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(54) **FUME EXTRACTION AND/OR FILTRATION HOOD OF IMPROVED TYPE, PARTICULARLY FOR A HOUSEHOLD KITCHEN**

(57) The present invention relates to a fume extraction and/or filtration hood (1), in particular for a household kitchen, comprising:

- a chimney (10) having a hollow interior and comprising lateral walls (11), a back wall (12) and a front wall;
- an inlet section (20) through which fumes flow into the chimney (10);
- a motor fan (30) accommodated in the chimney (10) opposite to the inlet section (20);
- an extraction volume (40) placed between the lateral walls (11) and the motor fan (30);
- a partition element (60) placed between the motor fan (30) and the inlet section (20), the partition element (60) comprising a base (61) facing toward the motor fan (30) and an apex (62) oriented toward the inlet section (20).

According to the invention, the apex (62) has an angle of less than 40°.

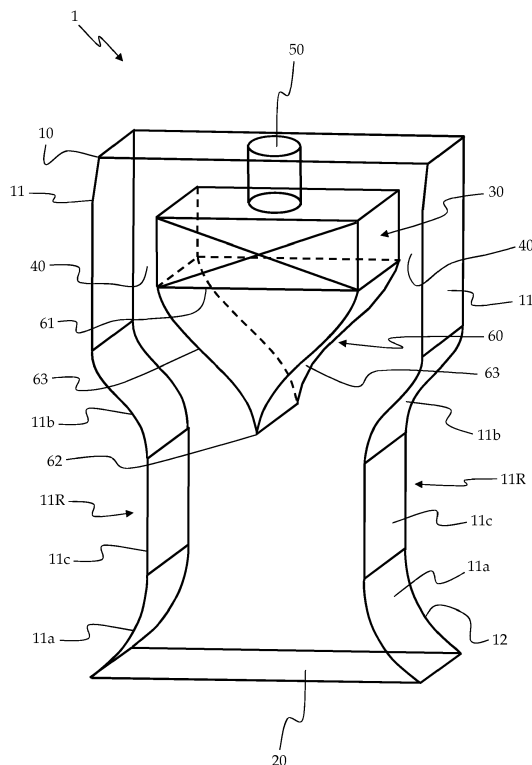


Fig. 1

Description

[0001] The present invention relates to a fume extraction and/or filtration hood, in particular for a household kitchen.

[0002] Fume extraction and/or filtration hoods have become a substantially indispensable appliance in any household kitchen.

[0003] A hood is known to have the main purpose of allowing recycling of air saturated with cooking fumes; nevertheless, a hood may also have a very important function as an aesthetic piece of furniture in a household kitchen, and shall meet special requirements, also prescribed by law.

[0004] Hoods known at the state of the art are usually composed of a chimney having a hollow interior, an inlet section through which fumes flow into said chimney, a motor fan accommodated in said chimney, which is used for extraction of air into the chimney.

[0005] In fume extraction and/or filtration hoods, particularly for household kitchens, the inlet section is usually oriented horizontally or slightly inclined with respect to the base of the interiorly hollow chimney and above the cooking top, to collect as many odors and fumes generated thereby as possible.

[0006] Fume extraction and/or filtration hoods, particularly for household kitchens, may be:

- extractor hoods, i.e. of a type that extracts cooking fumes and pull them out through a special flue liner associated with the fume outlet section, and
- filtering hoods (also known as "recirculating hoods") i.e. of a type that does not pull out the extracted fumes, but purifies air through special filters and recirculates it into the environment.

[0007] It shall be also noted that extractor hoods may be reconverted to also perform a filtering function, particularly by placing filters in their frame, which retain impurities (e.g. fumes, odors and grease molecules) in extracted air.

[0008] Hoods known at the state of the art have considerable drawbacks, as they generate an unpleasant noise, caused both by the noise of the motor fan, and by forced flow of extracted air through extraction conduits; usually, as extraction speed increases, a higher noise is generated by the hood.

[0009] In an attempt to attenuate noise, hoods of the last generation are equipped with sound-absorbing protections, and has tubing and extraction conduits of special sizes and conformations.

