

(19)



(11)

EP 3 031 348 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
22.01.2020 Bulletin 2020/04

(51) Int Cl.:
A45D 1/06 ^(2006.01) **A45D 2/00** ^(2006.01)
A45D 20/10 ^(2006.01)

(21) Application number: **15197883.0**

(22) Date of filing: **03.12.2015**

(54) HAIR CARE DEVICE

HAARPFLEGEVORRICHTUNG

DISPOSITIF POUR SOINS CAPILLAIRES

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

(30) Priority: **10.12.2014 JP 2014249765**

(43) Date of publication of application:
15.06.2016 Bulletin 2016/24

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Description

[0001] This application relates generally to a hair iron that can supply moisture to hair without the providing of a liquid reservoir.

[0002] A hair care device such as a hair dryer, hair iron or roll brush is equipped to wave, curl or straighten hair by using a heater to heat air, and by then blowing the heated air against the hair so as to dry the hair, or by using a heated clamping component in direct contact with the hair. However, the hair care device damages the hair due to the use of heat. In particular, a hair iron clamps the hair using two clamping components maintained at a high temperature of 120°C to 190°C, and the hair is heated very quickly by a high temperature heating portion. That is to say, due to direct contact of the high temperature clamping components with the hair, repeated hair styling using the hair iron greatly damages the hair. Damaged hair is the major cause of loss of gloss and resilience, hair frizzing, and difficulty in handling of curly hair. Thus moisture retention or the supplying of moisture to the hair to prevent hair damage is important when using a hair iron.

[0003] The supplying of moisture to the hair is attempted in various types of previously developed hair care devices. For example, in Unexamined Japanese Patent Application Kokai Publication No. 2009-136576, a hair dryer as a hair care device is disclosed that is suitable for increasing the spraying pressure of a steam generator to partially concentrate and apply steam. This hair dryer is equipped with a steam generator. This steam generator is equipped with a liquid storage chamber capable of receiving heat from a heater and capable of storing liquid, a steam spray opening for spraying the steam volatilized in the liquid storage chamber, and an open-close valve for opening and closing the steam spray opening. Due to this configuration, steam pressure within the steam generator can be increased by closing the open-close valve, and then the open-close valve can be opened to vigorously spray high pressure steam. The hair dryer disclosed in Unexamined Japanese Patent Application Kokai Publication No. 2009-136576 is thus suitable for concentrated application of steam to part of the hair.

[0004] Unexamined Japanese Patent Application Kokai Publication No. 2013-102826 discloses a hair dryer as a hair care device capable of preventing electrical charging of the hair and capable of supplying sufficient moisture to the hair, by imparting positive and negative ions to the hair. This hair dryer is equipped with: a blower fan, a heater, an ion generator capable of generating $H^+(H_2O)_m$ as positive ions (in which m is a positive integer) and $O_2^-(H_2O)_n$ as negative ions (in which n is a positive integer), an operational part for selection of operation in permeation mode for promoting permeation into the hair of positive and negative ions generated by the ion generator, and a control part for controlling a heater while operating the ion generator and the blower fan such that temperature of air blown from a blowing opening becomes a predetermined promotion temperature for promotion of permeation into the hair of moisture accompanied by the positive and negative ions generated by the ion generator.

[0005] Unexamined Japanese Patent Application Kokai Publication No. 2014-97214 discloses a hair iron that is capable of supplying heated vapor according to properties of hair so as to advantageously set the hair. This hair iron has a first clamping part having a first hair clamping surface and a second clamping part having a second hair clamping surface, and is configured such that the hair is clamped between the first hair clamping surface and the second hair clamping surface. At least one of the first hair clamping surface and the second hair clamping surface is equipped with a heater for heating the clamped hair. At least one of the first hair clamping surface and the second hair clamping surface is equipped with a superheated vapor generator for generating vapor by heating a liquid and then further heating the vapor to generate superheated vapor, and is equipped with a discharge opening for delivering the generated superheated vapor to the clamped hair. Due to configuration in this manner, the hair iron disclosed in Unexamined Japanese Patent Application Kokai Publication No. 2014-97214 is capable of setting hair in a form desired by the user by the use of superheated vapor regardless of the condition of the hair of the user.

[0006] In order to generate steam, the hair dryer of Unexamined Japanese Patent Application Kokai Publication No. 2009-136576 is required to be equipped with a steam generator that has the liquid storage chamber, the steam spray opening and the open-close valve. Also, when the user uses the hair dryer, the user is required to store water in the liquid storage chamber. That is to say, in addition to requiring the securing of space for arrangement of the steam generator, the hair dryer of Unexamined Japanese Patent Application Kokai Publication No. 2009-136576 requires a complex mechanism for heating water in the chamber in order to spray high pressure steam through the open-close valve from the steam spray opening. Furthermore, the user is required to perform the troublesome operation of storing water in the liquid storage chamber when using the hair dryer.

[0007] The hair dryer of Unexamined Japanese Patent Application Kokai Publication No. 2013-102826 has as required components: the ion generator for generation of positive and negative ions, the operational part for selection of operation in permeation mode for promoting permeation into the hair of positive and negative ions generated by the ion generator and a control part for controlling a heater while operating the ion generator and the blower fan such that temperature of air blown from the blowing opening becomes the predetermined promotion temperature for promotion of permeation into the hair of moisture accompanied by the positive and negative ions generated by the ion generator. Thus in order to supply moisture to the hair, the hair dryer of Unexamined Japanese Patent Application Kokai Publication No.

2013-102826 requires the special structure that is the ion generator, operational part and control part.

