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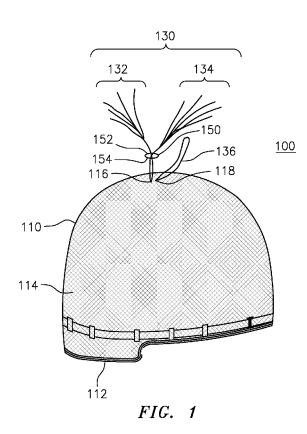
US

- (71) Applicant: SHAKE-N-GO FASHION, INC. [US/US]; 85 Harbor Road, Port Washington, NY 11050 (US).
- (72) Inventors: KIM, James, K.; c/o Shake-n-go Fashion, Inc., 85 Harbor Road, Port Washington, NY 11040 (US). KIM, Hye, Sun; c/o Shake-n-go Fashion, Inc., 85 Harbor Road, Port Washington, NY 11040 (US).

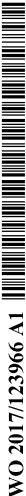
- (74) Agent: VOLK, Brian, R.; Cowan, Liebowitz & Latman, P.C., 114 West 47th Street, New York, NY 10036 (US).
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(54) Title: HAIR BUNDLES, HAIR WIG SYSTEM, METHOD OF SECURING HAIR BUNDLES, AND METHOD OF MANUFACTURING HAIR BUNDLES



(57) Abstract: A method of securing a hair bundle to a user's natural hair is provided. The method includes providing the hair bundle comprising one or more strands of artificial hair. The method further includes providing a ring member and coupling the ring member to the hair bundle. At least a portion of a semicircle member of the bundle of hair is introduced through the user's natural hair and at least a portion of the first hair segment and the second hair segment is introduced through the semicircle member. The method includes tightening the hair bundle around the user's natural hair by moving the ring member away from the ends of at least one of the first hair segment and the second hair segment.



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# HAIR BUNDLES, HAIR WIG SYSTEM, METHOD OF SECURING HAIR BUNDLES, AND METHOD OF MANUFACTURING HAIR BUNDLES

#### CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to U.S. Provisional Patent Application No. 62/278,752 filed on January 14, 2016, the entire content of which is incorporated herein by reference.

#### **BACKGROUND OF THE INVENTION**

#### 1. Field of the Invention

[0002] The present invention relates generally to hair extensions, and in particular to hair bundles, methods of securing hair bundles, a hair wig system, and methods of securing a hair bundle to the hair wig system.

### 2. Description of Related Art

[0003] Hair extensions and wigs are used by people to enhance their appearance. Wigs generally include multiple strands of hair attached to a cap to form a unit that can be secured to an user's scalp. Hair weaves and hair extensions are also used by people to either conceal or supplement their natural hair. In some cases, people use wigs when they are experiencing baldness or thinning of their natural hair. For those experiencing baldness or

thinning of natural hair, use of wigs provides an alternative to use of potentially dangerous hair growth drugs or chemicals, or uncomfortable hair plugs. In other cases, people use wigs for temporary purposes when they are undergoing medical treatments that result in loss of their hair, such as chemotherapy.

[0004] Hair extensions and wigs are also used to provide a user with an alternative hair color in order to improve their appearance. Furthermore, hair extensions and wigs can be used by people to present an alternative texture to their own hair, such as changing their hair from straight to curly. Just as many people enjoy accessorizing their wardrobe, people who wear hair extensions and wigs enjoy changing and enhancing their appearance.

#### **SUMMARY OF THE INVENTION**

[0005] According to embodiments of the present invention, a system for securing artificial hair to a hair wig is provided. The system includes a hair bundle comprising one or more strands of artificial hair, the hair bundle comprising a first hair segment, a second hair segment, and a third hair segment comprising a loop formed by the first hair segment and the second hair segment. The system also includes a ring member comprising a top portion side and a bottom portion side, the ring member being coupled to the hair bundle such that each of the first hair segment and the second hair segment are disposed on the top portion side and the third hair segment is disposed on the bottom portion side.

[0006] According to further embodiments: the third hair segment is disposed between the first hair segment and the second hair segment along a length of the hair bundle; the ring member comprises an inner layer and an outer layer, wherein the inner layer is constructed out of a first material and the outer layer is constructed out of a second material, and wherein the first material is different from the second material; the first material is an elastic material; and the ring member comprises a loop.

[0007] According to an additional embodiment, a hair wig system is provided. The hair wig system includes: a mesh layer configured to cover a user's head comprising an inner surface side, an outer surface side, a first mesh aperture and a second mesh aperture; hair bundle, at least a first portion of which is disposed within the first mesh aperture and at least a second portion of which is disposed in the second mesh aperture, the hair bundle comprising a first hair segment, a second hair segment, and a third hair segment, the third hair segment being disposed between the first hair segment and the second hair segment, the hair bundle being configured to be coupled to the mesh layer such that the first hair segment and the second hair segment are located on the outer surface side and the third hair segment is located on the outer surface side; and a ring member comprising a top portion side and a bottom portion side, the ring member being coupled to the hair bundle such that each of the first hair segment and the second hair segment are located on the top portion side and the third hair segment is located on the bottom portion side.

[0008] According to further embodiments: at least a first portion of the third hair segment is disposed on the outer surface side and at least a second portion of the third hair

segment is disposed on the inner surface side, and wherein at least a third portion of the third hair segment is disposed within the first mesh aperture and at least a fourth portion of the third hair segment is disposed within the second mesh aperture; the first portion of the third hair segment, the second portion of the third hair segment, the third portion of the third hair segment and the fourth portion of the third hair segment are distinct sections of the third hair segment; the first mesh aperture is adjacent to the second mesh aperture; the ring member comprises a loop comprising an interior portion and an exterior portion, and wherein the first hair segment and the second hair segment are at least partially disposed within the interior portion of the loop; at least a portion of the third hair segment is configured as a semi-circle, the semi-circle comprising an interior portion and an exterior portion, and wherein at least a portion of each of the first hair segment and the second hair segment is at least partially disposed within the interior portion of the semi-circle of the third hair segment; the ring member is at least partially disposed within the interior portion of the semi-circle; the ring member comprises an inner layer and an outer layer, wherein the inner layer is constructed out of a first material and the outer layer is constructed out of a second material, and wherein the first material is different from the second material; the first material is an elastic material; each hair bundle comprises multiple strands of hair comprising artificial hair and wherein the multiple strands of hair comprise curly, straight, crimped, or wavy hair textures and combinations thereof.

[0009] According to an additional embodiment, a hair wig system is provided. The system includes: a mesh layer configured to cover a user's head comprising an inner surface,

an outer surface, a front region, a rear region, and a circumferential edge region, wherein the circumferential edge region extends around the front region and the rear region; a filament coupled to the outer surface of the mesh layer, at least a first portion of the filament being disposed in the front region, at least a second portion of the filament being disposed in the rear region and at least a third portion of the filament being disposed on the circumferential edge region of the mesh layer; a hair bundle comprising a first hair segment, a second hair segment, and a third hair segment, the third hair segment being disposed between the first hair segment and the second hair segment, the hair bundle being configured to be coupled to the filament by being wrapped around the filament to adjustably couple the hair bundle to the filament; and an ring member comprising a top portion side and a bottom portion side, the ring member being coupled to the hair bundle such that each of the first hair segment and the second hair segment are disposed on the top portion side and the third hair segment is disposed on the bottom portion side.

