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(54) **EMBEDDED AIR EXTRACTOR**

EINGEBETTETER LUFTENTFERNER

EXTRACTEUR D'AIR ENCASTRABLE

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Description

[0001] The present invention concerns an air extractor adaptable for building in, of the type of those which comprise: a supporting casing of insulating material, an impeller with blades working as an axial fan, an electric motor and an electronic circuit.

[0002] It is often convenient to install extractors in small enclosures or rooms, such as bathrooms, toilets, pantries, cellars or washing rooms, etc., which lack direct ventilation to the outside.

[0003] The normally known extractors are frequently difficult to mount in a built-in manner in standard individual ducts for static extraction or ventilation which are installed in almost all buildings. In addition, with these conventionally known extractors it is not simple to perform their assembly in a wall, ceiling or window and, moreover, said assembly frequently requires a space which is often not available.

[0004] The publication of German patent DE 36 10 685 C 1 describes an invention which relates to a ventilator for installation in an opening of a window or of the wall with a casing essentially in the form of a shell, in which an electromotor is installed with a fan on the upper part of the motor shaft, and with a protective piece which covers the suction or discharge part of the casing, which can be joined to the casing, it has an essentially square cross section and allows air to pass. The protective piece can rotate with limitations next to an intermediate piece. The intermediate piece has some plug pins which can be plugged into some female sockets of a connection strip which is fixed to the casing. The plug-in connection can only take place in the predetermined rotating position of the intermediate piece. The electric components of the protective piece are connected with the plug pins by means of some connecting wires. The protective piece can be positioned independently of the assembly position of the casing in the opening of the window or of the wall without endangering the interconnection between the protective piece and the connection strip.

[0005] By German publication DE 3711720 AI the invention is made known which relates to a ventilator for installation in an opening of a window or of the wall with a casing essentially in the form of a shell, in which an electromotor is installed with a fan on the upper part of the motor shaft, and with some protective pieces which cover the suction or discharge part of the casing, which can be joined to the casing, they have an essentially square cross section and allow the air to pass.

The emplacement of the protective piece without visible fastening elements with the possibility of universal positioning of the protective piece on the casing is achieved because the protective piece and a part of the casing have respectively on their mutually opposing parts, one fitting over the other, some unions by embedding and/or bayonet-fitting with some coincident elements facing each other, and by means of these they

can be joined to each other, and in that with the unions produced by embedding and/or bayonet-fitting the piece is housed in the opposing part of the casing in the plane of the suction or discharge part so that it can rotate with limitations.

[0006] The present invention is an air extractor adaptable for buildings, which comprises a supporting casing of insulating material, which consists of a cylindrical part, and a laminar part in integral arrangement, so that the laminar part is essentially at right angles to the axis of the cylindrical part, said cylindrical part having a cylindrical body joined to the cylindrical part by radial arms, said cylindrical body determining two recesses, one directed towards the rear part which houses the electronic circuit and the other directed towards the rear part which houses the electric motor, there remaining between the cylindrical body and cylindrical part a passage for the air, characterized in that the cylindrical part is provided with embossed projections between which are determined a number of helicoidal spaces which act together with a helicoidal rib practised on the inside cylindrical face of a ring, so that the assembly by screwing of said ring on the cylindrical part mentioned makes it possible to graduate the distance of said ring with the laminar part and in that the laminar part has on its perimeter an elastic section that extends beyond said perimeter, capable of being anchored in a groove on the side edge of a front cover, which has the form of a thin bowl and has an opening for the passage of air.

[0007] The extractor of the present invention has at least two of the radial arms, diametrically opposite, have each a fork which determines an open space in the cylindrical part, being closed by a front partition, which is traversed by a screw which also traverses a folded fluke capable of tilting back and forth, and is screwed into a piece in form of a prism.

[0008] The extractor of the present invention allows, in the manner priorly detailed, the possibility of rapid means for its installation in ceilings as well as walls, and also laminar media such as glass and panels.

[0009] Other advantages and characteristics of the invention can be appreciated from the following description, in which, in a non-restrictive manner, a preferential method of implementing the invention is explained, making reference to the drawings hereto attached. The figures show:

[0010] Fig. 1 is a front view, exploded in perspective, of the extractor object of the present invention.

