 12 which is of nozzle-like form and

which is provided in the manifold 1 at the side laterally opposite the intake opening 6. The support 12 is fixed to the manifold by means of a plurality of struts 13, which define another auxiliary lateral opening 14 for drawing in the gases, in the portion 8 of the manifold, at the side axially opposite the opening 6.

[0016] The impeller 2 is mounted coaxially relative to the motor 3 and is also supported in a projecting manner on the portion 8 of the manifold.

[0017] With particular reference to Figure 3, a plane which is parallel with the direction Y of flow and which extends through the axis X (therefore parallel with the plane of the page showing Figure 3) is designated Q, the projection of the profile P for connecting the portions 7 and 8 of the manifold in the plane Q defines a discontinuous line L, including a plurality of segments with a rectilinear portion, as will be clearly appreciated below. Starting from the delivery cross-section 4, the line L comprises, in a continuation of each other, a portion 15 which is parallel with the axis X and which continues as far as a portion 16 which is perpendicular relative to the axis X and which in turn continues as far as a portion 17 which is angled with respect to the axis X. The portion 17 further extends as far as a portion 18 which is also directed perpendicularly relative to the axis X, but spaced-apart in relation to the portion 16, in the direction towards the intake cross-section 5. In greater detail, the portion 17 (for connecting the portions 16 and 18) extends near the axis X so that the portions 16 and 18 are developed at opposite sides with respect to a diametral plane which extends through the axis X and which is perpendicular to the plane Q. In accordance with this configuration of the projection of the connection profile P in plane Q, it is possible for the first and second manifold portions 7, 8 to be connected/disconnected to/from each other along the profile P, by means of a main relative movement brought about substantially in the axial direction of flow (in a manner parallel with axis Y) even if the impeller (and the motor 3 therewith) is held so as to be supported on the second manifold portion. In fact, owing to the gap defined by the portions 17 and 18 of the line L, the assembly comprising the impeller 2/portion 8 can be coupled to the portion 7 of the manifold with a main movement which is substantially axial which, at most, can provide for a modest movement transversely relative to the axis Y, thereby promoting the assembly/disassembly of the fan unit, which in typical applications in extractor hoods preferably involves that axial direction, along the axis Y, whereas, in contrast, it involves limited access for the operator in a transverse direction relative to the delivery flow (parallel with the axis X).

[0018] In typical applications, the delivery flow axis coincides with the vertical direction and the space available to the operator for assembling/disassembling the fan is nearly accessible, from below, exclusively in the vertical direction, the dimensions of the extractor hood limiting the possibilities for access in the transverse direction relative to the vertical axis of flow.

[0019] With the above-described configuration, therefore, there is achieved a main two-fold advantage, firstly, the portion 7 of the manifold which carries the delivery mouth can be held so as to be fixed to the frame of the extractor hood, even during phases for disassembling the fan/motor unit, assisting the operator who does not have to remove the portion for connecting the manifold to the fume extraction pipe; secondly, the second portion 8 of the manifold, which is fixedly joined to the impeller and to the motor, can be assembled/disassembled in a quasi-parallel direction relative to the delivery flow axis, with the advantages set out above owing to that configuration.

[0020] In a preferred form, the portion 16 of the profile line L can belong to a central plane of symmetry (perpendicular to the axis X) of the manifold, or it can be formed at the side opposite the portion 18 with respect to that central plane of symmetry. In another alternative, the portion 16 can itself be angled with respect to the axis Y (Figure 5); in that case, the portion 17 is developed in a manner parallel with the axis Y. It will be appreciated that the various geometric configurations are selected in accordance with the structural rigidity which has to be ensured for each portion 7, 8 of the manifold. The invention thereby achieves the proposed objects, resulting in the advantages set out above over known solutions.

[0021] Besides the two-fold advantage set out above, there is also the additional fact that the manifold according to the invention allows significant simplifications of the operations for disassembling the motor or the impeller, even during service phases.

