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(54) **A HAIR TREATMENT DEVICE**

(57) Present disclosure discloses a hair treatment device. The hair treatment device includes a body defined with a hair-treatment section and a heating plate disposed in the hair treatment section. The heating element is an electrical conductor. Further, the hair treatment device includes at least one ion generator configured to generate and channelize ions through a groove defined in the body adjacent to the hair-treatment section forming an ion stream. Furthermore, the hair treatment

device includes an ion attractor defined in the body. The ion attractor bridges the groove and the heating element, where the heating element attracts ions from the ion stream through the ion attractor for distributing ion stream along a length of the groove. Even distribution of the ions along the length of the groove, provides more area for defrizzing of hair, thereby facilitates effective defrizzing of the hair.

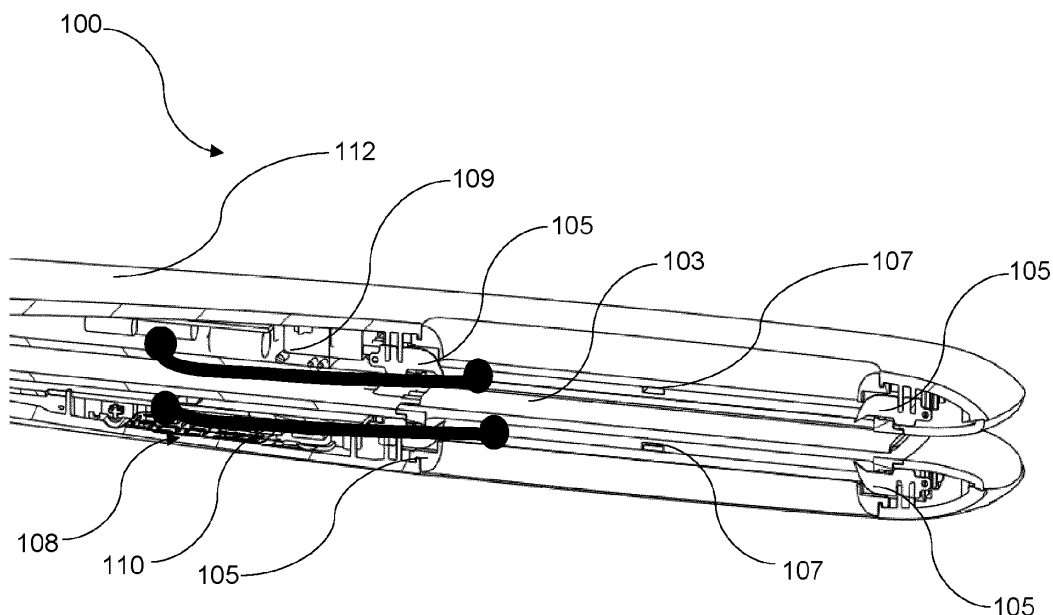


Fig. 5

Description

FIELD OF THE INVENTION

[0001] The present disclosure generally relates to a device for performing a treatment operation on hair of a subject, and in particular to a hair treatment device which incorporates an ion generator.

BACKGROUND OF THE INVENTION

[0002] Many people have various problems regarding beauty, and a typical example is the problem of hair damage. Hair damage is mainly caused by hair drying. Drying of the hair not only causes a feeling of rustling, but also causes problems such as easy generation of static electricity, loss of cohesion of the entire hair and easy attachment of dust.

[0003] Considering the above, hair stylers such as hair straightener, hair curlers and the like, that generate ions have evolved. In conventional heat treatment devices, negative ions are generated by corona discharge via a negative ion generator. In case of a hair styler with minimal air-flow like a hair straightener, the generated negative ions eventually get saturated forming a substantially stationary ion cloud adjacent to the ion generator. In such a case, an ion count at positions distant from the ion generator may be significantly low. This in turn leads to a decreased performance of the hair treatment device or the hair styler.

[0004] The present disclosure is directed to overcome one or more limitations stated above or any other limitations associated with the devices known in art.

SUMMARY OF THE INVENTION

[0005] It is an objective to provide a hair treatment device, which enhances ion count along a hair-treatment section (i.e., along heating plate), thus increasing the coverage of ions and therefore providing a better defrizzing performance. In case of a hair styler such as a straightener, it would be desirable to enable the hair treatment device to enhance or uniformly distribute the ion count along the heating plates, through minor structural modifications, unlike convention techniques, which adapt increasing the ionizer output power, increasing the number of ionic vents etc., leading to higher power consumption and complexity of the hair treatment device.

