

(19)



(11)

EP 4 740 786 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
13.05.2026 Bulletin 2026/20

(51) International Patent Classification (IPC):
A45D 20/12^(2006.01)

(21) Application number: **24211367.8**

(52) Cooperative Patent Classification (CPC):
A45D 20/12; A45D 20/122

(22) Date of filing: **07.11.2024**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL
NO PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA
Designated Validation States:
GE KH MA MD TN

(71) Applicant: **Koninklijke Philips N.V.**
5656 AG Eindhoven (NL)

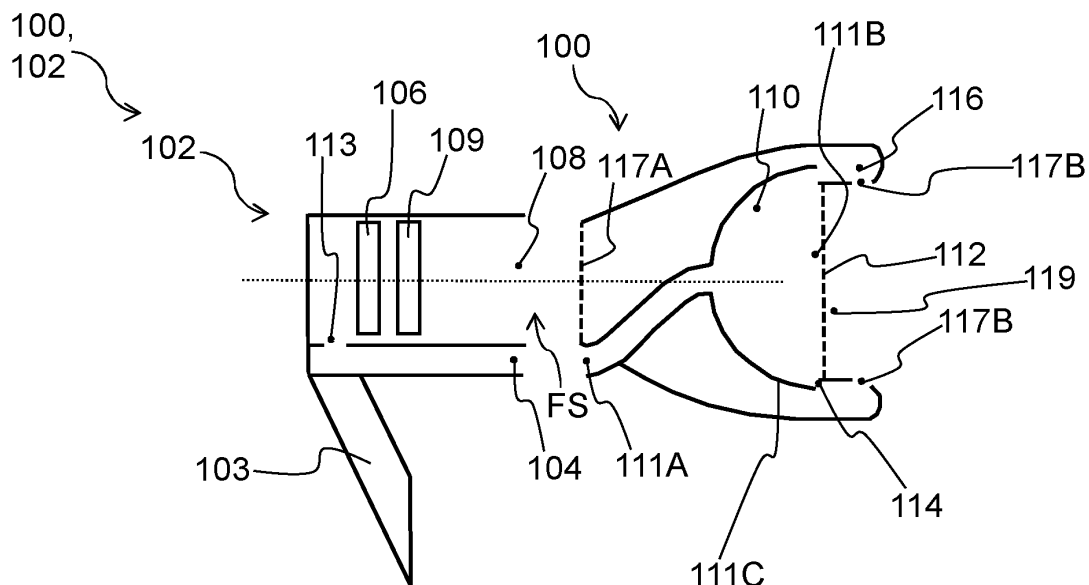
(72) Inventor: **LELIEVELD, Mark Johannes**
5656 AG Eindhoven (NL)

(74) Representative: **Philips Intellectual Property &
Standards**
High Tech Campus 52
5656 AG Eindhoven (NL)

(54) **HAIR DRYER ATTACHMENT, HAIR TREATMENT ASSEMBLY AND METHOD OF OPERATING A HAIR DRYER**

(57) Provided is a hair dryer attachment (100) for attaching to a hair dryer (102), which hair dryer has an air inlet (104) for admitting air into the hair dryer, a fan unit (106), and an air outlet (108) for allowing the air admitted into the hair dryer to be blown by the fan unit out of the hair dryer. The hair dryer attachment comprises at least one air inflow path (110) configured to interface with the air

inlet and to guide air into the air inlet when the hair dryer attachment is attached to the hair dryer. Additionally provided is a hair treatment assembly (100, 102) comprising a hair dryer and such a hair dryer attachment. Further provided is a method of operating a hair dryer, in which method the hair dryer attachment is attached to the hair dryer.

**FIG. 1A**

Description

FIELD OF THE INVENTION

[0001] The invention relates to a hair dryer attachment for attaching to a hair dryer, and to a hair treatment assembly comprising the hair dryer attachment and the hair dryer. Further provided is a method of operating a hair dryer, in which method a hair dryer attachment is attached to the hair dryer.

BACKGROUND OF THE INVENTION

[0002] Known hair dryers generally comprise a housing, an air inlet allowing air to enter the housing, a fan to move the air from the air inlet via an air heater to an air outlet where heated air leaves the housing.

[0003] It would be desirable to enhance energy efficiency of such known hair dryers and/or to provide such known hair dryers with new or improved hair treatment functionality.

SUMMARY OF THE INVENTION

[0004] The invention is defined by the claims.

[0005] According to examples in accordance with a first aspect of the present disclosure, there is provided a hair dryer attachment for attaching to a hair dryer, which hair dryer has an air inlet for admitting air into the hair dryer, a fan unit, and an air outlet for allowing the air admitted into the hair dryer to be blown by the fan unit out of the hair dryer, the hair dryer attachment comprising at least one air inflow path configured to interface with the air inlet and to guide air into the air inlet when the hair dryer attachment is attached to the hair dryer.

[0006] The term "interface" in this context may refer to an arrangement of the air inflow path(s) and the air inlet in which a downstream end of the at least one air inflow path meets, e.g. faces, the air inlet when the hair dryer attachment is attached to the hair dryer.

[0007] The air inflow path(s) can take any suitable form provided that the air inflow path(s) is/are able to interface with the air inlet and guide air into the air inlet when the hair dryer attachment is attached to the hair dryer. The air inflow path(s) can, for example, be in the form of air inflow channel(s) defined in the hair dryer attachment.

[0008] Such air inflow channel(s) may, for instance, be closed channel(s), in other words air inflow duct(s).

[0009] Alternatively, the air inflow channel(s) may be open channel(s) that extend(s) to reach the air inlet and is/are shaped to guide the air into the air inlet.

[0010] The fluid connection established between the air inflow path(s) and the air inlet when the hair dryer attachment is attached to the hair dryer can provide various technical benefits. Depending on precisely how the air inflow path(s) are arranged, the air inflow path(s) can confer functionality, e.g. hair styling functionality, that is not already provided by the hair dryer by itself, can help

to minimize hair flying away during drying/styling, and/or can assist drying, e.g. together with volumizing, of the hair. Alternatively or additionally, the air inflow path(s) can confer enhanced energy efficiency, or else assist the hair dryer to provide a hotter air flow, by the air inflow channel(s) recirculating a portion of the air blown from the air outlet back into the air inlet.

[0011] In some embodiments, the hair dryer attachment further comprises at least one air outlet path for guiding, when the hair dryer attachment is attached to the hair dryer, at least some of the air blown out of the hair dryer via the air outlet towards hair, with the at least one air outlet path being provided in addition to the at least one air inflow path. Thus, the hair dryer attachment can assist to control outflow of air towards the hair, as well as controlling inflow of air into the air inlet via the at least one air inflow path.

[0012] The at least one air outlet path may be arranged to guide at least some of the air blown out of the hair dryer via the air outlet in first flow direction(s) that is/are different from second flow direction(s) along which the air is guided by the at least one air inflow path to the air inlet. Thus, the hair dryer attachment can be regarded as combining two different, e.g. oppositely, directed air flows, which are respectively matched with the air flows entering and exiting the hair dryer via the air inlet and the air outlet. In other words, the hair dryer attachment can link with the air inlet and the air outlet to create a suction and blowing force within the same hair dryer attachment.

[0013] In some embodiments, the hair dryer attachment comprises a nozzle, with the at least one outlet path being included in the nozzle and configured to provide a focused flow of at least some of the air blown out of the hair dryer via the air outlet. Such a nozzle-comprising attachment can facilitate hair styling. This functionality may benefit, for instance, from the air inflow channel(s) recirculating a portion of air blown from the air outlet back into the air inlet, since the latter may assist to provide a hotter air flow which, when focused by the nozzle, assists hair styling.

[0014] In other embodiments, the hair dryer attachment comprises a diffuser, with the at least one outlet path being included in the diffuser for diffusing at least some of the air blown out of the hair dryer via the air outlet. Such a diffuser can be used, for example, for hair curling and/or scalp massaging.

[0015] The diffuser may, for example, comprise louver elements for diffusing the air blown out of the hair dryer via the air outlet.

[0016] In embodiments in which the air inflow channel(s) recirculate the portion of the air blown from the air outlet back into the air inlet, the at least one air inflow path can be regarded as comprising at least one air recirculation path configured to guide the portion of the air blown out of the hair dryer via the air outlet back into the air inlet when the hair dryer attachment is attached to the hair dryer.

[0017] The air recirculation path(s) can assist to en-

hance the energy efficiency of the hair dryer, particularly in embodiments in which the hair dryer includes the heater. Recirculation of air that has already been heated by the hair dryer's heater can assist to reduce energy consumption, via re-use of thermal energy, so that more efficient hair drying can be achieved. Alternatively, the hair dryer attachment can assist to provide a hotter air-flow than when the hair dryer is used without the hair dryer attachment, which can help to make hair drying quicker and/or can assist hair styling.

[0018] As an alternative or in addition to the at least one recirculation path, the at least one air inflow path may comprise at least one ambient air path for guiding air, from outside the hair dryer attachment and the hair dryer, into the air inlet when the hair dryer attachment is attached to the hair dryer. The ambient air path(s) can assist to increase flow through the hair dryer and the hair dryer attachment.

[0019] In some embodiments, the hair dryer attachment is configured to attach to a front side of the hair dryer, with the at least one air inflow path being arranged to interface with the air inlet at the front side.

[0020] In other embodiments, the hair dryer attachment comprises a cavity for receiving at least part of the hair dryer, which at least part of the hair dryer has a rear side at which the air inlet is provided and a front side, facing away from the rear side, at which the air outlet is provided. In such embodiments, the at least one air inflow path may extend from in front of the cavity to behind the cavity so as to enable the at least one air inflow path to receive air, e.g. the portion of the air blown out of the hair dryer via the air outlet, at the front side and to interface with the air inlet at the rear side.

