

(19)



(11)

EP 1 967 743 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
10.09.2008 Bulletin 2008/37

(51) Int Cl.:
F04D 29/42^(2006.01)

(21) Application number: **08151216.2**

(22) Date of filing: **08.02.2008**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
 HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT
 RO SE SI SK TR**
 Designated Extension States:
AL BA MK RS

(72) Inventors:
 • **Ranalli, Antonio
 66020, Scerni (CH) (IT)**
 • **Mazzieri, Paolo
 60027, Osimo (AN) (IT)**

(30) Priority: **06.03.2007 IT PD20070074**

(74) Representative: **Fabris, Stefano et al
 Cantaluppi & Partners S.r.l.
 Via Matteotti 26
 35137 Padova (IT)**

(71) Applicant: **LN 2 S.R.L. a socio unico
 62010 Montecassiano (MC) (IT)**

(54) **A system for connecting motors to and supporting them on scroll type manifolds of electric fans, in particular for use in extractor hoods**

(57) There is described a system for connecting motors (3) to, and supporting them on, scroll type manifolds (1) of electric fans, wherein there are provided between

the motor (3) and the manifold (1) removable connection means which comprise bayonet type connection means (11,12,14,16).

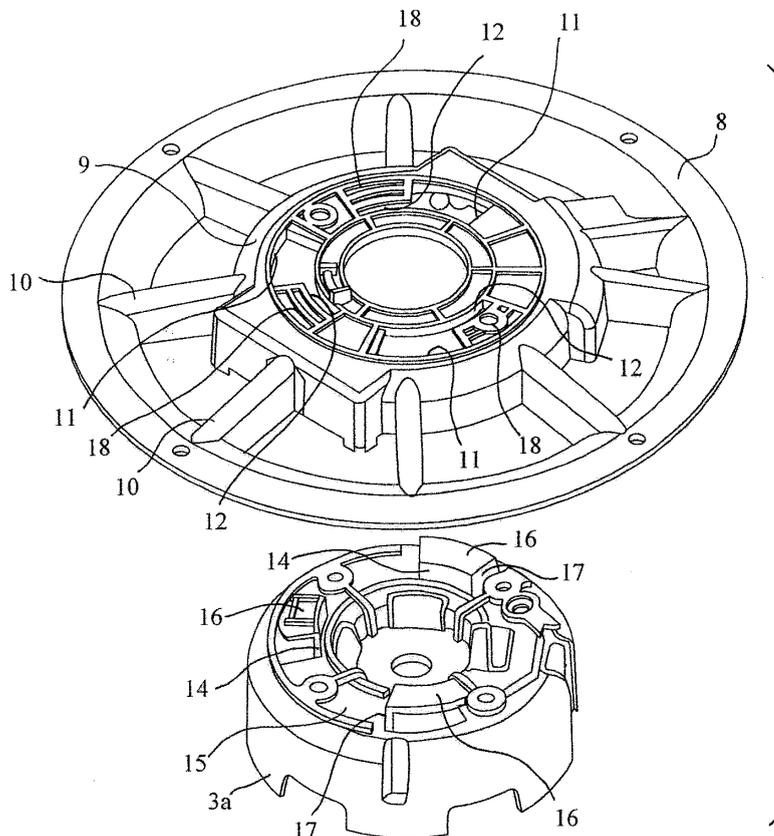


Fig. 2

EP 1 967 743 A2

Description

[0001] The present invention relates to a system for connecting motors to and supporting them on scroll type manifolds of electric fans having the features set out in the preamble of main claim 1.

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

[0003] In that context, it is known to construct the scroll type manifold, which is intended to accommodate the impeller of the fan, as two half-shells which can be connected together so as to construct the volute of the manifold, inside which the above-mentioned impeller is rotatably supported and is operated by the relevant motor unit.

[0004] The manifold typically has, at the side of one of the two half-shells thereof, a flange which is connected to the half-shell by a plurality of struts and to which the motor is fitted, being arranged such that the motor axis is coaxial with the axis of the impeller.

