



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 805 277 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
05.11.1997 Bulletin 1997/45

(51) Int. Cl.⁶: **F04D 29/66, F04D 29/42**

(21) Application number: **96107007.5**

(22) Date of filing: **03.05.1996**

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB IT LI LU NL SE

(72) Inventor: **Marchi, Germano**
I-41032 Cavezzo (MO) (IT)

(71) Applicant: **IDR HOLDING S.A.**
2960 Luxembourg (LU)

(74) Representative: **Lanzoni, Luciano**
BUGNION S.p.A.,
Via Emilia Est, 25
41100 Modena (MO) (IT)

(54) A centrifugal ventilator

(57) The invention relates to a centrifugal ventilator (10) comprising an impeller (2) rotating internally of a volute (3) afforded as an impression made in a parallel-epiped single block (1) made of a plastic material. The single block (1) is provided with an external shape which is different to a shape of the volute (3) and exhibits, in a zone thereof not occupied by the volute (3), impressions (5) and/or through-holes (6) of various shapes and dimensions; a cover (4) also being provided for closing the impression forming the volute (3).

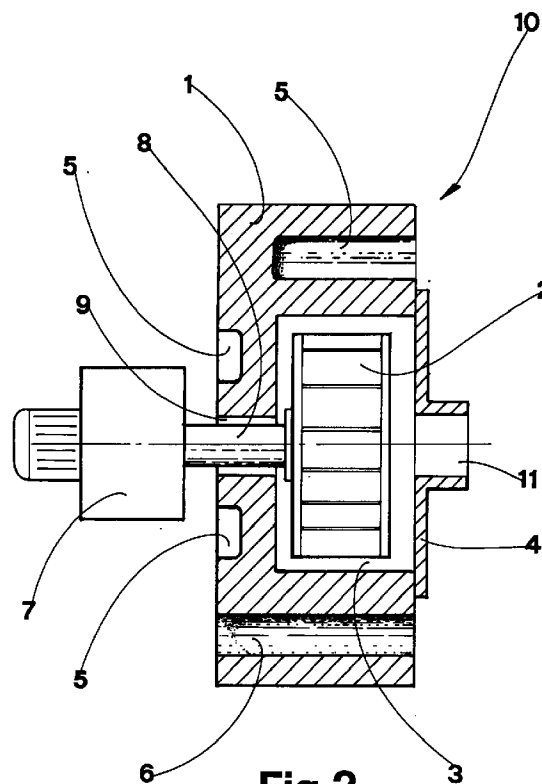


Fig.2

EP 0 805 277 A1

Description

The invention relates in particular to the field of centrifugal ventilators for industrial use, which are destined to generate considerable, generally low-pressure, air flows, and which are called upon to function continuously in work areas containing several personnel.

These ventilators are provided with an impeller, normally set in rotation by a motor, and rotating internally of a volute usually realized by means of a shell which can be made by casting, though since construction of this type of ventilator is especially economical, more frequently the shell is made of specially fashioned sheet metal.

The main drawback exhibited by such ventilators is that they are noisy enough to irritate personnel, as during functioning vibrations are created both by the rotations of the impeller and by the flow of air produced.

To obviate this drawback, such ventilators are located, if possible, in areas not frequented by personnel; also, construction quality thereof has been improved, especially with regard to the shell, and by covering the shell itself with sound-absorbent material. All of these solutions, however, only partially reduce the noise level generated by such ventilators.

The main aim of the present invention is to obviate the above-described limits and drawbacks in the prior art, by providing a centrifugal ventilator which is constructionally simple and economical and which generates, during functioning, only limited noise.

Some of the advantages of the invention are its compactness, its simplicity of manufacture and installation, and the fact of being able to vary the external geometry of the ventilator in such a way as to eliminate possible noise determined by special installation and functioning conditions.

The above aims and objectives are all attained by more the centrifugal ventilator of the invention, as it is characterized in the claims that follow.