[0021] In embodiments in which the hair dryer attachment comprises the cavity and the at least one air outlet path, the at least one air outlet path may be arranged in front of the cavity and arranged to guide at least some of the air blown out of the air outlet in a direction away from the cavity when the hair dryer attachment is attached to the hair dryer.

[0022] In some embodiments, the hair dryer attachment comprises an air inlet grille, through which air inlet grille outside air is drawable into the at least one air inflow path, in a direction towards the air inlet, by operation of the fan unit when the hair dryer attachment is attached to the hair dryer. Implicit in the function of the air inlet grille is that inlet openings of the air inlet grille allow air to enter the air inflow path(s).

[0023] In some embodiments, the air inlet grille has outwardly protruding region(s) that, in use, outwardly protrude(s) towards the hair, and/or inwardly protruding region(s) that, in use, is/are inwardly recessed with respect to the hair.

[0024] Such a profile of the air inlet grille can assist to enable air to pass into the air inflow path(s) when the hair is placed over the air inlet grille.

[0025] Alternatively, the air inlet grille may be a flat/planar air inlet grille.

[0026] The flat hair-contacting surface of the flat/planar air inlet grille can assist in straightening/taming hair.

[0027] In some embodiments, the hair dryer attachment comprises a hair-receiving region in which hair is receivable between a downstream end of the air outlet path(s) and an upstream end of the air inflow path(s), so that air blown out of the downstream end is drawn through the hair to reach the upstream end of the air inflow path(s).

10 **[0028]** For example, the air blown out of the downstream end may be drawn through the hair and into the air inflow path(s) via the inlet openings of the air inlet grille.

15 **[0029]** According to examples in accordance with a second aspect of the present disclosure, there is provided a hair treatment assembly comprising: a hair dryer having an air inlet for admitting air into the hair dryer, a fan unit, and an air outlet for allowing the air admitted into the hair dryer to be blown by the fan unit out of the hair dryer; and the hair dryer attachment according to any of the embodiments described herein.

[0030] The hair dryer may comprise a heater for heating air prior to the heated air exiting the hair dryer. The heated air can assist drying and/or styling of hair.

25 **[0031]** The heater may, for example, be arranged downstream of the fan unit, such that the air is heated after exiting the fan unit but before the air exits the hair dryer via the air outlet. In other embodiments, the heater may be arranged upstream of the fan unit, such that the air is heated prior to entering the fan unit.

30 **[0032]** The heater can have any suitable design. For example, the heater can comprise one or more of a heating wire, a ceramic heater, and a light source. In some embodiments, the heater, e.g. the heater comprising the heating wire and/or the ceramic heater, can comprise a positive temperature coefficient (PTC) heater.

35 **[0033]** In embodiments in which the at least one air inflow path comprises the at least one recirculation path, the hair treatment assembly may comprise a heater control system configured to adjust operation of the heater to compensate for the portion of the heated air blown out of the hair dryer via the air outlet being guided back into the air inlet when the hair dryer attachment is attached to the hair dryer. Such compensation can, for example, comprise reducing power supply to the heater to account for the heated air being recirculated back into the air inlet.

40 **[0034]** The heater control system may, for example, comprise sensor(s) for sensing an air temperature, with the heater control system being configured to use the air temperature sensed by the sensor(s) to adjust operation of, e.g. by reducing power supply to, the heater to compensate for the portion of the heated air blown out of the hair dryer via the air outlet being guided back into the air inlet when the hair dryer attachment is attached to the hair dryer.

45 **[0035]** The heater control system, e.g. including the

sensor(s), may be included in the hair dryer.

[0036] According to examples in accordance with a third aspect of the present disclosure, there is provided a method of operating a hair dryer, which hair dryer has an air inlet for admitting air into the hair dryer, a fan unit, and an air outlet for allowing the air admitted into the hair dryer to be blown by the fan unit out of the hair dryer, the method comprising: providing a hair dryer attachment comprising at least one air inflow path; attaching the hair dryer attachment to the hair dryer so that the at least one air inflow path of the hair dryer attachment interfaces with the air inlet; and operating the fan unit so that air is guided by the at least one air inflow path into the air inlet.

[0037] The hair dryer attachment and the hair dryer may be according to any of the embodiments described herein in relation to the first aspect and the second aspect.

[0038] In some embodiments, the hair dryer comprises a heater for heating air prior to the heated air exiting the hair dryer.

[0039] In such embodiments, and when the hair dryer attachment includes the at least one recirculation path, the method may comprise adjusting operation of the heater to compensate for the portion of the heated air blown out of the hair dryer via the air outlet being guided back into the air inlet due to the attachment of the hair dryer attachment to the hair dryer.

[0040] For example, the method may comprise adjusting operation of the heater, based on a sensed air temperature, to compensate for the portion of the heated air blown out of the hair dryer via the air outlet being guided back into the air inlet when the hair dryer attachment is attached to the hair dryer.

[0041] These and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0042] For a better understanding of the invention, and to show more clearly how it may be carried into effect, reference will now be made, by way of example only, to the accompanying drawings, in which:

FIG. 1A shows a hair treatment assembly according to an example, which hair treatment assembly is in a disassembled configuration in which a hair dryer and a hair dryer attachment are not attached to each other;

FIG. 1B shows the hair treatment assembly shown in FIG. 1A, but with the hair treatment assembly being in an assembled configuration in which the hair dryer and the hair dryer attachment are attached to each other;

FIG. 2A shows a hair treatment assembly according to another example, which hair treatment assembly is in a disassembled configuration in which the hair dryer and the hair dryer attachment are not attached

to each other;

FIG. 2B shows the hair treatment assembly shown in FIG. 2A, but with the hair treatment assembly being in an assembled configuration in which the hair dryer and the hair dryer attachment are attached to each other;

FIG. 3 shows a hair dryer attachment according to an example;

FIG. 4A shows a hair treatment assembly according to still another example;

FIG. 4B provides a front-facing view of the hair dryer attachment included in the hair treatment assembly shown in FIG. 4A;

FIG. 4C provides another view of the hair dryer attachment included in the hair treatment assembly shown in FIG. 4A;

FIG. 4D replicates the front-facing view of the hair dryer attachment provided in FIG. 4B but also shows a position of an air outlet of the hair dryer when the hair dryer attachment is attached thereto;

FIG. 5 shows a hair treatment assembly according to yet another example;

FIG. 6A shows a hair treatment assembly according to a further example, which hair treatment assembly is in a disassembled configuration in which the hair dryer and the hair dryer attachment are not attached to each other; and

FIG. 6B provides a front view of the hair treatment assembly shown in FIG. 6A, but with the hair treatment assembly being in an assembled configuration in which the hair dryer and the hair dryer attachment are attached to each other.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0043] The invention will be described with reference to the Figures.

[0044] It should be understood that the detailed description and specific examples, while indicating exemplary embodiments of the apparatus, systems and methods, are intended for purposes of illustration only and are not intended to limit the scope of the invention. These and other features, aspects, and advantages of the apparatus, systems and methods of the present invention will become better understood from the following description, appended claims, and accompanying drawings. It should be understood that the Figures are merely schematic and are not drawn to scale. It should also be understood that the same reference numerals are used throughout the Figures to indicate the same or similar parts.

[0045] Provided is a hair dryer attachment for attaching to a hair dryer, which hair dryer has an air inlet for admitting air into the hair dryer, a fan unit, and an air outlet for allowing the air admitted into the hair dryer to be blown by the fan unit out of the hair dryer. The hair dryer attachment comprises at least one air inflow path configured to interface with the air inlet and to guide air into the air inlet when the hair dryer attachment is attached to

the hair dryer.

[0046] Additionally provided is a hair treatment assembly comprising a hair dryer and such a hair dryer attachment.

[0047] Further provided is a method of operating a hair dryer, in which method the hair dryer attachment is attached to the hair dryer.

[0048] FIGs. 1A and 1B schematically depict a hair dryer attachment 100 for attaching to a hair dryer 102. The hair dryer 102 may be a hand-held hair dryer 102 comprising a handle 103 graspable by a user of the hair dryer 102.

[0049] The handle 103 can facilitate use of the hair dryer 102, since the user can grasp the handle 103 and direct an air flow generated by the hair dryer 102 towards hair HA, which can be the user's own hair HA or someone else's hair HA in the scenario that the user is using the hair dryer 102 to dry and/or style another person's hair HA.

[0050] The hair dryer 102 has an air inlet 104 for admitting air into the hair dryer 102, a fan unit 106, and an air outlet 108 for allowing the air admitted into the hair dryer 102 to be blown by the fan unit 106 out of the hair dryer 102. The air blown by the fan unit 106 out of the hair dryer 102 can be used to dry and/or style hair HA.

[0051] A housing of the hair dryer 102 may delimit the air inlet 104 and the air outlet 108.

[0052] The housing can be formed from any suitable material. In some embodiments, the housing is formed from an engineering thermoplastic, such as acrylonitrile butadiene styrene (ABS), and/or polycarbonate (PC).

[0053] In at least some embodiments, such as shown in FIGs. 1A and 1B, the hair dryer 102 comprises a heater 109 for heating air prior to the heated air exiting the hair dryer 102. The heated air can assist drying and/or styling of hair HA.

[0054] The heater 109 may, for example, be arranged downstream of the fan unit 106, such that the air is heated after exiting the fan unit 106 but before the air exits the hair dryer 102 via the air outlet 108. Such an arrangement of the heater 109 is schematically illustrated in FIGs. 1A and 1B. In other embodiments (not shown), the heater 109 may be arranged upstream of the fan unit 106, such that the air is heated prior to entering the fan unit 106.

