

HAIR CARE ACCESSORIES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Patent Application No. 18/416,781 entitled “Hair Care Accessories” filed on January 18, 2024, which claims priority under 35 U.S.C. § 119(e) to U.S. Provisional Patent Application No. 63/503,825, filed on May 23, 2023; U.S. Provisional Patent Application No. 63/506,617, filed on June 7, 2023; U.S. Provisional Patent Application No. 63/532,289, filed on August 11, 2023; U.S. Provisional Patent Application No. 63/581,423, filed on September 8, 2023; and U.S. Provisional Patent Application No. 63/480,680, filed on January 19, 2023. The entire contents of each of which are incorporated by reference herein in their entirety.

FIELD

[0002] Hair care accessories for use with hair care appliances are provided.

BACKGROUND

[0003] Hair care accessories are devices that can be used with hair care appliances for drying and styling of hair. Hair care accessories can include a variety of components operable to receive and convey a fluid flow via a fluid flow path extending from the hair care appliance and into the hair care accessory. The fluid flow path receives ambient air and directs the ambient air through the hair care appliance via a motor and fan assembly. The fluid flow path is directed across a heating assembly to generate heated air at an outlet of the hair care appliance. Air is expelled from the hair care appliance via the fluid flow path to enable a user to dry or style hair. One or more accessories are often used with the hair care appliance depending on the user's hair styling or treatment needs.

SUMMARY

[0004] In general, hair care accessories are provided for use in drying and/or styling hair. In one embodiment, a hair care accessory is provided having an elongate frame with a longitudinal axis and an inner lumen extending there through along the longitudinal axis. The hair care accessory can also include a plurality of plates disposed on the elongate frame. In some embodiments, the plurality of plates can include a first row of plates that can be spaced circumferentially around a first longitudinal portion of the elongate frame, and at least one second row of plates that can be spaced circumferentially around a second longitudinal portion of the elongate frame. Each plate in the first row of plates can define a first longitudinally extending outlet and each plate in the second row of plates can define a second longitudinally extending outlet. The second

longitudinally extending outlet can be circumferentially offset from the first longitudinally extending outlet.

[0005] In some embodiments, the elongate frame can include a plurality of outlet groups spaced circumferentially around the elongate frame in the first and second longitudinal portions of the elongate frame. In other embodiments, a first plurality of outlet groups in the first longitudinal portion of the elongate frame can be circumferentially offset from a second plurality of outlet groups in the second longitudinal portion of the elongate frame. In some embodiments, the plurality of outlet groups of the elongate frame can be fluidically coupled to the inner lumen of the elongate frame and can be configured to direct air from the inner lumen of the elongate frame through the first and second longitudinally extending outlets.

[0006] In other embodiments, an outlet group of the plurality of outlet groups can include two or more outlets. The two or more outlets can be circumferentially offset from one another. In some embodiments, the first and second longitudinally extending outlets can be configured to convey air circumferentially around the first and second row of plates respectively. In other embodiments, plates of the first and second rows of plates can include an inner surface adjacent to the elongate frame. The inner surface can include a plurality of vanes adjacent to the first and second longitudinally extending outlets and protruding toward the elongate frame. In some embodiments, one or more vanes of the plurality of vanes further can include a spacing element opposite the first and second longitudinally extending outlets. The spacing element can be configured to maintain a gap between the elongate frame and plates of the first and second rows of plates.

[0007] In other embodiments, the hair care accessory can include an appliance mating portion positioned at a first end of the elongate frame. The appliance mating portion can be configured to detachably couple the elongate frame to a hair care appliance. In some embodiments, the appliance mating portion can include an air inlet at which air is received from the hair care appliance.

[0008] In another embodiment, a hair care accessory is provided having a hollow elongate frame with a plurality of opening sections. Each opening section can include at least one curved wall oriented to direct fluid flow in a radially outward and circumferential direction. The hair care accessory can also include a plurality of plates mounted on the hollow elongate frame. Each plate can be positioned over at least one of the opening sections such that the plate and the at least one curved wall of the at least one opening section define at least one elongated outlet. Airflow directed through the at least one elongated outlet can be configured to flow

circumferentially around at least a portion of an outer surface at least one of the plurality of plates.

[0009] In some embodiments, the plurality of opening sections can be arranged circumferentially in rows around and longitudinally along the hollow elongate frame. In other embodiments, opening sections of a first row can be rotationally offset from opening sections of a second row. The first row can be longitudinally adjacent to the second row along the hollow elongate frame. In some embodiments, each opening section can include two or more outlets adjacent to the at least curved wall. The two or more outlets can be configured to convey air across the at least one curved wall and through the at least one elongated outlet. In other embodiments, adjacent outlets of the two or more outlets can be circumferentially offset from one another within each opening section.

[0010] In some embodiments, each plate can include an attachment hook on an inner surface thereof. The attachment hook can be configured to couple with the at least one curved wall of each opening section. In other embodiments, each plate can be positioned over at least one of the opening sections via one or more ridges protruding from an inner surface of each plate. The one or more ridges can be configured to maintain a gap between the hollow elongate frame and each plate. In some embodiments, a height of the gap can correspond to a height of the at least one elongated outlet. In other embodiments, the plurality of plates can include a plurality of plate pairs. Each plate pair can include a first plate and a second plate, the second plate circumferentially offset from the first plate.

[0011] In some embodiments, the hair care accessory can include an appliance mating portion positioned at a first end and an end cap positioned at a second end opposite the first end. The appliance mating portion can be configured to detachably couple the hollow elongate frame to a hair care appliance and the end cap can include a heat-resistant material.

[0012] In another embodiment, a hair care accessory is provided having a hollow elongate frame with a first plurality of outlets formed therein and an air inlet at a first end thereof. The hair care accessory can also include a plurality of rings positioned over the hollow elongate frame and at least partially overlapping one another. Each ring can have a plurality of vanes formed on an inner surface thereof. The plurality of vanes can be configured to receive fluid from the first plurality of outlets and to direct fluid through a second plurality of outlets formed between adjacent rings such that fluid flows circumferentially around an outer surface of the plurality of rings.

[0013] In some embodiments, the hair care accessory can include at least one heating element disposed on at least one of the plurality of rings and the hollow elongate frame. In other embodiments, each of the plurality of rings can have a first portion with an outer diameter that is greater than an outer diameter of a second portion. In some embodiments, the plurality of vanes can be spiral-shaped, and wherein a first ring of the plurality of rings has spiral-shaped vanes oriented in a first rotational direction and a second ring of the plurality of rings has spiral shaped vanes oriented in a second rotational direction opposite to the first rotational direction. In other embodiments, the first ring can be positioned adjacent to a first end of the elongate hollow frame. The first end including the air inlet. In some embodiments, the plurality of vanes can extend at an angle between 5 degrees and 45 degrees relative to a longitudinal axis of the hollow elongate frame.

[0014] In other embodiments, the plurality of vanes can have a height configured to create a gap between overlapping rings. The gap between each of the plurality of rings can define the second plurality of outlets. In some embodiments, the hair care appliance can also include an appliance mating portion positioned at one end of the hollow elongate frame. The appliance mating portion can be configured to couple the hollow elongate frame to a hair care appliance.

[0015] In another embodiment, a hair care accessory can include a hollow elongate frame having a first end with an appliance mating portion and a second end. The hair care accessory can also include a first ring disposed over the hollow elongate frame. The hair care accessory can further include a second ring disposed over the hollow elongate frame and having a first end position over a second end of the first ring and spaced radially outward from the first ring such that a circumferential gap is formed between the first and second rings. The circumferential gap can have at least one first vane configured to divert fluid flowing from the hollow elongate frame through the circumferential gap in a circumferential direction around the first ring.

[0016] In some embodiments, the hair care accessory can also include a third ring disposed over the hollow elongate frame and having a first end position over a second end of the second ring and spaced radially outward from the second ring such that a second circumferential gap is formed between the second and third rings. The second circumferential gap can have at least one second vane configured to divert fluid flowing from the hollow elongate frame through the second circumferential gap in a circumferential direction around the second ring. In other embodiments, the at least one first vane and the at least one second vane can be angled relative to the longitudinal axis to direct fluid in the same circumferential direction.

[0017] In some embodiments, the hair care accessory can also include a base ring positioned around the hollow elongate frame. The base ring can be positioned between the first ring and the appliance mating portion. In other embodiments, at least one third vane can be positioned between the base ring and the hollow elongate frame and can be configured to direct fluid flow in a circumferential direction. In other embodiments, the at least one third vane can be configured to direct fluid flow in a first direction and the at least one first and second vanes can be configured to direct fluid flow in a second direction opposite the first direction.

[0018] In some embodiments, the hollow elongate frame can include a first portion adjacent to the appliance mating portion having a plurality of first openings therein, and a second portion extending from the first portion and having a plurality of second openings therein that differ in shape than the plurality of first openings. In other embodiments, the second plurality of openings can include a first group of openings arranged longitudinally along the hollow elongate frame and a second group of openings arranged longitudinally along the hollow elongate frame. In some embodiments, the first group of openings can be configured to divert the fluid flow from the hollow elongate frame to the circumferential gap via the at least one first vane.

[0019] In other embodiments, a portion of the second group of openings can be located between annular frame elements located along a length of the hollow elongate frame. In some embodiments, the annular frame elements can include a channel on an outer surface thereof at which a tab of at least one of the first, second, or third rings is received to secure the at least one of the first, second, or third rings to the hollow elongate frame, the tab protruding from an inner surface of the at least one of the first, second, or third rings.

[0020] In another embodiment, a hair care accessory is provided having an elongate hollow frame with a fluid flow path extending there through between an air inlet and a first plurality of outlets spaced circumferentially around and longitudinally along the elongate hollow frame. The hair care accessory can also include a plurality of elongate plates positioned on the elongate hollow frame and having a second plurality of outlets positioned in alignment with the first plurality of outlets. The second plurality of outlets can be configured to divert fluid flowing along the fluid flow path in a circumferential direction around the plurality of elongate plates. The hair care accessory can further include an elongate hollow cover positioned over the elongate hollow frame and having a plurality of openings aligned with the plurality of first and second outlets.

[0021] In some embodiments, the elongate hollow cover can include a unibody cylindrical body. In other embodiments, the plurality of openings can be arranged in rows and columns on the

elongate hollow cover. In some embodiments, the hair care appliance can also include an appliance mating portion adjacent to the air inlet and configured to couple the elongate hollow frame to a hair care appliance. In other embodiments, the plurality of openings in the elongate hollow cover can extend in a plurality of rows spaced longitudinally along the elongate hollow cover and a plurality of columns can be spaced circumferentially around the elongate hollow cover. In some embodiments, the second plurality of outlets can include a plurality of outlet pairs spaced longitudinally along the plurality of elongate plates. Each outlet pair can be separated by a vane.

[0022] In other embodiments, the elongate hollow frame can include a first end adjacent to the air inlet and a second end. The plurality of outlet pairs can include a first outlet pair having a first vane configured to direct airflow toward the second end, and a second outlet pair having a second vane configured to direct airflow toward the first end. In some embodiments, the first outlet pair can be positioned adjacent to the first end. In other embodiments, each of the second plurality of outlets can be defined by first and second radially offset walls defining a longitudinal slot therebetween. In some embodiments, each elongate plate can include first and second longitudinally extending rails spaced a distance from one another. The first and second radially offset walls of each of the second plurality of outlets can form a bridge element extending between the first and second rails. In other embodiments, the elongate hollow frame can include a plurality of ridges spaced circumferentially there around. The plurality of ridges can extend longitudinally along the elongate hollow frame adjacent to the second plurality of outlets in the plurality of plates.

[0023] In some embodiments, each ridge can have an angled surface for directing fluid through the second plurality of outlets. In other embodiments, the outer cover can include at least one conduit extending therethrough having a heating element therein. In some embodiments, the hair care accessory can further include an electrical connector adjacent to the air inlet and configured to electrically couple to a hair care appliance to convey power from the hair care appliance to the heating element in the at least one conduit.

[0024] In another embodiment, a hair care accessory is provided having a hollow cylindrical body with a plurality of rows of outlets spaced longitudinally there along between first and second ends thereof. The hair care accessory can also include a cylindrical cover positioned over the hollow cylindrical body and having a plurality of rows of openings spaced longitudinally there along between first and second ends thereof. The plurality of rows of openings can at least partially overlap the plurality of rows of outlets. The hair care accessory can further include a

plurality of plates positioned between the hollow cylindrical body and the cylindrical cover. The plurality of plates can have diversion openings therein and configured to direct airflow from the plurality of rows of outlets through the plurality of rows of openings in a circumferential direction around the cylindrical cover.