[0010] According to further embodiments: at least a first portion of the third hair segment is disposed between the mesh layer and the filament, and wherein at least a second portion of the third hair segment is disposed between the filament and the second hair segment; the first portion of the third hair segment and the second portion of the third hair segment are distinct sections of the third hair segment; the filament is rigidly coupled to the mesh layer; the ring member comprises an inner layer and an outer layer, wherein the inner layer is constructed out of a first material and the outer layer is constructed out of a second material, and wherein the first material is different from the second material; the first

material is an elastic material; the ring member comprises a loop comprising an interior portion and an exterior portion, and wherein the first hair segment and the second hair segment are at least partially disposed within the interior portion of the loop; at least a portion of the third hair segment is configured as a semi-circle, the semi-circle comprising an interior portion and an exterior portion, and wherein at least a portion of each of the first hair segment and the second hair segment is at least partially disposed within the interior portion of the semi-circle of the third hair segment; the ring member is at least partially disposed within the interior portion of the semi-circle; each hair bundle comprises multiple strands of hair comprising artificial hair and wherein the multiple strands of hair comprise curly, straight, crimped, or wavy hair textures and combinations thereof.

[0011] According to an additional embodiment, a method of securing artificial hair to a hair wig system, the system comprising a mesh layer configured to cover a user's head, the mesh layer comprising an inner surface side, an outer surface side, a first mesh aperture and a second mesh aperture, is provided. The method includes: providing a hair bundle comprising one or more strands of hair, the hair bundle comprising a first hair segment, a second hair segment, and a third hair segment; folding the hair bundle such that at least a portion of the third hair segment comprises a semi-circle; providing an ring member comprising an interior portion, an exterior portion, a top portion side and a bottom portion side, the ring member being coupled to the hair bundle such that at least a portion of the hair bundle is disposed within the interior portion of the ring member and such that each of the first hair segment and the second hair segment are located on the top portion side and the

third hair segment is located on the bottom portion side; inserting at least the semi-circle of the third hair segment from the outer surface side through the first mesh aperture to the inner surface side; pulling the semi-circle of the third hair segment from the inner surface side through the second mesh aperture to the outer surface side; and inserting at least a portion of the first hair segment and at least a portion of the second hair segment through the semi-circle of the third hair segment.

[0012] According to further embodiments: the ring member is adjusted to be closer to the outer surface side of the mesh layer; the first hair segment and the second hair segment are pulled in opposite directions in order to adjust the ring member to be closer to the outer surface side of the mesh layer; the ring member is at least partially disposed within the interior portion of the semi-circle; the ring member comprises an inner layer and an outer layer, wherein the inner layer is constructed out of a first material and the outer layer is constructed out of a second material, and wherein the first material is different from the second material.

[0013] According to an additional embodiment, a method of securing artificial hair to a wig comprising a mesh layer configured to cover a user's head, the mesh layer comprising an inner surface side, an outer surface side, and a filament coupled to the outer surface side, is provided. The method includes: providing a hair bundle comprising one or more strands of hair, the hair bundle comprising a first hair segment, a second hair segment, and a third hair segment; folding the hair bundle such that at least a portion of the third hair segment comprises a semi-circle; providing a ring member comprising an interior portion, an

exterior portion, a top portion side and a bottom portion side, the ring member being coupled to the hair bundle such that at least a portion of the hair bundle is disposed within the interior portion of the ring member, and such that each of the first hair segment and the second hair segment are located on the top portion side and the third hair segment is located on the bottom portion side; inserting at least the semi-circle of the third hair segment between the filament and the outer surface side; pulling the semi-circle of the third hair segment from between the filament and the outer surface side; and inserting at least a portion of the first hair segment and at least a portion of the second hair segment through the semi-circle of the third hair segment.

[0014] According to further embodiments: the ring member is adjusted to be closer to the outer surface side of the mesh layer; the first hair segment and the second hair segment are pulled in opposite directions in order to adjust the ring member to be closer to the outer surface side of the mesh layer; the ring member is at least partially disposed within the interior portion of the semi-circle; the ring member comprises an inner layer and an outer layer, wherein the inner layer is constructed out of a first material and the outer layer is constructed out of a second material, and wherein the first material is different from the second material.

[0015] According to an additional embodiment, a method of securing a hair bundle to a user's natural hair is provided. The method includes: providing the hair bundle comprising one or more strands of artificial hair, the hair bundle comprising a first hair segment, a second hair segment, and a third hair segment, wherein the first hair segment

comprises a first hair segment end, wherein the second hair segment comprises a second hair segment end, and wherein the third hair segment comprises a semicircle member; providing a ring member comprising a top portion side, a bottom portion side, an exterior portion and an interior portion; coupling the ring member to the hair bundle such that at least a portion of the hair bundle is disposed within the interior portion; introducing at least a portion of the semicircle member through the user's natural hair, wherein the user's natural hair comprises a predetermined configuration; introducing at least a portion of the first hair segment and the second hair segment through the semicircle member; and tightening the hair bundle around the user's natural hair by moving the ring member away from at least one of the first hair segment end and the second hair segment end.

[0016] According to further embodiments: the first hair segment and the second hair segment are spread in different directions in order to adjust the ring member to be closer the user's natural hair; the ring member is coupled to the hair bundle comprises at least a portion of each of the first hair segment and the second hair segment disposed on the top portion side and at least a portion of the third hair segment disposed on the bottom portion side; the semicircle member is not rotated prior to the introduction of the first hair segment and the second hair segment through the semicircle member and is not rotated after the introduction of the first hair segment and the second hair segment through the semicircle member; the semicircle member is not rotated after the introduction of the first hair segment and the second hair segment through the semicircle member; the first hair segment and the second hair segment are introduced through the semicircle member before tightening the

semicircle member around the user's natural hair; the semicircle member is tightened around the user's natural hair and the method comprises grasping at least one of the first hair segment and the second hair segment and moving the ring member away from at least one of the first hair segment end and the second hair segment end; the ring member comprises an inner layer and an outer layer, wherein the inner layer is constructed out of a first material and the outer layer is constructed out of a second material, and wherein the first material is different from the second material; the first material is an elastic material and the second material is a fabric material; the predetermined configuration of the user's hair comprises at least one of a corn-row of the user's natural hair and a braid of the user's natural hair; the ring member is coupled to the hair bundle and the method comprises folding the hair bundle such that at least one of the semicircle member is introduced through the interior portion of the ring member and the first hair segment end and the second hair segment end is introduced through the interior portion of the ring member; the hair bundle is coupled to the user's natural hair without a mesh cap; and the third hair segment is disposed between the first hair segment and the second hair segment.

[0017] According to an additional embodiment, a method of manufacturing a hair bundle is provided. The method includes: providing a portion of artificial hair; separating the portion of artificial hair into individual bundles of hair according to a predetermined weight and a predetermined length, each bundle of hair comprising a first hair segment, a second hair segment and a third hair segment, wherein the first hair segment comprises a first hair segment end and the second hair segment comprises a second hair segment end; disposing

the hair bundle over a rod member such that the third hair segment comprises a semicircle member and the first hair segment and the second hair segment are disposed on opposite sides of the rod member; twisting the third hair segment; coupling a ring member to the hair bundle, wherein the ring member comprises a top portion side, a bottom portion side, an exterior portion and an interior portion; and introducing the hair bundles into a package.

