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(54) **Exhaust hood**

(57) Described is a hood for a domestic kitchen comprising:

- a centrifugal fan (2) comprising a volute (21) and a wheel (22) positioned inside the volute (21), the wheel (22) having an axis (220) of rotation; the volute (21) comprising a first inlet opening (210) allowing entry of air inside the volute (21); the volute (21) comprising a first and a second side (211, 212) extending transversally to a direction identified by the axis (220) of rotation; the first side (211)

circumscribing the first inlet opening (210);

- an enclosure (3) housing at least a part of the volute (21) and the wheel (22).

The enclosure (3) comprises a first and a second wall (51, 52) reciprocally convergent and connecting in a first zone (30) of reciprocal connection, the first and the second wall (51, 52) not being coplanar.

At least a part of the first wall (51) of the volute (21) faces the first connection zone (30).

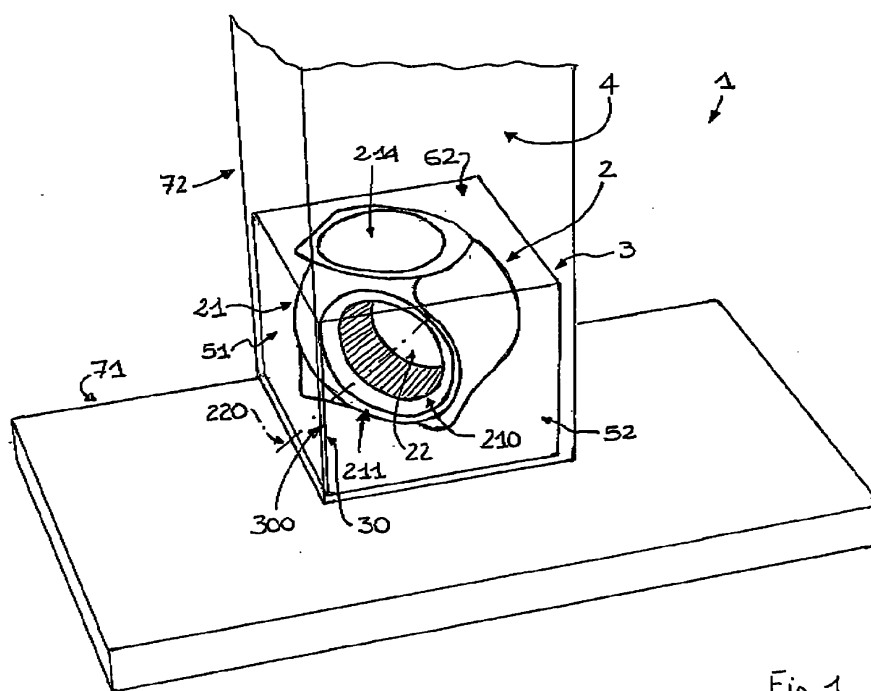


Fig. 1

## Description

**[0001]** This invention relates to a hood for a domestic kitchen.

**[0002]** Known in the prior art are hoods for domestic kitchens comprising:

- a centrifugal fan comprising a volute and a wheel positioned inside the volute, the wheel having an axis of rotation; the volute comprising a first inlet opening allowing entry of air inside the volute; the volute comprising a first and a second side extending transversally to a direction identified by the axis of rotation; the first side circumscribing the first inlet opening; the centrifugal fans having an air inlet direction substantially at right angles to the air outlet direction;
- an enclosure substantially in the shape of a parallelepiped housing the volute and the wheel;

**[0003]** The enclosure comprises a lower air inlet opening. On an upper surface (in a position substantially opposite the lower opening) the enclosure comprises an opening through which the air coming from the volute passes. Conveniently, the hoods comprise a lower structure for collecting air having a substantially horizontal main direction of extension and an upper flue having a mainly vertical direction.

**[0004]** The enclosure is housed in the flue. More specifically, the flue comprises a front decorative cover which extends vertically and is parallel to and against a first face of the parallelepiped-shaped housing.