[0025] In some embodiments, the hair care accessory can include at least one heater between the cylindrical cover and the hollow cylindrical body configured to heat hair wrapped around the cylindrical cover. In other embodiments, the diversion openings can be defined by first and second radially offset plates defining a slot therebetween. In some embodiments, each diversion opening can include a pair of openings separated by a vane. In other embodiments, a first vane of a first diversion opening of the plurality of diversion openings can be angled to direct airflow toward the first end of the cylindrical cover and a second vane of a second diversion opening of the plurality of diversion openings can be angled to direct airflow toward the second end of the cylindrical cover. In some embodiments, the hair care accessory can also include a mating portion at the first end of the hollow cylindrical body configured to mate with a hair care appliance.

[0026] In another embodiment, a hair care accessory can include an elongate body having an outer wall forming a heated hair contacting surface. The hair care accessory can also include at least one heater assembly disposed within the body. The at least one heater assembly can include at least one heating element positioned adjacent to the outer wall, a pressure plate positioned adjacent to the at least one heating element and a protective sheet extending over at least a portion of the pressure plate.

[0027] In some embodiments, the pressure plate can include a first surface adjacent to the at least one heating element and a second surface opposite the first surface. The second surface can be adjacent to the protective sheet. In other embodiments, the pressure plate can include at least one force transmission element arranged on the second surface and configured to maintain the pressure plate adjacent to the at least one heating element. In other embodiments, the at least one force transmission element can include a compression spring. In some embodiments, the at least one heating element can include a polyimide film. In other embodiments, the protective sheet comprises a mica material. In some embodiments, the elongate body can include an electrical connector configured to power the at least one heater assembly via power received from a hair care appliance. In other embodiments, the elongate body can include a lumen configured to receive a fluid flow from a hair care appliance via an air inlet at a proximal end of the body.

[0028] In another embodiment, a heater assembly can include a wall having an inner surface and an outer surface, a heating element positioned adjacent to the inner surface of the wall, a plate positioned adjacent to the heating element and configured to maintain the heating element in contact with the inner surface of the wall, and a power supply configured to power the heating element.

[0029] In some embodiments, the outer surface of the wall can include a heated hair contacting surface of a hair care appliance or a hair appliance accessory. In other embodiments, the plate can be configured to maintain the heating element in contact with the inner surface of the wall via one or more springs positioned between the plate and a wall of a housing of a hair care appliance or a hair appliance accessory. In some embodiments, the plate can be configured to maintain the heating element in contact with the inner surface of the housing via pressure fitting the heater assembly within a housing of a hair care appliance or a hair appliance accessory. In other embodiments, the heater assembly can also include a mica sheet abutting the pressure plate.

[0030] In another embodiment, a hair curler accessory is provided having a hollow elongate frame with a plurality of plates positioned circumferentially around the hollow elongate frame. The plurality of plates can form outlets therebetween. The hair curler accessory can also include a heater assembly including a ring having an inner wall forming an opening of the ring and an outer wall opposite the inner wall and a plurality of elongate flexible heating elements extending radially from the outer wall. The ring can be configured to be received over the hollow elongate frame such that the plurality of elongate flexible heating elements are positioned between the hollow elongate frame and the plurality of plates.

[0031] In some embodiments, the plurality of elongate flexible heating elements can include a polyimide film. In other embodiments, the ring can include a non-heated material. In some embodiments, respective elements of the plurality of elongate flexible heating elements can include wiring configured to convey power to the respective elements. The power can be provided via a hair care appliance detachably coupled to the hair curler accessory.

DESCRIPTION OF DRAWINGS

[0032] These and other features will be more readily understood from the following detailed description taken in conjunction with the accompanying drawings.

[0033] FIG. 1A is a side view of one exemplary embodiment of a hair care accessory described herein;

[0034] FIG. 1B is a cross-sectional side view of the hair care accessory of FIG. 1A;

[0035] FIG. 2 is a partially exploded side view of the hair care accessory of FIG. 1A showing some plates removed;

[0036] FIG. 3A is a side view of a frame of the hair care accessory of FIG. 1A;

[0037] FIG. 3B is a cross-sectional side view of the frame of FIG. 3A;

[0038] FIG. 4 is a side view of a plurality of plates configured on the hair care accessory of FIG. 1A;

[0039] FIG. 5A is a front view of a plate of the plurality of plates of FIG. 4;

[0040] FIG. 5B is a rear view of the plate of FIG. 5A;

[0041] FIG. 6 is a cross-sectional view of the hair care accessory of FIG. 1A showing fluid flows conveyed through a plurality of outlets thereof;

[0042] FIG. 7 is a detailed view of a portion of FIG. 6 showing a fluid flow conveyed through an outlet of the hair care accessory of FIG. 1A;

[0043] FIG. 8A is a cross-sectional view showing a plurality of plates of the hair care accessory of FIG. 1A configured in a first rotational direction;

[0044] FIG. 8B is a cross-sectional view showing a plurality of plates of the hair care accessory of FIG. 1A configured in a second rotational direction;

[0045] FIG. 9A is a fluid flow diagram showing fluid flow paths provided via outlets of the hair care accessory of FIG. 1A;

[0046] FIG. 9B is a fluid flow diagram showing fluid flow velocities of fluid flows provided via outlets of the hair care accessory of FIG. 1A;

[0047] FIG. 10A is a side view of another exemplary embodiment of a hair care accessory described herein;

[0048] FIG. 10B is a cross-sectional side view of the hair care accessory of FIG. 10A;

[0049] FIG. 11 is a cross-sectional view of the hair care accessory of FIG. 10A with a frame removed;

[0050] FIG. 12A is a perspective view of a ring frame of the hair care accessory of FIG. 10A;

[0051] FIG. 12B is a perspective view of a ring configured for use with the ring frame of FIG. 12A;

[0052] FIG. 13 is a side view of a frame of the hair care accessory of FIG. 10A;

[0053] FIG. 14A is a cross-sectional view of a plurality of vanes of the hair care accessory of FIG. 10A configured in a first rotational direction;

[0054] FIG. 14B is a cross-sectional view of a plurality of vanes of the hair care accessory of FIG. 10A configured in a second rotational direction;

[0055] FIG. 15A is a side view of another embodiment of a hair care accessory described herein;

[0056] FIG. 15B is a side view of the hair care accessory of FIG. 15A with a plurality of rings and an electronics cover of the frame removed;

[0057] FIG. 16A is a side view of the hair care accessory of FIG. 15B with a plurality of ring frames removed;

[0058] FIG. 16B is a perspective view of the hair care accessory of FIG. 16A;

[0059] FIG. 17A is a side view of the hair care accessory of FIG. 15A showing the frame and electrical contacts with the plurality of ring frames, heating elements, and rings removed;

[0060] FIG. 17B is a side view of the hair care accessory of FIG. 17A with the frame removed;

[0061] FIG. 18A is a front side view of the frame of the hair care accessory of FIG. 15A;

[0062] FIG. 18B is a rear side view of the frame of the hair care accessory of FIG. 15A;

[0063] FIG. 19A is a cross-sectional view of a ring of the frame of the hair care accessory of FIG. 15A;

[0064] FIG. 19B is a perspective view of a ring of the hair care accessory of FIG. 15A;

[0065] FIG. 20A is a fluid flow diagram showing fluid flow paths provided via outlets of the hair care accessory of FIG. 15A;

[0066] FIG. 20B is a fluid flow diagram showing fluid flow velocities of fluid flows provided via outlets of the hair care accessory of FIG. 15A;

[0067] FIG. 21A is a side view of another exemplary embodiment of a hair care accessory described herein;

[0068] FIG. 21B is a cross-sectional side view of the hair care accessory of FIG. 21A;

[0069] FIG. 22 is an exploded view of the hair care accessory of FIG. 21A;

[0070] FIG. 23A is a perspective view of a front surface of a plate of the hair care accessory of FIG. 21A;

[0071] FIG. 23A is a perspective view of a rear surface of a plate of the hair care accessory of FIG. 21A;

[0072] FIG. 24 is a cross-sectional view of the hair care accessory of FIG. 21A showing fluid flows conveyed through a plurality of outlets thereof;

[0073] FIG. 25 is a detailed view of a portion of FIG. 24 showing a fluid flow conveyed through an outlet of the hair care accessory of FIG. 21A;

[0074] FIG. 26 is a fluid flow diagram showing fluid flow paths provided via outlets of the hair care accessory of FIG. 21A;

[0075] FIG. 27 is a cross-sectional view of an exemplary embodiment of a heater assembly configured for use with the hair care accessories described herein;

[0076] FIG. 28 is an exploded view of another exemplary embodiment of a heater assembly configured for use with the hair care accessories described herein;

[0077] FIG. 29 is a top view of another exemplary embodiment of a heater assembly configured for use with the hair care accessories described herein;

[0078] FIG. 30A is a side view of another exemplary the hair care accessory of FIG. 21A showing the heater assembly of FIG. 27 configured therein; and

[0079] FIG. 30B is a cross-sectional view of the hair care accessory of FIG. 30A.

[0080] It is noted that the drawings are not necessarily to scale. The drawings are intended to depict only typical aspects of the subject matter disclosed herein, and therefore should not be considered as limiting the scope of the disclosure.

DETAILED DESCRIPTION

[0081] Various exemplary hair care accessories for use with hair care appliances are provided herein. In general, the hair care appliance can be in the form of a hair dryer that has an air inlet and at least one air outlet, and various internal components that facilitate use and operation of the hair care appliance, such as a fan, motor, and heater. Various accessories are provided for use with a hair care appliance, and the configuration of the appliance can be varied based on the type of accessory mated to the hair care appliance. In some embodiments, the hair care accessories herein can also include a heating element.

[0082] The hair care accessories described herein can be configured to couple to a hair care appliance, for example as an attachment, and can be used to treat the hair, including drying, curling, and/or otherwise styling hair. The hair care accessories described herein include a number of advantageous features which can enhance the provision of a fluid flow exiting the hair care accessories described herein. As a result, the hair care accessories herein can improve the drying and/or styling of hair compared to existing hair care accessories.

[0083] FIGS. 1A-9B illustrate one exemplary embodiment of a hair care accessory 100 configured to couple with a hair care appliance, such as a hair dryer, to receive a fluid from the hair care appliance. The illustrated hair care accessory 100 has a frame 102 and a plurality of plates 101 arranged on the frame 102. The accessory 100 has a substantially elongate cylindrical shape extending between a first end 104 and a second end 105. At the first end 104, the frame 102 includes an appliance mating portion 110 having one or more slots 106 provided around a circumference of the frame 102. The slots 106 can be configured to receive a protrusion provided at an accessory mating portion at an outlet end of a hair care appliance. The protrusion can be received within and rotatably advanced into the channel 106 to secure the hair care accessory 100 to the hair care appliance. A person skilled in the art will appreciate that a variety of other mating features can be utilized, including magnets or other fastening mechanisms. The second end 105 of the hair care accessory 100 can include an end cap 103 formed on or coupled to the frame 102, e.g., via a screw 114 or similar attachment mechanism. The end cap 103 can include a projection 113. In some embodiments, a user can grasp the projection 114 when drying and/or styling hair using the hair care accessory 100. In some embodiments, the end cap 103 can be formed from a heat-resistant material.

[0084] As indicated above, the hair care accessory 100 includes a plurality of plates 101 which in the illustrated embodiment are arranged longitudinally along the hollow elongate frame 102 between the first end 104 and the second end 105 of the hair care accessory 100. The plates 101

can have a curved shape that can correspond to a portion of a circumference of the cylindrical shaped frame 102. The plurality of plates 101 can be arranged in a plurality of rows A-D along the length of the elongate frame 102. Each row can include a plurality of plates 101 positioned circumferentially around the elongate frame 102. Although the embodiment shown in FIGS. 1A-4 includes 4 rows, e.g., rows A-D, in some embodiments the hair care accessory 100 can have more or fewer rows, such as 2, 3, 4, 5, 6, 7, or 8 rows. Each row can correspond to a longitudinal portion of the elongate frame 102. For example, as shown in the cross-sectional view of FIG. 1B, the elongate frame 102 includes longitudinally offset portions A'-D' extending along the length of the frame 102. The longitudinally offset portions A'-D' can be associated with rows A-D as shown in FIG. 2.

