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(54) BRUSH FOR TREATING THE HAIR

(57) The invention relates to a brush (10) for treating the hair, in particular for straightening, having:
- at least one heated hair combing zone (C), without a steam outlet, in which the brush (10) has:
o a plurality of teeth (23) made of a heat conducting material, and
o heating means (35, 37) for heating at least two teeth of the plurality of teeth (23),

- at least one steam outlet zone (V) in which the brush (10) has at least one steam outlet (30), the steam outlet zone (V) being separate from the heated hair combing zone or zones (C).

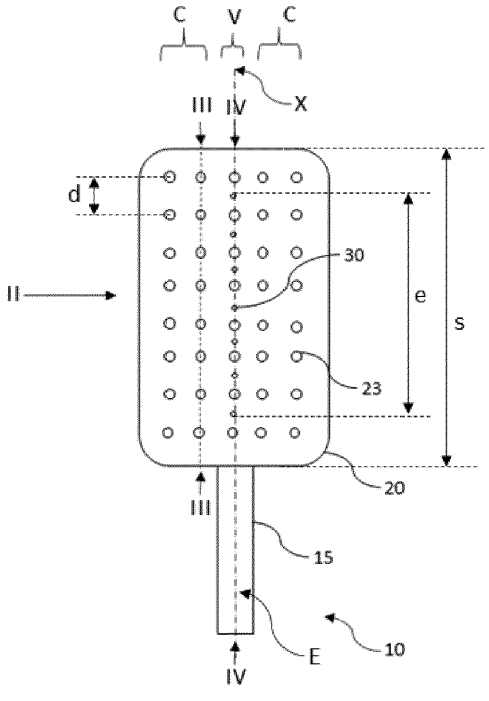

Figure 1

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Description

[0001] The present invention relates to a brush for treating the hair and to the corresponding method for treating the hair.

Technical field

[0002] In the field of hairstyling, it is commonplace to use hairbrushes. Numerous improvements to traditional hairbrushes have been proposed. Among these improvements, the conjoint use of heat has been the subject of numerous proposals. Among the documents that mention the use of heat, the patent applications CH600821 and EP2074902 can be cited, which mention blowing hot air. The patent applications IL219875 and US4217915 may also be mentioned, which mention heating at the base of the bristles or combing teeth of the brush. Lastly, the patent application US2018125223 may be mentioned, which mentions heated teeth. None of those documents mentions the conjoint use of steam.

[0003] The patent application DE19822718 mentions a comb of which the teeth may be perforated in order to output steam which comes into contact with the hair. Alternatively, the brush does not have steam outlet nozzles, and the teeth are heated by a heating resistor without steam being applied. Such a brush with steam-heated perforated teeth is difficult to manufacture and limits the temperature imparted to the hair. It may also result in uneven treatment due to steam being over-concentrated locally in certain parts of the hair.

[0004] There also exist documents that describe hairstyling brushes that output steam through the base carrying the bristles or teeth during the treatment, the base acting as a heating means. Thus, it is possible to cite the documents US4936027, JPS5568318, JPH07213325, CN2061786, JPH01207001, JPH1033253, JPH07163416, JP2000175723 and KR19990036306U. None of those documents mentions that the bristles or teeth may themselves be heated independently of the output of steam.

[0005] The patent application KR20030085159A describes a brush having a plurality of spikes that are heated by a heating resistor in the base and having steam outlets between the spikes. In that document, the steam outlets and the spikes are distributed over the entire surface of the brush. Such a brush therefore does not allow steam to be applied to a limited part of the head of hair and the action of the steam to be separated from the action of the dry heat.

[0006] There is therefore a need for a brush that exhibits an improved treatment performance, in particular in terms of combing, which is relatively uniform and durable, while being safe.

Summary of the invention

[0007] The present invention meets this need with the aid of a brush for treating the hair, in particular for straightening, having:

- at least one heated hair combing zone, without a steam outlet, in which the brush has:
    - o a plurality of teeth and
    - o heating means for heating at least two teeth of the plurality of teeth,
- at least one steam outlet zone in which the brush has at least one steam outlet, the steam outlet zone or zones being separate from the heated hair combing zone or zones.

[0008] A *"brush"* is understood to be a device for treating the hair that is constituted of a single arm bearing a plurality of teeth, between which the hair is received when the brush passes through the head of hair. The brush may have a single row of teeth or have preferably a plurality of rows of teeth.

[0009] *"Teeth"* are understood to be elements protruding from the brush and extending from the treatment surface of the brush, between which the hair is received when the brush passes through the head of hair. The teeth may have any shape.

[0010] A *"heated combing zone"* is understood to be a zone with at least two teeth that does not have a steam outlet, as is specified above. It is not excluded for the brush to have other elements except for a steam outlet in the heated combing zone, in particular an applicator member for applying cosmetic product. The heated combing zone is delimited on the brush by the external edges of the teeth heated by the heating means, which are at the periphery of the heated combing zone.

[0011] A *"steam outlet zone"* is understood to be a zone with at least one steam outlet. It is not excluded for the brush to have other elements in the steam outlet zone, in particular heated teeth and/or an applicator member for applying cosmetic product, as will be shown below.

[0012] Such a brush makes it possible to treat the hair effectively by performing on the hair at least one simultaneous heating/combing step and at least one step of applying steam to one and the same lock of hair, the two steps being temporally offset.

[0013] The fact that the steam outlet zone or zones is/are on the same treatment surface allows the two treatment steps to be carried out, successively, in a single action on one and the same lock of hair when the brush passes through the hair.

[0014] The fact that the two zones are separate from one another makes it possible to separate the application of steam from combing and from the application of dry heat by the heated combing zone, thereby improving the treatment of the hair.

[0015] Preferably, the brush has an elongate shape along a main axis.

[0016] In a variant, the brush is not elongate.

[0017] Preferably, the brush has a handle and a head, the head bearing the treatment surface. The handle makes it easier to hold the brush and allows additional elements to be added to the brush, in particular a user interface, a water or cosmetic product reservoir and/or one or more sensors.

[0018] The head of the brush may have any shape in cross section. Preferably, the head of the brush has a substantially polygonal, in particular substantially rectangular or substantially square, substantially oval, or substantially circular cross section

[0019] Preferably, the brush ha a treatment surface, the teeth extending from the treatment surface. Preferably, this treatment surface is flat or domed towards the outside. Preferably, this treatment surface has a substantially polygonal, in particular rectangular or square, circular or oval outline.

