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(54) **AIR EMITTING DEVICE FOR HAIR TREATMENT**

(57) The present invention refers to an air emitting device for the hair treatment provided with an interspace interposed between the casing that houses the heating element and the external body. In this way, the air present in the interspace is not heated by the heating element. This allows the user to grab the device without getting burned.

In addition, the interspace is provided with at least one outlet for the air not heated by the heating element, so that the hair is not subjected to a too hot air jet.

This avoids damaging the hair itself, contrary to what happens in known in the art devices where the interspace has no such outlet for the air not heated by the heating element.

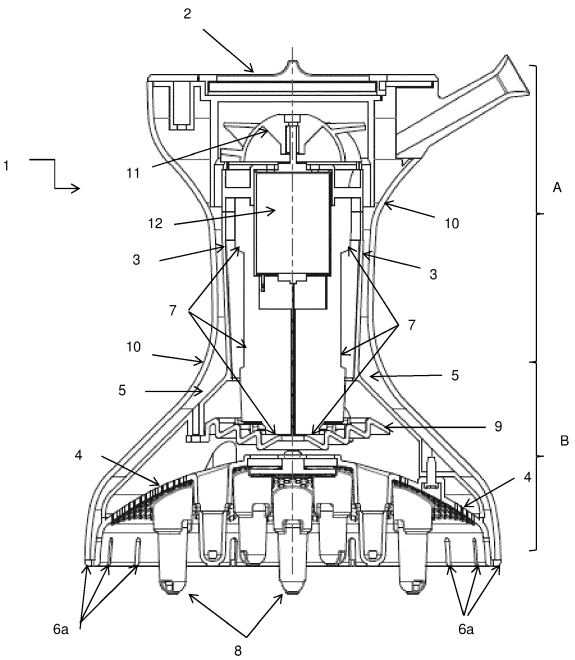

Fig. 1

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Description

Field of the invention.

[0001] The present invention relates to a air emitting device for hair treatment. In particular, the present invention refers to a device designed to air diffusing to facilitate hair drying and shaping.

State of the Art.

[0002] Air diffusing device have been known for some time allowing the user to hair drying and at the same time to hair shaping or curling by using a brush or other devices suitable for use.

[0003] Typically, such a known in the art device is provided with an air inlet, a resistance suitable for heating the air entering the diffuser and a perforated surface which acts as an air outlet suitable for allowing the hot air passage through these holes in order to dry the hair.

[0004] This known in the art device typically remains in operation for a particularly long period, since the hair curling action takes a long time.

[0005] As a result, the hair is at risk of being damaged by being subjected to a hot air flow for a long period of time.

[0006] The Chinese utility model published under no. CN 210 353 624 describes a hair dryer wherein a first air duct is arranged on the air outlet surface of the fan; a second air duct is arranged on the air outlet surface of the fan; a part of the air flow generated by the rotation of the fan exits through the first air duct, a part of the air flow generated by the rotation of the fan exits through the second air duct, in the first air duct is arranged a duct heating element and the heating element heats the cold air flowing in the first air duct into hot air.

[0007] The Japanese patent application published with n. JP 2010/274050 discloses a hair dryer configured to divide the air flow into a hot air flow passage for blowing hot air and a cold air flow passage for blowing cold air by setting a heating element in an intermediate position between the fan and an outlet.

[0008] The Applicant of this patent application has found the need to create a diffuser capable of avoiding damage to the hair itself.

[0009] Furthermore, the Applicant of this patent application has found the need to create a diffuser easy to be gripped by the user.

Summary of the invention.

[0010] In a first aspect, the present invention relates to a air emitting device for hair treatment such as that indicated in claim 1.

[0011] The Applicant of the present application has in fact surprisingly found that the above technical problem can be solved in an effective and reliable way by means of a air emitting device for hair treatment comprising an entry air area, a casing suitable for containing within it at least one heating element suitable for heating said air inside said casing, an outlet area for said air heated by said heating element, opposite to said entry air area, and an external body arranged around said casing.

[0012] The device of the present invention also comprises an interspace placed between said casing and said external body so that the air present in said interspace is not capable of being heated by said at least one heating element. The interspace also includes at least one outlet for said air not heated by said at least one heating element.

[0013] In this way, thanks to the presence of the at least one outlet for the air not heated by said at least one heating element, the hair subjected to treatment with the device of the present invention receives an air flow at a lower temperature because it is not directly heated by said heating element, such as to allow the hair treatment, such as for example the curl formation, without damaging the hair itself, contrary to what happens in the known in the art devices not having such an outlet for the air not heated by said heating element.

[0014] Said at least one outlet area for said air not heated by said at least one heating element is different from said outlet area for said air heated by said at least one heating element.

[0015] Said outlet area for said air heated by said heating element consists of a grid consisting of a substantially concave base surface provided with a plurality of holes for the exit of said air heated by said at least one heating element.

[0016] Said at least one outlet for said air not heated by said at least one heating element is arranged along the perimeter edge of a circular ring arranged around said grill for releasing said air heated by said at least one heating element.

[0017] The device of the present invention comprises a plurality of outlets for said air not heated by said at least one heating element uniformly arranged along said perimeter edge of said circular ring arranged around said grid.

[0018] In this way, the jets of air not heated by said at least one heating element through said plurality of outlets substantially surround the jets of air heated by said at least one heating element through the relative holes of said grid. Consequently, a hair lock placed at said grid and the relative circular ring arranged around it is substantially simultaneously subjected both to a jet of air heated by said at least one heating element and to a jet of air not heated by said at least a heating element, thus avoiding further damage to the hair and at the same time facilitating the curl formation.

[0019] According to a preferred embodiment, some or all of said plurality of outlets for said air not heated by said at least one heating element consist of longitudinal slots.

[0020] In this way, the longitudinal slots help to facilitate the distribution towards the hair lock to be treated

by the air not heated by said heating element.

[0021] According to an alternative preferred embodiment, some or all of said plurality of outlets for said air not heated by said heating element consist of holes for the air passage.

[0022] According to a preferred embodiment, said grid is further provided with protuberances, also called "fingers", which extend substantially in the air flow direction.

[0023] According to a preferred embodiment, on said protuberances there are longitudinal openings to further facilitate the exit of the air heated by said at least one heating element.

[0024] In this way, said finger grid allows a better definition and support (tone) to curly or wavy hair and/or a greater volume.

[0025] According to a preferred embodiment, said protuberances are arranged so as to occupy two concentric circumferences.

[0026] According to an alternative preferred embodiment, said grid is of the shower type, i.e. constituted by a preferably concave base surface wherein there are a plurality of holes for the exit of the air heated by said at least one heating element, without the presence of protuberances as in the finger grid described above.

[0027] In this way, said shower grid allows for more natural drying that respects the natural hair movement.

[0028] According to a preferred embodiment, the device of the present invention further comprises a fan suitable for channeling a part of said air introduced into the device towards said interspace and for channeling another part of said air in the area inside said casing to pass through said heating element.