[0006] To better address one or more of these concerns, in a first aspect of the disclosure there is provided a hair treatment device. The hair treatment device includes a body defined with a hair-treatment section and a heating plate disposed in the hair treatment section. The heating element is an electrical conductor. Further, the hair treatment device includes at least one ion generator configured to generate and channelize ions through a groove defined in the body adjacent to the hair-treatment section forming an ion stream. Furthermore,

the hair treatment device includes an ion attractor defined in the body. The ion attractor bridges the groove and the heating element, where the heating element attracts ions from the ion stream through the ion attractor into the hair treatment device for distributing ion stream along a length of the groove. Even distribution of the ions along the length of the groove, provides more area for defrizzing of hair, thereby facilitates effective defrizzing of the hair.

[0007] In an embodiment, the ion attractor is a guideway defined in at a substantially central portion of the body.

[0008] In an embodiment, the guideway comprises a through opening between the groove and the heating element such that, a part of ion stream flows from the groove towards the heating element.

[0009] In an embodiment, the through opening includes a cross-sectional area, which is constant throughout its length.

[0010] In an embodiment, the at least one ion generator is disposed in the body at either ends of the groove and is structured to generate anions.

[0011] In an embodiment, the groove extends substantially parallel to at least one longitudinal edge of the heating element.

[0012] In an embodiment, the hair treatment device comprises a grounding circuit for electrically grounding the heating element. The grounding circuit comprises a printed circuit board and a conductive member, electrically connecting the printed circuit board and the heating element.

[0013] In a second aspect of the disclosure, a hair styler for straightening hair is disclosed. The hair styler includes a pair of arms pivotally connected to each other at one end. Each of the pair of arms are configured to receive the hair treatment device, as described above.

[0014] In an embodiment, each of the pair of arms is elongate, with the hair treatment section defined at one end, and a grip section defined at another end, opposite to the one end.

[0015] The foregoing summary is illustrative only and is not intended to be in any way limiting. In addition to the illustrative aspects, embodiments, and features described above, further aspects, embodiments, and features will become apparent by reference to the drawings and the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The invention is as set forth in the appended claims, while encompassing various modifications routine to the skilled person and claim equivalents. The disclosure itself, as well as a mode of use, further objectives, and advantages thereof, will best be understood by reference to the following detailed description of the embodiments when read in conjunction with the accompanying drawings. One or more embodiments are now described, by way of example only, with reference to the accompanying exemplary drawings wherein like refer-

ence numerals represent like elements and in which:

Fig. 1 illustrates a perspective view of a hair styler, in accordance with an embodiment of the present disclosure;

Fig. 2 illustrates an exploded view of the hair styler, in accordance with an embodiment of the present disclosure;

Fig. 3 illustrates a top view of a hair treatment device of the hair styler, in accordance with an embodiment of the present disclosure;

Fig. 4 illustrates a magnified view of portion A of Fig. 3; and

Fig. 5 illustrates a sectional view of a portion of the hair styler, in accordance with an embodiment of the present disclosure.

[0017] The figures depict embodiments of the disclosure for purposes of illustration only. One skilled in the art will readily recognize from the following description that alternative embodiments of the structures and methods illustrated herein may be employed without departing from the principles of the disclosure described herein.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0018] While embodiments in the disclosure are subject to various modifications and alternative forms, specific embodiments thereof have been shown by way of example in the figures and will be described below. It should be understood, however, that it is not intended to limit the disclosure to the particular forms disclosed, but on the contrary, the disclosure is to cover all modifications, equivalents, and alternatives falling within the scope of the disclosure.

[0019] It is to be noted that a person skilled in the art would be motivated from the present disclosure and modify various features of a hair treatment device. Therefore, such modifications are part of the disclosure. Accordingly, the drawings show only those specific details that are pertinent to understand the embodiments of the present disclosure, so as not to obscure the disclosure with details that will be readily apparent to those of ordinary skill in the art having benefit of the description herein.

[0020] The terms "comprises", "comprising", or any other variations thereof used in the disclosure, are intended to cover a non-exclusive inclusions, such that an assembly or unit that comprises a list of components does not include only those components but may include other components not expressly listed or inherent to such device. In other words, one or more elements in a device preceded by "comprises... a" does not, without more constraints, preclude the existence of other elements or additional elements in the system or device.

[0021] In the following detailed description, embodiments of the disclosure are explained with reference to accompanying figures that form a part hereof, and which are shown by way of illustration and specific embodi-

ments in which the disclosure may be practiced. These embodiments are described in sufficient detail to enable those skilled in the art to practice the disclosure, and it is to be understood that other embodiments may be utilized and that changes may be made without departing from the scope of the present disclosure. The following description is, therefore, not to be taken in a limiting sense.

[0022] Fig. 1 illustrates a perspective view of a hair styler (100), in accordance with some embodiments of the present disclosure. The hair styler (100) may be a handheld device, which may be adapted for performing a treatment to hair of a subject. In an embodiment, the treatment to hair may be hair straightening, hair curling, hair defrizzing and the like. As described herein, the hair styler (100) is operated or used by a 'user', and the treatment operation is performed on a 'subject'. In some cases, the user and the subject is the same person, i.e., the hair styler (100) is held in a hand and used by the user on themselves (e.g., for hair straightening). In other cases, the user and the subject may be different, e.g., the hair styler (100) may be held in a hand and used by a user on someone else.