[0011] Fig. 2 is a diametrical cross section of the extractor in accordance with Fig. 1, conveniently assembled.

[0012] Fig. 3 is a diametrical cross section of same extractor, showing also elements related with its adaptation to a window of any standard thickness.

[0013] Fig. 4 is a front view, exploded in perspective, of the supporting casing of the extractor and cover, showing schematically the system for mounting.

[0014] The extractor device object of the invention

comprises, in the first place, a supporting casing which is preferentially moulded in a single piece from a suitable plastic material. This supporting casing is in the form of a cylindrical part 1, and a laminar part 2, the orientation of which is perpendicular to the hypothetical axis of the cylindrical part; preferentially it is square in shape though its sides are slightly concave.

[0015] The cylindrical part 1 serves for the housing of the assembly formed by the impeller 6 fitted with blades, that acts as axial ventilator, the electric motor 5 and the electronic circuit 7, useful for different applications. Inside said cylindrical part 1 is also to be found a cavity which is occupied partly by a cylindrical body 3, preferably moulded in single piece with the assembly, located coaxially with respect to the cylindrical part 1; from the foregoing, it is appreciated that a passage is left between the cylindrical part 1 and the cylindrical body 3. This cylindrical body 3 is connected by means of a number of radial arms 4 with the cylindrical part 1. The electric motor 5 is housed, practically entirely, inside the cylindrical body 3 and the impeller 6 is fixed directly onto the shaft of the electric motor 5. It is preferable that the impeller 6 be moulded in a single piece from a suitable plastic material in order to partly cover the electric motor, thereby eliminating any possibility of establishing contact with parts of the extractor that may be electrically live, even when using the feeler gauge required for the tests dictated by the electrical safety standard.

[0016] It can be seen that the cylindrical body 3 consists of two inverted housings, one for the aforementioned electric motor and another situated centrally to hold the different electronic circuits, such as the timing circuit and the circuit 7 equipped with a humidity detector (Fig. 1). This housing likewise permits the mounting of a standard connection strip in the case of a standard extractor, or the mounting of the electronic circuits in a quick and secure manner, retaining them in position by pliable pawls inside the housing, which provides the benefit of permitting the housing of all connections to be made on installation without taking up space on the outside and permitting the use of an extremely flat cover 8, wherein an innovation is introduced in the size of the extractors commercially available to date, permitting the invention to be housed almost entirely inside ducting pipes, in holes or other recesses made in walls, windows or ceilings for this purpose.

[0017] Two of the radial arms 4 which link the cylindrical body 3 with the cylindrical part 1, being situated at 180° from each other, have a fork 10 in the arm 4 in order to leave room for a quick-fit system to the ducting pipe wall, making it unnecessary for the operator to perform operations of hole-drilling and insertion of plugs and screws, leaving the latter procedure optional to the user if any case should so require, since the face 2 incorporates four drilled holes at its extremities for screw-mounting.

[0018] These forks delimit spaces open to the outside surface of the cylindrical part 1 (Fig. 2) and closed by a

front partition (which in Figs. 2 and 3 is situated in the upper part of the corresponding drawing sheet) and this outside partition is traversed by a screw 11; in each of these spaces is to be found a fluke which can rock back and forth; at its free end are projections suitable for biting into appropriate surfaces and it has a frontal fold with a hole through which the screw 9 can run. Each space also incorporates an essentially prismatic part 32 through which screw 9 can run; this piece 32 is fitted in such a manner it cannot turn in the space mentioned; thus, when screw 11 is turned, the piece 32 is moved towards the outside partition and, as a consequence, produces the tilting of the fluke 9 towards the outside of the cylindrical body 3, the result being its free ends overshoot the space and can bite into a body surrounding the cylindrical part 1, the flukes 9 being anchored into the walls where it is to be installed, fixing the extractor in place in a quick and clean fashion.

[0019] It can be seen that in the example of implementation shown in the drawings, the radial arms have been designed as a thin flat shape whereby they merely act as guide vanes for the air flow, achieving maximum advantage of the circular cross section for said air flow, however they can be implemented with other shapes and sections.