Heated combing zone(s)

[0020] The brush may comprise a plurality of discontinuous heated combing zones, in particular separated from one another by a steam outlet zone.

[0021] Preferably, the or each heated combing zone is elongate along a longitudinal axis, in particular an axis parallel to the main axis of the brush.

[0022] The brush may comprise a plurality of heated combing zones that are discontinuous and separated from one another, in particular by a steam outlet zone or an additional treatment zone, in particular for application of a cosmetic product, as will be shown below.

[0023] Preferably, the heated hair combing zone or the set of heated hair combing zones extend(s) over more than 50%, better still more than 70%, of the treatment surface of the brush.

Teeth

[0024] The teeth of the heated combing zone or zones may extend along at least one row of teeth, better still two rows of teeth, preferably each extending along the main axis of the brush.

[0025] Preferably, the brush has a substantially rectangular shape and the teeth extend in several rows of teeth, each extending along the main axis of the brush in the case of a brush having a treatment surface with a substantially rectangular outline.

[0026] The means for heating the teeth of the heated combing area may comprise at least one active element heating the tooth extending at least partially under the treatment surface of the heated combing area, in particular being in direct contact with the teeth and/or the treatment surface in the heated combing area.

[0027] Preferably, the row or rows of teeth in the heated combing zone each have at least 3 teeth, better still between 10 and 40 teeth, even better still between 15 and 40 teeth.

[0028] Preferably, the teeth have a height of between 2 mm and 50 mm, better still between 5 mm and 20 mm.

[0029] The largest dimension of the teeth extending into the heated combing area which are heated by the heating means, in cross section of the tooth, is between 0.5 mm and 25 mm, preferably between 1 mm and 10 mm.

[0030] The ratio between the height of a tooth and its largest cross-sectional dimension is greater than 1, preferably greater than 10.

[0031] Preferably, the at least two teeth heated by the heating means do not have surface protuberances.

[0032] Preferably, each tooth of the at least two teeth heated by the heating means is in one piece.

[0033] Preferably, the teeth heated by the heating means are attached to the treatment surface of the brush, in particular fixed in holes in the treatment surface.

[0034] The teeth may extend perpendicularly to the treatment surface or be inclined with respect to said treatment surface.

[0035] Preferably, the teeth of one row are spaced apart from one another by a distance of between 1 mm and 30 mm, better still between 2 mm and 15 mm. The spacing is measured between the longitudinal axes of the teeth.

[0036] Preferably, the teeth heated by the heating means are made of a heat conducting material, in particular of iron, aluminum, titanium, stainless steel, graphite, or ceramic. The teeth may be provided with a coating chosen from ceramic, tourmaline, elastomer, metal alloy and anodized coating materials. This makes it possible for the teeth to be heated easily by the heating means, and for the hair to be in contact with hot surfaces in the heated combing zone.

[0037] Said teeth may have, at their ends, a protective element made of insulating material in order to limit the heat in contact with the scalp. In this case, during operation, the temperature at the ends of the teeth may be less than or equal to 100°C, preferably less than or equal to 60°C, better still less than 45°C.

[0038] The brush is configured such that, during operation, the temperature of the teeth half-way up is from 110°C to 230°C, better still from 110°C to 210°C, even better still from 180°C to 210°C.

[0039] Preferably, the heat-conductive material has a thermal conductivity greater than 10 $Wm^{-1}K^{-1}$, better than 50 $Wm^{-1}K^{-1}$, better than 100 $Wm^{-1}K^{-1}$. Preferably, the thermally conductive material is selected from metals, in particular copper, aluminium, iron and steel. Alternatively, the heat-conducting material may be ceramic.

[0040] Some of the teeth may be made from a material with low heat conductivity, for example from elastomer or plastic.

[0041] Preferably, the material with low heat conductivity has a thermal conductivity comprised between 0,2 and 0,5 $Wm^{-1}K^{-1.}$

[0042] The brush may have, along an axis perpendicular to the main axis of the brush, alternating rows of teeth made of a heat conducting material and rows of

teeth made of a material that is a poor heat conductor.

[0043] The teeth made from a material that is a poor heat conductor may have a different height, in particular be taller, than the teeth made of a heat conducting material. The fact that there are teeth that are poor heat conductors and are taller than the heat conducting teeth makes it possible to limit contact between the scalp and the heat conducting teeth, the teeth that are poor heat conductors coming into contact with the scalp.

Heating means

[0044] Preferably, the heating means have at least one heating element in the body of the brush in order to heat the teeth by heat conduction, or the brush has a heating element in each of the heated teeth, in particular constituting the core of the corresponding tooth.

The heating means may be heating resistors or any other heating means.

Steam outlet zone(s)

[0045] The brush may have a plurality of discontinuous steam outlet zones that are separated from one another by the or a part of the heated combing zone.

[0046] Preferably, the or each steam outlet zone extends over more than 70% of the greatest dimension of the treatment surface of the brush.

[0047] Preferably, the or each steam outlet zone extends along a length substantially equal to that of the adjacent heated combing zone or zones.

[0048] The or each steam outlet zone may have a steam outlet, in particular a single steam outlet, extending along more or less the entire length of the steam outlet zone. In this case, the steam outlet may have an opening greater than or equal to 5 mm^2.

[0049] In a variant, the or each steam outlet zone has a plurality of steam outlets distributed over the steam outlet zone, in particular along at least one row of steam outlets. Preferably, the steam outlets open into the brush onto a common steam dispensing chamber.

[0050] The steam outlet zone or zones may be situated at the periphery of a single heated combing zone. The heated combing zone or zones may surround the steam outlet zone or zones.

[0051] Preferably, the steam outlet or at least one steam outlet is at a distance of less than or equal to 5 cm, better still less than or equal to 2 cm, from at least one heated spike of the heated combing zone.

[0052] Preferably, the or each steam outlet extends at least partially along the heated combing zone.

[0053] Preferably, the brush has a steam spraying system configured to supply the steam outlet zone, in particular the steam outlet or outlets, at a steam flow rate of less than or equal to 5 $mLmin^{-1}$, better still between 0.2 and 4 $mLmin^{-1}$, even better still between 0.4 et 2 $mLmin^{-1}$, preferably between 0.5 et 0.95 $mLmin^{-1}$.

