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(54) **A VACUUM CLEANER**

STAUBSAUGER

ASPIRATEUR

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Description

[0001] The invention relates to a vacuum cleaner comprising a housing including a tank element with receiving means for receiving a suction hose and that is under partial vacuum and wherein dust collection means may be provided, a chassis element accommodating an air flow generator, and a top cover element including air exhaust means.

[0002] In a vacuum cleaner the housing elements are designed so that two compartments are created on each side of the air flow generator, that comprises an electric motor and a blower fan. The first compartment is upstream the air flow generator and receives the particles that are sucked into the housing through the suction hose when the compartment is under partial vacuum. On the blower side of the air flow generator a second compartment is created. In this compartment the air is at atmospheric pressure or slightly above. In this compartment, filters, noise reduction means etc. may be provided in connection with the air exhaust system.

[0003] In vacuum cleaners of the above mentioned type, the first compartment is made up by the interior space in a lower tank housing element on to which a chassis element or central element is mounted. On top of the chassis element, a top cover housing element is positioned in order to shield any naked electrical parts inside the housing and to provide an air exhaust system with a noise reduction and/or air cleaning facilities. The top cover is assembled over a seal in order to ensure that particles in the exhaust system will not escape the air filtration. The tank element is removable from the other housing elements in order to be able to empty the collected particles in the dust collection bag in the first compartment.

[0004] Due to the difference in pressure in each of the compartments, it is crucial to the function of the vacuum cleaner that the assemblies of the housing elements are sealed in an air and dust tight manner.

[0005] From e.g. DE-A-44 21 214 sealing means in a vacuum cleaner with several housing elements are shown. However, this relates to a type of vacuum cleaner with two exterior housing parts and that internally are subdivided for accommodating the different functions. The problem with this type of sealing and with the sealing means known in other vacuum cleaners is that the seal is a loose fitting in association with each assembly line. Hereby, airtight seals are provided, but the drawbacks are that the sealing means may be complicated in design and/or that the production costs involved in the production of this sealing are quite high and that there is a risk for displacing the sealing when the user removes a housing element for changing the dust collection bag, or the like. Other known vacuum-cleaner is described in GB 423726.

[0006] Accordingly, it is an object by the present invention to provide a vacuum cleaner with sealing means that are relatively simple and inexpensive to produce and re-

liable in use.

[0007] This object is achieved by a vacuum cleaner with the combination of features according to the appended claim 1. Preferred embodiments are defined in the dependent claims.

[0008] The main sealing between the two compartments is provided in a simple and efficient way as only one single main sealing member is necessary for providing an air and dust tight seal between all the housing parts. This makes the vacuum cleaner according to the assembly easier to assemble and provides for a more cost effective manufacture than it is the case with the known vacuum cleaners. The sealing means are preferably integrally provided in the chassis element. Hereby, the sealing means may be produced together with the chassis element. The sealing means is preferably an elastomer and the chassis is a thermoplastic material.

[0009] In the preferred embodiment, the sealing means are produced together with the chassis element in a double injection moulding. The elastomer is injected onto the stiff thermoplastic chassis element in the same moulding tool.

[0010] In the preferred embodiment, the sealing means are provided on the outer periphery of the chassis element with a first receiving surface abutting the tank housing element and a second surface opposite said first surface abutting the top cover. Hereby, a simple design of the sealing means are provided.

[0011] In the preferred embodiment, the tank element is provided with an upper annular surface for receiving the common sealing means and the chassis element and the top cover element is provided with an annular flange engaging the sealing means on the opposite side of where the tank engages the sealing means. Hereby, the assembly of the housing elements are particularly simple as the housing elements are guided into the correct position relatively to each other.

