



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.11.2005 Bulletin 2005/44

(51) Int Cl.7: **F04D 29/28**, F04D 29/42,
F04D 29/66

(21) Application number: **05102671.4**

(22) Date of filing: **05.04.2005**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR LV MK YU

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(30) Priority: **06.04.2004 IT FI20040083**

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(54) **Fan unit**

(57) This invention relates to a device for exhaust fan units comprising a casing and an impeller to achieve improved performance in terms of capacity and reduced noise levels.

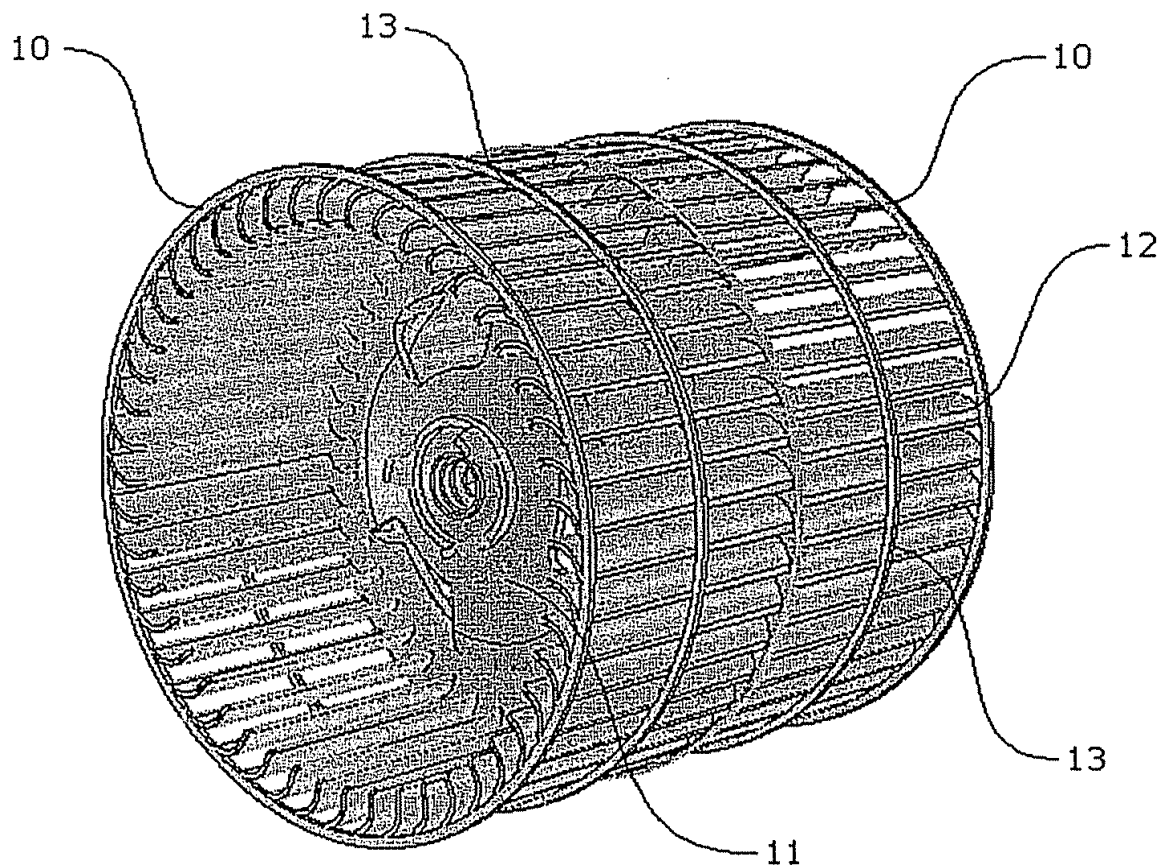


Fig. 1

Description

Scope of the invention

[0001] This invention relates to the field of exhaust fans and in particular to the casing and the relative impeller.

Prior art

[0002] A fundamental component of the air extraction systems used for instance in fume hoods or more generally in places where ventilation is essential, is the device that draws in the air to be eliminated and conveys it towards the outlet ducts.

[0003] Said device usually comprises a casing inside which there is an impeller.

[0004] The casing consists of a differently shaped structure with one or more inlets (usually arranged on opposite faces of the structure) and an outlet.

[0005] Inside said structure there is an impeller that moves the gas (air) and is driven in turn by a motor, usually an electric motor, by means of appropriate mechanical connections.

[0006] Said impeller consists of a structure that is basically cylindrical, comprising one or more rows of vanes the ends of which are integrally connected to two circular edges and which are arranged around a central hub in the form of a cage.

[0007] The capacity of the casing (meaning the volume of air per time unit that can be expelled) is clearly proportional to the speed of the impeller and the size of the actual casing.

[0008] One of the main problems concerning impellers is the noise generated during operation. This can be extremely tiresome, especially in small rooms or where several extraction fan units are installed.