[0029] In this way, a single fan is used to channel the air in two directions, one where the air is heated by said heating element and one where the air is not heated by said heating element.

[0030] According to a preferred embodiment, said at least one heating element consists of at least one sheet provided with a resistance or a plurality of electrical resistances fixed around it.

[0031] According to a preferred embodiment, said plurality of electrical resistances are uniformly distributed around said sheet.

[0032] According to a preferred embodiment, said sheet is a flexible sheet, such as for example a sheet of mica, preferably having a substantially conical or frustoconical shape.

[0033] According to a preferred embodiment, the device of the present invention further comprises a motor, adapted to drive said fan.

[0034] In a second aspect, the present invention relates to an air emitting device for hair treatment such as that indicated in claim 6.

[0035] The Applicant of the present application has in fact surprisingly found that the above technical problem can be solved in an effective and reliable way by means of a air emitting device for hair treatment which comprises an entry air area, a casing suitable for containing within it at least one heating element suitable for heating said air inside said casing, an outlet area for said air heated by said heating element, opposite to said entry air area, and an external body arranged around said casing.

[0036] The device of the present invention further comprises an interspace placed between said casing and said external body so that the air present in said interspace is not capable of being heated by said at least one heating element. The interspace also includes at least one outlet for said air not heated by said at least one heating element.

[0037] The device of the present invention has such a shape that said external body has a first portion and a second portion whereby: i) the first portion of the external body progressively decreases from said entry air area to a portion of said sheet which constitutes said heating element, and ii) the second portion of the external body progressively grows from a portion of said sheet which constitutes said heating element up to said outlet area for said air heated by said heating element.

[0038] In this way, the device overall assumes a typically hourglass shape, where the narrowest part is the central one in correspondence with said heating element, widening both towards the air inlet area and towards the air outlet area. Consequently, the device of the present invention can be effectively gripped by the user, by grasping the portion of the external body in said narrow part in correspondence with the heating element.

[0039] Thanks to the fact that said interspace substantially separates said at least one heating element from the external body, the air present in said interspace is at room temperature, or in any case not heated by said heating element.

[0040] Consequently, the area used as a handle by the user is not hot, even if in correspondence with said heating element, and this provides the further advantage that the user can grip the hairdryer without running the risk of coming into contact with particularly hot parts.

[0041] The device of the present invention, in addition to having said hourglass shape seen above, determined by the particular shape of the first and second portion of the external body, also comprises a substantially cylindrical element, arranged outside the external body and connecting with it at said central portion narrowed between said first and second portion, so as to be substantially orthogonal to the device longitudinal axis along the air flow line.

[0042] In this way, in this second aspect of the present invention, the device of the present invention can be gripped by the user in two different ways: either by gripping said narrow central portion, as seen above, or by gripping said substantially cylindrical element, like a classic hairdryer handle.

[0043] According to a preferred embodiment of this second aspect of the present invention, said outlet area for said air heated by said heating element consists of a grid consisting of a substantially concave base surface provided with a plurality of holes for the escape of said

heated air by said at least one heating element.

[0044] According to a preferred embodiment of this second aspect of the present invention, said at least one outlet for said air not heated by said at least one heating element is arranged along the perimeter edge of a circular ring arranged around said grid.

[0045] According to a preferred embodiment of this second aspect of the present invention, the device comprises a plurality of outlets for said air not heated by said at least one heating element uniformly arranged along said perimeter edge of said circular ring of said grid.

[0046] According to a preferred embodiment of this second aspect of the present invention, said grid is further provided with protuberances which substantially extend in the air flow direction and arranged so as to occupy two concentric circumferences.

[0047] According to a preferred embodiment of this second aspect of the present invention, some or all of said plurality of outlets for said air not heated by said at least one heating element consist by longitudinal slots suitable for facilitating the distribution of the air not heated by said at least one heating element towards the hair to be treated.

[0048] According to an alternative embodiment of this second aspect of the present invention, some or all of said plurality of outlets for said not heated air by said at least one heating element consist of holes for the air passage.

[0049] Further features and advantages of the present invention will be better highlighted by examining the following detailed description of preferred but not exclusive embodiments, illustrated by way of non-limiting indication, with the support of the attached drawings, in which:

- Fig. 1 is a side view of a first embodiment of the device of the present invention;
- Fig. 2 is an axonometric view of the device of Fig. 1;
- Fig. 3 is a top view of the device of Fig. 1;
- Fig. 4 is a side view of a second embodiment of the device of the present invention;
- Fig. 5 is an axonometric view of the device of Fig. 4;
- Fig. 6 is a side view of a third embodiment of the device of the present invention;
- Fig. 7 is an axonometric view of the device of Fig. 6;
- Fig. 8 is a side view of a fourth embodiment of the device of the present invention.

Detailed description

[0050] The following detailed description refers to particular embodiments of the device of the present invention.

[0051] Referring in particular to Figs. 1-3, a first embodiment of an air emitting device 1 for hair treatment of the present invention is shown.

[0052] With particular reference to Fig. 1, a side sectional view of the device 1 is shown wherein the air inlet area 2, the casing 3 suitable for containing at its inside the heating element 7 suitable for heating the air entering the casing 3, the outlet area 4 for the air heated by the heating element 7, opposite the air inlet area 2, and an external body 10 arranged around the casing 3 are visible.

[0053] In Fig. 1 the interspace 5 placed between the casing 3 and the external body 10 is also visible; in this position, the interspace 5 remains separated from the heating element 7 so that the air present in the interspace 5 is not heated by the heating element 7. In this way, the air present in the interspace 5 is at ambient temperature, or in any case not hot; consequently, the area used as a grip by the user is not hot, even if in correspondence with the heating element 7. This allows the user to grip the hair device 1 without running the risk of coming into contact with particularly overheated parts.

[0054] In Fig. 1 a fan 11 driven by the motor 12 is also visible; the fan 11 allows a first part of the air introduced into the device 1 to be channeled towards the interspace 5 through the air inlet 2, while a second part of the air is channeled by the fan 11 in the area inside the casing 3 to pass through the heating element 7.

[0055] In this way, a single fan 11 is used to channel the air in two directions, one where the air is heated by the heating element 7, and then exits the device 1 through the grid 4, and one where the air is not heated by the heating element 7.

[0056] The device 1 shown in Fig. 1 also contains, unlike similar known in the art devices, a plurality of outlets 6 of the interspace 5 for the air not heated by the heating element 7. These additional outlets 6 allow the second part of the air, that one channeled by the fan 11 towards the interspace 5 and not heated by the heating element 7, to reach the hair lock subjected to treatment, together with the hot air heated by the heating element 7 which, as seen above, comes out of the device 1 through the outlet area 4. In this way, thanks to the jet of air not heated by the heating element 7 that comes out of the additional outlets 6, the hair is less stressed than in the known in the art devices wherein the hair is subjected only to a hot air jet.