[0012] The chassis element may be provided with resilient support members, in particular an interior air flow generator resilient supporting member at a air flow generator receiving means integrally formed in the chassis element. Moreover, the chassis element may be provided with one or more integrally formed resilient support members on the underside of the chassis element for partly supporting the chassis on the bottom of the tank element. By utilising the double injection moulding technique, various special sealing, vibration dampening and/or supporting members may be provided, such as a resilient support where the electric motor and the blower is mounted in the chassis or at other contact points between the housing elements. These resilient supporting members are advantageous as a better strength in the housing assembly may be provided and since the resilient members may obtain dimensional tolerances, vibrations.

[0013] In one embodiment, the common sealing means may include outwardly protruding vacuum cleaner storage supports. This may be useful e.g. by a vacuum cleaner with wheels that may be stored in an upright po-

sition, as the vacuum cleaner may rest on these outwardly protruding supports with relatively high friction and on the wheels.

[0014] In the preferred embodiment, the top cover element is provided with an outer cover flange extending beyond the assembly area of the housing elements. Hereby, a protection of the seal against exterior impact is provided.

[0015] In the following, the invention is described in further detail with reference to the drawings, in which:

- fig. 1 is a schematic view of a vacuum cleaner assembly,
- fig. 2 and 3 are isometric views of the chassis element from the top and bottom, respectively, and
- fig. 4 is a detailed view of the assembly according to the preferred embodiment of the invention.

[0016] In figure 1 a schematic cross-section view of a vacuum cleaner is shown. The vacuum cleaner comprises a housing with three elements: a tank element 1, a middle chassis element 2 and a top cover element 3. A suction hose 4 is connected to the tank element 1. In the chassis element 2 an air flow generator 5 is provided. In the tank element 1 dust collection means (not shown) may be provided and the tank element 1 is also fitted with wheels 18. The interior space of the tank element 1 is under partial vacuum as the air flow generator 5 sucks air out of the tank compartment and blows into the second air compartment under the top cover 3. In the top compartment 3, the air is led through an air exhaust system 6, that may include noise reduction means, air filtration means etc. Due to the air and dust tight sealing 10, it is ensured that no air will by-pass the air filtration and escape through leaks in the assembly.

[0017] The chassis element 2 is fitted onto the top of the lowermost tank housing element 1 and the top cover housing element 3 is mounted on top of the chassis element 2. The chassis element is provided with an annular sealing member 10 that is designed in such a way that the three housing elements 1, 2, 3 are assembled over this seal in an air tight manner. The common sealing arrangement is shown in more detail in fig. 4.

[0018] The common sealing member 10 is integrally moulded onto the periphery of the chassis element 2, as shown in figs. 2 and 3. The chassis element 2 is shaped with an accommodation cavity 7 that is shaped in accordance with the shape of the air flow generator 5 for receiving said air flow generator 5 (not shown in figs. 2 and 3). On the bottom of the cavity 7 an integrated resilient support member 8 may also be provided, see fig. 2. On the bottom side of the chassis member 2, an elastomer supporting member 11 is preferably provided on the lowermost surface of the chassis 2, so that this surface is supported when the chassis element 2 rests on support protrusions 20 formed inside on the bottom of the tank element 1. Hereby, the weight of the chassis 2 is partly sup-

ported through the supporting element 11 and the protrusions 19 without transferring vibrations and noise from the air flow generator 5 to the tank element 1.

[0019] The common member 10 and possibly the supplementary resilient sealing and support members 8, 11 are produced together with the chassis element 2 in a double injection moulding process, where an elastomer is injected onto the stiff thermoplastic chassis element 2 still present in the moulding tool. Hereby, the common sealing member 10 and the supplementary sealing and support members 8, 11 are integrated in the chassis element 2 in a simple and inexpensive production process, just as it is ensured that the sealing members are accurately positioned. As shown in fig. 1, the resilient support elements 8, 11 may even be integrally designed and produced as one single elastomer member.