[0055] The heater 109 can have any suitable design. For example, the heater 109 can comprise one or more of a heating wire, a ceramic heater, and a light source. In some embodiments, the heater 109, e.g. the heater 109 comprising the heating wire and/or the ceramic heater, can comprise a positive temperature coefficient (PTC) heater.

[0056] The hair dryer attachment 100 can attach to the hair dryer 102 in any suitable manner. In some embodiments, the hair dryer attachment 100 attaches to the hair dryer 102 via an interference fit. Such an interference fit can make attaching and detaching the hair dryer attachment 100 to and from the hair dryer 102 relatively easy and efficient to implement. Other attachment mechanisms can also be contemplated, such as a rotational

attachment mechanism, e.g. a bayonet coupling.

[0057] More generally, the hair dryer attachment 100 comprises at least one air inflow path 110 configured to interface with the air inlet 104 and to guide air into the air inlet 104 when the hair dryer attachment 100 is attached to the hair dryer 102. The term "interface" in this context may refer to an arrangement of the air inflow path(s) 110 and the air inlet 104 in which a downstream end 111A of the at least one air inflow path 110 meets, e.g. faces, the air inlet 104 when the hair dryer attachment 100 is attached to the hair dryer 102.

[0058] The air inflow path(s) 110 can take any suitable form provided that the air inflow path(s) 110 is/are able to interface with the air inlet 104 and guide air into the air inlet 104 when the hair dryer attachment 100 is attached to the hair dryer 102. The air inflow path(s) 110 can, for example, be in the form of air inflow channel(s) defined in the hair dryer attachment 100.

[0059] Such air inflow channel(s) may, for instance, be closed channel(s), in other words air inflow duct(s). Alternatively, the air inflow channel(s) may be open channel(s) that extend to reach the air inlet 104 and is/are shaped to guide the air into the air inlet 104.

[0060] It is noted that the air inflow path(s) 110 interfacing with the air inlet 104 may mean that the air inflow path(s) 110 guide(s) air directly into, rather than merely in a general direction of, the air inlet 104. The fluid connection established between the air inflow path(s) 110 and the air inlet 104 can provide various technical benefits, as described in more detail herein below.

[0061] For example, inclusion of the air inflow path(s) 110 in the hair dryer attachment 100 can confer functionality, e.g. hair styling functionality, that is not already provided by the hair dryer 102 by itself. For example, when an upstream end 111B of the air inflow path(s) 110 is arranged at a hair-facing side, e.g. a front side FS, of the hair dryer 102 when the hair dryer attachment 100 is attached thereto, the air inflow path(s) 110 may suck hair HA towards the hair dryer attachment 100, as schematically illustrated in FIG. 1B. This can help to minimize the hair HA flying away during drying/styling and/or can assist drying, e.g. together with volumizing, of the hair HA.

[0062] In some embodiments, the air inflow path(s) 110 comprise(s) a concave or bowl-shaped portion 111C for receiving air, with the concave or bowl-shaped portion 111C at least partly delimiting the upstream end 111B of the air inflow path(s) 110.

[0063] In some embodiments, such as shown in FIGs. 1A and 1B, the hair dryer attachment 100 comprises an air inlet grille 112, through which air inlet grille 112 outside air is drawable into the at least one air inflow path 110, in a direction towards the air inlet 104, by operation of the fan unit 106 when the hair dryer attachment 100 is attached to the hair dryer 102. This drawing of outside air into the air inflow path(s) 110 is denoted in FIG. 1B by arrows OA1.

[0064] Implicit in the function of the air inlet grille 112 is

that inlet openings of the air inlet grille 112 allow air to enter the air inflow path(s) 110. The air inlet grille 112 may nonetheless be configured to minimize the risk of the hair HA being sucked into the air inflow path(s) 110.

[0065] In some embodiments, the air inlet grille 112 has outwardly protruding region(s) that, in use, outwardly protrude(s) towards the hair HA, and/or inwardly protruding region(s) that, in use, is/are inwardly recessed with respect to the hair HA. Such a profile of the air inlet grille 112 can assist to enable air to pass into the air inflow path(s) 110 when the hair HA is placed over the air inlet grille 112. Alternatively, the air inlet grille 112 may be a flat/planar air inlet grille 112. The flat hair-contacting surface of the flat/planar air inlet grille 112 can assist in straightening/taming hair.

[0066] In some embodiments, and still referring to FIGs. 1A and 1B, the at least one air inflow path 110 comprises at least one air recirculation path configured to guide a portion of the air blown out of the hair dryer 102 via the air outlet 108 back into the air inlet 104 when the hair dryer attachment 100 is attached to the hair dryer 102. The air recirculation path(s) can assist to enhance the energy efficiency of the hair dryer 102, particularly in embodiments in which the hair dryer 102 includes the heater 109. Recirculation of air that has already been heated by the hair dryer's 102 heater 109 can assist to reduce energy consumption, via re-use of thermal energy, so that more efficient hair drying can be achieved. Alternatively, the hair dryer attachment 100 can assist to provide a hotter airflow than when the hair dryer 102 is used without the hair dryer attachment 100, which can help to make hair drying quicker and/or can assist hair styling.

[0067] The hair dryer attachment 100 may comprise passage(s) 114 at which the portion of the air blown out of the hair dryer 102 via the air outlet 108 is received in the air recirculation path(s), e.g. while a remainder of the air blown out of the hair dryer 102 via the air outlet 108 is directed out of the hair dryer attachment 100 towards hair HA.

[0068] In some embodiments, a heater control system is provided for adjusting operation of the heater 109 to compensate for the portion of the heated air blown out of the hair dryer 102 via the air outlet 108 being guided back into the air inlet 104 when the hair dryer attachment 100 is attached to the hair dryer 102. Such compensation can, for example, comprise reducing power supply to the heater 109 to account for the heated air being recirculated back into the air inlet 104.

[0069] The heater control system may, for example, comprise sensor(s) for sensing an air temperature, with the heater control system being configured to use the air temperature sensed by the sensor(s) to adjust operation of, e.g. by reducing power supply to, the heater 109 to compensate for the portion of the heated air blown out of the hair dryer 102 via the air outlet 108 being guided back into the air inlet 104 when the hair dryer attachment 100 is attached to the hair dryer 102. For example, the sensor(s)

can enable adjustment of the outlet temperature of the air exiting the hair dryer 102, and as the air becomes re-warmed due to the recirculation, the temperature can be set lower as the accumulated temperature of the circulated air increases.

[0070] It is generally noted at this point that it is desirable for a cross-sectional area of the air inflow path(s) 110, e.g. air inflow channel(s), to be no smaller than that of the air inlet 104.

[0071] In this way, the air inflow path(s) 110 may be dimensioned to avoid limiting the air flow, and may therefore not create too much drag.

[0072] In some embodiments, such as shown in FIGs. 1A and 1B, the hair dryer attachment 100 further comprises at least one air outlet path 116 for guiding, when the hair dryer attachment 100 is attached to the hair dryer 102, at least some of the air blown out of the hair dryer 102 via the air outlet 108 towards hair HA, with the at least one air outlet path 116 being provided in addition to the at least one air inflow path 110. Thus, the hair dryer attachment 100 can assist to control outflow of air towards the hair HA, as well as controlling inflow of air into the air inlet 104 via the at least one air inflow path 110.

[0073] In such embodiments, the at least one air outlet path 116 may interface with the air outlet 108 while the at least one air inflow path 110 interfaces with the air inlet 104, when the hair dryer attachment 100 is attached to the hair dryer 102.

[0074] The term "interface" in the context of the at least one air outlet path 116 may refer to an arrangement of the air outlet path(s) 116 and the air outlet 108 in which an upstream end 117A of the at least one air outlet path 116 meets, e.g. faces, the air outlet 108 when the hair dryer attachment 100 is attached to the hair dryer 102.

[0075] In embodiments in which both the air inflow path(s) 110 and the air outlet path(s) 116 are included in the hair dryer attachment 100, the at least one air outlet path 116 may be arranged to guide at least some of the air blown out of the hair dryer 102 via the air outlet 108 in first flow direction(s) FD1 that is/are different from second flow direction(s) FD2 along which the air is guided by the at least one air inflow path 110 to the air inlet 104.

[0076] Thus, the hair dryer attachment 100 can be regarded as combining two different, e.g. oppositely, directed air flows, which are respectively matched with the air flows 118A, 118B entering and exiting the hair dryer 102 via the air inlet 104 and the air outlet 108. In other words, the hair dryer attachment 100 can link with the air inlet 104 and the air outlet 108 to create a suction and blowing force within the same hair dryer attachment 100.

[0077] In some embodiments, such as shown in FIGs. 1A and 1B, the hair dryer attachment 100 comprises a hair-receiving region 119 in which hair HA is receivable between a downstream end 117B of the air outlet path(s) 116 and the upstream end 111B of the air inflow path(s) 110, so that air blown out of the downstream end 117B is drawn through the hair HA to reach the upstream end

111B of the air inflow path(s) 110.

[0078] For example, the air blown out of the downstream end 117B may be drawn through the hair HA and into the air inflow path(s) 110 via the inlet openings of the air inlet grille 112.

[0079] In embodiments in which the hair dryer 102 includes the heater 109, air heated by the heater 109 may be blown out of the downstream end 117B and drawn through the hair HA to reach the upstream end 111B of the air inflow path(s) 110.

[0080] The downstream end 117B of the air outlet path(s) 116 may, for instance, be arranged around the upstream end 111B of the air inflow path(s) 110, such that the upstream end 111B of the air inflow path(s) 110 is centrally arranged while the downstream end 117B of the air outlet path(s) 116 is peripherally arranged. An example of this is schematically shown in FIGs. 1A and 1B.