**[0005]** The inlet opening of the centrifugal fan is substantially parallel to a second face of the parallelepiped-shaped enclosure, the second face being at right angles to the first face. The air enters inside the enclosure from the bottom, then flows into the volute and lastly is expelled from the enclosure through an upper surface of the enclosure.

**[0006]** In order to limit the size of the enclosure the inlet opening of the volute is positioned against the face of the enclosure and this generates noise and major head losses; in effect, immediately upstream of the inlet opening there is a reduced passage cross-section at which there is also a sudden change of direction of the air flow.

**[0007]** In this context, the technical purpose which forms the basis of this invention is to provide a hood that overcomes the above mentioned drawbacks of the prior art.

**[0008]** More specifically, an important aim of this invention is to provide a hood which is capable of minimising the head losses and the noise.

**[0009]** The technical purpose indicated and the aims specified are substantially achieved by a hood comprising the technical features described in one or more of the accompanying claims.

**[0010]** Further features and advantages of this invention are more apparent from the non-limiting description which follows of a preferred, non-limiting embodiment of

a hood as illustrated in the accompanying drawings, in which:

- Figure 1 is a perspective view of a hood according to this invention with some parts cut away to allow the parts behind to be seen;
- Figure 2 is a schematic top view of a portion of the hood of Figure 1. With reference to the accompanying drawings, the numeral 1 denotes a hood. The hood is a hood for a domestic kitchen. It is suitable for household use.

**[0011]** The hood 1 comprises a fan 2, typically of a centrifugal type, comprising a volute 21 and a wheel 22 positioned inside the volute 21, the wheel 22 having an axis 220 of rotation.

**[0012]** The adjectives "radial" and "axial" are relative to the axis 220 of rotation of the wheel 22.

**[0013]** The volute 21 comprises a first inlet opening 210 allowing entry of the air inside the volute 21. The volute 21 comprises a first side 211 extending transversally to a direction identified by the axis 220 of rotation. The first side 211 circumscribes the first inlet opening 210. More specifically, the first side 211 delimits the first inlet opening 210.

**[0014]** The hood 1 also comprises an enclosure 3 housing at least a part of the volute 21 and the wheel 22. As shown by way of an example in the accompanying drawings, the volute 21 and the wheel 22 are completely contained in the enclosure 3 (in this regard, the enclosure 3, as illustrated in the accompanying drawings, is hollow).

**[0015]** The enclosure 3 comprises a first and a second wall 51, 52 which converge on each other.

**[0016]** The first and the second wall 51, 52 connect together in a first zone 30 of reciprocal connection. As shown by way of example in the accompanying drawings, the first and the second wall 51, 52 are not coplanar. In a preferred embodiment of this invention, the first and the second wall 51, 52 are at right angles to each other.

**[0017]** At least a part of the first wall 51 of the volute 21 faces the first connection zone 30.

**[0018]** More specifically, the first inlet opening 210 is inside the enclosure 3 and faces the first connection zone 30. Conveniently, the distance, measured on the axis 220 of rotation, between the enclosure 3 and the first inlet opening 210 is greater than 1/4 of the external diameter of the wheel 22, preferably it is greater than 1/3 of the external diameter of the wheel 22, even more preferably it is greater than half of the external diameter of the wheel 22. In a specific embodiment, the distance, measured on the axis 220 of rotation, between the enclosure 3 and the first inlet opening 210 is conveniently greater than 1/4 of an internal reference diameter, preferably it is greater than 1/3 of the internal reference, even more preferably it is greater than half of the internal reference diameter (the internal reference diameter being the distance between the inlet edges of any pair of opposite blades relative to the axis 220 of rotation of the wheel 22).