[0020] In the cylindrical body 3 a central pillar 12 can be observed, to which the protective cover 13 is screwed, preferably moulded as a single piece, which can close the housing of the electronic circuitry; preferentially it is round in shape, but other forms can be taken, with arms arranged at 180° in order to fit into the channels made in the radial arms for the passage of cables and be able to mount the cover 13 securely. In the event that it is considered convenient, a number of small slots 14 can be made permitting thereby the penetration of humidity for detection without failing to comply with any tests of the standard. Likewise it incorporates a drill hole 15, for the case of incorporating a humidity detector, with the purpose of showing a light emitting diode (LED) to indicate the operational state.

[0021] A front cover 8 can be pressure-fitted and held in place on the front face of the supporting casing; this can be done, for example, by means of a device 31 with non-return anchoring, its release only being possible with the assistance of a screwdriver tip. This cover 8, preferably moulded in a single piece, takes the form of a very flat, square-shaped tray, having a side edge 16 (Fig. 2) of very reduced height arranged so that its free edge fits over the edge of the leaf 2. Said cover preferentially slightly convex or arched, provided with a large central opening 17, which constitutes the entrance for the suction or intake of air to the extractor, is covered by a grill 18, preferably moulded as a single piece with the assembly, framed by the inside part of the opening 17 by a lip 19 (Fig. 3), which is prepared for fitting on the free edge of the inside diameter of the laminar part 2 of the supporting casing; these elements fit together in an extremely shallow configuration. The outlet for the

conductors corresponding to the power supply of the device can be led through the slight gap 20 provided for this purpose in the laminar part or flat leaf 2, or it can also be done laterally through the front cover 8, provided with a notch 21 in its side wall.

[0022] In accordance with an important characteristic of the invention, at the extremity of the cylindrical part 1, there are two rectangular slots for the anchoring of a first ring 22, which in turn is provided with fixing pawls and drill holes which run through the thickness of the first ring 22 in order to incorporate two semi-circular fins 24, the function of which is to block the passage of return air, with the help of two weak springs inserted on the axis of rotation of the fins, making it possible for air to pass outwards only.

[0023] On the outside surface of the cylindrical part 1 are to be found a number of embossed segments between which are gaps arranged helicoidally: these gaps are suitable for receiving the helicoidal projection formed on the inside cylindrical face of a second ring 25 (Fig. 3), all of the foregoing being such that the screwed assembly of said ring on said cylindrical part, makes it possible to achieve a graduation in the distance of the second ring 25 with the laminar part 2.

[0024] In other words, the extractor, as well as to a wall or ceiling, can be applied to a window pane; to this end, an optional kit is prepared consisting of the second ring 25, a frame 26, a front cover 27 and an offsetting frame 28, these being moulded from a plastic material. The second ring 25 has incorporated on its inside diameter a screw thread which adapts to the threaded sections of the cylindrical part 1 of the supporting casing whereby when screwed onto said part the kit frame 26 is trapped against the glass and by displacing the inside face of the support leaving an offsetting section between the two elements mentioned which shall depend on the thickness of the glass. Therefore, in both cases the distance is offset with the offsetting frame 28 which being nestable can be built up to the thickness required.

[0025] The front cover of the kit explained, is press-fitted, and held in position by means of a screw 29, preferentially moulded in a single piece, which takes the shape of a square tray, having side walls 30, arranged to fit on its free edge into a recess which runs parallel to the edge of the outside partition of the frame 26, with a retaining web on its side opposite to the screw socket.

[0026] The offsetting frame is an independent piece preferably square in shape, following the external profile of the front cover 8, moulded from plastic material, which with a slot following the outside profile on one side and a rib standing out on the other face, makes it possible to assemble various frames until the desired offsetting height is reached.