[0081] In such embodiments, air may flow from outside to inside, causing air, e.g. heated air, to be pulled through the hair HA.

[0082] In other embodiments, the upstream end 111B of the air inflow path(s) 110 is/are arranged around the downstream end 117B of the air outlet path(s) 116, such that the upstream end 111B of the air inflow path(s) 110 is peripherally arranged while the downstream end 117B of the air outlet path(s) 116 is centrally arranged.

[0083] Regarding the spatial arrangement of the hair dryer's 102 air inlet 104, this may, for example, be arranged at the front side FS of the hair dryer 102, e.g. with an internal air path 113 within the hair dryer 102 fluidly connecting the air inlet 104 at the front side FS with the fan unit's 106 air intake. In such embodiments, the hair dryer attachment 100 may be configured to attach to the front side FS of the hair dryer 102, with the at least one air inflow path 110 interfacing with the air inlet 104 at the front side FS, as shown in FIGs. 1A and 1B.

[0084] In other embodiments, such as shown in FIGs. 2A and 2B, the hair dryer's 102 air inlet 104 may be arranged at a rear side RS while the air outlet 108 is arranged at the front side FS. In such embodiments, the hair dryer attachment 100 can comprise a cavity 120 for receiving at least part 122 of the hair dryer 102, with the at least part 122 of the hair dryer 102 having the rear side RS at which the air inlet 104 is provided and the front side FS, facing away from the rear side RS, at which the air outlet 108 is provided. In such embodiments, the at least one air inflow path 110 may extend from in front of the cavity 120 to behind the cavity 120 so as to enable the at least one air inflow path 110 to receive air, e.g. blown out of the hair dryer 102 via the air outlet 108, at the front side FS and to interface with the air inlet 104 at the rear side RS.

[0085] In embodiments in which the hair dryer attachment 100 includes the at least one air outlet path 116, the air outlet path(s) 116 may be arranged in front of the cavity 120 so as to guide at least some of the air blown out of the air outlet 108 in a direction, e.g. in the first direction(s) FD1, away from the cavity 120 when the hair dryer attachment 100 is attached to the hair dryer 102.

[0086] It is generally noted that with the miniaturization of hair dryers 102, the hair dryer attachment 100 according to the present disclosure, which may fit over the hair dryer 102, is considered to be relatively straightforward to implement and can be made compact in size, particularly with increasing miniaturization of hair dryers 102 expected in the future.

[0087] Whilst the hair dryer attachment 100 shown in FIGs. 1A, 1B, 2A and 2B has a diffuser-type shape, the air inflow path(s) and air outlet path(s)-comprising hair dryer attachment 100 can take any suitable form. In some embodiments, such as shown in FIGs. 3 and 4A to 4D, the hair dryer attachment 100 comprises a nozzle 124, with the at least one outlet path 116 being included in the nozzle 124 and configured to provide a focused flow of at least some of the air blown out of the hair dryer 102 via the air outlet 108.

[0088] Hair drying and/or styling using such a nozzle 124 may also benefit from a relatively high air temperature, since a purpose of the nozzle 124 may be to create a focused, relatively high speed, hot air flow. Hence, in embodiments in which the hair dryer attachment 100 includes the nozzle 124, the hair dryer attachment 100 may also include the recirculation air path(s) that guide the portion of the air blown out of the hair dryer 102 via the air outlet 108 back into the air inlet 104 when the hair dryer attachment 100 is attached to the hair dryer 102. An example of this is shown in FIG. 3, noting that the arrow 118B shows the air flow from the hair dryer's 102 air outlet 108, and the portion of this air flow passes, via the passage(s) 114, into the air recirculation channel.

[0089] In some embodiments, such as shown in FIGs. 3 and 4A to 4D, the at least one air inflow path 110 comprises at least one ambient air path for guiding air, from outside the hair dryer attachment 100 and the hair dryer 102, into the air inlet 104 when the hair dryer attachment 100 is attached to the hair dryer 102. The ambient air path(s) can assist to increase flow through the hair dryer 102 and the hair dryer attachment 100.

[0090] It is noted that including the air recirculation path (as shown in FIG. 3) can increase the temperature of the air exiting the hair dryer attachment 100, due to the air becoming hotter as a consequence of the internal reflow of heated air back into the air inlet 104. On the other hand, if the at least one air recirculation path is omitted (as shown in FIGs. 4A to 4D), the temperature of the air exiting the hair dryer attachment 100 may be lower.

[0091] In the case of the hair dryer attachment 100 that does not include the air recirculation path(s), reducing the air flow, whilst maintaining similar power supply to the heater 109, may increase the temperature of the air exiting the hair dryer attachment 100.

[0092] The hair dryer attachment 100 comprising the at least one ambient air path may enable a reflow hair dryer 102 (that is already configured, without the hair dryer attachment 100 being attached thereto, to recirculate a fraction 126 of the air exiting the air outlet 108 back into the air inlet 104) to operate in a manner more akin to a

non-reflow hair dryer 102. When the hair dryer attachment 100 does not include any air recirculation path (as shown in FIGs. 4A to 4D and 5), the temperature of the air exiting the hair dryer attachment 100 may be lower, since less (or no) heated air and more (or only) outside air is guided by the ambient air path(s) into the air inlet 104.

[0093] It is noted that inclusion of the nozzle 124 in the hair dryer attachment 100 should not be regarded as in any way limiting, and in other embodiments, such as shown in FIG. 5, the hair dryer attachment 100 comprises a diffuser 130, with the at least one outlet path 116 being included in the diffuser 130 for diffusing at least some of the air blown out of the hair dryer 102 via the air outlet 108. Such a diffuser can be used, for example, for hair curling and/or scalp massaging. The diffuser 130 may, for example, comprise louver elements 132 for diffusing the air blown out of the hair dryer 102 via the air outlet 108.

[0094] In some embodiments, such as shown in FIGs. 6A and 6B, the at least one air inflow path 110 is defined, at least in part, along a convexly curving surface 134 of the hair dryer attachment 100, which convexly curving surface 134 curvedly extends towards the air inlet 104 so as to guide air following the convexly curving surface 134 into the air inlet 104, when the hair dryer attachment 100 is attached to the hair dryer 102. The attachment 100 may be attached to the hair dryer 102 either only fluidly connected to the air inlet of the hair dryer or fluidly connected to both the air inlet and air outlet of the hair dryer.

[0095] Such a convexly curving surface 134 can make use of the Coanda effect to assist guidance of air into the air inlet 104.

[0096] The convexly curving surface 134 can, for example, be included in an exterior, in other words outside, surface of the hair dryer attachment 100.

[0097] This can be regarded as an example of the air inflow path(s) 110 including an open channel that extends to reach the air inlet 104 and is shaped to guide the air into the air inlet 104. Alternatively, if the attachment is fluidly connected to both air inlet and air outlet of the hair dryer, the air inflow path(s) 110 comprising a portion of closed channel and a portion of open channel.

[0098] Including the convexly curving surface 134 in the exterior surface of the hair dryer attachment 100 may result in a so-called "air multiplier" effect caused by the air being guided around the convexly curving surface 134 entraining ambient air surrounding the convexly curving surface 134.

[0099] In embodiments in which the air inlet 104 and the air outlet 108 are each arranged at the front side FS of the hair dryer 102, for example with the air inlet 104 being centrally arranged and the air outlet 108 being peripherally arranged around the air inlet 104, the convexly curving surface 134 may be arranged to receive a portion of the air blown out of the hair dryer 102 via the air outlet 108 and guide the portion of the air to the air inlet 104, e.g. inwardly to the centrally arranged air inlet 104 (see the arrows FD2 in FIGs. 6A and 6B), when the hair dryer attachment 100 is attached to the hair dryer 102.

[0100] In some embodiments, such as shown in FIGs. 6A and 6B, the hair dryer attachment 100 comprises a pair of flap elements 136 spaced apart from, e.g. opposite, each other, with the air inlet 104 at the front side FS of the hair dryer 102 being disposed in-between the pair of flap elements 136 when the hair dryer attachment 100 is attached to the hair dryer 102.

[0101] Such a pair of flap elements 136 can each be arranged at a side of the hair dryer attachment 100 so as to delimit a central channel in-between the pair of flap elements 136 for receiving hair HA.

[0102] The central channel can, for example, extend parallel with the handle 103 of the hair dryer 102.

[0103] In this way, the central channel can receive hair HA in the direction in which it naturally falls.

[0104] The openings of the central channel towards the top of the hair dryer attachment 100 and towards the bottom of the hair dryer attachment 100, when orientated for use, may provide air flow along the scalp direction.

[0105] By directing air at least partly across the scalp, rather than all of the air, e.g. hot air, being directed towards the scalp, the pair of flap element(s) 136 can make hair drying and/or styling more scalp-friendly.

[0106] In some embodiments, the flap elements 136 inwardly curve, e.g. inwardly and convexly curve, towards the air inflow path(s) 110, e.g. towards the air recirculation path(s) thereof.

[0107] This arrangement of the flap elements 136 can assist to retain hair HA proximal to the hair dryer attachment 100, by the flap elements 136 causing a secondary flow of air to be provided, which secondary flow extends transverse to the (second) direction(s) FD2 of air flow into the air inlet 104 in different height, and thus can blow hair from both front and back side. This secondary flow, which can be regarded as an air curtain, can inhibit hair HA being blown away from the air inlet 104.

[0108] At least one air inflow path(s) 110 is defined by the flap elements 136. Similar with the convexly curving surface 134, the exterior surface of flap elements 136 may also be a convexly curving surface to guide secondary flow of air by making use of the Coanda effect. Alternatively, the secondary flow of air may also be guided by the inner surface of the flap elements (opposite with the exterior surface), or the flap elements 136 comprising at least one inner cavity as the airflow channel to guide the secondary flow of air.

