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(54) **AUTOMATIC HAIR CURLER DEVICE WITH TAPERED BARREL**

(57) An automatic hair curler device (1) comprises a barrel (2) and a rotating mechanism (3) for wrapping hair around the barrel. The barrel is tapered and includes a movement mechanism (4) for translating the barrel in the vertical direction to adjust the diameter of the curl. This movement mechanism enhances the performance of the curl by increasing tension on the hair and improving heat exchange, resulting in sharper and longer-lasting curls.

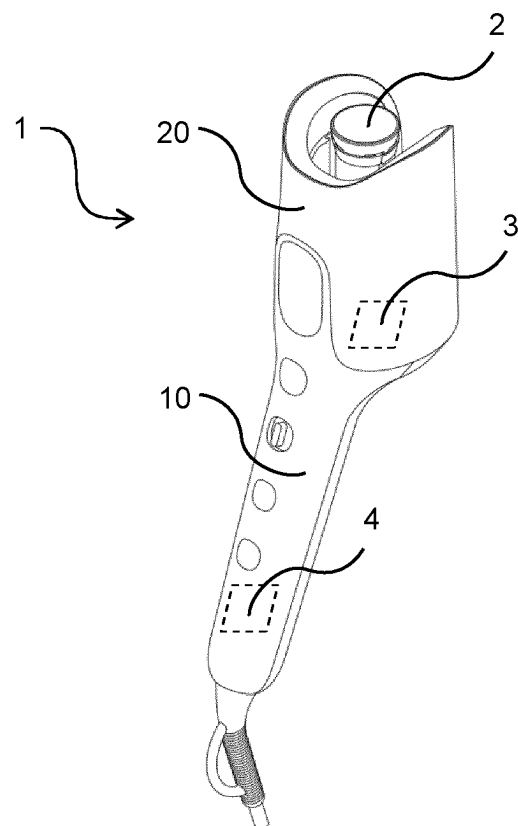


FIG. 1

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Description

FIELD OF THE INVENTION

[0001] The present relates to hair care devices, specifically to automated curling devices with a tapered hair barrel.

BACKGROUND OF THE INVENTION

[0002] Existing solutions in the field of hair curlers for adjusting the diameter of curls involve complex and heavy mechanisms. These solutions are often cumbersome and costly. There is a need for a streamlined and cost-effective method to adjust the diameter during and before the curling process, ensuring improved performance and ease of use. The present invention aims to address these challenges and achieve improved curling performance.

SUMMARY OF THE INVENTION

[0003] According to one aspect of the present invention, an automatic hair curler device comprises a handle, a housing having one end disposed on the handle, and a free end opposite to the one end that is disposed on the handle, a barrel having one end disposed on the handle and a free end away from the handle barrel and a rotating mechanism for wrapping hair around the barrel, characterized in the barrel being tapered and a movement mechanism for translating the barrel in the vertical direction to adjust the diameter of the curl.

[0004] According to another aspect, the device is characterized in that the movement mechanism is capable of sliding the barrel after the hair is wrapped around the barrel to increase the diameter of the curl and tension on the hair.

[0005] According to yet another aspect, the device is characterized in that the barrel moves from inside the device towards the outside of the device.

[0006] According to another aspect, the device is characterized in that the diameter of the barrel is smaller when the barrel is inside the device and larger when the barrel is outside the device.

[0007] According to yet another aspect, the device comprises the barrel being moved inward further than its original position to facilitate the release of the curl.

[0008] According to another aspect, the device comprises the sides of the barrel being straight.

[0009] According to yet another aspect, the device comprises the sides of the barrel being stepped.

[0010] According to another aspect, the device further comprises a manipulator mechanism to keep the hair in place after being rolled on the barrel.

[0011] According to yet another aspect, the device comprises the manipulator mechanism being part of a rotating mechanism that drives the translation of the barrel via a cam.

[0012] According to another aspect, the device comprises the manipulator mechanism engaging with the hair after rolling and releasing after the curl is removed.

[0013] According to yet another aspect, the device comprises the barrel being made of a material that facilitates heat exchange.

[0014] According to another aspect, the device comprises the mechanism for translating the barrel being manually operated.

[0015] According to yet another aspect, the device comprises the mechanism for translating the barrel being motorized.