[0057] In the embodiment shown in Fig. 1, the outlets 6 for the air not heated by the heating element 7 consist of longitudinal slots 6a (better visible in Fig. 2), to facilitate the distribution of the air not heated by the heating element 7 towards the hair lock to be treated. The slots 6a are uniformly arranged along the perimeter edge of a circular ring 14 arranged around the grid 4 for the escape of the air heated by the heating element 7.

[0058] The heating element 7 consists for example of a flexible sheet, for example made of mica, provided with

a resistance or a plurality of electrical resistances distributed evenly around the sheet and fixed to it.

[0059] In the embodiment shown in Fig.1, the grid 4 consists of a substantially concave base surface in which there are holes for the exit of the air heated by the heating element 7 (better visible in Fig. 2); the grid 4 is further provided with protuberances 8, also called "fingers", which substantially extend in the direction of the air flow and are arranged so as to occupy two concentric circles arranged in the grid 4.

[0060] The device 1 of Fig. 1 is also provided with a protection grid 9, positioned above the grid 4 towards the inside of the device 1, which acts as a safety or protective element to prevent the hair locks from being accidentally inserted inside the device 1 through the grid 4, to come into contact with some electrical parts of the device 1, such as for example the heating element 7 or other live parts.

[0061] In the top view of Fig. 3, the device 1 of Fig. 1 also has a filter 13 that prevents particles and dirt from entering the device 1 through the air inlet area 2.

[0062] The device 1 of the present invention has an overall "hourglass" shape, where the first portion A of the external body 10 progressively decreases from the air inlet area 2 to a portion of the sheet which constitutes the heating element 7, for then gradually grow back in the second portion B of the external body 10 from a portion of the sheet which constitutes the heating element 7 up to the outlet area 4 for the air heated by the heating element 7. The narrowest part C of the external body 10 of the device 1 is the central one in correspondence with the heating element 7, which can be used as a grip by the user.

[0063] Referring in particular to Figs. 4-5, a second embodiment of an air emitting device 1 for hair treatment of the present invention is shown.

[0064] The device 1 of the second embodiment shown in Fig. 4,5 differs from the device 1 of the first embodiment shown in Fig. 1-3 in that the outlets 6 for the air not heated by the heating element 7 consist of holes 6b (better visible in Fig. 5) instead of longitudinal slots 6a. The holes 6b, like the slots 6a seen above with reference to Figs. 1 and 2, are also uniformly arranged along the perimeter edge of the circular ring 14 arranged around the grid 4 for the escape of the air heated by the heating element 7.

[0065] Referring in particular to Figs. 6-7, a third embodiment of a air emitting device 1 for hair treatment of the present invention is shown.

[0066] The device 1 of the third embodiment shown in Fig. 6,7 differs from the device 1 of the first embodiment shown in Fig. 1-3 for the sole fact that the grid 4 for the discharge of the air heated by the heating element 7 simply consists of a plurality of holes, in the absence of the protuberances 8, thus assuming the configuration of a grid 4 in the shape of a "shower" (better visible in Fig. 7). Vice versa, the outlets 6 for the air not heated by the heating element 7 also in this third embodiment (as in the first embodiment seen above with reference to Figs. 1-3) consist of longitudinal slots 6a uniformly arranged along the perimeter edge of the circular ring 14 arranged around the grid 4 for the escape of the air heated by the heating element 7.

[0067] Referring in particular to Fig. 8, a fourth embodiment of an air emitting device 1 for hair treatment of the present invention is shown.

[0068] The device 1 of the fourth embodiment shown in Fig. 8 differs from the device 1 of the first embodiment shown in Figs. 1-3 for the sole fact of having a further possibility of user grip provided by the substantially cylindrical element 15 arranged on the outside of the external body 10 and connecting it at said narrow central portion C between said first portion A and said second portion B of the external body 10, so as to be substantially orthogonal to the longitudinal axis of the device along the air flow line.

[0069] Of course, many modifications and variations of the described preferred embodiments will be apparent to those skilled in the art while still remaining within the scope of the invention.

[0070] Therefore, the present invention is not limited to the preferred embodiments described, illustrated only by way of non-limiting example, but is defined by the following claims.

Claims

1. Air emitting device (1) for hair treatment comprising an entry air area (2), a casing (3) adapted to contain therein at least one heating element (7) adapted to heat said air inside said casing (3), an outlet area (4) for said air heated by said heating element (7), opposite to said entry air area (2), an external body (10) arranged around said casing (3), an interspace (5) placed between said casing (3) and said external body (10) so that the air present in said interspace (5) is not suitable for being heated by said at least one heating element (7), wherein:

   - said interspace (5) also comprises at least one outlet (6) for said air not heated by said at least one heating element (7),
   - said outlet area (4) for said air heated by said heating element (7) consists of a grid (4) consisting of a substantially concave base surface provided with a plurality of holes for the escape of said heated air by said at least one heating element (7),
   - said at least one outlet (6) for said air not heated by said at least one heating element (7) is arranged along the perimeter edge of a circular ring (14) arranged around said grid (4),

   characterized by the fact that
   the device (2) comprises a plurality of outlets (6) for said air not heated by said at least one heating ele-

ment (7) uniformly arranged along said perimeter edge of said circular ring (14) of said grid (4).

2. Device (1) according to claim 1, wherein said grid (4) is further provided with protuberances (8) which substantially extend in the air flow direction and arranged so as to occupy two concentric circumferences.

3. Device (1) according to any one of the preceding claims, wherein some or all of said plurality of outlets (6) for said air not heated by said at least one heating element (7) consist by longitudinal slots (6a) suitable for facilitating the distribution of the air not heated by said at least one heataing element (7) towards the hair to be treated.

4. Device (1) according to any one of the preceding claims 1-2, wherein some or all of said plurality of outlets (6) for said not heated air by said at least one heating element (7) consist of holes (6b) for the air passage.

5. Device (1) according to any one of the preceding claims, wherein said at least one heating element (7) is constituted by at least one flexible sheet provided with a resistance or with a plurality of electrical resistances fixed to said sheet.