[0008] The hair dryer of Unexamined Japanese Patent Application Kokai Publication No. 2014-97214 must be equipped with the liquid reservoir for storage of liquid and a superheated vapor generator for heating the liquid to generate steam and further heating the generated vapor to generate superheated vapor. Thus the hair iron of Unexamined Japanese

[0009] EP 2680666 A1 relates to a domestic appliance having a heater, characterized in that the heating device has an electrically nonconductive substrate as a support material and an electrically conductive coating arranged thereon which heats up in the current-carrying state, or the heating device has an electrically conductive, porous material which heats up in the current-carrying state.

[0010] DE 10 2011 079642 A1 discloses a hair iron with cooling zones.

[0011] In this manner, a conventional hair care device is incapable of supplying moisture to hair unless a special structure is provided that includes components such as the liquid storage chamber, steam generator, ion generator, operational part, control part and superheated vapor generator. The securing of space for this structure is required in order to provide this special structure, and miniaturization of the hair care device is difficult. Furthermore, the type of hair care device that generates a vapor from water stored in a liquid storage chamber requires complex mechanisms such as a mechanism for preventing leakage of water and a mechanism for generating a suitable vapor from water. In addition, this type of hair care device requires that the user perform the troublesome operation of storing water in the liquid reservoir when using the hair care device. An objective of the present disclosure is to provide a hair iron that does not require the arrangement of the special structure, that is capable of miniaturization, and that does not require of the user the troublesome operation of storing water in the liquid reservoir when using the hair iron.

[0012] The present invention provides a hair iron according to claim 1.

[0013] In the hair iron of the present disclosure, furthermore, the drying agent can include a zeolite.

[0014] In the hair iron of the present disclosure, the drying agent can include alumina and silica.

[0015] In the hair iron of the present disclosure, the drying agent can include silica gel.

[0016] In the hair iron of the present disclosure, the drying agent can include a clay-based drying agent.

[0017] In the hair iron of the present disclosure, the hair iron can be configured so as to be capable of setting a temperature of the drying agent during use to greater than or equal to 150°C. By this means, moisture can be efficiently generated from the zeolite.

[0018] The hair iron of the present disclosure internally retains a regenerable drying agent, and an air stream generated during use blows moisture generated from a heated drying agent against the hair of the user to supply moisture to the hair. The regenerable drying agent takes up from the air in one day the necessary amount of moisture, and thus the hair iron can be used daily without the user performing the operation of refilling a liquid tank with water. Furthermore, since the hair iron of the present disclosure does not require the arrangement of specific structures of a conventional device, such as the liquid storage chamber, steam generator, ion generator, operational part, control part and superheated vapor generator, the hair iron becomes easily handled, and space for such a specific structure becomes unnecessary so that the hair iron can be miniaturized.

[0019] A more complete understanding of this application can be obtained when the following detailed description is considered in conjunction with the following drawings, in which:

FIG. 1 is a left side view of the hair iron of the present disclosure;

FIG. 2 is a backside view of the hair iron of the present disclosure;

FIG. 3 is a left side view of the hair iron of the present disclosure, in which the second clamping component is open;

FIG. 4 is a top view of the hair iron of the present disclosure;

FIG. 5 is a cross-sectional view of the hair iron of the present disclosure;

FIG. 6 is a graph showing moisture release characteristics of the hair iron of the present disclosure;

FIG. 7 is a graph showing moisture absorption characteristics of various types of drying agents;

FIG. 8 is a graph showing moisture release characteristics of various types of drying agents at 150°C; and

FIG. 9 is a graph showing moisture release characteristics of various types of drying agents at 200°C.

[0020] The hair iron of the present disclosure is explained below. As shown in a left side view of FIG. 1, a backside view of FIG. 2 and a top view of FIG. 4, a hair iron 8 is equipped with a handle 20 for the user to hold the hair iron, a first clamping component 16 arranged at the upper portion of the handle 20, and a second clamping component 18 coupled through a hinge 26 to the first clamping component 16. A handle 30 and a stand 28 are arranged on the second clamping component 18. A cool tip 15 is arranged at the distal tip of the first clamping component 16, multiple blowing openings 32 are arranged at the side portion of the first clamping component 16, and an electrical power cord 38 is

arranged at the lower portion of the first clamping component 16. An air intake opening 34 for intake of air is arranged in the upper portion of the handle 20, and an electrical power switch 40 is arranged at a side face of the handle 20. Distance from the tip of the cool tip 15 to the connection between the handle 20 and the electrical power cord 38 is 33 cm; cool tip 15 height is 4 cm and maximum diameter is 4 cm; and length of the handle 20 is 16 cm.

[0021] The cross-sectional drawing of FIG. 5 shows internal structure of the hair iron 8. In the handle 20, a control board 42 is arranged connected to the electrical power cord 38, and a blower fan 36 is arranged near the air intake opening 34. A plate-like heater 14 is arranged at the interior of the first clamping component 16.

[0022] A drying agent is arranged in drying agent retainers 12a, 12b and 12c at the periphery of the heater 14. For a cross section line A-A' of the drying agent retainer 12a in FIG. 5, the cross section is indicated to the right and adjacent to the cross section line A-A'. As can be understood from the figure, the drying agent is arranged in the entire lateral cross section in the drying agent retainer 12a. Similarly, for a cross section line B-B' of the drying agent retainer 12b, the cross section is indicated to the right and adjacent to the cross section line B-B'. In this cross section, the drying agent is arranged at both sides of the heater 14. Similarly, for a cross section line C-C' of the drying agent retainer 12c, the cross section is indicated to the right and adjacent to the cross section line C-C', although in this cross section, the drying agent is arranged at the periphery of an air flow tube 33.

