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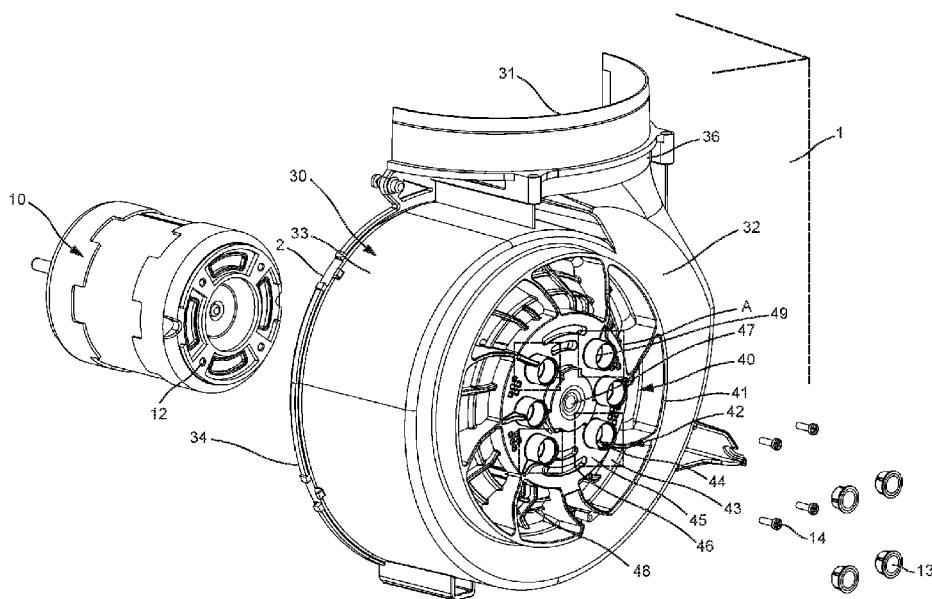


Figure 1

(57) Abstract: The invention relates to a housing for the radial fan of the range hood (1), comprising a spiral hollow body (30) surrounding an inner chamber (2); an air outlet (31) disposed on an upper end (36) of the body (30) to reach the inner chamber (2); an air suction nozzle (40) disposed on a flat front wall (32) of the body (30) angular with the air outlet (31); a support plate (45) provided at the center of the air suction nozzle (40) and having a plurality of mounting holes (49) provided thereon; and a plurality of flat blade members (42) that hold on to the support plate (45) from its first end (421) and to the front wall (32) from its opposite second end (423) such that the support plate (45) is suspended at the air suction nozzle (40) creating a plurality of air inlets (43) there between reaching to the inner chamber (1). The blade members (42) have a curvilinear form that forms a spiral when placed together at the air suction nozzle (40) around the support plate (45).



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A HOUSING FOR THE RADIAL FAN OF A RANGE HOOD

5 TECHNICAL FIELD

The invention relates to a housing which is suitable for a radial fan drawing the ambient air of the range hood and on which a motor is mounted.

10 BACKGROUND OF THE INVENTION

tA radial fan and a blower motor driving the fan is disposed inside the housing are provided on the hoods with a radial fan. The blower motor is attached on the housing by means of a motor suspension. The motor bearing comprises three arms each flanged to the body. The arms extend from the respective attachment section on the housing into a fan wheel surrounding the blower motor. The housing is designed to be double-flow spiral housing in particular variants. The air drawn in from the ambient flows substantially axial to the fan wheel through the air inlets on both sides, reaching a higher pressure and is discharged radially from an air outlet. It is generally known that such housings vibrate while radial fan is operated and disturbing noises may occur. Also, it is important to block the air inlet as little as possible, especially so as not to reduce the efficiency of the radial fan.

EP2971788 discloses a bearing shield with an air inlet delimited by an edge of a range hood comprising at least one support edge for a radial fan. The housing has a spiral shaped body having an air inlet and an edge. Further, at least one support edge extends in a spiral shape same as the shape of the spiral shaped body and at least one support edge is adjacent to the air inlet.