[0023] The hair styler (100) may broadly include a pair of arms (112), which may be pivotally connected to each other at one end. As an example, the pair of arms (112) may be hinged at the one end to facilitate pivotal movement between the pair of arms (112). Further, the hair styler (100) may include a hair treatment device (101), which may be disposed in at least one arm of the plurality of arms (112). The hair treatment device (101) may be configured to perform hair treatment by providing negative ions and heat. In an embodiment, the hair treatment device (101) may be disposed in each of the pair of arms (112). As apparent from Figs. 1 and 2, the pair of arms (112) may be elongate, with the hair treatment device (101) or a hair treatment section (103) thereof disposed at one end of the arm and a gripping section defined at another end, opposite to the one end. In an embodiment, the gripping section (111) may include a separate housing, which may be connected to each of the pair of the arms (112). The gripping section (111) may help in grasping and manipulating the device and may be narrower than the pair of arms (112). Additionally, the hair styler (100) may include a power source component (wire and plug) (115) for enabling the hair styler (100) to be connected to mains power supply.

[0024] Referring now to Figs 2 and 3, the hair treatment device (101) may include a body (102), which may be defined with the hair-treatment section (103). Further, the hair treatment device (101) may include a heating element (104), which may be disposed in the heat-treatment section (103) [thus, the body (102)]. The heating element (104) may be coupled to a heater (113), which may be configured to heat the heating element (104). In an embodiment, the heating element (104) may be of elongate form of generally a rectangular shape and may be disposed in an inner side of the hair-treatment section

(103). Further, the heating element (104) may include a hair contacting face (114), which may be substantially planar and may be adapted to be pressed into contact with hair in use. In an embodiment, the heating element (104) may be made of electrically conductive material such as metals. As apparent from Fig. 1, the hair treatment device (101) may include a groove (106) defined in the body (102) adjacent to the hair-treatment section (103). In an embodiment, the groove (106) may extend substantially parallel and along at least one longitudinal edge of the heating element (104).

[0025] In an embodiment, the heat treatment device (101) may include a plurality of heating elements, which may be disposed in the body (102). The groove (106) may be configured to extend between the plurality of heating elements, substantially parallel and along the longitudinal edge of the plurality of heating elements.

[0026] Turning now to Fig. 4, the hair treatment device (101) may include at least one ion generator (105), which may be positioned on either side of the groove (106). The at least one ion generator (105) may be structured to generation ions i.e., anions. The generated ions may be channelized through the groove (106) thereby forming an ion stream. In an embodiment, the ion generator (105) may be but not limiting to an anion generator. As an example, the anion generator may be such as but not limiting to Corona discharge device. Further the hair treatment device (101) may include a grounding circuit (108) (as seen in Figure. 5) for electrically grounding the heating element (104). The grounding circuit (108) includes a printed circuit board (PCB) (109) and conductive member (110) [110 emphasized in bold in Figure. 5]. The conductive member (110) may electrically connect the printed circuit board (PCB) (109) and the heating element (104). As an example, the conductive member (110) may be an electric wire. In an embodiment, the conductive member (110) may electrically connect the PCB (109) and any other conductive material associated with the heating element (104).

[0027] In an embodiment, the grounding circuit (108) may be configured to charge the heating element (104) to attract the anions generated by the at least one ion generator (105). Further, the grounding circuit may facilitate in absorbing the anions attracted by the heating element (104).

[0028] In an embodiment, the hair treatment device (101) may include a charging circuit, which may be connected to the heating element (104). The charging circuit may be configured to electrically charge the heating element (104) to induce positive ions, in order to attract the negative ions generated by at least one the ion generator (105).

[0029] Turning back to Figs. 3 and 4, the hair treatment device (101) may include an ion attractor (107), which may be defined in the body (102). The ion attractor (107) may be configured to bridge the groove (106) and the heating element (104). In an embodiment, the ion attractor (107) may be a guideway or a slot. The guideway may

include a through opening between the groove (106) and the heating element (104). In an embodiment, the through opening (thus, the guideway) may include a cross-sectional area, which may be substantially constant throughout its length. In some embodiments, the through opening (thus, the guideway) may include a cross-sectional area, which may vary throughout its length.