[0023] A drying agent such as SIBLET (tradename, manufactured by Tokai Chemical Industries Inc.), silica gel, clay-based drying agents and zeolites can be used as the regenerable drying agent of the hair iron of the present disclosure. SIBLET is a tablet type drying agent produced by tableting a porous, amorphous substance (natural silica-alumina clay, mineral name = allophane) that includes $\text{Al}_2\text{O}_3 \cdot \text{SiO}_2 \cdot n\text{H}_2\text{O}$ as the major ingredient. SIBLET is chemically stable and has high moisture absorption capacity. Silica gel is manufactured by using sulfuric acid to neutralize sodium silicate. Silica gel is a drying agent that has a sponge-like porous molecular structure and is regenerated by heating to 150°C to 180°C. The clay-based drying agent is a drying agent produced using as a raw material the mineral bentonite or the clay mineral montmorillonite. Zeolites are drying agents that, among aluminosilicates, have relatively large voids in the crystal structure.

[0024] In a first example, "SIBLET AS 1306", which is a tableted type allophane drying agent produced by Tokai Chemical Industries Inc., was used by forming a powder from a portion of 20 tablets, and then placing the drying agent in drying agent retainers 12a, 12b and 12c. A single tablet of SIBLET AS 1306 weighs 1 g, is 6 mm thick, and is 13 mm in diameter. Moisture release characteristics of a hair iron of the present disclosure using SIBLET AS1306 as the regenerable drying agent are explained below using Table 1 and FIG. 6. Furthermore, as drying agents other than SIBLET AS1206 as the regenerable drying agent, the inventors also used SIBLET ASW3012 (30 mm diameter, 12 mm thickness, 10 g weight) and plate-like molded synthetic zeolite drying agent MS SELAM-W10G (60 × 40 mm, 4 mm thickness, 10 g weight). A comparison of characteristics of these drying agents is explained below using FIGS. 7 to 9.

[0025] Operation of the hair iron 8 of the present disclosure is explained next. When the user turns the electrical power switch 40 on, via the electrical power cord 38 and the control board 42, electrical current is sent to the heater 14 and the blower fan 36. By operation of the blower fan 36, air is taken in by the air intake opening 34 and is sent through the air flow tube 33 to the heater 14. Moisture is released from the drying agent when the drying agent arranged in the drying agent retainers 12a, 12b and 12c is heated to a temperature greater than or equal to 150°C by heating by the heater 14. This moisture released from the drying agent is passed through a space 13, blown out from the multiple blowing openings 32 arranged at both sides of the first clamping component 16 and is supplied as moisture to the hair of the user. As explained below concerning FIGS. 6, 8 and 9, during a single use, the drying agent is capable of supplying moisture to the hair for at least 60 minutes. When the user finishes using the hair iron 8, turns the electrical power switch 40 off, and then when temperature of the drying agent decreases, the drying agent begins to absorb moisture from the air. The drying agent, as explained below concerning FIG. 7, is capable of absorption of 20 percent by weight moisture, that is, regeneration, during 24 h, and thus the user is able to use the hair iron 8 on the following day. That is to say, the user is not required to perform the troublesome operation of storing water in the liquid reservoir, as is required by the conventional hair iron, and the hair iron 8 can be used each day for at least 60 minutes.

[0026] When using the hair iron 8, the user presses the handle 30, opens the second clamping component 18 (FIG. 3), and curls the hair by clamping the hair between the first clamping component 16 and the second clamping component 18. During this curling operation, while the user uses the right hand to hold the handle 20 and the handle 30 and uses the left hand to grab the cool tip 15, the user rotates the hair iron 8. The cool tip 15 is configured so that the contact area of the fingers is small so that no interference occurs even when grasped by the fingers.

[0027] The first clamping component 16 and the second clamping component 18 reach a temperature during use that is greater than or equal to 140°C, and thus there is danger of burning or melting of a desk when the hair iron 8 is carelessly placed on the desk. The stand 28 is arranged on the hair iron 8 in order to avoid this danger. As indicated in FIG. 3, during use of the hair iron 8, the stand 28 is retracted toward the handle 20 so as not to interfere with use of the hair iron 8. Moreover, when the hair iron 8 during use is placed on an object such as a desk, as indicated in FIG. 1, the stand 28 projects from the second clamping component 18, and direct contact of the second clamping component 18 with the desk is prevented.

[0028] Table 1 shows moisture release characteristics of the hair iron of the present disclosure using 20 tablets of "SIBLET AS 1306", produced by Tokai Chemical Co., Ltd., as the regenerable drying agent. FIG. 6 is a graph of the moisture release characteristics. This figure indicates the amount and change of discharged moisture due to setting the hair iron of the present disclosure to 150°C.

TABLE 1

Change of weight						
		Elapsed time (minutes)				
Initial weight		5	10	20	30	60
	460	458.4	457.6	457.4	456.9	456.2
Released moisture amount						
		Elapsed time (minutes)				
	0	5	10	20	30	60
	0	1.6	2.4	2.6	3.1	3.8

[0029] As can be understood from the data indicated in Table 1 and FIG. 6, a large amount of moisture was released from the start of moisture release until 30 minutes had elapsed, and a relatively small amount of moisture was released after 30 minutes and up to 60 minutes elapsed time. That is to say, the hair iron of the present disclosure was shown to be capable of a single continuous use for 60 minutes.

[0030] FIG. 7 shows results of a moisture absorption testing performed at 30°C and 45% relative humidity using a single type of drying agent selected from among three types, that is from among zeolite (MS SELAM-W10G), SIBLET AS3012 and SIBLET AS1306. Although the absorbed moisture for all of the drying agents was about 20 percent by weight when 48 h had elapsed, during the initial three hours, the zeolite and SIBLET AS1306 absorbed 10 percent by weight moisture, and in contrast, the SIBLET AS3012 had only absorbed 5 percent by weight moisture. However, after 24 h had elapsed, each of the drying agents had absorbed at least 18 percent by weight moisture.