[0054] Preferably, the brush has a steam spraying system configured such that the speed of the steam output by the steam outlet or outlets is between 0.007 m/s and 15 m/s, better still between 0.01 m/s and 3 m/s and even better still between 0.1 m/s and 1 m/s. A lower speed of steam output does not allow the steam to penetrate sufficiently into the hair for effective treatment and a higher speed of steam output can entail a risk of scalp discomfort, the steam not having time to cool before reaching the scalp.

The steam outlet zone or zones may not have teeth.

[0055] In a variant, a steam outlet zone may have a plurality of teeth. The teeth of the steam outlet zone may each be made of a heat conducting material, in particular of iron, aluminum, titanium, stainless steel, graphite, or ceramic. The teeth may be provided with a coating chosen from ceramic, tourmaline, elastomer, metal alloy and anodized coating materials.

[0056] In a variant, the teeth of the steam outlet zone may each be made of a material that is a poor heat conductor, for example of elastomer or plastic.

[0057] In another variant, some of the teeth of the steam outlet zone are made of a heat conducting material, in particular as mentioned above, and some of the teeth of the steam outlet zone are made of a material that is a poor heat conductor, in particular as mentioned above.

[0058] The brush may have a steam containment groove in which the steam outlet or outlets communicate. This makes it possible to contain the steam in a closed space, making it easier to apply.

[0059] The brush preferably has at least one vaporization chamber. The vaporization chamber may be in the head of the brush or in the handle.

[0060] The steam outlet or outlets may have any shape, in particular substantially square, substantially rectangular, substantially round or ovoid.

[0061] The or each steam outlet has an opening smaller than or equal to 20 mm^2, better still smaller than or equal to 10 mm^2, even better still smaller than 5 mm^2, very preferably smaller than 2 mm^2.

[0062] The brush may have a reservoir of product to be vaporized, in particular water, in particular having a volume ranging from 1 mL to 50 mL. The reservoir may be in the handle or in the head.

[0063] The brush may have a pump between the water reservoir and the steam outlet zone, in particular between the reservoir and the vaporization chamber.

[0064] The steam outlets can alternate with teeth along the longitudinal axis of the steam outlet area.

[0065] The brush may comprise a single steam outlet area, the brush comprising in the steam outlet area a single row of steam outlets aligned with each other along the longitudinal axis of the steam outlet area.

Application of a cosmetic product

[0066] The brush may have at least one zone for application of a cosmetic product, which is preferably separate from the heated combing zones and from the steam outlet zones, the product application zone having an applicator member for applying a cosmetic product.

[0067] The applicator member for applying cosmetic product is disposed so as to come into contact with the hair. The applicator member for applying cosmetic product is preferably porous, elastically compressible, and may advantageously be made from an open-cell cellular material such as a PE (polyethylene) foam for example. The applicator member may be made from any material that is able to release or diffuse the cosmetic product.

The applicator member may be removable.

The brush may have a cosmetic product reservoir.

[0068] Preferably, the cosmetic product delivered is in the fluid state. The expression *"in the fluid state"* should be understood as meaning liquid at ambient temperature (25°C) or at a higher temperature, between 25 and 50°C for example, and at atmospheric pressure. In this case, the product may initially be in the solid or pasty state at ambient temperature in the reservoir and be heated up within the reservoir in order to make it sufficiently fluid to be dispensed by the dispensing mechanism provided to supply the applicator member. The product is thus fluid in the reservoir at the time of application.

[0069] The reservoir may be equipped with an electrical resistor, for example a fine screen-printed resistor, making it possible to bring the temperature of its contents to above 50°C for example.

[0070] The cosmetic product may be a composition for cleaning, dyeing, bleaching, conditioning or shaping the hair. Preferably, the cosmetic product is a hair shaping composition, in particular a composition for curling, setting or preferably relaxing or straightening the hair.

[0071] The cosmetic product may contain one or more active agents chosen from reducing agents and in particular thiols, oxidizing agents and in particular hydrogen peroxide or persalts such as persulfates, coloring agents and in particular pigments, direct dyes or oxidation dyes, temporary shaping agents and in particular styling polymers that are preferably anionic, amphoteric or nonionic, conditioning agents and in particular silicones, mineral or plant oils, plant waxes, cationic surfactants or cationic polymers, alkaline agents or acids.

[0072] Even more preferably, the cosmetic product contains one or more agents chosen from oxidizing agents, reducing agents or alkaline agents of the hydroxide type.

Comb

[0073] The brush may have a combing zone which is separate from the heated combing and steam outlet zones and does not have a heating element. Preferably, the combing zone has a single row of teeth, in particular spikes. Preferably, the combing zone is configured to be upstream of the steam outlet zone and of the heated combing zone while the hair is being brushed. This makes brushing easier, thereby improving the treatment of the hair.

Method

[0074] The invention also meets this need by way of a method for treating the hair with a brush, in particular with the brush as described above, having:

- a step of simultaneously heating and combing a lock of hair by passing it between the teeth of at least one heated combing zone of the brush,
- the application of steam to the lock of hair in at least one steam outlet zone, the steam outlet zone or zones being separate from the heated combing zone or zones,

[0075] the step of simultaneous heating and combing and the application of steam being carried out on a lock of hair by passing the brush through the hair once.

[0076] The features of the device described above apply to the method in combination with or separately from each other and independently of the brush or in combination with the brush.

[0077] In the above method, the application of steam is temporally separate from the application of dry heat by the simultaneous heating and combing zone, the steam outlet and heated combing zones being separate from one another.

[0078] The method may be repeated several times for the complete treatment of part or all of the head of hair.

[0079] Preferably, the brush is moved through the hair at a speed of between 0.5 cm/s and 50 cm/s.

[0080] The method may involve applying a cosmetic product to the lock of hair before or after using the brush of the invention, and preferably before.

[0081] The cosmetic product may be a composition for cleaning, dyeing, bleaching, conditioning or shaping the hair. Preferably, the cosmetic product is a hair shaping composition, in particular a composition for curling, setting or preferably relaxing or straightening the hair.

[0082] The cosmetic product may contain one or more active agents chosen from reducing agents and in particular thiols, oxidizing agents and in particular hydrogen peroxide or persalts such as persulfates, coloring agents and in particular pigments, direct dyes or oxidation dyes, temporary shaping agents and in particular styling polymers that are preferably anionic, amphoteric or nonionic, conditioning agents and in particular silicones, mineral or plant oils, plant waxes, cationic surfactants or cationic polymers, alkaline agents or acids.