Claims

1. A manifold, in particular a scroll type manifold, which is intended to constitute the housing of a radial impeller (2) of a fan, comprising a delivery cross-section (4) with a delivery flow direction (Y)which is substantially perpendicular to the axis (X) of rotation of the impeller (2) and at least an intake cross-section (5) which extends coaxially relative to that axis (X) of rotation, the manifold comprising a first and a second manifold portion (7, 8) which can be connected to each other at a coupling profile(P), the delivery cross-section (4) being defined in the first manifold portion (7), the impeller (2) being rotatably supported on the second manifold portion (8), **characterized in that** the delivery cross-section (4) is integrally formed in the first manifold portion (7) and is developed axially over at least a portion in the delivery flow direction (Y),
and **in that** the projection of the coupling profile (P) defines, in a plane (Q) which is parallel with the direction (Y) of flow and which extends through the axis (X) of rotation of the impeller, a discontinuous line (L) including, starting from the delivery cross-section (4), at least a first portion (16) which extends

transversely relative to the axis (X) of the impeller as far as a location adjacent to the axis itself, and at least a second portion (18) which extends away from the axis (X) of the impeller and transversely relative thereto, the second portion (18) being spaced apart from the first portion (16) in the direction towards the intake cross-section (5), in such a manner that the first and the second manifold portions (7, 8) are able to be mutually coupled/uncoupled along that profile (P), with a main relative movement being brought about substantially in the axial direction of the delivery flow, even with the impeller (2) being held so as to be supported on the second manifold portion (8).

2. A manifold according to claim 1, wherein the first (16) and the second portion (18) of the discontinuous line (L) are mutually parallel rectilinear segments, with a mutual spaced-apart relationship, and which extend perpendicularly relative to the axis (X) of the impeller.

3. A manifold according to claim 2, wherein the discontinuous line (L) of the profile (P) comprises a connection portion (17) between the first portion (16) and the second portion (18).

4. A manifold according to claim 3, wherein the connecting portion (17) is rectilinear and is angled with respect to the axis (X) of rotation of the impeller (2).

5. A manifold according to claim 4, wherein the connecting portion (17) is directed parallel with the axis (X) of the impeller.

6. A manifold according to any one of the preceding claims, wherein the discontinuous line (L) of the coupling profile (P) comprises a third portion (15), as a continuation of the first portion (16), at the opposite side to the second portion (18), the third portion (15) extending near the delivery cross-section (4), substantially in a direction parallel with the axis (X) of the impeller (2).

7. A manifold according to any one of the preceding claims, wherein the first portion (16) belongs to a central plane of symmetry of the manifold, directed perpendicularly relative to the axis (X) of the impeller (2).

8. A manifold according to claim 7, wherein the first and second portions (16, 18) extend, in the plane (Q) of projection of the coupling profile (P), at opposite sides with respect to the central plane of symmetry.