[0016] According to another aspect, the device comprises the rotating mechanism having adjustable speed settings.

[0017] According to yet another aspect, the device further comprises a safety feature that automatically shuts off the heating element after a certain period of inactivity.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] 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 illustrates the auto curler device with a tapered barrel.

FIG. 2 shows the barrel of the existing technology. FIG. 3 depicts the tapered barrel of the disclosed embodiment.

FIG. 4 illustrates the hair wrapped around the tapered barrel of the auto curler.

FIG. 5 depicts the barrel translating outward to increase the curl diameter and tension on the hair.

FIG. 6 shows the barrel moving inward to facilitate the release of the curl.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0019] The field of hair care has seen significant advancements, particularly in the development of automatic hair curler devices. These devices aim to simplify the process of curling hair, providing users with consistent and professional results. However, achieving the desired curl diameter and maintaining the performance of the curl remain challenging. Users often seek devices that offer flexibility in curl size and ensure long-lasting curls without causing damage to the hair. Existing automatic hair curler devices typically employ fixed-diameter barrels or complex mechanisms to adjust the curl diameter. These solutions often involve multiple parts, making the devices bulky, heavy, and expensive to manufacture. Additionally, the fixed-diameter barrels limit the user's ability to customize the curl size, while the complex mechanisms can be prone to mechanical failures and require frequent maintenance. These disadvantages hinder the overall

user experience and limit the effectiveness of the devices.

[0020] The present device addresses these issues by introducing an automatic hair curler with a tapered barrel and a movement mechanism for translating the barrel in the vertical direction. This design allows for easy adjustment of the curl diameter both before and during the curling process. In the preferred embodiment barrel is in conical form.

[0021] The barrel can slide into the device for a smaller diameter or extend outside the device for a larger diameter. This movement mechanism enhances the performance of the curl by increasing tension on the hair and improving heat exchange, resulting in sharper and longer-lasting curls. Additionally, the device includes a manipulator mechanism to keep the hair in place after being rolled on the barrel, ensuring consistent and reliable curling results.

[0022] The automatic hair curler device comprises a barrel and a rotating mechanism for wrapping hair around the barrel. The barrel is tapered, allowing for a gradual change in diameter along its length. This design provides a unique curling effect, creating curls that start tighter at the base and become looser towards the ends, offering a more natural and voluminous look. The rotating mechanism ensures that the hair is wrapped around the barrel efficiently, while the movement mechanism allows the barrel to slide into the device for a smaller diameter or extend outside the device for a larger diameter.

[0023] The device also includes a manipulator mechanism to keep the hair in place after being rolled on the barrel, ensuring consistent and reliable curling results. The manipulator mechanism may include components such as hooks or clamps that engage with the hair after it has been rolled on the barrel. This mechanism plays a crucial role in maintaining the position of the hair during the curling process, preventing slippage and ensuring consistent curling results.

[0024] In a specific embodiment, the manipulator mechanism is part of a rotating mechanism that drives the translation of the barrel via a cam. The rotating mechanism ensures that the hair is wrapped around the barrel efficiently, while the cam-driven translation allows for precise control over the movement of the barrel. This design enables the barrel to slide into the device for a smaller diameter or extend outside the device for a larger diameter, adjusting the curl size as needed.

[0025] The cam mechanism provides a smooth and controlled movement of the barrel, enhancing the performance of the curl by increasing tension on the hair and improving heat exchange. This results in sharper and longer-lasting curls. The integration of the manipulator mechanism with the rotating mechanism and cam ensures that the hair remains securely in place throughout the curling process, preventing slippage and ensuring consistent curling results.

[0026] Additionally, the manipulator mechanism may be designed to engage with the hair after rolling and

release it after the curl is removed. This ensures that the hair is held securely during the curling process and can be easily released once the curl is set. The manipulator mechanism's design can include adjustable settings to accommodate different hair types and curl sizes, providing versatility and ease of use for the user.

[0027] In one embodiment, the automatic hair curler device features a barrel with straight sides, which ensures uniform heat distribution and consistent curl formation. This design can be particularly beneficial for users seeking even curls along the entire length of the hair strand.