**[0019]** Typically, with a wheel 22 having a diameter of the inlet edge of the blades (that is, the internal reference diameter) equal to 130 mm and in the case in which the axis 220 of rotation of the wheel 22 is inclined by approximately 45° relative to the first or the second wall 51, 52 the distance is equal to approximately 110-130 millimetres (with a different inclination the maximum distance tends to reduce to approximately 70-80 millimetres). With reference to the accompanying drawings, the first and the second wall 51, 52 of the enclosure 3 are substantially vertical. In the preferred embodiment the axis 220 of rotation of the wheel 22 is horizontal. In this way, advantageously, a straight line at right angles to an outlet cross-section of the volute 21 is vertical and a straight line at right angles to the first inlet opening 210 of the volute 21 is horizontal. In other words, the ideal direction of the air leaving the volute 21 is vertical, whilst the ideal direction of the air entering the volute 21 is horizontal.

**[0020]** In the preferred embodiment, the enclosure 3 forms a space shaped substantially as a parallelepiped (which could have a square or rectangular base) or as a cube (or more generally as a right prism).

**[0021]** The first and the second wall 51, 52 lie on planes which are transversal to the axis 220 of rotation 22 of the wheel. In the preferred solution the enclosure 3 comprises a lower base 61, an upper base 62 and a side surface 63 connecting the lower base 61 and the upper base 62. The first and the second wall 51, 52 preferably form part of the side surface 63. The enclosure 3 comprises a lower opening 35 through which air enters the enclosure 3. The lower opening 35 faces downwards. The lower opening 35 is formed in the lower base 61 (in some cases the lower opening 35 occupies entirely the lower base 61). The delivery side 214 of the volute 21 is preferably formed on the upper base 62. Conveniently, the upper base 62 and/or the lower base 61 are/is horizontal.

**[0022]** The hood 1 also comprises a decorative cover 4 having a front portion substantially parallel to a reference plane 40; the front portion of the decorative cover 4 conceals at least a part of the enclosure 3 to an outside observer; the second wall 52 of the enclosure 3 is substantially parallel to the reference plane 40; a vertical plane containing the axis 220 of rotation forms with the reference plane 40 an acute angle of between 15° and 75°, advantageously it is between 25° and 65°, preferably it is between 40° and 50°. The reference plane 40 is substantially vertical.

**[0023]** It consists of a first imaginary vertical plane 9 containing a first and a second edge of the enclosure 3, the enclosure 3 being cubic or parallelepiped in shape and the first and the second edge being parallel and not belonging to a same wall of the enclosure 3. The axis 220 of rotation of the wheel 22 and the first imaginary plane 9 being parallel or coincident or forming an angle less than 20° (in this regard, the first imaginary plane 9 and the axis 220 of rotation have infinite extension). Conveniently, the decorative cover 4 forms and delimits a hollow space. The enclosure 3 preferably comprises a

third and a fourth wall 33, 34 converging in a second zone 301 of reciprocal connection. The third and the fourth wall 33, 34 are not coplanar, and they are preferably at right angles to each other. Preferably, but not necessarily, the volute 21 also comprises:

- a second side 212 extending transversally to the axis 220 of rotation;
- a second inlet opening 213 circumscribed by the second side 212. The second side 212 faces the second connection zone 301. In the embodiment illustrated, the centrifugal fan 1 has a double inlet and a single outlet. Conveniently, the second inlet opening 213 is inside the enclosure 3 and faces the second connection zone 301.

**[0024]** The first connection zone 30 is a junction edge 300 between the first and the second wall 51, 52 or a rounded fitting or a flat chamfer.

**[0025]** A first translation of the junction edge 300 or the rounded fitting or the flat chamfer intersects a least a part of the first inlet opening 210, the first translation occurring along a direction identified by the axis 220 of rotation. As shown by way of example in the accompanying drawings, the first inlet opening 210 of the volute 21 is not parallel to any of the walls of the enclosure 3.

**[0026]** The hood 1 comprises a first structure 71 having a horizontal main direction of extension and a second structure 72 overlapping the first structure 71 and having a vertical main direction of extension. The first structure 71 conveniently defines a collector which facilitates the conveying of the air into the second structure 72. Conveniently, the enclosure 3 lies inside the second structure 72.