6. Air emitting device (1) for hair treatment comprising an entry air area (2), a casing (3) adapted to contain therein at least one heating element (7) adapted to heat said air inside said casing (3), an outlet area (4) for said air heated by said heating element (7), opposite to said entry air area (2), an external body (10) arranged around said casing (3), an interspace (5) placed between said casing (3) and said external body (10) so that the air present in said interspace (5) is not suitable for being heated by said at least one heating element (7), wherein:

- said interspace (5) also comprises at least one outlet (6) for said air not heated by said at least one heating element (7),
- said at least one heating element (7) is constituted by at least one flexible sheet provided with a resistance or with a plurality of electrical resistances fixed to said sheet,
- said external body (10) has a first portion (A) and a second portion (B) whereby: i) the first portion (A) of the external body (10) progressively decreases from said entry air area (2) up to a portion of said sheet which constituting said heating element (7) and ii) the second portion (B) of the external body (10) progressively grows from a portion of said sheet constituting said heating element (7) up to said outlet area (4) for said air heated by said heating element (7), so that a narrow central portion (C) between said first portion (A) and said second portion (B) of the external body (10) is adapted to be used by the user as a device grip,

characterized by the fact that
the device (1) further comprises a substantially cylindrical element (15) disposed outside the external body (10) and which is connected with it at said narrow central portion (C) between said first portion (A) and said second portion (B) of the external body (10), so as to be substantially orthogonal to the longitudinal axis of the device (1) along the air flow line, wherein said substantially cylindrical element (15) or said narrow central portion (C) of the external body (10) are adapted to be used by the user as possible alternative device grips.

7. Device (1) according to claim 6, wherein

- said outlet area (4) for said air heated by said heating element (7) consists of a grid (4) consisting of a substantially concave base surface provided with a plurality of holes for the escape of said heated air by said at least one heating element (7),
- said at least one outlet (6) for said air not heated by said at least one heating element (7) is arranged along the perimeter edge of a circular ring (14) arranged around said grid (4), and
- the device (1) further comprises a plurality of outlets (6) for said air not heated by said at least one heating element (7) uniformly arranged along said perimeter edge of said circular ring (14) of said grid (4).

8. Device (1) according to claim 7, wherein said grid (4) is further provided with protuberances (8) which substantially extend in the air flow direction and arranged so as to occupy two concentric circumferences.

9. Device (1) according to claim 8, wherein some or all of said plurality of outlets (6) for said air not heated by said at least one heating element (7) consist by longitudinal slots (6a) suitable for facilitating the distribution of the air not heated by said at least one heating element (7) towards the hair to be treated.

10. Device (1) according to claim 8, wherein some or all of said plurality of outlets (6) for said not heated air by said at least one heating element (7) consist of holes (6b) for the air passage.