[0085] Adjacent rows of plates 101 can be separated by a ring 107 arranged there between as shown in FIGS. 1A-1B. For example, the ring 107 can be positioned between rows B and C associated with frame portions B' and C'. The ring 107 can be located between any two rows and the corresponding longitudinal portions of elongate frame 102. In some embodiments, the hair care accessory 100 may not include a ring 107.

[0086] As illustrated in FIG. 2, plates 101A and 101B have been removed from the frame 102. As shown, plate 101A can include a pair of plate elements 101A' and 101A'' which in one embodiment can be integrally formed as a single component, and plate 101B can include a pair of plate elements 101B' and 101B'' which likewise in one embodiment can be integrally formed as a single component. **Plate element 101A' can be rotationally or circumferentially offset from plate element 101A'' with respect to a longitudinal axis Y of the frame 102, and plate element 101B' can be rotationally or circumferentially offset from plate element 101B'' with respect to the longitudinal axis Y of frame 102. In this way, plate element 101A' can couple with the frame 102 within longitudinal portion A' and plate element 101A'' can couple with the frame 102 within longitudinal portion B'. Similarly, plate element 101B' can couple with the frame 102 within longitudinal portion C' and plate element 101B'' can couple with the frame 102 within longitudinal portion D'. In some embodiments, the plurality of plates 101 arranged within a row can include a gasket 115 configured to maintain the plates 101 coupled to the frame 102.**

[0087] A plurality of outlets 109 can extend longitudinally along an edge of each of the plurality of plates 101, as shown in FIGS. 1A-1B and 2. The plurality of outlets 109 can be fluidically coupled to a plurality of outlet groups 112 in the frame 102, as shown encircled in FIGS. 1B and 2 and which will be described in more detail later. A fluid flow provided at the outlet of a hair care appliance to which the hair care accessory 100 is coupled can be received at an inlet 108

arranged in the first end 104 of the frame 102. The received fluid flow can be conveyed through a lumen 111 of the elongate frame 102, through the outlets configured in the plurality of outlet groups 112, and through the outlets 109 defined by the plates to provide fluid flow substantially circumferentially around and over the plurality of plates 101 so as to produce a Coanda effect, which will be described in more detail later.

[0088] The plurality of outlet groups 112 can be arranged circumferentially around the frame 102 and each outlet can extend longitudinally along the frame 102 as shown encircled in FIGS. 3A-3B. Each longitudinal portion of the elongate frame 102, such as longitudinal portions A', B', C', and D', **can include a plurality of** opening sections 116 that include the respective outlet groups 112. In some embodiments, each longitudinal portion can include 3, 4, 5, 6, 7, or 8 openings sections 116 arranged circumferentially around the elongate frame 102. Thus, each longitudinal portion can include a number of outlet groups 112 corresponding to the number of opening sections 116. In some embodiments, one or more opening sections 116 may not include an outlet group 112.

[0089] The plurality of opening sections 116 in a first longitudinal portion can be rotationally and circumferentially offset from the plurality of openings 116 in an adjacent longitudinal portion. For example, in the embodiment shown in FIGS. 3A-3B, each longitudinal portion of the elongate frame 102 includes 6 opening sections 116 arranged around the circumference of the frame 102. As shown in FIG. 3A, longitudinal portion A' includes opening sections 116A-1 and 116A-2, which are rotationally and circumferentially offset from the plurality of openings 116B-1 and 116B-2 of longitudinal portion B'. **The plurality of openings 116B-1 and 116B-2 of longitudinal portion B' are rotationally and circumferentially offset from the plurality of openings 116C-1 and 116C-2 of longitudinal portion C'.** The amount of rotational offset can vary.

[0090] Opening sections 116 can include a curved wall 117 extending longitudinally along the frame 102. The curved wall 117 can be configured adjacent to respective outlet groups 112 that are arranged within openings sections 116. For example, as shown in FIG. 3A, the opening section 116A-1 in longitudinal portion A' includes curved wall 117A-1. Similarly, in longitudinal portion B', **the opening** section 116B-1 includes curved wall 117B-1 and in longitudinal portion C', the opening section 116C-1 includes curved wall 117C-1 and the opening section 116C-2 includes curved wall 117C-2. The curved walls 117 can be positioned adjacent to a second edge 130 of each plate 101 such that the plurality of outlets 109 are provided longitudinally there between as shown in FIG 6. Opposite the curved walls 117, each opening

group 116 can also include a shoulder 134 to which the projection 128 on the second surface 122 of each plate can couple the plate 101 to the frame 102 as shown in FIGS. 3A and 6.

[0091] The plurality of outlet groups 112 can be provided through a wall of the frame 102 so as to be in fluidic communication with the lumen 111 of the frame 102 as shown in FIG. 3B. Each outlet group 112 can include 1, 2, 3, or more outlets. For example, in the embodiment shown in FIG. 3B, the frame 102 includes a plurality of outlet groups 112 that include 3 outlets, shown as outlets 119A, 119B, and 119C of outlet **group 112C arranged within longitudinal portion C'. A** variety of outlet shapes can be envisioned, such as the rectangular shape shown in FIG. 3B. At least one outlet can be configured to couple plates 101 to the frame 102.

[0092] The frame 102 can also include ribs 118 arranged on an inner surface 120 of the frame 102. The ribs 118 can be positioned to intersect the plurality of outlet groups 112. In some embodiments, the ribs 118 can be arranged offset from the plurality of outlet groups 112. The ribs 118 can be configured to increase the longitudinal rigidity of the frame 102. The ribs 118 can also provide an engagement surface for projection 128 of plates 101 to mate with as shown in FIGS. 6 and 7. A hook-shaped portion or similar coupling mechanism of the tab 128 can couple with the ribs 118 to secure the plates 101 to the frame 102.

[0093] The plurality of plates 101 can be configured to form a substantially cylindrical shape including plates 101 arranged in one or more rows A-D as shown in FIG. 4, in which the frame 102 and a portion of the plurality of plates 101 has been removed. For example, plate 101A can be positioned circumferentially adjacent to plate 101C and plate 101B can be positioned circumferentially adjacent to plate 101D. Plate 101A includes plate elements 101A' and 101A'', which can be circumferentially offset from one another longitudinally. Plate 101A can extend between rows A and B such that plate element 101A' is arranged in row A and plate element 101A'' is positioned in row B. Plate 101B can similarly extend between rows C and D such that plate element 101B' is positioned in row C and plate element 101B'' is positioned in row D.

[0094] The plurality of outlet groups 109 can be positioned between adjacent edges of circumferentially adjacent plate elements so as to direct the fluid flow provided via a first plurality of outlets 109 associated with a first plate element over an upper surface of an adjacent plate element and circumferentially around the plate elements of a particular row. For example, as shown in FIG. 4, the plurality of outlet groups 109A' can be configured between plate elements 101A' and 101C' and the plurality of outlet groups 109B' can be configured between plate elements 101B' and 101D'.

[0095] Plates 101 can include a number of features configured to direct the fluid flow provided via the plurality of outlet groups 112 through the plurality of outlets 109. For example, as shown in FIGS. 5A-5B, plate 101B (corresponding to plate 101B of FIGS. 2 and 4) includes a substantially curved, non-planar surface profile and includes plate elements 101B' and 101B''. Plate element 101B' includes a first end 131 of plate 101B and plate element 101B'' includes a second end 132 of plate 101B. The first end 131 can include one or more collar segments 123 that extend longitudinally from a collar base 124 positioned circumferentially around the first end 131. The collar segments 123 can be separated by a notch 133 as shown in FIG. 5B. The collar segments 123 can be configured to be received in and to couple the plate 101 to the end cap 113 or the ring 107, as shown in FIG. 1B. As shown in FIG. 2, a gasket 115 can be configured to surround the collar segments 123 to secure the plates 101 to the frame 102.

[0096] With further reference to FIGS. 5A and 5B, the second end 132 of the plate 101B can include a tab 125 which can be received within a cavity 136 configured around a circumference of a base collar 135 of the frame 102 shown in FIG. 3A. The tab 125 can also be received within the ring 107 as shown in FIG. 1B to help secure the plate 101 to the frame 102 and to prevent rotational displacement of the plates around the frame 102.

[0097] Plate 101B includes a first surface 121 and a second surface 122 that is opposite to the first surface 121. The first surface 121 can be substantially smooth and can be a hair-contacting surface at which a user can contact hair with the hair care accessory 100 for drying and/or styling of hair. The second surface 122 can include features configured to divert the fluid flow through the plurality of outlets 109, to maintain a spacing of the plate 101 with the frame 102 for providing the fluid flow, and/or to secure the plate 101 to the frame 102.

[0098] As shown in FIG. 5B, the second surface 122 of plate 101B includes a plurality of vanes 126 extending between a first edge 129 and a second edge 130 of plate elements 101B' and 101B''. The illustrated vanes 126 extend longitudinally along the second edge 130. The plurality of vanes 126 can be configured to divert the fluid flow received from the plurality of outlet groups 112 to the plurality of outlets 109, such as outlets 109B' of plate 101B' and outlets 109B'' of plate element 101B''. The plurality of vanes 126 can vary in height along their length, such that the vanes 126 can be shorter adjacent to the second edge 130 and the plurality of outlets 109 and can increase in height as the vane extends across the second surface 122 toward the first edge 129. The vane height H_v adjacent to the second edge 129 can be configured to provide the fluid flow F at a velocity configured to create a Coanda effect of airflow circumferentially around the hair care accessory 100. In some embodiments, one or more of the vanes 126 can include a

spacing element 127 having a height H_s that is configured maintain a gap between the frame 102 and the plate 101A. The spacing element 127 can be positioned along the vane 126, such as at an end of vane 126 that is opposite the outlets 109 as shown in FIG. 5B. In some embodiments, the spacing element 127 may not be positioned along the vane 126 and can be positioned on the second surface 122 separately from the vane 126.

[0099] The second surface 122 can also include a projection 128 extending therefrom. The projection 128 can include a hook or similar attachment feature that is configured to be received in an outlet 119 included in the plurality of outlets 112, such as outlet 119B shown in FIG. 3B. The projection 128 can be configured to secure the plate element of plates 101 to the elongate frame 102. For example, as shown in FIG. 5B, the plate elements 101B' and 101B'' include projections 128. The projections 128 of adjacent plate elements can be received within outlets 119 of outlet groups 112 that are configured in adjacent longitudinal portions of the frame 102. For example, the projections 128 configured on the plate elements 101B' and 101B'' can be received within outlets 119B and 119D shown in FIG. 3B to couple the plate 101B to the elongate frame 102 within the longitudinal portions C' and D'. Although the embodiments herein show the plurality of outlets 112 including 3 outlets 119 and the projection 128 received within a central outlet 119, other numbers of outlets 119 can be envisioned in the plurality of outlets groups 112 and the projection 128 can be received within any other outlets 119 of the plurality of outlet groups 112. In some embodiments, the projection 128 can be received within an opening of the frame 102 that is separate from the outlets 119 of the plurality of outlet groups 112. In other embodiments, other attachment techniques can be used to mate the plates to the frame.

[0100] As indicated above, the hair care accessory 100 can provide a plurality of fluid flows F via the plurality of outlets 109. As shown in the cross-sectional view of FIG. 6, a fluid flow F can be received at the inlet 108 and can pass through the lumen 111 of the frame 102 to the plurality of outlet groups 112, which include individual outlets 119. The fluid flow F can pass through the individual outlets 119 of outlet groups 112 and can engage with the second surface 122 of plates 101 to be diverted through the plurality of outlets 109 via the vanes 126. The fluid flow F can flow around the plates 101 in a circumferential manner. A more detailed view of the fluid flow F through the plurality of outlets 109 can be seen in FIG. 7. The fluid flow F can pass from the lumen 111 into the outlet 119 and can be diverted by the second surface 122 of the plate 101B' and the vanes 126 toward the plurality of outlets 109. The vanes 126 can have a height H_v adjacent to the first edge 130 of plates 101B' that can define an outlet height of the plurality of outlets 109.