[0083] Even more preferably, the cosmetic product

contains one or more agents chosen from oxidizing agents, reducing agents or alkaline agents of the hydroxide type.

The method may involve one or more steps of rinsing the hair.

Brief description of the drawings

[0084]

[Fig 1] Figure 1 schematically shows an example of a brush,
[Fig 2] Figure 2 is a view along II of the brush in Figure 1,
[Fig 3] Figure 3 is a cross section on III-III of the example of a brush in Figures 1 and 2,
[Fig 4] Figure 4 is a cross section on IV-IV of the example of a brush in Figures 1 and 2,
[Fig 5] Figure 5 shows a cross section of a brush variant,
[Fig 6] Figure 6 shows a cross section of a brush variant,
[Fig 7] Figure 7 shows a top view of a brush variant,
[Fig 8] Figure 8 shows a top view of a brush variant,
[Fig 9] Figure 9 shows a top view of a brush variant,
[Fig 10] Figure 10 shows a top view of a brush variant,
[Fig 11] Figure 11 shows a top view of a brush variant,
[Fig 12] Figure 12 shows a top view of a brush variant,
[Fig 13] Figure 13 shows a top view of a brush variant,
[Fig 14] Figure 14 shows a top view of a brush variant,
[Fig 15] Figure 15 shows a top view of a brush variant,
[Fig 16] Figure 16 shows a top view of a brush variant, and
[Fig 17] Figure 17 shows a cross section of a brush variant.

Detailed description

[0085] Figures 1 to 4 illustrate an example of a brush 10 according to the invention.

[0086] The brush 10 has a gripping handle 15 and a treatment head 20. The head 20 has a substantially rectangular shape with rounded corners. However, this does not have to be the case. The head could be polygonal, oval or round in particular.

[0087] The head 20 forms a treatment surface 21 intended to come into contact with the hair during brushing.

[0088] The head 20 has teeth 23 arranged along a plurality of rows that extend from the treatment surface 21. The rows of teeth 23 extend along a main axis X of the brush. The rows of teeth may have from 8 to 40 teeth, and in this case 8 teeth have been shown for illustrative purposes. The teeth may be attached to the brush, being made in particular of a different material from the treatment surface.

[0089] The head 20 also has a plurality of steam outlets 30 which may be interposed between the teeth 25 of one of the rows of teeth, in this case the central row.

[0090] In the case illustrated, the zones of the treatment surface of the brush that do not have steam outlets constitute heated combing zones C. The zone of the brush having the steam outlets, in this case also having teeth, constitutes a steam outlet zone V that extends along the heated combing zones C along the majority of the length of the latter. The heated combing zones C cover more than 70% of the treatment surface 21 of the brush intended to come into contact with the hair.

[0091] The steam outlet zone, delimited by the lateral edges of the peripheral steam outlets, is elongate along an axis of extension E, in particular parallel to the main axis X. The steam outlet zone extends along a length e greater than or equal to 80% of the dimension *s* of the treatment surface along this axis.

[0092] In the embodiments illustrated, all of the teeth are identical, but this does not have to be the case. For example, the teeth may exhibit different materials, heights, shapes or orientations.

[0093] Preferably, the teeth 23 each extend along a longitudinal axis Y. The longitudinal axis Y of each tooth 23 may form an angle α with the treatment surface 21 of between 60 and 120°, for example substantially equal to 90°.

[0094] The teeth 23 are spaced apart from one another by a distance d, measured between the longitudinal axes Y of the teeth, less than or equal to 30 mm, preferably between 2 mm and 15 mm.

[0095] Preferably, the height *h* of the teeth 23 is less than or equal to 50 mm, better still between 2 and 50 mm, even better still between 5 and 35 mm.

[0096] As can be seen in the Figure 3, the teeth 23 of the heated combing zones C are heated by heating means. The brush 10 has in particular one or more heating resistors 35, in particular in the head, and the teeth 25 are heated by heat conduction from the head to the distal end of the teeth 25. Preferably, the teeth are made of a heat conducting material, in particular of iron, aluminum, titanium, stainless steel, graphite or ceramic, optionally provided with a coating.

[0097] Preferably, the electrical heating resistor or resistors are situated in the head of the brush.

[0098] The brush 10 may have a system, not illustrated here, for regulating the temperature by virtue of one or more sensors disposed in the vicinity of the heating resistor or resistors or in contact with the brush and/or at the end of at least one of the teeth.

[0099] In a variant, as illustrated in Figure 5, the heating resistor or resistors 35 extend into the teeth 35 in the form of a heating core 37.

The source of heat is not limited to the one which has just been described.

[0100] The steam outlets are supplied with steam, in the example illustrated, by an elongate rail 45 that extends in a direction parallel to the main axis X and is

arranged in the head of the brush.

[0101] The steam outlets 30 are orifices that open onto the rail, for example between 6 and 10 orifices, which are preferably spaced apart evenly along the rail 45 and each have an axis oriented substantially perpendicularly to the median treatment plane such that the steam is output perpendicularly to the treatment surface along an axis W.

[0102] The steam outlets 30 may have any shape, in particular square, rectangular, round or ovoid.

[0103] The rail 45 is supplied with steam by a vaporization chamber 42, heated by a heating element, which is itself supplied with product to be vaporized by a reservoir 48. The reservoir may be in the brush, in particular the handle or the head, as illustrated in Figure 4, or be remote therefrom in an external base 50 to which the brush is connected by a line supplying product to be vaporized 52, as is illustrated in Figure 6.

[0104] The reservoir of product to be vaporized, in particular water, may have a volume of between 1 mL and 50 mL when it is in the handle or in the head of the brush.

[0105] Preferably, the steam outlets have a steam flow rate of between 0.5 and 0.95 $mL.min^{-1}$, the steam being emitted at the mouth of the steam outlets at a speed of between 0.7 cm/s and 15 m/s.

[0106] When the brush is being used, it is passed through the hair at a speed of between 0.5 cm/s and 50 cm/s. The hair may or may not be combed before the brush is used.

[0107] The embodiments in Figures 7 to 12 differ from the preceding embodiment in terms of the shape and positioning of the steam outlet zone 30.