SUMMARY OF THE INVENTION

30 The object of the invention is to provide a housing for the radial fan of the range hood with an improved extraction performance.

In order to achieve abovementioned objects, the invention relates to a housing for the radial fan of the range hood, comprising a spiral hollow body surrounding an inner chamber; an air outlet located on an upper end of the body to reach the inner chamber; an air suction nozzle located on a flat front wall of the body angular with the air outlet; a support plate provided at the center of the air suction nozzle and having a plurality of mounting holes provided thereon;

and a plurality of flat blade members that hold on to the support plate from its first end and to the front wall from its opposite second end such that the support plate is suspended at the air suction nozzle creating a plurality of air inlets there between reaching to the inner chamber. In the housing, the blade members have a curvilinear form that forms a spiral when placed together at the air suction nozzle around the support plate. The spiral form of the blade members ensures that the ambient air is sucked into the air inlet by creating a vortex from the air suction nozzle and increases the range hood suction performance during suction by a radial fan to be placed in the housing. The spiral form of the blade members can be adjusted clockwise or counterclockwise. The spiral form may have a center coaxial with the center of the support plate or may be centered from a different point on the support plate.

A preferred embodiment of the invention comprises a casing that surrounds each mounting hole and extends outward from the support plate. By preventing the formation of turbulence due to mounting hole in the vortex forming suction air directed to the air inlet over the spiral formed blade members of the casing, it is ensured that the air suction efficiency of the range hood is increased.

A preferred embodiment of the invention comprises a tab provided on the outer perimeter along the width of the casing from a proximal end and extending adjacently from a distal end to the first end of the blade member. The tab forms the continuation of the blade member and thus the spiral blade structure is extended from the mounting wall at the front of the body over the support plate. Thereby, it is possible to direct the part of the ambient air sucked from the air inlet running into the support plate towards the air inlet over the spiral blade members without disturbing the vortex direction.

In a preferred embodiment of the invention, the form of the tab extends radially outward from the casing in accordance with the spiral structure of the adjacent blade member. In this way, the extension of the tab maintains the curvature of the blade member and acts as a continuation of the blade member and directs the air.

In a preferred embodiment of the invention, the blade members are provided in the same form and at an equal distance with each other for delimiting the air inlets. The blade members can manipulate the air in the direction of rotation during air suction because they define the outer limits of the air inlet. The blade members having the equal form and located at the equal distance both prevent the disruption of the flow line in the ambient air in which the suction is performed and allow the support plate to be fixed in place with a high structural strength against the air flow by the blade members on the front wall of the body.

In a preferred embodiment of the invention, a longitudinal auxiliary air inlet opens on the support plate and reaches to the inner chamber. The auxiliary air inlet ensures that the negative pressure created by the radial fan creates an air passage over the support plate, thereby increasing the efficiency of air suction. The auxiliary air inlet has the structure of a single or multiple, asymmetrically or preferably symmetrically longitudinal hole which is distributed on the support plate.

In a preferred embodiment of the invention, the frame surrounds the blade members such that it divides the air inlet transversely. The frame creates a grid structure by dividing each air inlet transversely on the blade members that limit the air inlet longitudinally. The grid reduces the pressure of the ambient air sucked from the outside and creates a shield for preventing the foreign substances from entering into the radial fan from an outer environment.

In a preferred embodiment of the present invention, the support plate and the blade members are integrated to the body together. This prevents the vibrations caused by the radial fan from making noise on the support plate and also enables it to be produced in one piece by a process such as plastic injection.

In a preferred embodiment of the invention, the blade member comprises a flat directing wall extending in an expansible manner from the first end to the second end. In this case, while suspending a flat support plate from the first end thereof, it does not form a protrusion structure that will adversely affect the air flow from the air inlet, in contrast, it forms a large holding area supporting the air suction nozzle from its second end.

