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(54) **HAIR STRAIGHTENING APPLIANCE WITH VARIABLE STEAM OUTPUT CONTROL**

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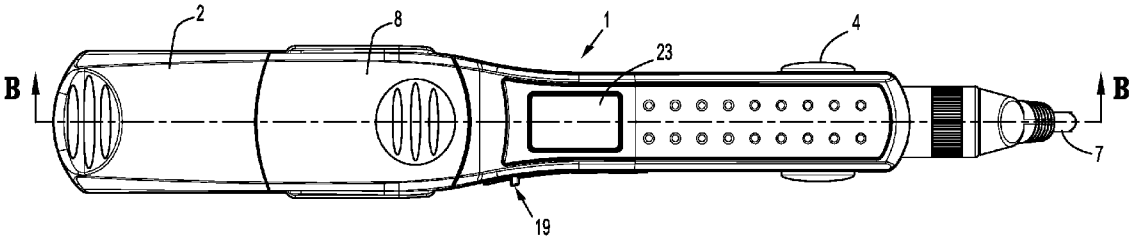
(57) **ABSTRACT**

A hair straightening device **1** comprises pair of handles pivotally joined at a hinge **4**. The upper handle **2** comprises an upper plate **5** that is selectively heated. A water reservoir **8** is removably mounted to the upper handle portion **2**. As the handle portions **2**, **3** are closed toward each other, a valve actuating member **11** on the lower handle portion **3** contacts a rubber bulb **12** located on the upper handle portion **2** compressing the bulb **12** to force air through a tube **13** and through an air input opening **14** on the reservoir **8**, forcing open a one-way, flexible valve **15** the allows the air to enter the interior **16** of the reservoir **8**. The pressure of the entering air displaces the water stored in the reservoir and causes it to exit the reservoir **8** at an exit port **17** into a channel **18** of the upper handle portion **2** and plate **5**. The plate **5** may have one or more openings to release the steam that is produced by the water, as the water receives heat from the plate **5** being heated. An adjustment lever **19** allows mechanical adjustment of the actuating member **11** to various heights ranging from a low height where it will not contact the bulb **12** (FIG. **4**B) and, thus, will cause zero steam to emit, to intermediate and highest height (FIG. **4**A) where a proportionate amount of air displacement and thus steam emission occurs.



