A HAIR STYLING APPLIANCE

The present invention relates to a hair styling appliance. Heated hair styling appliances are designed to use the action of heat and mechanical means and airflow to form hair into a desired shape or style.

A hair straightener utilises heated plates attached to pivoted arms which can be held, by a user, in a closed position with a tress of hair clamped between the heated plates. The tress of hair can be styled into a changed shape once the hair is heated above a transition temperature.

Whilst a hair tress is gripped between closed arms of a hair straightener and subjected to high temperatures from the heated plates, there is a possibility of heat damage to the hair. Also, a tress of hair gripped between two flat and rigidly fixed heating plates is forced to splay widely across the plates, which is detrimental when styling hair into straight, even tresses. Further, hair is a thermal insulator and therefore transfer of heat from the heated plates into the centre of a hair tress is poor. It is therefore desirable to provide an improved hair styling apparatus.

A first example of the present disclosure provides a hair styling apparatus comprising a first arm and a second arm coupled together at a first end thereof, wherein an inner wall of the first arm is facing an inner wall of the second arm, and the first arm and the second arm are arranged to receive hair within a cavity formed between the first arm and the second arm, and wherein at least one of the first arm and second arm comprise a plenum, said plenum comprising an air inlet for receiving airflow from a fan unit and an air outlet for emitting airflow towards hair within the cavity, wherein said air outlet extends along the inner wall of at least one of the first arm and the second arm.

In a first aspect, the present disclosure refers to a hair styling apparatus comprising; a first arm and a second arm coupled together at a first end thereof, wherein an inner wall of the first arm is facing an inner wall of the second arm, and the first arm and the second arm are arranged to receive hair within a cavity formed between the first arm and the second arm when the first arm and the second arm are in a closed position, and wherein each of the first arm and second arm comprise a plenum, said plenum comprising an air inlet for receiving airflow from a fan unit, and an air outlet for emitting airflow towards hair within the cavity, wherein said air outlet extends along the inner wall of at least one of the first arm and the second arm, wherein the air outlet is adapted to emit airflow generally towards an exhaust port.

The fan unit in the hair styling apparatus may generate around 3.5 – 3.9kPa of pressure to create high velocity and high pressure airflow through the apparatus from the central body to the plenum in each arm.

In respect of the present apparatus, a plenum refers to a chamber having an inlet and an outlet and an air pressure greater than atmospheric pressure within the chamber.

Preferably, the air outlet comprises an aperture, and the aperture may have a width in the range from 1mm and 3mm. More preferably, the aperture may have a width in the range from 1.5mm and 2.5mm.

Preferably, the aperture may have a length in the range from 90mm and 180mm.

Advantageously, the laminar, blade-like airflow exiting the aperture also improves alignment of individual hair strands within the tress of hair.

In a preferred example, the aperture is a slot and the slot may be located in parallel alignment with the longitudinal axis of the arm and is disposed in proximity to an upper edge of the arm.

Preferably, the air outlet is adapted to emit airflow generally towards a lower edge of the arm. In a preferred example the air outlet is adapted to emit airflow at an angle in the range from 30° and 60° from the plane of the inner wall. More preferably still, the air outlet is adapted to emit airflow at an angle in the range from 40° and 50° from the plane of the inner wall. Advantageously, when such downward airflow interacts with a hair tress, the hair cuticles (which form the external surface of a strand of hair), are urged downwards and thus lie flat on the hair shaft. Therefore, the hair strand has a smoother surface which results in a hair style with improved shine.

The air outlet may comprise a channel between the plenum and the cavity, said channel terminating in said aperture. The channel may have substantially parallel walls for a pre-determined distance prior to the air outlet. Alternatively, the channel may have gradually converging walls for a pre-determined distance prior to the air outlet.

A terminus of the inner wall at the aperture has a smooth, rounded configuration in order to turn the airflow efficiently as it exits the plenum and enters the channel. Advantageously, airflow within the plenum may attach to the rounded terminus of the inner wall and increase in velocity as it passes through the relatively narrow aperture channel.