[0108] In a variant, as illustrated in particular in Figure 7, the brush may have a single steam outlet 30 extending along more or less the entire length of the steam outlet zone parallel to the rows of teeth. Preferably, the steam outlet has an opening greater than or equal to 5 mm^2.

[0109] The steam outlet zone V may be positioned elsewhere on the brush. It may be upstream of a single heated combing zone, as illustrated in Figure 8, or downstream of the latter, as illustrated in Figure 9.

[0110] The device may have a plurality of steam outlet zones V which are separated from one another by a heated combing zone C, in particular two steam outlet zones V which are separated from one another by a heated combing zone C, as is illustrated in Figures 10 and 13.

[0111] The two steam outlet zones may be positioned at the periphery of the treatment surface 21, on either side of a single heated combing zone, as is illustrated in Figure 13.

[0112] The or at least one of the steam outlet zones V may have a steam containment groove 50 into which the steam outlet or outlets extend, as is illustrated in Figure 11.

[0113] The steam outlet zone or zones V may extend along only a part of the length of the heated combing zone, as is illustrated in Figure 12.

[0114] In the example in Figure 14, the teeth 23 are inclined by an angle α of between 45° and 90° with respect to the treatment surface 21. The steam outlet or outlets 30 may output steam at an angle to the treatment surface 21 other than 90°, in particular between 45° and 90°, for example substantially equal to the angle of extension of the teeth 23.

[0115] In the variant in Figures 15 and 16, the brush has at least one additional treatment zone A, preferably separate from the steam outlet zone or zones and/or from the heated combing zone or zones.

[0116] The additional treatment zone A may be an unheated combing zone having a comb 60 at a temperature less than or equal to 50°C when the brush is in operation. Preferably, the comb 60 is disposed upstream of the steam outlet or outlets 30.

[0117] The additional treatment zone may be a zone for application of a cosmetic product, having an applicator member 65 for applying a cosmetic product.

[0118] The applicator member 65 for applying a cosmetic product is disposed so as to come into contact with the hair. The applicator member 65 for applying a cosmetic product is preferably porous, elastically compressible, and may advantageously be made of an open-cell cellular material, such as a PE (polyethylene) foam for example. The applicator member may be made from any material that is able to release or diffuse the cosmetic product.

[0119] The applicator member may be removable.

[0120] The brush may have a cosmetic product reservoir, which is not shown.

[0121] Preferably, the cosmetic product is in the fluid state at the time of use.

[0122] The cosmetic product reservoir may be equipped with an electrical resistor, for example a fine screen-printed resistor, making it possible to bring the temperature of its contents to 40-50°C, for example in order to liquefy it.

[0123] Preferably, the cosmetic product is a hair shaping composition, in particular a composition for curling or setting and, preferably, relaxing or straightening the hair.

[0124] The cosmetic product may contain one or more active agents chosen from reducing agents and in particular thiols, oxidizing agents and in particular hydrogen peroxide or persalts such as persulfates, coloring agents such as pigments, direct dyes or oxidation dyes, temporary shaping agents such as styling polymers that are preferably anionic, amphoteric or nonionic, conditioning agents such as silicones, mineral or plant oils, plant waxes, cationic surfactants and cationic polymers, alkaline agents or acids.

[0125] Even more preferably, the cosmetic product contains one or more agents chosen from oxidizing agents, reducing agents or alkaline agents of the hydroxide type.

[0126] In the example in Figure 17, the brush has teeth 23a made of a heat conducting material and longer teeth 23b made of a material that is a poor heat conductor. The teeth 23a and 23b may alternate within one and the same row, as illustrated in Figure 17. In a variant, the

brush has, perpendicularly to the main axis X, alternating rows of teeth 23a made of a heat conducting material and rows of teeth 23b made of a material that is a poor heat conductor.

[0127] Numerous modifications can be made to the examples that have just been described, without departing from the scope of the present invention.

[0128] For example, it is possible for the brush not to have a handle, the back of the brush being used to grip the brush.

[0129] The brush may have several different additional treatment zones, which are or are not separate from one another.

[0130] The steam outlet zone may have heated teeth like the heated combing zone.

[0131] The steam outlets extend from the treatment surface, but they could extend from protuberances, in particular teeth, of the treatment surface.

Claims

1. Brush (10) for treating the hair, in particular for straightening, having:

   - at least one heated hair combing zone (C), without a steam outlet, in which the brush (10) has:

     o a plurality of teeth (23) made of a heat conducting material, and
     o heating means (35, 37) for heating at least two teeth of the plurality of teeth (23),

   - at least one steam outlet zone (V) in which the brush (10) has at least one steam outlet (30), the steam outlet zone (V) being separate from the heated hair combing zone or zones (C).

2. Brush according to claim 1, having a plurality of discontinuous heated combing zones that are separated from one another by one or more steam outlet zones (V).

3. Brush according to claim 1 or 2, having a treatment surface (21) which is intended to come into contact with the hair during the treatment of the head of hair and from which the teeth (23) extend, the heated hair combing zone or the set of heated hair combing zones (C) covering more than 50%, better still more than 70%, of the treatment surface (21).

4. Brush according to any one of the preceding claims, wherein the teeth (23) do not have surface protrusions.

5. Brush according to any one of the preceding claims, wherein the teeth (23) are made of a heat conducting material, in particular of metal, in particular of iron, aluminum, titanium or stainless steel, of graphite or ceramic, optionally provided with a coating.

6. Brush according to any one of the preceding claims, having a plurality of discontinuous steam outlet zones (V) that are separated from one another by the or a part of the heated combing zone (C).

7. Brush according to any one of the preceding claims, wherein the steam outlet zone or zones (V) extend(s) along a length substantially equal to that of the adjacent heated hair combing zone or zones (C).

8. Brush according to any one of the preceding claims, wherein the steam outlet zone (V) has a steam outlet (30) extending along substantially the entire length of the steam outlet zone (V) or a plurality of steam outlets (30) distributed along the length of the steam outlet zone (V), in particular along at least one row.

9. Brush according to any one of the preceding claims, having a steam spraying system (42, 45, 48) configured to supply the steam outlet zone or zones (V), in particular the steam outlet or outlets (30), at a steam flow rate of less than or equal to 5 $mLmin^{-1}$, better still between 0.2 and 4 $mLmin^{-1}$, even better still between 0.4 et 2 $mLmin^{-1}$ and very preferably between 0.5 et 0.95 $mLmin^{-1}$.