[0109] Alternatively, the air inflow path 110 is blocked at the bottom portion of the attachment or there is no air inflow path at the bottom portion of the attachment to further minimize hair flying away during drying/styling. It is noted more generally that the hair dryer attachment 100 can be formed from any suitable material. In some embodiments, the hair dryer attachment 100 is formed from an engineering thermoplastic, such as acrylonitrile butadiene styrene (ABS), and/or polycarbonate (PC).

[0110] The air inflow path(s) 110, as well as the air outlet path(s) 116 when included in the hair dryer attachment 100, can be provided during molding of the hair

dryer attachment 100, e.g. during molding of the hair dryer attachment 100 from the engineering thermoplastic.

[0111] It is noted that the present disclosure partly concerns the hair dryer attachment 100 as such, since the hair dryer attachment 100 can be supplied by itself to the user, with the hair dryer 102 being already in the user's possession or sourced separately from the hair dryer attachment 100.

[0112] The present disclosure also relates to a hair treatment assembly 100, 102 comprising the hair dryer attachment 100 and the hair dryer 102. The user may accordingly be conveniently provided with the hair dryer attachment 100 along with the hair dryer 102.

[0113] The present disclosure further provides a method of operating a hair dryer 102, which hair dryer 102 has an air inlet 104 for admitting air into the hair dryer 102, a fan unit 106, and an air outlet 108 for allowing the air admitted into the hair dryer 102 to be blown by the fan unit 106 out of the hair dryer 102. The hair dryer 102 can be according to any of the embodiments described herein.

[0114] The method comprises providing a hair dryer attachment 100 comprising at least one air inflow path 110, attaching the hair dryer attachment 100 to the hair dryer 102 so that the at least one air inflow path 110 of the hair dryer attachment 100 interfaces with the air inlet 104, and operating the fan unit 106 so that air is guided by the at least one air inflow path 110 into the air inlet 104. The hair dryer attachment 100 may be according to any of the embodiments described herein.

[0115] In some embodiments, the hair dryer 102 comprises the heater 109 for heating air prior to the heated air exiting the hair dryer 102. In such embodiments, and when the hair dryer attachment 100 includes the at least one recirculation path, the method may comprise adjusting operation of the heater 109 to compensate for the portion of the heated air blown out of the hair dryer 102 via the air outlet 108 being guided back into the air inlet 104 due to the attachment of the hair dryer attachment 100 to the hair dryer 102.

[0116] For example, the method may comprise adjusting operation of the heater 109, based on an air temperature sensed by the sensor(s), to compensate for the portion of the heated air blown out of the hair dryer 102 via the air outlet 108 being guided back into the air inlet 104 when the hair dryer attachment 100 is attached to the hair dryer 102.

[0117] Variations to the disclosed embodiments can be understood and effected by those skilled in the art in practicing the claimed invention, from a study of the drawings, the disclosure and the appended claims. In the claims, the word "comprising" does not exclude other elements or steps, and the indefinite article "a" or "an" does not exclude a plurality.

[0118] The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage.

[0119] If the term "adapted to" is used in the claims or description, it is noted the term "adapted to" is intended to be equivalent to the term "configured to".

[0120] Any reference signs in the claims should not be construed as limiting the scope.

Claims

1. A hair dryer attachment (100) for attaching to a hair dryer (102), which hair dryer has an air inlet (104) for admitting air into the hair dryer, a fan unit (106), and an air outlet (108) for allowing the air admitted into the hair dryer to be blown by the fan unit out of the hair dryer, the hair dryer attachment comprising at least one air inflow path (110) configured to interface with the air inlet and to guide air into the air inlet when the hair dryer attachment is attached to the hair dryer.
2. The hair dryer attachment (100) according to claim 1, further comprising at least one air outlet path (116) for guiding, when the hair dryer attachment is attached to the hair dryer (102), at least some of the air blown out of the hair dryer via the air outlet (108) towards hair (HA), the at least one air outlet path being provided in addition to the at least one air inflow path (110).
3. The hair dryer attachment (100) according to claim 2, wherein the at least one air outlet path (116) is arranged to guide at least some of the air blown out of the hair dryer via the air outlet in first flow direction(s) (FD1) that is/are different from second flow direction(s) (FD2) along which the air is guided by the at least one air inflow path (110) to the air inlet (104).
4. The hair dryer attachment (100) according to claim 2 or claim 3, comprising a nozzle (124), the at least one outlet path (116) being included in the nozzle and configured to provide a focused flow of at least some of the air blown out of the hair dryer via the air outlet (108).
5. The hair dryer attachment (100) according to claim 2 or claim 3, comprising a diffuser (130), the at least one outlet path (116) being included in the diffuser for diffusing at least some of the air blown out of the hair dryer via the air outlet (108).
6. The hair dryer attachment (100) according to any one of claims 1 to 5, wherein the at least one air inflow path (110) comprises at least one air recirculation path configured to guide a portion of the air blown out of the hair dryer via the air outlet (108) back into the air inlet (104) when the hair dryer attachment is attached to the hair dryer.
7. The hair dryer attachment (100) according to any

one of claims 1 to 6, wherein the at least one air inflow path (110) comprises at least one ambient air path for guiding air, from outside the hair dryer attachment and the hair dryer, into the air inlet (104) when the hair dryer attachment is attached to the hair dryer (102).

8. The hair dryer attachment (100) according to any one of claims 1 to 7, wherein the hair dryer attachment is configured to attach to a front side (FS) of the hair dryer, the at least one air inflow path (110) being arranged to interface with the air inlet (104) at said front side.
9. The hair dryer attachment (100) according to any one of claims 1 to 7, comprising a cavity (120) for receiving at least part (122) of the hair dryer, the at least part of the hair dryer having a rear side (RS) at which the air inlet (104) is provided and a front side (FS), facing away from the rear side, at which the air outlet (108) is provided, the at least one air inflow path (110) extending from in front of the cavity to behind the cavity so as to enable the at least one air inflow path to receive air at the front side and to interface with the air inlet at the rear side.
10. The hair dryer attachment (100) according to claim 9 as according to any of claims 2 to 5, wherein the at least one air outlet path (116) is arranged in front of the cavity (120) and arranged to guide at least some of the air blown out of the air outlet (108) in a direction away from the cavity when the hair dryer attachment is attached to the hair dryer (102).
11. The hair dryer attachment (100) according to any one of claims 1 to 10, comprising an air inlet grille (112), through which air inlet grille outside air is drawable into the at least one air inflow path (110), in a direction towards the air inlet (104), by operation of the fan unit (106) when the hair dryer attachment is attached to the hair dryer (102).
12. A hair treatment assembly (100, 102) comprising:
 - a hair dryer (102) having an air inlet (104) for admitting air into the hair dryer, a fan unit (106), and an air outlet (108) for allowing the air admitted into the hair dryer to be blown by the fan unit out of the hair dryer; and
 - the hair dryer attachment (100) according to any one of claims 1 to 11.
13. The hair treatment assembly (100, 102) according to claim 12, wherein the hair dryer (102) comprises a heater (109) for heating air prior to the heated air exiting the hair dryer.
14. The hair treatment assembly (100, 102) according to claim 13, wherein the hair dryer attachment is ac-

cording to claim 6, and the hair treatment assembly comprises a heater control system configured to adjust operation of the heater (109) to compensate for the portion of the heated air blown out of the hair dryer (102) via the air outlet (108) being guided back into the air inlet (104) when the hair dryer attachment (100) is attached to the hair dryer.

15. A method of operating a hair dryer (102), which hair dryer has an air inlet (104) for admitting air into the hair dryer, a fan unit (106), and an air outlet (108) for allowing the air admitted into the hair dryer to be blown by the fan unit out of the hair dryer, the method comprising:

- providing a hair dryer attachment (100) comprising at least one air inflow path (110);
- attaching the hair dryer attachment to the hair dryer so that the at least one air inflow path of the hair dryer attachment interfaces with the air inlet; and
- operating the fan unit so that air is guided by the at least one air inflow path into the air inlet.