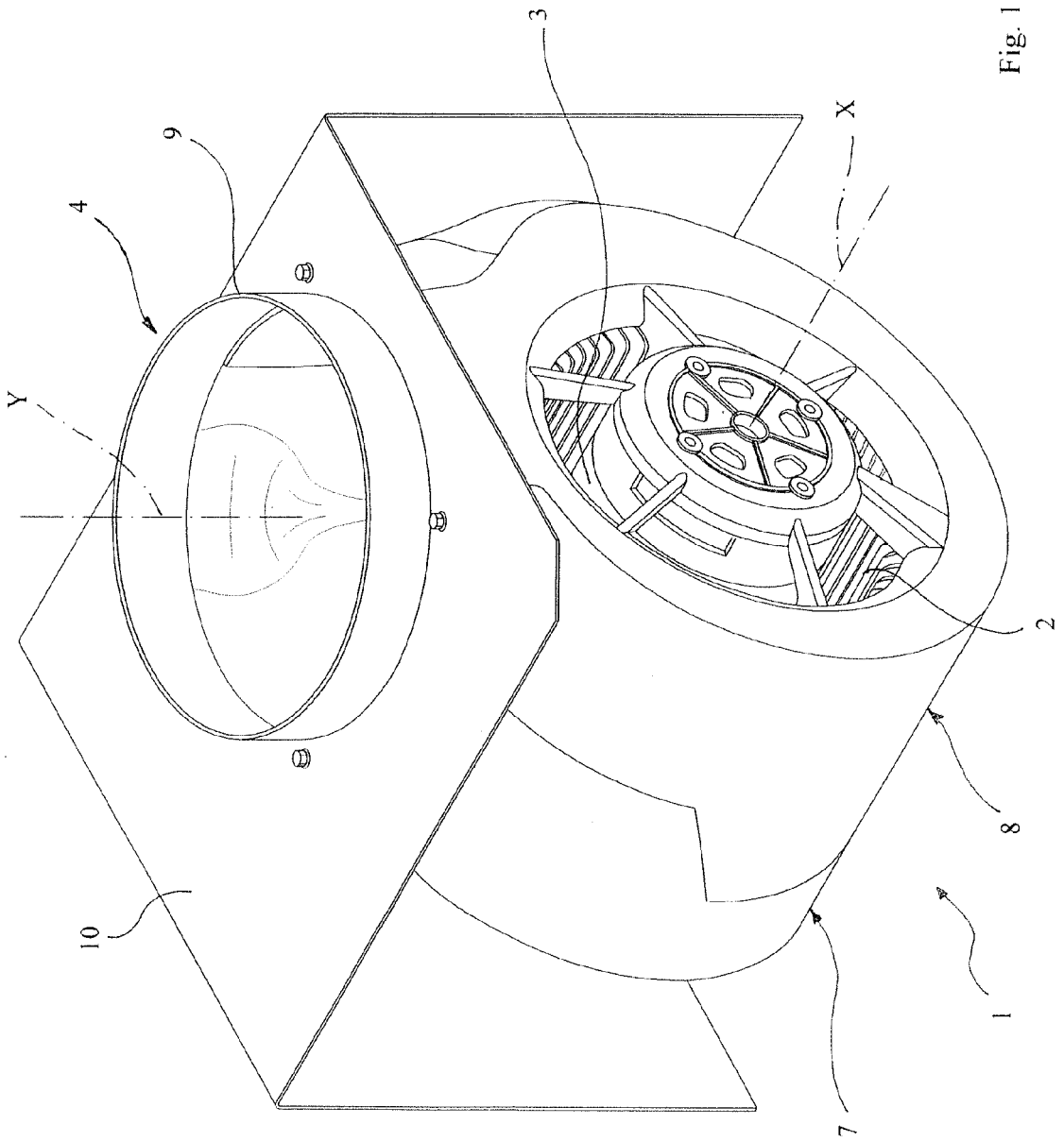

Fig. 1

