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(54) **EXTRACTOR ASSEMBLY TO BE INSTALLED INSIDE IN AN AIR DUCT**

(57) The invention relates to an extractor assembly to be installed inside an air duct, which comprises an impeller (1); an actuating element (2) for imparting rotational momentum to the impeller (1); a support (3); and a case (4) for surrounding the impeller (1), actuating element (2) and support (3). The support (3) comprises an internal wall (3.3) that determines, with the first face (3.1), a housing (6) for accommodating the actuating element

(2); and an external wall (3.4) that is disposed radially and externally with respect to the internal wall (3.3), such that the walls (3.3, 3.4) define a passage (7) for the movement of air. When the extractor assembly is mounted in a use position, the external wall (3.3) radially covers part of the inside of the case (4), such that the case (4) does not come into contact with the air driven by the impeller (1) along the external wall (3.4).

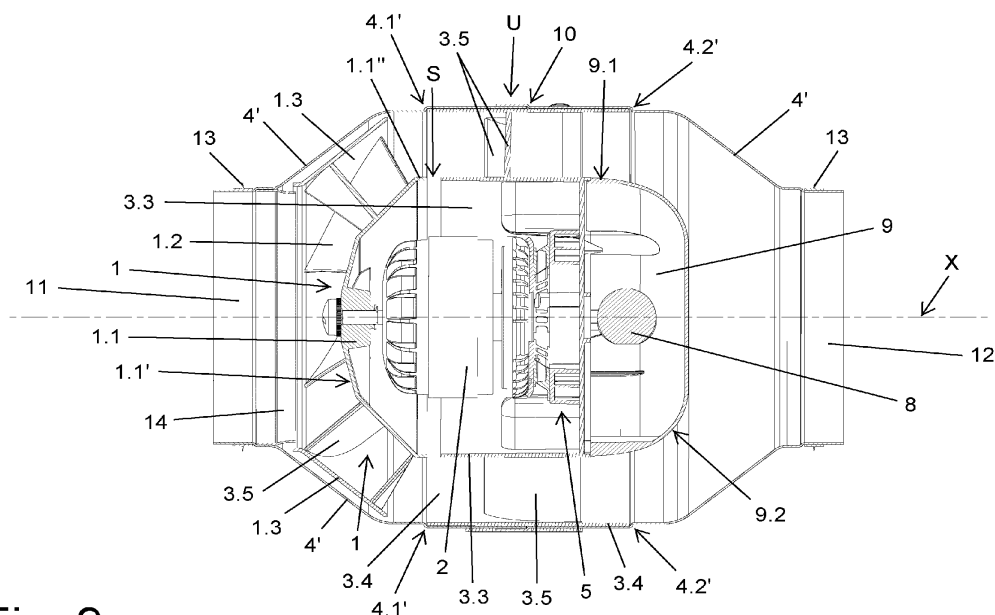


Fig. 9

Description

Technical field

[0001] The present invention is related to the industry dedicated to extractor assemblies to be installed inside air ducts.

State of the art

[0002] Currently, extractor assemblies to be installed inside air ducts are widely known. These extractor assemblies have an impeller with blades, an electric motor to rotate the impeller such that, by means of the blades, the flow or movement of air is generated, a support to arrange the motor fixed inside the extractor assembly and an external case as a general covering.

[0003] Said extractor assemblies, as a result of the generation of said flow or movement of air, generate noise which is annoying. Mainly, this noise is generated as a result of the movement of air along the extractor assemblies.

[0004] In turn, this is largely due to the fact that air is not moved in a completely continuous or uniform manner, but it is generated with discontinuities which derive in point contacts according to a frequency, being mainly irregular, with the external case. This drawback is seriously aggravated in the case of metal external cases.

[0005] In view of the described disadvantages or limitations had by currently existing solutions, a solution is necessary which enables the noise generated by the passage of air along the extractor assembly to be reduced.

Object of the invention

[0006] In order to meet this objective and solve the technical problems discussed so far, in addition to providing additional advantages which may be derived later, the present invention provides an extractor assembly to be installed inside an air duct.

[0007] The extractor assembly comprises an impeller having a base and blades, the blades projecting from the base, in addition to being able to additionally have a panel to prevent contact of the air with the case along the blades.

[0008] The extractor assembly additionally comprises an actuating element for imparting rotational momentum to the impeller such that it generates an air flow by means of the blades; a support having a first face and a second face, the first face being for fixed arrangement of the actuating element; and, a case comprising a first portion and a second portion for surrounding the impeller, actuating element and support.

[0009] The support comprises an internal wall that determines, with the first face, a housing for accommodating the actuating element; and an external wall that is disposed radially and externally with respect to the internal wall, such that these walls define a passage for the

movement of air.

[0010] Thus, when the extractor assembly is mounted in a use position, the external wall makes radial and internal contact against the first portion and the second portion, as well as against a joining area of the first portion and the second portion with each other, such that an air outlet along the external wall remains blocked. In this manner, a noise outlet through said joining area is also blocked.

[0011] Preferably, the external wall is disposed in contact against the entire joining area. Said joining area, moreover, is preferably formed by an overlap between the first portion and the second portion.

[0012] Preferably, the support comprises fins in the passage to direct the air flow. Accordingly, the fins are preferably curved in order to eliminate a tangential component of the air flow generated by the blades such that the air flow can be directed according to a rectilinear path.

[0013] The actuating element being disposed fixed in the support and the impeller being joined to the actuating element, a separating gap is disposed between the base and the internal wall for an air inlet into the actuating element.

[0014] The extractor assembly can comprise a cover disposed along the second face of the support such that it determines a continuation of the passage. Accordingly, the cover preferably has a concave side for covering components of the extractor assembly and a convex side for guiding the air.

[0015] The extractor assembly may comprise a conduit disposed communicating an external portion of the case with the housing. Accordingly, the conduit preferably has a first section externally projecting with respect to the external wall and each of the portions of the case has a slot to jointly define a gap for receiving the first section.

[0016] The extractor assembly may comprise a blocking element disposed to prevent air from moving between the case and the panel of the impeller, such that the air entering the case is guided between the panel and the base.

[0017] Preferably, the case comprises a metal material. Additionally or alternatively, the support preferably comprises a plastic material. Additionally or alternatively to any of the above, the impeller preferably comprises a plastic material.

Description of the figures

[0018]

Figure 1 shows an extractor assembly belonging to the state of the art, upper portion, and an extractor assembly object of the invention, lower portion.

Figure 2 shows an exploded schematic view of an extractor assembly to be installed inside an air duct, object of the invention.

Figures 3 and 4 show schematic perspective views of the extractor assembly, object of the invention.

Figures 5 and 7 show schematic side views of the extractor assembly, object of the invention; whereas Figures 6 and 8 show rear and front views, respectively.

Figure 9 shows a schematic view, according to a longitudinal cross section, of the extractor assembly in a use position.

Figures 10A and 10B show schematic views of an impeller comprised in the extractor assembly, object of the invention.

Figures 11 and 12 show schematic perspective views of a support comprised in the extractor assembly, object of the invention.

Figures 13 and 15 show rear and front schematic views of the support, respectively; whereas Figures 14 and 16 show a schematic side view and a schematic side cross-sectional view of said support, respectively.

Detailed description of the invention

[0019] The present invention relates to an extractor assembly to be installed inside an air duct, which comprises an impeller (1), an actuating element (2), a support (3) and a case (4), which comprises a first portion (4.1) and a second portion (4.2) for surrounding the impeller (1), actuating element (2) and support (3) as a general covering.

[0020] The impeller (1) has a base (1.1) and blades (1.2), the blades (1.2) projecting from the base (1.1). The base (1.1) has a contact face (1.1') configured to receive contact from a portion of air which enters the impeller (1), and therefore the extractor assembly. The impeller (1) is visible in Figures 2, 10A and 10B.

[0021] This configuration of the base (1) provides a direction to the internal periphery of the air extractor assembly, in other words, towards a portion radially and externally farther away with respect to an imaginary central longitudinal axis (X) of the extractor assembly, minimising the impact or an impediment to the advance of the air along the case (4) through an internal portion thereof. Accordingly, said contact face (1.1') has a convex shape.