[0005] In such applications, both when the motor is mounted internally and when it is mounted externally relative to the casing of the scroll type manifold, there is typically provision for the motor, generally one of the opposing covers thereof, to be fixed to the flange, in a removable manner, by way of screw type fixing means. In that manner, the motor is connected to the flange of the scroll type manifold with a disengageable connection.

[0006] A main object of the invention is to provide a system for connecting the motors to and supporting them on the respective electric fan manifolds, which system is structurally and functionally configured so as to provide for assembly and disassembly of the motor with respect to the manifold which are quicker and easier than the above-mentioned known systems, and which is capable at the same time of being reliable in terms of correct and secure connection of the motor to the ventilation unit and support thereon.

[0007] This object and other objects which will be appreciated more clearly below are achieved by a connection and support system which is brought about in accordance with the appended claims.

[0008] Other features and advantages of the invention will be appreciated more clearly from the following detailed description of one 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 of an electric fan, in which the manifold and the motor of the fan are arranged so as to be connected by the connection system of the invention,
- Figure 2 is a perspective view of a pair of components, the manifold and the motor of the preceding Figure, respectively, which are able to be connected using the system of the invention and which are illustrated in the disconnected state,

- Figure 3 is a view corresponding to that of Figure 2, in which the components are illustrated in an intermediate mutual connection phase,
- Figure 4 is a view corresponding to that of Figures 2 and 3, in which the components are illustrated in the connected state,
- Figures 5 and 6 are partial perspective views, drawn to an enlarged scale, of another component of the connection system of the invention, in different operating states,
- Figure 7 is a perspective view of a component of Figures 5 and 6,
- Figures 8 and 9 are partial schematic views of components of the preceding Figures, illustrated in different phases of the connection system of the invention.

[0009] With reference to the Figures mentioned, a scroll type manifold is generally designated 1 and is arranged so as to constitute the housing of a radial impeller 2 of a fan, which is only schematically illustrated and which is able to be rotated by a motor 3 about an axis of rotation which is designated X.

[0010] The manifold 1 and the motor 3 are configured so as to be mutually connected by a connection system which is constructed in accordance with the present invention.

[0011] There is defined in the manifold 1 a delivery cross-section 5, in which the delivery flow direction, which is indicated by the axis Y of the Figures, is directed substantially perpendicularly relative to the axis X.

[0012] The manifold 1 is further constructed as two manifold half-shells, which are designated 1a, 1b, respectively, and which can be connected together in a manner known *per se* in a connection plane. Preferably, the half-shells are formed in a practically specularly symmetrical manner with respect to the connection plane, the plane therefore defining a median plane of substantial symmetry. At the delivery cross-section 5, each half-shell 1a, 1b comprises a respective semi-cylindrical nozzle portion 5a, those portions together defining the delivery nozzle which is able to be connected, to a pipe, for example, of an extractor hood (both not illustrated), so as to direct the flow drawn in by the ventilation unit in the direction of the discharge of the hood.

[0013] There is provided in the half-shell 1a, a main intake cross-section 6 of the fan comprising a lateral opening 6a which is coaxial with the axis X of the impeller. In the other half-shell 1b, in a corresponding position with respect to the opposite opening 6a, there is provided a flange 7 for supporting the impeller/motor unit which is capable of disengageable connection with respect to the body of the half-shell 1b.

[0014] The flange 7 comprises an external annular frame 8, in which there are provided holes 8a for fixing the flange to the body of the manifold, and a central hub portion 9 which is connected to the frame 8 by a plurality of strut-like elements 10. The motor 3 can be supported

on the flange 7 with the connection system of the invention, described below in detail, the motor being able to be both arranged inside the manifold, as in the example described, and arranged outside the manifold, both configurations being possible with the above-mentioned connection system.

[0015] In order to connect the motor 3 to the manifold, there are provided connection and support means which, according to a main feature of the invention, are able to bring about a bayonet type connection between the mutually connected portions.

[0016] In greater detail, the bayonet type connection means are provided between the central portion 9 of the flange 7 and a cover 3a of the motor 3 which can be fitted to each other coaxially.

[0017] The above-mentioned bayonet type connection is brought about by cooperation between at least a first connection element formed on the flange portion 9 and at least a respective second connection element formed on the cover 3a of the motor.

