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

(72) Inventors:
- **LELIEVELD, Mark Johannes**
  5656 AG Eindhoven (NL)
- **LEUNG, Sze Keung**
  5656 AG Eindhoven (NL)
- **CHAN, Sze Chuen**
  5656 AG Eindhoven (NL)
- **LAO, Celia Mei See**
  5656 AG Eindhoven (NL)

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

(54) **A HAIR CURLER**

(57) A hair curler has a tubular heating barrel with a tubular sleeve around the heating barrel. A treatment liquid application system is provided for applying a treatment liquid to the hair. There is an application pad arrangement located along a path of the hair during winding on the tubular heating barrel and/or during removal of the hair from the hair curler. Thus, a protection topical may be applied before curling, a topical may be applied after curling or both. The hair curler can for example apply treatment liquids before and after curling, and in an automatic way during use of the hair curler.

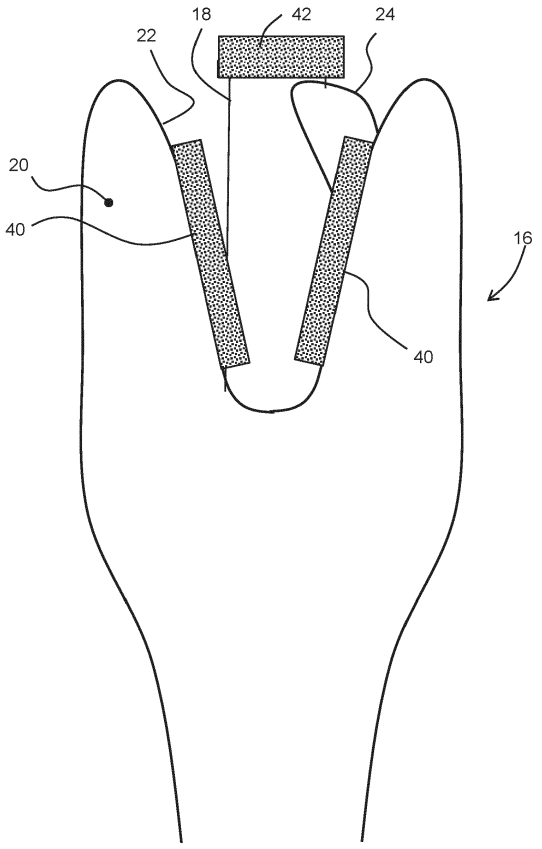

FIG. 2

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Description

FIELD OF THE INVENTION

[0001] This invention relates to hair curlers, and in particular it relates to hair curlers in which hair is wound around a heated drum and liquid is applied to the hair as part of the curling process.

BACKGROUND OF THE INVENTION

[0002] A hair curler is a handheld electronic product used to curl the hair.

[0003] Hair may be curled using dry heat, or by using steam. This invention relates, in particular, to a curler which uses dry heat.

[0004] The main components of this type of hair curler are a handle, a heating element and a sleeve around the heating element to form a hair receiving space (referred to below as a "curling space"). The heating element is in the form of a heating barrel which generally has a cylindrical shape. The heating barrel is for example a tourmaline ceramic panel. Hair is wound around the heating barrel in use and is then heated to form a curl. Different sections of hair are treated in succession to create a desired style.

[0005] It is known to provide this type of curler with a water reservoir and a water spray system, for spraying water into the hair receiving space. Cold water may be used to prevent scolding, and topicals may also be applied to the hair by means of a spray function during curling.

[0006] The spraying operation is not efficient as it results in wastage, and it may also not result in a uniform application of treatment liquid to the hair. There is therefore a need for an improved treatment liquid application system for a hair curler.

SUMMARY OF THE INVENTION

[0007] The invention is defined by the claims.

[0008] According to examples in accordance with an aspect of the invention, there is provided a hair curler, comprising:

a tubular heating barrel around which hair is to be wound for curling;

a tubular sleeve around the heating barrel, wherein the sleeve has a longitudinal entry slit for receiving hair to be wound on the tubular heating barrel; and

an application pad arrangement for applying a treatment liquid to the hair and configured to be located along a path of the hair during winding on the tubular heating barrel and/or along a path of the hair during removal of the hair from the hair curler.

[0009] This hair curler uses a pad to apply a liquid to the hair while it is being wound around the heating drum and/or when it is removed from the heating drum. This enables the liquid to be applied just before curling and/or after curling. The use of a pad, which delivers liquid by means of contact with the surface, reduces waste and enables application of liquid to an accurate location.

[0010] The application pad arrangement comprises a porous body which retains a treatment liquid.

[0011] The treatment liquid is for example for heat protection. This may simply comprise water, or it may comprise treatment topicals. The heat protection liquid is applied before curling. The treatment liquid may instead or as well comprise an after-care liquid or a fixation liquid. This may be applied during or after curling. Both types of treatment liquid may be applied, at different times.

[0012] The entry slit for example has a U-shape or V-shape with lateral arms and a base, and wherein the application pad arrangement is provided along at least one arm of the U-shape or V-shape. The hair enters the curling space through the entry slit so that it is moved along the surface of the application pad arrangement during winding of hair into the curler.