[0022] The actuating element (2), moreover, is an electric motor disposed for imparting rotational momentum to the impeller (1) such that it generates an air flow by means of the blades (1.2). The actuating element (2) is visible in Figures 2 and 9.

[0023] Accordingly, the impeller (1), and more specifically through the base (1.1), is disposed mechanically joined to the actuating element (2) to receive the rotation driven by the latter (2). Said air flow generated by the rotary movement of the blades (1.2) is moved along the extractor assembly.

[0024] The support (3) has a first face (3.1) and a second face (3.2), the first face (3.1) being opposite from the second face (3.2). The first face (3.1) is for fixed arrangement of the actuating element (2). The support (3) is vis-

ible in Figures 11 to 16.

[0025] The actuating element (2) is disposed fixed on said first face (3.1) of the support (3) by means of threaded joints. Likewise, preferably, between the actuating element (2) and the aforementioned first face (3.1) a shock absorber or vibration-damping element (5) is disposed. Accordingly, the fixed joint of the actuating element (2) on the first face (3.1) is through being fastened to the damper (5), which in turn is disposed fastened to said first face (3.1) for the use of the extractor assembly.

[0026] The support (3), moreover, additionally has an internal wall (3.3) perpendicular, or substantially perpendicular, to the first face (3.1) for fastening the actuating element (2). Preferably, the internal wall (3.3) extends parallel to the imaginary central longitudinal axis (X) of the extractor assembly. Likewise, preferably, said internal wall (3.3) describes a geometric shape, preferably cylindrical, such that it determines a housing (6).

[0027] The first face (3.1) of the support (3) is limited on the perimeter by the aforementioned internal wall (3.3). In this manner, the housing (6) is defined radially and externally or on the perimeter by the internal wall (3.3) and axially or longitudinally by the first face (3.1).

[0028] Said housing (6) has an opening at a longitudinal end opposite from the location of the first face (3.1) through which the actuating element (2) projects in the joint thereof with the impeller (1), in other words, the internal wall (3.3) and the first face (3.1) determine the housing (6), the latter (6) being open.

[0029] The support (3), moreover, additionally has an external wall (3.4) which is disposed radially and externally with respect to the internal wall (3.3). Likewise, preferably, the external wall (3.4) describes a geometric shape, preferably cylindrical. Thus, preferably, said external wall (3.4) is parallel, or substantially parallel, to the internal wall (3.3). Accordingly, the internal wall (3.3) and the external wall (3.4) are radially spaced from each other such that they define a passage (7) for the movement of air.

[0030] The internal wall (3.3) and the external wall (3.4) are joined together by fins (3.5) comprised in the support (3). These fins (3.5), in addition to acting as a joining element between both of said walls (3.3, 3.4), act as directing elements for air or for the air flow generated by the impeller (1), at the same time that they determine a passage gap between them according to the passage (7).

[0031] Preferably, the fins (3.5) are curved. Said air flow generated by the impeller (1), due to the rotation of the impeller (1), leaves it with a helical flow, in other words, describing a spiral-shaped path. In other words, the air flow has a velocity with a tangential component as it leaves the impeller (1). Accordingly, the fins (3.5) are disposed to eliminate said tangential component such that the air is directed in a linear or rectilinear manner, the velocity and pressure of the air being increased.

[0032] Preferably, the external wall (3.4) is smooth, continuous and uniform, in other words, lacking through holes in the radial direction. Likewise, also preferably,

the internal wall (3.3) is equally smooth, continuous and uniform, in other words, lacking through holes in the radial direction.

[0033] When the actuating element (2) is correspondingly fastened on the support (3) along the housing (6) and the impeller (1) is mechanically joined to the actuating element (2) to receive the rotational momentum imparted by the latter (2) such that it generates the air flow, the configuration and arrangement of the impeller (1) and of the external wall (3.4) are such that the air flow leaves the impeller (1) driven such that it is partly directed substantially parallel to the external wall (3.4) and partly against said external wall (3.4).

[0034] By means of this configuration and arrangement, which can be derived in light of Figure 9, at least most of the air flow generated is prevented from coming into contact with the case (4) both at the outlet of the impeller (1) and in the advance or movement thereof longitudinal and parallel to the imaginary central longitudinal axis (X) along the extractor assembly.

[0035] Preferably, by means of this configuration and arrangement, the proportion of the air flow generated which comes into contact with the case (4) at the outlet of the impeller (1) is zero, or at least negligible from the point of view of the decibels that it generates. Likewise, the proportion of the air flow which can be generated that can come into contact with the case (4) in the advance or movement thereof longitudinal and parallel to the imaginary central longitudinal axis (X) along the extractor assembly is also zero, or at least negligible from the point of view of the noise generated.

[0036] The base (1.1) of the impeller (1) has a flange or contour (1.1") which, when the actuating element (2) is correspondingly fastened on the support (3) along the housing (6) and the impeller (1) is mechanically joined to the actuating element (2) to receive the rotational momentum imparted by the latter (2) such that it generates the air flow, remains aligned, or substantially aligned, with the internal wall (3.3) of the support (3). Additionally, said flange or contour (1.1") includes a longitudinal extension aligned with said internal wall (3.3).

[0037] Accordingly, between the aforementioned contour (1.1") and a longitudinal end of the internal wall (3.3), a separating gap (S) is disposed defined for a controlled air inlet into the housing (6). The separating gap (S) is therefore configured to provide cooling of the actuating element (2) through a controlled and reduced portion of the air flow generated by the impeller (1).

[0038] The second face (3.2) of the support (3) is configured to arrange additional components (8), which intervene in the operation of the extractor assembly. In Figures 2 and 9, one of these components (8) is indicated, which is a capacitor.

[0039] The present extractor assembly comprises a cover (9) to be disposed, in a use position, along the second face (3.2) of the support (3) such that it determines a continuation of the passage (7). Preferably, said cover (9) is disposed joined to the support (3) by means

of threaded joints, although alternatively it can be by means of clipping or snap joining points.

[0040] Moreover, the cover (9) is defined such that it has a concave side for covering the components (8) of the extractor assembly disposed along the second face (3.2) and a convex side for guiding the air. Accordingly, said covering (9) has a perimeter edge (9.1) dimensioned such that it is equal to or smaller, in terms of a radial measurement, than the geometric shape of the internal wall (3.3). See Figure 9.

[0041] Preferably, the cover (9) is joined to the support (3) such that the perimeter edge (9.1) is disposed such that it determines a continuation of the internal wall (3.3), according to the direction longitudinal and parallel to the imaginary central longitudinal axis (X) of the extractor assembly. Thus, the generation of turbulence is prevented in the air flow generated by the impeller (1) in the movement thereof along the end of the internal wall (3.3) according to the movement or advance direction of said air flow. This arrangement or configuration is clearly visible in Figure 9.

[0042] Moreover, the cover (9) is defined such that it has a convex side to guide the air. In other words, it smooths the directing of the air flow after the advance thereof through the passage (7) towards a more radial and internal area in order to exit the extractor assembly.

[0043] Accordingly, said cover (9) has a curved edge (9.2) on said convex side dimensioned such that it determines a reduction in the radial measurement, or with respect to said imaginary central longitudinal axis (X), of the cover (9) in a progressive manner, in other words, devoid of abruptness. In this manner, the cover (9) prevents the formation of turbulence or pressure changes which hinder or reduce the fluidity of the air when leaving the extractor assembly, or at least in the directing thereof towards a more radial and internal area after the advance thereof through the passage (7) in order to exit the extractor assembly.

[0044] As previously mentioned, the case (4) comprises the first portion (4.1) and the second portion (4.2). Preferably, said portions (4.1, 4.2) are available joined together, each determining a longitudinal end of the extractor assembly, as can be clearly seen, for example, in Figure 2, although alternatively they can be available joined together, each one determining a longitudinal half of said assembly.

[0045] The first portion (4.1) and the second portion (4.2) are joined together according to a joining area (J) located along the external wall (3.4). More specifically, the external wall (3.4) is disposed in contact with the first portion (4.1) and with the second portion (4.2), both in proximity to the joining area (J) between both of them and along the joining area (J) itself, which is formed by an overlap between said portions (4.1, 4.2).