**[0027]** This invention also relates to a system comprising:

- a cooking top;
- a hood 1 surmounting the cooking top, the hood having one or more of the technical features described above.

**[0028]** The invention described brings many advantages.

**[0029]** Firstly, it can increase the flow of air drawn inside since the first inlet opening faces towards a corner of the enclosure and thus increases the space in front of the inlet opening. This increase in space allows lower air speeds at the inlet to the volute and, consequently, the distributed head losses, since they are proportional to the square of the air speed, are significantly less. Consequently, it is possible to have a lower air speed and, thus, a potential lower noise. Lower head losses allow the selection of the electric motor for driving the wheel to be optimised.

**[0030]** It shall be understood that the invention described above may be modified and adapted in several ways without departing from the scope of the inventive

concept. Moreover, all the details of the invention may be substituted by other technically equivalent elements. In practice, the embodiments of the invention may be made from any material, and in any size, depending on requirements.

## Claims

### 1. A hood for a domestic kitchen comprising:

- a centrifugal fan (2) comprising a volute (21) and a wheel (22) positioned inside the volute (21), the wheel (22) having an axis (220) of rotation; the volute (21) comprising a first inlet opening (210) allowing entry of air inside the volute (21); the volute (21) comprising a first side (211) extending transversally to a direction identified by the axis (220) of rotation; the first side (211) circumscribing the first inlet opening (210);  
- an enclosure (3) housing the volute (21) and the wheel (22); the enclosure (3) comprising a first and a second wall (51, 52) reciprocally convergent and connecting in a first zone (30) of reciprocal connection, the first and the second wall (51, 52) not being coplanar;  
**characterised in that** at least a part of the first face (51) of the volute (21) faces the first connection zone (30).

### 2. The hood according to claim 1, **characterised in that** the first inlet opening (210) is inside the enclosure (3) and faces the first connection zone (30).

### 3. The hood according to any of the preceding claims, **characterised in that** the enclosure (3) forms an inner space with the shape of a parallelepiped or a cube.

### 4. The hood according to any of the preceding claims, **characterised in that** the first wall (51) and the second wall (52) are substantially vertical.

### 5. The hood according to any of the preceding claims, **characterised in that** it comprises a decorative cover (4) having a front portion substantially parallel to a reference plane (40); the front portion of the decorative cover (4) concealing at least a part of the enclosure (3) to an outside observer; the second wall (52) of the enclosure (3) being substantially parallel to the reference plane (40); a vertical plane containing the axis (220) of rotation forming with the reference plane (40) an acute angle of between 25° and 65°.

### 6. The hood according to any of the preceding claims, **characterised in that** the enclosure (3) comprises a third and a fourth wall (33, 34) converging in a

second zone (301) of reciprocal connection, the third and the fourth wall (33, 34) not being coplanar; the volute (21) comprising:

- a second side (212) extending transversally to a direction identified by the axis (220) of rotation;  
- a second inlet opening (213) circumscribed by the second side (212), the second side (212) facing the second connection zone (301).

### 7. The hood according to claim 6, **characterised in that** the second inlet opening (213) is inside the enclosure (3) and faces the second connection zone (301).