[0013] The application pad arrangement may be provided at least along both arms of the U-shape or V-shape. There may be two separate pads of the application pad arrangement or there may be a single pad that follows the entire shape of the slit, including the base of the U-shape or V-shape as well as the two arms.

[0014] The application pad arrangement may instead or additionally be provided on the tubular surface of the tubular heating barrel, e.g., along its length. Thus, as hair is wound around the heating barrel, it contacts the application pad arrangement. The application pad arrangement may then be shielded from the heat of the heating barrel, or instead the heat may intentionally be used to assist release of the treatment liquid from the application pad arrangement.

[0015] If thermal insulation is required, a thermally insulating sleeve may be provided between the application pad arrangement and the tubular heating barrel.

[0016] The application pad arrangement may for example comprise a cylindrical sleeve for fitting around the tubular heating barrel. This provides an easy way for the user to replenish the treatment liquid. The cylindrical sleeve for example comprises a set of channels for containing pad portions that contain the treatment liquid. The treatment liquid may for example be released from the pad portions with the assistance of the heating.

[0017] The hair curler may further comprise a looper for looping hair around the heating barrel, and the application pad arrangement is provided on the looper.

[0018] The examples above relate to different pad positions to apply liquid during winding of hair onto the heating barrel.

[0019] For applying liquid when removing hair from the hair curler, the application pad arrangement may be located at the top of the tubular heating barrel. The entry slit is open at a distal end of the tubular sleeve, and hair is removed by sliding longitudinally off the heating barrel.

Thus, when hair is removed from the curling space, it passes the top of the heating barrel, wherein the second pad arrangement is, in this example, located.

[0020] The treatment liquid, for application after the curling, may comprise an after-care or fixation liquid as mentioned above.

[0021] When the application pad arrangement is configured to be located along a path of the hair both during winding of hair onto the heating barrel and during removal of the hair from the hair curler, the hair curler then has two arrangements of pads (each with one or more pads). They are located such that the first pad or pads apply liquid to the hair when it enters the curling space between the sleeve and heating barrel, and the second pad or pads apply liquid to the hair when it is removed from the curling space. Thus, a full hair treatment, before and after curling, is automatically applied as part of the curling process.

[0022] A treatment liquid may also be applied during curling (as well as before and after), by having additional pads within the curling space occupied by the hair during curling.

[0023] The examples above make use of statically positioned application pads. In another arrangement, the application pad arrangement comprises a first pad and a second pad, wherein the first and second pads are connected and are movable such that a selected one of the first and second pads is configured to be located along a path of the hair during winding on the tubular heating barrel or along a path of the hair during removal from the hair curler.

[0024] For example, the first pad is configured to be located along a path of the hair during winding on the tubular heating barrel and the second pad is configured to be located along a path of the hair during removal from the hair curler.

[0025] The connected first and second pads are for example part of a movable body, wherein the movable body is rotatable, and the hair curler further comprises a drive system to drive the movable body to rotate.

[0026] In this way, a single treatment liquid application unit (with two pads with different treatment liquids) is used. It is moved between the start and end of the curling process, so that during hair loading, hair contacts the first pad and during hair unloading, hair contacts the second pad. The movement is controlled such that a selected one of the first and second pads faces a space between the tubular sleeve and the tubular heating barrel.

[0027] The rotatable movable body is for example located along the heating barrel. Thus, the outward facing side faces into the curling space, and the body is rotated between hair loading and hair unloading.

[0028] The movable body may be moved manually by the user, or there may be a drive system for driving the movable body between the different operation positions.

[0029] In another example, the movable body is provided on a looper of the hair curler.

[0030] The heating barrel may have an adjustable size. This enables different curl sizes to be selected.

[0031] A rotating mechanism may for example be used to adjust the barrel size. It may be electrically adjusted using an internal motor or manually adjusted. The barrel size may for example be controlled to increase during setting of curls to provide additional tension.

[0032] The hair curler may instead comprise a set of (non-adjustable) heating barrels of different sizes, wherein different designs of application pad arrangements are provided with the different heating barrels. Thus, different treatment liquids may be used for different curl sizes.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033] 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. 1 shows an example of the type of hair curler to which the invention may be applied;
Fig. 2 shows a first example of treatment liquid application system;
Fig. 3 shows a second example of treatment liquid application system;
Fig. 4 shows a third example of treatment liquid application system;
Fig. 5 shows a fourth example of treatment liquid application system; and
Fig. 6 shows a fifth example of treatment liquid application system.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0034] The invention will be described with reference to the Figures.

[0035] 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.

[0036] The invention provides a hair curler having a tubular heating barrel with a tubular sleeve around the heating barrel. A treatment liquid application system is provided for applying a treatment liquid to the the hair. The application system has an application pad arrangement located along a path of the hair during winding on the tubular heating barrel and/or during removal of the hair from the hair curler. Thus, a protection topical may be

applied before curling, a topical may be applied after curling, or both. The hair curler can for example apply treatment liquids before and after curling, and in an automatic way during use of the hair curler.

[0037] Fig. 1 shows an example of the type of hair curler 10 to which the invention may be applied.