[0046] According to the aforementioned preferred option according to which each of the portions (4.1, 4.2) determines one of the longitudinal ends of the extractor assembly, the joining area (J) is completely located along

and in contact with the external wall (3.4), in other words, in its entirety, which can be derived from Figures 2 and 9. In this manner, it contributes to an airtight joint or a seal between the aforementioned portions (4.1, 4.2) of the case (4) such that a leak or outlet of air through said joining area (J) is prevented.

[0047] The first portion (4.1) and the second portion (4.2) have a first step (4.1', 4.2') in a longitudinal portion parallel, or substantially parallel, to the imaginary central longitudinal axis (X) for a longitudinally adjusted arrangement of the external wall (3.4). Additionally, said first steps (4.1', 4.2') are defined such that an internal face, opposite from the one in contact with the case (4), of the external wall (3.4) is aligned or gives continuity to an internal surface of the case (4), in other words, of the portions (4.1, 4.2). See Figure 9.

[0048] Thus, the generation of turbulence is prevented in the air flow generated by the impeller (1) in the movement thereof along both the beginning of the external wall (3.4) and the end of said wall (3.4) according to the movement or advance direction of said air flow.

[0049] Additionally, one of the portions (4.1, 4.2) has a second step (10) to overlap with the corresponding longitudinal end of the other portion (4.2, 4.1) in order to improve the tightness, in other words, to prevent the outlet of air and noise. In this case, the one joining area (J) is determined or defined according to this overlap, as has also been previously described.

[0050] The case (4) has an inlet mouth (11) and an outlet mouth (12). Preferably, the inlet mouth (11) is entirely located in the first portion (4.1) and the outlet mouth (12) is entirely located in the second portion (4.2). Likewise, the inlet mouth (11) determines the inlet of the air sucked into the extractor assembly by the impeller (1) and the outlet mouth (12) determines the outlet of the air flow driven or generated by the impeller (1) of the extractor assembly.

[0051] These mouths (11, 12) are configured to be connected to an air duct, not object of the present invention. Likewise, the portions (4.1, 4.2) of the case (4) have smaller dimensions in said mouths (11, 12), in other words, a smaller internal diameter.

[0052] In this manner, therefore, the case (4) has diameter change sections (4'). Accordingly, the case (4) has one of the diameter change sections (4') immediately after the inlet mouth (10) and another of the diameter change sections (4') immediately before the outlet mouth (11), according to the advance or movement direction of the air flow which can be generated by the impeller (1).

[0053] Optionally, the external wall (3.4) of the support (3) extends such that it radially and internally covers the case (4) also along the diameter change section (4') located immediately before the outlet mouth (12).

[0054] Along each of the mouths (11, 12), radially and externally to them (11, 12), the extractor assembly comprises a gasket (13) to provide a tightness such that an air leak with respect to the air duct and the extractor assembly itself is prevented.

[0055] When the extractor assembly is mounted, or at least the portions (4.1, 4.2) of the case (4) are joined together according to the joining area (J) along the external wall (3.4) of the support (3), the mouths (11, 12) are disposed in a concentric manner with respect to the imaginary central longitudinal axis (X) and according to a smaller diameter with respect to said external wall (3.4), in addition to preferably with respect to the internal wall (3.3). In this manner, both the air inlet into the extractor assembly and the air outlet from it are favoured.

[0056] Preferably, and as can be clearly observed in Figures 10A and 10B, the impeller (1) additionally has a panel (1.3). This panel (1.3) has an extension in the longitudinal direction such that, at each point along it, it corresponds to a different diametral measurement. In other words, the panel (1.3) has open longitudinal ends, each of these with a different diameter from the other according to a preferably progressive variation.

[0057] The open longitudinal end disposed facing the inlet mouth (11) has a smaller diameter than the open longitudinal end disposed facing the actuating element (2). According to a progressive, and preferably linear, change in the diameter of said panel (1.3), the latter (1.3) is configured to be disposed parallel, or substantially parallel, to the case (4) along the corresponding diameter change section (4').

[0058] When the extractor assembly is mounted, for example according to the state visible in Figure 9, said panel (1.3) prevents or blocks the air from coming into contact with the case (4), and more specifically with the diameter change section (4') located immediately after the inlet mouth (11).

[0059] This panel (1.3) is highly efficient in reducing the noise generated by the extractor assembly in operation due to the fact that it prevents air from coming into contact with the case (4) in a critical area, since it is the actuation area of the impeller (1), which is the area wherein, on the one hand, the suction of air and, on the other, the air flow to be moved or driven along the extractor assembly are generated.

[0060] In order to optimise the inlet of air into the impeller (1) through the open longitudinal end disposed facing the inlet mouth (11), the diameter of said open longitudinal end is equal to or larger, preferably larger, than the diameter of the inlet mouth (11).

[0061] With the object of further optimising the air inlet into the impeller (1) through the open longitudinal end disposed facing the inlet mouth (11), the extractor assembly preferably comprises a blocking element (14). The blocking element (14), visible in Figure 9, is disposed blocking an air passageway between the case (4) and the panel (1.3) of the impeller (1) at the inlet of said air into the extractor assembly, and more specifically into the impeller (1).

[0062] Accordingly, said blocking element (14) is disposed joined to the case (4), by an internal portion thereof, as visible in said Figure 9. Thus, the blocking element (14) forces the air which enters the extractor assembly

through the inlet mouth (11) to enter the impeller (1). Said blocking element (14) is disposed immobile, which favours the non-generation of noise.

[0063] Additionally, and preferably, the locking element (14) is fixed in the case (4), in addition to being partially inserted into the impeller (1) through the open longitudinal end disposed facing the inlet mouth (11). See again the aforementioned Figure 9.

[0064] The open longitudinal end of the panel (1.3) with a larger diameter, the one disposed facing the actuating element (2), has a diameter larger than a diameter of the flange (1.1") of the base (1.1), as well as larger than a diameter of the longitudinal extension aligned with the internal wall (3.3). These diameters are considered based on radii with respect to the imaginary central longitudinal axis (X) of the extractor assembly.

[0065] In this manner, a smoother, fluid path is provided for the air driven by the blades (1.2) at the outlet thereof by providing between the base (1.1) and the panel (1.3) of the impeller (1) a separation according to the described difference in diameters. Thus, therefore, the path is more parallel to the imaginary central longitudinal axis (X) of the extractor assembly, with fewer direction changes, the existing direction changes also being less abrupt. See arrows included in the extractor assemblies in Figure 1.

[0066] This configuration, in addition to providing less noise, provides smaller diametral dimensions of the extractor assembly for certain features of the impeller (1), such as flow and pressure. This makes it possible to install the extractor assembly in spaces smaller than in other cases according to said features of the impeller (1). See, for example, Figure 1, which shows a longitudinal cross-sectional view of the present assembly (lower portion) and a view of a conventional extractor assembly (upper portion), according to the same flow and pressure performance.

[0067] The present extractor assembly comprises a conduit (15) disposed communicating an external portion of the case (4), and therefore of the extractor assembly, with the housing (6). In this manner, the conduit (15) acts as a passage element for a wiring in order to electrically connect an electrical box (16), comprised in the extractor assembly and disposed in the external portion of the case (4) for the accessibility thereof, with the actuating element (2). This conduit (15) is visible in Figure 16.

[0068] Said conduit (15) has a first section (15.1) externally projecting with respect to the external wall (3.4). Additionally, the conduit (15) has a second section (15.2) which extends crossing through the passage (7) such that it reaches the housing (6).

[0069] Accordingly, each of said portions (4.1, 4.2) of the case (4) has a slot (17) open at one end to receive said first section (15.1) of the conduit (15) such that together both aforementioned portions (4.1, 4.2), and more specifically both aforementioned slots (17), cover or surround the first section (15.1). In this manner, said first section (15.1) acts as an unequivocal positioning element of the portions (4.1, 4.2) of the case (4) relative to each

other.

[0070] According to a preferred embodiment of the invention, the present extractor assembly is for installation in aggressive environments, which by regulation require the case (4) to be made of metal. These environments, by regulation, require the extractor assembly to be resistant to impacts, fire, etc. Accordingly, the elements, the configuration and the arrangement thereof take on special relevance in order to provide an efficient and notable reduction of the noise generated by the use of the extractor assembly.

[0071] According to this described preferred embodiment, the support (3) is preferably made of a plastic material in order to reduce the total weight of the extractor assembly.