In a preferred example, the air outlet comprises at least one vane disposed within the channel. The at least one vane may be adapted to modify the emitted airflow direction in the x-axis of the apparatus.

Further, a series of vanes may be disposed at intervals along the aperture, within the channel. Advantageously, the series of vanes functions both to direct the laminar airflow in a preferred direction and also to provide structural rigidity along the length of the aperture. Such structural support maintains the original slot dimension even where torsion forces are applied to the apparatus arms or high temperatures lead to plasticity of components.

The aperture may have a constant width along the length of the air outlet. Alternatively, the aperture may have a non-constant width along the length of the air outlet.

Preferably, the air outlet is located in each of the first arm and the second arm. The air outlets may be located symmetrically in each of the first arm and the second arm. Alternatively, the apertures may be located asymmetrically in each of the first arm and the second arm.

The high velocity, heated airflow in such a hair styling apparatus uses convection to heat the hair tress and thermal transfer is even throughout the tress. The airflow temperature in the drying cavity may be around 130-170°C, and preferably around 140-160°C. Therefore, modifying the hair shape into straight strands can be achieved at a lower temperature than regular hair straightener using heated plates. Airflow through the

cavity has a flow rate of approximately 4-12 litres per second dependent upon the primary effect required by the user. Specifically, a higher flow rate is advantageous to reduce water content of a wet tress, whilst a lower flow rate (combined with a higher temperature) is advantageous to shape the hair strands. In use, the hair styling apparatus both drys and straightens a hair tress simultaneously.

Advantageously, characteristics of the airflow exiting the apertures can be precisely determined by controlling the power of the fan unit and the form of the apertures including any vanes therein.

A second example of the present disclosure provides a hair styling apparatus comprising a first arm and a second arm coupled together at a first end thereof wherein an inner wall of the first arm is facing an inner wall of the second arm, wherein the first arm and the second arm are arranged to receive hair within a cavity formed between the first arm and the second arm, and wherein at least one of the first arm and second arm comprise a plenum, said plenum comprising an air outlet for emitting air towards hair within the cavity, and a hair clamp comprising a pair of clamping members for gripping hair therebetween, wherein each clamping member is supported by the inner wall of the first arm and second arm, respectively.

Each clamping member may comprise a clamping face for contacting hair.

Preferably, each clamping member is adapted to move relative to the arm upon which it is supported, between an extended position and a retracted position, and the movement is biased towards the extended position.

When the hair styling apparatus is not in use and the arms are in an open position, the hair clamping members are in an extended position. When the hair styling apparatus is in use and the arms are squeezed into a closed (parallel) position by the user, the hair clamping members are pushed into a retracted position.

Preferably, in the extended position, the distance between the pair of clamping faces is less than the distance between the inner wall of the first arm and the inner wall of the second arm.

In a preferred example, each clamping member comprises an elongate bar extending longitudinally on the inner wall of the respective arm. Each clamping member may be comprised of a metallic material. Alternatively, each clamping member may be comprised of a resiliently deformable material.

The inner walls may be comprised of a plastics material which may increase in temperature whilst the hair styling apparatus is in use, but returns to the ambient temperature when the apparatus is not in use. Alternatively, the inner walls may be comprised of an anodised metal.

Preferably, each clamping member is located in parallel alignment with the arm and is disposed in proximity to an upper edge of the arm. Each arm may comprise a groove extending longitudinally along the inner wall of the arm, and the clamping member is mounted partially within said groove. A resilient means may be disposed within the groove and the clamping member is positioned on the resilient means. Preferably, the resilient means is at least one spring. The resilient means may also be at least one silicone support.

In a preferred example, each clamping member has a straight longitudinal profile. Alternatively, each clamping member has a concave longitudinal profile.

Preferably, the first arm and the second arm are coupled together via a hinge to allow the first arm and the second arm to be moveable between an open position, and a closed position in which the inner wall of the first arm and the inner wall of the second arm are parallel to one another and the hair treatment cavity is formed therebetween.

The arms and central body may be elastically secured to one another, enabling the arms to be biased into the open position and also smoothly closeable by the user.