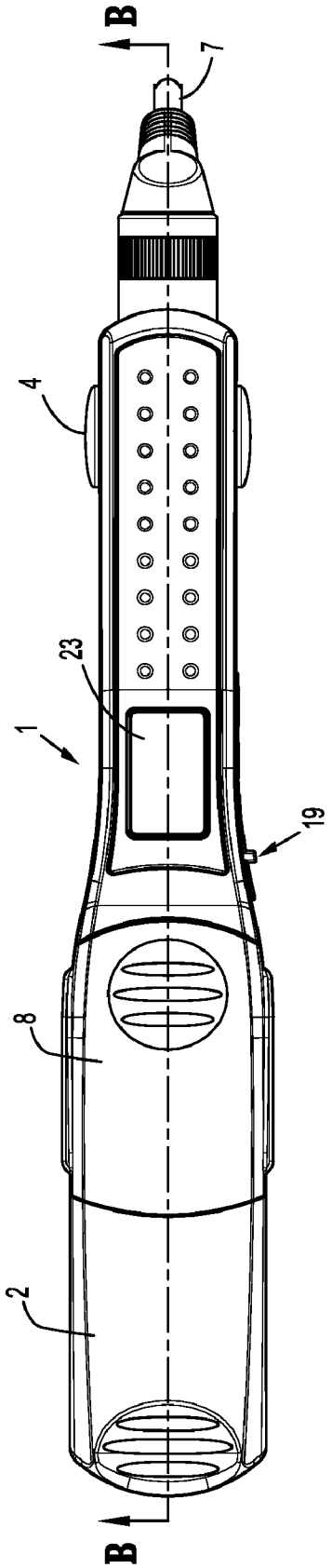
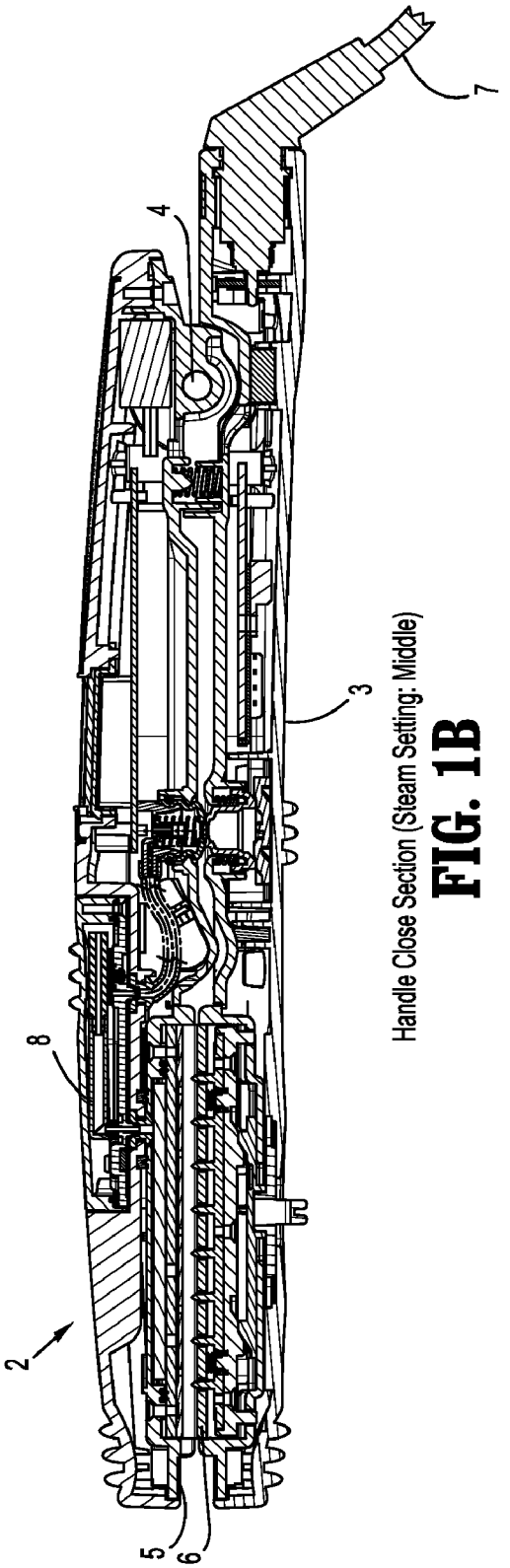