[0072] Continuing with the described preferred embodiment, the impeller (1) is preferably made of a plastic material in order to, among other reasons, reduce the total weight of the extractor assembly, reduce the noise generated in the generation of the air flow to be driven towards the outlet mouth (12) and increase the performance of the extractor assembly due, on the one hand, to the reduced weight from being made of a plastic material instead of a metal material and, on the other hand, to a specific geometry proportional to the blades (1.2) since it is made of plastic and not metal, obviously within limited manufacturing times and costs.

Claims

1. An extractor assembly to be installed inside an air duct, the extractor assembly comprising:

- an impeller (1) having a base (1.1) and blades (1.2), the blades (1.2) projecting from the base (1.1);
 - an actuating element (2) for imparting rotational momentum to the impeller (1) such that it generates an air flow by means of the blades (1.2);
 - a support (3) having a first face (3.1) and a second face (3.2), the first face (3.1) being for fixed arrangement of the actuating element (2);
 - a case (4) comprising a first portion (4.1) and a second portion (4.2) for surrounding the impeller (1), actuating element (2) and support (3);
- characterised in that** the support (3) comprises:
- an internal wall (3.3) that determines, with the first face (3.1), a housing (6) for accommodating the actuating element (2); and
 - an external wall (3.4), which is disposed radially and externally with respect to the internal wall (3.3), such that these walls (3.3, 3.4) define a passage (7) for the movement of air;
- wherein, when the extractor assembly is mounted in a use position, the external wall (3.4) makes radial and internal contact against the

- first portion (4.1) and the second portion (4.2), as well as against a joining area (J) of the first portion (4.1) and the second portion (4.2) with each other, such that an air outlet along the external wall (3.4) remains blocked. 5
2. The extractor assembly according to claim 1, **characterised in that** the external wall (3.4) is disposed in contact against the entire joining area (J). 10
 3. The extractor assembly according to claim 1 or 2, **characterised in that** the joining area (J) is formed by an overlap between the first portion (4.1) and the second portion (4.2). 15
 4. The extractor assembly according to any one of claims 1 to 3, **characterised in that** the support (3) comprises fins (3.5) in the passage (7) to direct the air flow. 20
 5. The extractor assembly according to claim 4, **characterised in that** the fins (3.5) are curved in order to eliminate a tangential component of the air flow generated by the blades (1.2) such that the air flow can be directed according to a rectilinear path. 25
 6. The extractor assembly according to any one of claims 1 to 4, **characterised in that**, when the actuating element (2) is disposed fixed in the support (3) and the impeller (1) is joined to the actuating element (2), a separating gap (S) is disposed between the base (1.1) and the internal wall (3.3) for an air inlet into the actuating element (2). 30
 7. The extractor assembly according to any one of claims 1 to 5, **characterised in that** it additionally comprises a cover (9) disposed along the second face (3.2) of the support (3) such that it determines a continuation of the passage (7). 35
 8. The extractor assembly according to claim 7, **characterised in that** the cover (9) has a concave side for covering components (8) of the extractor assembly and a convex side for guiding the air. 40
 9. The extractor assembly according to any one of claims 1 to 8, **characterised in that** it additionally comprises a conduit (15) disposed communicating an external portion of the case (4) with the housing (6). 45
 10. The extractor assembly according to claim 9, **characterised in that** the conduit (15) has a first section (15.1) externally projecting with respect to the external wall (3.4) and each of the portions (4.1, 4.2) of the case (4) has a slot (17) to jointly define a gap for receiving the first section (15.1). 50
 11. The extractor assembly according to any one of claims 1 to 10, **characterised in that** the impeller (1) additionally has a panel (1.3) to prevent contact of the air with the case (4) along the blades (1.2). 55
 12. The extractor assembly according to claim 11, **characterised in that** it additionally comprises a blocking element (14) disposed to prevent air from moving between the case (4) and the panel (1.3), such that the air entering the case (4) is guided between the panel (1.3) and the base (1.1).
 13. The extractor assembly according to any one of claims 1 to 12, **characterised in that** the case (4) comprises a metal material.
 14. The extractor assembly according to any one of claims 1 to 13, **characterised in that** the support (3) comprises a plastic material.
 15. The extractor assembly according to any one of claims 1 to 14, **characterised in that** the impeller (1) comprises a plastic material.

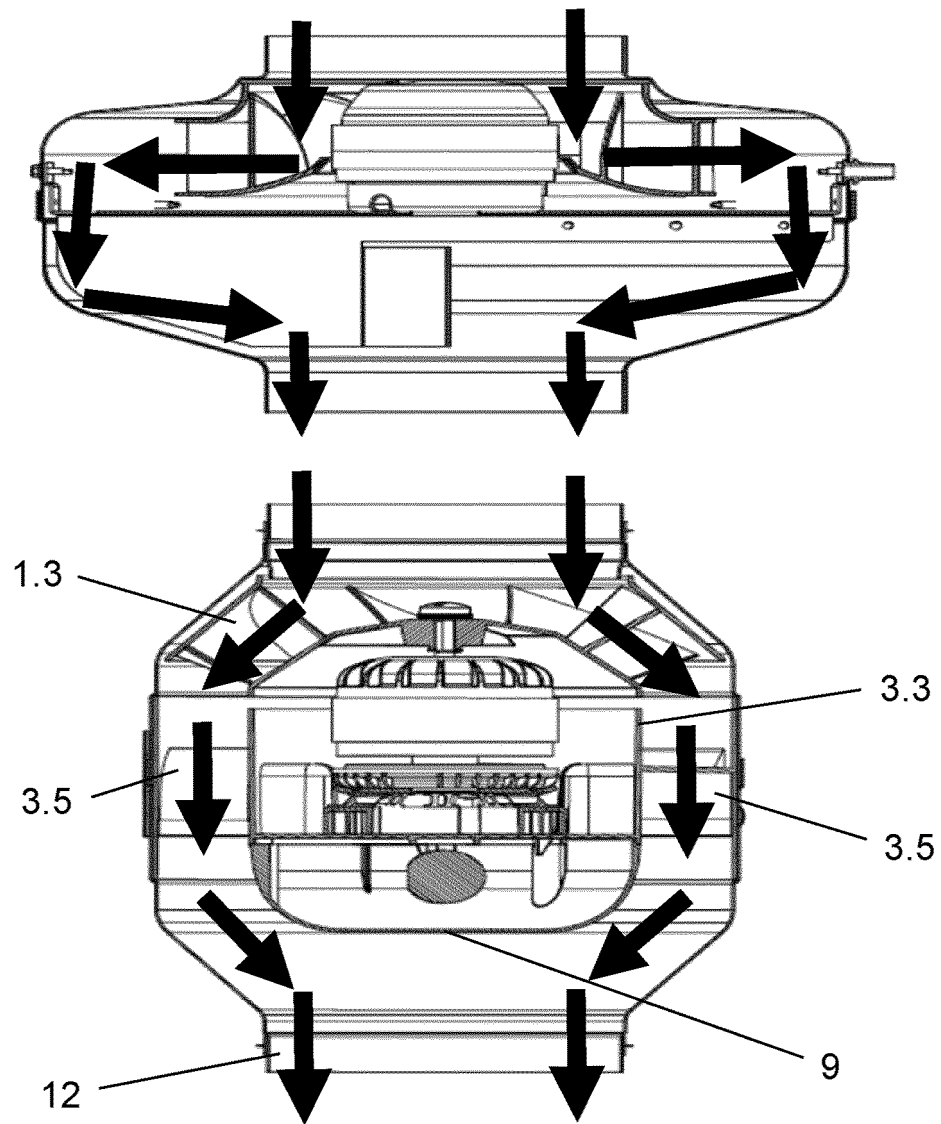
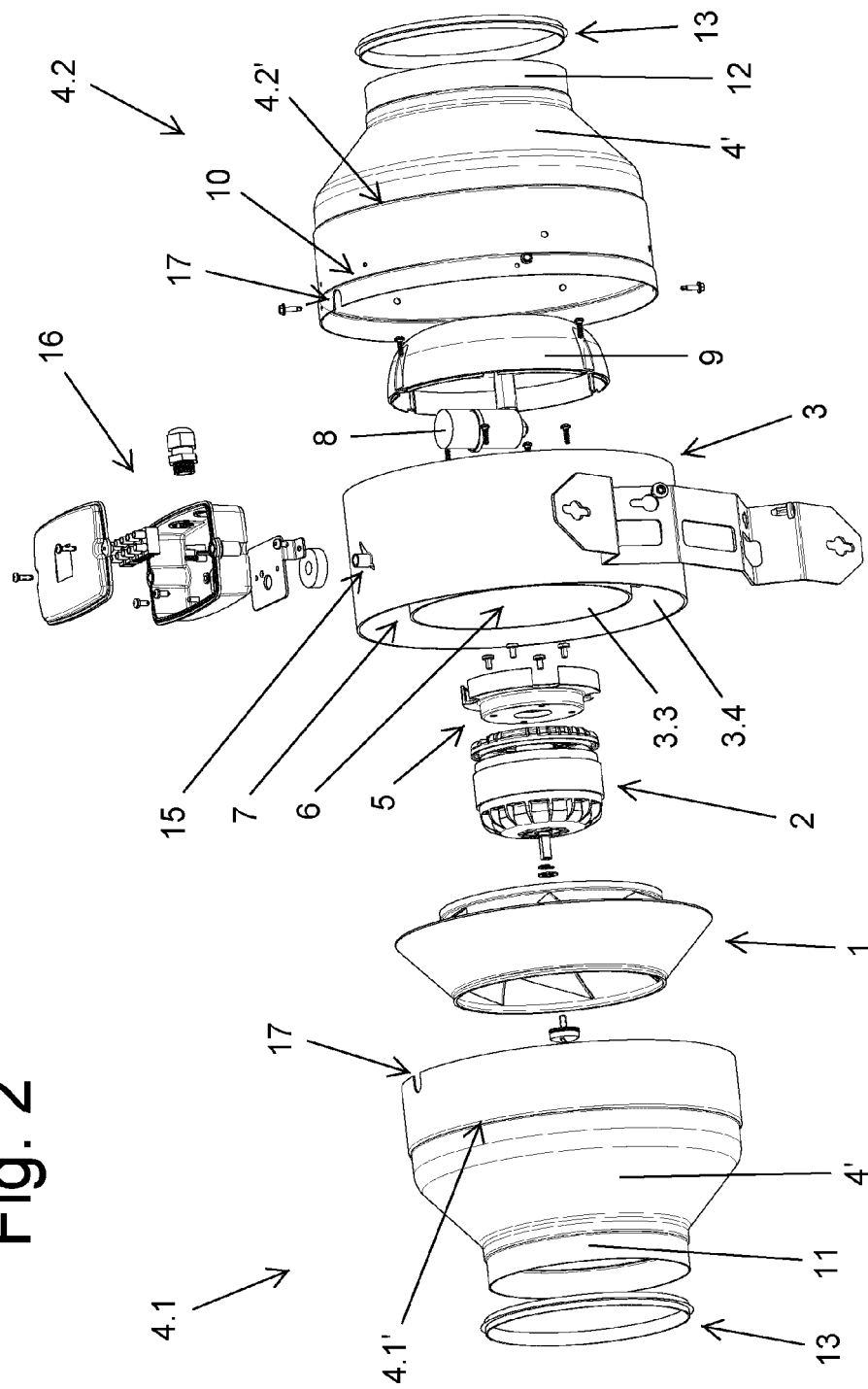