[0020] In fig. 4, the assembly involving the common main sealing member 10 is shown. The tank housing 1 is provided with an annular flange 13 with a generally horizontal upper surface. The sealing member 10 is provided around the end of a horizontal flange 14 of the chassis element 2. The chassis 2 also includes a generally vertical wall member 19 extending into the interior of the tank element 1 when the two elements 1, 2 are assembled. The sealing member 10 includes a first portion 16 and a second portion 17. The second portion 17 is making contact the upper surface of the flange 13 of the tank element 1 providing an air tight assembly between the housing elements 1 and 2. The first portion 16 of the sealing member 10 is brought in contact with the end of the wall member 15 of the top lid 3. Hereby, the top cover 3 is assembled in an air and dust tight manner to the chassis 2. The top cover element 3 is provided with a shielding wall member 12 for protecting the assembly and also to guide the top cover 3 into the determined position as the shielding wall member 12 extends just below the outside of the end flange 13 of the tank element 1.

[0021] In the description of the preferred embodiment, terms like horizontal and vertical are used. These terms are merely to be understood as relative terms, as it is realised that the orientation of the vacuum cleaner and the interrelation of the housing elements may be altered without departing from the scope of the invention, such as set forth in the accompanying claims.

Claims

1. A vacuum cleaner comprising a housing including a tank element (1) with receiving means for receiving a suction hose (4) and that is under partial vacuum and wherein dust collection means may be provided, a chassis element (2) accommodating an air flow generator (5), a top cover element (3) including air exhaust means, and

common sealing means (10) for providing an air tight seal between the tank (6) and chassis (2) element and a dust tight seal between the chassis (1) and top cover (3) elements,

characterised in that

the sealing means (10) is formed integrally with the chassis element (2).

2. A vacuum cleaner according to claim 1, wherein the sealing means is an elastomer and the chassis is a thermoplastic material
3. A vacuum cleaner according to claim 2, wherein the sealing means is produced together with the chassis element in a double injection moulding.
4. A vacuum cleaner according to any of claims 1 to 3, wherein the chassis element is provided with an interior air flow generator resilient support and air sealing member at a air flow generator receiving means formed in the chassis element.
5. A vacuum cleaner according to any of claims 1 to 4, wherein the chassis element is further provided with one or more integrally formed resilient support members on the underside of the chassis element for partly supporting the chassis on the bottom of the tank element.
6. A vacuum cleaner according to any of claims 1 to 5, wherein the common sealing means include vacuum cleaner storage supports.
7. A vacuum cleaner according to any of claims 1 to 6, wherein the tank element is provided with an upper annular surface for receiving the common sealing means and the chassis element and the top cover element is provided with an annular flange engaging the sealing means on the opposite side of where the tank engages the sealing means.
8. A vacuum cleaner according to claim 7, wherein the sealing means are provided on the outer periphery of the chassis element with a first receiving surface abutting the tank housing element and a second surface opposite said first surface abutting the top cover.
9. A vacuum cleaner according to claim 7 or 8, wherein the top cover element is provided with an outer cover flange extending beyond the assembly area of the housing elements.

Patentansprüche

1. Staubsauger mit einem Gehäuse, umfassend ein Behälterelement (1) mit einem Aufnahmemittel

zum Aufnehmen eines Saugschlauches (4), und das unter einem Teilvakuum steht und in dem ein Staubsammelmittel vorgesehen sein kann, ein Chassiselement (2), das einen Luftflußgenerator (5) aufnimmt ;

ein oberes Abdeckelement (3), das ein Luftauslaßmittel aufweist, und ein gemeinsames Dichtmittel (10) zum Herstellen einer luftdichten Dichtung zwischen dem Behälterelement (1) und dem Chassiselement (2) und einer staubdichten Dichtung zwischen dem Chassis (1) und dem oberen Abdeckelement (3),

dadurch gekennzeichnet, daß

das Dichtmittel (10) integral mit dem Chassiselement (2) ausgebildet ist.