[0030] In an illustrated embodiment, the ion attractor (107) is defined at a substantially central portion of the body (102) between the groove (106) and the heating element (104). In some embodiments, the ion attractor (107) may be defined at any location of the body (102) between the groove (106) and the heating element (104), for bridging the groove (106) and the heating element (104). Further, the ion attractor (107) includes a substantially rectangular profile and same cannot be construed as a limitation since, the ion attractor (107) may be configured to include any other geometrical profiles such as square, triangle, circular and the like. In some embodiments, the ion attractor (107) may facilitate the positively charged heating element (104) to attract negative ions towards it, which may result in flow of ions (as indicated in dotted lines in Fig. 4) along a length of the groove (106), thus evenly distributing the ions along the length of groove (106). That is, the positively charged heating element (104) may attract a portion of negative ions from the ion stream in the groove (106) through the ion attractor (107). Due to this attraction, the ions generated by the ion generators (105) at either end of the groove (106) may flow towards the ion attractor (107), thereby resulting in the ions to flow along the length of the groove (106), and thus evenly distributing the ions along the length of the groove. In an embodiment, even distribution of ions may be inferred as presence of substantially equal number of ions throughout the length of the groove (106). Even distribution of the ions along the length of the groove (106), provides more area for defrizzing of hair, thereby facilitates effective defrizzing of the hair. Further, the ions attracted by the heating element (104) may be grounded by the grounding circuit (108).

[0031] In an operational embodiment, i.e., during use of the hair styler (100) for performing hair treatment [for example hair straightening], the hair to be treated may be placed in between the pair of arms (112) (thus, between the hair treatment devices) and the hair styler (100) may be traversed on the hair. That is, hair to be treated is laid on and along the length of the heating element (104) and the groove (106). During operation, the at least one ion generator (105) may generate ions, which are channelized through the groove (106), thus forming the ion stream. Simultaneously, the heating element (104) may be heated by the heater (113). Further, the heating element (103) may attract the ions from the ion stream in the groove (106) through the ion attractor (107), thereby creating flow of ions (indicated as dotted lines in Fig. 4) along the length of the groove (106), thus resulting even distribution of the ions along the length of the groove

(106). This even distribution aids in effective defrizzing of all the hair positioned along the groove (106), unlike the conventional hair stylers where effective defrizzing of the hair occur in vicinity of the ion generators.

[0032] With respect to the use of substantially any plural and/or singular terms herein, those having skill in the art can translate from the plural to the singular and/or from the singular to the plural as is appropriate to the context and/or application. The various singular/plural permutations may be expressly set forth herein for sake of clarity.

[0033] It will be understood by those within the art that, in general, terms used herein, and especially in the appended claims (e.g., bodies of the appended claims) are generally intended as "open" terms (e.g., the term "including" should be interpreted as "including but not limited to," the term "having" should be interpreted as "having at least," the term "includes" should be interpreted as "includes but is not limited to," etc.). It will be further understood by those within the art that if a specific number of an introduced claim recitation is intended, such an intent will be explicitly recited in the claim, and in the absence of such recitation no such intent is present. For example, as an aid to understanding, the following appended claims may contain usage of the introductory phrases "at least one" and "one or more" to introduce claim recitations. However, the use of such phrases should not be construed to imply that the introduction of a claim recitation by the indefinite articles "a" or "an" limits any particular claim containing such introduced claim recitation to inventions containing only one such recitation, even when the same claim includes the introductory phrases "one or more" or "at least one" and indefinite articles such as "a" or "an" (e.g., "a" and/or "an" should typically be interpreted to mean "at least one" or "one or more"); the same holds true for the use of definite articles used to introduce claim recitations. In addition, even if a specific number of an introduced claim recitation is explicitly recited, those skilled in the art will recognize that such recitation should typically be interpreted to mean *at least* the recited number (e.g., the bare recitation of "two recitations," without other modifiers, typically means *at least* two recitations, or *two or more* recitations). Furthermore, in those instances where a convention analogous to "at least one of A, B, and C, etc." is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., "a system having at least one of A, B, and C" would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C together, B and C together, and/or A, B, and C together, etc.). In those instances, where a convention analogous to "at least one of A, B, or C, etc." is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., "a system having at least one of A, B, or C" would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C together, B and C together, and/or A,

B, and C together, etc.). It will be further understood by those within the art that virtually any disjunctive word and/or phrase presenting two or more alternative terms, whether in the description, claims, or drawings, should be understood to contemplate the possibilities of including one of the terms, either of the terms, or both terms. For example, the phrase "A or B" will be understood to include the possibilities of "A" or "B" or "A and B." While various aspects and embodiments have been disclosed herein, other aspects and embodiments will be apparent to those skilled in the art. The various aspects and embodiments disclosed herein are for purposes of illustration and are not intended to be limiting, with the true scope being indicated by the following claims.

Referral Numerals:

Reference Number	Description
100	Hair styler
101	Hair treatment device
102	Body
103	Hair-treatment section
104	Heating element
105	Ion generator
106	Groove
107	Ion attractor
108	Grounding circuit
109	Printed circuit board
110	Conductive member
111	Gripping section
112	Arms
113	Heater
114	Hair contacting face
115	Wire and Plug

Claims

1. A hair treatment device (101), comprising:

a body (102) defined with a hair-treatment section (103);
a heating element (104) disposed in the hair-treatment section (103), wherein the heating element (104) is an electrical conductor;
at least one ion generator (105) configured to generate and channelize ions through a groove (106) defined in the body (102) adjacent to the hair-treatment section (103) forming an ion stream; and
an ion attractor (107) defined in the body (102),

bridging the groove (106) and the heating element (104), wherein the heating element (104) is arranged to attract ions from the ion stream through the ion attractor (107).