Fig. 1

Fig. 2



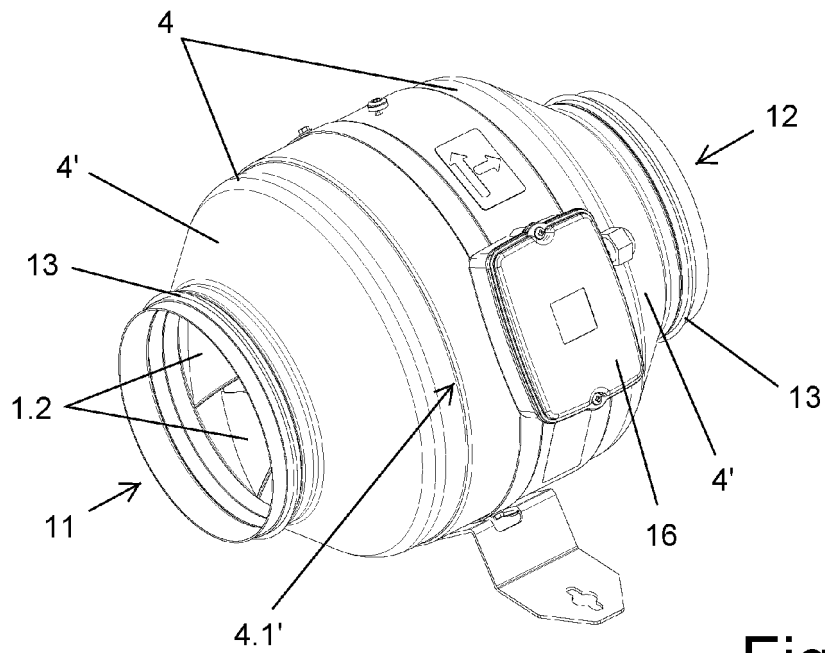


Fig. 3

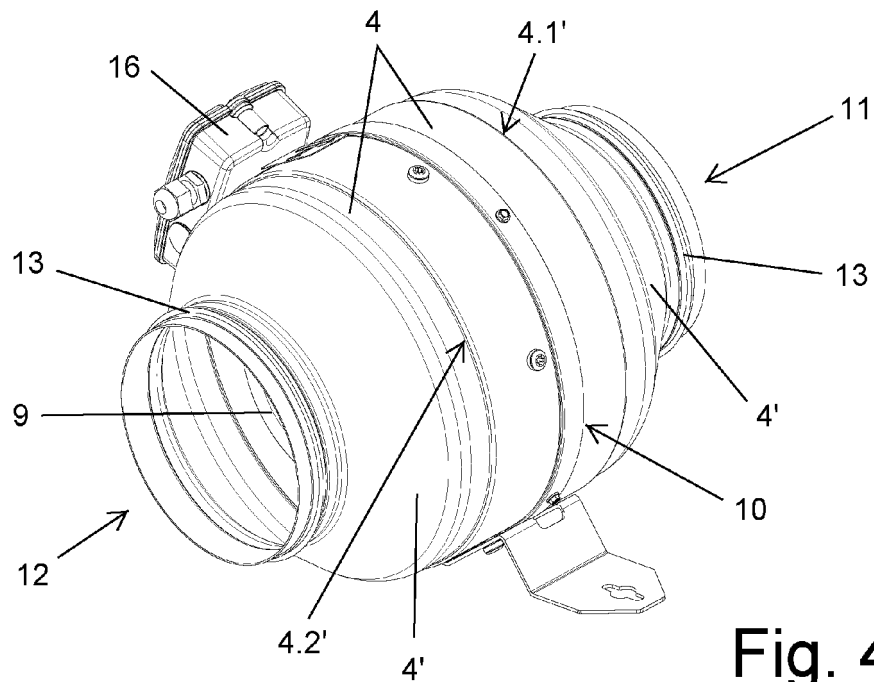


Fig. 4

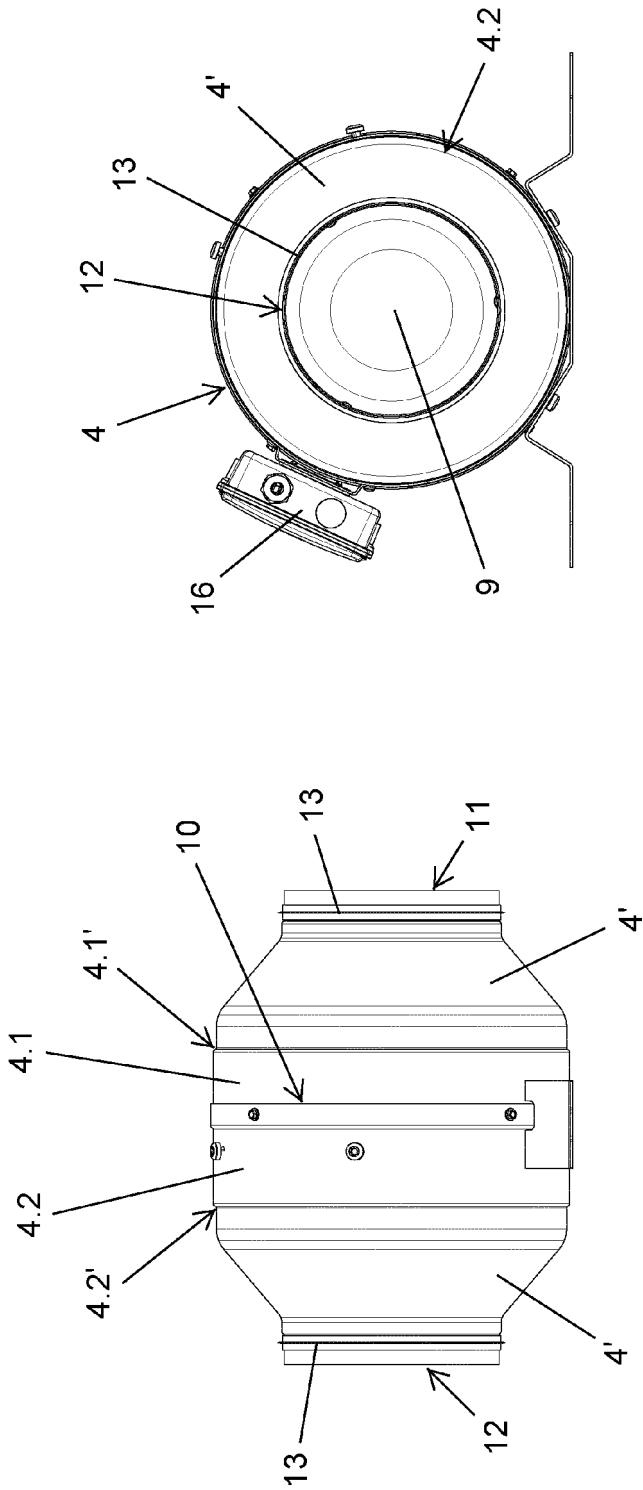


Fig. 6