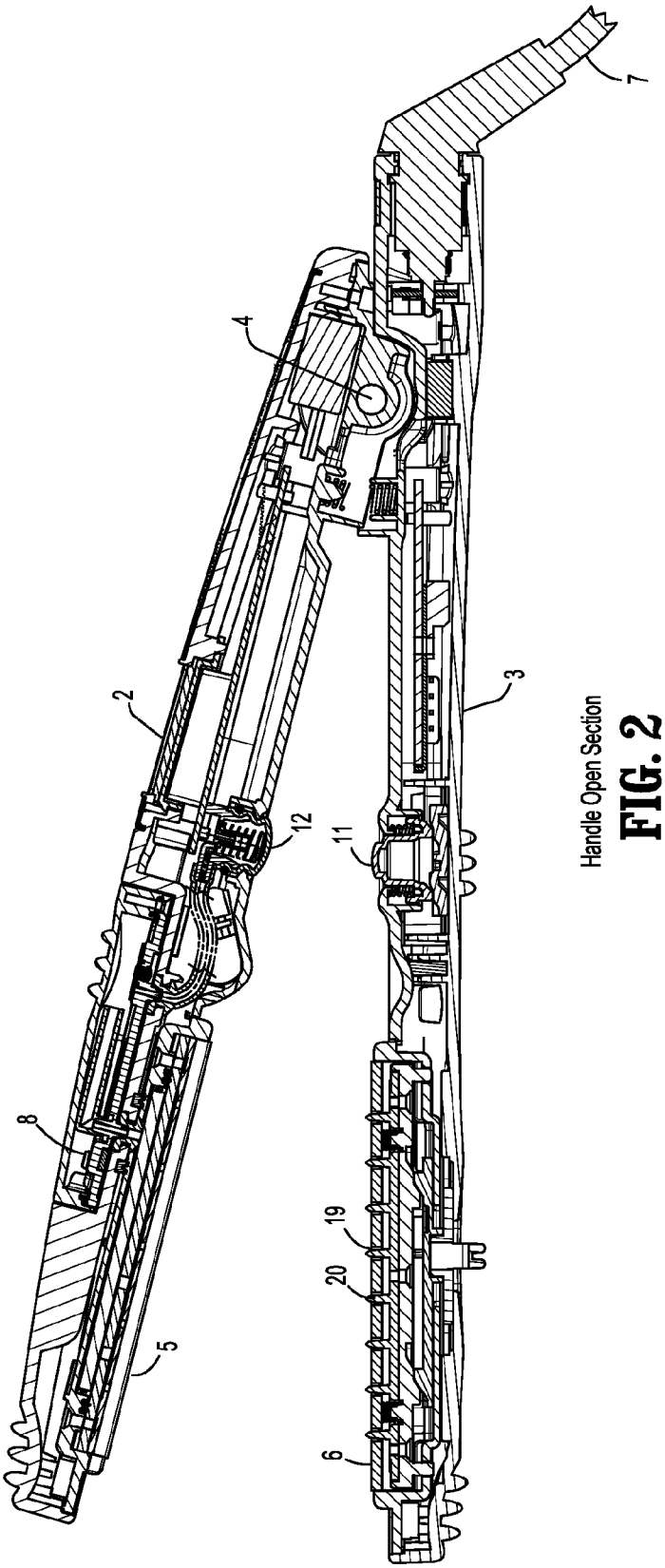