[0101] The plurality of plates 101 can be arranged circumferentially around the frame 102 in a first rotational direction R_1 as shown in FIG. 8A or a second rotational direction R_2 as shown in FIG. 8B. The second rotation direction R_2 can be for example a clockwise rotational direction and can be opposite the first rotational direction R_1 , which can be a counterclockwise direction. For example, as shown in FIG. 8A, the plates 101 can be arranged on the frame 102 in the first rotational direction R_1 such that the fluid flow can be provided via the plurality of outlets 109 in a direction F_A corresponding to the first rotational direction R_1 . As shown in FIG. 8B, in some embodiments, the plurality of plates 101 can be arranged on the frame 102 in the second rotational direction R_2 such that the fluid flow can be provided via the plurality of outlets 109 in a direction F_B corresponding to the second rotational direction R_2 . The arrangement of the plates 101 in the first rotational direction R_1 can facilitate formation or styling of left-handed curls in hair. The arrangement of the plates 101 in the first rotational direction R_2 can facilitate formation or styling of right-handed curls in hair.

[0102] The hair care accessory 100 can advantageously provide fluid flows therefrom to enhance drying and/or styling of hair. For example, as shown in FIGS. 9A and 9B, the hair care accessory 100 includes the plurality of plates 101 configured in the first rotational direction R_1 as shown on the hair care accessory 100 of FIG. 8A. As shown in FIG. 9A, the fluid flow can be provided in each row A-D in direction F_A corresponding to the first rotational direction R_1 . The fluid flow provided via the plurality of outlets 109 from rows A and D can be entrained toward the middle of the hair care accessory 100 by the fluid flow provided via the plurality of outlets 109 configured in rows B and C. In this way, while fluid flow is provided circumferentially along the entire length of the hair care accessory 100, a user can more easily couple hair to the hair care accessory 100 by bringing hair into contact with fluid flow provided in the middle of the hair care accessory 100. As shown in FIG. 9B, the hair care accessory 100 can be configured to provide the fluid flow in each row A-D in direction F_A corresponding to the first rotational direction R_1 at a consistent velocity circumferentially around each row A-D and longitudinally across each row A-D.

[0103] The arrangement of the plates 101 on the frame 102 can form a plenum chamber which can provide a positive pressure to air flow within the frame 102 that can be maintained as the air flow is distributed along the elongate member of the accessory 100 to the outlets 109. The outlets 109 can be formed between adjacent plates 101 by adjacent vanes 126 extending along the surface 122 of the plates 101 and can be sized to control back pressure within the accessory 100 for even distribution of air to the outlets 109. In some embodiments, the amount of back pressure imparted to the plenum chamber can be between about 2 – 4 KPa.

[0104] Embodiments of the hair care accessory 100 described herein produce several advantages. For example, the arrangement of outlet groups 112 in the frame 102 and the plurality of outlets 109 configured between plates 101 can evenly distribute airflow within the plenum chamber and along the length of the accessory 100. The positive air flow pressure generated within the lumen 111 of the frame 102 and conveyed through the outlets 109 can improve adherence of hair to the accessory via a Coanda effect. As a result, the accessory can provide more efficient drying and styling of hair with improved permanency in applied styles.

[0105] FIGS. 10-14B illustrate another exemplary embodiment of a hair care accessory 200 configured to couple with a hair care appliance, such as a hair dryer, to receive a fluid flow from the hair care appliance. The illustrated hair care accessory 200 includes a plurality of rings 201, such as rings 201A-201F, that can be stacked upon one another to form an elongate member having a first end 211 and a second end 212. In some embodiments, the plurality of rings 201 can include 2, 3, 4, 5, 6, 7, 8, 9, 10 or more rings. In some aspects, each ring 201 can have a substantially annular, cylindrical shape having a lumen therein extending between a first end 213 and a second end 214 of the ring, as shown by example in FIG. 10A for ring 201E. However, the shape can vary and the rings need not be circular in cross-section. Other shapes, such as oval, oblong, or any other geometric or irregular shape are envisioned. In some embodiments one or more of the rings 201 can have an inverted tulip shape. In the illustrated embodiment, the diameter of the first end 213 of a ring is less than the diameter of the second end 214 of the ring to enable the first end of a ring to be received in the second end of an adjacent ring, thus allowing the rings to be stacked upon one another as shown in FIG. 2. In some embodiments, the second end 214 of a ring 201 can include a plurality of indentations 207 arranged around the circumference of the ring as shown on ring 201A in FIG. 10A. The indentations 207 can be configured to guide the fluid flow provided at the second end 214 of each ring onto an adjacent ring.

[0106] In one embodiment, the plurality of rings 201 can be coupled to or disposed over a hollow elongate frame 202 to aid in securing the rings together. In the embodiment shown in FIGS. 10A and 10B, the frame 202 includes a cylindrical base 216 with an air inlet 204 arranged in an opening of the base 216 and fluidically coupled to a lumen 210 of the frame 202. The frame 202 further includes an appliance mating portion 205 provided to couple the hair care accessory 200 to a hair care appliance. In some embodiments, the appliance mating portion 205 can include one or more slots 206 or protrusions configured to engage corresponding protrusions or slots on the hair care appliance. When the hair care accessory 200 is coupled to a hair care appliance, a fluid flow provided via an outlet of hair care appliance can be received at the air inlet 204 and can be

conveyed through the frame 202 to a plurality of outlets 215 arranged longitudinally along the frame 202 as shown in FIG. 10B. The plurality of outlets 215 can be fluidically coupled to a plurality of outlets 208 formed in the second end 214 of rings 201.

[0107] The hair care accessory 200 can also include an end cap 203 at the second end 212 of the accessory 100. The end cap 203 can be coupled to the terminal-most ring 201, such as ring 201A as shown in FIG. 10B. The end cap 203 can be configured to allow a user to grasp the hair care accessory 200 during styling and/or drying of hair. In some embodiments, the end cap 203 can include a heat resistant material to enable a user to manipulate the hair care accessory 200 more easily. The end cap 203 can be attached to the ring 201A via friction fitting, snap fitting, or the like. In some embodiments, the end cap 203 can be secured to the frame 202 via a screw 217 or similar attachment mechanism. As shown in FIG. 10B, the screw 217 securing the end cap 203 to the frame 202 can extend through the ring 201A.

[0108] At least one ring 201 can be coupled to the frame 202 via a ring frame 209. For example, the proximal-most ring 201F can be coupled to the frame 202 via a ring frame 209 as shown in FIG. 10B. The ring frame 209 can include one or more outlets 225 fluidically coupled to outlets 215 configured in a cylindrical housing 239 extending from the base 216 of the frame 202. The ring frame 209 can include vanes 220, oriented as shown by vanes 220A and 220B in FIG. 12A, arranged in different rotational directions. In some embodiments, ring 201F may include an arrangement of vanes 220A and/or 220B in addition to or in place of vanes 220A and/or 220B configured on the ring frame 209.

[0109] A first plurality of vanes 220A of the ring frame 209 can provide air flow F_1 in an upward rotational direction. The ring frame 209 can also include a second plurality of vanes 220B arranged to provide air flow F_2 in a downward rotational direction that is opposite that of the vanes 220A arranged in rings 201A-201E. Ring 201F can include a plurality of outlets 208 at the first end 213 through which air flow F_1 is provided in the upward rotational direction to direct the air flow F_1 upward toward adjacent ring 201E. The outlets 208 can be defined between the ring frame 209 and ring 201F, and each outlet can be defined by the spacing between ends of adjacent vanes 220A. Ring 201F can include a second plurality of outlets 208 at the second end 214 through which air flow F_2 is provided in the downward rotational direction to direct the air flow F_2 downward toward the base 216 of frame 202. The outlets 208 can be defined between the ring frame 209 and ring 201F, and each outlet can be defined by the spacing between ends of adjacent vanes 220B. Ring 201F can also include a circumferential protrusion 227 extending around the inner surface 219 of the ring. The protrusion 227 can be received within a notch 228 formed at a

location at which the vanes 220A, 220B intersect on the outside surface 229 of the ring frame 209, as shown in FIG. 12A.

[0110] Returning to FIG. 11, a cross-sectional view of the hair care accessory 200 with the frame 202 removed is illustrated to show the plurality of rings 201 in more detail. As shown, ring 201A includes an outer surface 218, an inner surface 219 on which a plurality of vanes 220 are arranged, and the plurality of outlets 208 are configured in between adjacent vanes 220 at the second end 214 of the ring 201A. The ring 201A can include a bottom wall 221 and a top wall 222 opposite the bottom wall at the first end 213 of the ring. The surface of the bottom wall 221 can include an attachment element 223, such as a cylindrical protrusion. The attachment element can be configured to receive a support element 224 or a portion extending from the frame 202 as shown in FIGS. 10B and 13. A hole 226 can be configured through the top wall 222 and bottom wall 221 of the ring 201A. A coupling mechanism 217, such as a screw or bolt as shown in FIG. 10A, can be received through the hole 226 and can couple with the support element 224 to provide the hair care accessory 200 with structural rigidity along its length.

[0111] As shown in FIGS. 10B-11, one or more of the rings 201 can include a plurality of outlets 208 adjacent to the second end 214. The outlets 208 can be arranged around the circumference of the second end 214 of the ring 201. In some embodiments, the outlets 208 can be arranged around the circumference of the first end 213 of the ring 201, such as ring 201F shown in FIG. 10B. A circumferential gap 241 shown in FIG. 11 can extend around rings 201 at the location of the outlet 208 where a first end 213 of a first ring, such as ring 201C, is configured within a second end 214 of an adjacent ring, such as ring 201B. The outlets 201 can be fluidically coupled to the inner lumen 210 and can convey air to the surface of the hair care accessory 200. The stacked arrangement of rings 201 and the corresponding stacked arrangement of outlets 208 can encourage adhesion of air flowing out of adjacent outlets 208 along the length of the accessory 200 so that air flow exiting the outlets 208 of one ring 201 can be drawn further down the accessory 200 by air flow exiting outlets 208 of an adjacent ring 201. In one embodiment, the velocity of air exiting the outlets 208 can be between 15 and 40 m/s at each outlet of the plurality of outlets 208.

[0112] The vanes 220 can be arranged in a first rotational direction R_1 or a second rotational direction R_2 on the inner surface 219 of the ring 201, with the first rotational direction being opposite to the second rotational direction as shown in FIGS. 14A-14B. As a result of the rotational orientation of the vanes 220 on the inner surface 219 of the ring 201, the air flow F can be directed onto the outer surface of the hair care accessory 200 in an upward direction F_1 or

downward direction F_2 . For example, as shown in FIG. 14A, rings 201A-201E include vanes 220 arranged in a first rotational direction R_1 configured to cause the air flow F_2 to exit the plurality of outlets 208 in a downward direction. In some embodiments, the ring frame 209 can include vanes 220A oriented in the first rotational direction R_1 and can also include vanes 220B arranged in a second rotational direction R_2 that is opposite that of vanes 220A, as shown in FIG. 12A. In some embodiments, ring 201F may include vanes 220A oriented in the first rotational direction R_1 or vanes 220B arranged in a second rotational direction R_2 that is opposite that of vanes 220A. The vanes 220A can cause the air flow F_1 to exit the plurality of outlets 208 of ring 201F in an upward direction. In some embodiments, it can be advantageous to include vanes 220A, 220B to produce bidirectional air flows (e.g., F_1 and F_2) so that hair is precluded from wrapping onto the hair care appliance to which the accessory 200 is attached.

[0113] The plurality of vanes 220 can be arranged at an angle α relative to the longitudinal axis A of the ring 201, as shown in FIGS. 14A-14B. In some embodiments, the vanes 220 can be angled in an upward or downward direction at an angle between about 2 and 60 degrees, for example the angle can be between about 5 and 45 degrees relative to the longitudinal axis of the rings 201. The angle of the vanes 220 can advantageously increase adherence of hair to the accessory 200. The angle and directional orientation of the vanes 220 on different rings 201 can cause the airflow to be provided in different rotational directions along the length of the accessory 200. For example, as shown in FIG. 11 and 14A-14B, rings 201A-201E include vanes, oriented as shown by vanes 220B in FIG. 12A, configured to provide air flow F_2 in a first rotational direction R_1 or a second rotational direction R_2 . Rings 201A-201E direct the air flow F_2 out of the outlets 208 downward in the first or second rotational directions.

[0114] As further shown in FIG. 11, rings 201 can include a tab 230 arranged at the first end 213 of the ring on the inner surface 219 thereof. The tab 230 can be received within a corresponding slot 231 or portion of the frame 202 to secure the ring to the frame 202 and to prevent rotational movement of the ring 201 relative to the frame. As shown in FIG. 10B, the tab 230 of ring 201E can be seen received within the slot 231 of the frame 202.