[0031] FIG. 8 shows results of moisture release testing at 150°C using a single type of drying agent selected from among three types, that is from among zeolite (MS SELAM-W10G), SIBLET AS3012 and SIBLET AS1306. According to these results, when 60 minutes had elapsed, the SIBLET AS1306 had release nearly the entire amount of moisture, 20 percent by weight, and in contrast, the zeolite had only released 6 percent by weight moisture and retained 14 percent by weight moisture, and the SIBLET AS3012 had released 12.5 percent by weight moisture and retained 7.5 percent by weight moisture. After 480 minutes (8 h) had elapsed, although nearly the entire amount of moisture of had been released from the SIBLET AS3012 and the SIBLET AS1306, the zeolite still retained 7 percent by weight moisture.

[0032] FIG. 9, shows results of moisture release testing at 200°C using a single type of drying agent, either SIBLET AS3012 or SIBLET AS1306. According to these results, although the entire amount of moisture was released from these drying agents after 180 minutes (3 h) had elapsed, after 60 minutes had elapsed, the SIBLET AS3012 retained 2 percent by weight moisture, and the SIBLET AS1306 retained 1 percent by weight moisture. According to these results, in comparison to SIBLET AS3012, SIBLET AS1306 is understood to release a greater amount of moisture at 60 minutes, which is a practical time interval of use.

[0033] The foregoing describes some example embodiments for explanatory purposes. Although the foregoing discussion has presented specific embodiments, persons skilled in the art will recognize that changes may be made in form and detail without departing from the scope of the invention according to the appended claims. Accordingly, the specification and drawings are to be regarded in an illustrative rather than a restrictive sense. This detailed description, therefore, is not to be taken in a limiting sense, and the scope of the invention is defined only by the included claims, along with the full range of equivalents to which such claims are entitled.

[0034]

- 8 Hair iron
- 12a, 12b, 12c Drying agent retainer
- 14 Heater
- 15 Cool tip
- 16 First clamping component
- 18 Second clamping component
- 26 Hinge
- 28 Stand

30	Handle
32	Blowing opening
33	Air flow tube
34	Air intake opening
5 36	Blower fan
38	Electrical power cord
40	Electrical power switch
42	Control board

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Claims

1. A hair iron (8) **characterized by** comprising:

15 a fan (36) configured to blow air;
a regenerable drying agent;
a first clamping component (16);
a second clamping component (18); and
a heater (14) configured to heat the air blown by the fan (36) and to heat the regenerable drying agent, wherein
20 the air heated by the heater passes through the regenerable drying agent configured to pass the air heated by
the heater
characterized in that
the first clamping component (16) is cylindrical,
the plate-like heater (14) is arranged at the interior of the first clamping component (16).

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2. The hair iron (8) according to claim 1, **characterized in that** the drying agent comprises a zeolite.

3. The hair iron (8) according to claim 1, **characterized in that** the drying agent comprises alumina and silica.

30 4. The hair iron (8) according to claim 1, **characterized in that** the drying agent comprises silica gel.

5. The hair iron (8) according to claim 1, **characterized in that** the drying agent comprises a clay-based drying agent.

35 6. The hair iron (8) according to any one of claims 1 to 5, **characterized in that** the hair iron (8) is configured so as
to be capable of setting a temperature of the drying agent during use to greater than or equal to 150°C.

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7. A method of treating hair using a hair iron (8) according to any preceding claim, wherein air is blown by the fan to
the heater, the heater heats the air and the regenerable drying agent, and the heated air passes through the
regenerable drying agent, whereby moisture is released from the drying agent.

8. The method of claim 7, wherein the regenerable drying agent is heated to a temperature greater than or equal to
150°C.

45 Patentansprüche

1. Lockenstab (8), **dadurch gekennzeichnet, dass** er Folgendes aufweist:

50 ein Gebläse (36), das zum Blasen von Luft konfiguriert ist;
ein regenerierbares Trocknungsmittel;
einen ersten Klemmteil (16);
einen zweiten Klemmteil (18); und
ein Heizelement (14), das zum Erhitzen der vom Gebläse (36) geblasenen Luft und zum Erhitzen des regene-
rierbaren Trocknungsmittels konfiguriert ist, wobei die vom Heizelement erhitzte Luft durch das regenerierbare
55 Trocknungsmittel hindurchströmt, das zum Durchlassen der vom Heizelement erhitzten Luft konfiguriert ist,
dadurch gekennzeichnet, dass
der erste Klemmteil (16) zylindrisch ist,
das plattenähnliche Heizelement (14) am Inneren des ersten Klemmteils (16) angeordnet ist.

2. Lockenstab (8) nach Anspruch 1, **dadurch gekennzeichnet, dass** das Trocknungsmittel einen Zeolithen umfasst.
3. Lockenstab (8) nach Anspruch 1, **dadurch gekennzeichnet, dass** das Trocknungsmittel Aluminiumoxid und Siliziumdioxid umfasst.
4. Lockenstab (8) nach Anspruch 1, **dadurch gekennzeichnet, dass** das Trocknungsmittel Kieselgel umfasst.
5. Lockenstab (8) nach Anspruch 1, **dadurch gekennzeichnet, dass** das Trocknungsmittel ein Trocknungsmittel auf Tonbasis umfasst.
6. Lockenstab (8) nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** der Lockenstab (8) konfiguriert ist, um eine Temperatur des Trocknungsmittels während der Verwendung auf größer oder gleich 150 °C einstellen zu können.
7. Verfahren zur Behandlung von Haar mit einem Lockenstab (8) nach einem der vorhergehenden Ansprüche, wobei Luft durch das Gebläse zum Heizgerät geblasen wird, das Heizgerät die Luft und das regenerierbare Trocknungsmittel erhitzt und die erhitzte Luft durch das regenerierbare Trocknungsmittel hindurchströmt, so dass Feuchtigkeit aus dem Trocknungsmittel freigesetzt wird.
8. Verfahren nach Anspruch 7, wobei das regenerierbare Trocknungsmittel auf eine Temperatur von größer oder gleich 150 °C erhitzt wird.