[0038] The hair curler 10 comprises a main body 12 having a handle 14 and a hair curling head 16. The hair curling head comprises a central cylindrical heating barrel 18 around which a sleeve 20 extends. The sleeve 20 has a lateral opening 22 into which hair can be received. The lateral opening is in the form of a longitudinal entry slit which is open at a distal end (i.e., the end opposite the handle) of the tubular sleeve.

[0039] The received hair is wound around the heating barrel 18 by a looper 24, i.e., a rotatable element for example having a blade form. There may for example be two loopers spaced around the heating barrel by 180 degrees. The looper 24 is driven to rotate around the heating barrel and it winds hair around the heating barrel. The hair between the heating barrel 18 and the sleeve 20 (the "curling space") is heated while in a wound condition.

[0040] The heating barrel comprises an internal heater (not shown) for heating an outer surface of the barrel, which will be in contact with hair wound around the barrel.

[0041] The hair curler has a controller 30 to control the temperature of the heater, which can evenly disperse the heat, circulate the heating process, improve the protein structure of the hair to create bends, and meanwhile protect the hair during the curling process.

[0042] The invention relates to a system for applying liquids to the hair during the curling process.

[0043] Liquid topicals may be used for hair protection, to protect hair against the applied heat.

[0044] Heat protection products are well known, for example to protect against the heat of a hair dryer. Heat protection liquids for example make use of silicones for heat protection. Typically, they also include conditional agents such as proteins and amino acids that help to nourish and strengthen the hair. Hair oils or serums may also be applied to nourish and/or moisturize the hair. These may also be based on silicones, and include oils (e.g., argan oil, coconut oil, jojoba oil) and/or vitamins.

[0045] Liquids may also be used for assisting fixation (i.e., setting). Fixation liquids typically comprise polymers that form a film on the hair, with alcohol to assist drying. Conditioning agents and/or oils and/or serums may also be applied post-styling together with the fixation product.

[0046] The invention provides a hair curler which enables treatment liquids to be applied before curling and/or after curling (and also optionally during curling).

[0047] Fig. 2 shows a first example of the application system for applying a treatment liquid or liquids.

[0048] An application pad arrangement is used to deliver liquid to the hair. The application pad arrangement comprises one or more pads. The pad or pads comprise a porous structure for retaining liquid, and releasing liquid when contact is made with the surface of the pad, for example when pressure is applied to the surface of the pad. The pad thus has a sponge-like form. A pad thickness and porosity may be selected to achieve the desired release of liquid, in response to the contact and pressure applied by the hair in use of the hair curler. A more open pore structure will give greater storage capacity and a greater application rate.

[0049] The application pads may be self-contained, or else they may be combined with a storage container for delivering liquid to the pad when it empties. The pads may be static or they may move within a housing, for example with round and rolling pads.

[0050] The pads may have a solid base part for handling purposes, to ease the changing of the pads.

[0051] The release of liquid absorbed into the pad may be enhanced by heating, whereby the liquid becomes less viscous when heated. Alternatively, the liquid may be shielded from the heat of the heating barrel.

[0052] The delivery of liquid to the pad surface is typically passive, but it is also possible to employ an internal pumping system for assisting the delivery of liquid from the pad to the hair, for example using a mechanical spring-loaded system or actuated using the thermal energy delivered by heating barrel.

[0053] However, in all cases, it is contact of the hair with a pad that causes a release of liquid to the hair, in contrast to a spray system.

[0054] In one example, the application pad arrangement is configured to be located along a path of the hair during winding around the tubular heating barrel. In another example, the application pad arrangement is configured to be located along a path of the hair during removal of the hair from the hair curler. In some examples, the application pad arrangement includes separate parts which are along the paths of the hair during winding as well as during removal. In such a case, one or more pads are in the path of the hair during winding and one or more pads are in the path of the hair during removal.

[0055] Fig. 2 shows an example with first pads 40 for applying liquid during winding of hair around the heating barrel and a second pad 42 for applying liquid during hair removal.

[0056] The first pads 40 are located around the slit 22 which defines the hair entry channel into the curling space. The entry slit has a U-shape (which is intended to include non-parallel sides i.e., a V shape), so that the shape has opposing arms and a connecting base. Fig. 2 shows the pads 40 provided along both of the arms of the U-shape. Instead, there may be a pad along only one arm. The pads may also extend around the bend, so fully around the U-shape or V-shape.

[0057] Hair makes contact with the first pads 40 when being wound around the heating barrel, causing the pads to release liquid onto the hair.

[0058] The second pad 42 is located at the top of the tubular heating barrel 18. Hair is removed from the curler by sliding longitudinally off the heating barrel. Thus, when hair is removed from the curling space, it passes across

the top of the heating barrel, where the second pad 42 is located.

[0059] The first pads 40 contain an absorbed heat protection liquid, whereas the second pad 42 contains an after-care or fixation treatment liquid. A treatment liquid may also be applied during curling, by having an additional pad arrangement within the curling space occupied by the hair during curling.

[0060] Fig. 3 shows an alternative positioning for the first pads 40. In this example, there is a single pad 50 extending along the length of the tubular heating barrel 18. During winding, the hair passes over the pad 50 driven by the looper 24. There may instead be multiple pads at different angular positions around the heating barrel. The pad 50 may be straight (parallel to the longitudinal axis of the heating barrel) or it may be spiral-wound.