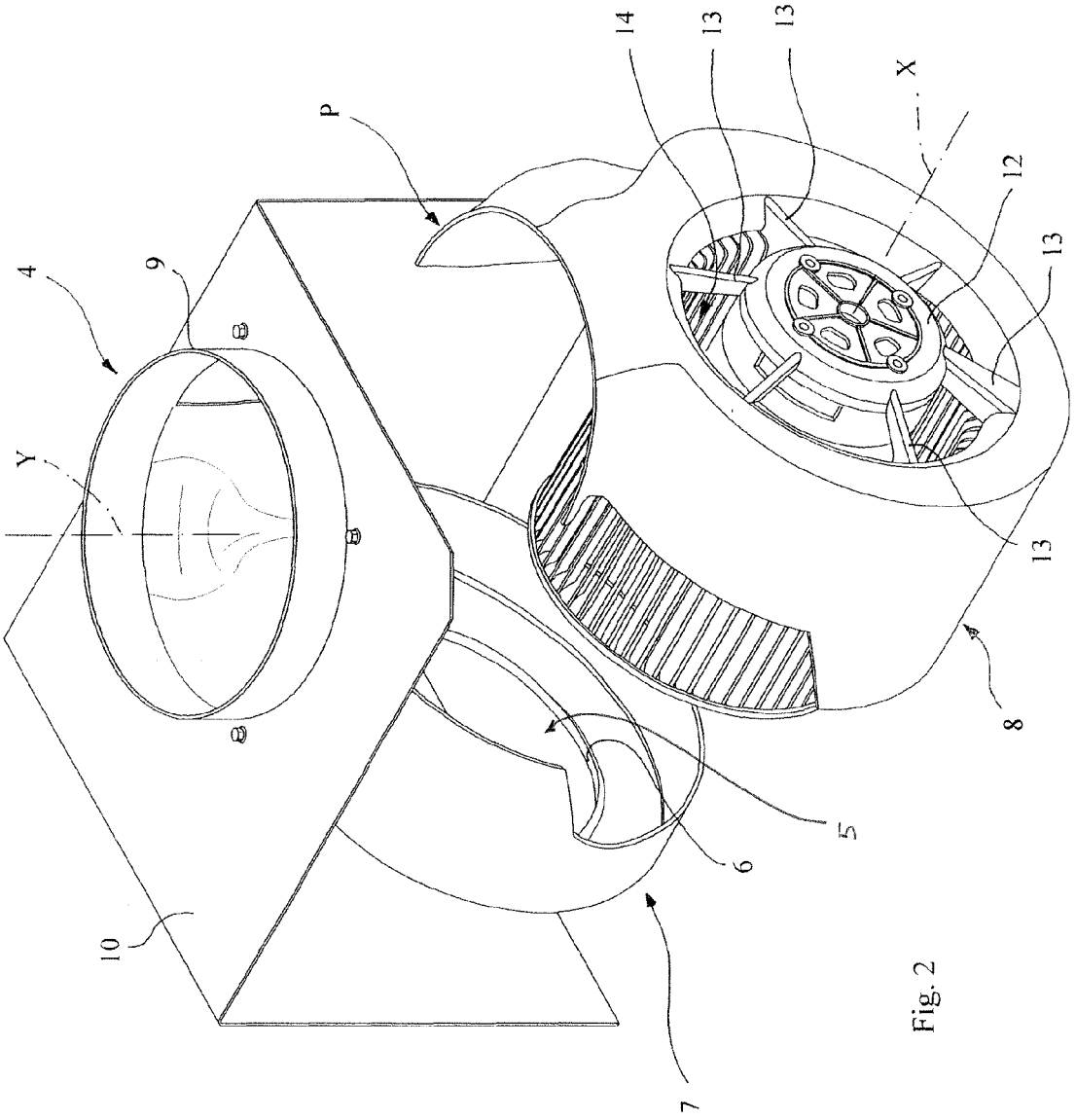

Fig. 2

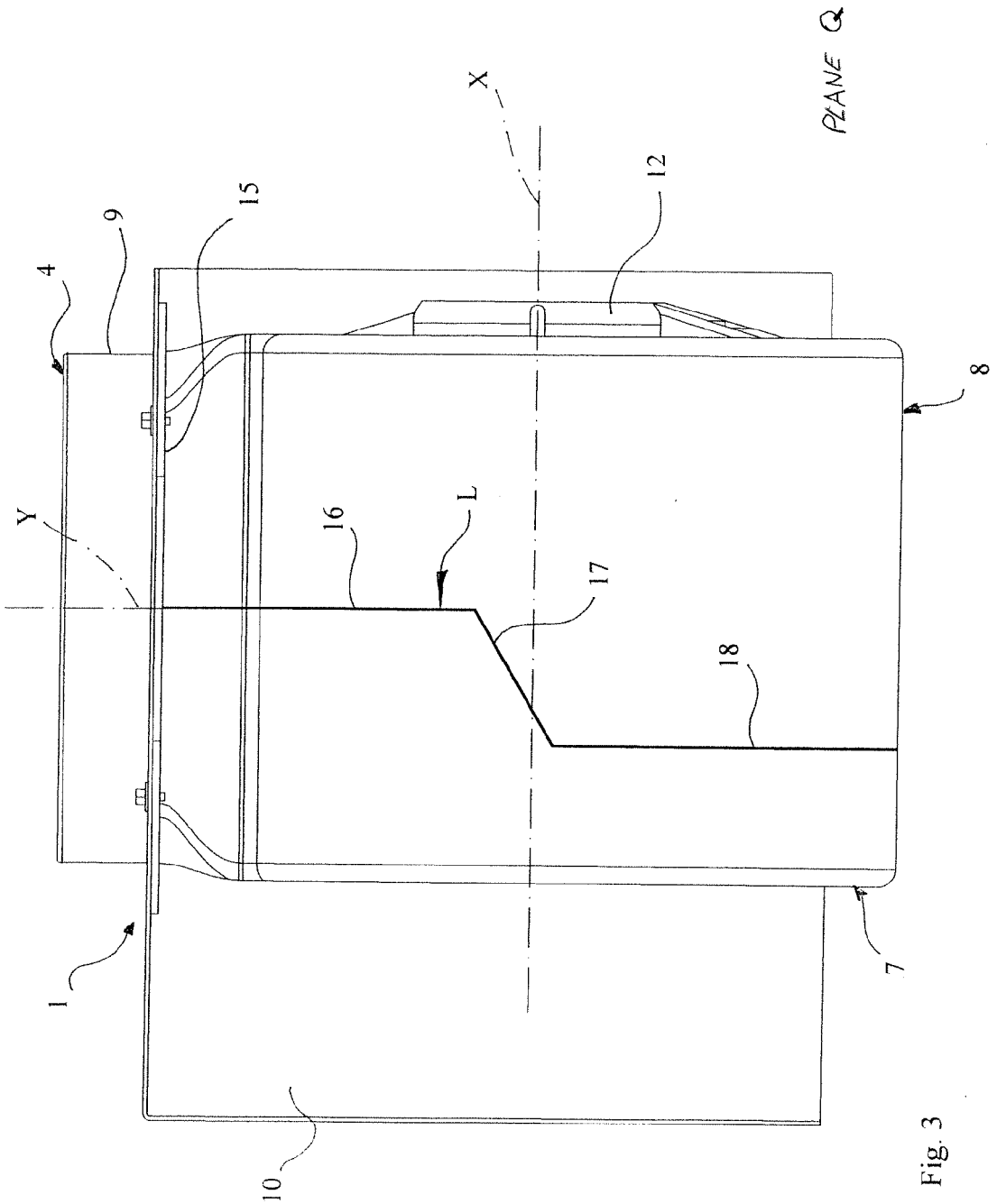