10. Brush according to any one of the preceding claims, having a steam spraying system (42, 45, 48) configured such that the speed of the steam output by the steam outlet zone or zones (V), in particular the steam outlet or outlets (30), is between 0.007 m/s and 15 m/s, better still between 0.01 m/s and 3 m/s and even better still between 0.1 m/s and 1 m/s.

11. Brush according to any one of the preceding claims, having a steam containment groove (50) in which the steam outlet or outlets (30) extend.

12. Brush according to any one of the preceding claims, having a reservoir (48) of product to be vaporized, in particular water, in particular having a volume of between 1 mL and 50 mL, in a handle or in the head of the brush.

13. Brush according to any one of the preceding claims, having at least one zone (A) for application of a cosmetic product, which is preferably separate from the heated combing zone or zones (C) and from the steam outlet zone or zones (V), the application zone (A) having an applicator member (65) for applying a cosmetic product.

14. Brush according to any one of the preceding claims, having at least one combing zone (A) that does not have a heating element and is separate from the

heated combing zones (C) and from the steam outlet zone (V).

15. Method for treating the hair with a brush (10) according to any one of the preceding claims, having:

- a step of simultaneously heating and combing a lock of hair by passing it between the teeth (23) of at least one heated combing zone (C),
- the application of steam to the lock of hair in at least one steam outlet zone (V), the steam outlet zone or zones being separate from the heated combing zone or zones (C),

the step of simultaneous heating and combing and the application of steam being carried out on a lock of hair by passing the brush (10) through the hair once.

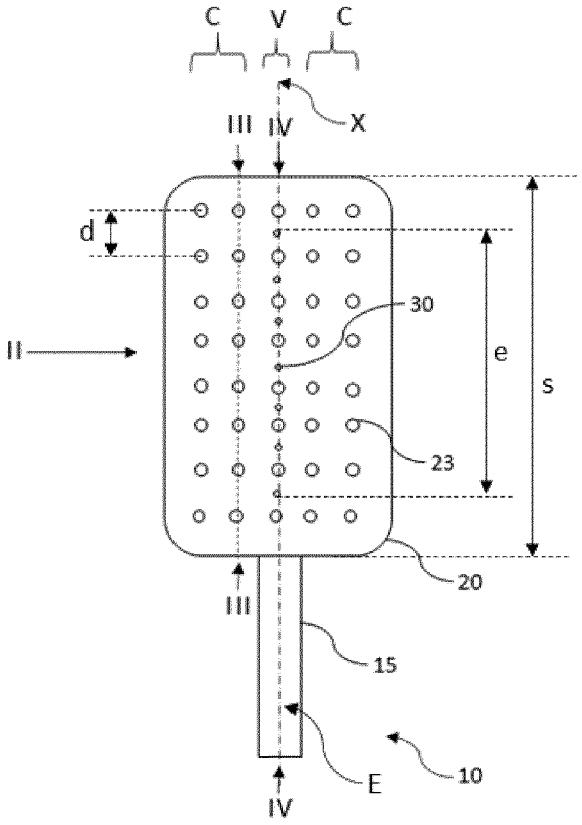


Figure 1

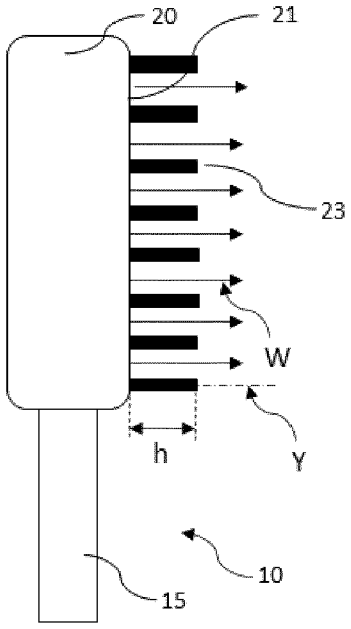


Figure 2

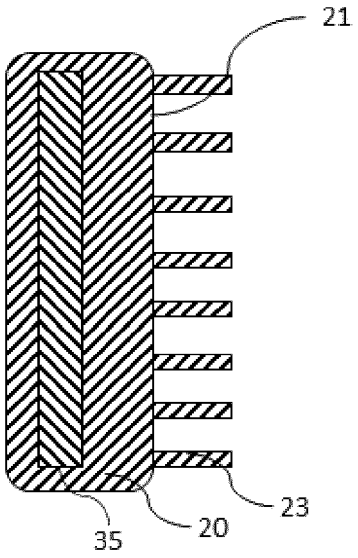
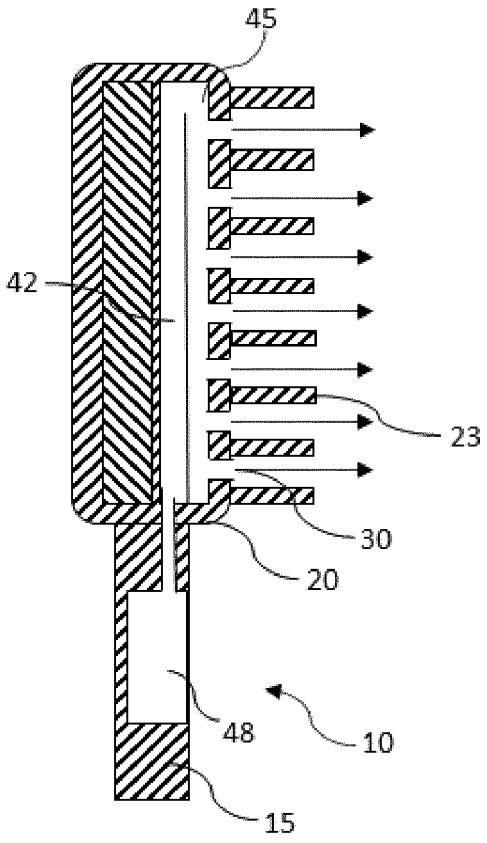


Figure 3



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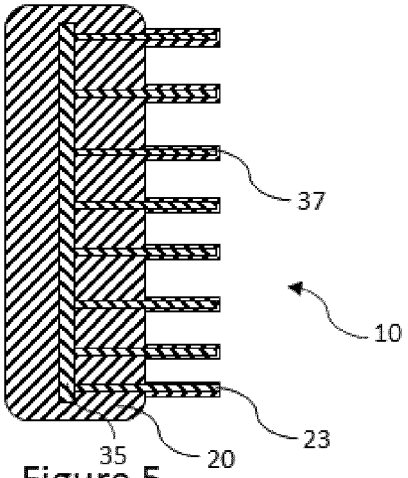