An object of the invention is to create a connection structure of the support plate that allows more than one radial blower motor to be mounted. In order to achieve abovementioned objects, the invention relates to a housing for the radial fan of the range hood, comprising a hollow body surrounding an inner chamber; an air outlet located on an upper end of the body to reach the inner chamber; a mounting cap having a plurality of through hole provided on a front wall of the body angular with the air outlet and reaching to the inner chamber. The housing comprises preferably a support plate provided at the center of the air suction nozzle and having a plurality of mounting holes symmetrically grouped to form simultaneously a first motor connection unit suitable for a first type of first motor and a second motor connection unit suitable for a second motor. In this case, it is possible to fix the motor to the support plate, for example in the radial fan using a capacitive motor or a square motor.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a representative embodiment of a housing according to the invention for a radial fan for a range hood in which a capacitive motor is used, with the motor
5 being disassembled.

Figure 2 is a perspective view of a representative embodiment of a housing according to the invention for a radial fan for a range hood in which a square motor is used, with the motor
10 being disassembled.

Figure 3 is a zoomed-in view of the air suction nozzle of a representative embodiment of the housing according to the invention.

Figure 4 is a representative view of the groups of the motor connection unit in the housing
15 shown in Figure 3.

BRIEF DESCRIPTION OF THE DRAWINGS

In this detailed description, the development of the invention has been described without any
20 limitation and only with reference to the examples for a better explanation of the subject.

In Figure 1, there is shown a perspective view of a housing surrounding an inner chamber (2) into which a first motor (10) located on the range hood (1) is placed. The housing (2) comprises a hollow semi-cylinder body (30). On the upper part of the body (30), there is
25 provided an air outlet (31). On the face of the first motor (10) facing the body (30), there are four holes (12) located at an equal angle close to the edge. On the other hand, there is a screw (14) corresponding to each hole (12) on the outer part of the body (10) and a plug (13) fitting on the screw (14).

30 A front wall (32) of the body (30) surrounded by the curvilinear lateral part (33) is in the flat form and rises towards the air outlet (31). An air suction nozzle (40) having an outer periphery (41) spaced along the edge of the front wall (32) has an air inlet (43) reaching to the inner chamber (2). The air inlet (43) is placed between a support plate (45) located in the
35 middle of the air suction nozzle (40) and the outer periphery (41). In order to achieve this, the blade members (42) extend radially outward at an equal distance between the outer periphery (41) and the outer edge of the support plate (45). The blade members (42) have a flat form and extend radially inclined towards each other, forming a spiral form. By means of

the flat and thin concentric frames (48) having a ring structure that are intersected by the blade members (42) in the radial direction and placed in the air inlet (43) in accordance with the support plate (45), the air inlet (43) is covered by the blade member (45) and the frames (48) in a grid structure.

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Individual casings (44) extend on the support plate (45) adjacent to the part of each of the blade members (42) facing the support plate (45). The casings (44) are arranged in two-three groups close to each other on the support plate (45) in mirror symmetry. There is a symmetrical auxiliary air inlet (46) facing up and down in the form of an opening radially extending between the two groups of casings (44). The pattern of the auxiliary air inlet (46) is two radial openings that are expansible in a superimposed manner. A hub (47) is located between the auxiliary air inlet (46) and the casings (44) such that the support plate (45) is aligned to the center of the circle.

Each screw (14) passes through the mounting hole (49) in the corresponding casing (44) and passes therefrom to the corresponding hole (12) of the first motor (10). Since the first motor (10) has the type of the capacitive motor, there are four holes (12) in the part of the support plate (45) resting on the inner chamber (2). An individual plug (13) adjusted to fit into the casing (44) is seated on the screws (14) placed into the support casings (44) corresponding to the holes (12). The mounting holes (49) and screws (14) required for the mounting of the first motor (10) through the holes (12) form a first motor connection unit (A).