[0009] On the other hand, increasing the size of the casing and reducing the impeller speed as a means of assuring the same capacity is not a satisfactory solution, as the use of a bigger casing results in increased vibrations of the impeller vanes during operation. These vibrations may cause said vanes to become deformed, reducing the mechanical stability of the impeller and increasing noisiness and wear of the impeller during normal operation.

[0010] There is therefore a need for a casing and the relative impeller capable of ensuring good extraction capacity and of operating without the drawbacks described above.

Brief description of the drawings

[0011]

Figure 1: Illustrates an impeller according to this invention

Figure 2: Illustrates a casing according to this invention

vention

Detailed description of the invention

[0012] The casing and relative impeller according to this invention overcome the drawbacks described above by incorporating specific supporting rings that increase the stability of the impeller vanes to prevent deformation during operation.

[0013] A series of important advantages are achieved thanks to the use of said rings.

[0014] Said rings strengthen the impeller by increasing the rigidity and reducing the deformation thereof regardless of the type of material that is used to make it.

[0015] It is therefore possible to maintain a constant speed-capacity ratio also in relation to parameters such as the ambient temperature and humidity in which said impeller is used. The incorporation of said supporting rings enables the use of bigger impellers without any loss of efficiency or stability of the impeller.

[0016] As shown in figure 1 the impeller according to this invention has the usual cylindrical cage shape comprising two circular edges 10, at least one row of vanes 12 that are arranged around at least one central hub 11 to which they are integrally connected, the ends of each of said vanes being integrally connected to said circular edges 10.

[0017] The stability of the vanes as the impeller turns is guaranteed by the presence of the circular supporting rings 13 that are integrally connected to the vanes and prevent the latter from vibrating and increase their stability during rotation thus achieving the desired advantages.

[0018] According to a preferred embodiment of the impeller according to this invention, said impeller consists of two rows of vanes 12 joined by means of a circular support arranged in correspondence with said central hub 11, said two rows of vanes 12 both having at least one circular supporting ring 13 integrally connected thereto.

[0019] The casing (see figure 2) consists of a structure 14 with the air inlet holes 16 on two parallel faces 15, said holes being protected in the usual manner by means of suitable grilles 17.

[0020] The structure has an outlet 18 that is normally cylindrical to facilitate its insertion into the specific conduits through which the air to be eliminated is conveyed.

[0021] According to a second preferred embodiment of the invention the parallel faces 15 of the casing are as flat as possible, i.e. with the rims raised as little as possible in order to facilitate the smooth airflow into the actual casing.

[0022] Note that this solution enables the size of the casing to be increased while maintaining constant noise levels within acceptable levels, enabling a significant increase in extraction capacity.

[0023] According to another preferred embodiment of this invention, the electrical connection box 19, which

contains the capacitor and the electrical terminations of the motor, is arranged on the outside of the structure 14 of the casing (and integrally connected thereto) in a position that is diametrically opposite the outlet 18 in order to optimise dimensions and facilitate the installation of the casing in the fume hood.

[0024] According to another preferred embodiment of this invention said outlet 18 of the casing incorporates a ledge 20 that is provided with a number of appropriate coupling devices. For example said coupling devices may be of the bayonet type 21 as illustrated in Fig. 2 where the ledge on the casing outlet is provided with four bayonet couplings arranged at a distance of 90° from one another.

[0025] Said ledge 20 enables the casing to be fitted more easily, more quickly and more accurately to the extraction duct, while the bayonet couplings 21 enable the casing to be clamped in the required position by means of a simple movement.

[0026] In this way the casing is fitted and clamped in place more quickly and more safely to produce savings in terms of installation times and the relative production costs.

[0027] The casings and impellers according to this invention are manufactured using the materials that are normally used for this purpose, for example plastic or metal, and using the appropriate molding processes.

Claims

1. Device for exhaust fan units comprising a casing and an impeller, said impeller having a basically cylindrical shape and comprising: two circular edges (10), at least one row of vanes (12) arranged around at least one central hub (11) and integrally connected thereto, the ends of each of said vanes being integrally connected to said circular edges (10), **characterized in that** said impeller is provided with at least one circular supporting ring (13) that is integrally connected to said vanes (12) and arranged in an intermediate position in relation to said two circular edges (10)
2. Device according to claim 1 **characterized in that** said impeller comprises two rows of vanes (12) connected by means of a circular support arranged in correspondence with said central hub (11) said two rows of vanes (12) both having at least one circular supporting ring (13) integrally connected thereto.
3. Device according to claims 1 and 2 comprising a casing consisting of a structure (14) with the air inlet holes (16) on two parallel faces (15) said holes being protected by means of suitable grilles (17), an outlet (18) basically cylindrical in shape **characterized in that** said parallel faces (15) of the casing are flat and have no raised rims.
4. Device according to claims 1 - 3 **characterized in that** said outlet (18) of said casing incorporates a ledge (20) that is provided with at least one appropriate coupling device.
5. Device according to claims 1 - 4 **characterized in that** said at least one appropriate coupling device consists of a bayonet coupling (21).
6. Device according to claims 1 - 5 **characterized in that** said ledge (20) is provided with four bayonet couplings (21)
7. Device according to claims 1 - 6 **characterized in that** said casing and said impeller are made of plastic.
8. Device according to claims 1 - 7 **characterized in that** said casing and said impeller are made by means of a molding process.
9. Device according to claims 1 - 8 **characterized in that** the electrical connection box (19), which contains the capacitor and electrical terminations of the motor, is integrally connected to the outside of the structure (14) of the casing in a position that is diametrically opposite the outlet (18).