[0018] Advantageously, the connection between the flange and the motor is brought about by means of cooperation between three different pairs of first and second connection elements, the first elements, similarly to the second elements, of the respective plurality being arranged with regular angular spacing between them, that is to say, angled at 120° relative to each other, on the respective flange and motor portion. It will be appreciated that a different number of cooperating pairs of elements may be provided, this not modifying the inventive concept of the connection system to which the invention relates.

[0019] Owing to the structural and functional identity of the pairs of first and second engagement elements, only one will be described in detail below, the remaining pairs being referred to with the same reference numerals as the one described above in the appended drawings.

[0020] Each first connection element comprises a first seat 11 and a second seat 12 which are formed in the central portion 9 of the flange and which are preferably constructed as axial through-holes through the flange. Those seats communicate with each other and extend circumferentially in the flange 7, one in continuation of the other, the seat 12 being developed in the form of an arcuate opening, whose curved profile is concentric relative to the axis X, as clearly illustrated in Figure 2.

[0021] Each second connection element comprises a first extension piece 14 which projects from a base surface 15 of the cover, the extension piece being formed as a wall which has an arcuate profile and which is developed along a circumferential arc which is concentric relative to the axis X. At the end of the wall remote from the base, the extension piece 14 continues with a second extension piece 16 which extends substantially at right-angles, in a radial direction with respect to the cover. Both the extension pieces are further connected, at one end of the circumferentially developed curvilinear profile thereof, by another wall 17 which projects from the base

15.

[0022] The pair of extension pieces 14, 16 are selected to have such a shape as to be received with limited play through the opening of the seat 11, during relative axial movement between the cover of the motor and the flange, coaxially relative to the axis X, in order to be subsequently guided during relative rotational movement (about the axis X) with respect to the seats, during which the extension piece 14 is slidingly guided in the opening of the seat 12, as far as a position in which the flange portion which is adjacent to that seat and which is designated 18 is interposed between opposing surfaces of the cover base and the second extension piece, respectively, so as to bring about a relative axial retention action between the cover and the flange. In other words, the first axial engagement movement followed by the second relative rotational movement between the flange and the cover are such that a bayonet type connection is brought about between the portions in relative engagement. Vice versa, relative disconnection is brought about by means of a first inverted rotation between the flange and the cover (until the second extension piece is disengaged from the second seat), followed by the disengagement in an axial direction of the pair of extension pieces from the first seat, thereby allowing the flange and cover of the motor to be moved apart from each other axially.

[0023] According to another feature of the invention, there is provided another relative retention means between the flange and the cover, which means is active therebetween when the bayonet type connection is brought about. That means comprises an engagement element which is generally designated 20 and which is able to engage respective portions of the cover and the flange with each other. That element is particularly constructed in the form of a resilient clip (Figure 7) which has a pair of opposing ends 20a, 20b which can be resiliently deformed, thereby moving apart, when pressed between a pair of projections 21, 22 which project from the cover and the flange, respectively, in order to exert, owing to the resilient return forces caused by the deformation, a reciprocal retention action between the cover and the flange.

[0024] The projection 21 is preferably provided on the second extension piece 16, as illustrated in Figure 4, and is able to be radially aligned with the projection 22, which is provided on the flange, when the bayonet type connection described above is completely brought about between the cover and the flange.

[0025] Respective pairs of reliefs 21a, 22a can further be associated with each of the projections 21, 22 and have the function of retaining the clip 20 in position when it is engaged in order to act counter to disengagement from the engagement position brought about.

[0026] The invention thereby achieves the objects set out and provides a number of advantages over known solutions.

[0027] This includes in particular the advantage linked to the greater ease and rapidity of the connection system

over known solutions, which allows the operator to engage and disengage the motor quickly with respect to the manifold, with a simple and reliable connection and without requiring specific equipment or additional fixing elements with respect to the connected portions, as is the case, for example, with screw type fixing systems.