[0010] In particular, certain types of prior art hoods are formed with deflector elements, which are realized in such a way to cause the air extracted by the motor fan to follow a non-rectilinear path, in particular in the hood segment that joins the inlet conduit with the motor fan.

[0011] In particular, said deflector elements may include:

- first elements associated with side walls of the hood, in particular said first elements being formed with a section having the shape of a right trapezoid, with the longer base associated with said side walls of the hood;
- a second partition element having a triangular section, said partition element being located below the motor fan;
- a possible third element, also having a section with the shape of a right trapezoid, with the longer base associated with the back wall of the hood. Nevertheless, the above described types of prior art hoods were also found to be affected by drawbacks, mainly caused by the sharp edges of said deflector elements.

[0012] In fact, said sharp edges of the deflector elements generate a number of turbulences in the air flow extracted by the motor fan; said turbulences forcibly affect the air extraction performance of the motor fan and also increase hood noise.

[0013] Further types of hoods known at the state of the art include a partition element having a triangular section, said partition element being located below the motor fan.

[0014] Document FR2911520 relates to a hood that comprises a partition element located below the motor fan, said partition element having an apex oriented toward the inlet section of the hood. Since said apex has an angle of substantially 60°, and anyway greater than 45°, it causes a number of turbulences at the area in which the air extracted by the hood and flowing in from the inlet section is separated, which involves inevitable pressure and flow losses in the hood.

[0015] Thus, the sharp edge of the partition element of a hood as described, for instance, in document FR2911520, also generates a number of turbulences in the air flow extracted by the motor fan, which affect the air extraction performance of the motor fan and also increase hood noise.

[0016] In this context, the main object of the present invention is to provide a fume extraction and/or filtration hood, in particular for a household kitchen, that is realized in such a way to obviate the drawbacks of prior art hoods and, in particular, to ensure optimized extraction of the odors and fumes generated by the cooking top with which it is associated.

[0017] Another object of the present invention is to provide a fume extraction and/or filtration hood, in particular for a household kitchen, that is designed to minimize noise, also irrespective of the extraction speed.

[0018] A further object of the present invention is to provide a fume extraction and/or filtration hood, in particular for a household kitchen, that is designed to avoid difficult and expensive manufacturing and/or installation procedures.

[0019] In view of fulfilling such objects, the present invention provides a fume extraction and/or filtration hood, in particular for a household kitchen, incorporating the

features set out in the appended claims, which are intended as an integral part of the present description.

[0020] Further objects, features and advantages of the present invention will become apparent from the following detailed description and from the annexed drawings, which are supplied by way of non-limiting example, wherein:

- Fig. 1 is a simplified perspective view of a fume extraction and/or filtration hood, in particular for a household kitchen, according to the present invention;
- Fig. 2 is a simplified frontal sectional view of the hood of Fig. 1;
- Fig. 3 is a simplified perspective view of the hood of Figs. 1 and 2.

[0021] Referring to the description of the annexed figures, numeral 1 generally designates a fume extraction and/or filtration hood, in particular for a household kitchen, according to the present invention.

[0022] Such hood 1 comprises a chimney 10 having a hollow interior and comprising lateral walls 11, a back wall 12 and a front wall; it shall be also noted that said front wall is not shown in the accompanying figures, in such a way to expose the architecture and the inner components of said hood 1.

[0023] Furthermore, the hood 1 of the present invention comprises:

- an inlet section 20 through which fumes flow into said chimney 10;
- a motor fan 30 accommodated in said chimney 10 opposite to said inlet section 20;
- an extraction volume 40 placed between said lateral walls 11 and said motor fan 30,

said side walls 11 and said extraction volume 40 being substantially symmetrical with respect to a common plane of symmetry, as shown in Fig. 2 by a dash-and-dot line PS.

[0024] It shall be noted that said plane of symmetry PS divides the hood 1 of the present invention into two substantially equally parts.