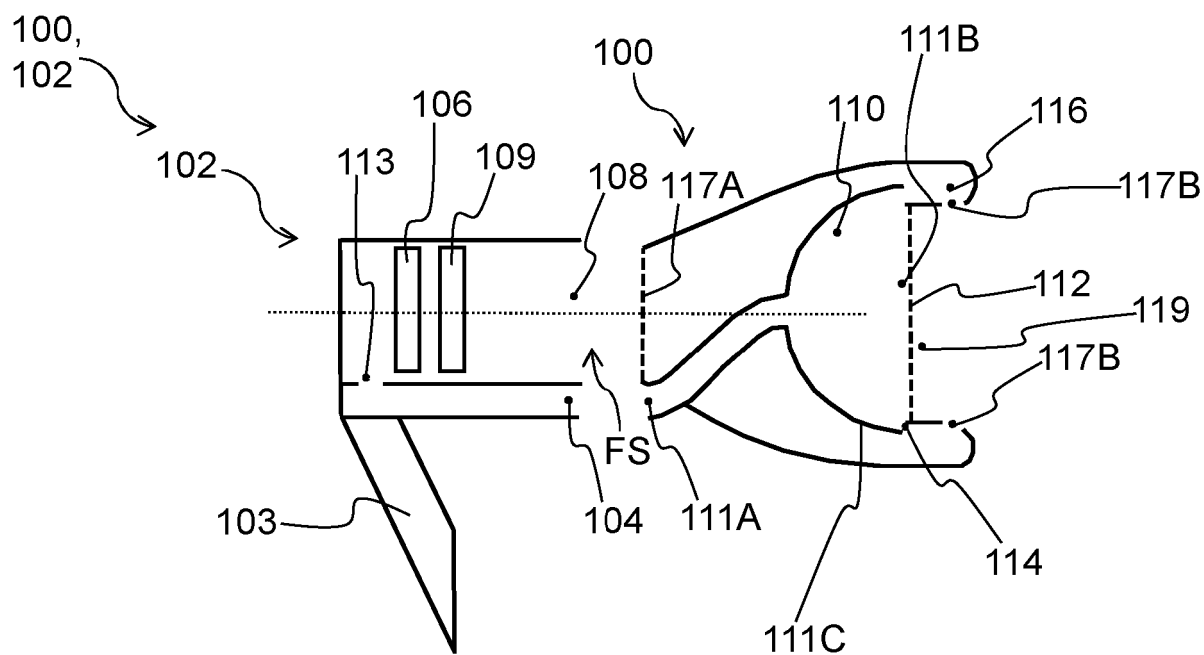


FIG. 1A

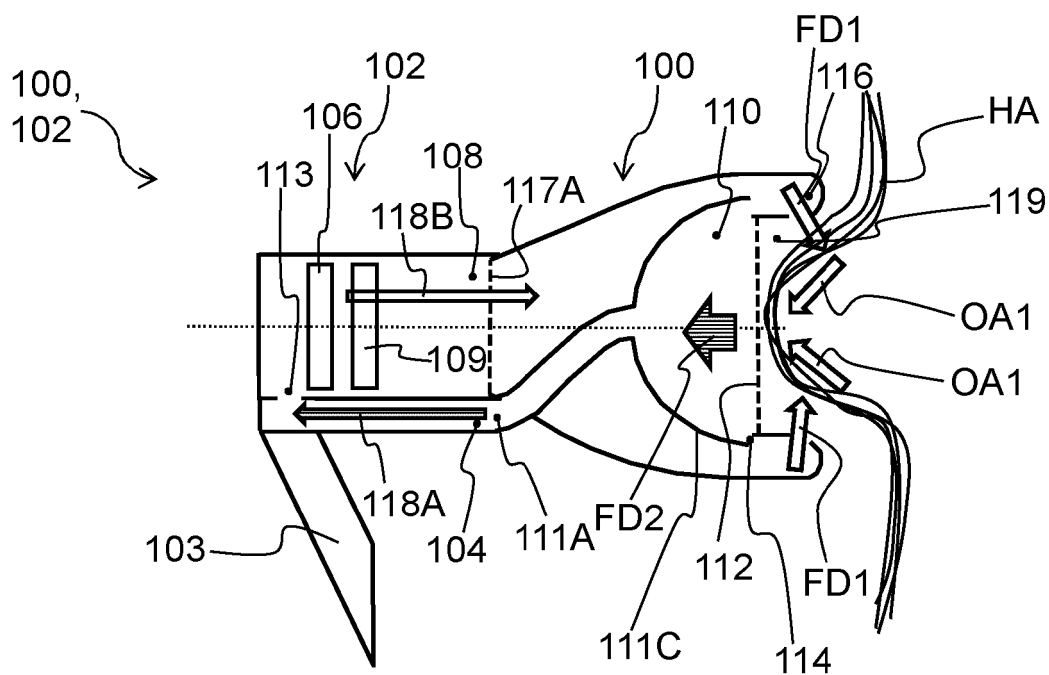


FIG. 1B

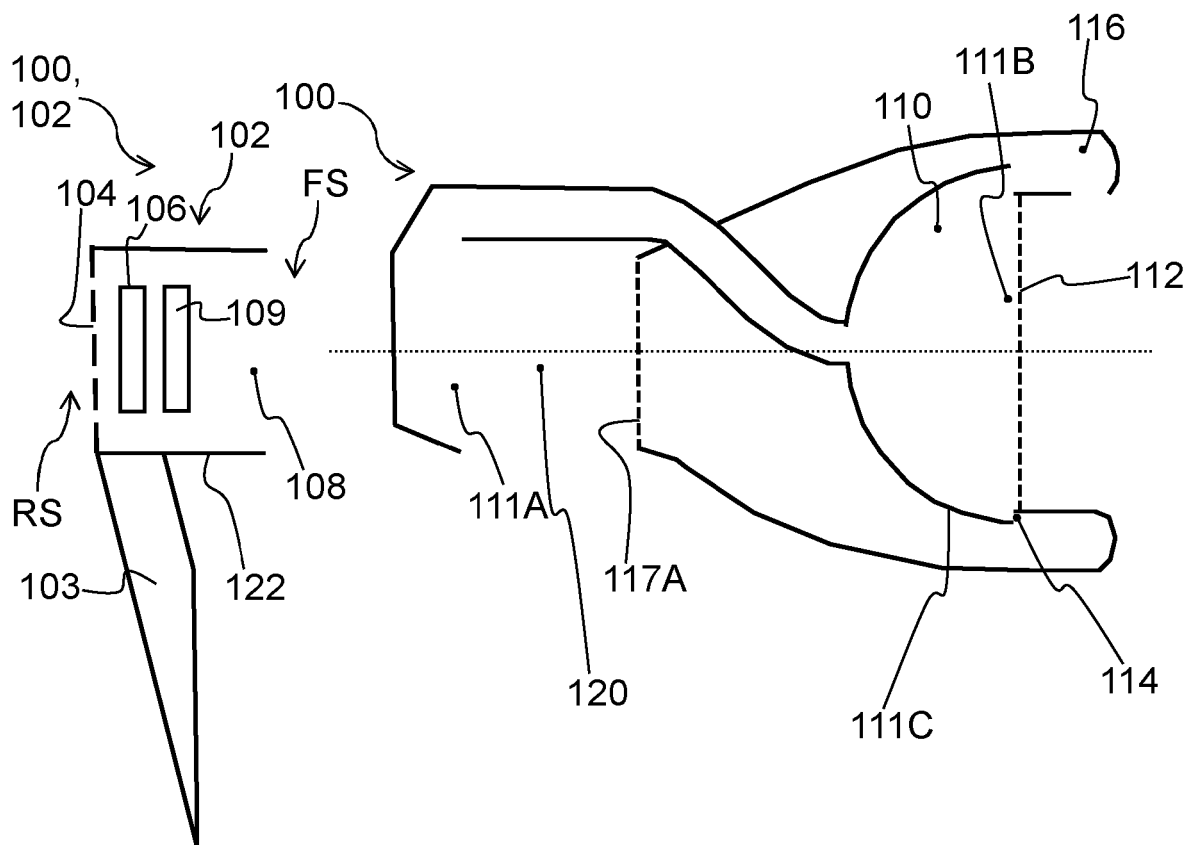


FIG. 2A

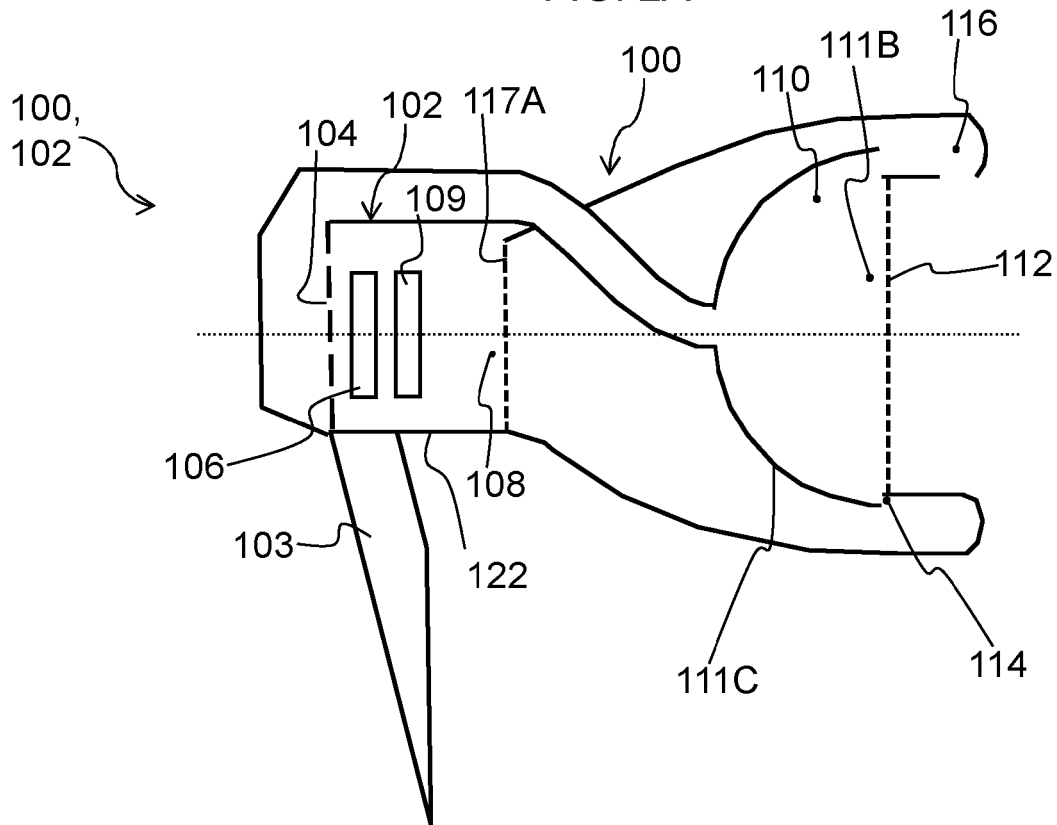


FIG. 2B

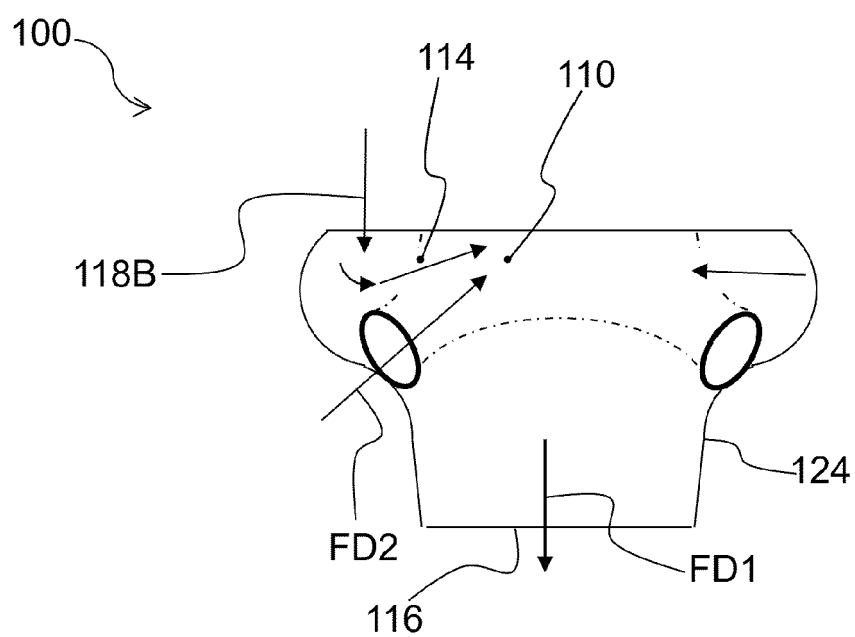


FIG. 3

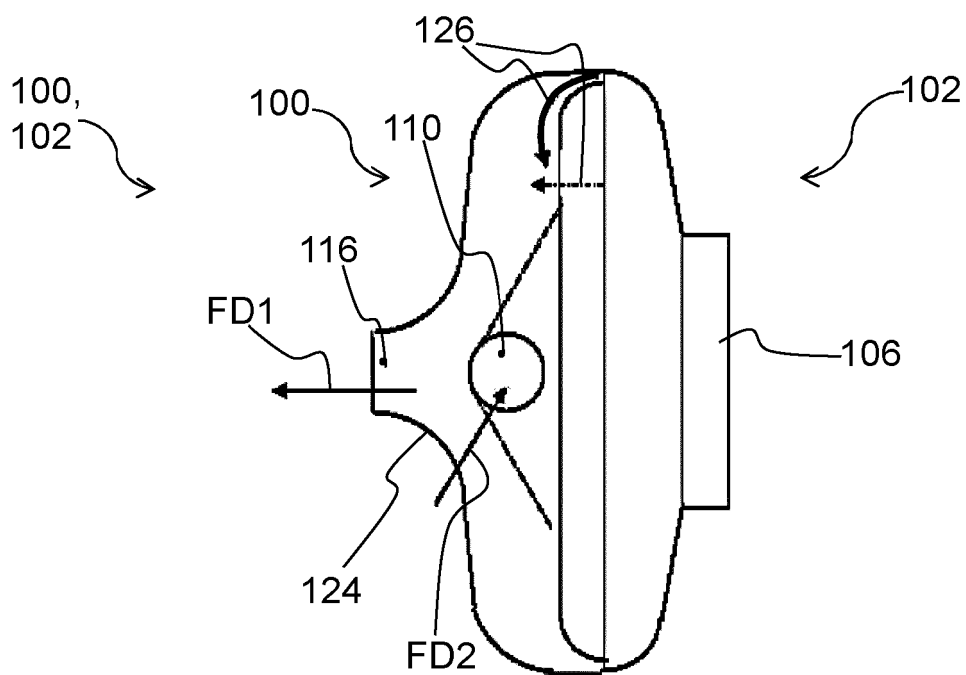


FIG. 4A

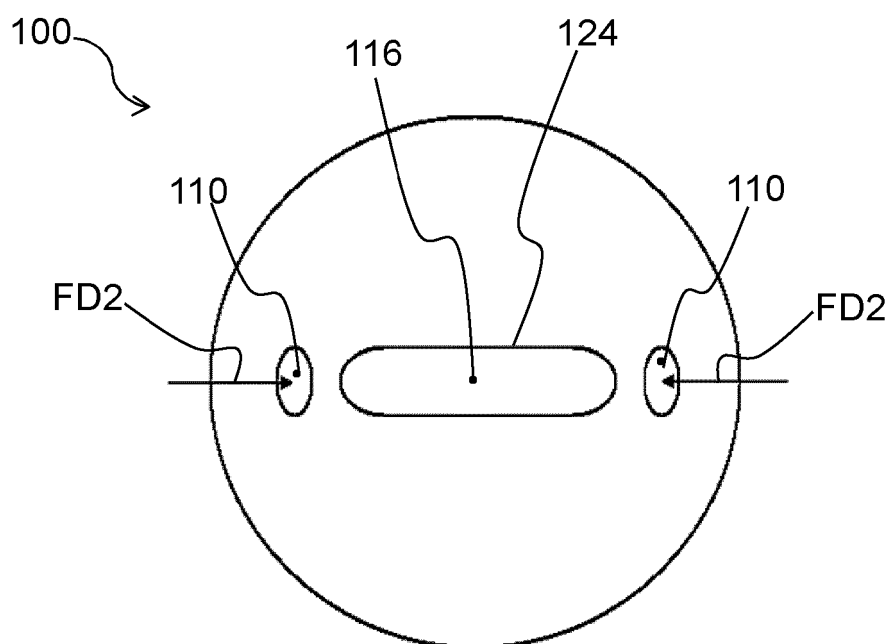


FIG. 4B

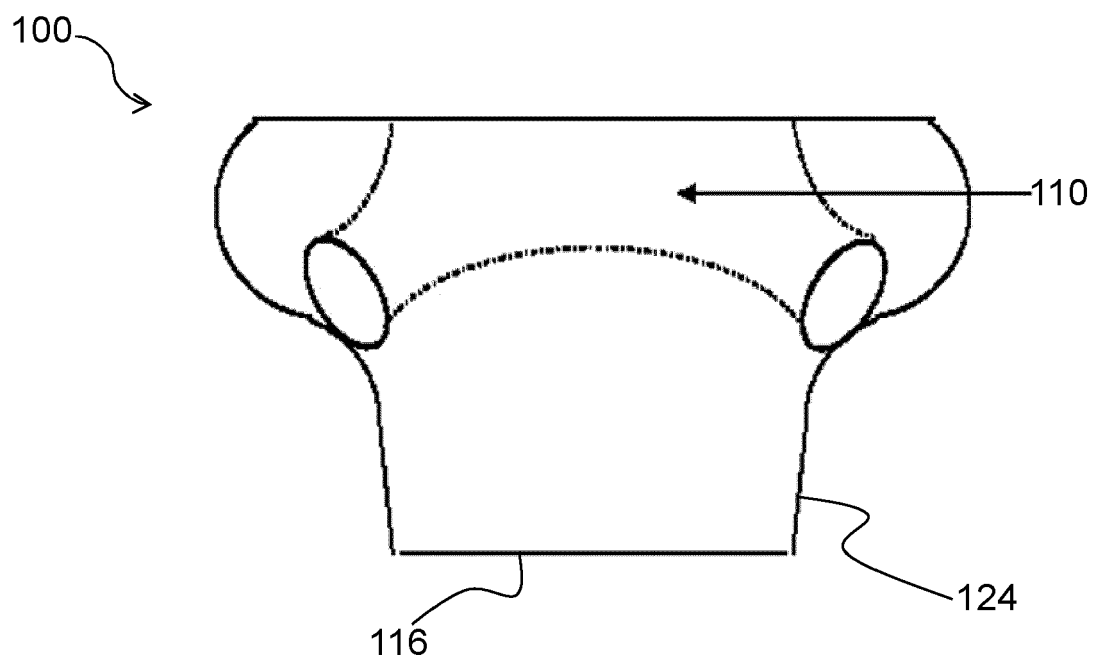


FIG. 4C

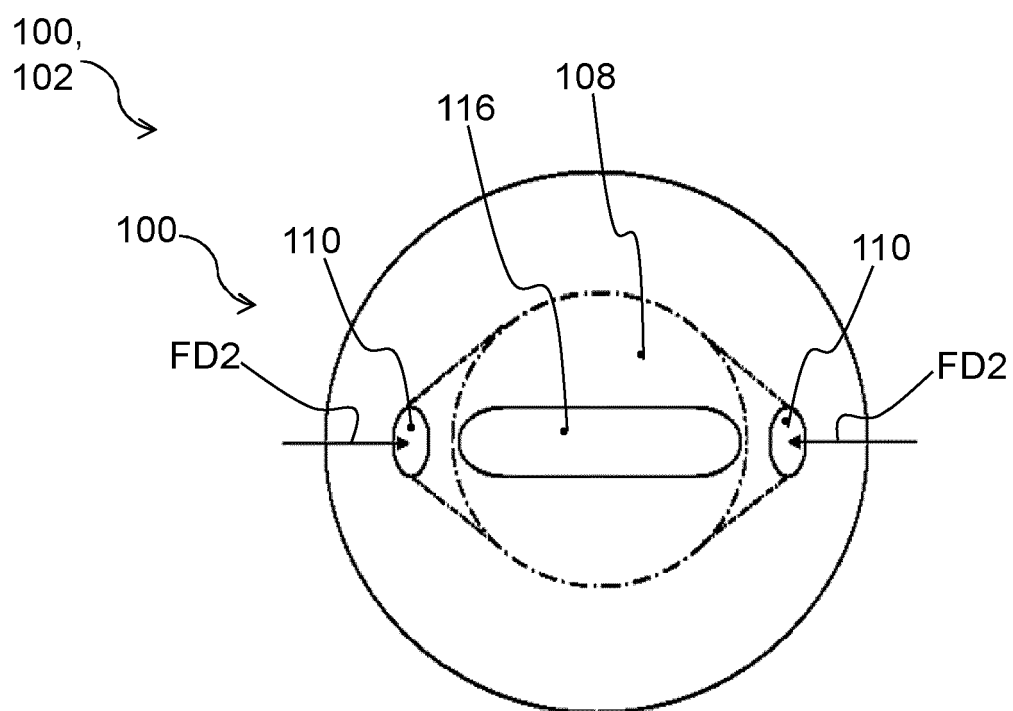


FIG. 4D

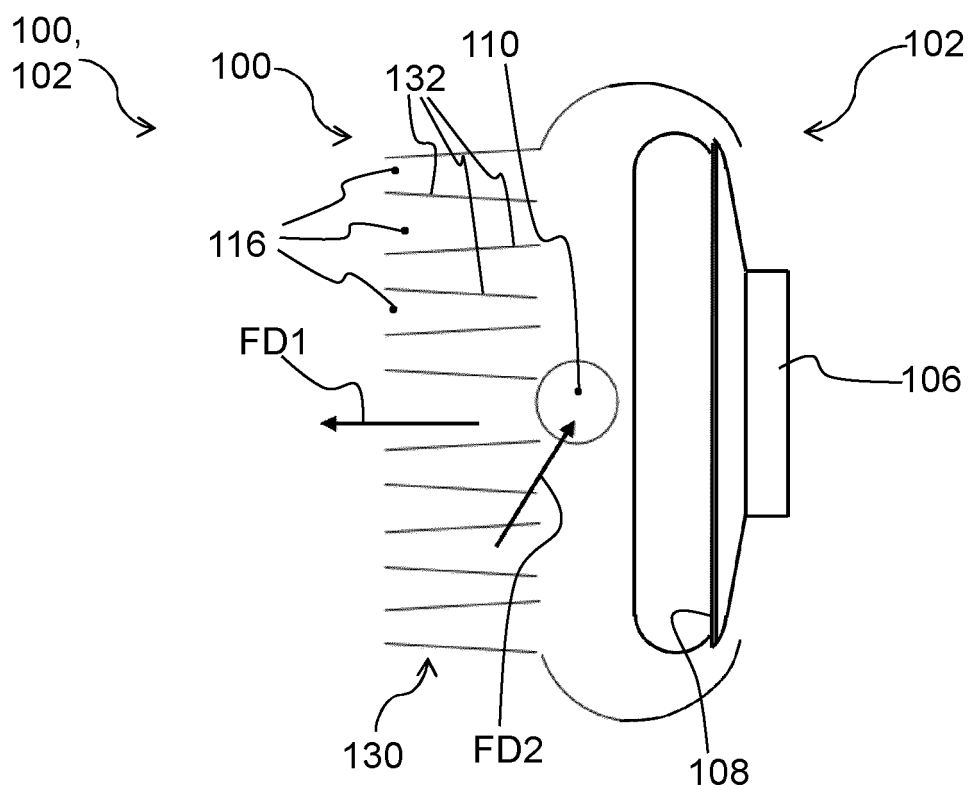


FIG. 5

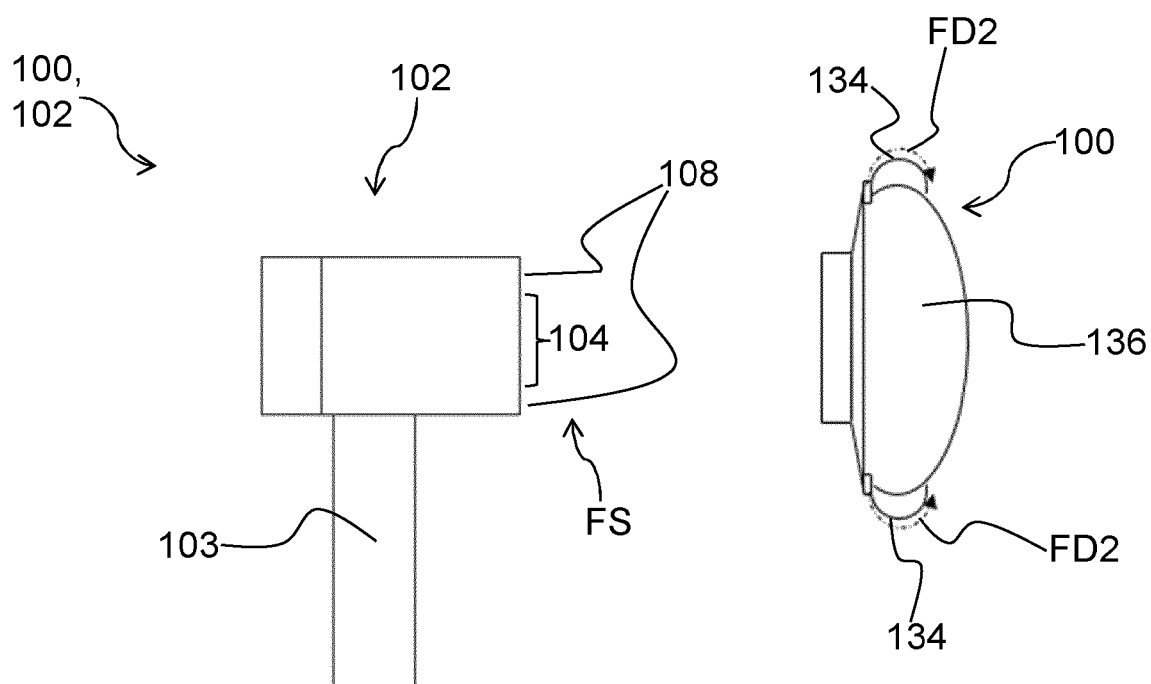


FIG. 6A

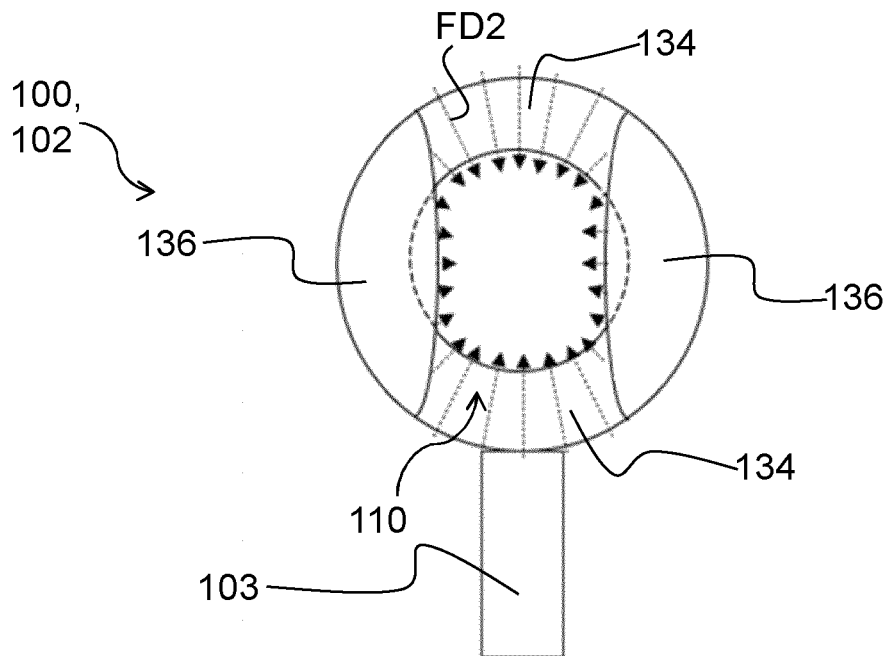


FIG. 6B



EUROPEAN SEARCH REPORT

Application Number

EP 24 21 1367