In Figure 2, there is shown a perspective view of the housing body (30) that is identical to the form in Figure 1, in which a second motor (20), which is a square motor, is mounted. Herein, on the second motor (20), there are two opposite mounting pins (22) in the rod structure extending outwards. The mounting pins (22) are mounted to the support plate (45) with two opposing casings (44) forming a second motor connection unit (B) and a nut (15) located outside by passing through the mounting hole (49) therein. An individual plug (13) is covered on the nuts (15). Thereby, the nozzle of the casing (44) is closed and a semi-cylindrical structure is obtained.

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In Figure 3 and Figure 4, there is shown a zoomed-in view of a front wall (32) on the body (30) in a representative embodiment of the housing according to the invention. Each blade (42) is connected from a first end (421) to the air suction nozzle (40) on the front wall (32) of the body (30) from its outer periphery (41) in the form of a pulley. The blade member (42) holds on to the support plate (45) from side wall thereof from the opposite second end (423). Each casing (44) comprises a cylindrical extension (441) that surrounds a corresponding mounting hole (49), and a tab (442) extending from the part thereof facing radially outward to

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the blade member (45) and standing on the support plate (45). The tab (442) is adjacent to the lateral wall of the extension (441) at one proximal end and adjacent the blade member (42) at the second end (423) at a distal end (444). The directing wall (422) of the blade member (42) in the form of a flat plate extends perpendicular to the body (30) such that it at least closes the air inlet (43). The directing wall (422) is wide at the first end (421) and transitively in a narrow form at the second end (423). An outer edge (446) of the casing (44) forming the nozzle of the extension (441) is in circular form with a larger diameter than the mounting hole (49). Thereby, the plug (13) easily passes through the outer edge (446) and sits on the screw (14) or nut (15) that rests against the outer face of the support plate (45) and surrounds the mounting hole (49).

In Figure 4, there are shown the first and second engine connection units (A, B) consisting of the mounting holes (49) selected according to the type of motor to be placed on the body (30) of the housing and of the casing (44) surrounding it. It is possible to mount the first motor (10) or the second motor (20) by using the same body (30) structure. Accordingly, the corresponding first or second motor connection unit (A, B) is connected through the mounting holes (39).

After connecting the first or second motors (10, 20), the radial fan is operated and suction is performed. In the meantime, the outdoor air is taken from the air suction nozzle (40) to the inner chamber (2) such that it is directed to the air outlet (31). The outdoor air creates a flow indirectly through the support plate (45) or directly from the corresponding air inlet (43) to the first or second motor (10, 20). This flow is in the form of a vortex due to the spiral form formed by the blade members (42) together on the air inlets (43). In this air flow in which the ambient air facing the air suction nozzle (40) is drawn circumferentially into the inner chamber (2), the cylindrical casings (44) prevent the formation of turbulence and take the air from the second end (423) to the directing wall (422) over the tab (442) and the air passing through therefrom reaches the inner chamber (2). Preventing the turbulence reduces the noise created by the suction air while passing through the air inlet (43). Vibrations created by the first or second motor (10, 20) during operation are transferred from the support plate (45) to the blade members (42) and are damped here. Thereby, silent operation of the first or second motor (10, 20) inside the body (30) is possible.

35 REFERENCE NUMBERS

1 Range hood

421 First end

2 inner chamber	422 Directing wall
10 First motor	423 Second end
12 Hole	43 Air inlet
13 Plug	44 Casing
14 Screw	441 Extension
15 Nut	442 Tab
20 Second motor	443 Proximal End
22 Mounting pin	444 Distal end
30 Body	446 Outer edge
31 Air outlet	45 Support plate
32 Front wall	46 Auxiliary air inlet
33 Lateral part	47 Hub
34 Rear wall	48 Frame
36 Upper end	49 Mounting hole
40 Air suction nozzle	A First motor connection unit
41 Outer periphery	B Second motor connection unit
42 Blade member	