FIG. 1A



Handle Close Section (Steam Setting: Middle)

FIG. 1B



Handle Open Section

FIG. 2

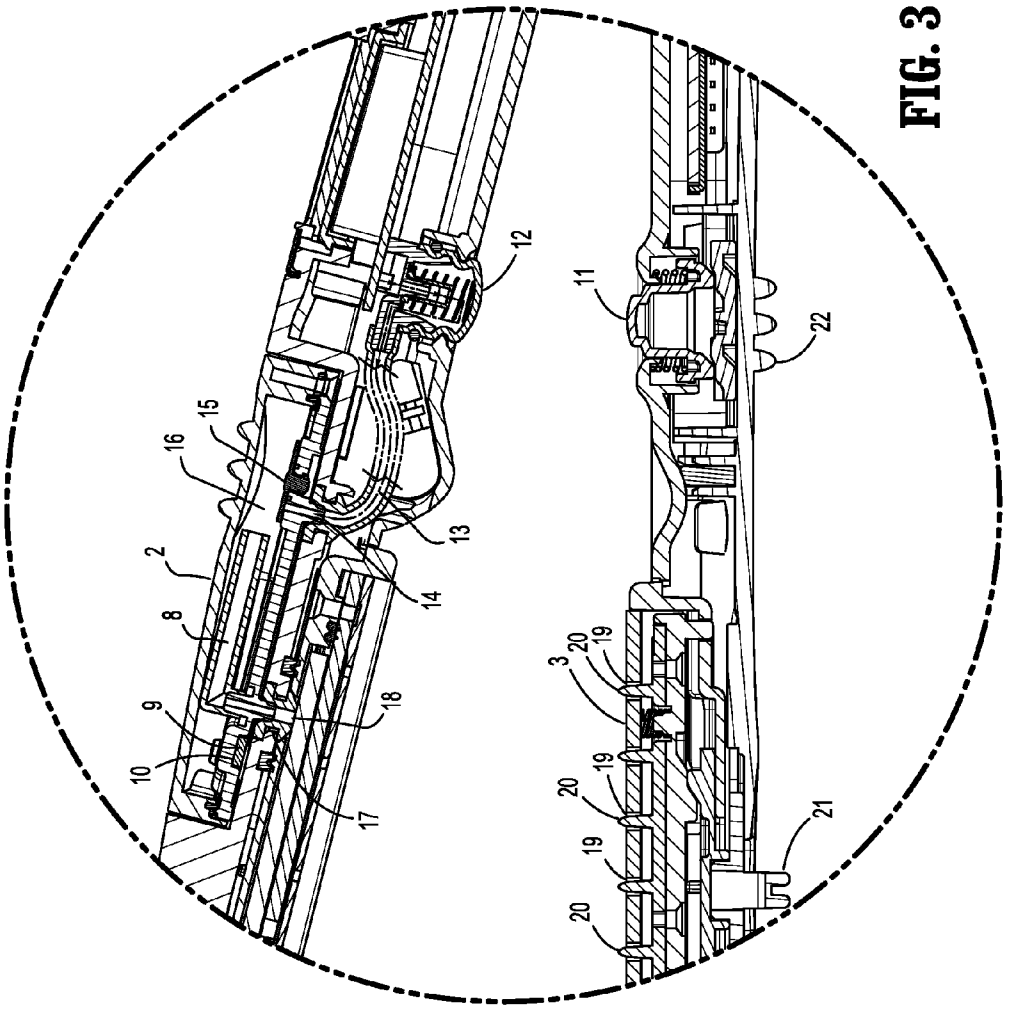
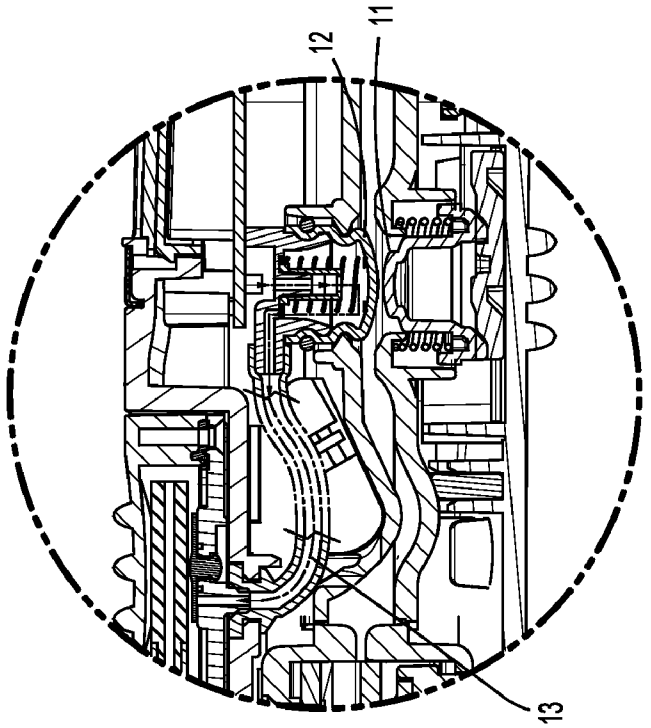
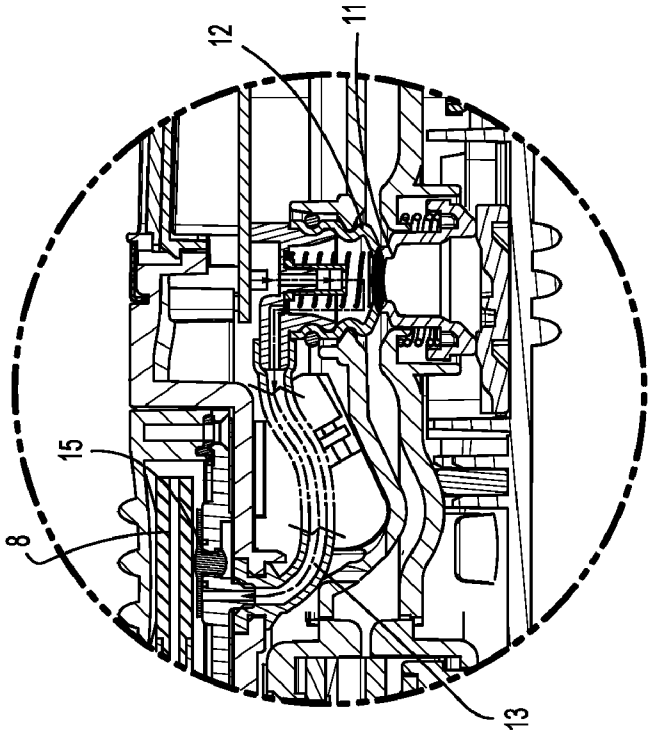