[0025] It shall be also noted that, as used herein, the terms "frontal", "front" "back" and "lateral" are related to an operating state of the hood 1 of the present invention, i.e. a state in which said hood 1 is located above a cooking top (not shown in the annexed drawings) to collect as many odors and fumes generated thereby as possible, i.e. a state in which said plane of symmetry PS is substantially vertical. Said motor fan 30 is located between said inlet section 20 and an outlet section 50 to extract fumes from said inlet section 20 and pull them out of the outlet section 50; in particular, said motor fan 30 is located in proximity of said outlet section 50 and comprises a centrifugal motor for extraction of air and fumes from said at least one extraction volume 40.

[0026] According to the present invention, said lateral walls 11 comprise at least:

- a first segment 11a located proximate to said inlet section 20 and inclined toward said plane of symmetry PS;
- a second segment 11b inclined in a opposite direction with respect to said plane of symmetry PS,

said first segment 11a and second segment 11b being formed with radiused surfaces, each having a first length (see reference A in Fig. 2, for the first portion 11a and the second portion 11b) ranging from 70 mm to 110 mm (i.e. $70 \text{ mm} \leq A \leq 110 \text{ mm}$).

[0027] Preferably, the first length A of each of said first 11a and second 11b segments is about 87 mm (i.e.: $A \approx 87 \text{ mm}$), if an air flow of about 700-800 m³/h is required to be conveyed into the chimney 10.

[0028] When looking at the hood 1 from the inlet section 20 toward the motor fan 30 or toward the outlet section 50, it can be noted that:

- the first segment 11a converges toward the plane of symmetry PS, whereas
- the second segment 11b diverges from said plane of symmetry PS, the upper portion of said second segment 11b being advantageously joined to or radiused with the side wall 11 of the hood 1.

[0029] Said first segment 11a and second segment 11b may be directly joined to each other. Otherwise, as shown in the annexed figures, said side walls 11 may comprise a third segment 11c positioned between said first segment 11a and second segment 11b, in particular said third segment 11c being substantially parallel to the plane of symmetry PS. In particular, said third segment 11c may have a second length B greater than or equal to 0 mm (i.e. $B \geq 0 \text{ mm}$).

[0030] As shown in the annexed figures, said first length A and second length B are obtained by measuring said first segment 11a, second segment 11b and third segment 11c on a reference plane PR substantially parallel to the plane of symmetry PS.

[0031] Furthermore, the annexed figures show that said first segment 11a, second segment 11b and third segment 11c of the side walls 11 create a narrowed portion 11R of the hood 1 relative to a first width L1 of the inlet section 20 of the hood 1.

[0032] Said narrowed portion 11R has its largest size in correspondence of the third segment 11c, wherein said narrowed portion 11R has a second width L2 that depends on the first width L1 of the inlet section 20, particularly said second width L2 ranging from 0.15 times to 0.2 times the first width L1 (i.e.: $0.15L1 \leq L2 \leq 0.2L1$). Preferably, the second width L2 is about 0.175 times the first width L1 (i.e.: $L2 \approx 0.175L1$), if an air flow of about 700-800 m³/h is required to be conveyed into the chimney 10.

[0033] Of course, if the third segment 11c is designed to have a second length B equal to 0 mm, then the second width L2 of the narrowed portion 11R is calculated substantially at the connection point of said first segment 11a and second segment 11b.

[0034] The particular construction of the hood 1 of the present invention, and especially the lateral walls 11 of said hood 1, affords optimized extraction of the odors and fumes generated by a cooking top associated therewith.

[0035] Also, the particular construction of the lateral walls 11 and the hood 1 of the present invention, affords optimized noise suppression, also irrespective of the extraction speed of the motor fan 30. In particular, it avoids the formation of air recirculation and/or stagnation areas in the chimney 10.

[0036] It shall be further noted that the construction of the hood 1 does not require difficult and expensive manufacture and/or installation procedures.

[0037] In a preferred embodiment, a motor fan base 30 is located at a first distance D1 from an upper portion of the second segment 11b, said first distance D1 ranging from 30 mm to 70 mm (i.e. $30 \text{ mm} \leq D1 \leq 70 \text{ mm}$).