2. Staubsauger nach Anspruch 1, bei dem das Dichtmittel ein Elastomer und das Chassis ein thermoplastisches Material ist.
3. Staubsauger nach Anspruch 2, bei dem das Dichtmittel zusammen mit dem Chassiselement in einer doppelten Einspritzform hergestellt wird.
4. Staubsauger nach einem der Ansprüche 1 bis 3, bei dem das Chassiselement mit einem inneren, nachgiebigen Luftflußgenerator-Träger und einem Luftdichtungsteil an einem Luftflußgenerator-Aufnahmemitte ausgestattet ist, das im Chassiselement ausgebildet ist.
5. Staubsauger nach einem der Ansprüche 1 bis 4, bei dem das Chassiselement ferner mit einem oder mehreren integral ausgebildeten, nachgiebigen Trägerteilen an der Unterseite des Chassiselements zum teilweisen Tragen des Chassis auf dem Boden des Behälterelements ausgestattet ist.
6. Staubsauger nach einem der Ansprüche 1 bis 5, bei dem die gemeinsamen Dichtmittel Staubsaugeraufbewahrungsträger aufweisen.
7. Staubsauger nach einem der Ansprüche 1 bis 6, bei dem das Behälterelement mit einer oberen ringförmigen Fläche zum Aufnehmen des gemeinsamen Dichtmittels und des Chassiselements ausgestattet ist, und das obere Abdeckelement mit einem ringförmigen Flansch ausgestattet ist, der an den Dichtmitteln an der gegenüberliegenden Seite angreift, an der der Behälter an den Dichtmitteln angreift.
8. Staubsauger nach Anspruch 7, bei dem die Dichtmittel am Außenumfang des Chassiselements vorgesehen sind, wobei eine erste Aufnahme­fläche am Behältergehäuseelement anstößt, und eine zweite Fläche gegenüber der ersten Fläche an der oberen Abdeckung austößt.

9. Staubsauger nach Anspruch 7 oder 8, bei dem das obere Abdeckelement mit einem äußeren Abdeckflansch ausgestattet ist, der sich über die Montagefläche der Gehäuseelemente erstreckt

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moyens d'étanchéité communs et l'élément de châssis, et l'élément de revêtement supérieur est muni d'un flasque annulaire coopérant avec les moyens d'étanchéité sur le côté opposé de celui où le réservoir coopère avec les moyens d'étanchéité.

Revendications

1. Aspirateur comprenant un logement incorporant un élément réservoir (1) avec des moyens de réception pour recevoir un tuyau flexible d'aspiration (4) et qui se trouve sous vide partiel et dans lequel peuvent être disposés les moyens de recueil de la poussière, un élément de châssis (2) recevant un générateur de flux d'air (5), un élément de revêtement supérieur (3) incorporant des moyens d'échappement d'air, et, des moyens d'étanchéité communs (10) pour fournir un joint étanche à l'air entre l'élément réservoir (1) et l'élément de châssis (2), et un joint d'étanchéité à la poussière entre le châssis et les éléments de revêtement supérieurs (3),
caractérisé en ce que
les moyens d'étanchéité (10) sont formés solidairement avec l'élément de châssis (2).

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2. Aspirateur selon la revendication 1, dans lequel les moyens d'étanchéité sont en élastomère et le châssis est en matériau thermoplastique.

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3. Aspirateur selon la revendication 2, dans lequel les moyens d'étanchéité sont produits conjointement avec l'élément de châssis dans un moulage à double injection.

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4. Aspirateur selon l'une quelconque des revendications 1 à 3, dans lequel l'élément de châssis est muni d'un support élastique de générateur de flux d'air interne et d'un élément d'étanchéité d'air sur des moyens de réception de générateur de flux d'air formés dans l'élément de châssis.

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5. Aspirateur selon l'une quelconque des revendications 1 à 4, dans lequel l'élément de châssis est, de plus, muni d'un ou de plusieurs éléments de support élastiques formés solidairement sur le côté inférieur de l'élément de châssis pour supporter partiellement le châssis sur le fond de l'élément réservoir.

