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(54) **HAIR CARE DEVICE**

(57) Hair care device (D), comprising a base (B) provided with an array of protrusions (Br), a fan (F) for providing an air flow (A) into the hair care device (D) and through the base (B); and a heating unit (H) for providing

heat radiation (R) from the device (D) and through the base (B), in a direction opposite to a direction of the air flow (A). Preferably, the hair care device has a liquid dispenser (L).

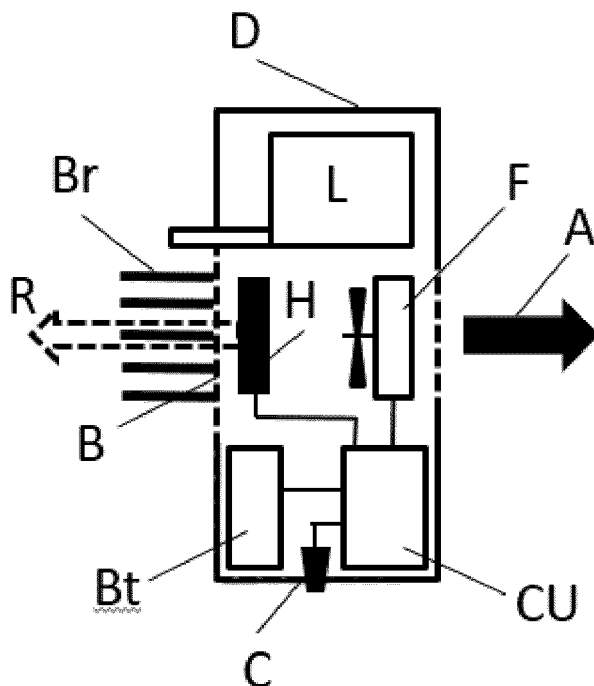


Fig. 1

Description

FIELD OF THE INVENTION

[0001] The invention relates to a hair care device, such as a brush or comb.

BACKGROUND OF THE INVENTION

[0002] Most brushes are passive brushes without any added feature. Brushes can create style and shine. Style due to the shape the hair will be brought into, and shine is obtained by having the hair glide along the bristles. The deeper the hair is guided along the bristles the better the shine. Another issue is that in hair styling, the brushes are combined with heated air flow. Here the brush can be used for styling and drying. Often not portable and the air blows the hair away, which requires another hand to guide the hair and keep in place. Another issue encountered is that brushes are used before, during and after blow-drying to speed up the drying effect. A drying brush would be able to make the dryer and brush redundant, but this requires a very effective solution in terms of drying rate. However, if the consumer blow-dries the hair till 80% dry, while for the remaining part a brush is used to dry/style the last part in natural air, the overall process takes time.

[0003] US2009064529 discloses an intake-exhaust type hair styling dryer which can perform drying and styling of hair at the same time along with other functions through intake and exhaust of air, moisture, etc. The intake-exhaust type hair styling dryer comprises a comb including an intake hole, a bristle extending through the intake hole, and an exhaust aperture spaced apart from the bristle, a main body detachable attached to the comb and having an air outlet formed therein, an air intake and blowing device disposed in the main body, and a filter positioned below the air intake and blowing device.

[0004] US5435327 discloses a hand-held grooming device has a comb which protrudes from a slot through which air is drawn and used by a fan driven by an electric motor. Loose hairs and dandruff are thus drawn into the device and collected by a filter. The same air is then blown out through an orifice which can be rotated about the axis of the device, at a point adjacent the point from which the air was drawn into the device. A heater can be switched on to heat the exhaust air. Thus, the same air which is drawn into the device to remove loose hairs and dandruff, after such removal is returned to the same location to dry or warm or cool the location from which the hair was withdrawn.

[0005] US3209386A discloses a combing brush provided with a rotary fan which permits of the suction, through apertures arranged at least between the brush element and comb elements, of dust particles and other impurities which are retained in the hair or fur. By reversing the direction of rotation, the fan can be employed for the purpose of blowing hot or cold air or else for the pur-

pose of projecting a suitable product.