[0038] Preferably, said first distance D1 is about 52 mm (i.e.: $D1 \approx 52 \text{ mm}$).

[0039] The hood 1 of the present invention also comprises a partition element 60 located between the motor fan 30 and the inlet section 20.

[0040] Said partition element 60 has a wedge shape, with a substantially triangular section, and is positioned in such a way that its base 61 faces toward the motor fan 30 and its apex 62 is oriented toward said inlet section 20.

[0041] Particularly, said apex 62 lies on said plane of symmetry PS and has an angle of less than 40° , preferably less than 15° , and more preferably less than 7° .

[0042] In the accompanying figures, the base 61 of the partition element 60 rests on the motor fan 30; nevertheless, the hood 1 may be also designed with the base 61 of the partition element 60 separate from the motor fan 30, e.g. with the interposition of an additional component (not shown) of the hood 1.

[0043] In order to avoid turbulences in the air flow extracted by the motor fan 30, the base 61 of the partition element 60 is formed with a width substantially equal to a third width L3 of the motor fan 30.

[0044] Then, the base of the partition element 60 is positioned in such a way to lie at a second distance D2 from the inlet section 20, said second distance D2 being substantially equal to the sum of the first length A of said first segment 11a and second segment 11b, the second length B of the third segment 11c and the first distance D1 [i.e.: $D2 = (A+A)+B+D1$].

[0045] Furthermore, the partition element 60 is designed with a third distance D3 between the base 61 and the apex 62, substantially equal to the sum of the first length A of the second segment 11b and the first distance D1 (i.e.: $D3 \approx A+D1$).

[0046] In a preferred embodiment the partition element

60 comprises radiused lateral faces 63, in particular each lateral face 63 being formed with curvatures that substantially match those of the segment of the facing lateral wall 11; this construction can be particularly appreciated from Fig. 2. This allows to obtain an optimal air path in the hood 1, both in terms of fluid dynamics and in terms of noise suppression in the hood 1.

[0047] Preferably, said lateral faces 63 are curved with two mutually tangent curvatures. Alternatively, said lateral faces 63 are divided into three portions:

- an apex portion having a curvilinear trend with an angle increasing from the apex 62 to the base 61;
- an intermediate portion having a substantially rectilinear trend;
- a base portion having a curvilinear trend with an angle decreasing from the apex 62 to the base 61.

[0048] Advantageously, the profile of the base portion of said lateral faces 63 for at least the last 2 mm is substantially orthogonal to the base 61 of the partition element 60.

[0049] Preferably, said lateral walls 11 and/or said partition element 60 of the hood 1 may be made of a sound-absorbing material (e.g. melamine foam) or sheet metal or plastic and/or may be associated with components (not shown) made of a sound-absorbing material (e.g. melamine foam) or sheet metal or plastic, in particular said sound-absorbing material being coated or surface-treated (e.g. by painting) with a waterproofing material. The presence of such waterproofing material allows to prevent impurities (e.g. fumes, odors or grease molecules) in the extracted air from impregnating the sound-absorbing material.

[0050] In particular, said sound-absorbing material may consist of a plastic polymer, such as melamine.

[0051] From the above description the advantages of a hood 1 according to the present invention are clear.

[0052] In particular, these advantages consist in that the particular construction of the hood 1 affords optimized extraction of the odors and fumes generated by a cooking top associated therewith.

[0053] In fact, the particular conformation of the lateral walls 11 and the partition element 60 allows to obtain an optimal fume extraction without creating any turbulence. This particular construction positively minimizes the noise of the hood 1, also irrespective of the extraction speed of the motor fan 30, and without requiring difficult and expensive manufacturing and/or installation procedures.

[0054] The extractor hood described herein by way of example may be subject to many possible variations without departing from the novelty spirit of the inventive idea; it is also clear that in the practical implementation of the invention the illustrated details may have implemented in different manners, or replaced by technically equivalent elements.

[0055] For instance, a possible variant of the hood 1

of the present invention is shown in Fig. 3.