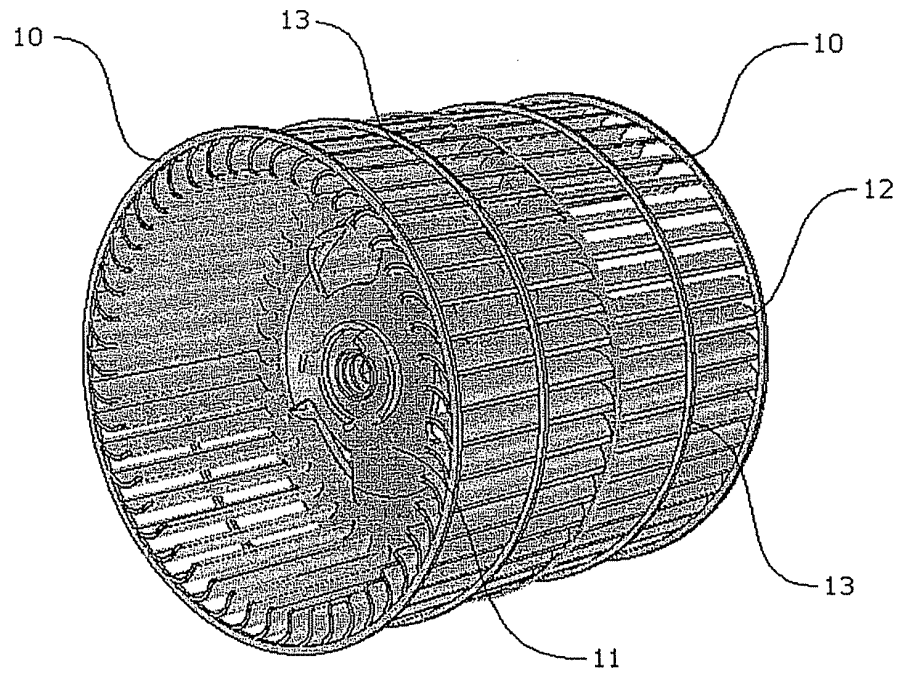


Fig. 1

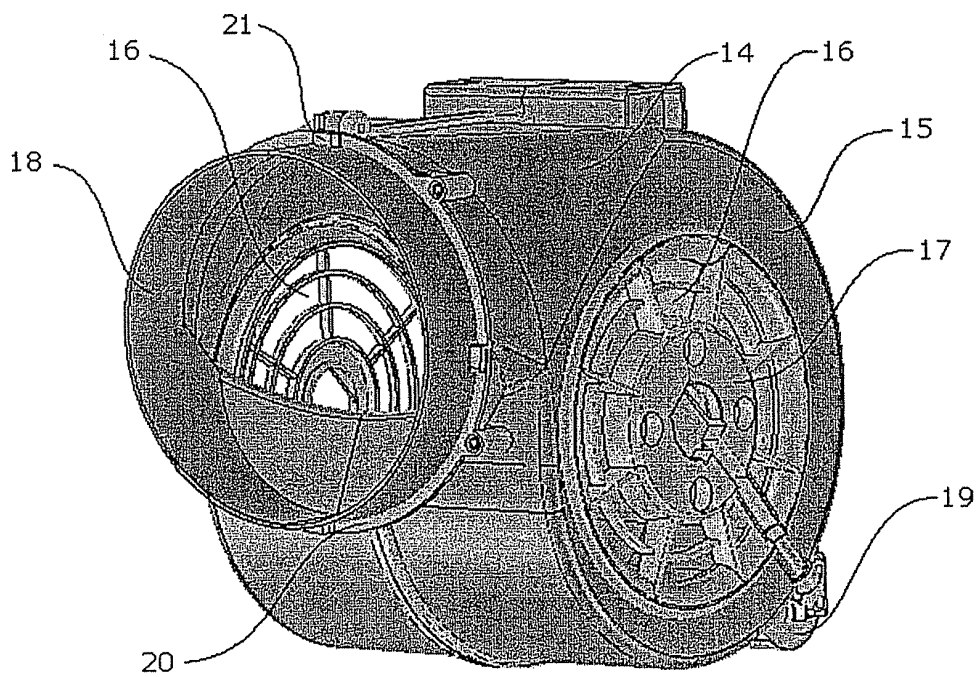


Fig. 2