[0061] The application pad 50 may then be shielded from the heat of the heating barrel, for example by having a heat shielding layer between the inward facing side of the pad 50 and the heating barrel. Instead, the heat may intentionally be used to assist the release of the liquid from the application pad 50.

[0062] Fig. 4 shows another alternative positioning for the first pad. In this example, there is a pad 60 located on the looper 24.

[0063] Fig. 5 shows a further alternative design for the first pad. In this example, the first pad comprises an array of pad regions 70 arranged around a cylindrical sleeve 72. The pad regions are fixed to the sleeve and the sleeve is fitted over the heating barrel. The liquid can be replenished by fitting a new sleeve. The pad regions are fitted into channels, and the pad regions contain the treatment liquid. The treatment liquid may for example be released from the pad regions within the channels with the assistance of the heating provided by the heating barrel. The channels and pad regions may extend parallel to the longitudinal axis of the heating barrel as shown, and hence extend along the length of the heating barrel. However, they may instead follow a spiral path around the heating barrel. More generally, in this arrangement, the first pad is provided on the tubular surface of the tubular heating barrel.

[0064] Instead of pad regions on a sleeve, the whole sleeve may be formed as a pad.

[0065] When a sleeve is used, heat needs to be transferred from the heating barrel through the sleeve to the hair, so the sleeve is designed to allow the required heat transfer.

[0066] The examples above make use of fixedly mounted application pads (including mounted on the looper).

[0067] In another example shown in Fig. 6, the application pad arrangement comprises first and second pads 80, 82 which are connected together and are part of a movable body, so that a selected one of the first and second pads can be moved into an operative position.

[0068] In the example shown, the first and second pads 80, 82 form opposite sides of a rotary body. The hair curler further comprises a drive system to enable movement of the rotary body such that a selected one of the first and second pads is in an operative position. In the operative position, the pad outwardly, i.e., it faces the space between the tubular sleeve and the tubular heating barrel. Thus, it makes contact with hair in the curling space. In this example, the drive system is a rotary system for rotating the rotary body. The drive system may be a manual knob (so that the drive is manual), or it may be an electric motor.

[0069] In this way, a single pad treatment unit (with two pads with different treatment liquids) is used. It is moved at a time between the start and end of the curling process, so that during hair loading hair contacts the first pad, and during hair unloading hair contacts the second pad.

[0070] The rotatable body is located along the length of the heating barrel 18. Thus, the outward facing side faces into the curling space, and the body is rotated between hair loading and hair unloading.

[0071] In another example, the rotatable body is mounted on the looper.

[0072] The heating barrel may have an adjustable size. This enables different curl sizes to be selected. A rotating mechanism may for example be used to adjust the barrel size. It may be electrically adjusted using an internal motor or manually adjusted. The barrel size may for example be controlled to increase during setting of curls to provide additional tension.

[0073] The application pad may be designed such that a single design can be used and it can remain in place during barrel size adjustment. This applies self-evidently to pads on the outer sleeve (Fig. 2) or on the looper (Fig. 4). Pads on the heating barrel such as shown in Figs. 3 and 6 may also remain in place if they are positioned such that they do not overlap the size adjustment areas of the heating barrel. For the sleeve design of Fig. 5, different sleeve sizes, or else a stretchable sleeve, will be needed for different barrel size settings.

[0074] The hair curler may instead comprise a set of (non-adjustable) heating barrels of different sizes. A same pad design may be designed to fit to different barrel sizes, or else different designs of first and second application pads are provided with the different heating barrels. Different treatment liquids may also be used for different curl sizes. For a sleeve design, a different sleeve will be provided for the different barrel sizes.

[0075] 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.

[0076] 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.

[0077] 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". If the term "arrangement" is used in the claims or description, it is noted the term "arrangement" is intended to be equivalent to the term "system", and vice versa.

[0078] Any reference signs in the claims should not be construed as limiting the scope.

Claims

1. A hair curler (10), comprising:

a tubular heating barrel (18) around which hair is to be wound for curling;
a tubular sleeve (20) around the heating barrel (18), wherein the sleeve has a longitudinal entry slit (22) for receiving hair to be wound on the tubular heating barrel (18); and
an application pad arrangement (40, 42, 50, 60, 70, 80, 82) for applying a treatment liquid to the hair and configured to be located along a path of the hair during winding on the tubular heating barrel and/or along a path of the hair during removal of the hair from the hair curler.

2. The hair curler of claim 1, wherein the treatment liquid comprises at least one of a heat protection liquid, an after-care liquid, and a fixation liquid.

3. The hair curler of any one of claims 1 to 2, wherein the entry slit (22) has a U-shape or V-shape with two arms and a connecting base, and wherein the application pad arrangement is provided along at least one arm of the U-shape or V-shape.

4. The hair curler of claim 3, wherein the application pad arrangement is provided along at least both arms of the U-shape or V-shape.

5. The hair curler of any one of claims 1 to 4, wherein the application pad arrangement is provided on the outer tubular surface of the tubular heating barrel.

6. The hair curler of claim 5, comprising a thermally insulating sleeve between the application pad arrangement and the tubular heating barrel.