FIG. 3



Handle Close Section
(Steam Setting: Off)

FIG. 4B



Handle Close Section
(Steam Setting: High)

FIG. 4A

HAIR STRAIGHTENING APPLIANCE WITH VARIABLE STEAM OUTPUT CONTROL

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is related to and claims priority from U.S. Provisional Application No. 60/988477 filed 16 Nov. 2007.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to electric handheld hair straightening appliances and, more particularly, to handheld hair straightening appliances that emit steam.

[0004] 2. Description of Related Art

[0005] Various known handheld hair straightening appliances have a pair of opposed, selectively heated plates that are each attached to a handle portion. The handle portions are hingedly connected to one another so that the assembly may be held on one hand an the plates can be closed toward each other by pivoting about the hinge. Some such devices include a water reservoir that delivers water to a heat source to create steam, which is emitted through one or more openings to apply steam to hair that is being compressed between the heated plates. Varying amounts of heat and steam, along with varying techniques, will produce various hair styling effects. In such known devices, no means are provided for varying the steam output.

OBJECTS OF THE PRESENT INVENTION

[0006] It is an object of the present invention to provide an electrical handheld hair straightening with a steam output feature that can be controlled selectively to vary steam output.

[0007] These and other objects are achieved by the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. **1**A is a top view of a hair straightening device according to the present invention shown in a closed position.

[0009] FIG. **1**B is a side, cross-sectional view of a hair straightening device according to the present invention shown in a closed position.

[0010] FIG. **2** is a side, cross-sectional view of a hair straightening device according to the present invention shown in an opened position.

[0011] FIG. **3** is a partial, side, cross-sectional view of a hair straightening device according to the present invention shown in an opened position.

[0012] FIG. **4**A is a partial, side, cross-sectional view of a hair straightening device according to the present invention shown in a closed position with the steam setting on high.

[0013] FIG. **4**B is a partial, side, cross-sectional view of a hair straightening device according to the present invention shown in a closed position with the steam setting off.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

[0014] Referring to the drawing figures, a hair straightening device **1** comprises an upper handle portion **2** and a lower handle portion **3**, said handle portions **2**, **3** being pivotally joined at a hinge **4**. The upper handle portion **2** comprises an upper plate **5** that is selectively heated. The lower handle portion **3** comprises a lower plate **6** that may or may not be selectively heated. Electrical energy from an external source is delivered to the device **1** via an electrical cord **7**. The electrical energy causes the plate **5** or plates **5**, **6** to be selectively heated for styling hair that is compressed between the two plates when they are closed toward each other.