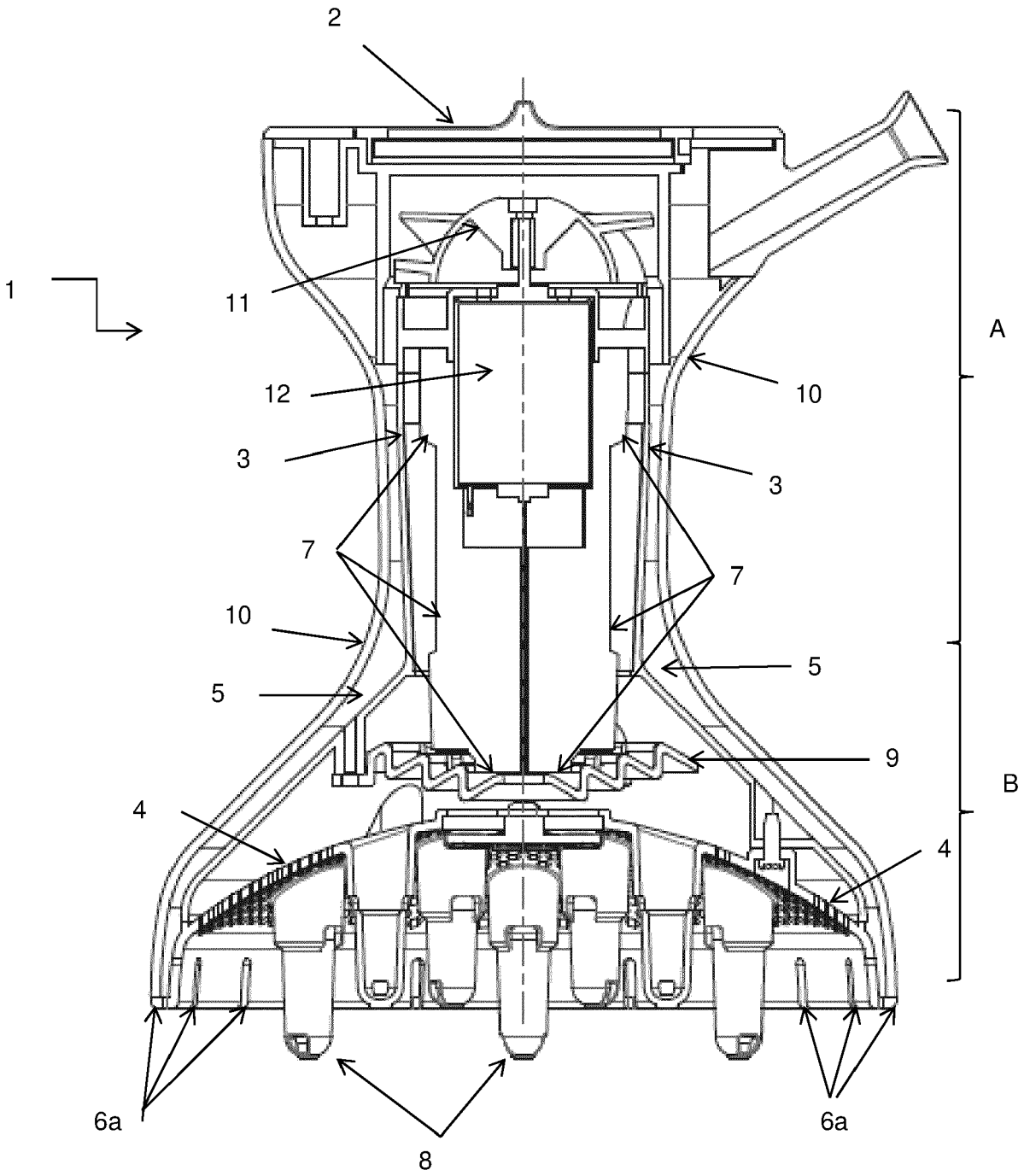

Fig. 1

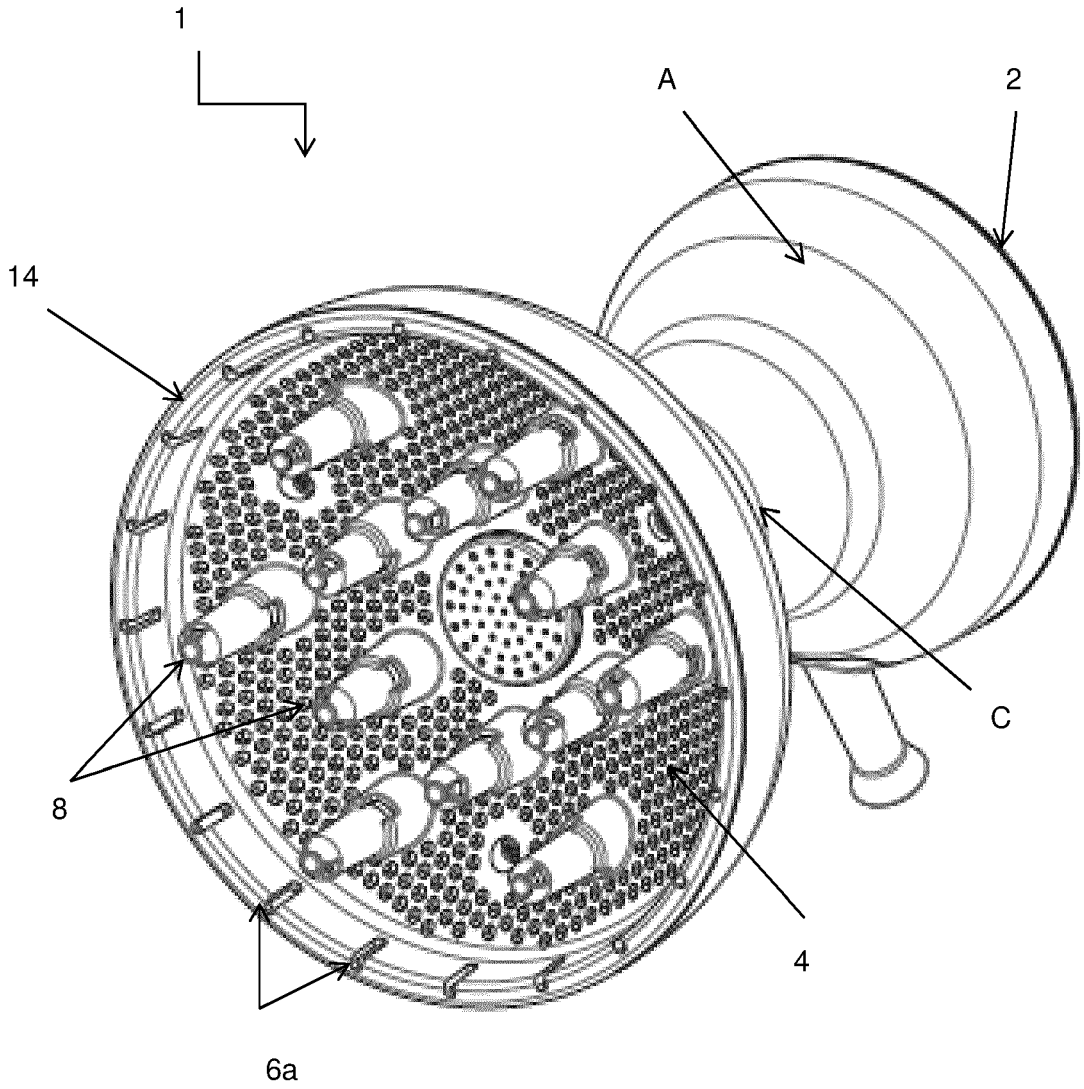

Fig. 2

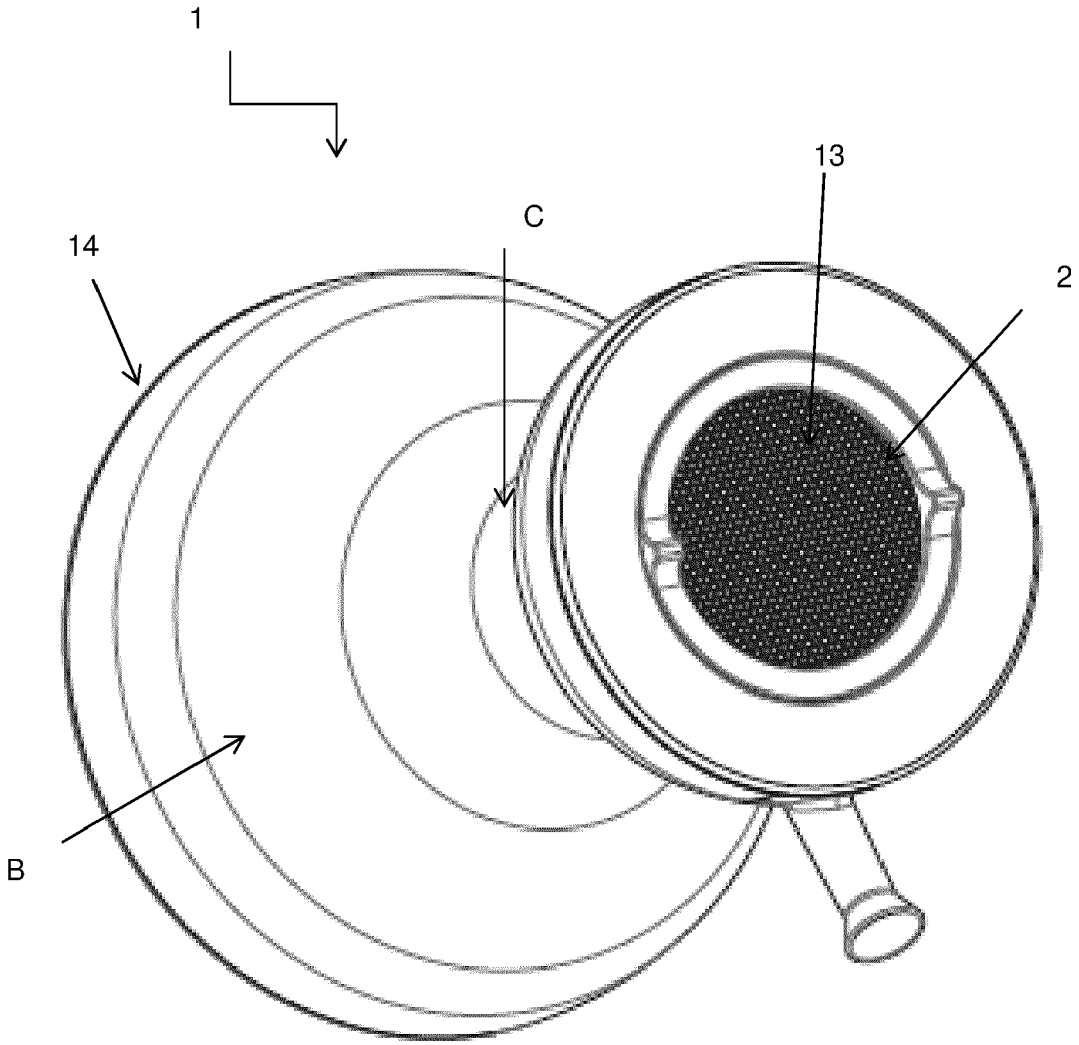

Fig. 3

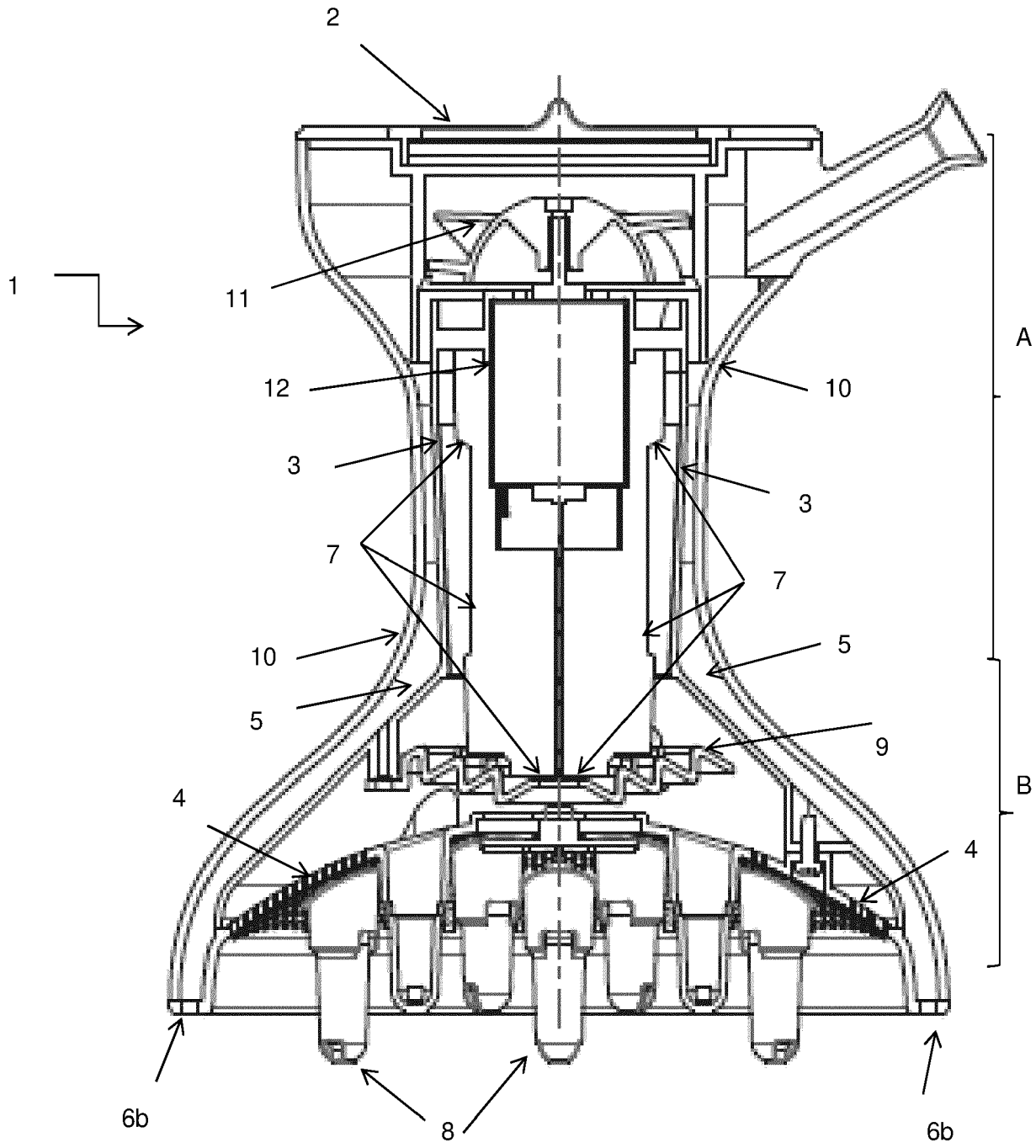

Fig. 4

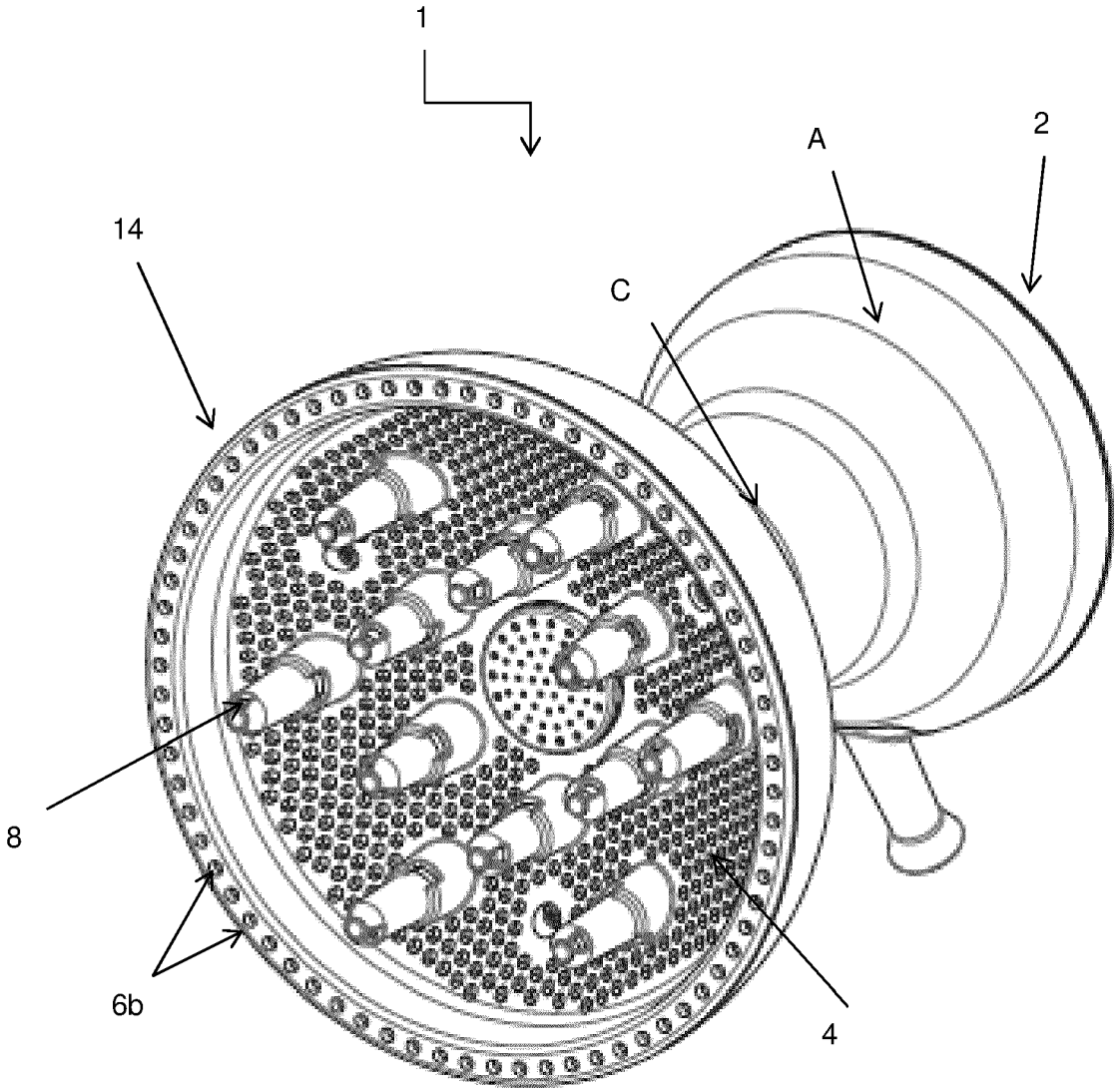

Fig. 5

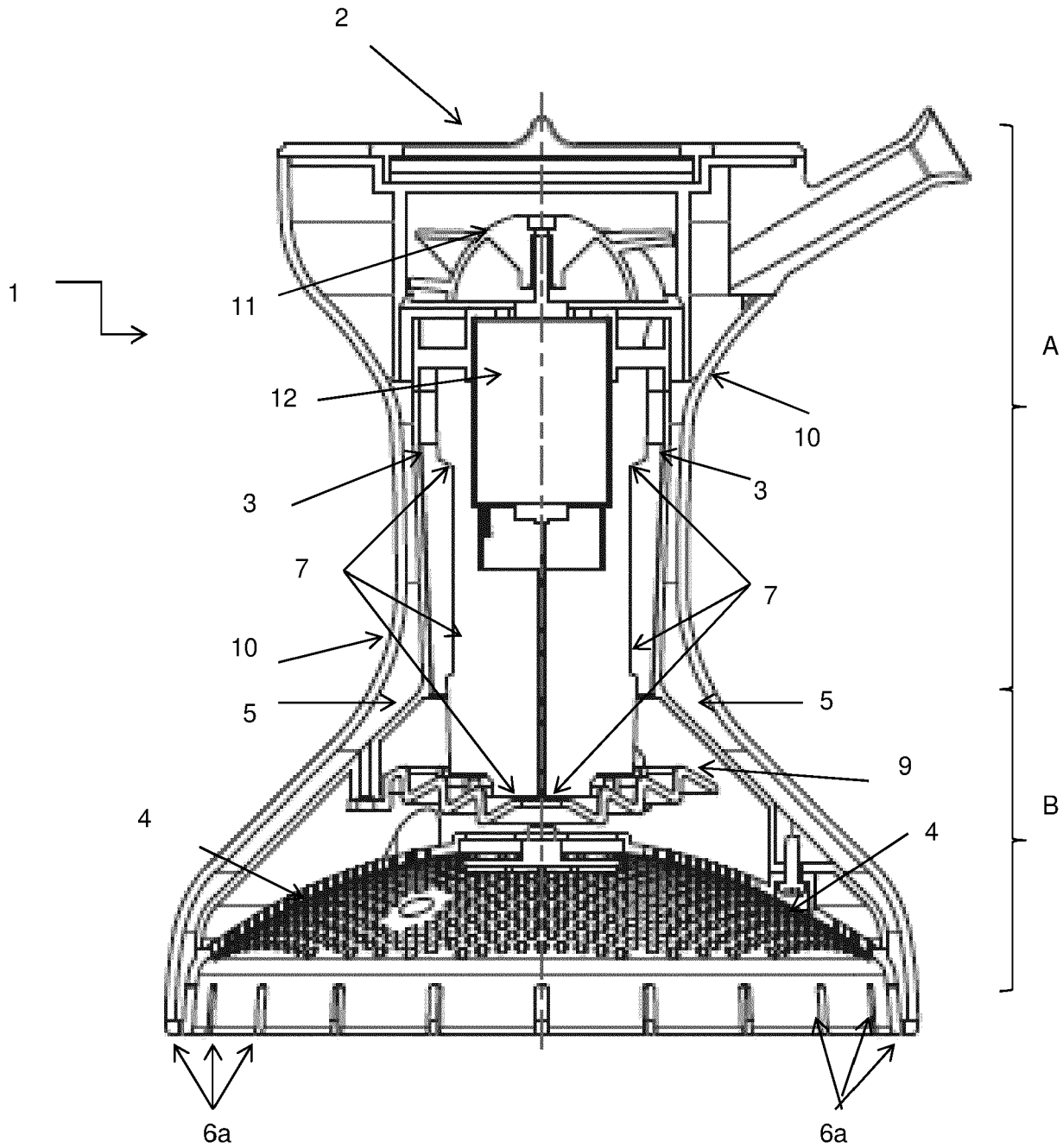

Fig. 6

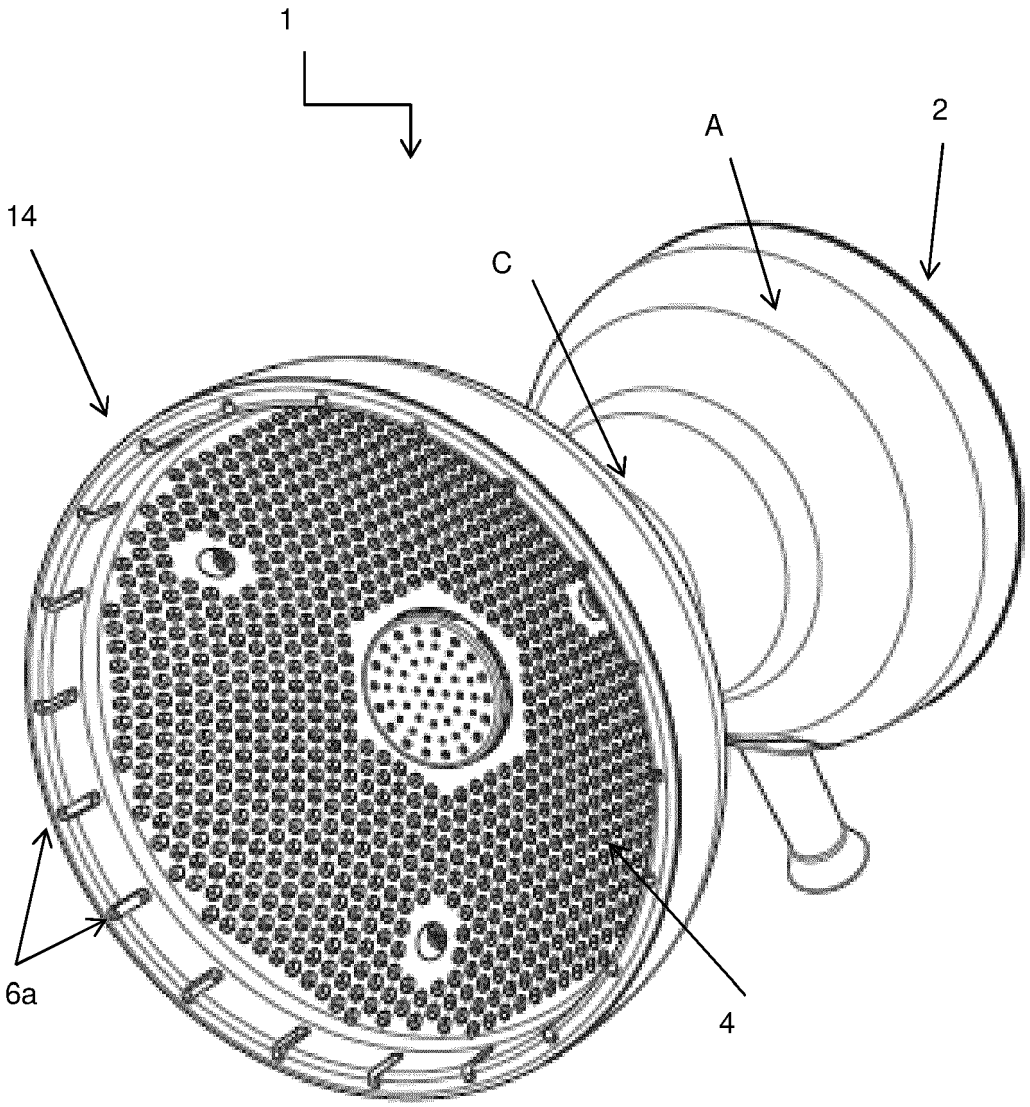

Fig. 7

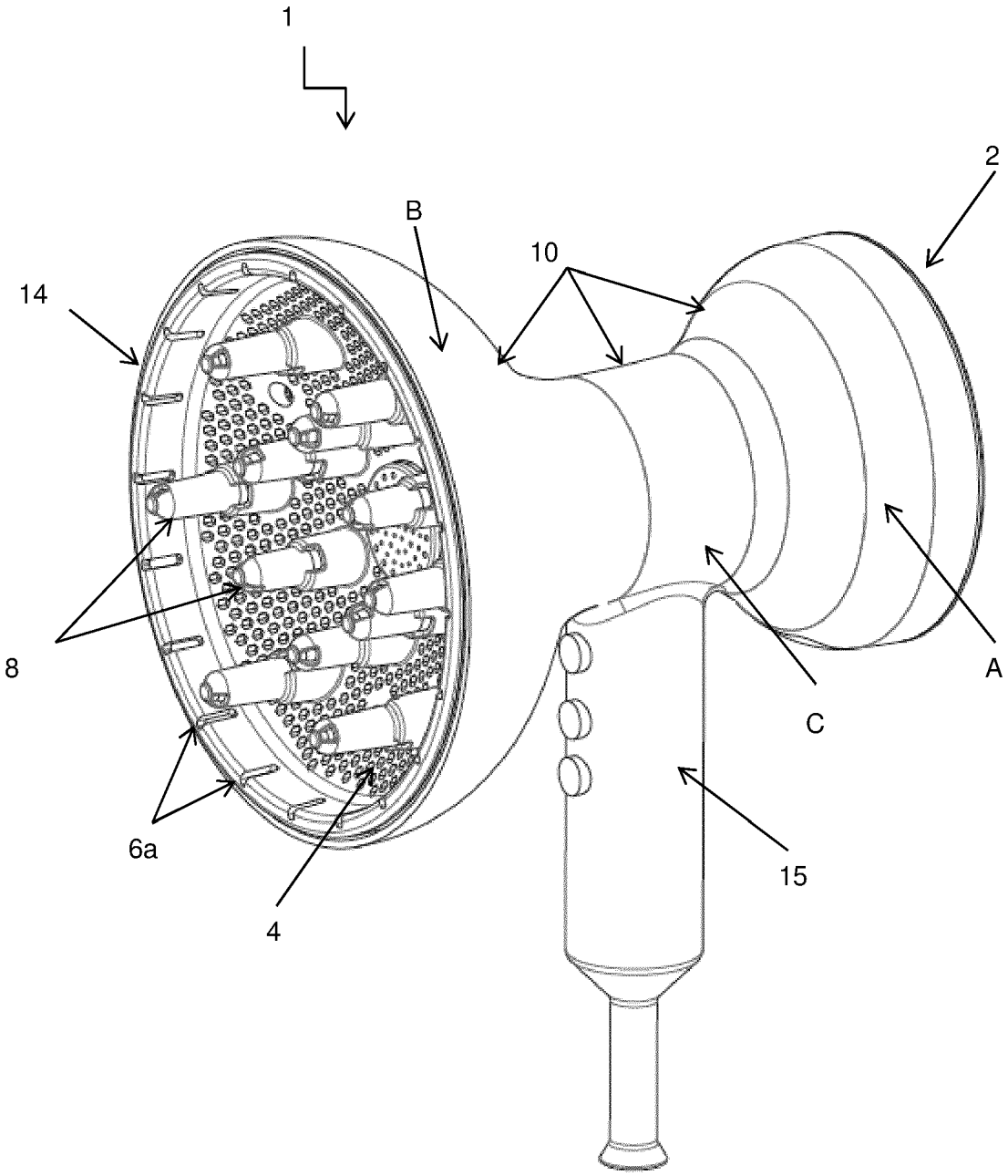

Fig. 8

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PARTIAL EUROPEAN SEARCH REPORT

under Rule 62a and/or 63 of the European Patent Convention. This report shall be considered, for the purposes of subsequent proceedings, as the European search report