Claims

1. A system for connecting motors (3) to and supporting them on scroll type manifolds (1) of electric fans, in which there are provided between the motor (3) and the manifold (1) removable connection means, **characterized in that** the connection means comprise bayonet type connection means (11, 12, 14, 16). 5
2. A system according to claim 1, wherein the bayonet type connection means (11, 12, 14, 16) are provided between a flange (7) of the manifold (1) and a cover (3a) of the motor (3), which can be coaxially connected to each other. 10
3. A system according to claim 2, wherein the bayonet type connection means comprise at least a first connection element (11, 12) on the flange (7) and a corresponding second connection element (14, 16) on the cover (3a) of the motor (3), which are able to be slidingly engaged one in the other during relative axial movement in an engagement phase, and which are capable of further relative rotation, as far as mutual axial retention, so as to ensure the bayonet type connection between the elements. 15
4. A system according to claim 3, wherein the first element comprises a first and a second seat (11, 12), which seats extend in the flange (7) and communicate with each other, the second seat (12) being circumferentially developed, the second element comprising a first extension piece (14) which projects axially from the cover (3a) and which continues with a second radial extension piece (16), which is angled relative to the first extension piece (14), those extension pieces (14, 16) being able to be received in the first seat (11), in an axial engagement phase, the first extension piece (14) being slidingly received in the second seat (12), following the relative rotation between the engagement elements, so that a flange portion (18) remains interposed between the cover (3a) and the second extension piece (16), thereby bringing about the relative axial retention between the cover (3a) and the flange (7) in the bayonet type connection therebetween. 20
5. A system according to claim 4, wherein there are provided a plurality of the first and second seats (11, 12) which are arranged with regular angular spacing relative to each other on the flange (7) and which are able to cooperate with a corresponding plurality of pairs of the first and second extension pieces (14, 16) which are arranged in a corresponding angular position on the cover (3a) of the motor. 25
6. A system according to claim 5, wherein the pluralities comprise three groups of seats (11, 12) and extension pieces (14, 16), on the flange (7) and on the cover (3a), respectively, which are arranged with angular spacing of 120° relative to each other. 30
7. A system according to any one of the preceding claims, wherein there are provided further relative retention means between the flange (7) and the cover (3a), the means comprising an element (20) for engaging two corresponding portions of the flange and the cover, which are able to be connected with that element in the position in which the flange and the cover are connected in a bayonet type manner. 35
8. A system according to claim 7, wherein the engagement element comprises a resilient clip (20) which can be connected to a first and a second projection (21, 22) projecting from the cover (3a) and the flange (7), respectively. 40
9. A system according to claim 8, wherein the first projection (21) is formed on the second extension piece (16). 45