[0115] The frame 202 can include a hollow elongate portion 238 extending from the cylindrical housing 239. The frame 202 can include a plurality of outlets 235 arranged circumferentially along the length of the hollow elongate portion 238, as shown in FIG. 13. The outlets 235 can be formed between longitudinal columns 236 and rows 237 that are configured in between the longitudinal columns 236. The outlets 235 can convey the fluid flow F through the frame 202 to the plurality of outlets 208.

[0116] The frame 202 can also include attachment features 231 and 234 configured to secure or maintain rings 201 in locations along the frame 202. For example, the frame 202 can include a plurality of slots 231 extending longitudinally along the frame 202. In some embodiments, the slots 231 can be arranged within rows 237. The slots 231 can be configured to receive tabs 230 configured on rings 201. The frame can also include slot 234 adjacent to the base 216 of the frame 202. The slot 234 can be configured to receive tab 232 of frame ring 209 shown in FIG. 12A. When the ring frame 209 is disposed over the cylindrical housing 239, the tab 232 is received in the slot 234 and the bottom edge 240 of the ring frame 209 can abut a flange 233 to secure the ring frame 209 in place longitudinally and rotationally on the cylindrical housing 239 of the frame 202.

[0117] The arrangement of the rings 201 on the frame 202 can form a plenum chamber which can provide a positive pressure to air flow within the frame 202 that can be maintained as the air flow is distributed along the elongate member of the accessory 200 to the outlets 208. The outlets 208 can be formed within circumferential gaps 241 of adjacent rings 201 by adjacent vanes 220 extending around the circumference of the rings 201 and can be sized to control back pressure within the accessory 200 for even distribution of air to the outlets 208. In some embodiments, the amount of back pressure imparted to the plenum chamber can be between about 2 – 4 KPa.

[0118] Embodiments of the hair care accessory 200 described herein produce several advantages. For example, the arrangement of outlets 215 in the frame 202 and the plurality of outlets 208 formed at the second end 214 of rings 201 can evenly distribute airflow within the plenum chamber and along the length of the accessory 200. The positive air flow pressure generated within the lumen 210 of the frame 202 can improve adherence of hair to the accessory via a Coanda effect. As a result, the accessory can provide more efficient drying and styling of hair with improved permanency in applied styles.

[0119] In another embodiment, any of the hair care accessories disclosed herein can include heating elements. For example, hair care accessory 300 described herein can include one or more heating elements provided therein as shown in FIGS. 15A-17 and 19. The hair care accessory 300 can include the same features as the hair care accessory 200 except where noted otherwise. As shown in FIG. 15A, the hair care accessory 300 includes a plurality of rings 301 (rings 301A-301F) mounted atop a frame 302. In some aspects, each ring 301 can have a substantially annular, cylindrical shape having a hollow lumen therein extending between a first end 306 and a second end 307 of the ring, as shown by example in FIG. 15A for ring 301C.

However, the shape can vary and the rings need not be circular in cross-section. Other shapes, such as oval, oblong, or any other geometric or irregular shape are envisioned. In some embodiments one or more of the rings 201 can have an inverted tulip shape.

[0120] The rings 301 can be configured atop ring frames 313 shown in FIG. 15B. Ring 301F can include a substantially cylindrical shape as shown in FIGS. 15A and can correspond to ring 201F described in relation to the embodiment of hair care accessory 200 including ring frame 209.

Ring frame 353 can be coupled to the ring 301F and can include a plurality of outlets 354 and a plurality of vanes 355, 356 extending circumferentially around the ring frame 353 as shown in FIG. 16B. Vanes 355 can be configured to direct air flow F_1 through the outlets 305 in a first rotational direction upward along the length of the frame 302. Vanes 356 can be configured to direct air flow F_2 through the outlets 305 in a second rotational direction downward along the frame 302 via vanes 356.

[0121] An end cap 303 can be affixed to the frame 302 and an air inlet can be provided in the frame 302 to convey a fluid flow F to the plurality of outlets 305 formed at the second end 307 of rings 301. The fluid flow F can be conveyed through the outlets 305 such that air flow F_1 can be provided in an upward rotational direction or air flow F_2 can be provided in a downward rotational direction.

[0122] The hair care accessory 300 can include a cover 308 configured on the frame 302. The cover 308 can be configured to cover a printed circuit board (PCB) 309 arranged on a cylindrical housing 310 of the frame 302 as shown in FIG. 15B. The PCB 309 can be communicably coupled to a power supply received from a hair care appliance to which the hair care accessory 300 is attached. The PCB 309 can be coupled to the power supply via electrical connectors 311 connected to electrical contacts 312 configured in a proximal end 315 of the frame 302 as shown in FIG. 16B. When coupled to a hair care appliance, the power supply can be received via the electrical contacts 312 from the hair care appliance. The power supply can be conveyed from the PCB 309 via wiring W to a plurality of heating elements 314 (heating elements 314A-314D) configured on ring frames 313 (ring frames 313A-313D) as shown in FIG. 15B in which the rings 301A-301F shown in FIG. 15A have been removed. The heating elements 314 can be flexible heating elements that include a metal wire or mesh embedded within an insulative layer, such as a polyimide material. The heating elements 314 can be provided atop the surface 316 of one or more of the ring frames 313. In this way, the heating elements 314 can convey heat to rings 301 so as to provide a heated hair-contacting surface on which drying and styling of hair can be performed using the hair care accessory 300.

[0123] The heating elements 314 can be communicably coupled to the wiring W and to a plurality of busbars 317 as shown in FIGS. 16A and 17A-17B. The busbars 317 can be configured longitudinally along the frame 302 to electrically couple adjacent heating elements 314. For example, in FIG. 16A, ring frame 313A and 313B shown in FIG. 15B have been removed for clarity. The heating elements 314A and 314B can be shown coupled to busbars 317A and 317B. The busbar 317A can be electrically coupled to electrical connector 321 as shown in FIGS. 16A and 17A which can convey power received via the wiring W to the busbar 317A and to the heating element 314A. As shown in FIGS. 17A and B, the busbars 317 can be arranged in series to convey power received via the wiring W through the electrical connectors 321 and subsequently to heating elements 314. Each heating element 314 can be coupled to a busbar 317 via a plurality of terminal leads 320, such as terminal leads 320A-320D shown in FIG. 17A in which the ring frames 313 have been removed and in FIG. 17B in which the frame 302 has also been removed. The busbars 317 can be secured to the frame 302 via a plurality of screws 319. A first end of one busbar 317 can be secured to the frame 302 via a first screw of a first screw pair and a second end of the bus bar 317 can be secured to the frame 302 via a second screw of a second, longitudinally adjacent screw pair. For example, as shown in FIG. 16A, the busbar 317A can be secured to the frame 302 via a first screw 319-1 and a second screw 319-2.

[0124] A plurality of thermal cutout (TCO) switches 318 can also be configured longitudinally along the frame 302 as shown in FIGS. 17A and 17B. One or more TCOs 318 can correspond to each heating element 314. The TCO 318s can be configured to shut off power supplied to the heating elements when the heating element overheats and can act as a safety mechanism for the hair care accessory 300 to prevent burns or damage to the apparatus.

[0125] The frame 302 can include one or more substantially planar surfaces 332 and one or more substantially curved surfaces 333 extending longitudinally along its length as shown in FIGS. 18A and 18B. The planar surface 332 and curved surface 333 can be formed from columns 334 that extend from the cylindrical housing 346 of the frame 302. Rows 335 can extend between the columns 334 and a plurality of outlets 336 can be configured longitudinally along the frame 302 between the columns 334 and the rows 335. The cylindrical housing 346 can also include a plurality of outlets 336 extending circumferentially therearound.

[0126] At least one planar surface 332 can include a first plurality of channels 338 extending longitudinally along the frame 302. The channels 338 can be configured to receive the busbars 317 shown in FIGS. 16A, 17A and 17B. The channels 338 can include holes 340 therein configured to receive screws 319 that can couple the busbar 317 to the frame 302 within the

channel 338. A second plurality of channels 339 can also extend longitudinally along the frame 302. The channels 339 can be configured to receive the wiring W and the TCOs 318 shown in FIGS. 16A, 17A and 17B therein and to provide the wiring W and the TCOs 318 along the length of the frame 302.

[0127] At least one curved surface 333 can include a plurality of channels 337 formed within rows 335. The channels 337 can be longitudinally oriented along the frame 302 and within each row 335. The channels 337 can be configured to receive tab 328 of ring frame 313 shown in FIG. 19A when the ring frame 313 is mounted to the frame 302. The tab 328 received within the channel 337 can prevent rotational displacement of rings frames 313 around the frame 302. In some embodiments, the tab 328 can include one or more protrusions extending from an inner surface 327 of ring frame 313. As shown in FIGS. 19A and 19B, ring frame 313 can include a first end 325 and a second end 326. The diameter of the first end 325 can be less than the diameter of the second end 326 such that the first end 325 of a first ring frame 313, such as 313D, can be received within the second end 326 of an adjacent ring frame 313, such as 313C as shown in FIG. 16A.

[0128] Ring frame 313 can include a collar 329 extending circumferentially around the first end 325 and the tab 328 can be formed on the collar 329 on the inner surface 327 of the ring frame 313. The ring frame 313 can include a body 330 extending from the collar 329 toward the second end 326. The body 330 can include a frustoconical shape as shown in FIG. 19A and can include a lumen 347 therein. The ring frame 313 can be assembled onto the frame 302 by inserting the frame 302 through opening 349 at the second end 326, through the lumen 349, and through the opening 348 at the first end 325. The ring frame 313 can be rotated to align the tab 328 to be received within the channel 337 of the elongate frame. The ring frame 313 can be secured to the frame by securing screws 319 to the holes 340. The screws 319 can be provided through the holes 322 formed in tab 324 projecting from the first end 325 of the ring frame 313 as shown in FIG. 19B. Holes 323 can be configured adjacent to holes 322 to convey the terminal leads 320 to heating elements 314.

[0129] In some aspects, each ring frame 313 can have a substantially annular, cylindrical shape having a hollow lumen 349 therein extending between the first end 325 and the second end 326 of the ring frame 313, as shown in FIGS. 19A and 19B. However, the shape can vary and the ring frames need not be circular in cross-section. Other shapes, such as oval, oblong, or any other geometric or irregular shape are envisioned. In some embodiments one or more of the rings frames 313 can have an inverted cone shape.

[0130] Ring frame 313 can include a plurality of vanes 331 formed on the inner surface 347 thereof. The plurality of vanes 331 can extend between the first end 325 and the second end 326 of the ring frame 313. A plurality of outlets 305 can be formed circumferentially around the second end 326. The outlets 305 can be fluidically coupled to outlets 336 in the frame 302 to convey the fluid flow received via the lumen 345 of the frame 302 to the lumen 349 of the ring frame 313 into engagement with the vanes 331 and out through the outlets 305. The vanes 331 can be arranged in a first rotational direction or a second rotational direction that is opposite to the first rotational direction as described in relation to the embodiments of the hair care accessory 100 and 200 herein.

[0131] The frame 302 can include a frame base 342 shown in FIGS. 18A and 18B that can couple with a frame receiver 341 shown in FIGS. 16A-17B. The frame base 342 can include a tab 343 that can be received within a corresponding slot on the frame receiver and once coupled can prevent rotation of the frame 302 with respect to the frame receiver 341. A frame support 350 can be configured on the frame receiver 341 and can be inserted into the lumen 345 when the frame 302 is coupled with the frame receiver 341. The frame support 350 can include a cylindrical body 351 that can be sized to correspond to the inner diameter of the cylindrical housing 346. The cylindrical body 351 can be coupled to the frame receiver 341 via a longitudinal support 352 that extends from the frame receiver 341. The frame support 350 can provide rigidity to the elongate frame 302 when mounted to the frame receiver 341.