[0018] According to further embodiments: the third hair segment is twisted at least 180 degrees; the ring member is coupled to the hair bundle and the method comprises at least a portion of each of the first hair segment and the second hair segment disposed on the top portion side and at least a portion of the third hair segment disposed on the bottom portion side; the semicircle member is tightened around the rod member by holding at least one of the first hair segment and the second hair segment and moving the ring member away from at least one of the first hair segment end and the second hair segment end; the ring member is constructed out of an elastic material and the second material is a fabric material; the ring member is coupled to the hair bundle and the method comprises folding the hair bundle such that at least one of the semicircle member is introduced through the interior portion of the ring member and the first hair segment end and the second hair segment end are introduced through the interior portion of the ring member; the third hair segment is disposed between the first hair segment and the second hair segment; separating the artificial hair comprises measuring the length of the portion of artificial hair and cutting the portion of artificial hair to the predetermined length; and separating the artificial hair into individual bundles

comprises weighing the individual bundles of hair and removing or adding artificial hair until the individual bundles meet the predetermined weight.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

- [0019] The above and other aspects, features and advantages of certain embodiments will be more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:
- [0020] FIG. 1 illustrates a side-view of an artificial hair apparatus according to a first embodiment of the present invention;
- [0021] FIG. 2 illustrates a side view of an artificial hair apparatus according to a second embodiment of the present invention;
  - [0022] FIGS. 3-6 illustrate various embodiments of hair bundles;
- [0023] FIGS. 7A-7C illustrate a ring member coupled to various positions of a hair bundle;
  - [0024] FIGS. 8A and 8B illustrate various embodiments of a ring member;
- [0025] FIG. 9 illustrates a hair bundle according to an embodiment of the present invention;
- [0026] FIG. 10 illustrates an alternative embodiment of the hair bundle shown in FIG. 9; and

[0027] FIGS. 11 and 12 illustrate the hair bundle arranged according to an embodiment of the manufacturing method.

## **DETAILED DESCRIPTION OF THE PRESENT INVENTION**

[0028] The following detailed description of certain embodiments will be made in reference to the accompanying drawings. In the detailed description, explanation about related functions or constructions known in the art are omitted for the sake of clearness in understanding the concept of the invention, to avoid obscuring the invention with unnecessary detail.

[0029] Crochet cap-style wigs have become more desirable to consumers. A crochet cap wig generally includes a mesh cap configured to fit around and cover a human head and a filament attached to the mesh cap according to a predetermined pattern. The filament may be, for example, a braid of synthetic hair that traverses the mesh cap from one side to the other in multiple rows. Bundles of artificial hair are crocheted to the filament to create a natural-appearing and fashionable artificial hair wig.

[0030] Some users prefer to attach bundles of hair directly to their scalp using crocheting methods. For example, some users braid their natural hair tightly to their scalp in, for example, what is referred to as a "corn row," and then crochet the bundles of artificial hair to the corn row. Bundles of artificial hair can be crocheted to the user's natural hair when the user's hair is in different configurations, including corn rows, braids, pony tails, and other suitable configurations. This can also be accomplished by covering the user's

natural scalp with a mesh cap that has artificial braids, or some other suitable point of attachment, for crocheting the bundles of hair to the user's scalp. The crochet-style hair wigs provide the user with the ability to attach artificial hair to their scalp according to their own style and preference.

[0031] Embodiments of the invention, as further described herein, provide advantages over conventional hair extensions and wigs that utilize bundles of hair attached to a surface of the user's scalp or surface of the wig. The embodiments described herein include wig systems including a hair bundle secured to a surface thereof, methods of securing hair bundles to a user's natural hair, methods of manufacturing hair bundles, methods of securing hair bundles to a wig system, kits for assembling wig systems, methods of assembling kits for wigs, and packaging for wigs and wig kits.

[0032] The phrase "artificial hair," as used herein, refers to synthetic hair products as well as human hair or animal hair and combinations thereof and may be embodied in various traditional hair colors, such as black, brown, blonde, and red, as well as non-traditional hair colors, such as blue, green, and purple, and combinations thereof, including individual strands of hair having two or more colors. The phrase "natural hair" when used in the context of the user, refers to the user's natural hair that is growing from the user's scalp.

[0033] Embodiments of wig system described herein are directed to wigs that cover a user's natural hair or scalp. The artificial hair utilized in the hair bundles is embodied in various hair textures, such as curly, straight, crimped, wavy, and combinations thereof, optionally including a one-prong curl, a two-prong curl, and one or more prong curls, as

illustrated in FIGS. 3-6. A "prong" refers to a group of artificial hair. For example, two prongs of artificial hair are created by folding a bundle of artificial hair in half resulting in two prongs of artificial hair. As described herein, the wig systems include bundles of artificial hair that are crocheted to a wig's mesh layer or filament and secured to the mesh layer or filament by a ring member. Use of a ring member, as a replacement of, or supplement to, crocheted knots or braids, preserves the various textures of the bundles of hair. That is, crocheting bundles of hair to the mesh layer or filament can lead to unwanted reduction and/or changes in the hair bundles' texture, such as unraveling of curls. Thus, using a ring member, as further described herein, secures bundles of hair to the mesh layer or filament with minimal disturbance to the texture of the bundles of hair.

[0034] Embodiments of the artificial hair bundles described herein are also directed to methods of securing hair bundles directly to the user's natural hair without the use of a separate mesh cap. The methods of securing the hair bundle to the user's natural hair provide a simpler, more efficient, and more secure method of securing hair bundles than is currently used.

[0035] Reference to individual embodiments, whether by number of embodiment or relevant feature of the embodiment, is used for convenience in describing such embodiments. Moreover, reference to individual embodiments does not indicate that any of such embodiments are preferred over any other embodiments. Each individual embodiment may be combined with any other individual embodiment whether or not expressly stated.

[0036] FIG. 1 illustrates a side-view of a hair wig system 100 according to a first embodiment of the present invention. The hair wig system 100 includes a mesh layer 110. The mesh layer 110 is configured to fit around a circumference of a user's head. The mesh layer 110 is configured as a half-spherical shape, dome shape or other shape that corresponds to the shape of a human head in order to cover the hair on a surface thereof. The mesh layer 110 is constructed out of a flexible material, such as cotton, nylon, or other suitable fabrics and blends thereof. The mesh layer 110 includes an inner surface side 112, an outer surface side 114, a first mesh aperture 116 and a second mesh aperture 118. According to further embodiments, the mesh layer 110 may include multiple apertures in the surface thereof. The apertures may be embodied in large and small sizes.

[0037] The hair wig system 100 further includes a hair bundle 130. The hair bundle 130 is constructed out of artificial hair. At least a portion of the hair bundle 130 is disposed within the first mesh aperture 116 and within the second mesh aperture 118. As further described below, the hair bundle 130 is inserted through the first mesh aperture 116 beginning at the outer surface side 114 and then pulled through the second mesh aperture 118 from the inner surface side 112 back to the outer surface side 114. The hair bundle 130 includes a first hair segment 132, a second hair segment 134, and a third hair segment 136. The third hair segment 136 is disposed between the first hair segment 132 and the second hair segment 134. That is, at least a portion of the third hair segment 136 is a semi-circle created by folding the hair bundle 130, for example, in half.

[0038] For example, with the hair bundle 130 in a straight and unfolded configuration, the first hair segment 132 and the second hair segment 134 may be brought together, resulting in formation of a semi-circle in the hair bundle 130, the semi-circle being at least a portion of the third hair segment 136. Thus, the first hair segment 132, the second hair segment 134 and the third hair segment 136 refer to relative portions of the hair bundle 130. The hair bundle 130 is coupled to the mesh layer 110 such that the first hair segment 132 and the second hair segment 134 are disposed on the outer surface side 114 and the third hair segment 136 is disposed on the outer surface side 114 and the inner surface side 112. According to an embodiment, the third hair segment 136 may be disposed entirely on the outer surface side 114 such that at least a portion of each of the first hair segment 132 and the second hair segment 134 is disposed on the outer surface side 114 and the inner surface side 112.

