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**DE ES FR IT**(71) Applicant: **F.I.M.E. - FABBRICA ITALIANA  
MOTORI ELETTRICI - S.r.l.**  
**Via Ho Chi Min, 2/A**  
**I-60022 Castelfidardo (AN)(IT)**(72) Inventor: **Bacchiocchi, Alberto**  
**Via Dante Alighieri, 108**  
**I-60022 Castelfidardo (AN)(IT)**(74) Representative: **Baldi, Claudio**  
**Piazza Ghislieri, 3**  
**I-60035 Jesi (Ancona) (IT)**(54) **Electric fan.**

(57) The instant invention concerns an electric fan for cooker hoods, with a monolithic impeller (1) which is economic to produce and a grided basin-shaped cover (3), shaped in such a way as to act as a

nozzle for the impeller (1) behind it, on one side and as to increase the section for the passage of the air intake, on the other.

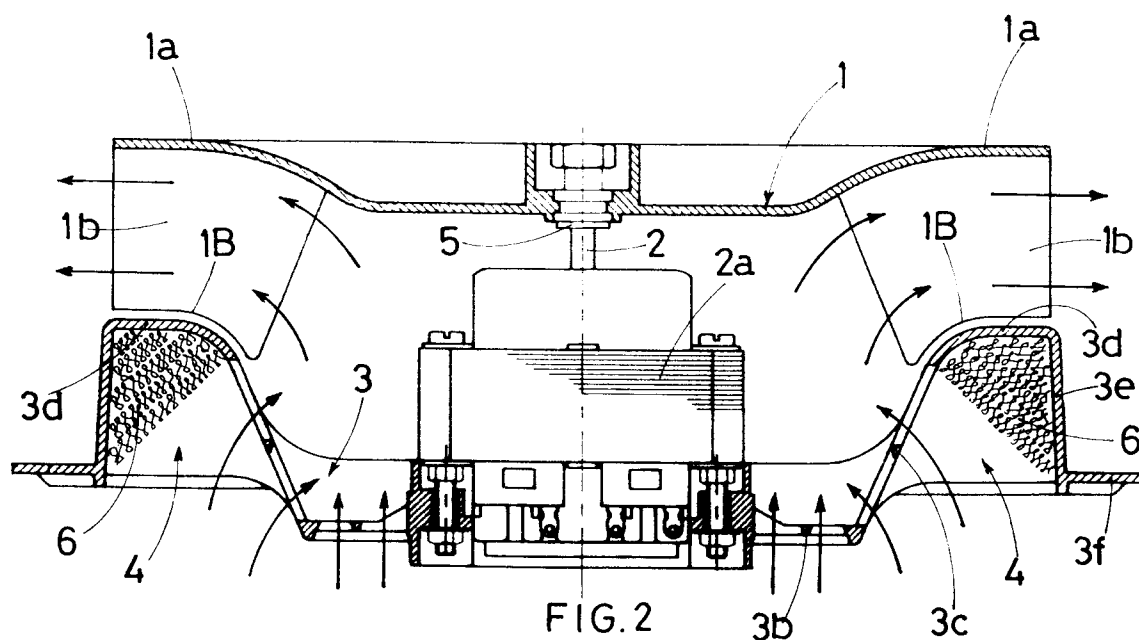


FIG. 2

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The instant invention concerns an electric fan for cooker hoods, which has a grille with a new shape, which permits an increase in the capacity of the air intake of the fan, on the one hand and a considerable reduction of the manufacturing costs of the impeller on the other.

As is known, modern fitted kitchens are always equipped with a cooker hood positioned above the cooker, within which hood an electric fan is housed, which serves to intake steam, fumes and smells which are emitted during the cooking of food, to expel these to the outside environment or to recycle into the kitchen environment after they have been purified from any impurities and smells by means of mechanical and chemical filters.

The electric fans currently being produced and used are made up of an impeller set on the shaft of an electric motor, the stator group of which is fixed inside a support flange positioned at the centre of a round, almost flat, grilled cover, which plugs up the entry hole of the scroll in which the electric fan is housed.

On its part, the suction fan resembles the impeller of a Francis-turbine, of the slow type and is obtained by welding to pre-moulded parts in plastic material: one comprising a toroidal bladed nozzle, the other a circular cap on which there is the hub of the impeller.