Claims

1. Air extractor adaptable for buildings, which com-

prises a supporting casing of insulating material, which consists of a cylindrical part (1), and a laminar part (2) in integral arrangement, so that the laminar part (2) is essentially at right angles to the axis of the cylindrical part (1), said cylindrical part (1) having a cylindrical body (3) joined to the cylindrical part (1) by radial arms (4), said cylindrical body (3) determining two recesses, one directed towards the rear part which houses the electronic circuit (7) and the other directed towards the rear part which houses the electric motor (5), there remaining between the cylindrical body and cylindrical part a passage for the air, **characterized in that** the cylindrical part (1) is provided with embossed projections between which are determined a number of helicoidal spaces which act together with a helicoidal rib practised on the inside cylindrical face of a ring (25), so that the assembly by screwing of said ring (25) on the cylindrical part (1) mentioned makes it possible to graduate the distance of said ring (25) with the laminar part (2) and **in that** the laminar part (2) has on its perimeter an elastic section (31) that extends beyond said perimeter, capable of being anchored in a groove (21) on the side edge of a front cover (8), which has the form of a thin bowl and has an opening (17) for the passage of air.

2. Extractor in accordance with claim 1, **characterized in that**, at least two of the radial arms (4), diametrically opposite, have each a fork which determines an open space in the cylindrical part (1), being closed by a front partition, which is traversed by a screw (11) which also traverses a folded fluke (9) capable of tilting back and forth, and is screwed into a piece (32) in form of a prism.

Patentansprüche

1. Lüfter, der für Gebäude geeignet ist und umfasst: ein tragendes Gehäuse aus isolierendem Material, das in einer integralen Anordnung aus einem zylindrischen Teil (1) und einem Laminarteil (2) besteht, so dass der Laminarteil (2) im wesentlichen in rechten Winkeln zu der Achse des zylindrischen Teils (1) steht, welcher zylindrische Teil (1) einen Zylinderkörper (3) aufweist, der mittels radialer Arme (4) mit dem zylindrischen Teil (1) verbunden ist, welcher zylindrische Körper (3) zwei Ausnehmungen festlegt, wobei eine in Richtung des Hinterteils gerichtet ist, das die elektronische Schaltung (7) aufnimmt und die andere in Richtung des Hinterteils gerichtet ist, das den Elektromotor (5) aufnimmt, wobei zwischen dem zylindrischen Körper und dem zylindrischen Teil ein Durchlass für die Luft verbleibt, **dadurch gekennzeichnet, dass** der zylindrische Teil (1) mit erhabenen Vorsprüngen versehen ist, zwischen denen eine Anzahl spindelförmige

ger Räume festgelegt ist, die mit einer spindelförmigen Rippe, die auf der Innenseite einer zylindrischen Fläche eines Rings (25) vorgesehen ist, zusammenwirken, so dass es die Anordnung durch Schrauben des Rings (25) auf den erwähnten zylindrischen Teil (1) ermöglicht, den Abstand des Rings (25) zu dem Laminarteil (2) abzustufen, und dadurch, dass der Laminarteil (2) auf seinem Umfang einen federnden Bereich (31) aufweist, der sich über den Umfang hinaus erstreckt und dazu geeignet ist, in einer Nut (21) auf der Seitenkante einer Frontabdeckung (8), die die Form einer flachen Schüssel und eine Öffnung (17) zum Durchlass von Luft aufweist, verankert zu werden.

2. Lüfter nach Anspruch 1, **dadurch gekennzeichnet, dass** wenigstens zwei der radialen Arme (4), die diametral vorgesehen sind, jeweils eine Gabel aufweisen, die einen offenen Raum in dem zylindrischen Teil (1) festlegen, der durch eine vordere Trennwand geschlossen ist, die von einer Schraube (11) durchlaufen wird, welche auch eine klappbare Flanke (9) durchläuft, die dazu geeignet ist, sich nach hinten und vorne zu neigen, und welche in ein Stück (32) in der Form eines Prismas geschraubt ist.