Revendications

1. Un fer de cheveux (8) **caractérisé en ce qu'il comprend** :

Un ventilateur (36) configuré pour souffler de l'air ;

Un agent de séchage régénérable ;

Un premier élément de serrage (16) ;

Un deuxième élément de serrage (18) ; et

Un dispositif chauffant (14) configuré pour chauffer l'air soufflé par le ventilateur (36) et pour chauffer l'agent de séchage régénérable, dans lequel l'air chauffé par le dispositif chauffant passe par l'agent de séchage régénérable configuré pour passer l'air chauffé par le dispositif chauffant

Caractérisé en ce que

Le premier élément de serrage (16) est cylindrique,

Le dispositif chauffant en forme de plaque (14) est positionné à l'intérieur du premier élément de serrage (16).

2. Le fer à cheveux (8) selon la revendication 1, **caractérisé en ce que** l'agent de séchage contient de la zéolite.
3. Le fer à cheveux (8) selon la revendication 1, **caractérisé en ce que** l'agent de séchage contient de l'alumine et de la silice.
4. Le fer à cheveux (8) selon la revendication 1, **caractérisé en ce que** l'agent de séchage contient du gel de silicium.
5. Le fer à cheveux (8) selon la revendication 1, **caractérisé en ce que** l'agent de séchage contient un agent de séchage à base de glaise.
6. Le fer à cheveux (8) selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** le fer à cheveux (8) est configuré de façon à pouvoir régler une température de l'agent de séchage pendant l'utilisation supérieure ou égale à 150°C.
7. Une méthode de traitement à l'aide d'un fer à cheveux (8) selon l'une quelconque des revendications précédentes, dans laquelle l'air est soufflé par le ventilateur vers l'élément chauffant, lequel chauffe l'air et l'agent de séchage régénérable, et l'air chauffé passe par l'agent de séchage régénérable, provoquant ainsi la libération de l'humidité à partir de l'agent de séchage.
8. La méthode de la revendication 7, dans laquelle l'agent de séchage régénérable est chauffé à une température

supérieure ou égale à 150°C.