This means that at the present time, in order to manufacture said impeller, two moulds plus the assembly operation of the two aforementioned components are required, as well as a balancing operation, given the fact that the numerous welding points between the blades and the cap bring about an unbalanced system of small eccentric masses which alter the original balance of the two pre-moulded parts.

The main aim of the instant invention is to reduce the cost of current electric fans using a monolithic impeller, which is economical to produce in that it does not have a nozzle.

The impeller in question comprises a series of radial curved blades made from moulding in one single piece with the circular cap which has a central hub in which to engage the shaft of the electric motor.

According to the instant inventive idea, a suitably shaped collar on the grilled cover, is used as a nozzle in order to frontally plug the blades of the impeller, which seals the entry of the scroll within which the fan motor group is positioned.

The fact that the nozzle of the impeller has been obtained on the cover brings about three immediate advantages as far as the economical manufacture of said electric ventilators is concerned: first of all, one mould is no longer required (the one currently required to produce the toroidal nozzle); secondly, the assembly operation is elimi-

nated (the one currently required for the coupling of the cap and the bladed nozzle of the impeller) and thirdly, the balancing operation is no longer necessary, in that the considerable balance obtained during the moulding phase of the monolithic impeller according to the invention is not altered by any subsequent machining processes.

A further aim of the instant invention is to increase, while maintaining the same overall transversal dimensions, the section for the passage of the air intake through the aforementioned grilled cover.

In fact, the useful intake section in current electric fans is much smaller when compared to the surface area of the grilled cover, both because of the space occupied by the concentric rings and the radii of the grid, but above all, because of the presence of the large central plate, within which the electric motor is flange-mounted.

In order to carry out the aim described above, according to the invention, the grilled cover of the electric fan has been provided with a basin shape, in such a way as to use as a useful section for the passage of the air intake, both the usual area surrounding the central plate of the motor flange mounting, and a supplementary area coinciding with the surface of the lateral grilled side of the basin.

These and other advantages deriving from the invention in question will become more apparent as the description progresses, with reference to the attached drawings, reproduced for illustrative and not limitative purposes, wherein:

- Fig.1 is the plan view seen from the outside of the grilled cover used in the electric fan according to the invention;
- Fig.2 is the section of the electric fan in the diametral II-II plane of Fig.1.

With reference to the aforementioned drawings, the electric fan in question comprises a suction fan or impeller (1), obtained from moulding in one single piece of plastic material, which is made up of a circular cap (1a) equipped with an annular series of radial curved blades (1b).

At the centre of said cap (1a), there is a hub for setting on the shaft (2) of the electric motor, the stator group (2a) of which is screwed inside a support flange positioned at the centre of a circular grilled cover (3).

The originality of said cover (3) lies in its basin shape with the edge curved downwards in an upside-down "U" shape, so as to create at the lower part of the cover, an annular channel which runs all around the truncated cone wall which delimits the depressed housing of the basin.

More precisely, said cover (3), obtained in one single piece of moulded plastic material, comprises a rectangular platform (3a), where the electric mo-

tor is to be flange-mounted, this platform being at the centre of the bottom grilled wall (3b) of the basin, from which wall there projects perimetally a truncated-cone side (3c), also grilled, which ends at the top in a large external annular lip (3d), which continues and connects with a second descending side (3e), which ends at the bottom in an external flange (3f), along which there are holes (3g) for the fixing screws of the cover (3) to the frame of the cooker hood.

Attention is brought to the fact that the lip (3d) and the side (3e) do not have grilled structures, therefore they form together a continuous wall which delimits on the bottom and externally, an annular channel (4) which is delimited internally by the grilled side (3c).

The useful section for the passage of the air intaken by the impeller is therefore increased, by means of the holes of the grilled side (3c) which are therefore additional to the slots of the grilled bottom (3b), these slots being the only through passage for the air intake in current electric fans.

The increase of the useful air intake section brings about not only an increase in the capacity of the air generated by the group, but also, a more efficient cooling of the electric motor, with the consequent possibility of using more compact and more economical motors.