[0056] In this figure, the hood 1 has a skirt 70 upstream from the chimney (with respect to the air path in the hood 1), i.e. an extractor chamber open at its bottom and having a main horizontal extension and joined to the inlet section 20 of said chimney 10. In this case, the lower end of the first segment 11a is advantageously joined and radiused to the upper wall of said skirt 70 to prevent turbulences at the inlet section 20.

[0057] It can therefore be easily understood that the present invention is not limited to the above-described hood, but may be subject to many modifications, improvements or replacements of equivalent elements and parts, without departing from the inventive idea, as clearly specified in the following claims.

Claims

1. A fume extraction and/or filtration hood (1), in particular for household kitchens, comprising:

- a chimney (10) having a hollow interior and comprising lateral walls (11), a back wall (12) and a front wall;
- an inlet section (20) through which fumes flow into said chimney (10);
- a motor fan (30) accommodated in said chimney (10) opposite to said inlet section (20);
- an extraction volume (40) placed between said lateral walls (11) and said motor fan (30);
- a partition element (60) placed between the motor fan (30) and the inlet section (20), said partition element (60) comprising a base (61) facing toward the motor fan (30) and an apex (62) oriented toward said inlet section (20),

said hood (1) being **characterized in that** said apex (62) has an angle of less than 40°, preferably less than 15°, and more preferably less than 7°.

2. A hood (1) as claimed in claim 1, **characterized in that** said apex (62) lies on a common plane of symmetry (PS) of the hood (1).

3. A hood (1) as claimed in one or more of the preceding claims, **characterized in that** said base (61) of the partition element (60) is formed with a width substantially equal to a third width (L3) of the motor fan (30).

4. A hood (1) as claimed in one or more of the preceding claims, **characterized in that** said partition element (60) comprises lateral faces (63) radiused.

5. A hood (1) as claimed in the preceding claim, **characterized in that** said lateral faces (63) include:

- an apex portion having a curvilinear trend with an angle increasing from the apex (62) to the base (61);
- an intermediate portion having a substantially rectilinear trend;
- a base portion having a curvilinear trend with an angle decreasing from the apex (62) to the base (61).

6. A hood (1) as claimed in one or more of the preceding claims, **characterized in that** said lateral walls (11) comprise at least:

- a first segment (11a) positioned in proximity to said inlet section (20) and inclined toward said plane of symmetry (PS);
- a second segment (11b) inclined in a opposite direction with respect to said plane of symmetry (PS),

said first (11a) and second (11b) segments being formed with radiused surfaces, each having a first length (A) ranging from 70 mm to 110 mm.

7. A hood (1) as claimed in the preceding claim, **characterized in that** the first segment (11a) converges toward the plane of symmetry (PS), and the second segment (11b) diverges from said plane of symmetry (PS), the upper portion of said second segment (11b) being advantageously radiused with the lateral wall (11) of the hood (1).

8. A hood (1) as claimed in one or more of the preceding claims, **characterized in that** said lateral walls (11) and/or said partition element (60) of the hood (1) are made of a sound-absorbing material and/or associated with components made of a sound-absorbing material.

9. A hood (1) as claimed in claim 8, **characterized in that** said sound-absorbing material consists of a plastic polymer.

10. A hood (1) as claimed in one or more of claims 8 and 9, **characterized in that** said sound-absorbing material is coated or surface-treated with a waterproofing material.

11. A fume extraction and/or filtration hood (1), in particular for household kitchens, comprising:

- a chimney (10) having a hollow interior and comprising lateral walls (11), a back wall (12) and a front wall;
- an inlet section (20) through which fumes flow into said chimney (10);
- a motor fan (30) accommodated in said chimney (10) opposite to said inlet section (20);

- an extraction volume (40) placed between said lateral walls (11) and said motor fan (30),

said lateral walls (11) and said extraction volume (40) being substantially symmetrical with respect to a common plane of symmetry (PS),
said hood (1) being **characterized in that**
said lateral walls (11) comprise at least:

- a first segment (11a) located proximate to said inlet section (20) and inclined toward said plane of symmetry (PS);
- a second segment (11b) inclined in a opposite direction with respect to said plane of symmetry (PS),

said first segment (11a) and second segment (11b) being formed with radiused surfaces, each having a first length (A) ranging from 70 mm to 110 mm.