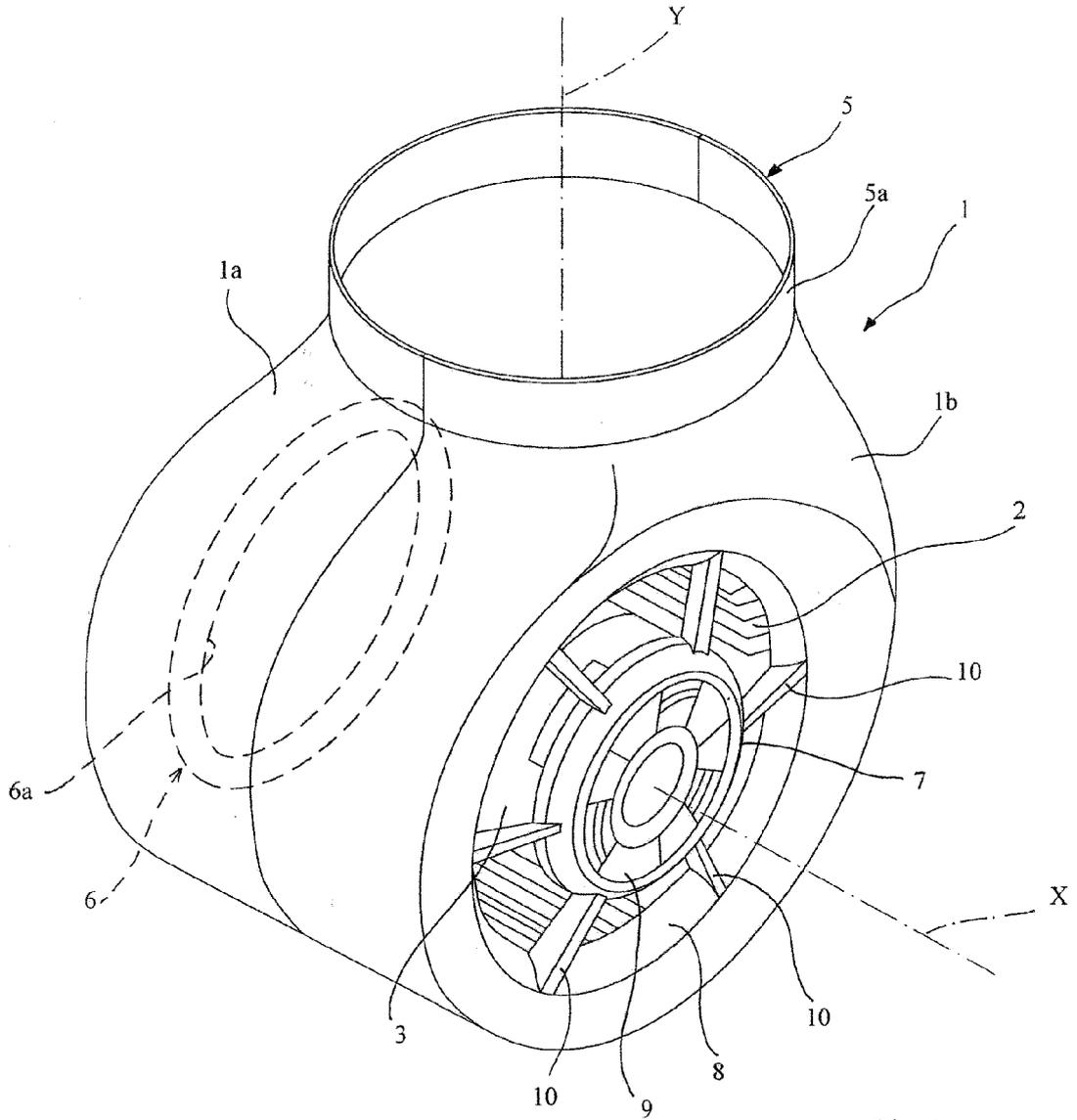


Fig. 1

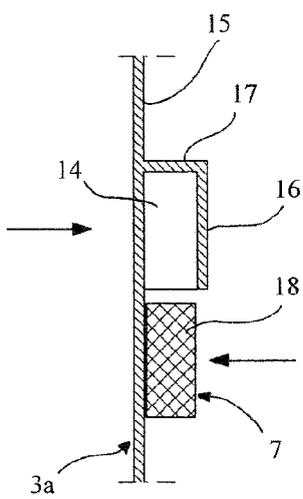


Fig. 8