In conclusion, the special shape of the lip (3d) of the cover (3) is to be noted, in that this enables said lip to act as a nozzle for the impeller (1) behind it.

In fact, it is to be remembered that current impellers are obtained from the assembly of two pre-moulded components in plastic material: one toroidal bladed nozzle and one cap, which, once they have been welded together form an annular series of radial curved ducts, delimited laterally by two consecutive blades, below the toroidal nozzle and above the cap.

In the electric fan according to the invention, this annular series of radial ducts is reproduced following the approach of the shaped lip (3d) of the cover (3) to the lower similarly shaped edge (1b), of the blades of the impeller (1); it being provided that said approach is determined automatically each time that the shaft (2) of the electric motor is inserted into the hub of the impeller (1), until it stops by means of a ring (5) inserted on the shaft (2).

In Fig.2, the number 6 indicates a ring made of a deadening material which can, on request, be built in to the bottom of the annular channel (4), in order to reduce noise due to the current of air taken in through the grilled cover.

## Claims

1. Electric fan for cooker hoods using a monolithic impeller and a grilled basin-shaped cover, of the type comprising a suction fan (1) and a monolithic grilled cover (3), fitted with a peripheral flange (3f) and a central platform (3a) for installing the electric motor, characterised by the fact that the impeller (1) is obtained from moulding in one single piece of plastic material and is made up of a circular cap (1a) with an annular series of radial curved blades (1b); moreover, said electric fan is also characterised by the fact that the aforementioned cover (3) has a basin shape, being made up of a platform (3a) at the centre of the grilled bottom wall (3b) of the basin, from which there projects perimetally a truncated cone side (3c), also grilled, which ends at the top in a large external annular lip (3d) which continues and links up with a second descending side (3e), which ends at the bottom with the aforementioned external flange (3f), along which there are holes (3g) for the fixing screws of the cover (3) to the frame of the hood; it being provided that the lip (3d) of the cover (3) takes the form of a toroidal ring of the same shape as the lower edge (1b) of the blades (1b) of the impeller (1), in such a way that said lip (3d) can act as a nozzle for the impeller behind.
2. Electric fan for cooker hoods using a monolithic fan and a grilled basin shaped cover, according to Claim 1), characterised by the fact that on the bottom of the annular canal (4), there is built-in ring in deadening material (6).