Revendications

1. Extracteur d'air adaptable à des bâtiments, qui comporte un carter de support d'un matériau isolant qui est constitué d'une partie cylindrique (1) et d'une partie laminaire (2) sous forme d'un arrangement solidaire, afin que la partie laminaire (2) soit pratiquement perpendiculaire à l'axe de la partie cylindrique (1), la partie cylindrique (1) ayant un corps cylindrique (3) raccordé à la partie cylindrique (1) par des bras radiaux (4), le corps cylindrique (3) délimitant deux cavités dont l'une est dirigée vers la partie arrière qui loge le circuit électronique (7) et l'autre est dirigée vers la partie arrière qui loge le moteur électrique (5), un passage pour l'air restant entre le corps cylindrique et la partie cylindrique, **caractérisé en ce que** la partie cylindrique (1) a des saillies entre lesquelles sont déterminés un certain nombre d'espaces hélicoïdaux qui forment ensemble une nervure hélicoïdale disposée à la face cylindrique interne d'un anneau (25) afin que l'assemblage par vissage de l'anneau (25) sur la partie cylindrique précitée (1) rende possible la gradation de la distance de l'anneau (25) sur la partie laminaire (2), et **en ce que** la partie laminaire (2) a à sa périphérie un tronçon élastique (31) qui s'étend au-delà de la périphérie et qui peut être fixé dans une gorge (21) du bord latéral du couvercle avant (8) qui a la forme d'une mince cuvette et qui a une ouverture (17) pour le passage d'air.

2. Extracteur selon la revendication 1, **caractérisé en ce que** deux au moins des bras radiaux (4) diamétralement opposés ont chacun une fourche qui délimite un espace ouvert dans la partie cylindrique (1) et qui est fermé par une cloison avant qui est traversée par une vis (11) qui passe aussi dans une aile pliée (9) qui peut basculer vers l'avant et vers l'arrière et est vissée sur une pièce (32) en forme de prisme.