[0039] The hair wig system 100 further includes a ring member 150. The ring member 150 includes an interior portion, an exterior portion, a top portion side 152 and a bottom portion side 154. The interior portion of the ring member 150 refers to the area encircled by the ring member 150, that is, the area within the perimeter of the ring member 150. The exterior portion of the ring member 150 refers to the area outside the perimeter of the ring member 150. In certain embodiments, the ring member 150 is a continuous circular item. In certain embodiments, the ring member 150 is not continuous, that is, the ring member 150 does not embody a complete circle, and has two ends.

[0040] The ring member 150 may be constructed of a single, uniform material, or a braided material. According to an embodiment, the ring member 150 further may include an inner layer and an outer layer. The inner layer may be constructed out of a flexible elastic material such as, for example, a rubber band, or other suitable material. In certain embodiments, the inner layer of the ring member 150 may be constructed out of a flexible inelastic material such as, for example, synthetic materials, metallic materials, glue, thread and other suitable materials. The outer layer may be constructed out of a flexible elastic material such as, for example, cloth, nylon, elastic, and combinations thereof, or other suitable material. In certain embodiments, the ring member 150 is configured with a single layer of material, including a flexible elastic material such as, for example, a rubber band, or other suitable material.

[0041] The thickness and/or length of the ring member 150 may vary according to desired styles and uses and is not limited to any particular thickness and/or length. In certain embodiments, the ring member 150 is coupled to the hair bundle 130 in a slidable manner. In certain embodiments, the ring member 150 is coupled to the hair bundle 130 in a fixed manner.

[0042] The ring member 150 is coupled to the hair bundle 130 such that each of the first hair segment 132 and the second hair segment 134 are disposed on the top portion side 152 and the third hair segment 136 is disposed on the bottom portion side 154.

[0043] In certain embodiments, the loop of the third hair segment 136 is pulled through the first mesh aperture 116 and through the second mesh aperture 118 using, for example, a crochet hook. The first hair segment 132 and the second hair segment 134 are then pulled through the loop of the third hair segment 136 that has passed through the first mesh aperture 116 and the second mesh aperture 118. A portion of the third hair segment 136 that has not passed through the first mesh aperture 116 and the second mesh aperture 118 may also be pulled through the loop of the third hair segment 136, though the third hair segment 136 may also be pulled entirely through the second mesh aperture 118. With the ring member 150 wrapped around the hair bundle 130, the length of the third hair segment 136 is decreased by pushing the ring member 150 towards the mesh layer 110, thus tightening the hair bundle 130 to the mesh layer 110. This can also be accomplished by pulling the first hair segment 132 and the second hair segment 134 in opposite directions to force the ring member 150 towards the mesh layer 110. The hair bundle 130 may be further secured to the mesh layer 110 by knotting, stapling, sewing, gluing or using a clip. Use of the ring member 150 maintains the texture of the hair bundle 130 with minimal disturbance to the desired style. Use of the ring member 150 allows for easier installation of the hair bundle 130 than conventional crocheting methods. That is, without the use of the ring member 150, installation of the hair bundle 130 requires multiple twists and/or knots to secure the hair bundle 130 to the mesh layer 110. The hair bundle 130 may be also be coupled to the user's natural hair in a similar manner, as further described herein.

[0044] The ring member 150 can be adjusted to tighten the hair bundle 130 by pushing the ring member 150 closer to the mesh layer 110, which decreases the length of the third hair segment 136, as illustrated by FIG. 7A. The ring member 150 can be adjusted to loosen the hair bundle 130 by increasing the length of the third hair segment 136, and thus increasing the size of the semi-circle of the third hair segment 136, as illustrated by FIG. 7B and FIG. 7C.

[0045] In FIG. 1 and FIG. 8B, the ring member 150 is illustrated as being a continuous loop. When the ring member 150 is embodied as a loop, the ring member 150 may be wrapped around the hair bundle 130 at least one time. The ring member 150 may be wrapped around the hair bundle 130 multiple times by twisting the ring member 150 and folding the ring member 150 back around the hair bundle 130. According to a further embodiment, the ring member 150 may be embodied as a string including two ends, as illustrated by FIG. 8A. In this embodiment, the two ends can be wrapped around the hair bundle 130 one or more times, to form a loop or multiple loops, and secured together by various attachment methods such as, for example, by a knot, stapling, sewing, gluing, use of a clip or other suitable methods of attachment.

[0046] Utilizing the hair wig system 100 described herein, a method of securing artificial hair to the hair wig system is provided. The method includes folding the hair bundle such that at least a portion of the third hair segment comprises a semi-circle. The ring member is coupled to the hair bundle such that at least a portion of the hair bundle is disposed within the interior portion of the ring member and such that each of the first hair

segment and the second hair segment are located on the top portion side and the third hair segment is located on the bottom portion side. The method includes inserting at least the semi-circle of the third hair segment from the outer surface side through the first mesh aperture to the inner surface side and pulling the semi-circle of the third hair segment from the inner surface side through the second mesh aperture to the outer surface side.

[0047] The method includes inserting at least a portion of the first hair segment and at least a portion of the second hair segment through the semi-circle of the third hair segment. In certain embodiments, the method includes adjusting the ring member to be closer to the outer surface side of the mesh layer. In certain embodiments, the method includes pulling the first hair segment and the second hair segment in opposite directions in order to adjust the ring member to be closer to the outer surface side of the mesh layer until the ring member is at least partially disposed within the interior portion of the semi-circle.

[0048] FIG. 2 illustrates a hair wig system 200 according to a second embodiment of the present invention. The hair wig system 200 includes a mesh layer 210 configured to fit around a circumference of a user's head. The mesh layer 210 is configured as a half-spherical shape, dome shape or other shape that corresponds to the shape of a human head in order to cover the hair on a surface thereof. The mesh layer 210 is constructed out of a flexible material, such as cotton, nylon, or other suitable fabrics and blends thereof. The mesh layer 210 includes an inner surface side 212, an outer surface side 214, a rear region 220, a front region 230, and a circumferential edge region 240. The circumferential edge region 240 extends around the rear region 220 and the front region 230.

[0049] The hair wig system 200 further includes a filament 250. The filament 250 is coupled to the outer surface side 214 of the mesh layer 210. The filament 250 is stitched, glued, stapled or otherwise rigidly coupled to the outer surface side 214 of the mesh layer 210. At least a portion of the filament 250 is disposed in each of the rear region 220, the front region 230 and on the circumferential edge region 240 of the mesh layer 210.

[0050] The filament 250 is constructed out of artificial hair, cotton, nylon, blends thereof, or other suitable material. The filament 250 may be a mono-filament or may include multiple filaments coupled together in, for example, a braided pattern or a twisted pattern. The filament 250 may be one continuous piece of material through each of the rear region 220, the front region 230, and the circumferential edge region 240 or multiple separate pieces of material. Thus, the filament 250 may include only a first filament end and a second filament end coupled to the outer surface 214 of the mesh layer 210 or may include more than two filament ends where the filament 250 is constructed of multiple separate pieces of material.

[0051] The hair wig system 200 further includes a hair bundle 260. The hair bundle 260 includes a first hair segment 262, a second hair segment 264, and a third hair segment 266. The third hair segment 266 is disposed between the first hair segment 262 and the second hair segment 264. The third hair segment 266 may be wrapped entirely around the filament 250 or wrapped around at least a portion of the filament 250 by, for example, crocheting. According to an embodiment, the third hair segment 266 may be crocheted to the filament 250 where, for example, the filament 250 is embodied as a braided filament. The

third hair segment 266 is the portion of the hair bundle 260 that is coupled to the filament 250, securing the hair bundle 260 to the hair wig system 200. The hair bundle 260 is otherwise configured as described above with respect to the hair bundle 130 in the first embodiment.