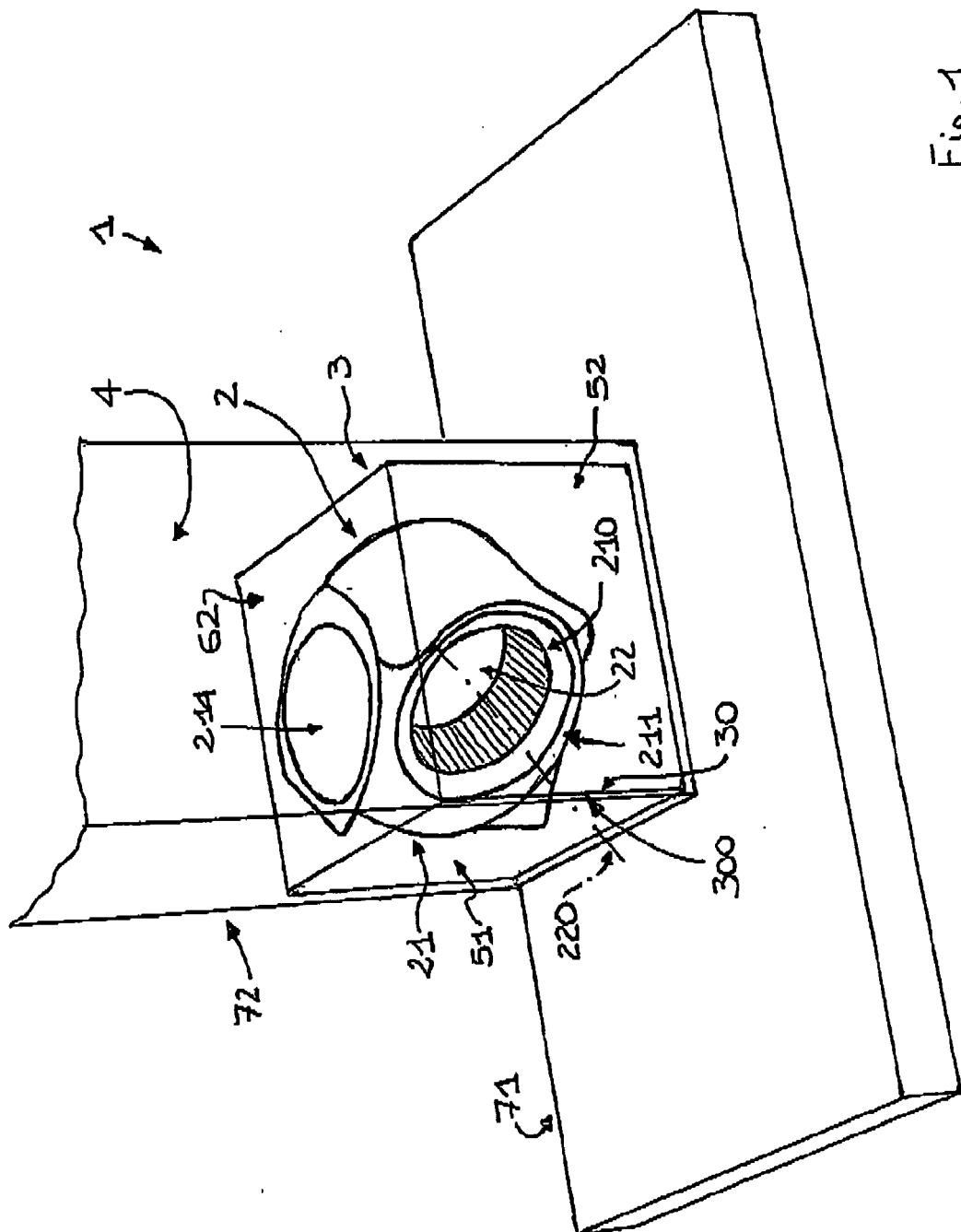
### 8. The hood according to any of the preceding claims, **characterised in that** the first connection zone (30) is a junction edge (300) between the first and the second wall (51, 52) or a rounded fitting or a flat chamfer.

### 9. The hood according to claim 8, **characterised in that** a first translation of the junction edge (300) or the rounded fitting or the flat chamfer intersects at least a part of the first inlet opening (210), the first translation occurring along a direction identified by the axis (220) of rotation.

### 10. The hood according to any of the preceding claims, **characterised in that** the enclosure (3) comprises a lower opening (35) through which air enters the enclosure (3), the lower opening (35) facing downwards.

### 11. The hood according to any of the preceding claims, **characterised in that** the first inlet opening (210) of the volute (21) is not parallel to any of the walls of the enclosure (3).