Further characteristics and advantages of the present invention will better emerge from the detailed description that follows, of an embodiment of the invention, illustrated in the form of a non-limiting example in the accompanying drawings, in which:

figure 1 is a lateral view of the ventilator, with some parts removed better to evidence others;
figure 2 is a section according to line II-II of figure 1;
figure 3 is a lateral view from the right of figure 1.

With reference to the figures of the drawings, 10 denotes in its entirety a centrifugal ventilator provided with an impeller 2 which rotates internally of a volute 3.

In the present invention the volute 3 is afforded is a single block 1 of plastic material (preferably polyurethane), provided with an external shape which is different to the shape of the volute 3. It has been demonstrated that the combination of the above-mentioned characteristics (especially the use of a plastic material

and the adoption of an external shape which does not follow the shape of the volute 3) produces a reduction in the number of vibrations and noises created by the ventilator 10 during use, and, at the same time, enables the ventilator 10 to be made extremely simply and economically.

The single block 1 preferably has a parallelepiped shape, with a flat inferior surface that enables it to be placed on a support plane, for which reason the ventilator 10 is self-standing. A cover 4 for closing the volute 3 is also provided (not shown in figure 1 for reasons of clarity of illustration).

The volute 3 afforded in the single block 1 exhibits on one side an aperture 9, coaxial to the impeller 2, through which a shaft 8 (for driving the impeller 2) of a motor 7 can pass. The aperture 9 can be conformed in such a way as to house therein a support for the shaft 8. In a further embodiment (not illustrated) of the invention, a recess complete with ventilation apertures is made internally of the single block 1, which recess can house a motor for the impeller 2, thus reducing ventilator vibrations and noise levels even further.

The cover 4 exhibits a mouth 11, coaxial to the impeller 2, for the inlet of air into the ventilator 10. 12 denotes an outlet mouth of the ventilator 10.

The breadth of the single block 1, measured in the various radial directions with respect to the impeller 2 starting from the outline of the volute 3 and going externalwise, is of the same order as the diameter of the impeller 2. This characteristic improves sound absorption during ventilator 10 functioning.

In the part of the single block 1 which is not occupied by the volute 3, one or more impressions 5 are made, variously-shaped and of various dimensions and depths; also present are one or more through-holes 6, also of various shapes and dimensions.

Tests have shown that the presence of cavities (impressions, niches, lowered parts, through-holes etc.) on the walls of the single block 1 further reduces the noise levels of the ventilator during its functioning.

The single block 1 can be manufactured in known ways and with relatively contained costs, by pressing or by moulding molten plastic material.

The above-indicated cavities are indicated by 5 and 6 and can be made directly during the single block 1 hot-pressing process, for example by inserting cores into the die, or after manufacture by removing material, for example after the installation of the ventilator 10 once excessive noise levels and vibrations are noted.

The single block 1 can also be provided with projections, recesses, grips, feet and the like, all directed at simplifying, for example, the setting up of the ventilator, its mounting on an external frame, the application on the single block 1 of the cover 4 to close the volute 3, and so on. It is further possible to provide holes 13 in the single block 1 around the outlet mouth 12, to allow fixture thereto of a connection flange to an external outlet. Thanks to the considerable breadth of the single block 1, it is possible to create chambers therein which can be

used, for example, for storing tools and other objects.