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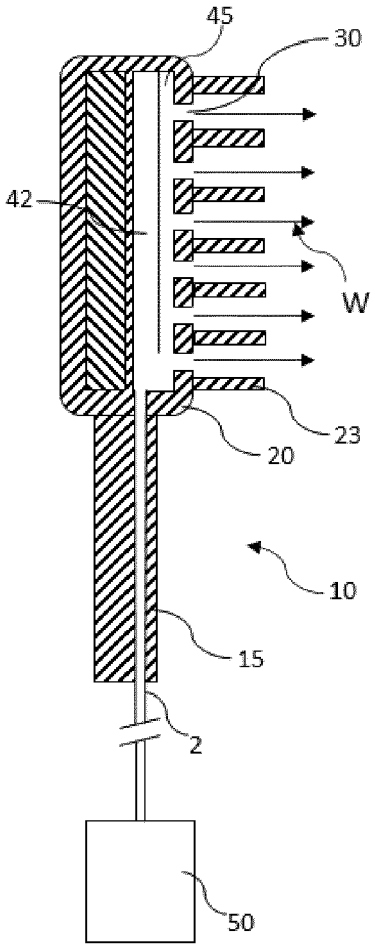

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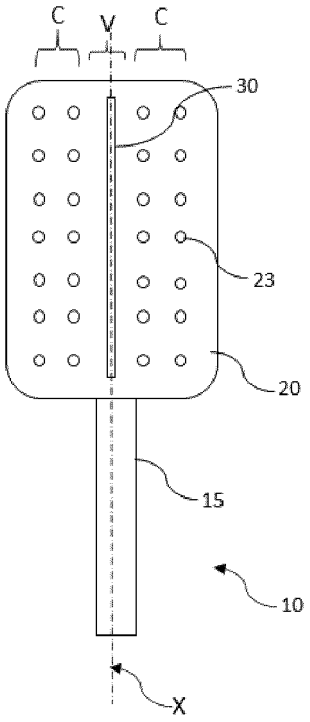

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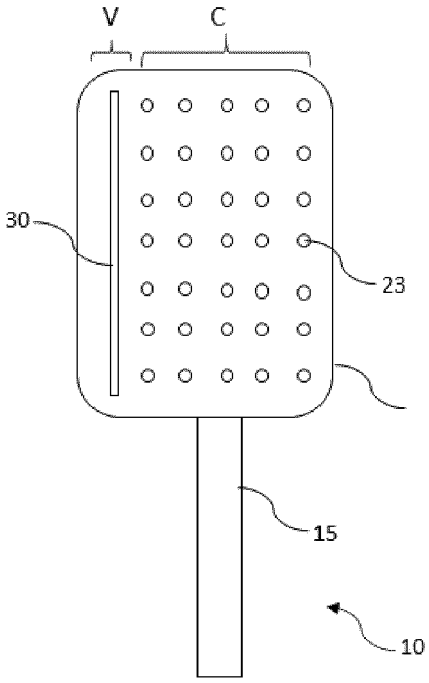

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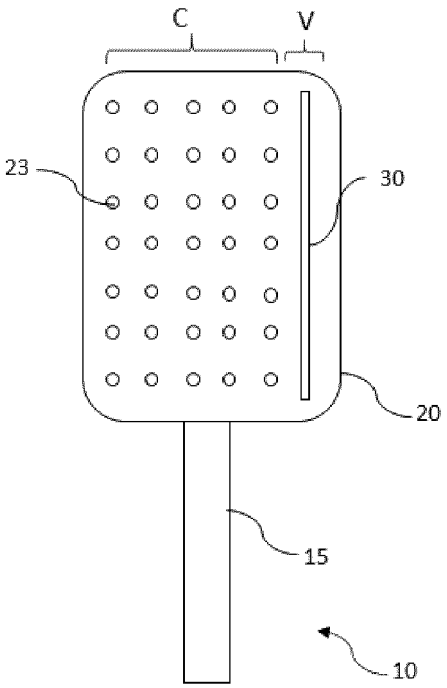

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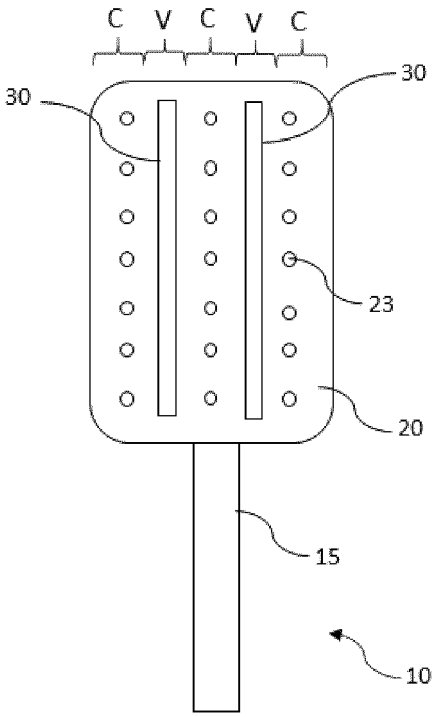
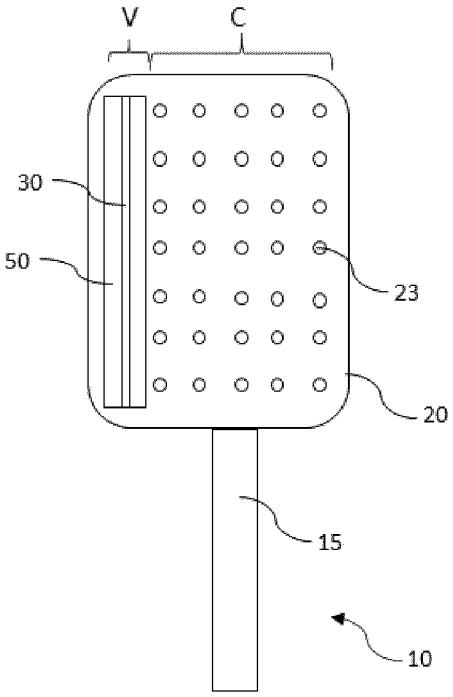