7. The hair curler of claim 5, wherein the application pad arrangement comprises a cylindrical sleeve (72) for fitting around the tubular heating barrel.

8. The hair curler of claim 7, wherein the cylindrical sleeve comprises a set of channels (70) housing application pad portions containing the treatment liquid.

9. The hair curler of any one of claims 1 to 8, further comprising a looper (24) for looping hair around the heating barrel, wherein the application pad arrangement is provided on the looper (24).

10. The hair curler of any one of claims 1 to 9, wherein the application pad arrangement is located at the top of the tubular heating barrel.

11. The hair curler of any one of claims 1 to 2, wherein the application pad arrangement comprises a first pad (80) and a second pad (82), wherein the first and second pads are connected and are movable such that a selected one of the first and second pads is configured to be located along a path of the hair during winding on the tubular heating barrel or along a path of the hair during removal from the hair curler.

12. The hair curler of claim 11, wherein the connected first and second pads are part of a movable body, the movable body is rotatable, and the hair curler further comprises a drive system to drive the movable body to rotate.

13. The hair curler of claim 12, further comprising a looper (24) for looping hair around the heating barrel, wherein the movable body is provided on the looper (24).

14. The hair curler of claim 12, wherein the movable body is located along the heating barrel.

15. The hair curler of any one of claims 1 to 14, wherein:

the heating barrel has adjustable size; or
the hair curlier comprises a set of heating barrels of different sizes, wherein different designs of application pad arrangement are provided with the different heating barrels.