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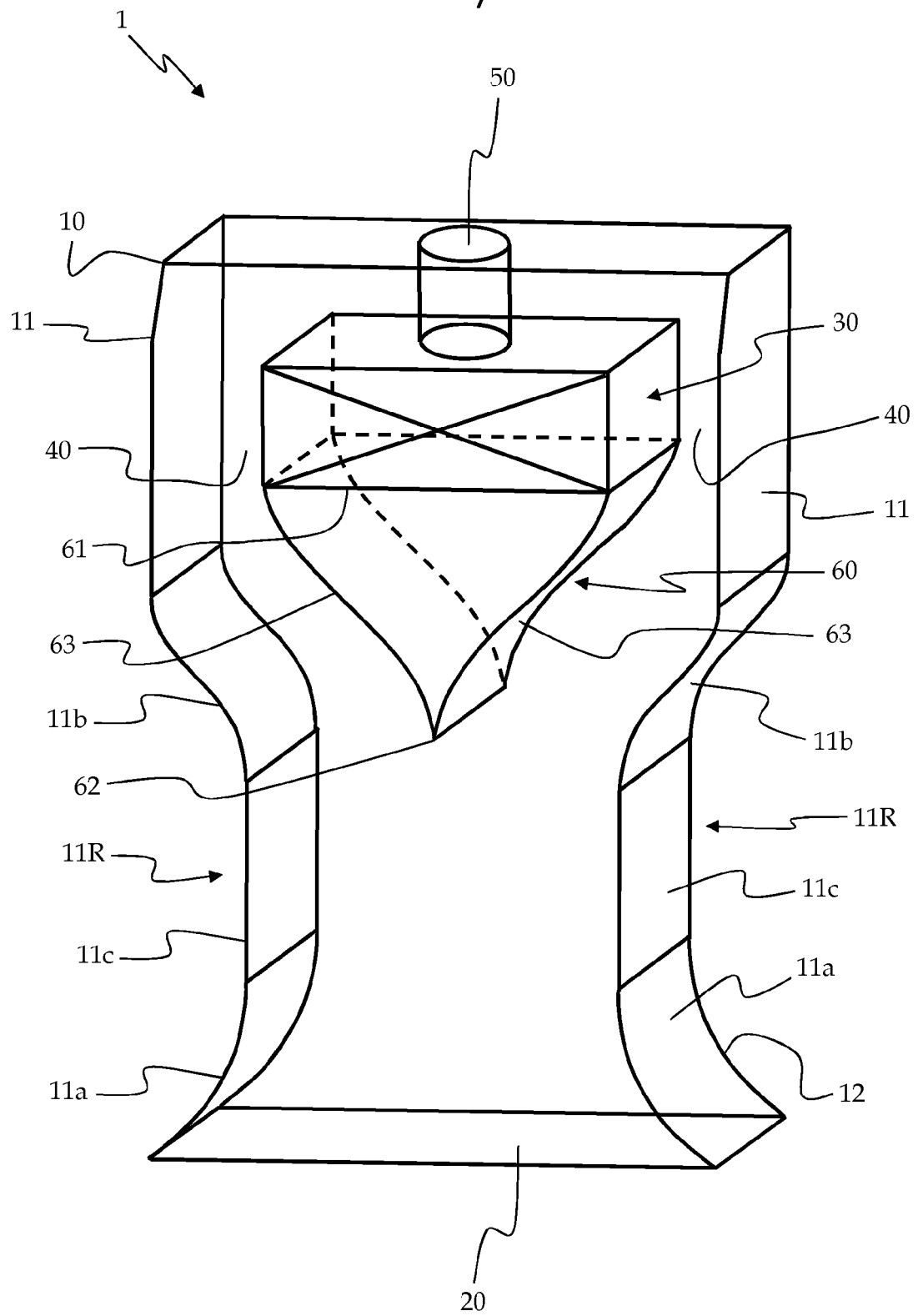