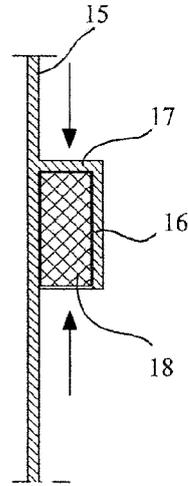
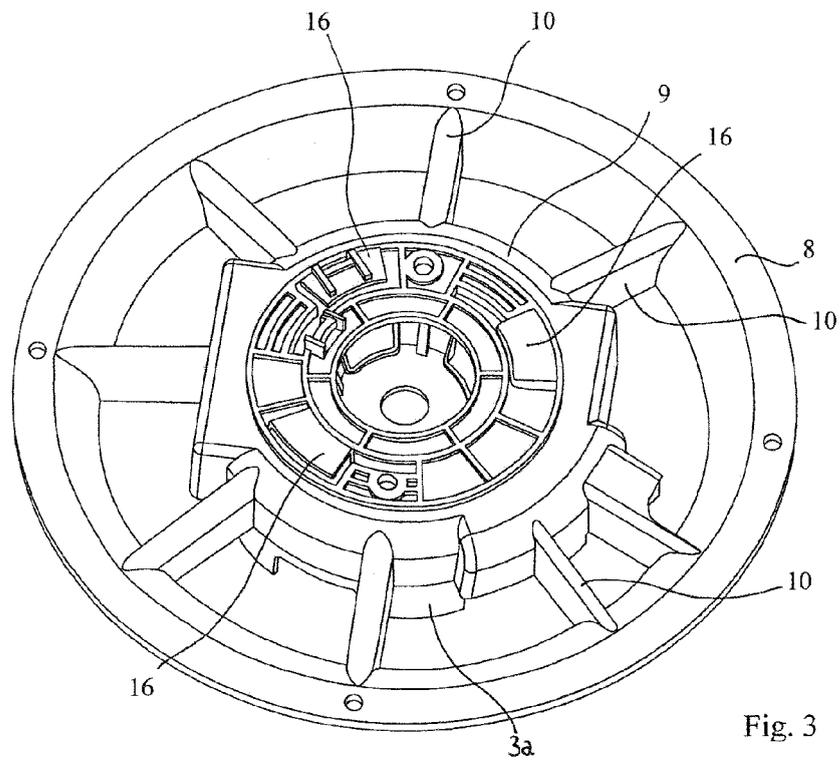
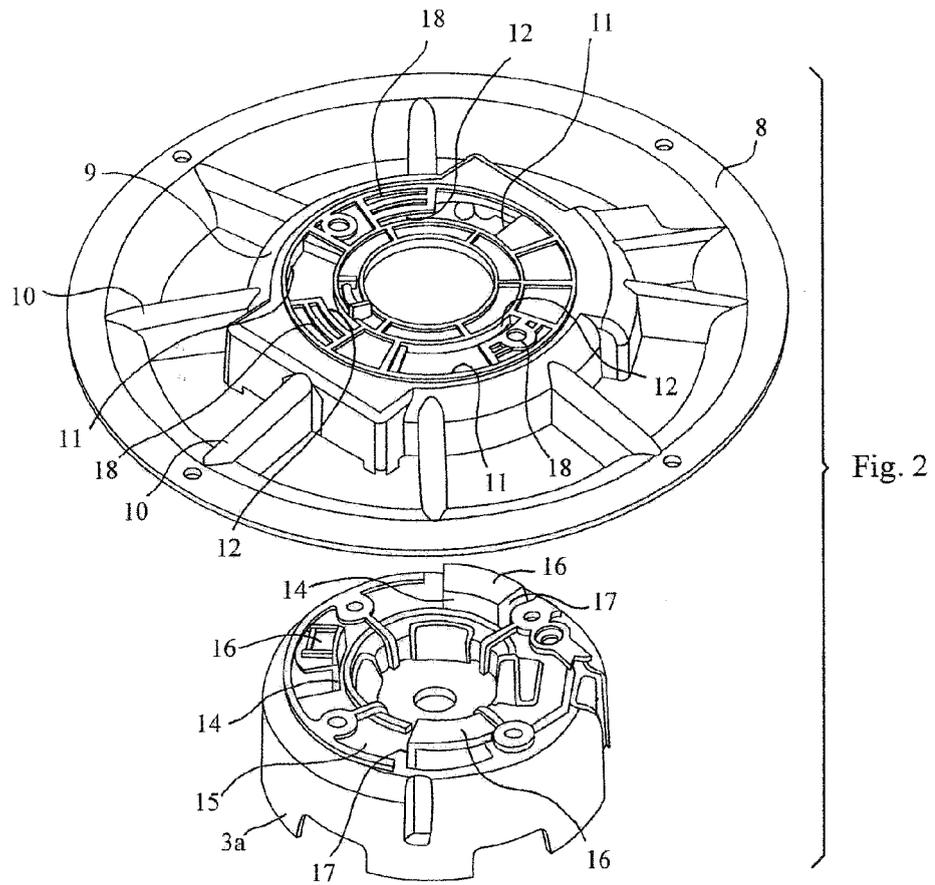