[0028] In another embodiment, the automatic hair curler device features a barrel with stepped sides. The progressive design of the barrel allows for a gradual change in diameter along its length, providing a unique curling effect. This design can create curls that start tighter at the base and become looser towards the ends, offering a more natural and voluminous look. The progressive sides of the barrel can be made from materials that facilitate heat exchange, such as ceramic, tourmaline, or titanium, each providing different benefits in terms of heat retention and hair protection.

[0029] The progressive design enhances the curling process by allowing the user to achieve varied curl patterns with a single device. This versatility is particularly useful for creating different hairstyles without the need for multiple curling tools. The progressive sides may also be coated with a non-stick material to prevent hair from snagging or tangling during the curling process, improving user experience and reducing hair damage.

[0030] In one embodiment, the barrel of the automatic hair curler device is made of a material that facilitates heat exchange. Materials such as ceramic, tourmaline, or titanium are particularly suitable for this purpose. Ceramic barrels are known for their even heat distribution, which helps in creating consistent curls without hot spots that can damage the hair. Tourmaline barrels emit negative ions that reduce frizz and enhance the smoothness and shine of the curls. Titanium barrels, on the other hand, offer excellent heat retention and durability, making them ideal for professional use. The choice of material ensures that the barrel heats up quickly and maintains a consistent temperature, which is crucial for achieving long-lasting curls.

[0031] In another embodiment, the mechanism for translating the barrel is manually operated. This design includes a user-friendly handle or lever that allows the user to slide the barrel in the y-direction to adjust the curl diameter. The manual operation provides the user with direct control over the curling process, enabling precise adjustments to achieve the desired curl size. This embodiment is particularly beneficial for users who prefer a more hands-on approach and wish to have complete control over the curling process. The manual translation mechanism is designed to be smooth and easy to operate, ensuring a comfortable user experience.

[0032] In yet another embodiment, the mechanism for

translating the barrel is motorized. This design includes an electric motor that drives the movement of the barrel in the y-direction. The motorized mechanism allows for automated and precise adjustments of the curl diameter, enhancing the convenience and efficiency of the curling process. The motor can be controlled via buttons or a digital interface, providing the user with the ability to select specific settings for different curl sizes. This embodiment is ideal for users who prefer a more automated approach and seek consistent results with minimal effort. The motorized translation mechanism can also include safety features such as automatic shut-off to prevent overheating.

[0033] In another embodiment, the automatic hair curler device further comprises a safety feature that automatically shuts off the heating element after a certain period of inactivity. This safety feature is designed to prevent accidental burns and reduce the risk of fire hazards. The automatic shut-off can be set to activate after a predetermined time, such as 30 minutes or 1 hour, ensuring that the device does not remain on when not in use. This feature enhances the safety and energy efficiency of the device, providing peace of mind to the user. The automatic shut-off mechanism can be integrated with a timer or sensor that detects inactivity, ensuring reliable and consistent operation.

[0034] The invention will now 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] FIG. 1 illustrates the automatic hair curler device (1). The device comprises a handle (10); a housing (20) having one end disposed on the handle (10), and a free end opposite to the one end that is disposed on the handle (10), a barrel (2) having one end disposed on the handle (10), and a free end away from the handle (10), a rotating mechanism (3) for wrapping hair around the barrel, and a movement mechanism (4) for translating the barrel in the vertical direction to adjust the diameter of the curl. The barrel (2) is tapered, allowing for easy adjustment of the curl diameter both before and during the curling process. The rotating mechanism (3) ensures that the hair is wrapped around the barrel (2) efficiently, while the movement mechanism (4) allows the barrel to slide into the device for a smaller diameter or extend outside the device for a larger diameter.

[0037] FIG. 2 shows the barrel (2) of the existing tech-

nology. The barrel (2) in this figure is cylindrical and does not allow for adjustment of the curl diameter. This fixed-diameter barrel (2) limits the user's ability to customize the curl size and does not provide the flexibility offered by the tapered barrel in the disclosed embodiment.

[0038] FIG. 3 depicts the tapered barrel (2) of the disclosed embodiment. The tapered design allows the barrel (2) to move from inside the device towards the outside, adjusting the diameter of the curl. When the barrel (2) is inside the device, the diameter is smaller, and when the barrel is outside the device, the diameter is larger. This design enhances the performance of the curl by increasing tension on the hair and improving heat exchange, resulting in sharper and longer-lasting curls.