[0052] The hair wig system 200 further includes a ring member 270. The ring member 270 is configured similarly as described above with respect to the ring member 150. The ring member 270 includes a top portion side 272 and a bottom portion side 274. The ring member 270 is coupled to the hair bundle 260 such that each of the first hair segment 262 and the second hair segment 264 are disposed on the top portion 272 side and the third hair segment 266 is disposed on the bottom portion side 274. The ring member 270 is otherwise configured as described above with respect to the ring member 150 in the first embodiment.

[0053] Utilizing the hair wig system 200 described herein, a method of securing artificial hair to the hair wig system is provided. The method includes folding the hair bundle such that at least a portion of the third hair segment comprises a semi-circle. The ring member is coupled to the hair bundle such that at least a portion of the hair bundle is disposed within the interior portion of the ring member, and such that each of the first hair segment and the second hair segment are located on the top portion side and the third hair segment is located on the bottom portion side. The method includes inserting at least the semi-circle of the third hair segment between the filament and the outer surface side and pulling the semi-circle of the third hair segment from between the filament and the outer

surface side. The method includes inserting at least a portion of the first hair segment and at least a portion of the second hair segment through the semi-circle of the third hair segment.

[0054] In certain embodiments, the method includes adjusting the ring member to be closer to the outer surface side of the mesh layer. In certain embodiments, the method includes pulling the first hair segment and the second hair segment in opposite directions in order to adjust the ring member to be closer to the outer surface side of the mesh layer until the ring member is at least partially disposed within the interior portion of the semi-circle.

[0055] FIGS. 3-6 illustrate various embodiments of the hair bundles including one or more prongs. FIGS. 3-5 illustrate the hair bundles having a two-prong curl. FIG. 6 illustrates the hair bundle having a one-prong curl.

[0056] FIG. 9 illustrates a hair bundle 160 according to a third embodiment. The hair bundle 160 illustrated in FIG. 9 may also be utilized in the embodiments described above with respect to the hair bundle 130 and the hair bundle 260, but is referred to herein as the hair bundle 160 for convenience in describing the embodiment. The hair bundle 160 includes a first hair segment 162, a second hair segment 164, and a third hair segment 166. The third hair segment 166 includes a proximal end 168, a distal end 170 and a semicircle member 172. The third hair segment 166 of the hair bundle 160 may be straight, braided, twisted, crimped or other suitable hair texture. The semicircle member 172 extends from the proximal end 168. The first hair segment 162 and the second hair segment 164 extend from the distal end 170 of the third hair segment 166. The first hair segment 162 and the second

hair segment 164 may be the same hair texture or a different hair texture from the third hair segment 166. For example, the first hair segment 162 and the second hair segment 164 may be crimped hair while the third hair segment 166 may be braided hair. Similarly as described herein with respect to the hair bundle 130 and the hair bundle 260, the hair bundle 160 may secured to a mesh layer of a wig or a user's natural hair by pulling the first hair segment 162 and the second hair segment 164 through the semicircle member 172. Although not shown in FIG. 9, the hair bundle 160 may be further secured to the mesh layer or user's natural hair using a ring member.

[0057] FIG. 10 illustrates a further embodiment of the hair bundle 160. In this embodiment, the entire hair bundle 160 is provided as braided hair and the semicircle member 172 is non-braided hair. That is, the semicircle member 172 is embodied as straight hair that has not been braided or twisted. The hair bundle 160 may also be embodied as twisted hair. The hair bundle 160, according to this embodiment, can be formed by folding the hair bundle 160 and then braiding and/or twisting the first hair segment 162 to the second hair segment 164. Although not shown in FIG. 10, this embodiment of the hair bundle 160 may be further secured to the mesh layer using a ring member.

[0058] According to the embodiments described herein, the wig system may be sold as part of a kit for assembling the wig or hair extension. In the case of a wig kit, the kit includes a mesh layer, a filament, a ring member and bundles of artificial hair. In the case of a hair extension kit, the kit includes a ring member and bundles of artificial hair. The kit may be sold in, for example, cardboard packaging wrapped in plastic cellophane or other suitable

packaging appropriate for display on store shelves. In the kit, the components may not be coupled together, though the ring member and hair bundles may be coupled together within the kit. That is, the filament would not be coupled to the mesh layer and the bundles of hair would not be coupled to the mesh layer or to the filament. The kit allows the user to easily attach the filament and/or the bundles of hair to the mesh layer customized to their own preferences and personal style. The kit also allows the user to attach bundles of artificial hair to the filament or their natural hair. Bundles of hair are attached to the filament or the user's natural hair by wrapping the bundle of hair around the filament, or the user's cornrow, or crocheting the bundle of hair to at least a portion of the filament, or the user's cornrow. The user can then attach the filament to the mesh layer. According to further embodiments, a method of assembling the kit is provided that includes providing each of the components of the artificial wig apparatus described herein, along with a crochet hook and/or thread, and inserting such components into a package. The bundles of hair may be packaged with, for example, each package having 8, 12, 16, 20, or more, individual bundles of hair with each bundle of hair having one or more corresponding ring members. Each package of hair bundles may itself be bundled with one or more packages. Furthermore, each bundle of hair may include one or more prongs.

[0059] According to a further embodiment, a method of securing a hair bundle to a user's natural hair is provided. The method of securing the hair bundle includes providing the hair bundle. The hair bundle is configured as described herein with respect to the other embodiments. The hair bundle includes one or more strands of artificial hair, a first hair

segment, a second hair segment, and a third hair segment. Each segment refers to separate sections of the hair bundle. The first hair segment includes a first hair segment end, the first hair segment end being the end of hair bundle. The second hair segment includes a second hair segment end, the first hair segment end being the end of hair bundle opposite to the first hair segment end. The third hair segment includes a semicircle member. The method includes providing a ring member. The ring member includes a top portion side, a bottom portion side, an exterior portion and an interior portion. The ring member is configured as described herein with respect to the other embodiments.

[0060] The method includes coupling the ring member to the hair bundle such that at least a portion of the hair bundle is disposed within the interior portion of the ring member. Coupling the ring member to the hair bundle includes at least a portion of each of the first hair segment and the second hair segment disposed adjacent to the top portion side and at least a portion of the third hair segment disposed adjacent to the bottom portion side. It is noted that "top" and "bottom" when referring to the ring member are relative terms, and the first hair segment, the second hair segment and third hair segment can be disposed adjacent to either the top or bottom of the ring member depending on the orientation of the hair bundle. Coupling the ring member to the hair bundle includes folding the hair bundle such that the semicircle member is introduced through the interior portion of the ring member. In certain embodiments, the first hair segment end and the second hair segment end are introduced through the interior portion of the ring member. At least a portion of the semicircle member is then introduced through the user's natural hair. The user's natural hair

is configured in a style such that the hair bundle can be coupled thereto. For example, the style of the user's hair includes at least one of a corn-row and a braid of the user's natural hair, or other suitable configuration.