Claims

1. A centrifugal ventilator, comprising an impeller (2) 5
which rotates internally of a volute (3), character-
ized in that said volute (3) is made as an impression
in a single block (1) of plastic material provided with
an external shape which is different from a shape of
said volute (3); a cover (4) being provided for clos- 10
ing said volute (3).
2. A ventilator as in claim 1, characterized in that a
breadth of said single block (1), measured in vari- 15
ous radial directions with respect to said impeller
(2) and starting from the shape of said volute (3)
and moving in an externalwise direction, is of a
same order of size as a diameter of said impeller
(2). 20
3. A ventilator as in claim 1 or 2, characterized in that
in a part of said single block (1) which is not occu-
pied by said volute (3) one or more impressions (5)
are made, said impressions (5) being of various
shapes, dimensions and depths. 25
4. A ventilator as in any one of the preceding claims,
characterized in that in the part of said single block
(1) not occupied by said volute (3), one or more
through-holes (6) of various shapes and dimen- 30
sions are afforded.
5. A ventilator as in any one of the preceding claims,
characterized in that said single block (1) has a par-
allelepiped shape. 35
6. A ventilator as in any one of the preceding claims,
characterized in that said single block (1) is made of
polyurethane. 40

45

50

55

Fig.1

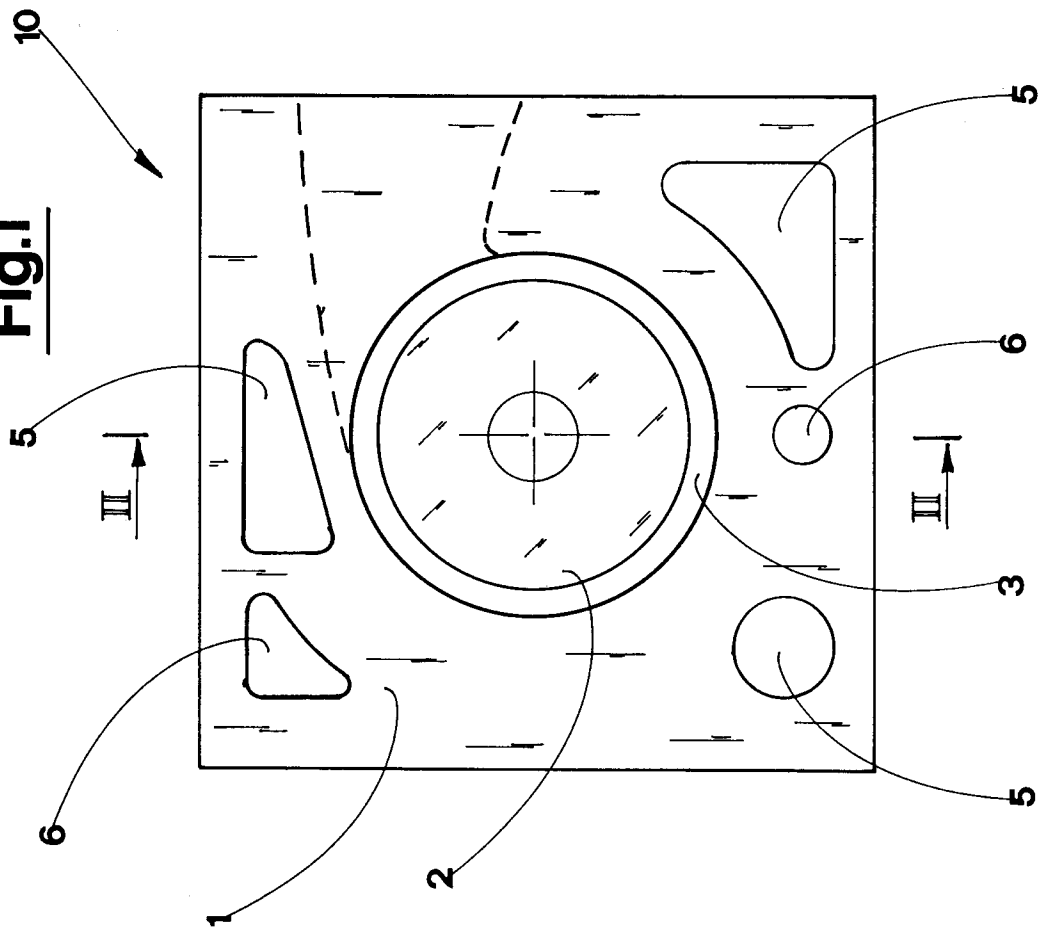
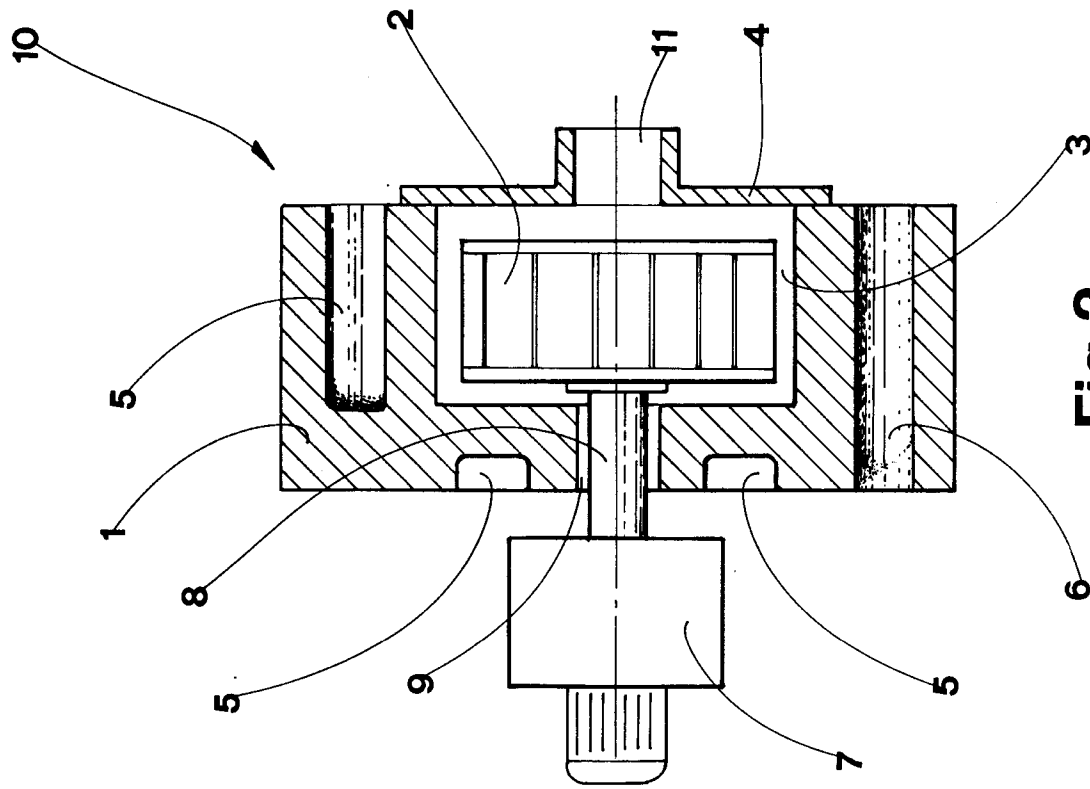