[0039] FIG. 4 illustrates the hair (H) wrapped around the tapered barrel (2) of the automatic hair curler device (1). The barrel (2) is designed to efficiently wrap the hair (H) around its surface, ensuring even distribution and consistent curling. The manipulator mechanism (5) is shown engaging with the hair (H) to keep it in place after being rolled on the barrel (2).

[0040] The tapered design of the barrel (2) allows for easy adjustment of the curl diameter both before and during the curling process. The rotating mechanism (3) ensures that the hair (H) is wrapped around the barrel (2) efficiently, while the movement mechanism (4) allows the barrel (2) to slide into the device for a smaller diameter or extend outside the device for a larger diameter.

[0041] The manipulator mechanism (5) serves for maintaining the position of the hair (H) during the curling process. It ensures that the hair (H) remains securely wrapped around the barrel (2), preventing slippage and ensuring consistent curling results. The manipulator mechanism (5) may include components such as hooks or clamps that engage with the hair (H) after it has been rolled on the barrel (2).

[0042] In summary, FIG. 4 demonstrates the interaction between the hair (H), the tapered barrel (2), and the manipulator mechanism (5) in the automatic hair curler device (1). The design ensures efficient wrapping, secure holding, and easy adjustment of the curl diameter, resulting in sharper and longer-lasting curls.

Claims

1. An automatic hair curler device (1) comprising:

- a handle (10),
- a housing (20) having one end disposed on the handle (10), and a free end opposite to the one end that is disposed on the handle (10),
- a barrel (2) having one end disposed on the handle (10), and a free end away from the handle (10),
- a rotating mechanism (3) for wrapping hair around the barrel (2),

characterized in

- the barrel (2) being tapered and
- a movement mechanism (4) for translating the barrel (2) in the vertical direction.

2. The device (1) of claim 1 **characterized in that** the movement mechanism (4) is capable of translating the barrel (2) after the hair is wrapped around the barrel (2). 5
3. The device (1) of claim 1 or 2 **characterized in that** the barrel (2) moves from inside the device towards the outside of the device (1). 10
4. The device (1) of claim 1 or 2 **characterized in that** the diameter of the barrel (2) is smaller in the free end and larger in the end disposed on the handle (10). 15
5. The device (1) according to any of the claims above, wherein the barrel (2) can be moved inward further than its original position to facilitate the release of the curl. 20
6. The device (1) of any one of the claims above, wherein the sides of the barrel (2) are straight. 25
7. The device (1) of claims 1 to 5 above, wherein the sides of the barrel (2) are stepped.
8. The device (1) of any one of the claims above further comprising a manipulator mechanism (5) to keep the hair in place after being rolled on the barrel (2). 30
9. The device (1) of claim 8, wherein the manipulator mechanism (5) is part of a rotating mechanism (3) that drives the translation of the barrel via a cam. 35
10. The device (1) of claim 8, wherein the manipulator mechanism (5) engages with the hair after rolling and releases after the curl is removed. 40
11. The device (1) of any one of the claims above, wherein the barrel (2) is made of a material that facilitates heat exchange.
12. The device (1) of any one of the claims above, wherein the movement mechanism (4) for translating the barrel (2) is manually operated. 45
13. The device (1) of any one of claims 1 to 12 above, wherein the movement mechanism (4) for translating the barrel is motorized. 50
14. The device (1) of claim 13, wherein the rotating mechanism (3) has adjustable speed settings. 55