Fig. 9



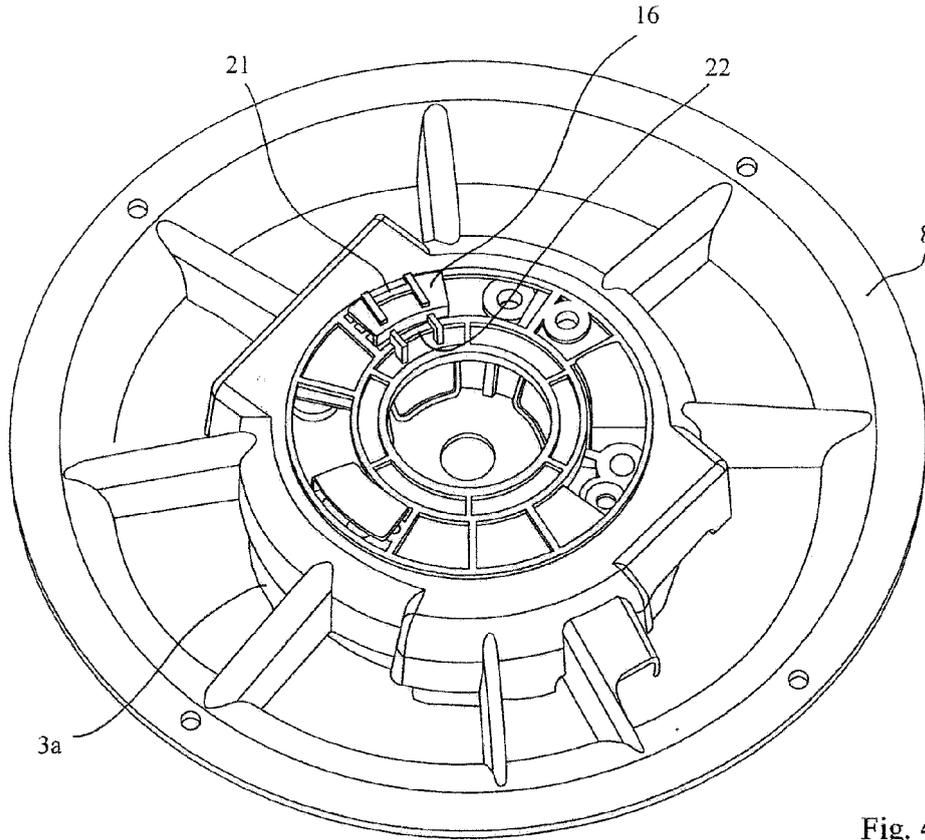


Fig. 4

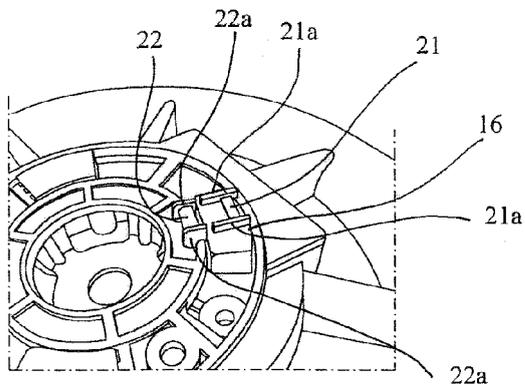


Fig. 5

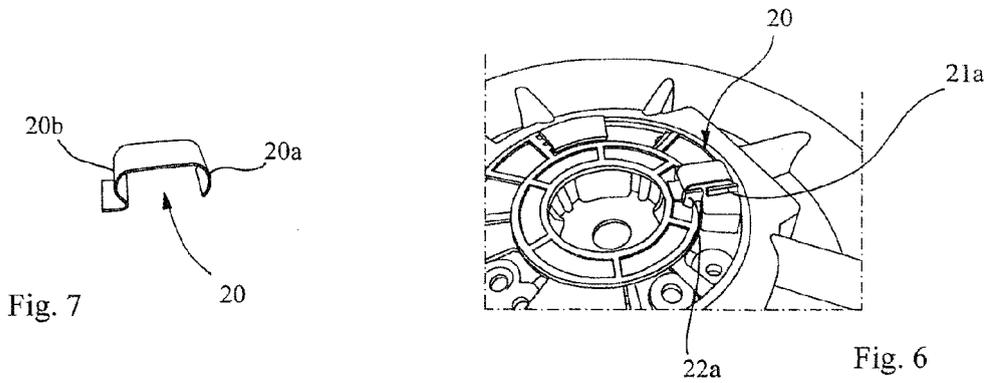


Fig. 7

Fig. 6