2. The hair treatment device (101) as claimed in claim 1, wherein the ion attractor (107) is a guideway defined at a substantially central portion of the body (102). 5
3. The hair treatment device (101) as claimed in claim 2, wherein the guideway comprises a through opening between the groove (106) and the heating element (104) such that, a part of ion stream flows from the groove (106) towards the heating element (104). 10
4. The hair treatment device (101) as claimed in claim 3, wherein the through opening includes a cross-sectional area, which is constant throughout its length. 15
5. The hair treatment device (101) as claimed in claim 1, wherein the at least one ion generator (105) is disposed in the body (102) at either ends of the groove (106). 20
6. The hair treatment device (101) as claimed in claim 1, wherein the at least one ion generator (105) is structured to generate anions. 25
7. The hair treatment device (101) as claimed in claim 1, wherein the groove (106) extends substantially parallel to a longitudinal edge of the heating element (104). 30
8. The hair treatment device (101) as claimed in claim 1, further comprising a grounding circuit (108) for electrically grounding the heating element (104). 35
9. The hair treatment device (101) as claimed in claim 8, wherein the grounding circuit (108) comprises: 40
 - a printed circuit board (109); and
 - a conductive member (110) configured to electrically connect the printed circuit board (109) and the heating element (104). 45
10. A hair styler (100) for straightening hair, the hair styler (100) comprising: 50
 - a pair of arms (112) pivotally connected to each other at one end; and
 - a hair treatment device (101) as claimed in claims 1 to 9, disposed in at least one arm of the pair of arms (112). 55
11. The hair styler (100) as claimed in claim 10, wherein the hair treatment device (101) as claimed in claims 1 to 9 is disposed in each of the pair of arms (112).

12. The hair styler (100) as claimed in claims 10 and 11, wherein each of the pair of arms (112) is elongate, with the hair treatment device (101) disposed at one end, and a grip section defined at another end, opposite to the one end.