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6. Aspirateur selon l'une quelconque des revendications 1 à 5, dans lequel les moyens d'étanchéité communs comprennent les supports de stockage de l'aspirateur.

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7. Aspirateur selon l'une quelconque des revendications 1 à 6, dans lequel l'élément réservoir est muni d'une surface annulaire supérieure pour recevoir les

8. Aspirateur selon la revendication 7, dans lequel les moyens d'étanchéité sont disposés sur la périphérie extérieure de l'élément de châssis, avec une première surface de réception venant en appui sur l'élément de logement de réservoir et une seconde surface opposée à ladite première surface venant en appui sur le couvercle supérieur.

9. Aspirateur selon la revendication 7 ou 8, dans lequel l'élément de couvercle supérieur est muni d'un flasque de revêtement extérieur s'étendant au-delà de la surface de montage des éléments de logement

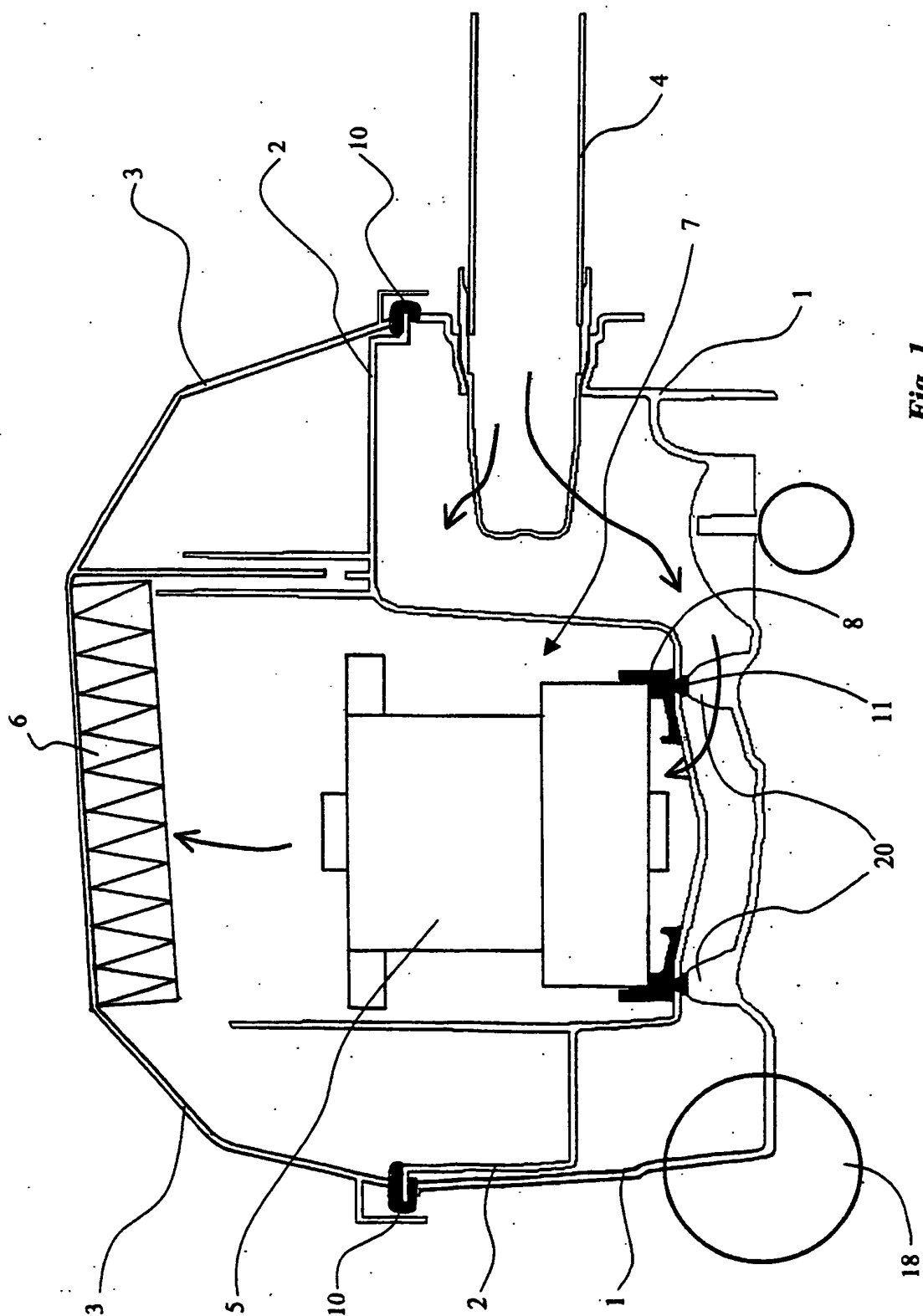


Fig. 1

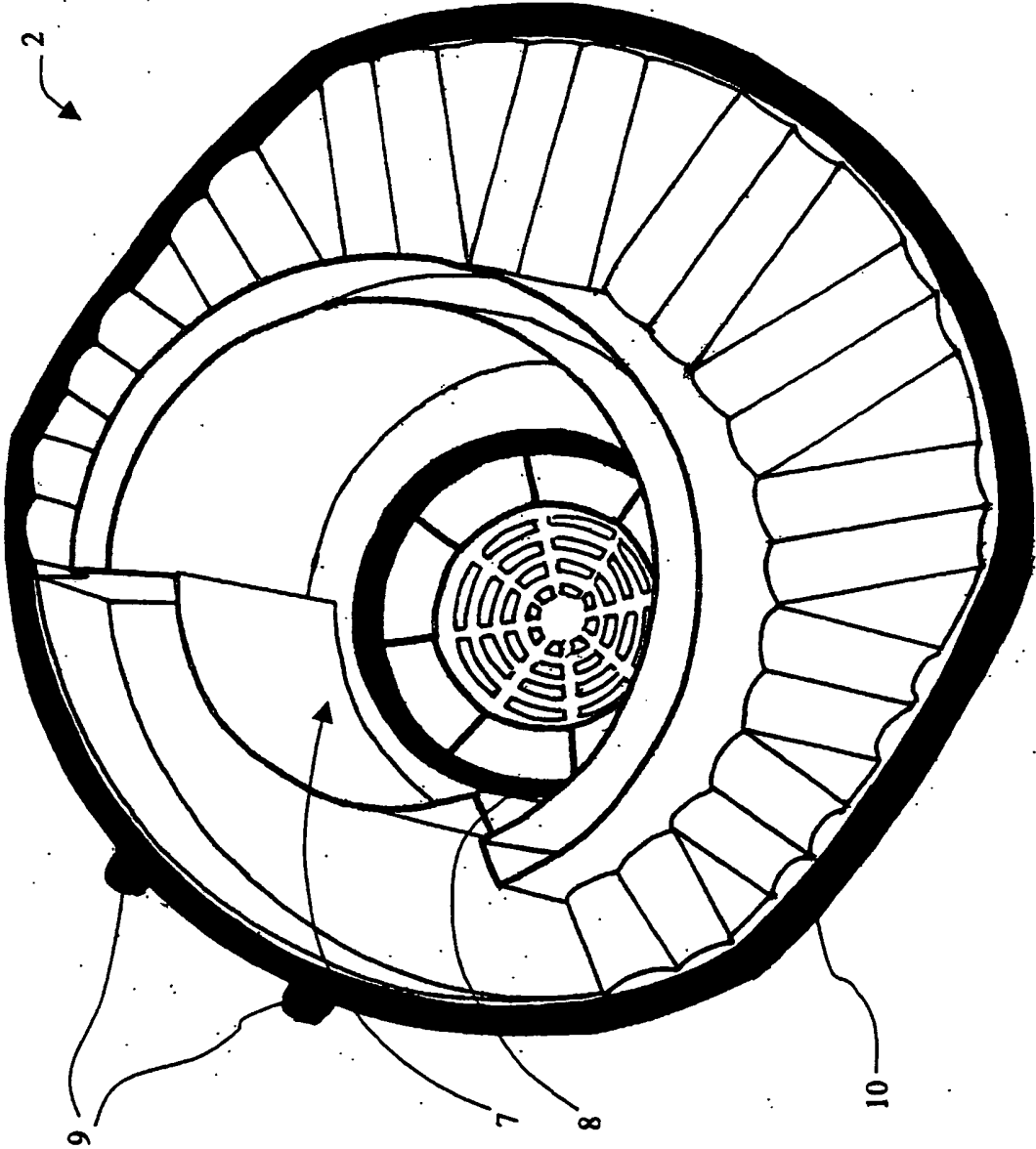


Fig. 2

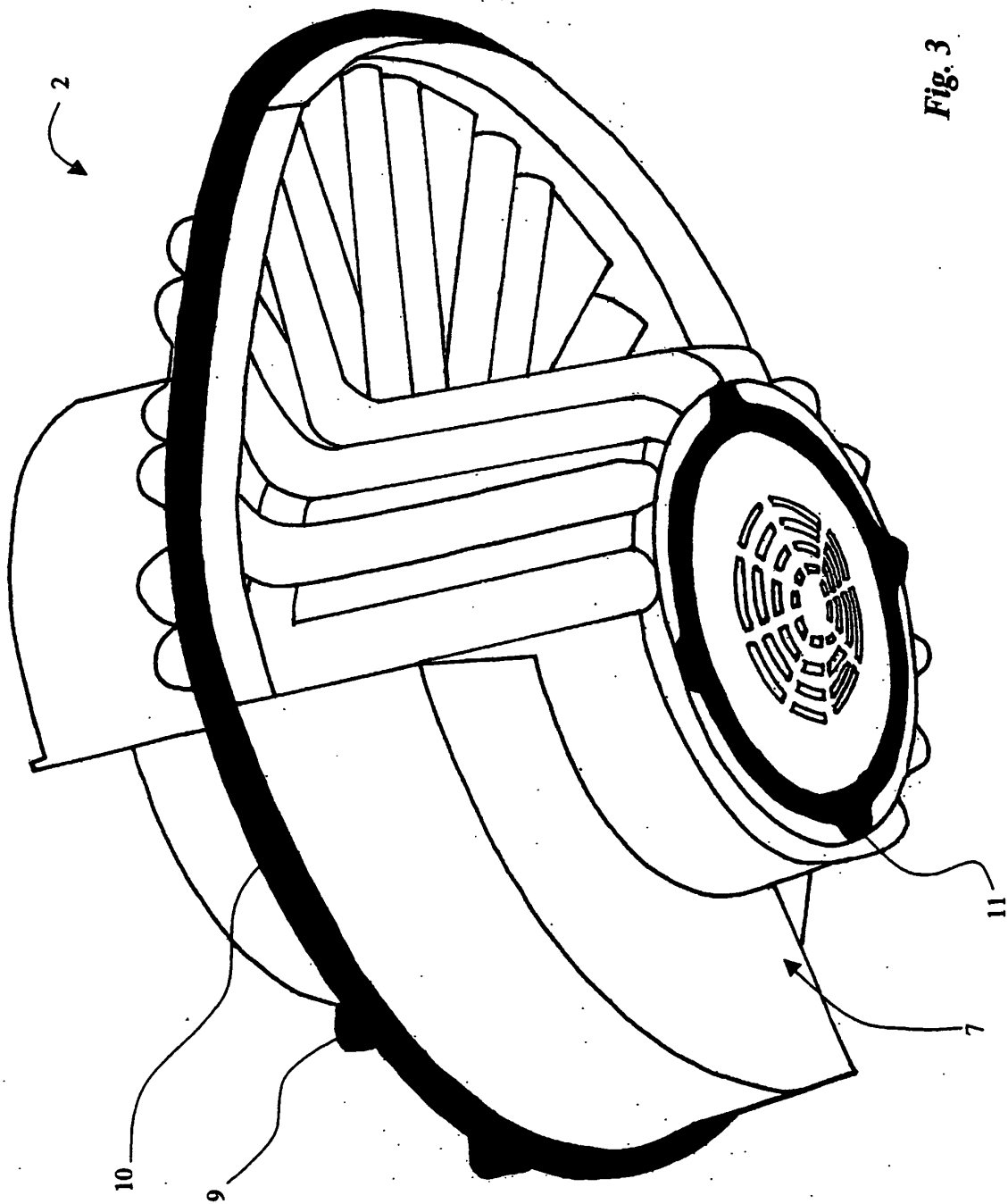


Fig. 3

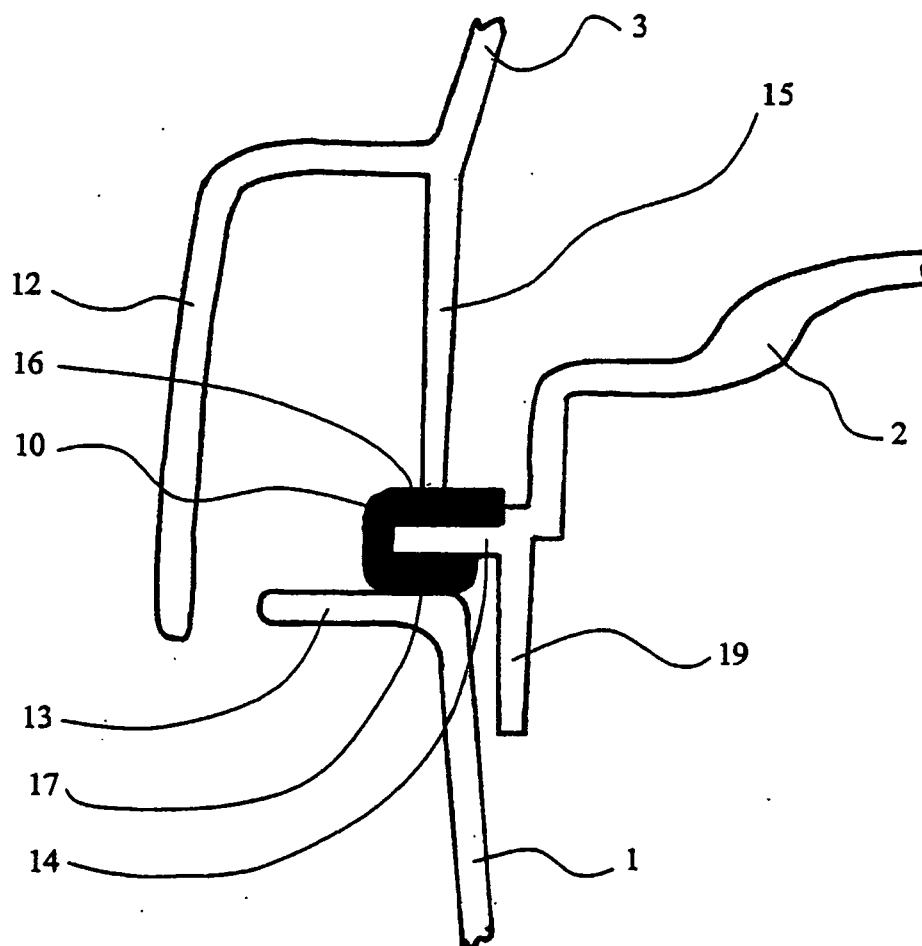


Fig. 4