Fig. 5

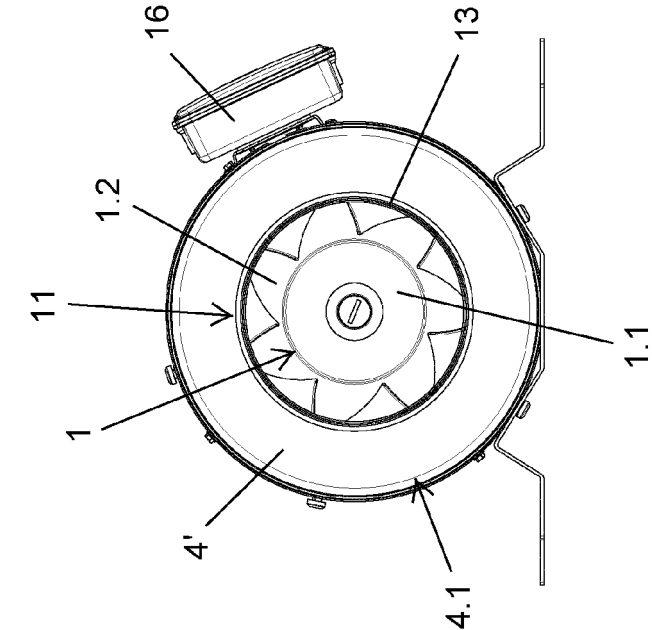


Fig. 8

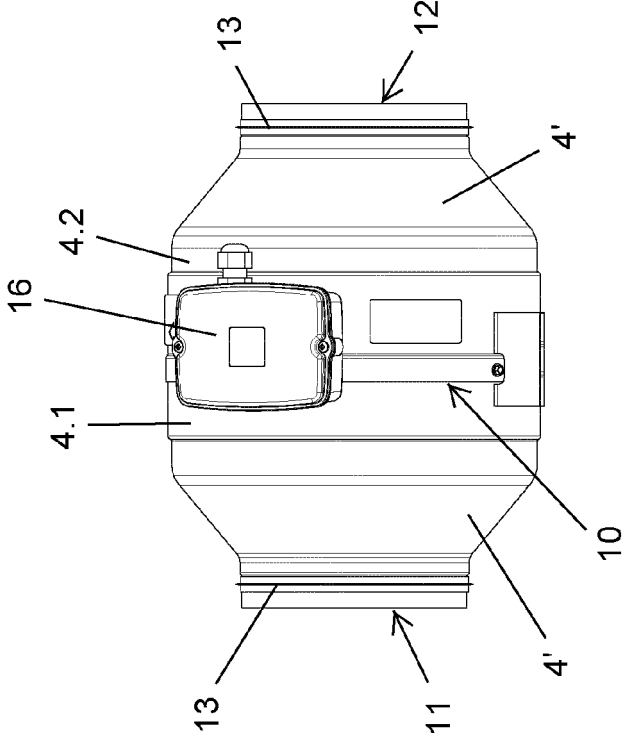


Fig. 7

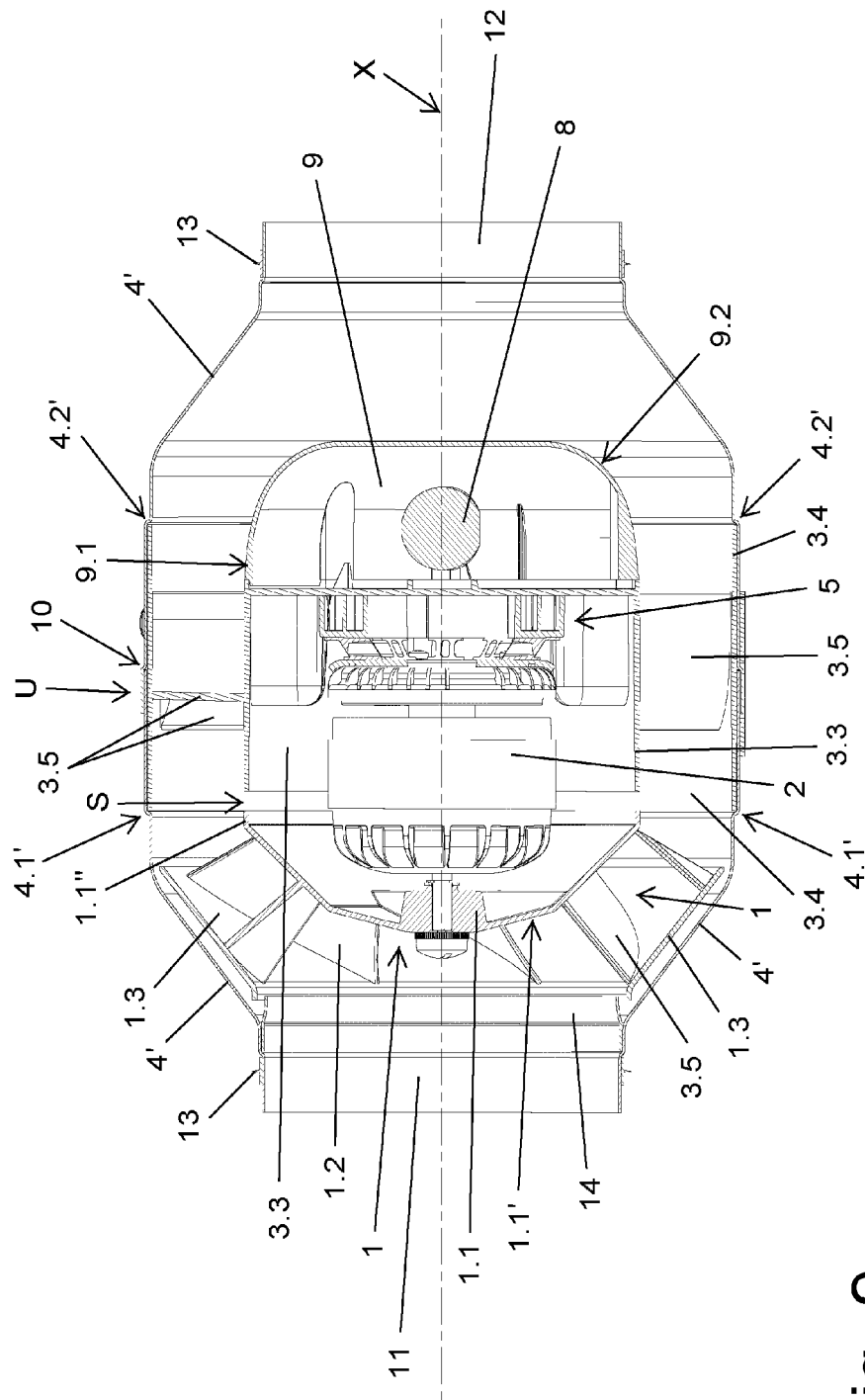


Fig. 9