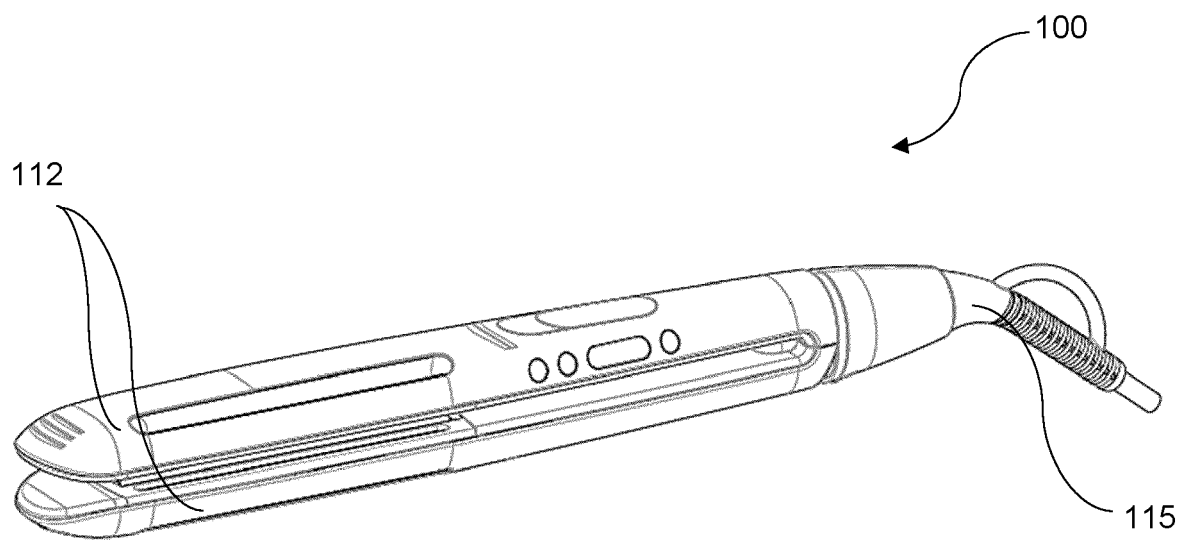


Fig. 1

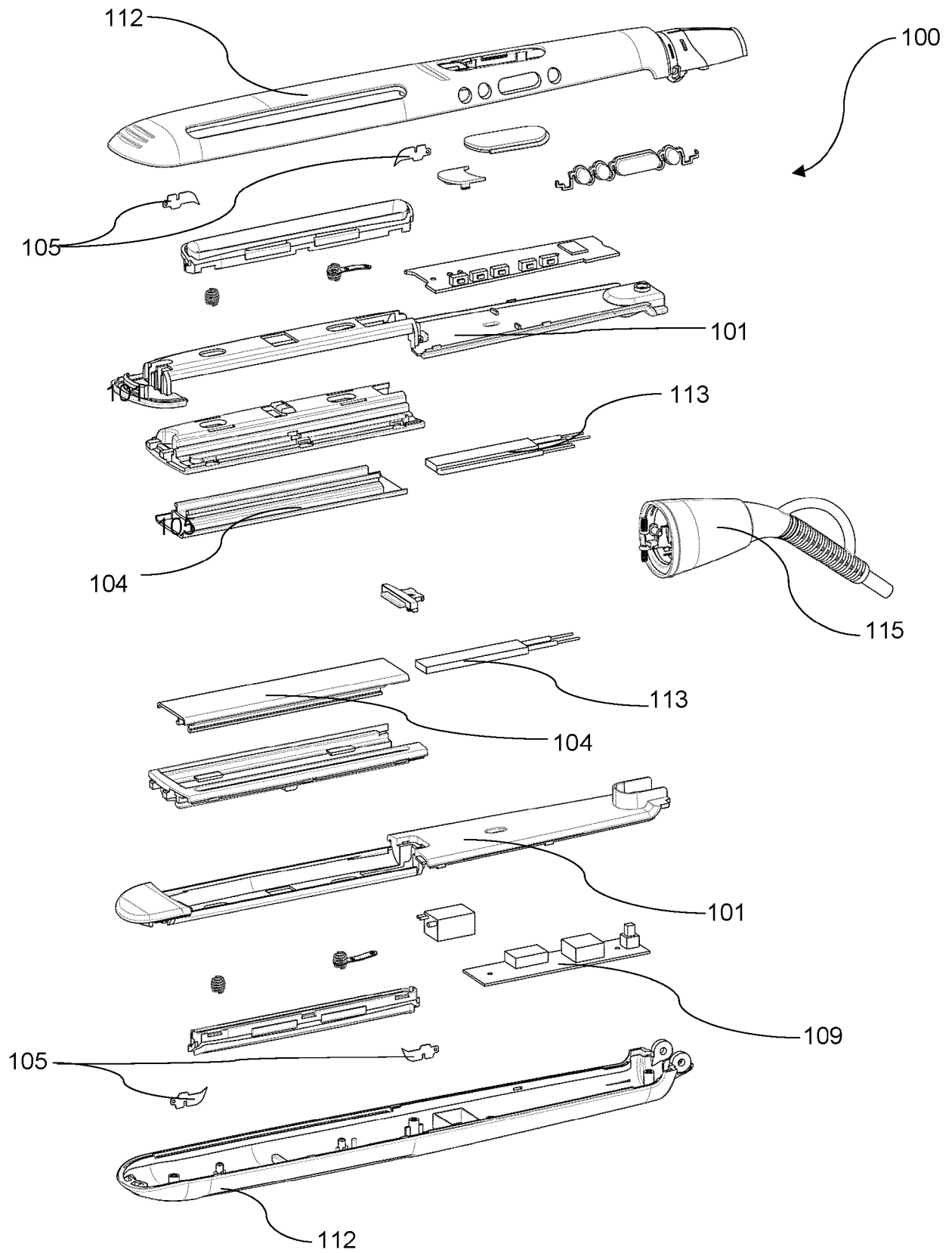


Fig. 2

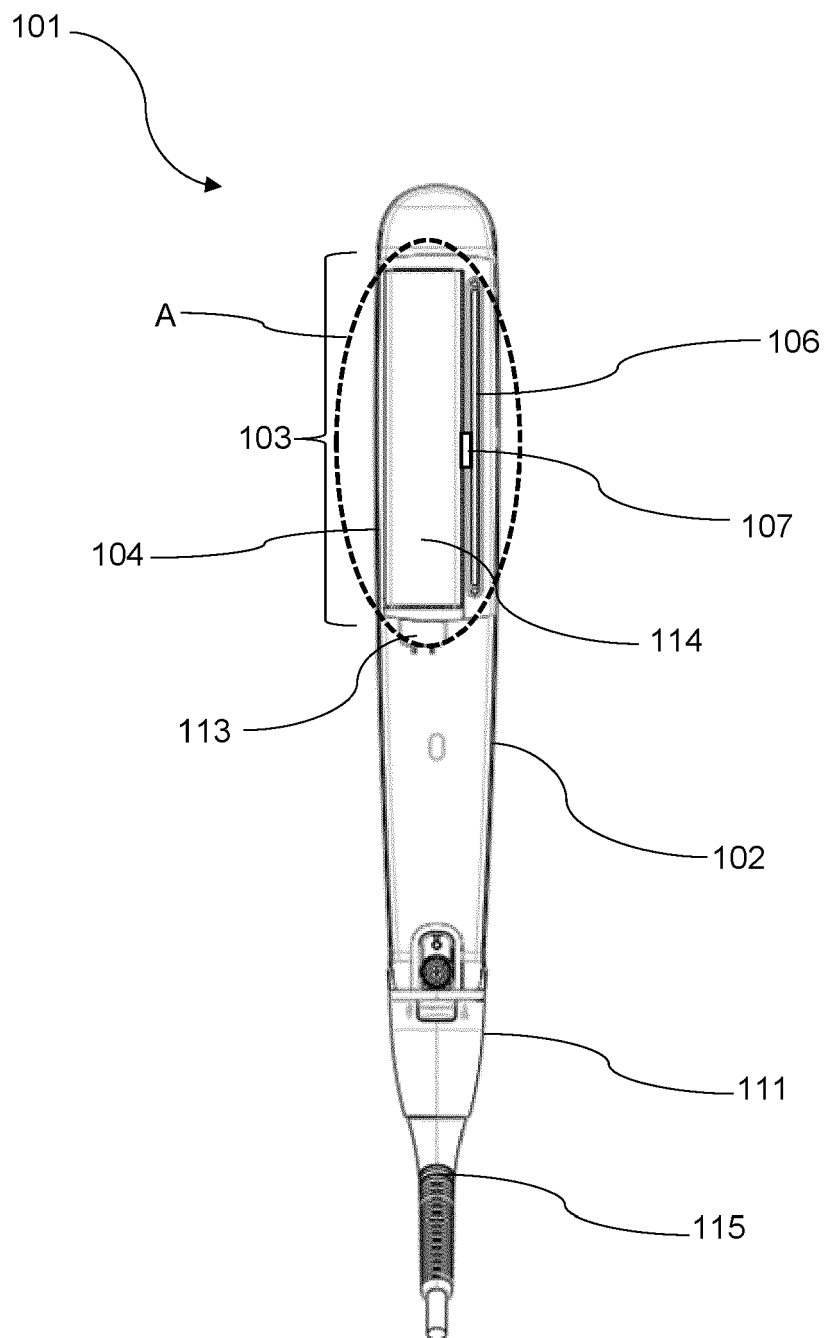


Fig. 3

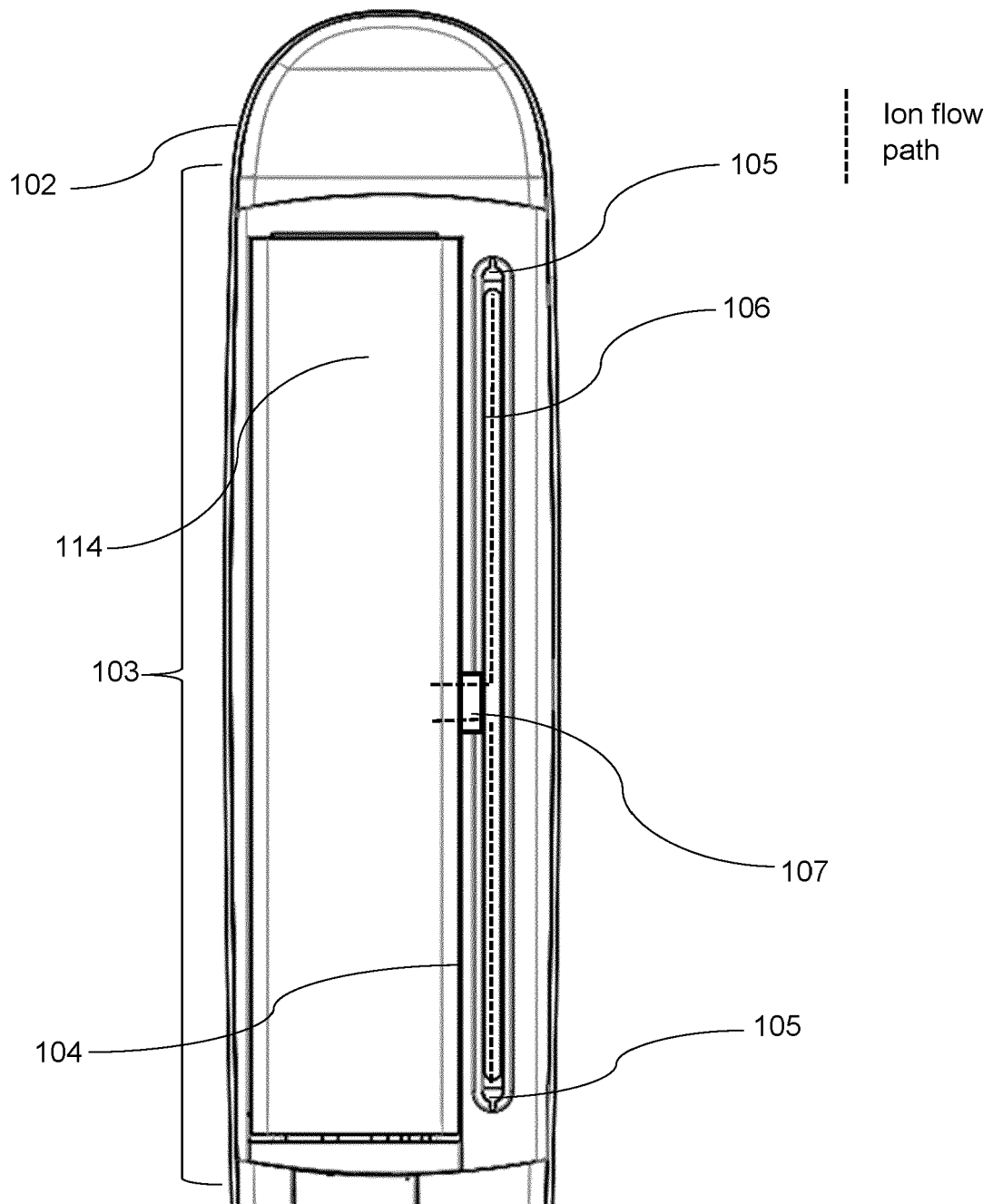


Fig. 4

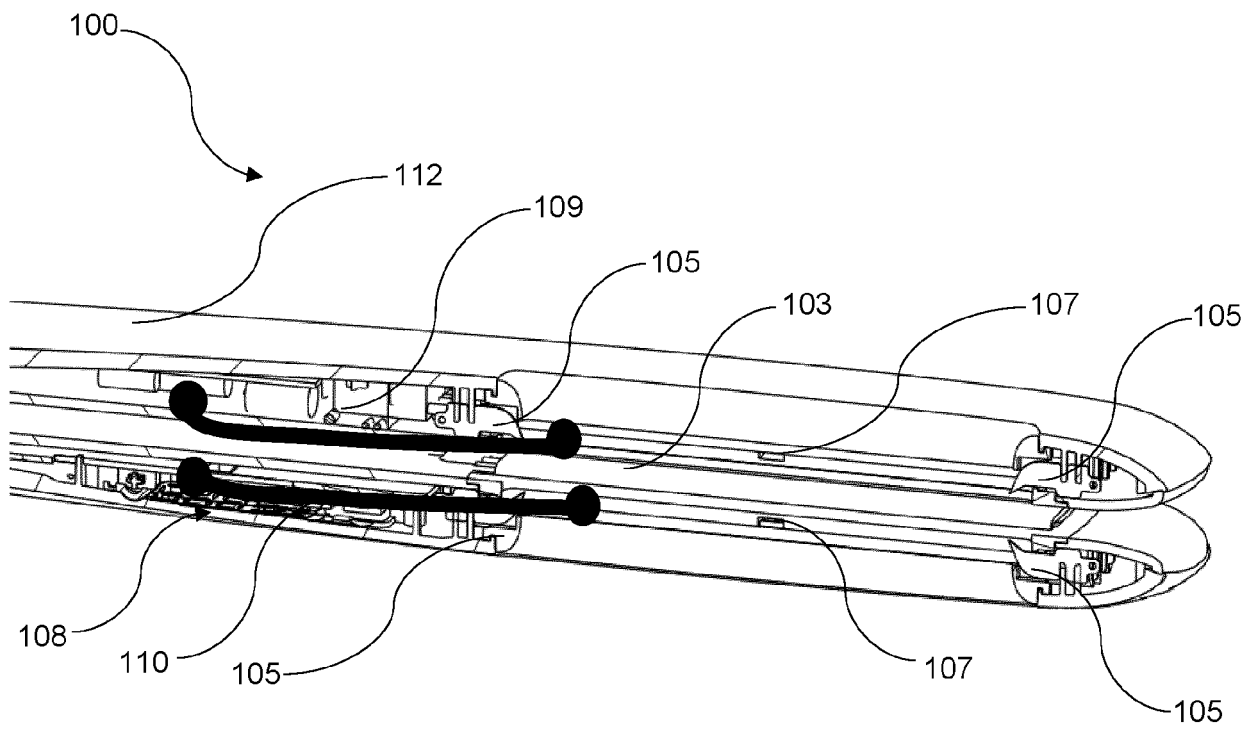


Fig. 5



EUROPEAN SEARCH REPORT

Application Number

EP 21 21 1885

DOCUMENTS CONSIDERED TO BE RELEVANT

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		12 May 2022	Nicolás, Carlos
CATEGORY OF CITED DOCUMENTS		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	
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			

EPO FORM 1503 03.82 (P04C01)

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

EP 21 21 1885

5 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.

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