Fig. 3

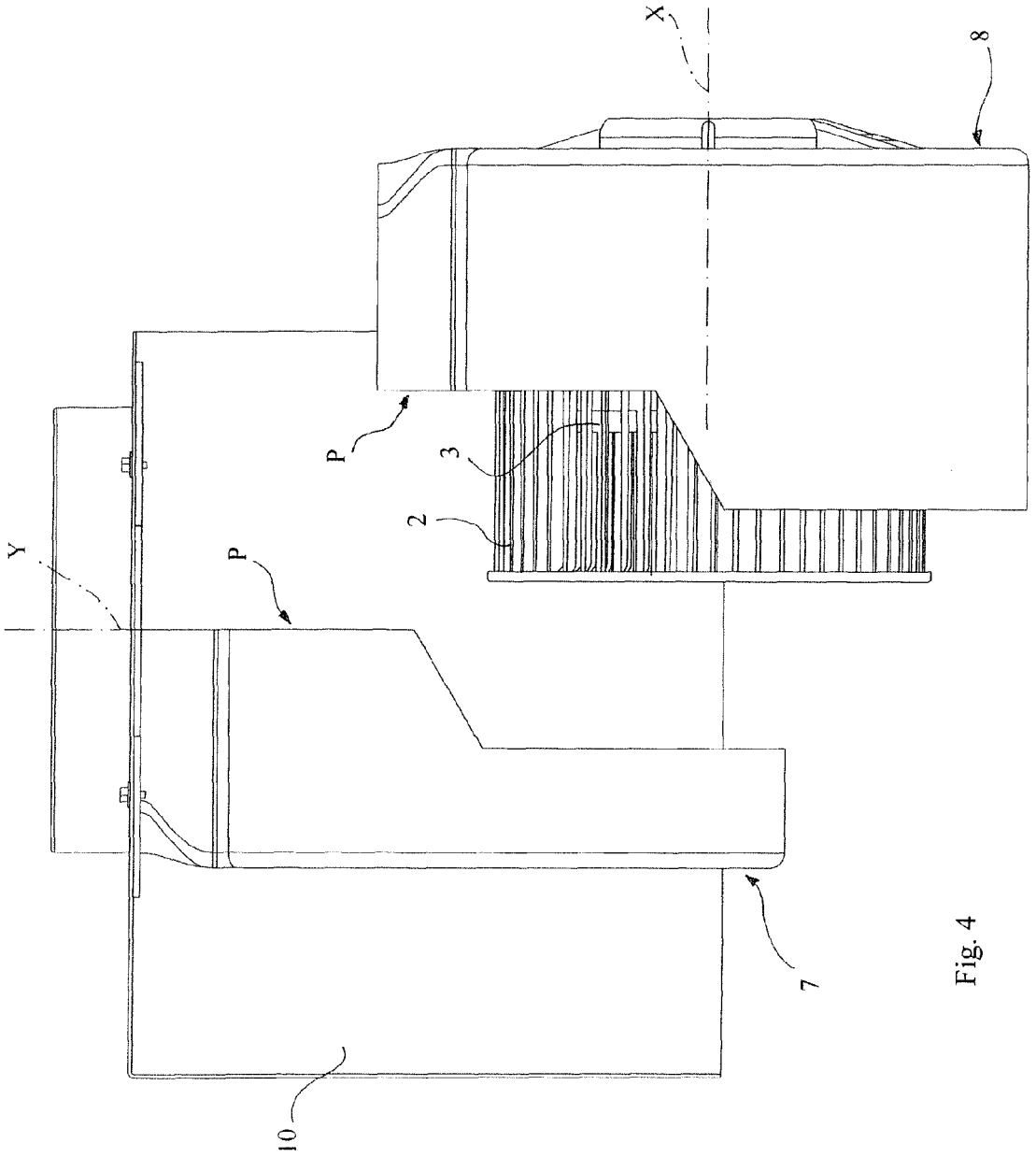