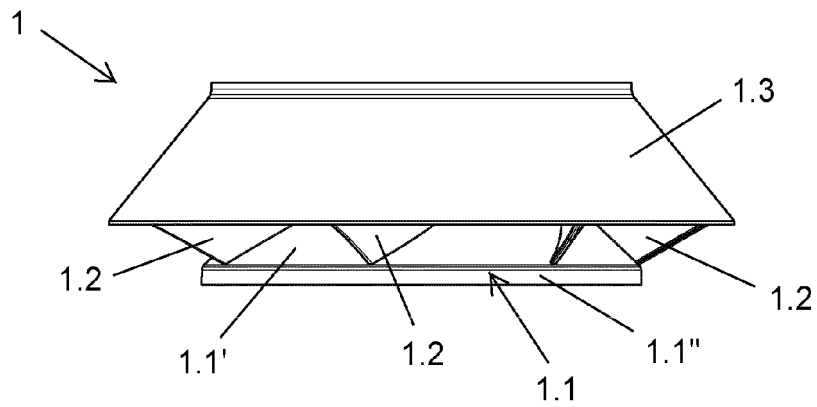


Fig. 10A

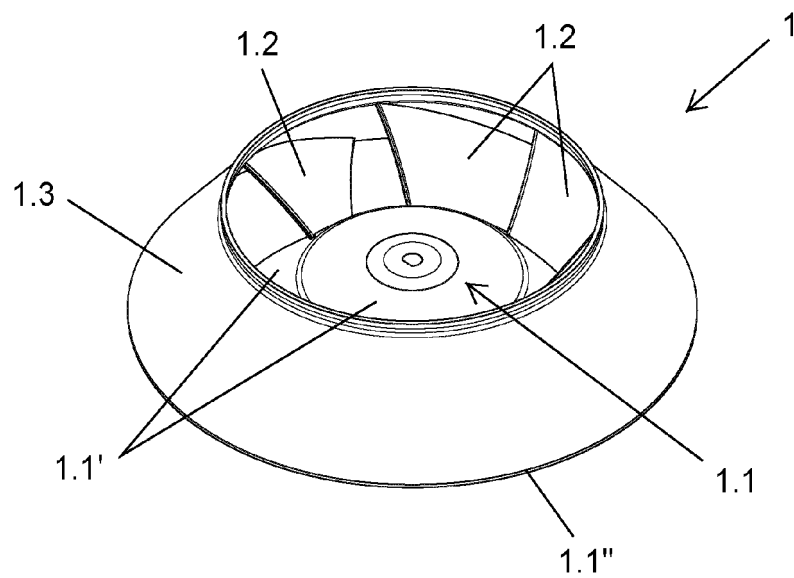
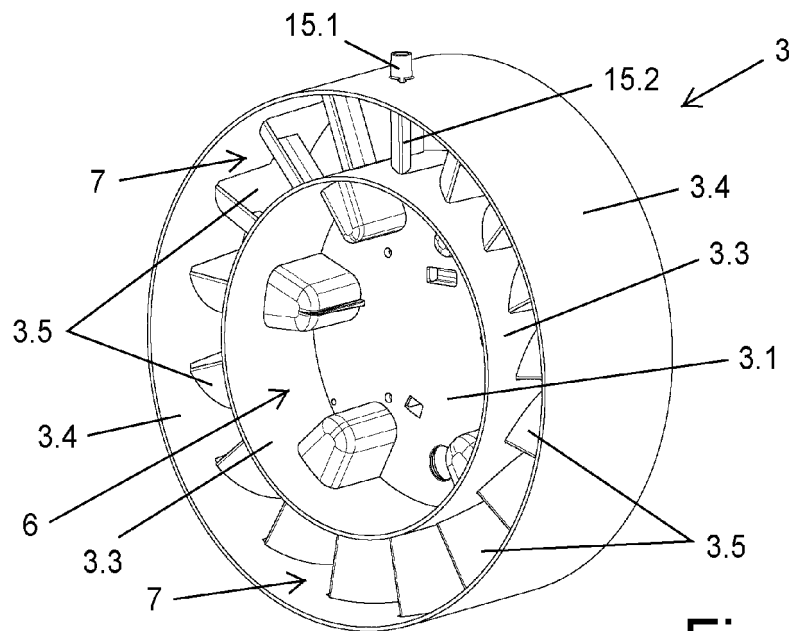
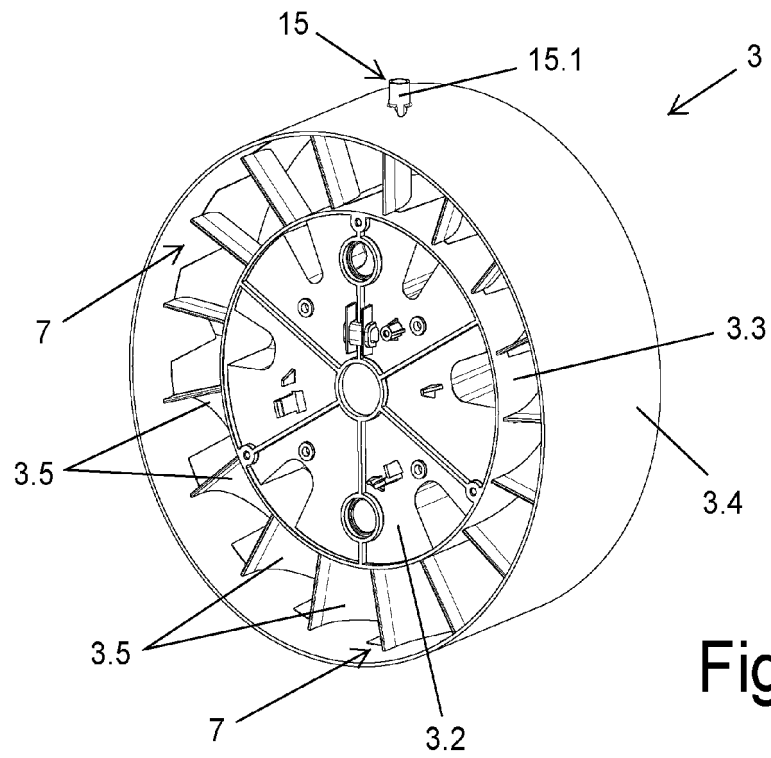