[0015] A water reservoir **8** is removably mounted to the upper handle portion **2**. While removed, the reservoir **8** is filled with water via an input opening **9** that can be plugged and un-plugged by a rubber plug **10**. The reservoir is then re-installed onto the upper handle portion **2**. During use, as the handle portions **2**, **3** are closed toward each other, a valve actuating member **11** on the lower handle portion **3** contacts a rubber bulb **12** located on the upper handle portion **2**. This causes the bulb **12** to compress and as the bulb **12** compresses it forces air through a tube **13** and through an air input opening **14** on the reservoir **8**, forcing open a one-way, flexible valve **15** the allows the air to enter the interior **16** of the reservoir **8**. As air enters the reservoir **8**, the pressure of the entering air displaces the water stored in the reservoir and causes it to exit the reservoir **8** at an exit port **17** into a channel **18** of the upper handle portion **2** and plate **5**. The plate **5** may have one or more openings to release the steam that is produced by the water, as the water receives heat from the plate **5** being heated. An adjustment lever **19** allows mechanical adjustment of the actuating member **11** to various heights ranging from a low height where it will not contact the bulb **12** (FIG. **4**B) and, thus, will cause zero steam to emit, to intermediate and highest height (FIG. **4**A) where a proportionate amount of air displacement and thus steam emission occurs.

[0016] While not limited to any one particular embodiment of hair straightening irons, one preferred embodiment of the present invention is with a design in which the lower plate **6** is provided with openings **19** aligned along a longitudinal axis that accommodate a plurality of fins **20** that are adjusted to protrude partially, all the way or not at all through the openings **19**, whereby the fins **20** are aligned transversely to the longitudinal axis and assist in guiding hair when the device **1** is pulled in a transverse direction along the hair. A lever **21** may be provided to activate such adjustment of the fins **20**. Various ridges **22** may be provided at different locations of the exterior of the device **1** to assist in gripping and to prevent contact with heated surfaces. A visual display **23** may be provided to display operating mode and setting information.

[0017] While the preferred embodiments have been shown and described, various modifications can be made without departing from the scope of the present invention.

What is claimed is:

1. A styling iron comprising

a first elongated handle having a heated plate, a first end, and a second end;

a second elongated handle having a heated plate, a first end, and a second end;

a hinge connected to each respective first end of said handles so that said handles are pivotally connected to each other;

an electrical heat element associated with at least one of said heated plates to heat said at least one plate;

a water reservoir associated with said heat element and adapted to be filled with water;

a water conduit connecting said water reservoir with an outlet port in proximity to said heated plate that is associated with said heat element; and

a flexible bulb connected to said water reservoir by an air conduit, said flexible bulb being adapted to selectively deliver air to said water reservoir when said bulb is compressed, thereby causing said air to displace said water and cause said water to pass in proximity to said heat element and exit said outlet port in the form of steam vapor.

2. A styling iron according to claim **1**, further comprising

an adjustment member for adjusting the rate at which steam vapor is emitted from said outlet port.

3. A styling iron according to claim **2**, wherein

said bulb is located on one of said first and second handles; and

said adjustment member comprises an actuating member located on the other of said first and second handles and adapted to contact said bulb when said handles are closed toward each other.

4. A styling iron according to claim **3**, wherein

said actuating member is adjustable and may be raised or lowered to between a position in which it contacts said bulb, a position in which it does not contact said bulb, and intermediate positions in which it contact said bulb to varying degrees when said handles are closed toward each other.

5. A styling iron according to claim **1**, wherein

said water reservoir is removably mounted.

6. A styling iron according to claim **1**, further comprising

a plurality of raised fins on one of said heated plates.

7. A styling iron according to claim **6**, further comprising

a groove on the other one of said respective plates, said groove located opposite said raised fins so that said groove and said fins engage when said handles are closed toward each other.

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