### 12. The hood according to any of the preceding claims, **characterised in that** it consists of a first imaginary vertical plane (9) containing a first and a second edge of the enclosure (3), the enclosure (3) being cubic or parallelepiped in shape and the first and the second edge being parallel and not belonging to a same wall of the enclosure (3); the axis (220) of rotation of the wheel (22) and the first imaginary plane (9) being parallel or coincident or forming an angle less than 20°.



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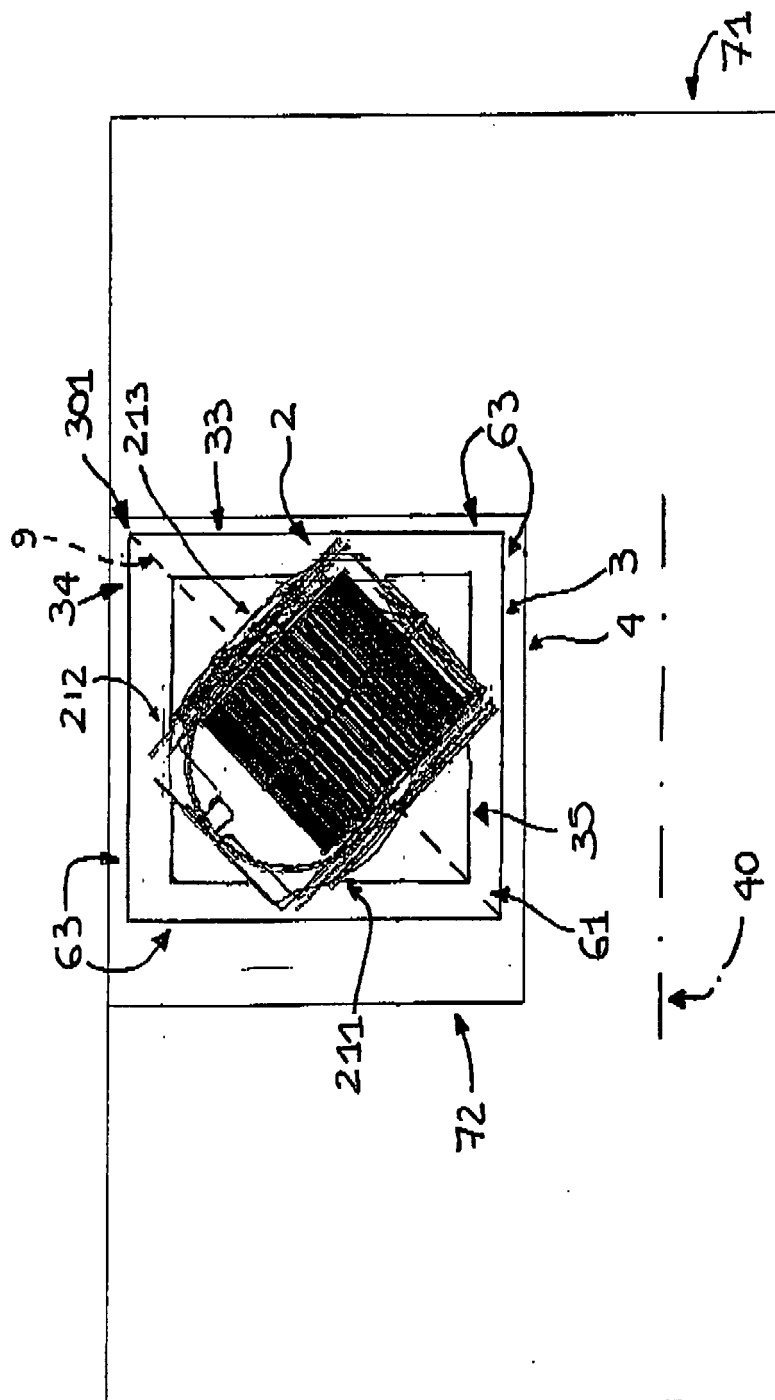


Fig. 2



## EUROPEAN SEARCH REPORT

Application Number  
EP 12 00 4126

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                              |                                  |                                         |
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82