SUMMARY OF THE INVENTION

[0006] It is, inter alia, an object of the invention to provide an improved hair care device. The invention is defined by the independent claims. Advantageous embodiments are defined in the dependent claims.

[0007] One aspect of the invention provides a hair care device, comprising a base provided with an array of protrusions, a fan for providing an air flow into the hair care device and through the base; and a heating unit for providing heat radiation from the device and through the base, in a direction opposite to a direction of the air flow. If the array is a one-dimensional array, the hair care device resembles a comb, while if the array is a two-dimensional array, the hair care device resembles a brush.

[0008] Various embodiments of the invention provide the following advantages. As a result of the air flow into the hair care device, the hairs are pulled deep into the bristles, which can enhance contact with the bristles and thus shine. As another result of the air flow into the hair care device, the hair is automated positioned and no other hand is needed. As brushing and drying are done in one go, a brush in accordance with embodiments of the invention will reduce time and improve style/shine.

[0009] An advantageous embodiment provides a heated brush surface where the bristles are located upon and air is sucked through. The benefit resulting from this is that it will give a less cold feeling when applied on wet hair, gives a drying function as heated plates radiate heat, and PTC heated plates can be powered more easily with a battery (in a non-corded embodiment). This embodiment thus provides a favorable combination of a heated plate, a brush, and an airflow direction that results in air being sucked into the hair care device.

[0010] These and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Fig. 1 shows a hair care device in accordance with an embodiment of the invention.

DESCRIPTION OF EMBODIMENTS

[0012] The hair care device D of Fig. 1 features a base B from which a plurality of protrusions protrudes to the left, to contact and treat hair of a user (not shown). The protrusions Br may be bristles of a brush, or teeth of a comb. A fan F provides an air flow A thru the device D from left to right. This air flow A will pull the hair towards the protrusions Br. Behind the base B, a heating unit H is provided to provide heat radiation R towards the hair at the left of the device. The direction of the heat radiation R is thus opposite to the direction of the air flow A. The heating unit H may include a PTC heater or an infrared

heater (e.g. having IR LEDs) to provide the heat radiation R. The heat radiation from the heating unit H will also heat the base B, so that the hair is not only heated by the heat radiation, but also by the hair touching the base B when the hair is sucked towards the base B as a result of the air flow A. The heating of the hair not only helps to dry the hair, but also helps to style the hair.

[0013] Preferably, the base B is provided with an air-permeable shield (not shown), e.g. formed by a mesh, to prevent hair from being sucked into the hair care device D as a result of the air flow A. In that case, the heating unit H is provided in the hair care device D behind the air-permeable shield.

[0014] If the hair care device D has a heat sensor for sensing the heat of the hair or the output air, the temperature of the heating unit H is preferably controlled in such a way, that the hair is not overheated.

[0015] In an advantageous embodiment, the hair care device D is powered by a battery Bt, which can be charged through a connector C, which may be a USB connector. The hair care device D is controlled by a control unit CU. The hair care device D may be provided with control buttons (not shown), and/or can be controlled by means of an app on a smartphone if the control unit CU is provided with a wireless transmission device (e.g. WiFi, Bluetooth).

[0016] In an advantageous embodiment, the hair care device has a liquid dispenser L for supplying a liquid hair care agent like a serum or a gel. When in accordance with embodiments of the invention, the hair is sucked into the comb teeth or brush bristles formed by the protrusions Br, and simultaneously heat is applied to the hair, the liquid hair care agent can be more intensely applied to the hair by the protrusions Br than in a prior art solution in which air blows the hair away from the hair care device. One or more outlets of the liquid dispenser L may be positioned between the protrusions Br.

[0017] As the hair may be wet, the air flow may contain moist, and the air path through the hair care device D is thus preferably designed in such a way, that the moist cannot reach the electronics.

[0018] The air path through the hair care device D may be provided with a filter so that any dirt (dust, dandruff, lice) sucked up by the hair care device D will not be returned to the outside air again. The filter may be provided with sensors that analyze the dirt so as to be able to provide care recommendations to the user, e.g. via a smartphone.