[0132] The hair care accessories 200 and 300 can advantageously provide fluid flows therefrom to enhance drying and/or styling of hair. For example, as shown in FIGS. 20A and 20B, the hair care accessories 200 and 300 include the plurality of rings 201 and 301 (including ring frames 313) configured in the first rotational direction R_1 as shown on the hair care accessory 200 of FIG. 14A and the ring frames 313 of the hair care accessory 300 of FIG. 19A. As shown in FIG. 20A, the fluid flow can be provided via the outlets 205, 308 of rings 201A, 301A-201E, 301E in a downward rotational direction F_A corresponding to the first rotational direction R_1 of vanes 220, 347. The ring 201F, 301F (including ring frame 353) can be configured to provide the fluid flow via the outlets 205A, 308A in the downward rotational direction F_A corresponding to the first rotational direction R_1 and in the upward rotational direction F_B via the outlets 205B, 308B. Advantageously, the fluid flows F_A and F_B can be merge at or in proximity of a longitudinal mid-point of the hair care accessory 200, 300 as shown in FIG. 20A. In this way, while fluid flow is provided circumferentially along the entire length of the hair care accessory 100, a user can more easily couple hair to the hair care accessory 200, 300 by bringing hair into contact with fluid flow provided in the middle of the hair care accessory 200, 300. As shown in FIG. 20B, the hair care

accessory 200, 300 can be configured to provide the fluid flows F_A and F_B from the rings 201A, 301A-201F-301F at a consistent velocity circumferentially around the rings 201A, 301A-201F, 301F.

[0133] The arrangement of the rings 301 and ring frames 313 on the frame 302 can form a plenum chamber which can provide a positive pressure to air flow within the frame that can be maintained as the air flow is distributed along the elongate member of the accessory 300 to the outlets 305. The outlets 305 can be formed by adjacent vanes 331 extending around the circumference of the surface 347 of the ring frames 313 and can be sized to control back pressure within the accessory 300 for even distribution of air to the outlets 305. The amount of back pressure imparted to the plenum chamber can be between about 2 – 4 KPa.

[0134] Embodiments of the hair care accessory 300 described herein produce several advantages. For example, the arrangement of outlets 336 in the frame 302 and the plurality of outlets 305 configured in the ring frames 313 can evenly distribute airflow within the plenum chamber and along the length of the accessory 300. The positive air flow pressure generated by the chamber formed by the frame 302 and/or the elongate member formed by the plurality of rings 301 and rings frames 313 can improve adherence of hair to the accessory via a Coanda effect. As a result, the accessory can provide more efficient drying and styling of hair with improved permanency in applied styles.

[0135] In another embodiment, as shown in FIGS. 21A-26, a hair care accessory 400 can include an elongate body 401 configured on an elongate frame 402. The body 401 can include a cylindrical cover 404 and an end cap 403 coupled to the first end 419 of the cover 404. In some embodiments, the end cap 403 can be coupled to the first end 421 of the frame 402. The body 401 can also include a plurality of elongate plates 405 which can extend longitudinally in between the frame 402 and the cover 404. The plates 405 can include a plurality of outlets 406 that can be configured in openings 407 in the cover 404. The outlets 406 can be fluidically coupled to an air inlet 408 configured in a cylindrical base 414 of the frame 402. The cylindrical base 414 of the frame 402 can include an appliance mating portion 411 configured to couple the hair care accessory 400 with a hair care appliance, such as a hair dryer. The attachment mating portion 411 can include at least one channel 412 and at least one slot 413 configured to engage a corresponding protrusion configured on an attachment mating portion of the hair care appliance. The hair care accessory 400 can be rotatably secured to the hair care appliance via the attachment mating portion 411.

[0136] When coupled, the hair care appliance can provide a fluid flow to the hair care accessory 400 via an air outlet of the hair care appliance. As shown in FIG. 21B, the fluid flow F can be received via the air inlet 408 and conveyed through a lumen 409 of the frame 402 toward the plurality of outlets 410. The outlets 410 can be configured to extend from a first surface 426 of the frame 402 adjacent to the lumen 409 through the frame 402 to a second surface 427 of the frame 402 as shown in FIG. 22. The outlets 410 can be fluidically coupled to the outlets 406 configured on the plates 405 such that the fluid flow F can pass through the outlets 406 and 410 and be provided around the circumference of the cover 404 for drying and/or styling of hair.

[0137] As shown in the exploded view of the hair care accessory 400 illustrated in FIG. 22, the cover 404 can have a unibody configuration and can include a plurality of openings 407 extending between an inner surface 415 and an outer surface 416 of the cover. The openings 407 can be arranged in columns that extend longitudinally between a first end 419 and a second end 420 of the cover 404 and in rows that extend circumferentially around the cover 404. Although the openings 407 are shown with a rectangular shape, a variety of opening shapes can be envisioned and the shape of openings 407 is not limited to rectangular shaped openings 407. The cover 404 can include a lumen 418 therein. A plurality of conduits 417 can be configured to project from the inner surface 415 toward the lumen 418. The conduits 417 can extend longitudinally along the inner surface 415 and can be configured to retain a heating element 428 therein to heat the cover 404. In some embodiments, the cover 404 can include a metal material or a thermally conductive material. In some embodiments, the cover 404 can include a coating on the second surface 416. The coating can include a metal, ceramic, or thermally conductive material.

[0138] The heating elements 428 can be powered via a power supply received via electrical contacts that can be configured in the cylindrical base 414 of the frame 402. The electrical contacts in the base 414 of the frame 402 can correspond to the electrical contacts 312 described in relation to the hair care accessory 300 and shown in FIG. 16B. When coupled to a hair care appliance, the power supply can be received from the hair care appliance by the electrical contacts and conveyed to the heating elements 428.

[0139] The frame 402 can include a substantially cylindrical shape extending between a first end 421 and a second end 422. The frame 402 can include one or more planar surfaces 425 configured on an outer surface 427 of the frame. The planar surfaces 425 can extend longitudinally along the length of the frame 402. The planar surfaces 425 can be configured to receive the conduits 417 therein when the cover 404 is assembled on to the frame 402. The

frame 402 can also include radially offset walls 429 that extend longitudinally along the frame 402. The walls 429 can form a longitudinal slot 430 therebetween. The plurality of outlets 410 can be configured within the slot 430. Although the plurality of outlets 410 are shown as a group of three individual outlets 431A-431C, other numbers of individual outlets can be envisioned, such as single individual outlets 431 or pairs of individual outlets 431. Similarly, although the plurality of outlets 410 are shown in groups of six extending longitudinally within the slot 430, in some embodiments, more or fewer groups of outlets 410 can be configured within the slots 430. The individual outlets 431 can have other shapes besides the rectangular shaped outlets 431 shown in FIG. 22. For example, in some embodiments, the outlets 431 can include circular, oval, triangular, or linear-shaped outlets.

[0140] The frame 402 can also include a plurality of ridges 424 that can be spaced circumferentially around the second surface 427 of the frame 402, such as ridges 424A-424D. The ridges 424 can extend longitudinally along the second surface 427 of the frame 402 between the first end 421 and the second end 422 of the frame 402. The ridges 424 can be located adjacent to the plurality of outlets 410. At least one radially offset wall 429 can form a portion of at least one ridge 424. The ridges 424 can be configured to couple with the slots 423 formed on a first surface 433 of plates 405. For example, the ridge 424A can be seated in the slot 423A to couple the plate 405A to the frame 402. The plates 405 can be sized such that the first end 435 can be co-planar or substantially flush with the first end 421 of the frame 402 and the second end 436 of the plate 405 can abut the collar 437 configured at the second end 422 of the frame 402. When the plates 405 are mounted to the frame 402, the plurality of outlets 406 can be aligned and fluidically coupled to the plurality of outlets 410 so as to convey the fluid flow F therethrough. In some embodiments, the frame 402 can include a flanged skirt 444 extending between the collar 437 and the shoulder 454 configured on the cylindrical base 414 of the frame 402 as shown in FIGS. 22 and 30A. The flanged skirt 444 can extend around the frame 402 adjacent to the cylindrical base 414 and can have a substantially frustoconical profile.

[0141] Assembling the hair care accessory 400 can include positioning the plates 405 within the lumen 418 of the cover 404 and aligning the plurality of outlets 406 with the plurality of openings 407. The plates 405 can be pressed radially toward the first surface 415 of the cover 404 such that the plurality of outlets 406 are received within the plurality of openings 407. The cover 404 with plates 405 attached thereto can then be coupled with the frame 402 by aligning the slots 423 with the ridges 424 and sliding the cover 404 with plates 405 attached thereto over the first end 421 of the frame 402 and down along the length of the frame 402 such until the second end 420 of the cover 404 with plates 405 disposed therein abuts the collar 437.

[0142] The plates 405 can be seen in more detail in FIGS. 23A illustrating a first side 434 of plate 405 and in FIG. 23B illustrating a second side 433 of plate 405. The plates 405 include a plurality of outlets 406A-406F configured longitudinally along the plate 405. As shown in FIG. 23A, the plurality of outlets 406 can be formed on bridge elements 439 extending between opposing longitudinal rails 438. A plurality of openings 442 can extend between opposing rails 438 and can be configured longitudinally along the plate 405 between adjacent bridge elements 439. Each bridge element 439 can include a first wall 445 that extends from rail 438 and is radially offset from a second wall 446 that extends from an opposing rail 438. A longitudinal slot 443 can be located in between the radially offset walls 445 and 446. The longitudinal slot 443 can correspond to an individual outlet of an outlet pair included in the plurality of outlets 406. In some embodiments, the plurality of outlets 406 may not include outlet pairs and can include any number of individual slots 443 that are longitudinally distributed along the plate 405 as outlets 406.

[0143] The longitudinal slots 443 can be separated by a vane 441. For example, as shown in FIG. 23A, outlet 406C can include slots 443A and 443B which can be separated by vane 441A. Thus, the individual outlets (e.g., slots 443A and 443B) of outlet 406C can be separated by vane 441A having a first orientation. Similarly, the individual outlets (e.g., slots 443C and 443D) of outlet 406F can be separated by a vane 441B having a second orientation that is different than the orientation of vane 441A. In some embodiments, the first orientation of vane 441 can be toward the second end 436 of plate 405 and thus toward the second 422 of the frame 402 when the plate 405 is coupled to the frame. This first orientation can be seen in vane 441A of outlets 406C. Vane 441A can be configured to direct the fluid flow F in a downward direction along the body 401. In some embodiments, the second orientation of vane 441 can be toward the first end 435 of plate 405 and thus toward the first 421 of the frame 402 when the plate 405 is coupled to the frame. This second orientation can be seen in vane 441B of outlets 406F. Vane 441B can be configured to direct the fluid flow F in an upward direction along the body 401. A non-limiting arrangement of vane 441 orientations can be envisioned within outlets 406. Advantageously, the orientations of vanes 441 can be configured within outlets 406 to concentrate the fluid flow F toward a mid-point of the body 401 of the hair care accessory 400.

[0144] As shown in FIG. 24, a cross-sectional view of the hair care accessory 400 is illustrated showing the fluid flow F received via the lumen 418 of the frame 402 being diverted through the outlets 406 and circumferentially around the body 401. The fluid flow F can be diverted into outlet 431 and into the bridge element 439. The fluid flow F can be diverted by a curved surface

449 of wall 445 of plate 405 through the slot 443 and out through the outlet 406 so as to wrap around the body 401 of the hair accessory 400.

[0145] In a more detailed view illustrated in FIG. 25, the fluid flow F can be diverted by the curved portion 449 of wall 445 into a channel 452 formed between surface 451 of wall 445 and surface 450 of ridge 424. The surface 450 of ridge 424 can have a sloped or curved profile as shown in FIGS. 24 and 25. The fluid flow F can pass through the channel 452 and exit through slot 443 of outlet 406. The slot 443 can be formed between radially offset walls 445 and 446 of plate 405. Wall 446 can include a sloped surface 453 configured to guide the fluid flow F through outlet 406 such that the fluid flow adheres to the surface 416 of the cover 404 and wraps circumferentially around the cover 404.

[0146] The resultant fluid flow F provided via the outlets 406 is illustrated in FIG. 26 where the orientation of vanes 441 and their arrangement along the body 401 is shown. Outlets 406A-406E can include vane 441A oriented in the first orientation as described in relation to FIG. 23A to direct the fluid flow F_A substantially downward along the body 401. Outlet 406F can include vane 441B oriented in the second orientation that is opposite to the first orientation. Vane 441B can be configured to direct the fluid flow F_B substantially upward along the body 401. The fluid flows F_A and F_B can combine to form a resultant fluid flow F that is provided circumferentially around the middle of the body 401 (e.g., a location corresponding to outlets 406C-406D). A portion of the fluid flow F_C can be entrained upward to the middle of the body 401 even though outlet 406E is configured with vane 441A oriented in the first orientation.