[0061] The method includes introducing at least a portion of the first hair segment and the second hair segment through the semicircle member and tightening the semicircle member around the user's natural hair by moving the ring member away, that is in the opposite direction, from at least one of the first hair segment end and the second hair segment end. In certain embodiments, the entire first hair segment and the entire second hair segment are introduced through the semicircle member. In certain embodiments, the first hair segment and the second hair segment are spread in different directions in order to adjust the ring member to be closer the user's natural hair. That is, spreading the first hair segment and the second hair segment in different directions forces the ring member to tighten the hair bundle to the user's natural hair. The first hair segment and the second hair segment are introduced through the semicircle member before tightening the semicircle member around the user's natural hair. Tightening the semicircle member around the user's natural hair includes grasping at least one of the first hair segment and the second hair segment and moving the ring member away from at least one of the first hair segment end and the second hair segment end.

[0062] In certain embodiments, the semicircle member is not rotated prior to the introduction of the first hair segment and the second hair segment through the semicircle member and is not rotated after the introduction of the first hair segment and the second hair

segment through the semicircle member. In certain embodiments, the semicircle member is not rotated after the introduction of the first hair segment and the second hair segment through the semicircle member. Use of the ring member removes the need for rotating the semicircle member in order to secure the hair bundle to the user's natural hair. Conventional methods require one or more rotations of the semicircle member, however, these methods do not provide a secure attachment of the hair bundle to the user's natural hair and the hair bundle tends to loosen.

[0063] Utilizing the above-described method, the hair bundle is coupled to the user's natural hair without the need for a mesh cap. Furthermore, practicing this method tightly secures the hair bundle to the user's natural hair such that the hair bundle does not slip or loosen. Conventional methods require knotting and/or twisting of hair bundles and still do not adequately secure the hair bundle to the user's natural hair.

[0064] According to a further embodiment, a method of manufacturing a hair bundle is provided. The method includes providing a portion of artificial hair. The portion of artificial hair is separated into individual bundles of artificial hair according to a predetermined weight and a predetermined length. Separating the artificial hair includes measuring the length of the portion of artificial hair and cutting the portion of artificial hair to the predetermined length. Suitable lengths of artificial hair for the hair bundle include about 5-30 inches, or about 10-20 inches. These exemplary lengths of hair refer to the total length of the artificial hair in a resting position. That is, for example, where the artificial hair is embodied as a curly texture, the length of the artificial hair is about 5-30, or about 10-20

inches, when the curls are not stretched to a straight-hair configuration – stretching the artificial hair when embodied as curly would result in a greater length. When the artificial hair is embodied as a straight texture, the length of the artificial hair is about 5-30, or about 10-20 inches, and no substantial stretching would occur. Separating the artificial hair into individual bundles includes weighing the individual bundles of hair and removing or adding artificial hair until the individual bundles meet the predetermined weight. Suitable weights of artificial hair for the hair bundle include about 0.25 grams to 5 grams, or about 1 to 3 grams.

embodiment of the manufacturing method. Similarly as described above, each bundle of hair 1100 includes a first hair segment 1105, a second hair segment 1110 and a third hair segment 1115. The third hair segment 1115 is disposed between the first hair segment 1105 and the second hair segment 1110. The first hair segment 1105 includes a first hair segment end 1106. The second hair segment 1110 includes a second hair segment end 1111. The method includes disposing the hair bundle 1100 over a rod member 1120 such that the third hair segment includes a semicircle member 1125. The rod member 1120 includes any sufficiently rigid item that can hold one or more hair bundles during manufacture of the hair bundle. For example, the rod member 1120 may be a length of metal, wood, plastic, wire, string, or other suitable material, configured as a cylinder, square, substantially flat shape, or other suitable shape. With the hair bundle 1100 disposed over the rod member 1120, the first hair segment 1105 and the second hair segment 1110 are disposed on opposite sides of the rod member 1120. The third hair segment 1115 is twisted, for example, at least 180 degrees. In certain

embodiments, the third hair segment may be twisted 360 degrees, 520 degrees, or 700 degrees or more.

[0066] In certain embodiments, twisting of the third hair segment 1115 occurs at the portion of the third hair segment 1115 disposed above the rod member 1120. That is, the location of the twist of the third hair segment 1115 is on the top of the rod member, at the apex of the semicircle member 1125, and not on the sides of the rod member 1120.

[0067] A ring member 1130 is then coupled to the hair bundle 1100. The ring member 1130 is configured as described herein with respect to the other embodiments. The ring member 1130 includes a top portion side, a bottom portion side, an exterior portion and an interior portion. Coupling the ring member 1130 to the hair bundle 1100 includes at least a portion of each of the first hair segment 1105 and the second hair segment 1110 disposed adjacent to the bottom portion side and at least a portion of the third hair segment 1115 disposed adjacent to the top portion side. In certain embodiments, coupling the ring member 1130 to the hair bundle 1100 includes folding the hair bundle 1100 such that the semicircle member 1125 is introduced through the interior portion of the ring member 1130. In certain embodiments, the first hair segment end 1106 and the second hair segment end 1111 are introduced through the interior portion of the ring member 1130.

[0068] In certain embodiments, the ring member 1130 is embodied as including two ends. Where the ring member 1130 includes two ends, the step of coupling the ring member 1130 to the hair bundle 1100 further includes wrapping the two ends of the ring

member 1130 around the hair bundle 1100 at least two times, or about two to 10 times. The two ends of the ring member 1130 are coupled together to secure the ring member 1130 around the hair bundle 130. The two ends of the ring member 1130 may be coupled together by a knot, staple, glue, twisting, tape or other suitable methods of attachment.

[0069] In certain embodiments, the method further includes tightening the semicircle member 1125 around the rod member 1120 by holding one or both of the first hair segment 1105 and the second hair segment 1110 and moving the ring member 1130 away from at least one of the first hair segment end 1106 and the second hair segment end 1111. In this configuration, the ring member 1130 secures the hair bundle 1100 to the rod member 1120 and prevents the hair bundle 1100 from loosening or detaching from the rod member 1120.

[0070] The method includes introducing the hair bundles 1100 into a package for shipping and sale to consumers. The hair bundles 1100 remain coupled to the rod member when introduced into the package. Having the hair bundles coupled to the rod member while in the packaging keeps the hair bundles organized and neatly presented to the consumer. This configuration also keeps the artificial hair of the hair bundles aligned and prevents the artificial hair from having an unkempt appearance.

[0071] Embodiments of the invention described herein include bundles of hair that are crocheted to a user's natural hair, a wig's mesh layer or a filament and secured by a ring member. Use of a ring member to secure bundles of hair to a user's natural hair or wig

preserves the various textures of the bundles of hair, preventing any unwanted reduction and/or changes in the hair bundles' texture, such as unraveling of curls, and provides a method to more easily secure bundles of hair to the user's natural hair or the mesh layer of a wig. Thus, using a ring member secures bundles of hair to the user's natural hair or the mesh layer or filament without damaging the texture of the bundles of hair.

[0072] While embodiments of the invention have been shown and described with reference to certain embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims and equivalents thereof.

#### **WHAT IS CLAIMED IS:**

1. A method of securing a hair bundle to a user's natural hair, the method comprising:

providing the hair bundle comprising one or more strands of artificial hair, the hair

bundle comprising a first hair segment, a second hair segment, and a third hair segment,

wherein the first hair segment comprises a first hair segment end, wherein the second hair

segment comprises a second hair segment end, and wherein the third hair segment comprises

a semicircle member;

providing a ring member comprising a top portion side, a bottom portion side, an exterior portion and an interior portion;

coupling the ring member to the hair bundle such that at least a portion of the hair bundle is disposed within the interior portion;

introducing at least a portion of the semicircle member through the user's natural hair, wherein the user's natural hair comprises a predetermined configuration;

introducing at least a portion of the first hair segment and the second hair segment through the semicircle member; and

tightening the hair bundle around the user's natural hair by moving the ring member away from at least one of the first hair segment end and the second hair segment end.