[0019] The hair care device D may be provided with a unit to supply ions to the hair to reduce frizz.

[0020] It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that those skilled in the art will be able to design many alternative embodiments without departing from the scope of the appended claims. In the embodiment of Fig. 1, the air outlet is opposite to the air inlet. In an alternative embodiment, air may leave the hair care device D at the top or at the bottom. In a brush or comb having a handle,

the fan F and battery Bt may be provided in the handle, while the heating unit H is still close to the protrusions Br. In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim.

The word "comprising" does not exclude the presence of elements or steps other than those listed in a claim. The word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements. The invention may be implemented by means of hardware comprising several distinct elements, and/or by means of a suitably programmed processor. In the device claim enumerating several means, several of these means may be embodied by one and the same item of hardware. Measures recited in mutually different dependent claims may advantageously be used in combination.

Claims

1. Hair care device (D), comprising:
 - a base (B) provided with an array of protrusions (Br) for treating hair;
 - a fan (F) for providing an air flow (A) into the hair care device (D) and through the base (B); and
 - a heating unit (H) for providing heat radiation (R) from the device (D) and through the base (B), to the hair, in a direction opposite to a direction of the air flow (A).
2. Hair care device (D) as claimed in claim 1, further comprising a liquid dispenser (L) for dispensing a liquid hair care agent.
3. Hair care device (D) as claimed in claim 1 or 2, wherein the base (B) is provided with an air-permeable shield to prevent the hair from being sucked into the hair care device (D) as a result of the air flow (A), and the heating unit (H) is provided in the hair care device (D) behind the air-permeable shield.

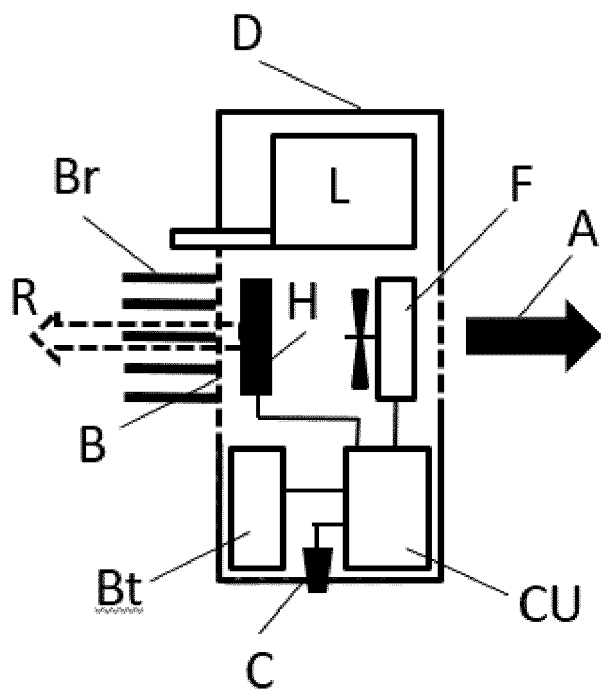


Fig. 1



EUROPEAN SEARCH REPORT

Application Number
EP 18 17 1031

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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	US 4 570 651 A (ADAMS CHARLES R [US]) 18 February 1986 (1986-02-18)	1	INV. A45D20/50
Y	* column 2, line 66 - column 3, line 45; figure 1 and 4 *	2,3	A45D24/22 A45D24/32
Y	US 2003/150126 A1 (CHANG TIMOTHY [US] ET AL) 14 August 2003 (2003-08-14) * paragraph [0057]; figure 20 *	2	
Y	WO 98/10677 A1 (AARREKORPI AAPPO [FI]) 19 March 1998 (1998-03-19) * page 5, line 31 - line 35; figure 9 *	3	
			TECHNICAL FIELDS SEARCHED (IPC)
			A45D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 June 2018	Examiner van de Beek-Duijker
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/02 (P04C01)

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

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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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22-06-2018

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EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 2009064529 A [0003]
- US 5435327 A [0004]
- US 3209386 A [0005]