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FIG.1

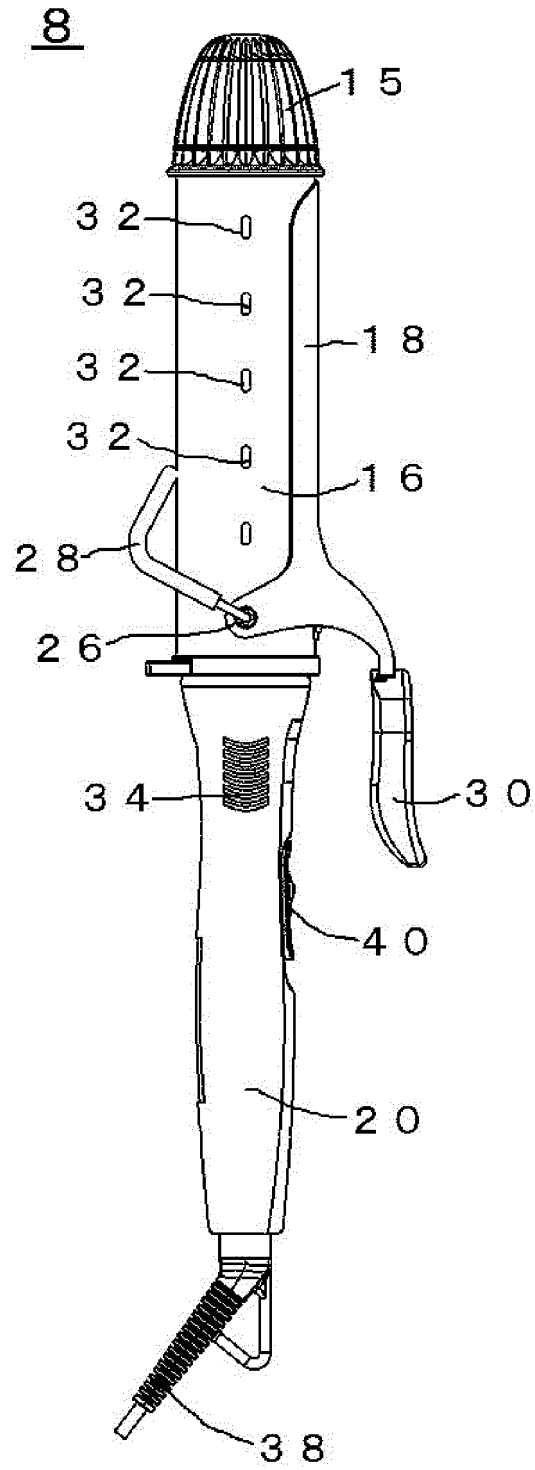


FIG.2

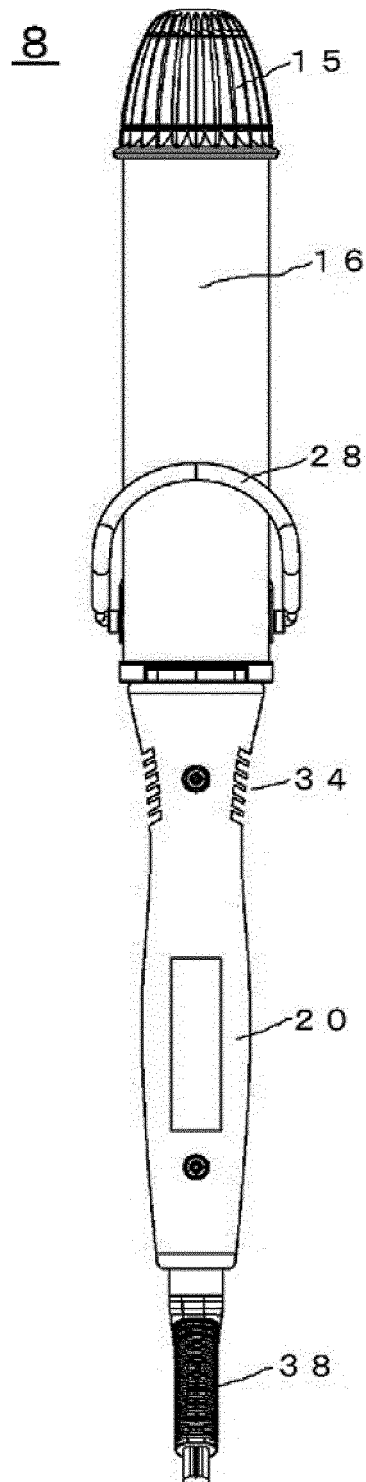


FIG.3

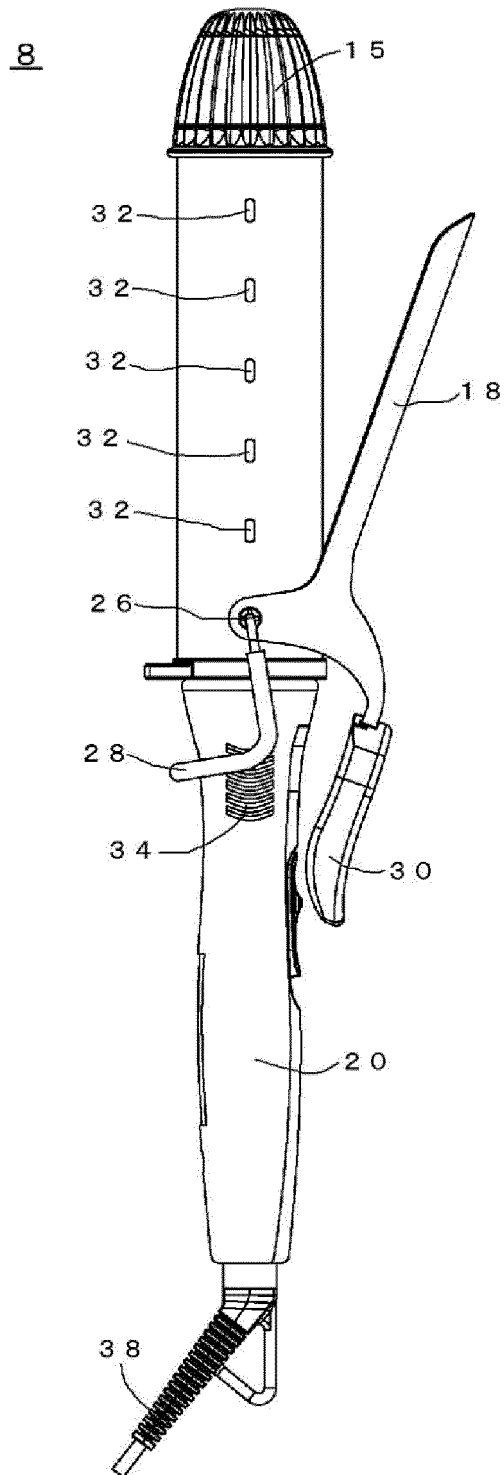