2. The method according to claim 1, further comprising spreading the first hair segment and the second hair segment in different directions in order to adjust the ring member to be closer the user's natural hair.

3. The method according to claim 1, wherein coupling the ring member to the hair bundle comprises at least a portion of each of the first hair segment and the second hair segment disposed on the top portion side and at least a portion of the third hair segment disposed on the bottom portion side.

- 4. The method according to claim 1, wherein the semicircle member is not rotated prior to the introduction of the first hair segment and the second hair segment through the semicircle member and is not rotated after the introduction of the first hair segment and the second hair segment through the semicircle member.
- 5. The method according to claim 1, wherein the semicircle member is not rotated after the introduction of the first hair segment and the second hair segment through the semicircle member.
- 6. The method according to claim 1, wherein the first hair segment and the second hair segment are introduced through the semicircle member before tightening the semicircle member around the user's natural hair.
- 7. The method according to claim 1, wherein tightening the semicircle member around the user's natural hair comprises grasping at least one of the first hair segment and the second

hair segment and moving the ring member away from at least one of the first hair segment end and the second hair segment end.

- 8. The method according to claim 1, wherein the ring member comprises an inner layer and an outer layer, wherein the inner layer is constructed out of a first material and the outer layer is constructed out of a second material, and wherein the first material is different from the second material.
- 9 The method according to claim 8, wherein the first material is an elastic material and the second material is a fabric material.
- 10. The method according to claim 1, wherein the predetermined configuration of the user's hair comprises at least one of a corn-row of the user's natural hair and a braid of the user's natural hair.
- 11. The method according to claim 1, wherein coupling the ring member to the hair bundle comprises folding the hair bundle such that at least one of the semicircle member is introduced through the interior portion of the ring member and the first hair segment end and the second hair segment end is introduced through the interior portion of the ring member.

12. The method according to claim 1, wherein the hair bundle is coupled to the user's natural hair without a mesh cap.

- 13. The method according to claim 1, wherein the third hair segment is disposed between the first hair segment and the second hair segment.
- 14. A method of manufacturing a hair bundle, the method comprising: providing a portion of artificial hair;

separating the portion of artificial hair into individual bundles of hair according to a predetermined weight and a predetermined length, each bundle of hair comprising a first hair segment, a second hair segment and a third hair segment, wherein the first hair segment comprises a first hair segment end and the second hair segment comprises a second hair segment end;

disposing the hair bundle over a rod member such that the third hair segment comprises a semicircle member and the first hair segment and the second hair segment are disposed on opposite sides of the rod member;

twisting the third hair segment;

coupling a ring member to the hair bundle, wherein the ring member comprises a top portion side, a bottom portion side, an exterior portion and an interior portion; and introducing the hair bundles into a package.

15. The method according to claim 14, wherein the third hair segment is twisted at least 180 degrees.

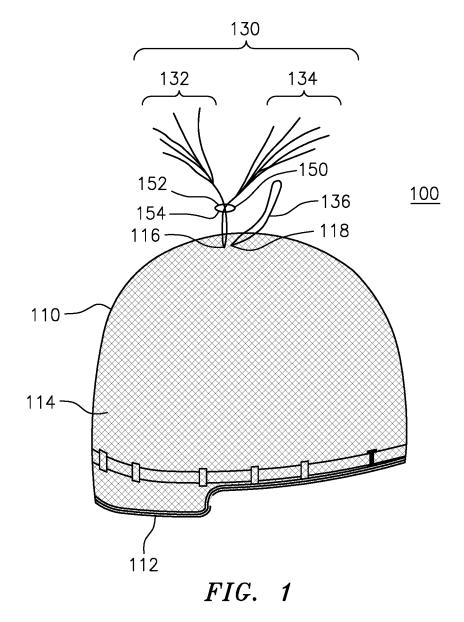
- 16. The method according to claim 14, wherein coupling the ring member to the hair bundle comprises at least a portion of each of the first hair segment and the second hair segment disposed on the top portion side and at least a portion of the third hair segment disposed on the bottom portion side
- 17. The method according to claim 14, further comprising tightening the semicircle member around the rod member by holding at least one of the first hair segment and the second hair segment and moving the ring member away from at least one of the first hair segment end and the second hair segment end.
- 18. The method according to claim 14, wherein the ring member is constructed out of an elastic material and the second material is a fabric material.
- 19. The method according to claim 14, wherein coupling the ring member to the hair bundle comprises folding the hair bundle such that at least one of the semicircle member is introduced through the interior portion of the ring member and the first hair segment end and the second hair segment end are introduced through the interior portion of the ring member.

20. The method according to claim 14, wherein the third hair segment is disposed between the first hair segment and the second hair segment.

- 21. The method according to claim 14, wherein separating the artificial hair comprises: measuring the length of the portion of artificial hair; and cutting the portion of artificial hair to the predetermined length.
- 22. The method according to claim 21, wherein separating the artificial hair into individual bundles comprises:

weighing the individual bundles of hair; and

removing or adding artificial hair until the individual bundles meet the predetermined weight.



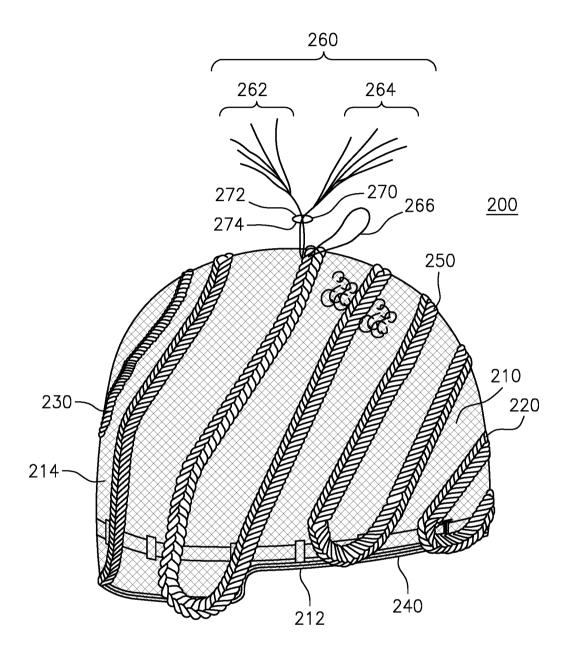
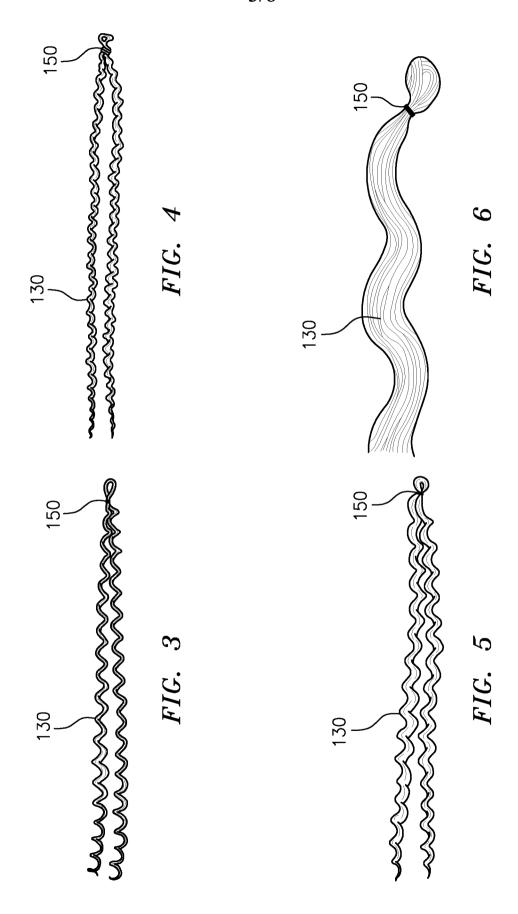