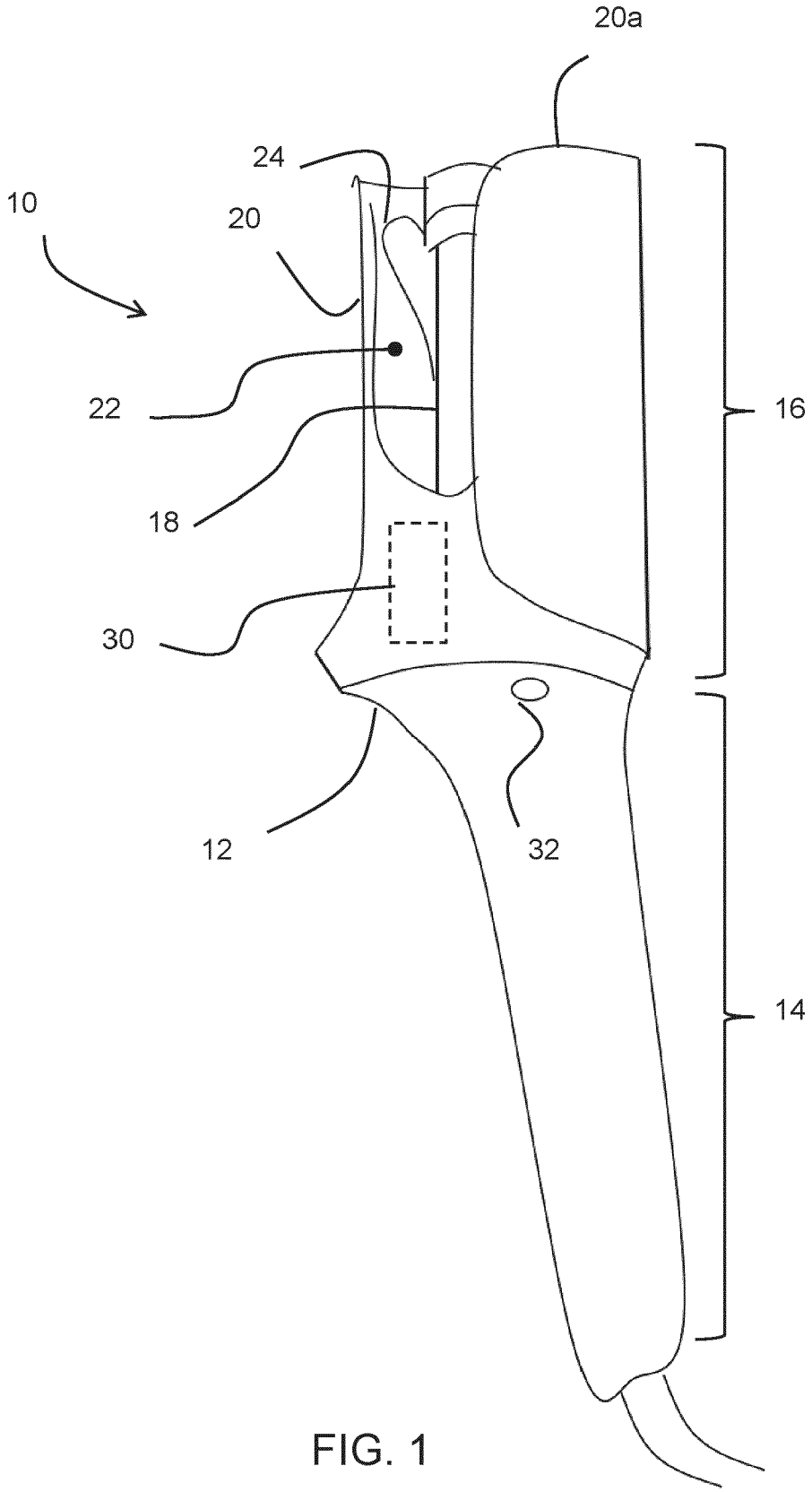

FIG. 1

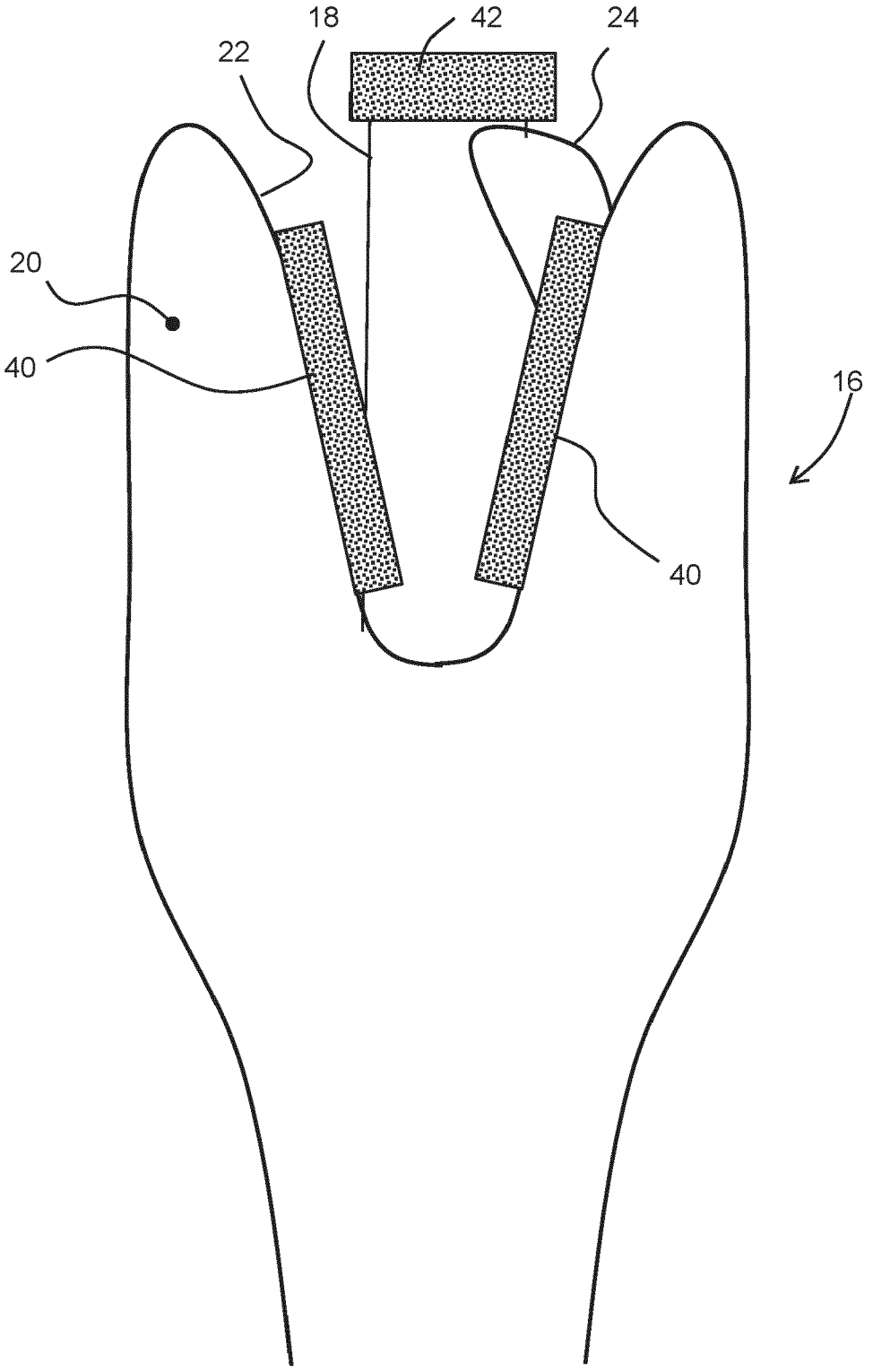

FIG. 2

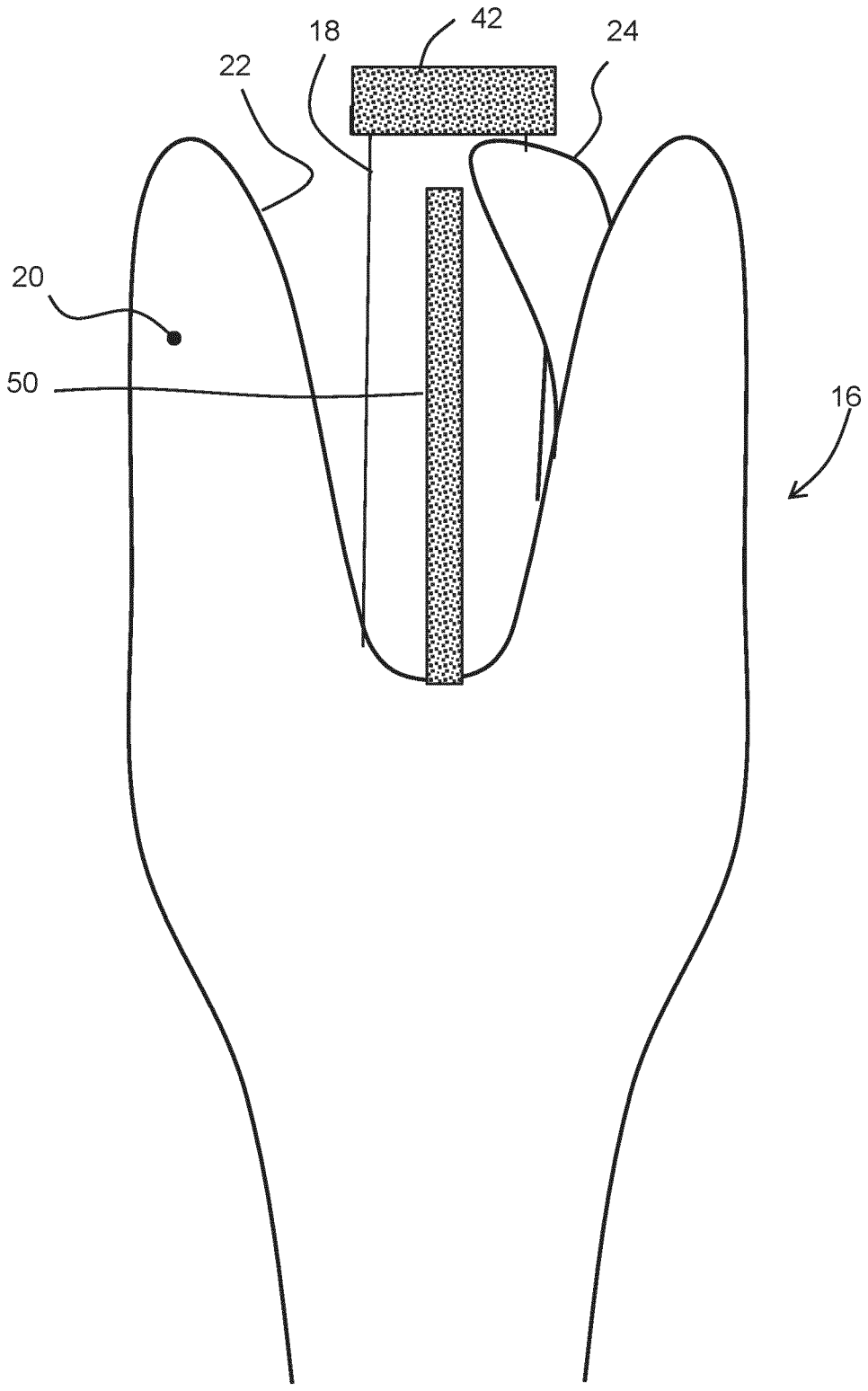

FIG. 3

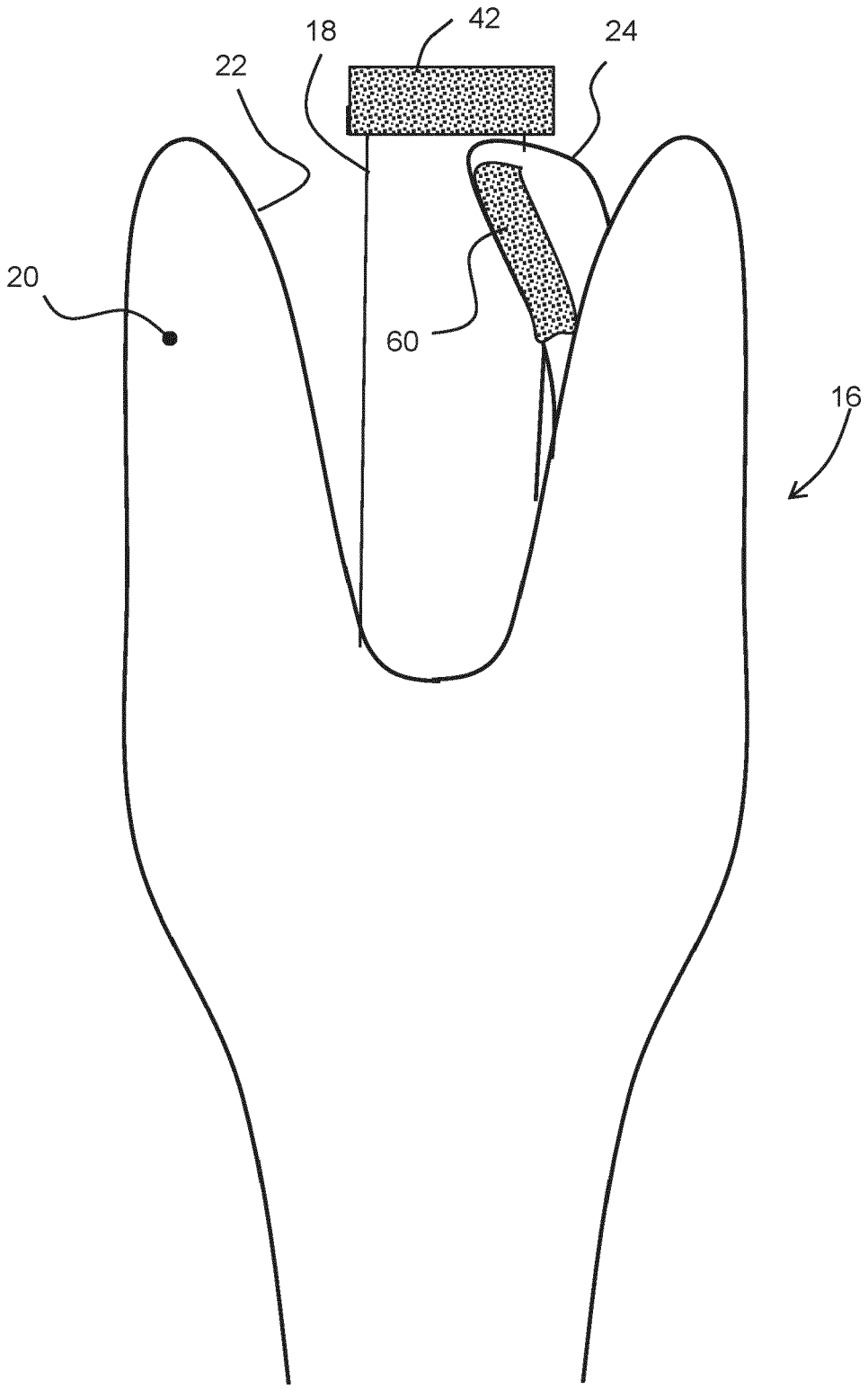

FIG. 4

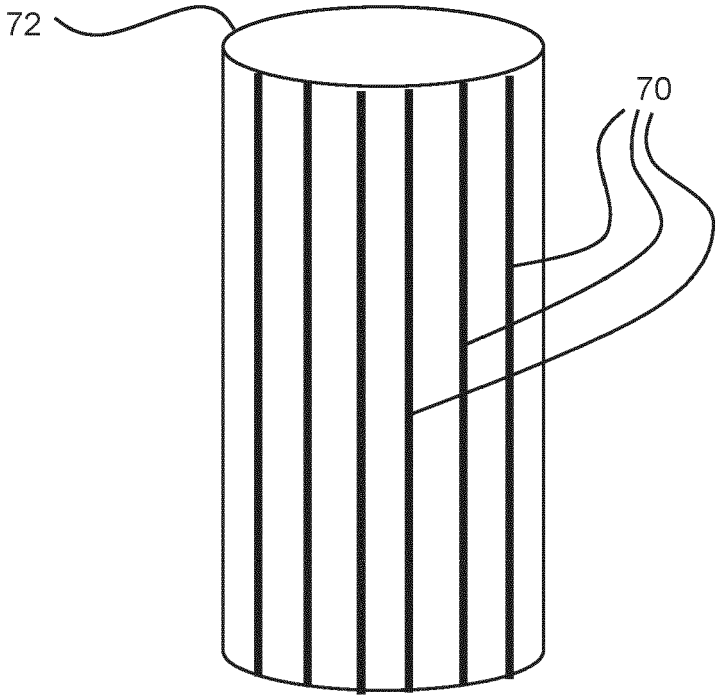

FIG. 5

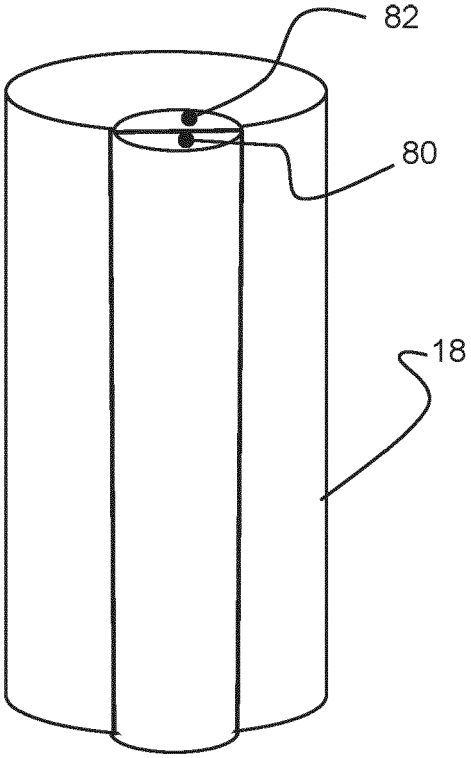

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 24 15 0349

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 A	US 2023/200510 A1 (PARK SUNGLYUL [KR] ET AL) 29 June 2023 (2023-06-29) * paragraph [0169] - paragraph [0171] * * figure 16C * -----	1,2 3-15	INV. A45D1/04 A45D1/16 A45D6/02 A45D6/04
X A	WO 90/14780 A1 (FIBROUS KERATIN PTY LTD [AU]) 13 December 1990 (1990-12-13) * abstract * * figure 2 * -----	1,2 3-15	ADD. A45D2/22

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	18 June 2024	Zetzsche, Brigitta

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 24 15 0349

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82