Application Number
EP 22 02 0076

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	CN 210 353 624 U (KAICAN TRADE SHENZHEN CO LTD) 21 April 2020 (2020-04-21) * abstract * * figures *	1,3,4	INV. A45D20/12
A	IT MI20 110 544 A1 (TENACTA GROUP SPA) 2 October 2012 (2012-10-02) * figures *	1,2	
A	CN 2 423 786 Y (LUO WUSONG [CN]) 21 March 2001 (2001-03-21) * figures 1, 2 *	5	
A	JP 2010 274050 A (KITANO HARUYUKI) 9 December 2010 (2010-12-09) * abstract * * figures *	1,3,4	

TECHNICAL FIELDS SEARCHED (IPC)

A45D

INCOMPLETE SEARCH

The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC so that only a partial search (R.62a, 63) has been carried out.

Claims searched completely :

Claims searched incompletely :

Claims not searched :

Reason for the limitation of the search:

see sheet C

Place of search	Date of completion of the search	Examiner
The Hague	19 September 2022	Zetzsche, Brigitta

CATEGORY OF CITED DOCUMENTS

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INCOMPLETE SEARCH
SHEET C

Application Number
EP 22 02 0076

Claim(s) completely searchable:
1-5

Claim(s) not searched:
6-10

Reason for the limitation of the search:

Rule 62a(2) EPC

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 22 02 0076

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19-09-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 210353624 U	21-04-2020	NONE	
IT MI20110544 A1	02-10-2012	----------	----------
CN 2423786 Y	21-03-2001	NONE	
JP 2010274050 A	09-12-2010	JP 5392648 B2	22-01-2014
		JP 2010274050 A	09-12-2010

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 210353624 **[0006]**
- JP 2010274050 A **[0007]**