Figure 10



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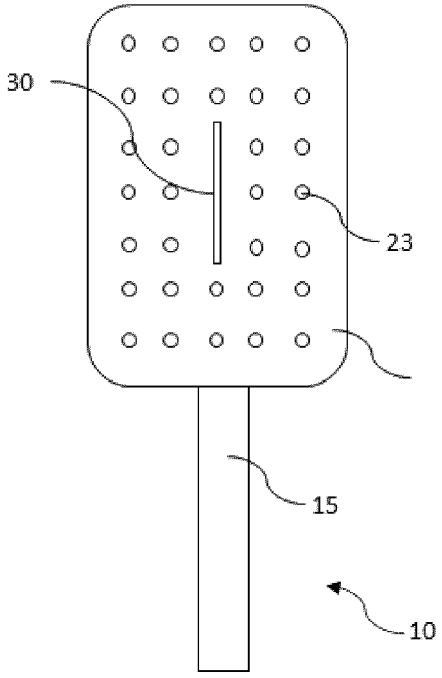


Figure 12

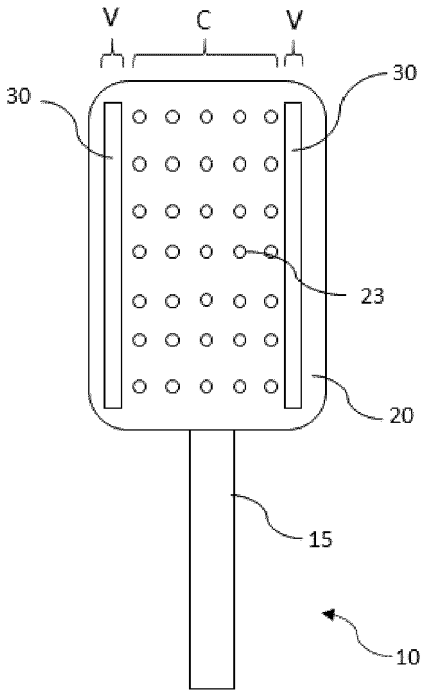
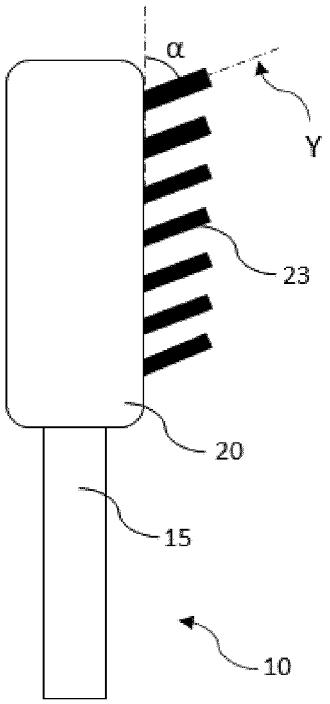


Figure 13



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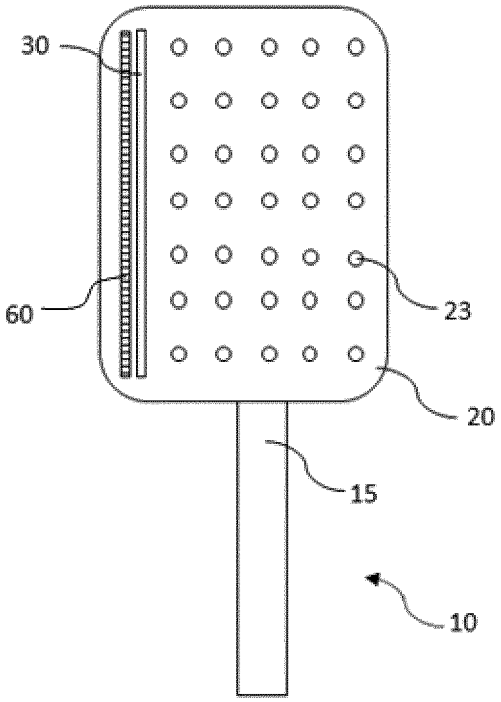

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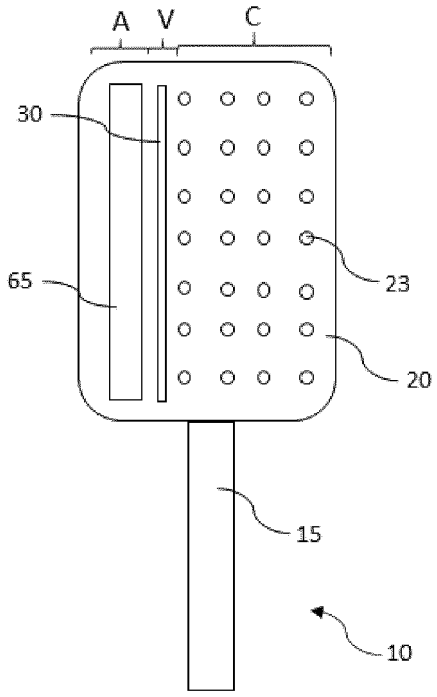

Figure 16

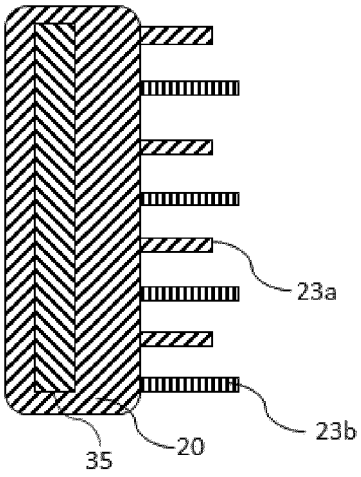

Figure 17

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CH 600821 **[0002]**
- EP 2074902 A **[0002]**
- IL 219875 **[0002]**
- US 4217915 A **[0002]**
- US 2018125223 A **[0002]**
- DE 19822718 **[0003]**
- US 4936027 A **[0004]**
- JP S5568318 B **[0004]**
- JP H07213325 B **[0004]**
- CN 2061786 **[0004]**
- JP H01207001 B **[0004]**
- JP H1033253 B **[0004]**
- JP H07163416 B **[0004]**
- JP 2000175723 B **[0004]**
- KR 19990036306 U **[0004]**
- KR 20030085159 A **[0005]**