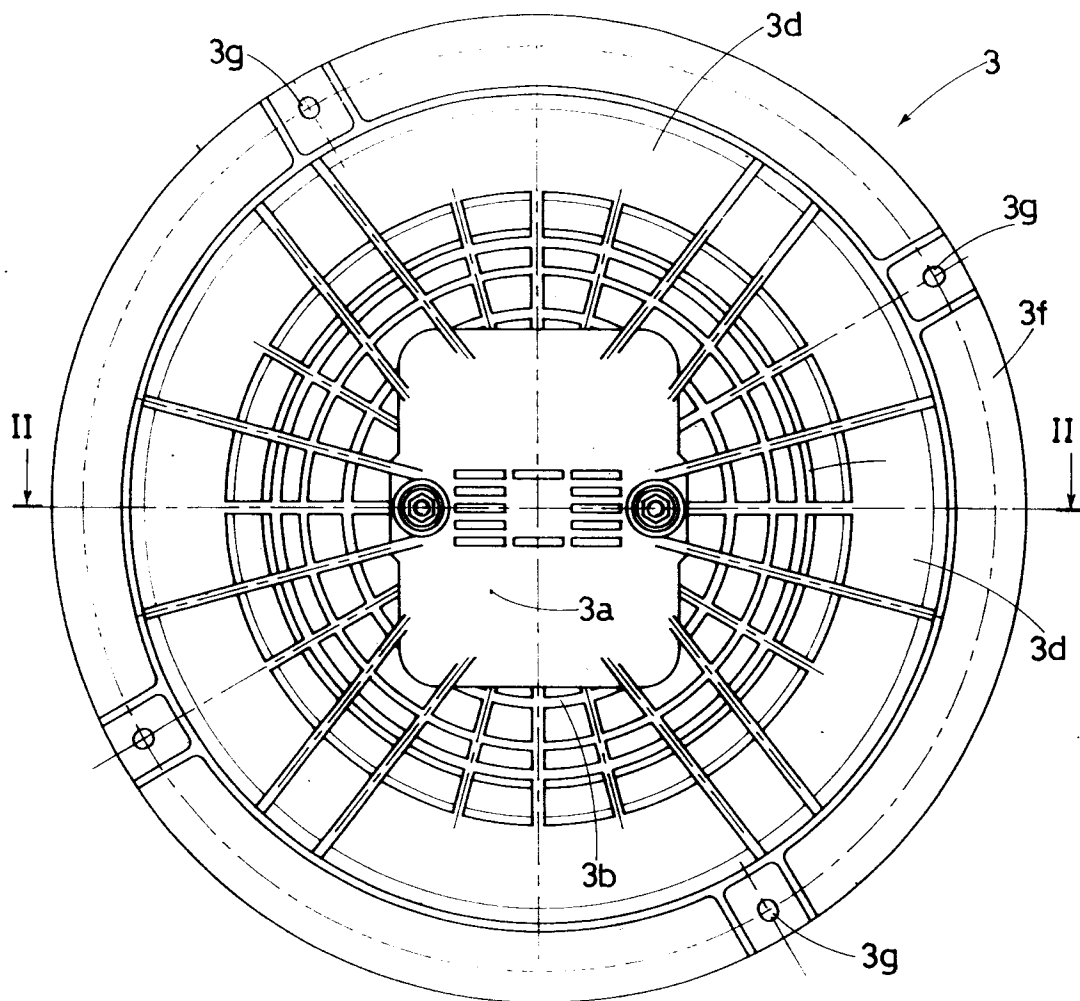


FIG. 1

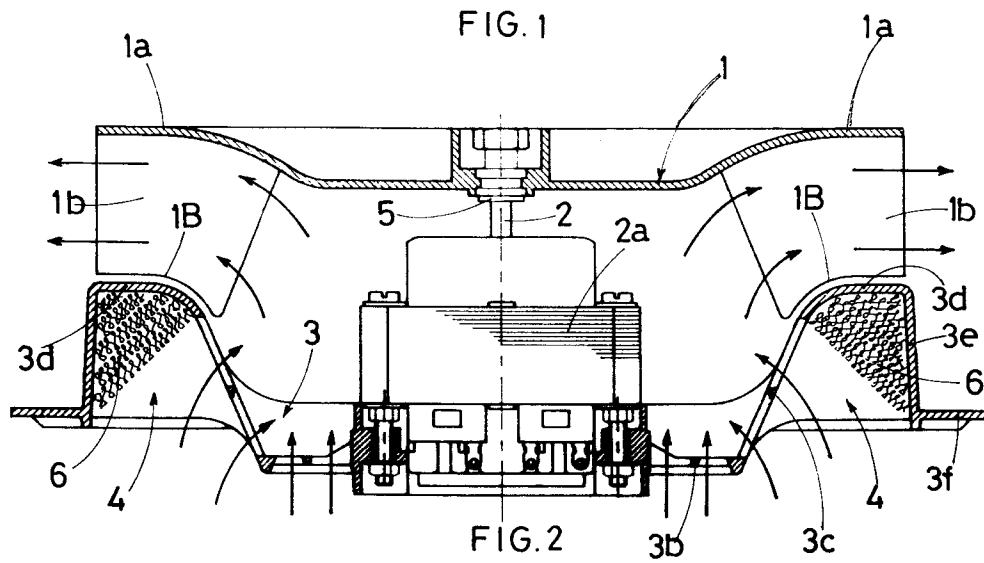


FIG. 2



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## EUROPEAN SEARCH REPORT

Application Number  
EP 93 83 0415

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.5)
A	FR-A-2 580 340 (ETUDES TECHNIQUES ET REPRESENTATIONS INDUSTRIELLES, E.T.R.I.) * figures 1,2 * ---	1	F24C1/00 F04D25/06 F04D29/70 F04D25/12
A	GB-A-1 085 565 (WOODS OF COLCHESTER) * the whole document * ---	2	
A	GB-A-1 328 082 (AIRSCREW-WEYROC) * the whole document * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			F04D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 25 January 1994	Examiner Teerling, J
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