CLAIMS

- 5 1- A housing for the radial fan of the range hood (1), comprising a spiral hollow body (30) surrounding an inner chamber (2); an air outlet (31) disposed on an upper end (36) of the body (30) to reach the inner chamber (2); an air suction nozzle (40) disposed on a flat front wall (32) of the body (30) angular with the air outlet (31); a support plate (45) provided at the center of the air suction nozzle (40) and having a plurality of mounting holes (49) provided thereon; and a plurality of flat blade members (42) that hold on to the support plate (45) from its first end (421) and to the front wall (32) from its
10 opposite second end (423) such that the support plate (45) is suspended at the air suction nozzle (40) creating a plurality of air inlets (43) there between reaching to the inner chamber (1), characterized in that the blade members (42) have a curvilinear form that forms a spiral when placed together at the air suction nozzle (40) around the support plate (45).
- 15 2- A housing according to claim 1, wherein a casing (44) surrounds each mounting hole (49) and extends outward from the support plate (45).
- 20 3- A housing according to claim 2, wherein a tab (442) is provided on the outer perimeter along the width of the casing (44) from a proximal end (443) and extends adjacently from a distal end (444) to the first end (421) of the blade member (42).
- 25 4- A housing according to claim 3, wherein the form of the tab (442) extends radially outward from the casing (44) in accordance with the spiral structure of the adjacent blade member (42).
- 30 5- A housing according to any one of the preceding claims, wherein the blade members (42) are provided in the same form and at an equal distance with each other so as to delimit the air inlets (43).
- 35 6- A housing according to any one of the preceding claims, wherein a longitudinal auxiliary air inlet (46) opens on the support plate (45) and reaches to the inner chamber (2).
- 7- A housing according to any one of the preceding claims, wherein a frame (48) surrounds the blade members (42) such that it divides the air inlet (43) transversely.
- 8- A housing according to any one of the preceding claims, wherein the support plate (45) and the blade members (42) are integrated to the body (30) together.

9- A housing according to any one of the preceding claims, wherein the blade member (42) comprises a flat directing wall (422) extending in an expansible manner from the first end (421) to the second end (423).

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10-A housing for the radial fan of the range hood (1), comprising a hollow body (30) surrounding an inner chamber (2); an air outlet (31) located on an upper part (36) of the body (30) to reach to the inner chamber (2); an air suction nozzle (40) provided on a front wall (32) of the body (30) angularly with the air outlet (31) and having a plurality of air inlets (43) provided thereon, reaching to the inner chamber (2), characterized in that a support plate (45) is provided at the center of the air suction nozzle (40) and having a plurality of mounting holes (49) symmetrically grouped to form simultaneously a first motor connection unit (A) suitable for a first type of first motor (10) and a second motor connection unit (B) suitable for a second motor (20) provided thereon.