[0147] The arrangement of the plates 405 on the frame 402 can form a plenum chamber which can provide a positive pressure to air flow within the frame 402 that can be maintained as the air flow is distributed along the elongate member of the accessory 400 to the outlets 406. The outlets 406 can be formed as a longitudinal slot 442 between adjacent radially offset walls 445 by vanes 441 separating slots 443 within bridge elements 439 that extend along the plates 405 and can be sized to control back pressure within the accessory 400 for even distribution of air to the outlets 406. The amount of back pressure imparted to the plenum chamber can be between about 2 – 4 KPa.

[0148] Embodiments of the hair care accessory 400 described herein produce several advantages. For example, the arrangement of outlets 410 in the frame 402 and the plurality of outlets 406 in plates 405 can evenly distribute airflow within the plenum chamber and along the length of the accessory 400. The positive air flow pressure generated by the chamber formed by the frame 402 and/or the plates 405 arranged on the frame 402 can improve adherence of hair to the accessory

via a Coanda effect. As a result, the accessory can provide more efficient drying and styling of hair with improved permanency in applied styles.

[0149] In some embodiments, the hair care accessories described herein can include a heater assembly disposed within a body of the hair care accessory. For example, the heating element 313 described in relation to the hair care accessory 300 can include a heater assembly as described herein. Additionally, or alternatively, the heating element 428 can include a heater assembly as described herein. An exemplary embodiment of a heater assembly 500 is illustrated in the cross-sectional view of FIG. 27. The heater assembly 500 can include an outer wall 501, a heating element 502, a pressure plate 503, and a protective sheet 504 arranged in a stacked formation as shown in FIG. 27. In some embodiments, the heater assembly 500 may exclude the pressure plate 503 and/or the protective sheet 504.

[0150] In some embodiments, the outer wall 501 can include a portion of a ring 301 or cover 404. The outer wall 501 can include a hair contacting surface 501A. In some embodiments, the hair contacting surface 501A can include a metal, ceramic, or thermally conductive material. In some embodiments, the hair contacting surface 501A can include a coating that includes a metal, ceramic, or thermally conductive material therein.

[0151] The heating element 502 can include a thin-film flexible heating element configured between the outer wall 501 and a pressure plate 503. The heating element 502 can include a conductive wire or similar heating element configured within a resin or plastic substrate, such as a polyimide film. The heating element 502 can have an operating range between 0 and 205 degrees C. Advantageously, the heating element 502 can be configured in different manners due to the flexible substrate.

[0152] The heater assembly 500 can also include a pressure plate 503 adjacent to the heating element 502. The pressure plate 503 can be configured to maintain the heating element in contact with the outer wall 501 such that a maximal amount of thermal energy produced by the heating element 502 can be conveyed to (and/or through) the outer wall 501 to the hair contacting surface 501A. In some embodiments, the pressure plate 503 can include one or more force transmission elements configured to maintain the pressure plate 503 against the heating element 502. In some embodiments, the force transmission element can include a compression spring.

[0153] The heater assembly 500 can also include a protective sheet 504. In some embodiments, the protective sheet 504 can include a mica material. The protective sheet 504 can be provided

between the pressure plate 503 and an adjacent surface, such as ring frame 313 or a wall of conduit 417 to protect the heater assembly 500.

[0154] Another embodiment of a heater assembly 600 is illustrated in the perspective view of FIG. 28. The heater assembly 600 can correspond to the heater assembly 500 except where noted otherwise. The heater assembly 600 can include an outer wall 601, which can include a hair contacting surface 601A. A recession 601B can be formed opposite to the hair contacting surface 601A. The recession 601B can be configured and sized to receive the heating element 602 therein. The heating element 602 can be coupled to a power supply PS via an electrical connector 607 and wiring W. The power supply PS can be provided via a hair care appliance to which a hair care accessory including the heater assembly 600 can be coupled. In some embodiments, the electrical connector 607 can correspond to electrical connectors 312 or 321 described herein in relation to the hair care accessory 300. As further shown, the pressure plate 603 can include a protective sheet 604 and a plurality of compression springs 605. The protective sheet 604 can include cutouts 606 therethrough to allow coupling of the compression springs 605 to the pressure plate 603.

[0155] Another embodiment of a heater assembly 700 is illustrated in a top view of FIG. 29. The heater assembly 700 can correspond to the heater assemblies 500 and 500 except where noted otherwise. The heater assembly 700 can include a plurality of heating elements 701 that can be coupled to a ring 702 having an opening 704, an inner wall 706 and an outer wall 705. In some embodiments, the ring 702 can include a non-heated material. The opening 704 of ring 702 can be received over a terminal end of a frame of the hair care accessories described herein. The terminal end of the frame can correspond to an end of the frame that is opposite an end of the frame that includes the air inlet configured therein. With the opening 704 coupled to the terminal end of the frame, the heating elements 701A and 701B can be folded down such that they are positioned between the frame and an outer wall of the hair care accessories 100-400 described herein. The outer wall can correspond to a plate 101, ring 301, ring frame 313, or cover 404 of the hair care accessories 100-400 described herein.

[0156] The heating elements 701A and 701B can be coupled to a power supply PS via electrical connectors 703A and 703B and wiring W. The power supply PS can be provided via a hair care appliance to which a hair care accessory including the heater assembly 700 can be coupled. In some embodiments, the electrical connector 703A and 703B can correspond to electrical connectors 312 or 321 described herein in relation to the hair care accessory 300.

[0157] As shown in FIGS. 30A and 30B, the heater assembly 500 can be configured on or within the hair care accessory 400 described in relation to FIGS. 21A-26. For example, in FIG. 30A, the cover 404 has been removed for clarity to show the arrangement of the heating elements 502 extending longitudinally along the frame 402 of the hair care accessory 400 between the first end 421 and the second end 422 thereof. In some embodiments, multiple heating elements 502 can be spaced apart longitudinally along the frame 402 such that a plurality of heating elements 502 extend longitudinally at a given circumferential location of the frame 402. The heating elements 502 can be circumferentially arranged on the frame 402 at locations adjacent to the plates 405. In this way, the heating elements 502 can advantageously heat the fluid flow F provided via the outlets 406 due to locating the heating element 502 adjacent to the fluid flow F exiting the outlets 406.

[0158] A number of heater assemblies 500 can be located circumferentially around the frame 402. For example, as shown in FIG. 30B, the hair care accessory 400 can include four heater assemblies 500 configured on the frame 402. In some embodiments, 2, 3, 4, 5, 6, 7, or 8 heater assemblies 500 can be configured on the hair care accessory 400. The heater assembly 500 can be configured on the frame 402 such that a protective sheet 504 can be located adjacent to the frame 402 and the pressure plate 503. The heating element 502 can be configured radially adjacent to the pressure plates 503 such that the heating element 502 is configured in between the pressure plate 503 and the cover 404. The cover 404 can form the outer wall 501 of the heater assembly 500. The outer surface of the cover 404 can be a hair contacting surface 501A that can be heated by the heating elements 502 for drying and/or styling of hair.

[0159] Embodiments of the heating assemblies 500, 600 and 700 described herein produce several advantages. For example, the thin and flexible configuration of heating elements 502, 602, and 701 can enable their use in a variety of low-volume spaces where traditional heating elements, such as Cal rods, may not be positioned due to their size and rigid construction. As a result, the heating elements described herein can be more easily located adjacent to hair-contacting surfaces of the accessories described herein. This can improve the transfer of heat to the surfaces of the rings 201 or cover 404 for heating, drying, and styling of hair.

[0160] Certain exemplary embodiments have been described to provide an overall understanding of the principles of the structure, function, manufacture, and use of the systems, devices, and methods disclosed herein. One or more examples of these embodiments have been illustrated in the accompanying drawings. Those skilled in the art will understand that the systems, devices, and methods specifically described herein and illustrated in the accompanying drawings are non-

limiting exemplary embodiments and that the scope of the present invention is defined solely by the claims. The features illustrated or described in connection with one exemplary embodiment may be combined with the features of other embodiments. Such modifications and variations are intended to be included within the scope of the present invention. Further, in the present disclosure, like-named components of the embodiments generally have similar features, and thus within a particular embodiment each feature of each like-named component is not necessarily fully elaborated upon.

[0161] Approximating language, as used herein throughout the specification and claims, may be applied to modify any quantitative representation that could permissibly vary without resulting in a change in the basic function to which it is related. Accordingly, a value modified by a term or terms, such as “about,” “approximately,” and “substantially,” are not to be limited to the precise value specified. In at least some instances, the approximating language may correspond to the precision of an instrument for measuring the value. Here and throughout the specification and claims, range limitations may be combined and/or interchanged, such ranges are identified and include all the sub-ranges contained therein unless context or language indicates otherwise.

[0162] One skilled in the art will appreciate further features and advantages of the invention based on the above-described embodiments. Accordingly, the present application is not to be limited by what has been particularly shown and described, except as indicated by the appended claims. All publications and references cited herein are expressly incorporated by reference in their entirety.

CLAIMS

1. A hair care accessory comprising:
an elongate frame having a longitudinal axis and an inner lumen extending there through along the longitudinal axis; and
a plurality of plates disposed on the elongate frame, the plurality of plates including a first row of plates spaced circumferentially around a first longitudinal portion of the elongate frame, and at least one second row of plates spaced circumferentially around a second longitudinal portion of the elongate frame, each plate in the first row of plates defining a first longitudinally extending outlet and each plate in the second row of plates defining a second longitudinally extending outlet, the second longitudinally extending outlet being circumferentially offset from the first longitudinally extending outlet.
2. The hair care accessory of claim 1, wherein the elongate frame comprises a plurality of outlet groups spaced circumferentially around the elongate frame in the first and second longitudinal portions of the elongate frame.
3. The hair care accessory of claim 2, wherein a first plurality of outlet groups in the first longitudinal portion of the elongate frame are circumferentially offset from a second plurality of outlet groups in the second longitudinal portion of the elongate frame.
4. The hair care accessory of claim 2, wherein the plurality of outlet groups of the elongate frame are fluidically coupled to the inner lumen of the elongate frame and are configured to direct air from the inner lumen of the elongate frame through the first and second longitudinally extending outlets.
5. The hair care accessory of claim 2, wherein an outlet group of the plurality of outlet groups comprises two or more outlets, the two or more outlets being circumferentially offset from one another.
6. The hair care accessory of claim 2, wherein the first and second longitudinally extending outlets are configured to convey air circumferentially around the first and second row of plates respectively.
7. The hair care accessory of claim 1, wherein plates of the first and second rows of plates comprise an inner surface adjacent to the elongate frame, the inner surface comprising a plurality of vanes adjacent to the first and second longitudinally extending outlets and protruding toward the elongate frame.

8. The hair care accessory of claim 7, wherein one or more vanes of the plurality of vanes further comprise a spacing element opposite the first and second longitudinally extending outlets, the spacing element configured to maintain a gap between the elongate frame and plates of the first and second rows of plates.
9. The hair care accessory of claim 1, further comprising an appliance mating portion positioned at a first end of the elongate frame, the appliance mating portion configured to detachably couple the elongate frame to a hair care appliance.
10. The hair care accessory of claim 9, wherein the appliance mating portion comprises an air inlet at which air is received from the hair care appliance.
11. A hair care accessory, comprising:
a hollow elongate frame having a plurality of opening sections, each opening section comprising at least one curved wall oriented to direct fluid flow in a radially outward and in a circumferential direction; and
a plurality of plates mounted on the hollow elongate frame, each plate positioned over at least one of the opening sections such that the plate and the at least one curved wall of the at least one opening section define at least one elongated outlet, and wherein airflow directed through the at least one elongated outlet is configured to flow circumferentially around at least a portion of an outer surface at least one of the plurality of plates.
12. The hair care accessory of claim 11, wherein the plurality of opening sections are arranged circumferentially in rows around and longitudinally along the hollow elongate frame.
13. The hair care accessory of claim 12, wherein opening sections of a first row are rotationally offset from opening sections of a second row, the first row being longitudinally adjacent to the second row along the hollow elongate frame.
14. The hair care accessory of claim 11, wherein each opening section includes two or more outlets adjacent to the at least curved wall and configured to convey air across the at least one curved wall and through the at least one elongated outlet.
15. The hair care accessory of claim 14, wherein adjacent outlets of the two or more outlets are circumferentially offset from one another within each opening section.