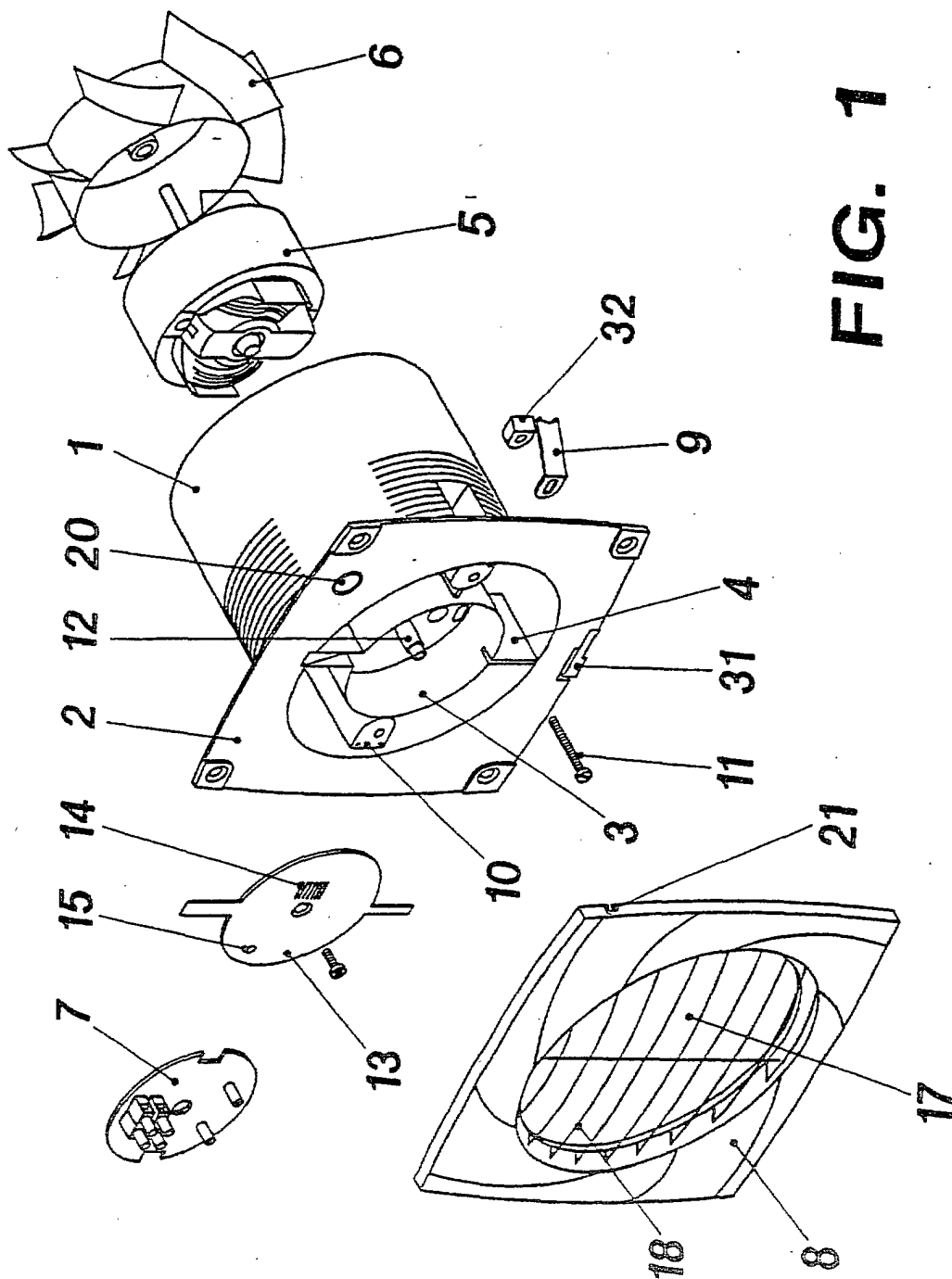


FIG. 1