FIG.4

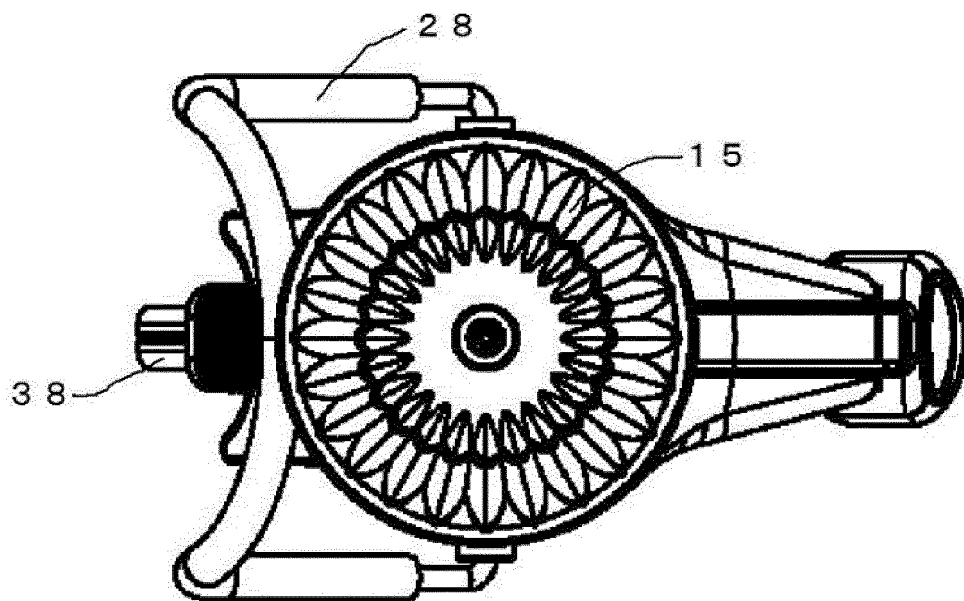


FIG.5

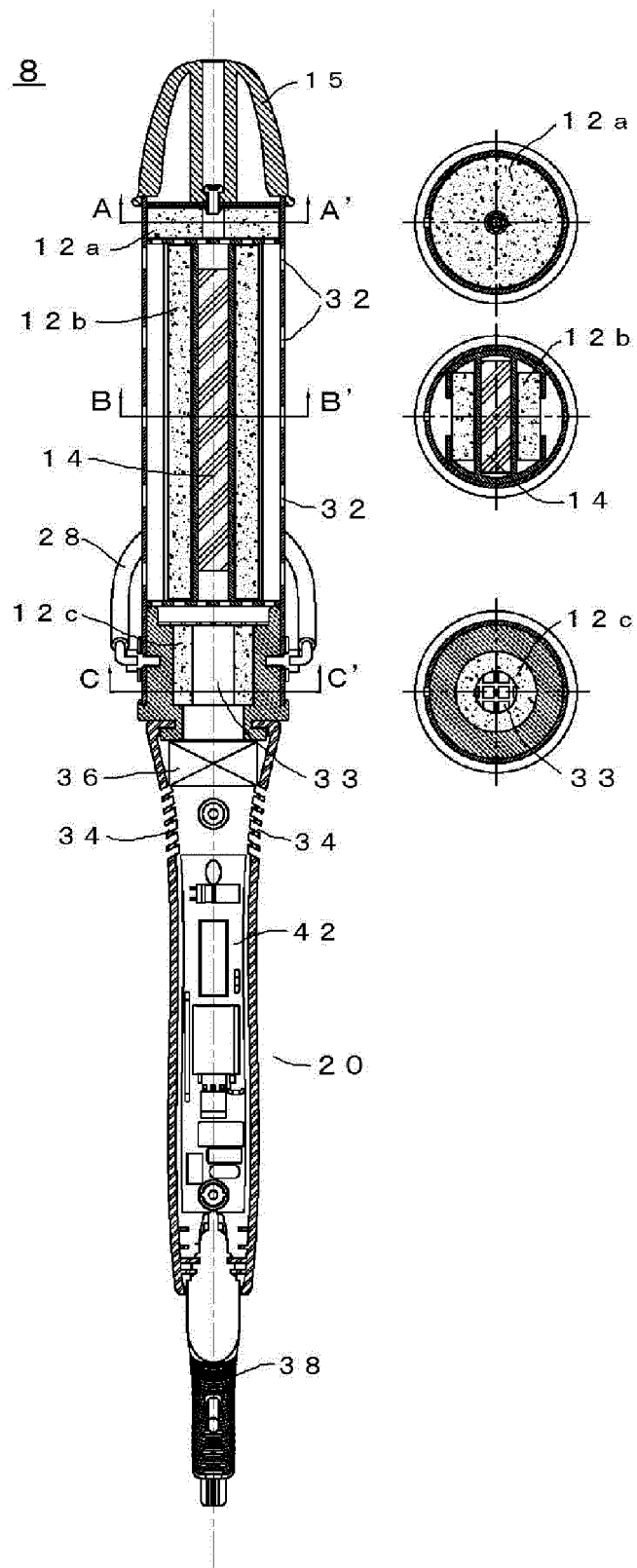


FIG.6

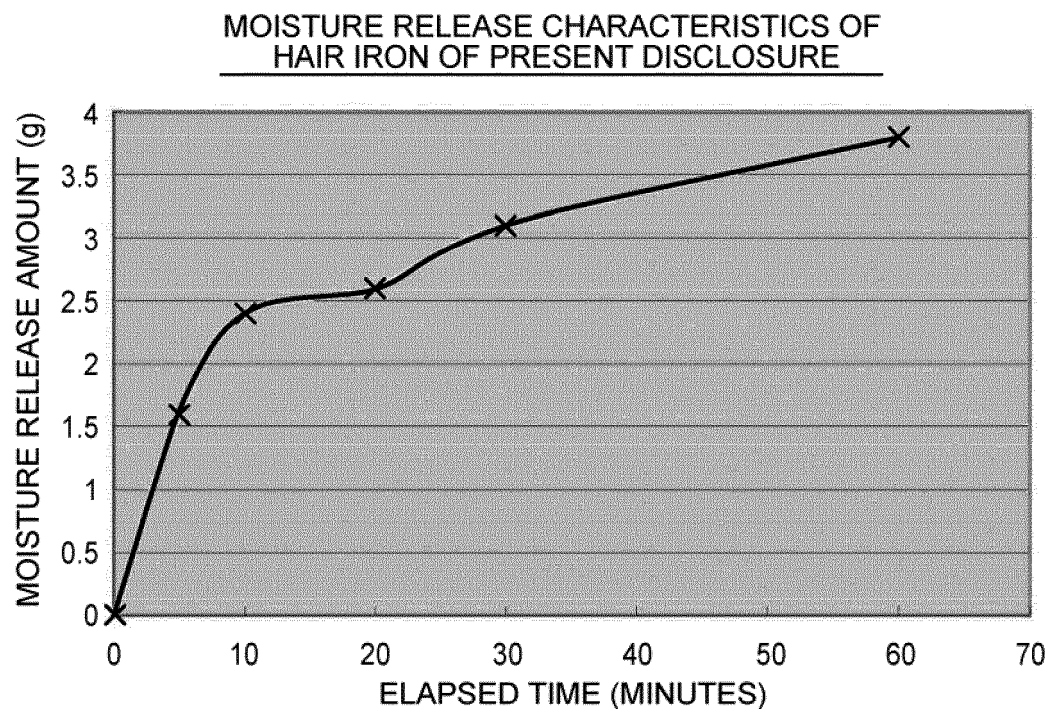


FIG.7

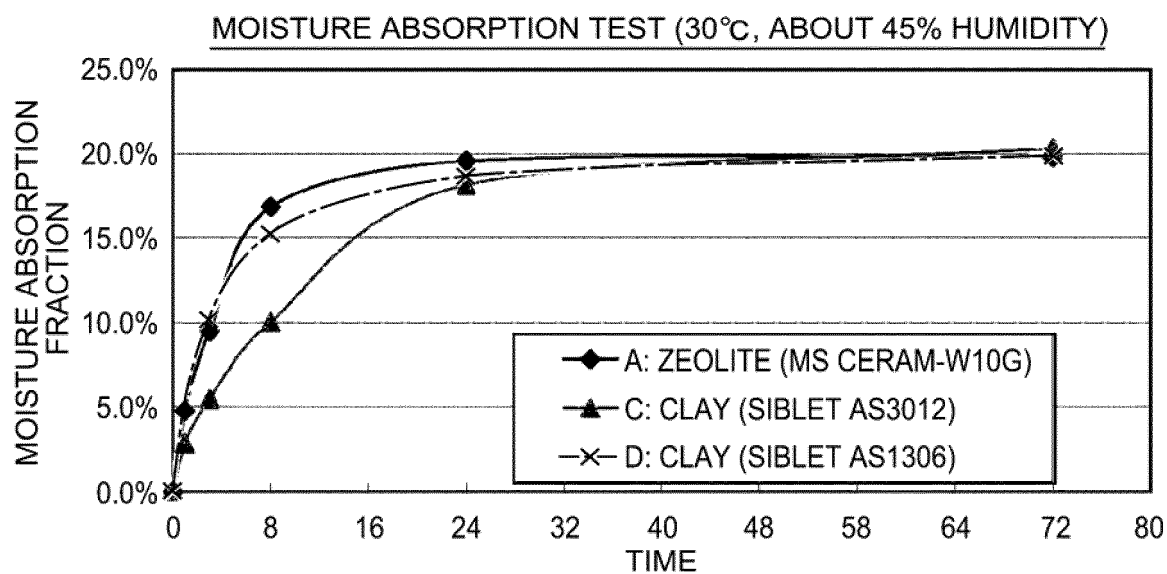