Fig. 4

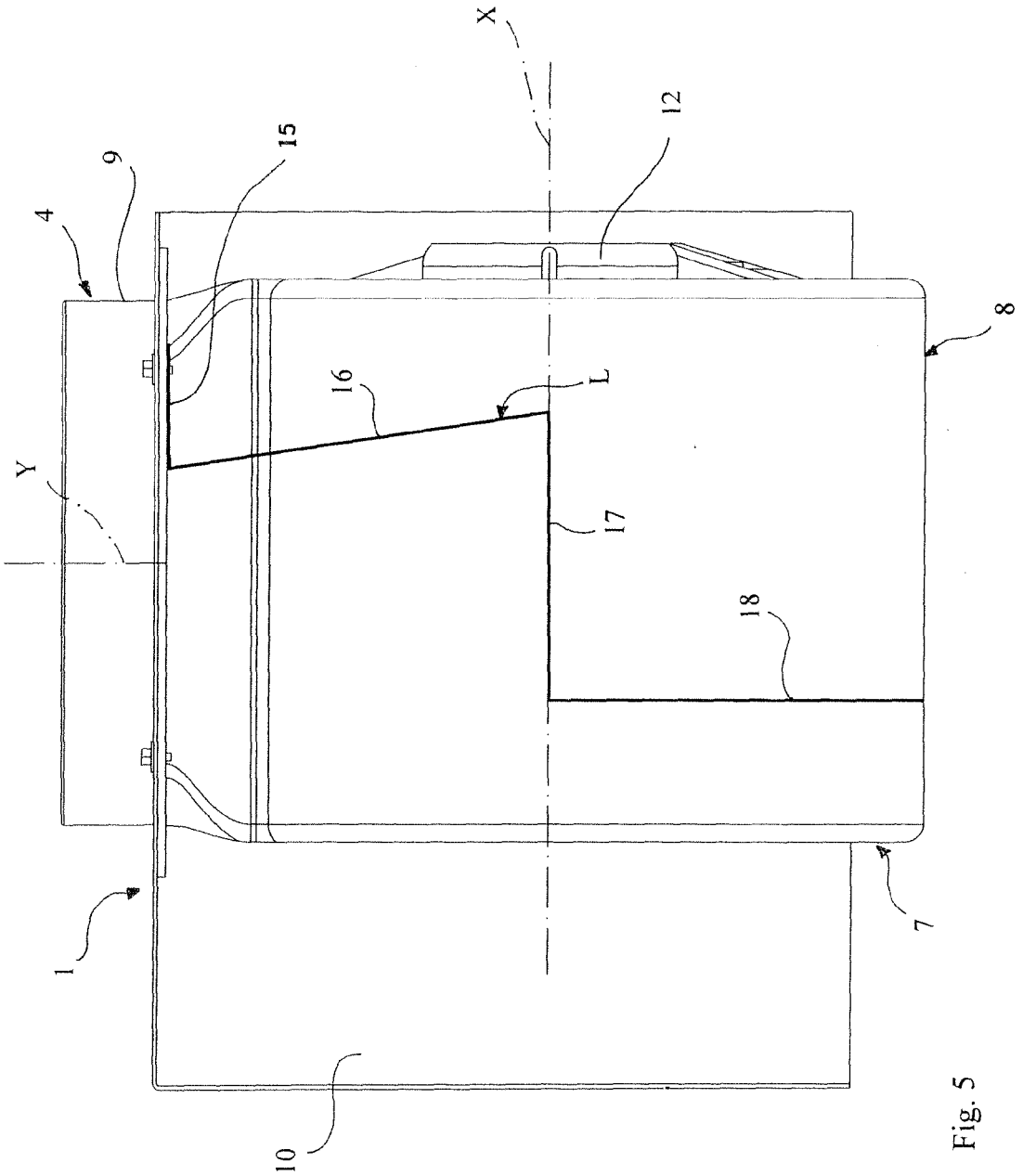

Fig. 5