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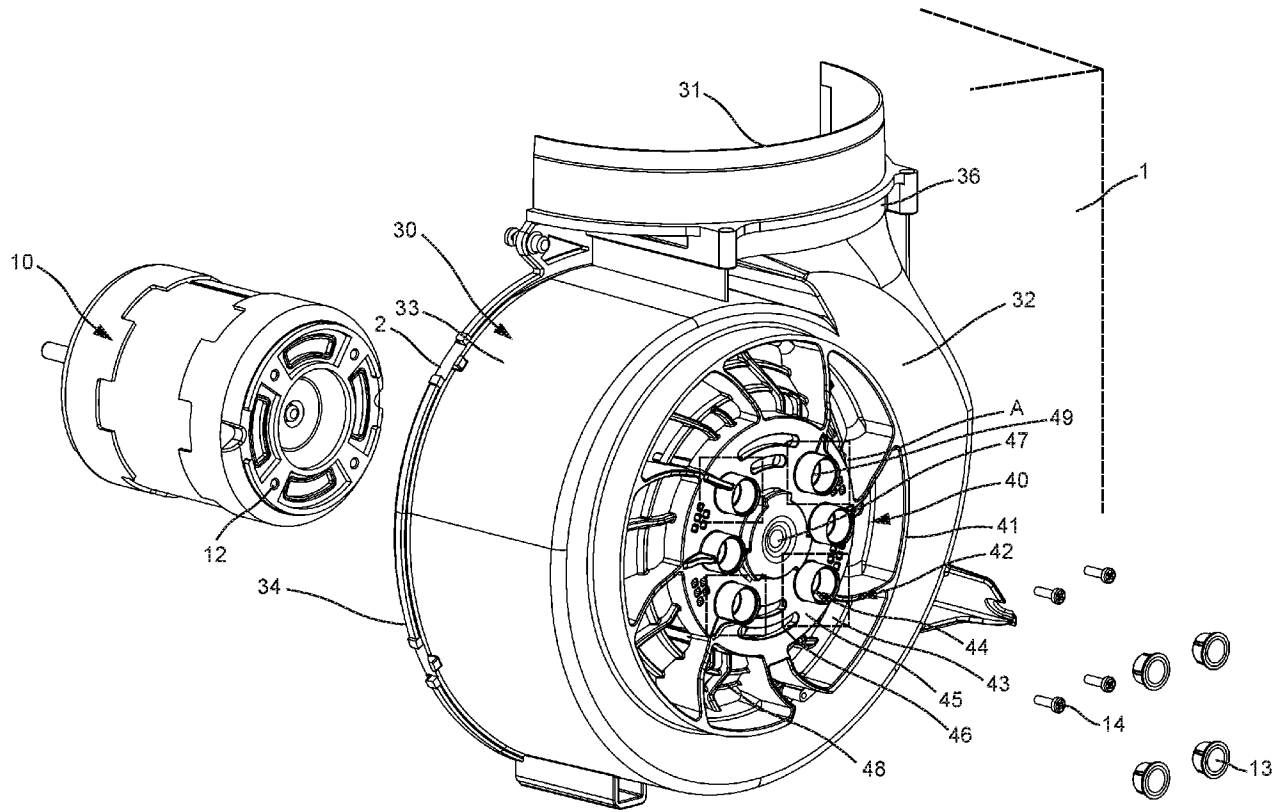