Fig. 1

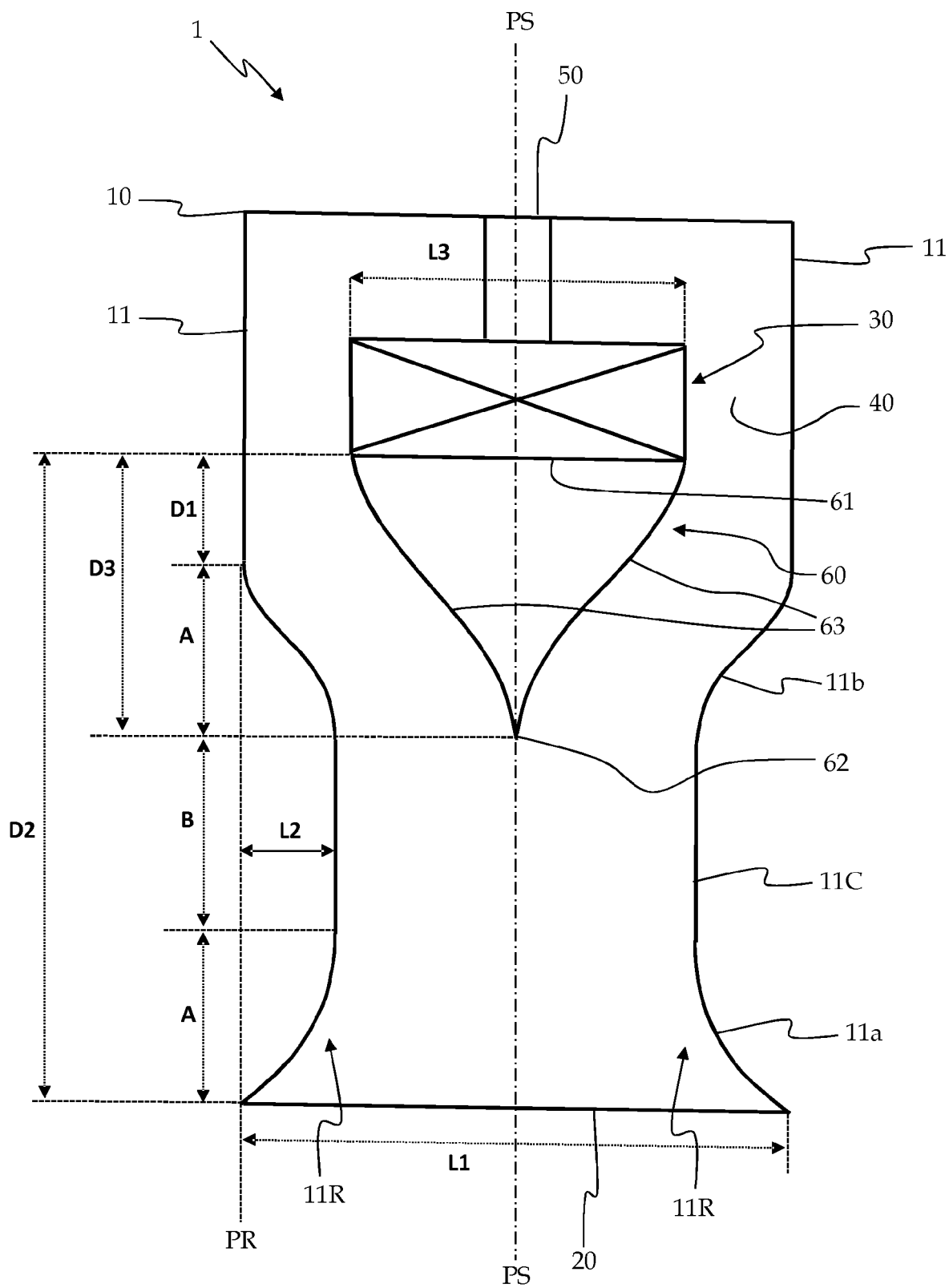


Fig. 2

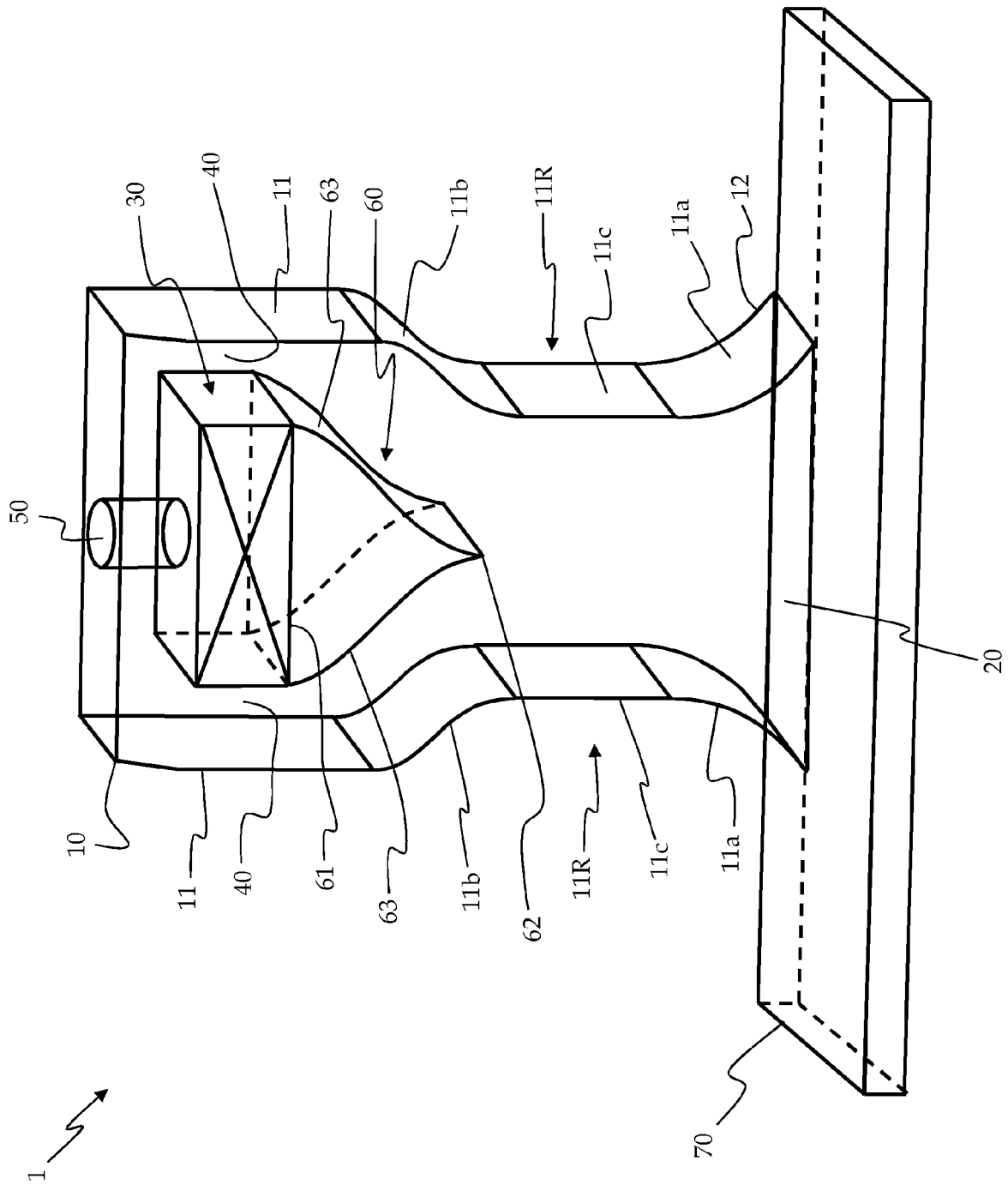


Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- FR 2911520 [0014] [0015]