The inner walls may be comprised of a plastics material which may increase in temperature whilst the hair styling apparatus is in use, but returns to the ambient temperature when the apparatus is not in use. Alternatively, the drying cavity wall may be comprised of an anodised metal.

In a preferred example, the first arm and the second arm are symmetrical in structure and substantially identical in weight, and also the central body is substantially symmetrical in structure about the longitudinal central axis of the hair styling apparatus. Advantageously, such a symmetrical, balanced arrangement increases ergonomic comfort for the user, because a balanced apparatus may minimise a user's hand and arm strain, and also be perceived as a lighter in weight in comparison to an unbalanced apparatus.

Advantageously, a tress styled and dried in this way comprises generally aligned strands of hair which have been straightened primarily by high pressure airflow. Importantly, the hair tress has increased volume, resulting from the airflow between the strands, which is a desirable feature in hair styling. In contrast, a traditional straightening iron reduces the volume of a hair tress as the tress is squeezed between two rigid, heated plates.

The hair styling apparatus may be battery operated or powered via the mains electricity supply.

In order that the present invention may be more readily understood, an embodiment of the invention will now be described, by way of example, and with reference to the accompanying drawings, in which:

Figure 1a is a plan view of a hair styling apparatus with a first arm and a second arm in a closed position, according to the present invention;

CLAIMS

1. A hair styling apparatus comprising;
a first arm and a second arm coupled together at a first end thereof, wherein an inner wall of the first arm is facing an inner wall of the second arm, and the first arm and the second arm are arranged to receive hair within a cavity formed between the first arm and the second arm when the first arm and the second arm are in a closed position, and wherein each of the first arm and second arm comprise a plenum, said plenum comprising an air inlet for receiving airflow from a fan unit, and an air outlet for emitting airflow towards hair within the cavity, wherein said air outlet extends along the inner wall of at least one of the first arm and the second arm, wherein the air outlet is adapted to emit airflow generally towards an exhaust port.

2. The hair styling apparatus according to claim 1, wherein the air outlet comprises an aperture, wherein the aperture has a width in the range from 1mm and 3mm.

3. The hair styling apparatus according to claim 2, wherein the aperture has a width in the range from 1.5mm and 2.5mm.

4. The hair styling apparatus according to any of claims 2 to 3, wherein the aperture has a length in the range from 90mm and 180mm.

5. The hair styling apparatus according to any of claims 2 to 4, wherein the aperture is a slot.

6. The hair styling apparatus according to any of claims 2 to 5, wherein the aperture is located in parallel alignment with the longitudinal axis of the arm.

7. The hair styling apparatus according to any preceding claim, wherein the air outlet is adapted to emit airflow at an angle in the range from 30° and 60° from a plane of the inner wall.

8. The hair styling apparatus according to claim 7, wherein the air outlet is adapted to emit airflow at an angle in the range from 40° and 50° from the plane of the inner wall.

9. The hair styling apparatus according to any of claims 2 to 8, wherein the air outlet comprises a channel between the plenum and the cavity, said channel terminating in said aperture.

10. The hair styling apparatus according to claim 9, wherein the channel has substantially parallel walls for a pre-determined distance prior to the air outlet.

11. The hair styling apparatus according to claim 9, wherein the channel has gradually converging walls for a pre-determined distance prior to the air outlet.

12. The hair styling apparatus according to any of claims 9 to 11, wherein the air outlet comprises at least one vane disposed within the channel.

13. The hair styling apparatus according to claim 12, wherein the at least one vane is adapted to modify the emitted airflow direction in an x-axis of the apparatus.

14. The hair styling apparatus according to any of claims 2 to 13, wherein the aperture has a constant width along the length of the air outlet.

15. The hair styling apparatus according to any of claims 2 to 13, wherein the aperture has a non-constant width along the length of the air outlet.

16. The hair styling apparatus according to claim 1, wherein air outlets are located symmetrically in each of the first arm and the second arm.

17. The hair styling apparatus according to claim 1, wherein the air outlets are located asymmetrically in each of the first arm and the second arm.