Fig. 10B



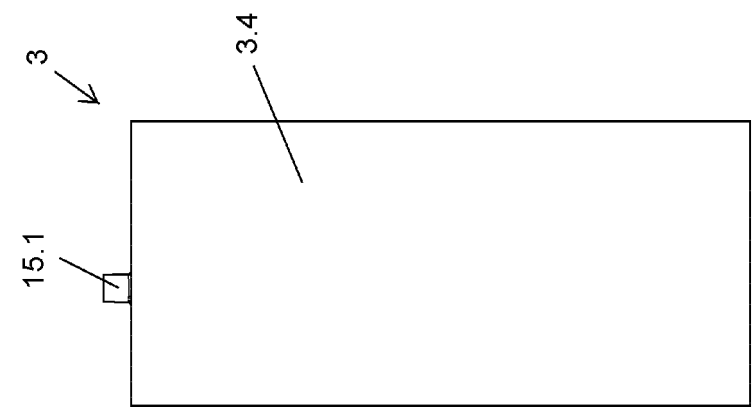


Fig. 14

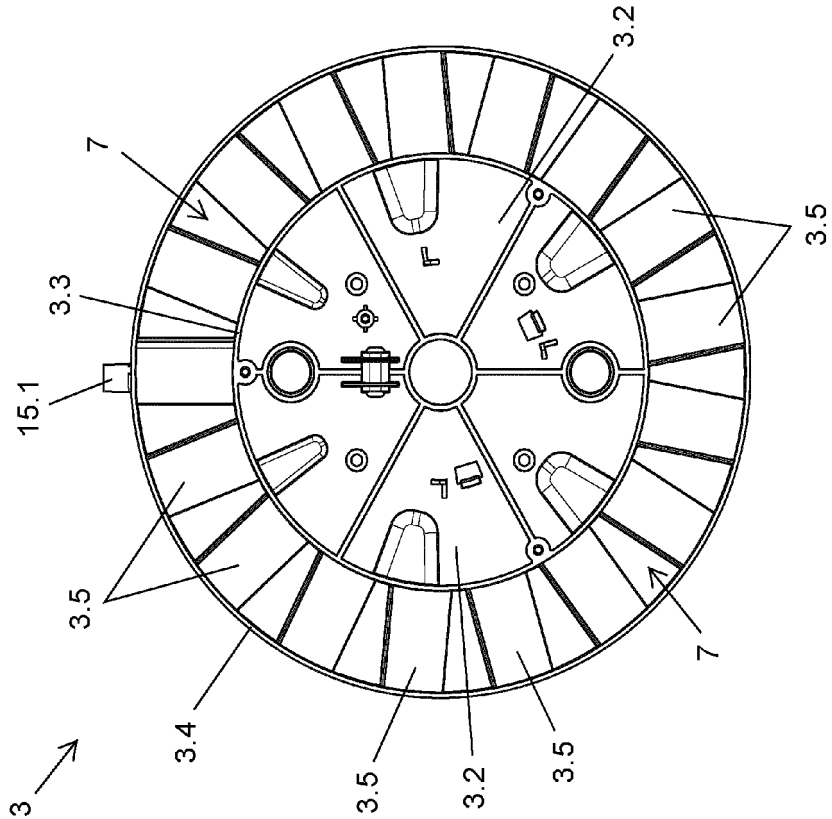


Fig. 13

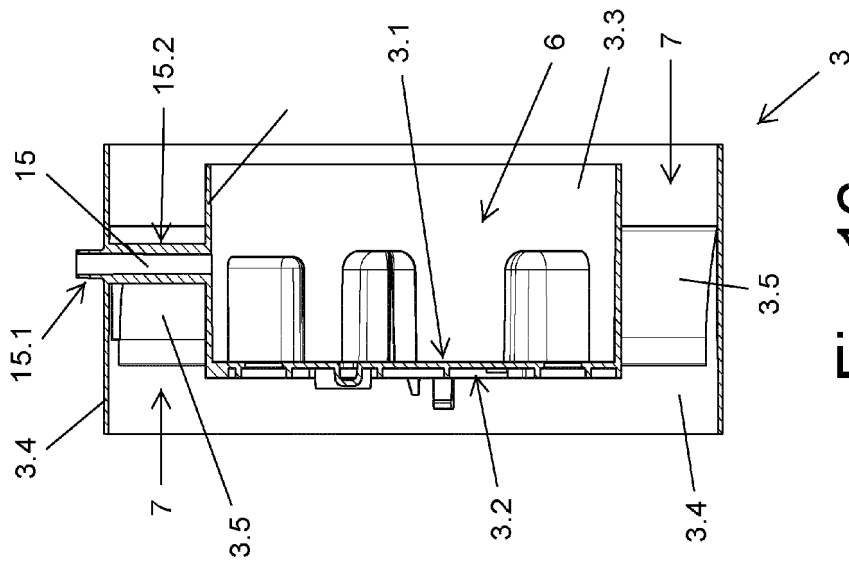


Fig. 16

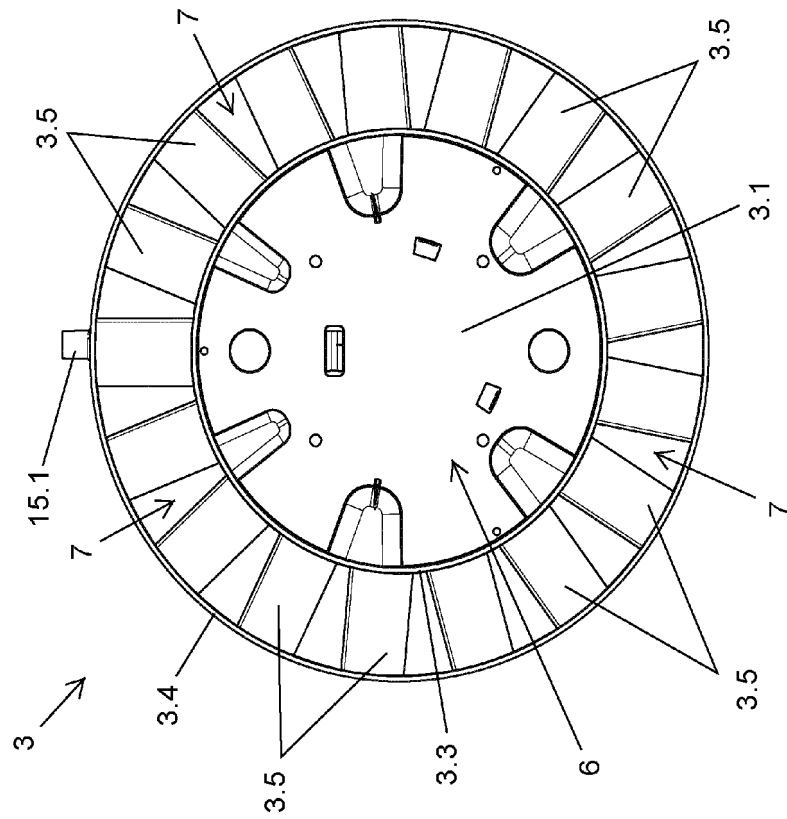


Fig. 15

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2019/070899

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F04D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2012051889 A1 (GAMISSANS BOU MARIUS) 01/03/2012, the whole document.	1-15
A	US 2014241894 A1 (BROWNELL KYLE ANDREW ET AL.) 28/08/2014, paragraphs [74 - 86]; figures 2 - 6, 16 - 17.	1, 11, 12
A	US 3312386 A (HULL RICHARD L ET AL.) 04/04/1967, the whole document.	1
A	WO 2012031295 A1 (TWIN CITY FAN COMPANIES LTD ET AL.) 08/03/2012, the whole document.	1

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"E" earlier document but published on or after the international filing date	
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"O" document referring to an oral disclosure use, exhibition, or other means.	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents, such combination being obvious to a person skilled in the art
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search

14/04/2020

Date of mailing of the international search report

(16/04/2020)

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2019/070899

Information on patent family members

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
US2012051889 A1	01.03.2012	ES2727022T T3 TR201907394T T4 PL2461043T T3 DK2461043T T3 EP3477119 A1 EP3477119 B1 UA103809 C2 RU2012103182 A RU2503857 C2 AU2010280643 A1 AU2010280643B B2 US8967949 B2 ES2356873 A1 ES2356873 B1 WO2011015680 A1 EP2461043 A1 EP2461043 A4	11.10.2019 21.06.2019 30.08.2019 20.05.2019 01.05.2019 04.03.2020 25.11.2013 10.08.2013 10.01.2014 02.02.2012 05.11.2015 03.03.2015 14.04.2011 15.03.2012 10.02.2011 06.06.2012 11.05.2016
US2014241894 A1	28.08.2014	CN105378289 A CN105378289B B MX2015011010 A MX361207 B CA2902299 A1 US10125783 B2 EP2959167 A1 EP2959167 B1 WO2014130060 A1	02.03.2016 30.10.2018 22.10.2015 30.11.2018 28.08.2014 13.11.2018 30.12.2015 28.08.2019 28.08.2014
US3312386 A	04.04.1967	GB1121138 A	24.07.1968
WO2012031295 A1	08.03.2012	CZ2013224 A3 CN103080558 A CN103080558B B SG187687 A1 CA2804314 A1 CA2804314 C US2013011239 A1 US8758101 B2 EP2612038 A1 EP2612038 A4	31.07.2013 01.05.2013 10.08.2016 28.03.2013 08.03.2012 25.09.2018 10.01.2013 24.06.2014 10.07.2013 04.07.2018

Form PCT/ISA/210 (patent family annex) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2019/070899

CLASSIFICATION OF SUBJECT MATTER

F04D17/06 (2006.01)

F04D29/66 (2006.01)

F04D29/52 (2006.01)

F04D29/32 (2006.01)