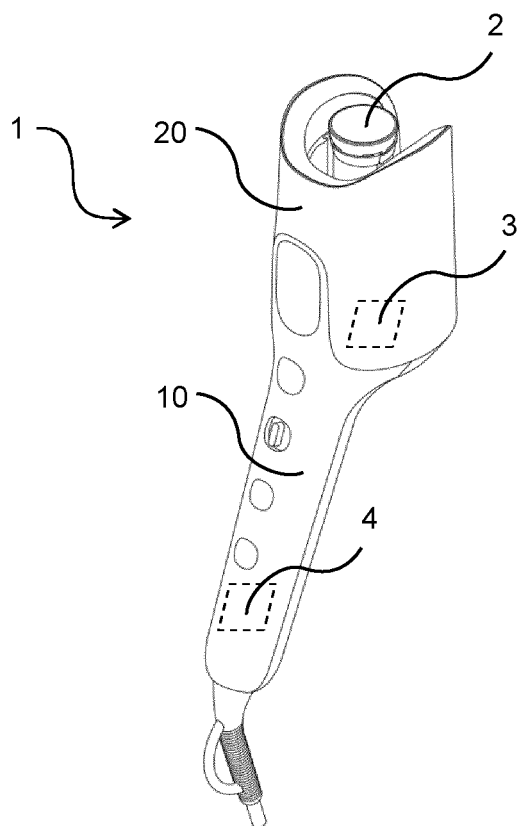


FIG. 1

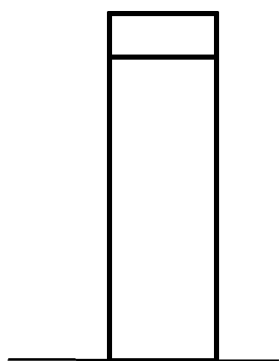


FIG. 2

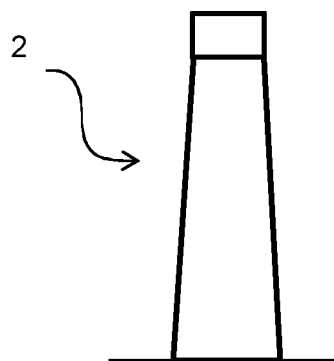


FIG. 3

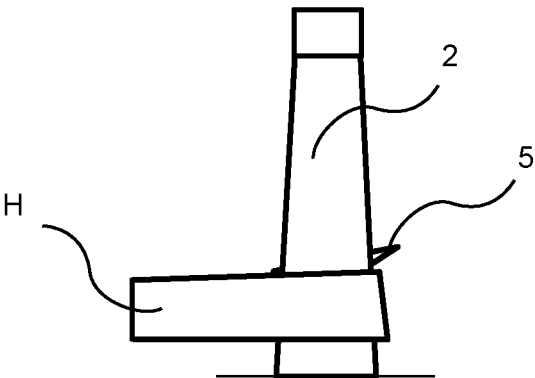


FIG. 4

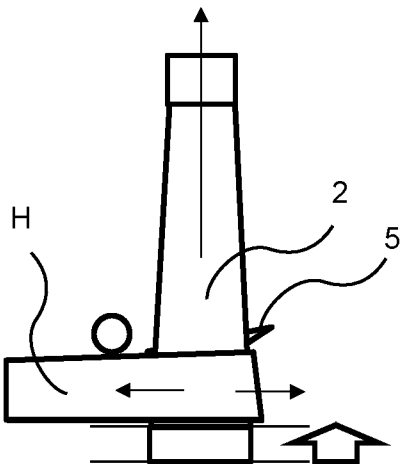


FIG. 5

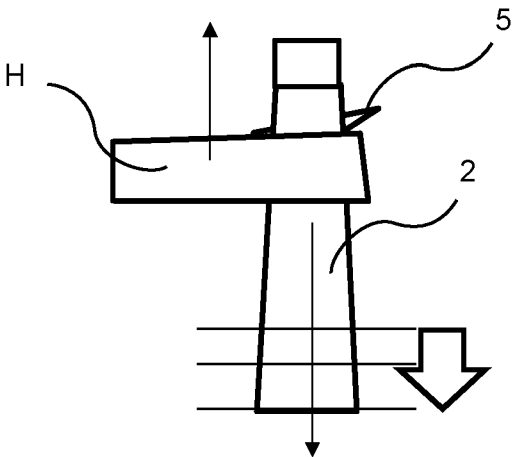


FIG. 6



EUROPEAN SEARCH REPORT

Application Number

EP 25 15 0009

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	WO 2016/134844 A1 (TENACTA GROUP SPA [IT]) 1 September 2016 (2016-09-01) * page 18, lines 1-7; claims 1,12; figures 1,3,5,10 *	1-14	INV. A45D1/00 A45D1/04
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			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		22 May 2025	Longo dit Operti, T
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EP 25 15 0009

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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