Figure 1

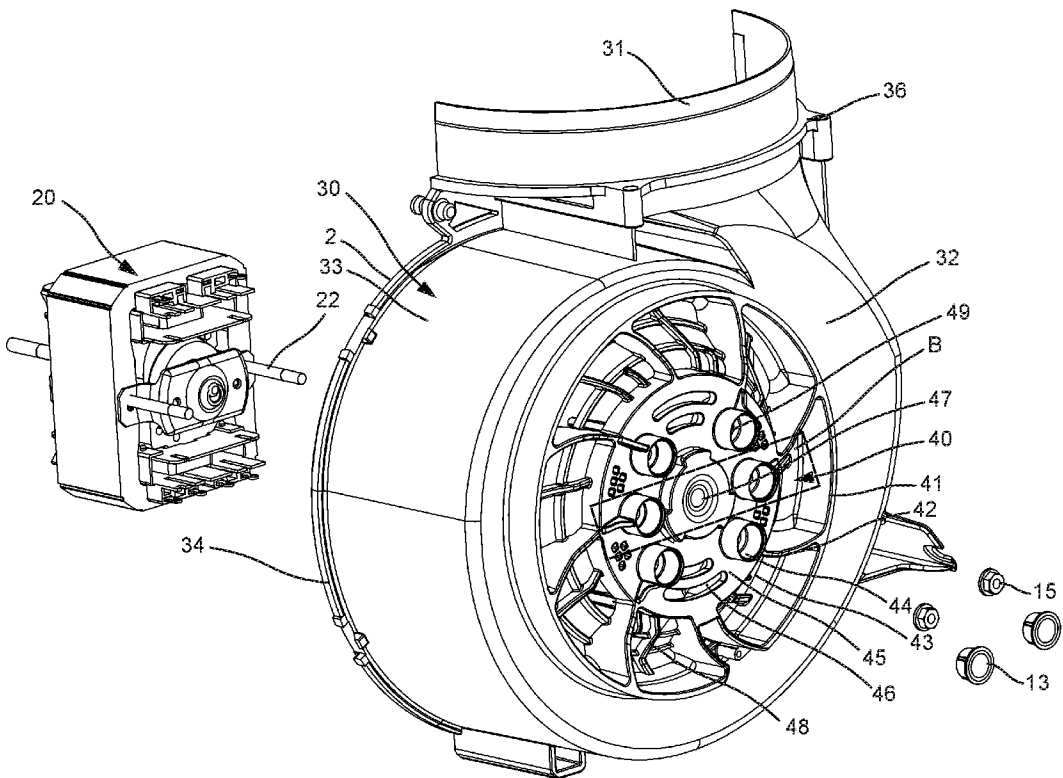


Figure 2

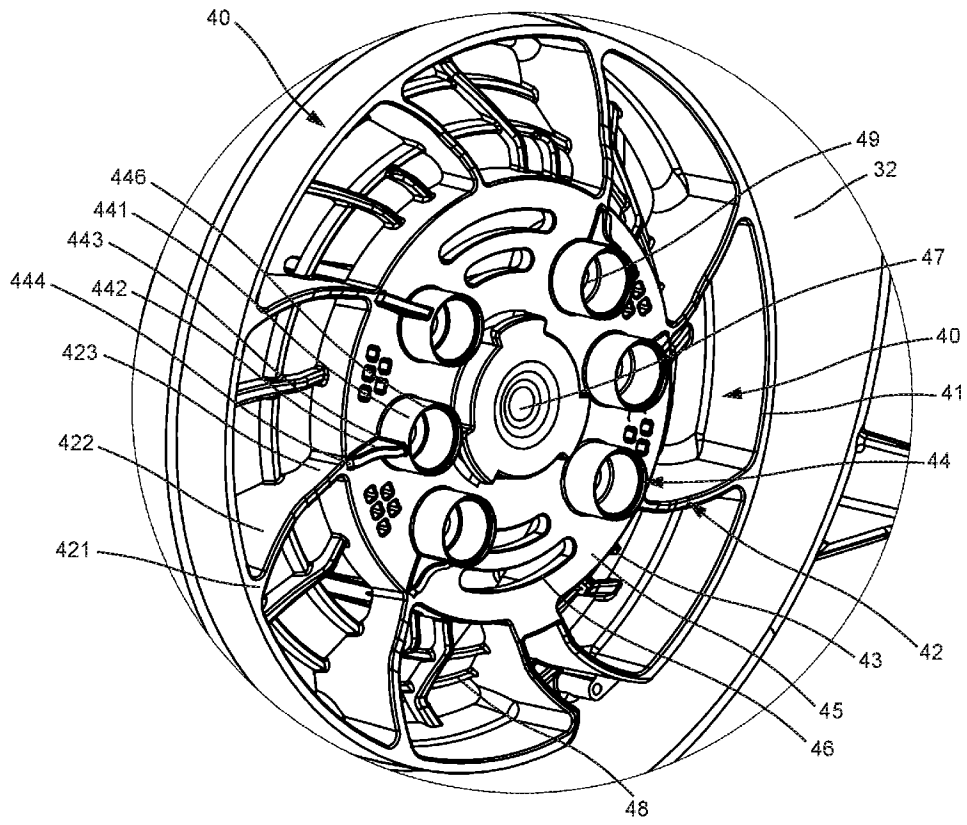


Figure 3

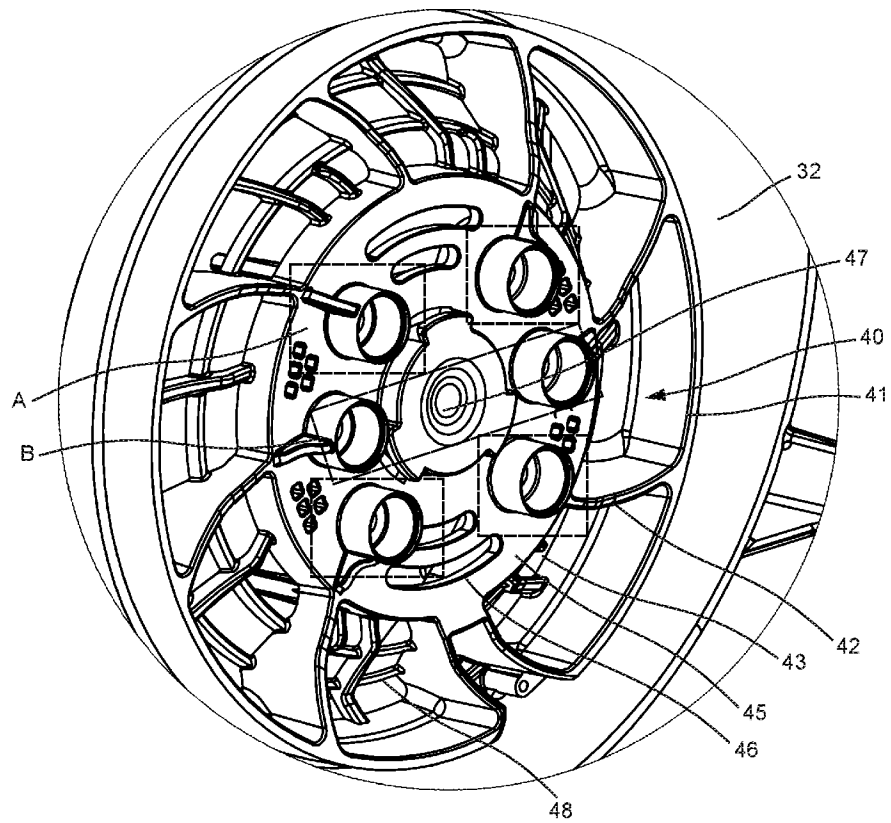


Figure 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/TR2020/050319

A. CLASSIFICATION OF SUBJECT MATTER

F04D 29/42 (2006.01)i; F24C 15/20 (2006.01)i; F04D 25/08 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F04D; F24C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI, EPOQUE, Espacenet, TURKPATENT

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 3037672 A1 (INDESIT CO SPA [IT]) 29 June 2016 (2016-06-29) Abstract; Description Paragraphs 62, 76; Figures 3-4	1-10
X	WO 2019034369 A1 (ARCELIK AS [TR]) 21 February 2019 (2019-02-21) Abstract; Figure 1	1-9
X	EP 3228875 A1 (FABER SPA [IT]) 11 October 2017 (2017-10-11) Abstract; Figure 1	1-9
X	CN 210088937 U (ZHONGSHAN CITY LINBO ELECTRICAL APPLIANCE CO LTD) 18 February 2020 (2020-02-18) Abstract; Figure 3	1-9
A	CN 204648450 U (SHANGHAI XIZHI ENVIRONMENTAL PROT TECHNOLOGY CO LTD) 16 September 2015 (2015-09-16) Abstract; Figures 1-2	1-10
A	CN 209704924 U (NINGBO FOTILE KITCHEN WARE CO) 29 November 2019 (2019-11-29) Abstract; Figures 1-4	1-10

 Further documents are listed in the continuation of Box C. See patent family annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/TR2020/050319

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/TR2020/050319

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