FIG. 2



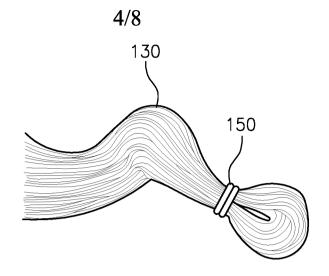


FIG. 7A

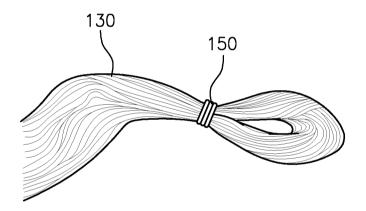


FIG. 7B

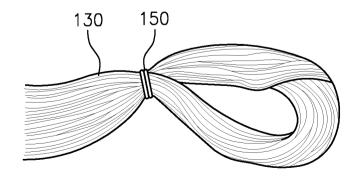


FIG. 7C

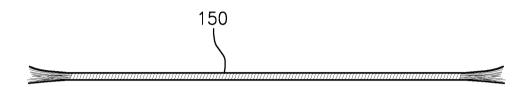


FIG. 8A

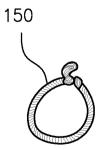
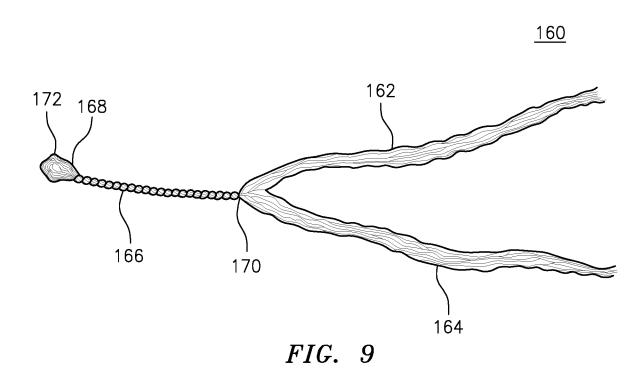


FIG. 8B



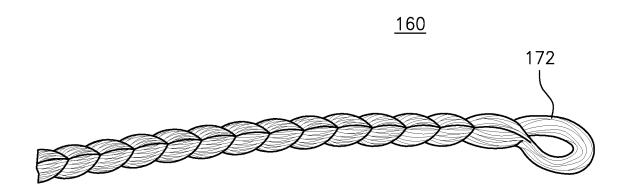
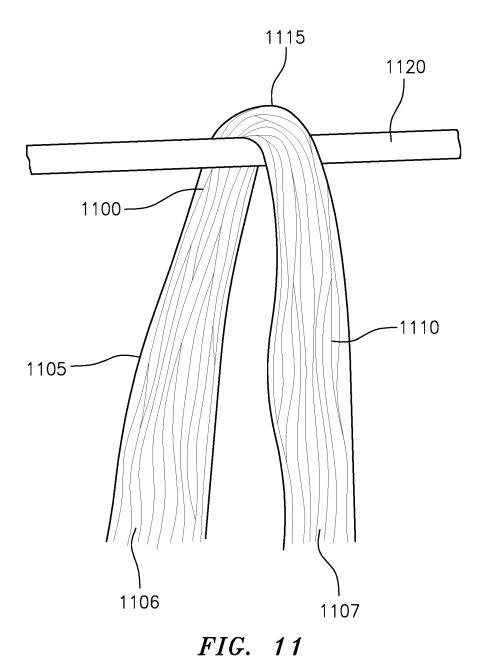


FIG. 10



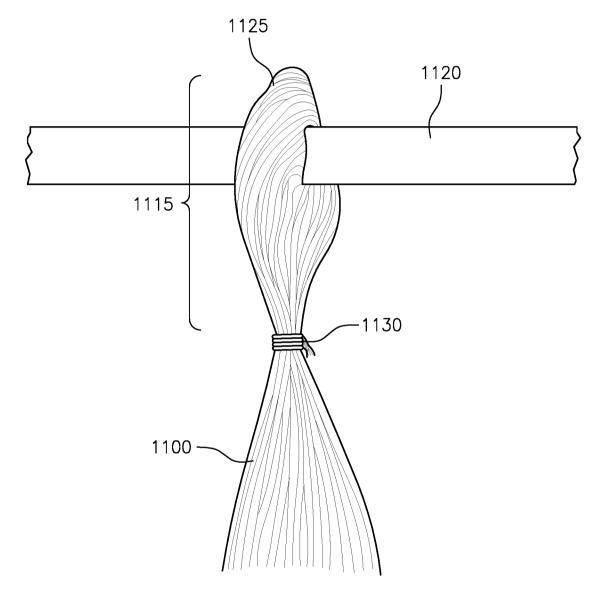


FIG. 12

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 2017/013466

## CLASSIFICATION OF SUBJECT MATTER A41G 3/00 (2006.01) According to International Patent Classification (IPC) or to both national classification and IPC FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A41G 3/00, 5/00, A45D 24/10 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Esp@cenet, PatSearch (RUPTO internal), PAJ, USPTO C. DOCUMENTS CONSIDERED TO BE RELEVANT Category\* Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. RU 2401020 C2 (ADERANS HOLDINGS CO., LTD.) 10.10.2010, Y abstract, paragraphs [0005], [0006], [0009], [0010], [0012], [0018], [0024], 1-7, 10-17, 19-22 [0039], [0041], [0045], [0052], fig. 1-2 A 8, 9, 18 JP H062206 A (ADERANS CO LTD) 11.01.1994, abstract, paragraphs [0006] – Y 1-7, 10-17, 19-22 [0008], [0014], [0022], [0027], [0028], fig. 1-3 Y US 2005/0252518 A1 (HORTENCIA SALINAS) 17.11.2005, claims 17, 18 10 Y RU 2339282 C1 (ZUDENKOVA LYUBOV VLADIMIROVNA) 27.11.2008, p. 3, 14-17, 19-22 lines 28-38, claims Y RU 2241361 C2 (ADERANS CO., LTD.) 10.12.2004, abstract, p. 8, lines 1-8, fig. 1 14-17, 19-22 Further documents are listed in the continuation of Box C. See patent family annex. Special categories of cited documents: later document published after the international filing date or priority date and not in conflict with the application but cited to understand document defining the general state of the art which is not considered the principle or theory underlying the invention to be of particular relevance "X" document of particular relevance; the claimed invention cannot be "E" earlier document but published on or after the international filing date considered novel or cannot be considered to involve an inventive "L" document which may throw doubts on priority claim(s) or which is step when the document is taken alone cited to establish the publication date of another citation or other "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other combined with one or more other such documents, such combination being obvious to a person skilled in the art document published prior to the international filing date but later than "&" document member of the same patent family the priority date claimed Date of the actual completion of the international search Date of mailing of the international search report 31 May 2017 (31.05.2017) 29 June 2017 (29.06.2017) Name and mailing address of the ISA/RU: Authorized officer Federal Institute of Industrial Property. Berezhkovskaya nab., 30-1, Moscow, G-59, T. Ivanova GSP-3, Russia, 125993 Facsimile No: (8-495) 531-63-18, (8-499) 243-33-37 Telephone No. (495)531-64-81