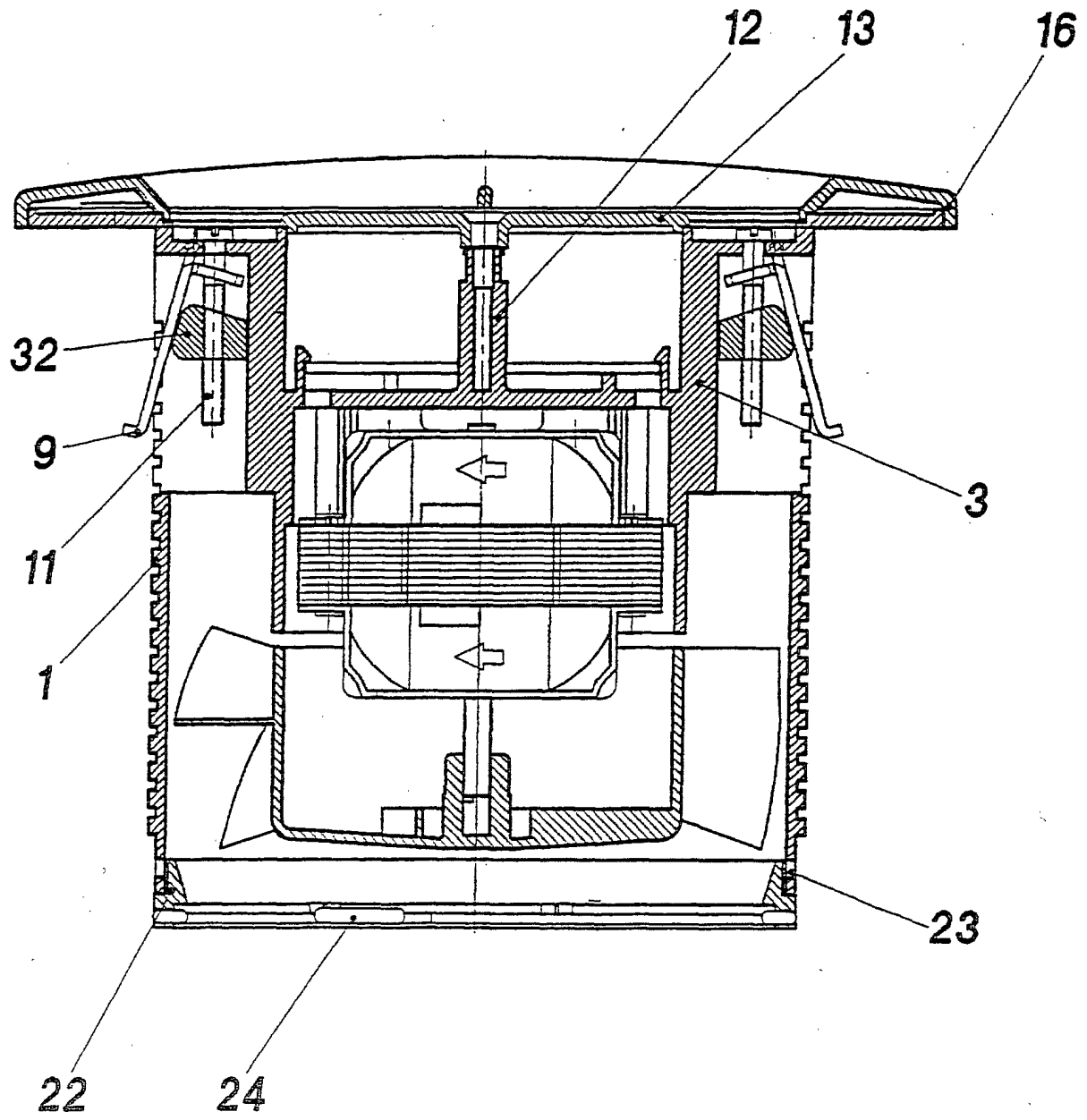
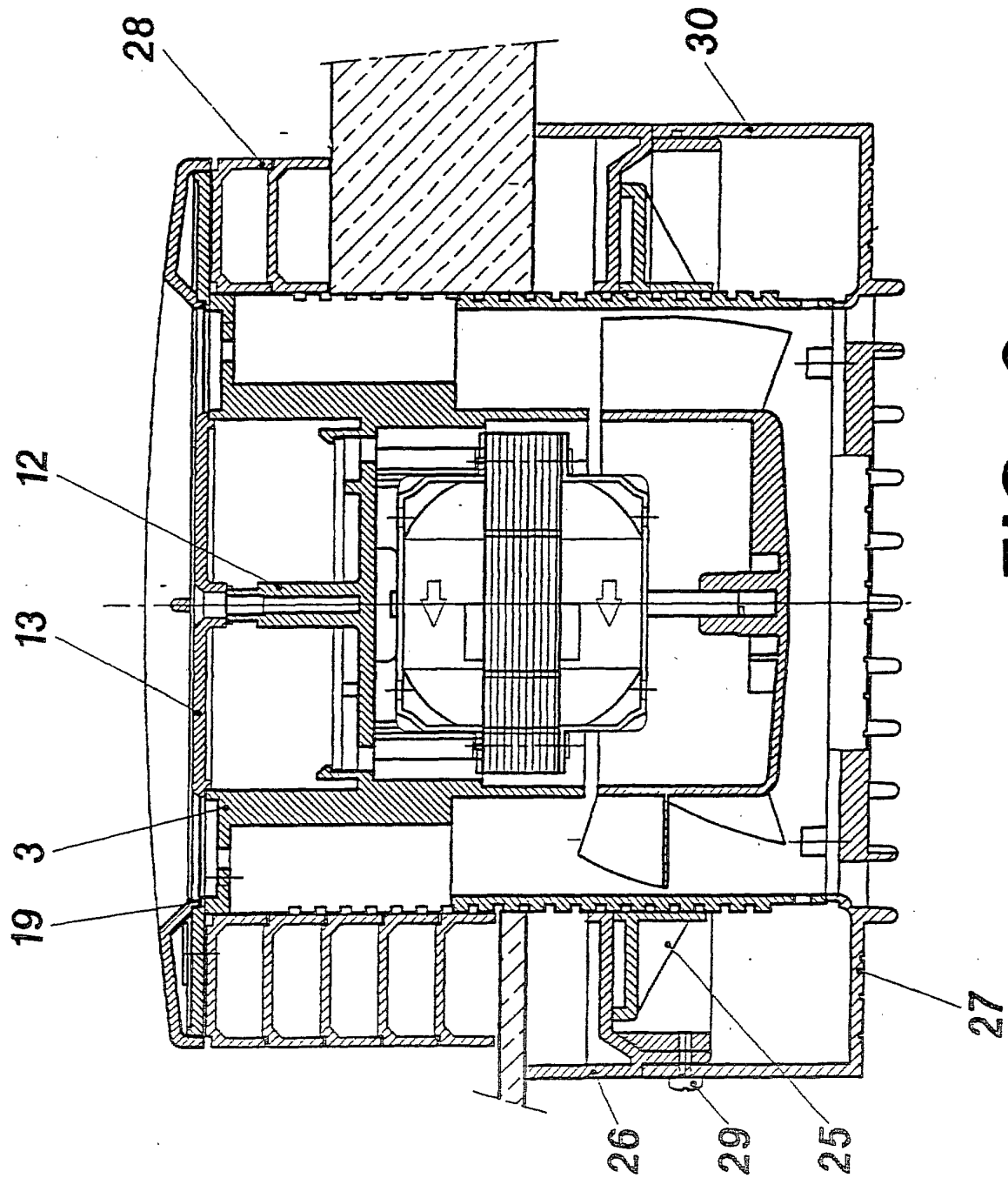