FIG.8

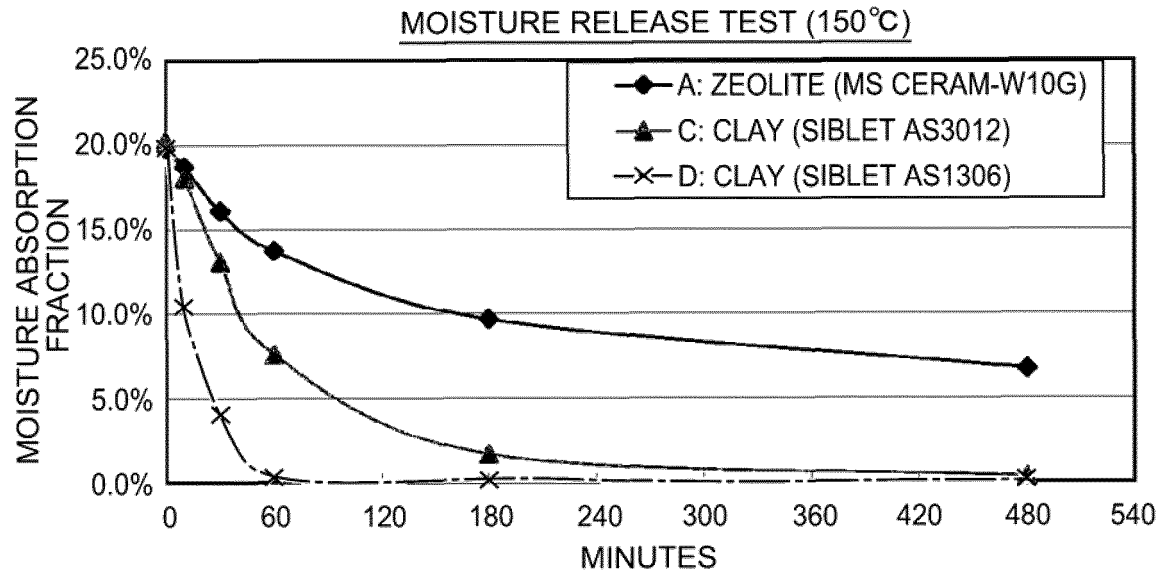
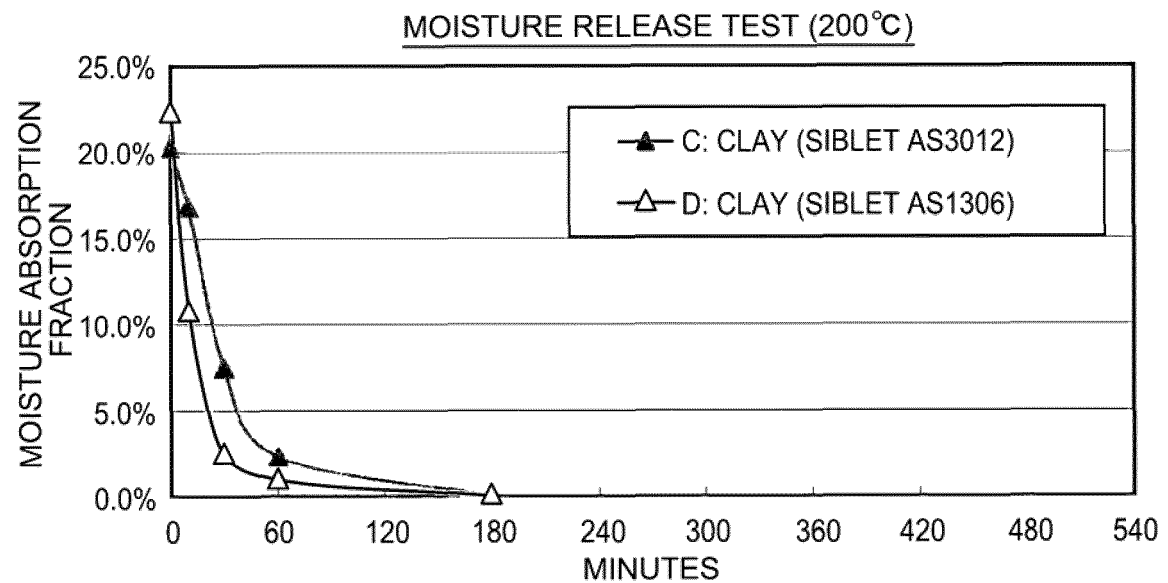


FIG.9



REFERENCES CITED IN THE DESCRIPTION

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