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CN 113 786 050 B (ZHEJIANG JINGBO HARDWARE TECH CO LTD) 13 September 2024 (2024-09-13) * claim 1 * * figure 2 *	1-3, 6-13,15 14	INV. A45D20/12
Y	GB 2 083 745 A (BRISTOL MYERS CO) 31 March 1982 (1982-03-31) * abstract * * figure 1 *	14	
X	GB 2 543 135 A (JEMELLA LTD [GB]) 12 April 2017 (2017-04-12) * figures 7a, 7b *	1-4,6-8, 11	
X	JP S55 113408 A (TOSHIBA DENKI KIGU KK) 2 September 1980 (1980-09-02) * figure 2 *	1-3,5-8, 12,13,15	
X	KR 102 159 580 B1 (LEE HAE RIN [KR]) 25 September 2020 (2020-09-25) * paragraphs [0032], [0033] * * paragraph [0052] * * figures *	1,7,8, 11-13,15	TECHNICAL FIELDS SEARCHED (IPC) A45D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		11 February 2025	Zetzsche, Brigitta
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 24 21 1367

11-02-2025

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 113786050	B	13-09-2024	NONE
GB 2083745	A	31-03-1982	NONE
GB 2543135	A	12-04-2017	AU 2013283014 A1 12-02-2015
		AU 2016277577 A1 12-01-2017	
		CN 104411205 A 11-03-2015	
		CN 108272207 A 13-07-2018	
		EP 2863770 A2 29-04-2015	
		ES 2632775 T3 15-09-2017	
		GB 2503519 A 01-01-2014	
		GB 2543135 A 12-04-2017	
		US 2015335128 A1 26-11-2015	
		WO 2014001770 A2 03-01-2014	
JP S55113408	A	02-09-1980	JP S6122962 B2 03-06-1986
			JP S55113408 A 02-09-1980
KR 102159580	B1	25-09-2020	NONE