16. The hair care accessory of claim 11, wherein each plate comprises an attachment hook on an inner surface thereof, the attachment hook configured to couple with the at least one curved wall of each opening section.
17. The hair care accessory of claim 11, wherein each plate is positioned over at least one of the opening sections via one or more ridges protruding from an inner surface of each plate, the one or more ridges configured to maintain a gap between the hollow elongate frame and each plate.
18. The hair care accessory of claim 17, wherein a height of the gap corresponds to a height of the at least one elongated outlet.
19. The hair care accessory of 11, wherein the plurality of plates includes a plurality of plate pairs, each plate pair comprising a first plate and a second plate, the second plate circumferentially offset from the first plate.
20. The hair care accessory of claim 11, further comprising an appliance mating portion positioned at a first end and an end cap positioned at a second end opposite the first end, the appliance mating portion configured to detachably couple the hollow elongate frame to a hair care appliance and the end cap comprising a heat-resistant material.
21. A hair care accessory comprising:
a hollow elongate frame having a first plurality of outlets formed therein and an air inlet at a first end thereof;
a plurality of rings positioned over the hollow elongate frame and at least partially overlapping one another, each ring having a plurality of vanes formed on an inner surface thereof, the plurality of vanes being configured to receive fluid from the first plurality of outlets and to direct fluid through a second plurality of outlets formed between adjacent rings such that fluid flows circumferentially around an outer surface of the plurality of rings.
22. The hair care accessory of claim 21, further comprising at least one heating element disposed on at least one of the plurality of rings and the hollow elongate frame.
23. The hair care accessory of claim 21, wherein each of the plurality of rings has a first portion with an outer diameter that is greater than an outer diameter of a second portion.
24. The hair care accessory of claim 21, wherein the plurality of vanes are spiral-shaped, and wherein a first ring of the plurality of rings has spiral-shaped vanes oriented in a first rotational

direction and a second ring of the plurality of rings has spiral shaped vanes oriented in a second rotational direction opposite to the first rotational direction.

25. The hair care accessory of claim 21, wherein the first ring is positioned adjacent to a first end of the elongate hollow frame, the first end comprising the air inlet.

26. The hair care accessory of claim 21, wherein the plurality of vanes extend at an angle between 5 degrees and 45 degrees relative to a longitudinal axis of the hollow elongate frame.

27. The hair care accessory of claim 21, wherein the plurality of vanes have a height configured to create a gap between overlapping rings, the gap between each of the plurality of rings defining the second plurality of outlets.

28. The hair care accessory of claim 21, further comprising an appliance mating portion positioned at one end of the hollow elongate frame, the appliance mating portion configured to couple the hollow elongate frame to a hair care appliance.

29. A hair care accessory, comprising:
a hollow elongate frame having a first end with an appliance mating portion and a second end;
a first ring disposed over the hollow elongate frame; and
a second ring disposed over the hollow elongate frame and having a first end position over a second end of the first ring and spaced radially outward from the first ring such that a circumferential gap is formed between the first and second rings, the circumferential gap having at least one first vane configured to divert fluid flowing from the hollow elongate frame through the circumferential gap in a circumferential direction around the first ring.

30. The hair care accessory of claim 29, further comprising a third ring disposed over the hollow elongate frame and having a first end position over a second end of the second ring and spaced radially outward from the second ring such that a second circumferential gap is formed between the second and third rings, the second circumferential gap having at least one second vane configured to divert fluid flowing from the hollow elongate frame through the second circumferential gap in a circumferential direction around the second ring.

31. The hair care accessory of claim 30, wherein the at least one first vane and the at least one second vane are angled relative to the longitudinal axis to direct fluid in the same circumferential direction.

32. The hair care accessory of claim 29, further comprising a base ring positioned around the hollow elongate frame, the base ring being positioned between the first ring and the appliance mating portion.
33. The hair care accessory of claim 32, wherein at least one third vane is positioned between the base ring and the hollow elongate frame and is configured to direct fluid flow in a circumferential direction.
34. The hair care accessory of claim 33, wherein the at least one third vane is configured to direct fluid flow in a first direction and wherein the at least one first and second vanes are configured to direct fluid flow in a second direction opposite the first direction.
35. The hair care accessory of claim 29, wherein the hollow elongate frame includes a first portion adjacent to the appliance mating portion having a plurality of first openings therein, and a second portion extending from the first portion and having a plurality of second openings therein that differ in shape than the plurality of first openings.
36. The hair care accessory of claim 35, wherein the second plurality of openings comprise a first group of openings arranged longitudinally along the hollow elongate frame and a second group of openings arranged longitudinally along the hollow elongate frame.
37. The hair care accessory of claim 36, wherein the first group of openings are configured to divert the fluid flow from the hollow elongate frame to the circumferential gap via the at least one first vane.
38. The hair care accessory of claim 36, wherein a portion of the second group of openings are located between annular frame elements located along a length of the hollow elongate frame.
39. The hair care accessory of claim 38, wherein the annular frame elements comprise a channel on an outer surface thereof at which a tab of at least one of the first, second, or third rings is received to secure the at least one of the first, second, or third rings to the hollow elongate frame, the tab protruding from an inner surface of the at least one of the first, second, or third rings.
40. A hair care accessory comprising:
an elongate hollow frame having a fluid flow path extending there through between an air inlet and a first plurality of outlets spaced circumferentially around and longitudinally along the elongate hollow frame;

a plurality of elongate plates positioned on the elongate hollow frame and having a second plurality of outlets positioned in alignment with the first plurality of outlets, the second plurality of outlets configured to divert fluid flowing along the fluid flow path in a circumferential direction around the plurality of elongate plates; and

an elongate hollow cover positioned over the elongate hollow frame and having a plurality of openings aligned with the plurality of first and second outlets.

41. The hair care accessory of claim 40, wherein the elongate hollow cover comprises a unibody cylindrical body.
42. The hair care accessory of claim 40, wherein the plurality of openings are arranged in rows and columns on the elongate hollow cover.
43. The hair care accessory of claim 40, further comprising an appliance mating portion adjacent to the air inlet and configured to couple the elongate hollow frame to a hair care appliance.
44. The hair care accessory of claim 40, wherein the plurality of openings in the elongate hollow cover extend in a plurality of rows spaced longitudinally along the elongate hollow cover and a plurality of columns spaced circumferentially around the elongate hollow cover.
45. The hair care accessory of claim 40, wherein the second plurality of outlets includes a plurality of outlet pairs spaced longitudinally along the plurality of elongate plates, each outlet pair being separated by a vane.
46. The hair care accessory of claim 45, wherein the elongate hollow frame has a first end adjacent to the air inlet and a second end, and wherein the plurality of outlet pairs comprises a first outlet pair having a first vane configured to direct airflow toward the second end, and a second outlet pair having a second vane configured to direct airflow toward the first end.
47. The hair care accessory of claim 46, wherein the first outlet pair is positioned adjacent to the first end.
48. The hair care accessory of claim 40, wherein each of the second plurality of outlets is defined by first and second radially offset walls defining a longitudinal slot therebetween.
49. The hair care accessory of claim 48, wherein each elongate plate comprises first and second longitudinally extending rails spaced a distance from one another, and wherein the first

and second radially offset walls of each of the second plurality of outlets form a bridge element extending between the first and second rails.

50. The hair care accessory of claim 40, wherein the elongate hollow frame comprises a plurality of ridges spaced circumferentially there around, the plurality of ridges extending longitudinally along the elongate hollow frame adjacent to the second plurality of outlets in the plurality of plates.

51. The hair care accessory of claim 50, wherein each ridge has an angled surface for directing fluid through the second plurality of outlets.

52. The hair care accessory of claim 40, wherein the outer cover includes at least one conduit extending therethrough having a heating element therein.

53. The hair care accessory of claim 52, further comprising an electrical connector adjacent to the air inlet and configured to electrically couple to a hair care appliance to convey power from the hair care appliance to the heating element in the at least one conduit.

54. A hair care accessory, comprising:
a hollow cylindrical body having a plurality of rows of outlets spaced longitudinally there along between first and second ends thereof;
a cylindrical cover positioned over the hollow cylindrical body and having a plurality of rows of openings spaced longitudinally there along between first and second ends thereof, the plurality of rows of openings at least partially overlapping the plurality of rows of outlets; and
a plurality of plates positioned between the hollow cylindrical body and the cylindrical cover, the plurality of plates having diversion openings therein and configured to direct airflow from the plurality of rows of outlets through the plurality of rows of openings in a circumferential direction around the cylindrical cover.

55. The hair care accessory of claim 54, further comprising at least one heater between the cylindrical cover and the hollow cylindrical body configured to heat hair wrapped around the cylindrical cover.

56. The hair care accessory of claim 54, wherein the diversion openings are defined by first and second radially offset plates defining a slot therebetween.

57. The hair care accessory of claim 54, wherein each diversion opening comprises a pair of openings separated by a vane.

58. The hair care accessory of claim 57, wherein a first vane of a first diversion opening of the plurality of diversion openings is angled to direct airflow toward the first end of the cylindrical cover and a second vane of a second diversion opening of the plurality of diversion openings is angled to direct airflow toward the second end of the cylindrical cover.

59. The hair care accessory of claim 54, further comprising a mating portion at the first end of the hollow cylindrical body configured to mate with a hair care appliance.

60. A hair care accessory, comprising:
an elongate body having an outer wall forming a heated hair contacting surface; and
at least one heater assembly disposed within the body, the at least one heater assembly including at least one heating element positioned adjacent to the outer wall, a pressure plate positioned adjacent to the at least one heating element and a protective sheet extending over at least a portion of the pressure plate.

61. The hair care accessory of claim 60, wherein the pressure plate comprises a first surface adjacent to the at least one heating element and a second surface opposite the first surface, the second surface being adjacent to the protective sheet.

62. The hair care accessory of claim 61, wherein the pressure plate comprises at least one force transmission element arranged on the second surface and configured to maintain the pressure plate adjacent to the at least one heating element.

63. The hair care accessory of claim 62, wherein the at least one force transmission element comprises a compression spring.

64. The hair care accessory of claim 60, wherein the at least one heating element comprises a polyimide film.

65. The hair care accessory of claim 60, wherein the protective sheet comprises a mica material.

66. The hair care accessory of claim 60, wherein the elongate body includes an electrical connector configured to power the at least one heater assembly via power received from a hair care appliance.

67. The hair care accessory of claim 60, wherein the elongate body comprises a lumen configured to receive a fluid flow from a hair care appliance via an air inlet at a proximal end of the body.

68. A heater assembly comprising:

a wall having an inner surface and an outer surface, a heating element positioned adjacent to the inner surface of the wall, a plate positioned adjacent to the heating element and configured to maintain the heating element in contact with the inner surface of the wall, and a power supply configured to power the heating element.

69. The heater assembly of claim 68, wherein the outer surface of the wall comprises a heated hair contacting surface of a hair care appliance or a hair appliance accessory.

70. The heater assembly of claim 68, wherein the plate is configured to maintain the heating element in contact with the inner surface of the wall via one or more springs positioned between the plate and a wall of a housing of a hair care appliance or a hair appliance accessory.

71. The heater assembly of claim 68, wherein the plate is configured to maintain the heating element in contact with the inner surface of the housing via pressure fitting the heater assembly within a housing of a hair care appliance or a hair appliance accessory.

72. The heater assembly of claim 68, further comprising a mica sheet abutting the pressure plate.

73. A hair curler accessory comprising:

a hollow elongate frame with a plurality of plates positioned circumferentially around the hollow elongate frame, the plurality of plates forming outlets therebetween; and

a heater assembly comprising a ring having an inner wall forming an opening of the ring and an outer wall opposite the inner wall and a plurality of elongate flexible heating elements extending radially from the outer wall, the ring being configured to be received over the hollow elongate frame such that the plurality of elongate flexible heating elements are positioned between the hollow elongate frame and the plurality of plates.

74. The hair curler accessory of claim 73, wherein the plurality of elongate flexible heating elements includes a polyimide film.

75. The hair curler accessory of claim 73, wherein the ring comprises a non-heated material.

76. The hair curler accessory of claim 73, wherein respective elements of the plurality of elongate flexible heating elements include wiring configured to convey power to the respective elements, the power provided via a hair care appliance detachably coupled to the hair curler accessory.