FIG. 2



35

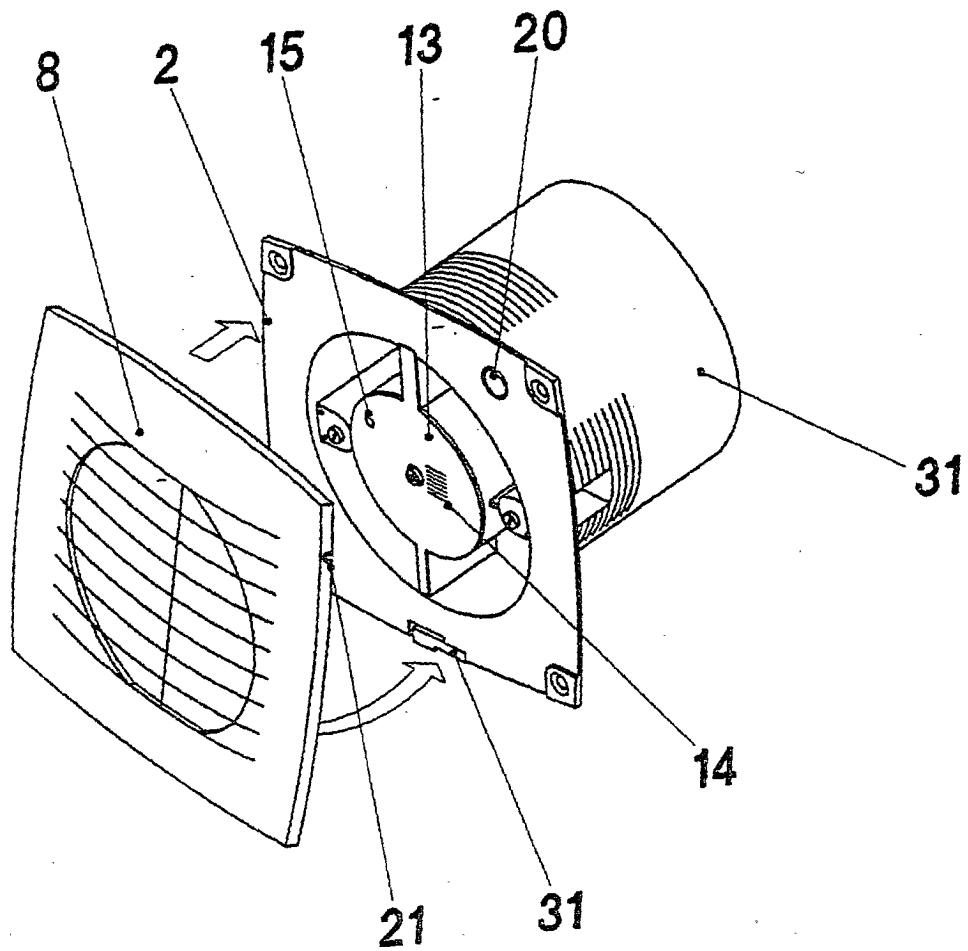


FIG. 4