Fig.2



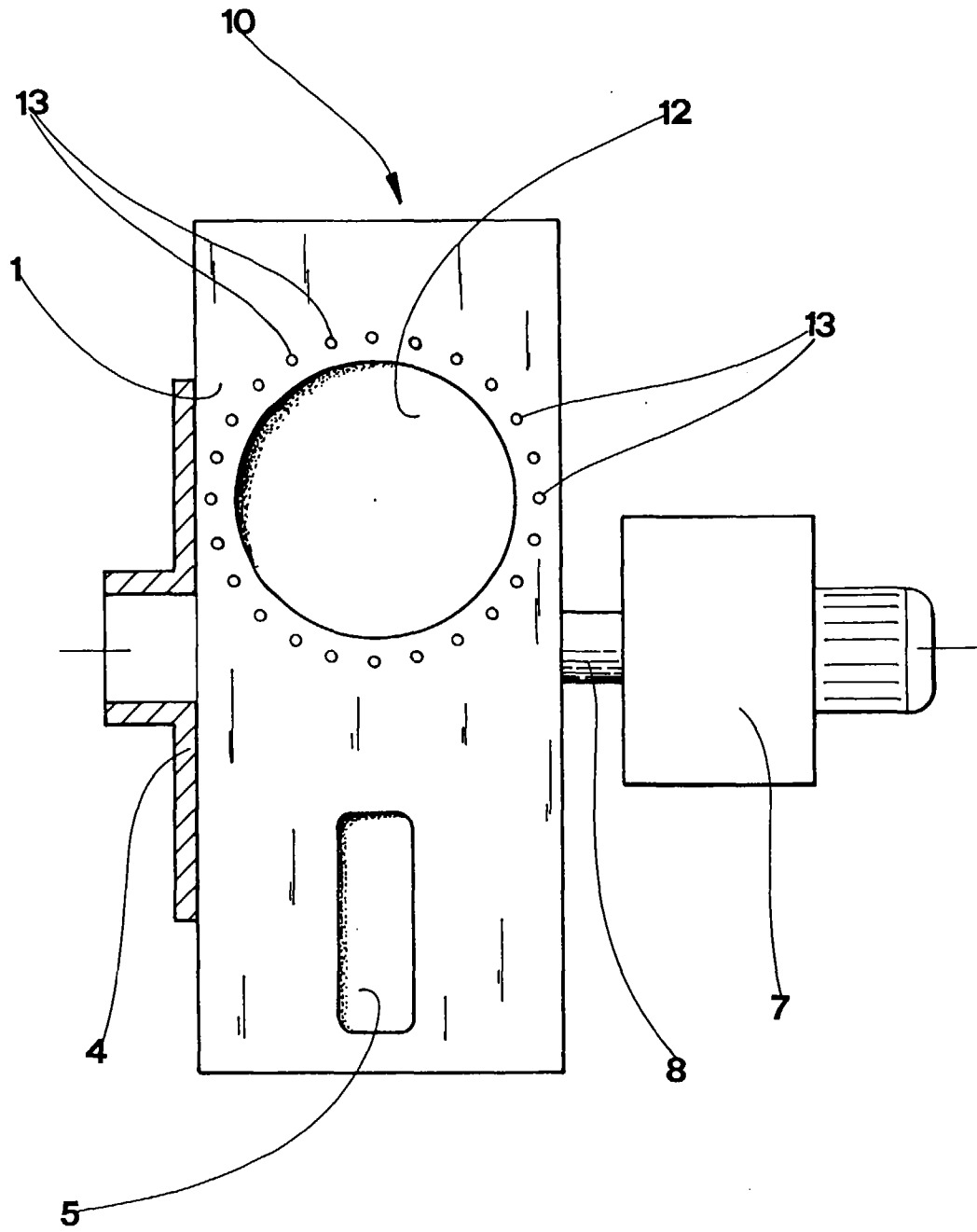


Fig.3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 10 7007

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	DE-A-26 22 969 (BERNSTEIN) * page 11, line 1 - page 17, line 13; figures 1-8 *	1-5	F04D29/66 F04D29/42
X	FR-A-2 406 107 (VIERLING) * page 3, line 39 - page 5, line 7; figures 1-6 *	1-3,5	
X	EP-A-0 083 704 (FSL FENSTER-SYSTEM-LÜFTUNG1) * the whole document *	1,2,5	
X	DE-A-14 03 496 (DAIMLER-BENZ) * the whole document *	1,5	
X	DE-A-15 03 610 (SOUND ATTENUATORS) * the whole document *	1,5,6	
A	FR-A-2 469 770 (TUZELESTECHNIKA KUTATOINTEZET) * the whole document *	1-5	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			F04D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 26 September 1996	Examiner Teerling, J
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (P/MC01)