An improved artificial hair for use in wigs and the like comprising a multiplicity of synthetic fibrous yarns each formed with a plurality of small waves having various sizes and extending in various directions is provided. The waves formed on such fibers permit the hair to be shaped in a plurality of different styles. The invention also provides a method for manufacturing such artificial hair, which includes the steps of forming and treating the synthetic fibrous yarns to create the small waves thereon.

2 Claims, 15 Drawing Figures
ARTIFICIAL HAIR AND METHOD FOR MANUFACTURING THE SAME

BACKGROUND OF THE INVENTION.

It has been common to manufacture artificial hair from synthetic fibrous yarns which have a smooth uncrimped texture. Such yarns are cut into definite lengths according to the length of the artificial hair desired and then stitched together in the middle or at the end thereof. The stitched hair section is then wound on a tubular member to form a wave or curl therein, and then heat set into such shape, thus forming relatively permanent curls. A plurality of such curled sections are then fastened to a head cap or the like so as to form a complete wig in which the hairs have been preset with permanent curls. Unfortunately, such artificial hair sections and wigs comprising the same can not be easily restyled to redevelop the curls in the opposite direction of their original winding because of the heat setting of the fibers. Furthermore, the individual fibers are usually held in place by three or more stitches, so that such fibers are radially fixed to the head cap and the rotation thereof to establish restyling is also impossible. Accordingly, to restyle or recur such prior artificial hairs and wigs, further heat setting of the fibers was required. This, of course, can result in damage to the hair and to the wigs produced from such hair, and, in addition, can not be easily accomplished by the average consumer.

SUMMARY OF THE INVENTION.

In accordance with the present invention artificial hair is provided which overcomes the styling difficulties associated with prior artificial hair by permitting the altering and restyling of curls formed therein without the necessity for rotating the synthetic fibers and without the need for heat setting to re-establish the curl direction. This is accomplished by the use of synthetic fibrous yarns each formed with a plurality of small waves having various sizes and extending in several directions. Such waves permit the bending or turning of each fiber in the direction of any one of said waves and thereby permit the restyling and reformation of all or any portion of the hairs which comprise a wig or other hair piece. The waves on each fiber also facilitate the bundling of groups of such fibers by partially intertwining the same, thus holding a desired hair style in place.

In general, the artificial hair of the invention comprises a multiplicity of synthetic fibrous yarns stitched together along a midsection and/or one end thereof, and each having a plurality of small waves of various sizes and directions formed therein to permit the curling of each fiber in any desired shape or direction by bending the same along the longitudinal axis of any one of said small waves.

As an additional feature of the invention, a method for manufacturing such artificial hair is also provided which is directed toward the formation of the small waves on each fiber comprising the hair. In general, the method of the invention comprises the steps of chemically treating a multiplicity of strands of synthetic fibrous yarn with a de-electrification solution to eliminate the build up of static electricity; forming one or more bundles of such fibrous yarns into a braid or rope-like pattern; heat setting the formed fibrous bundles; untwisting the bundles of said formed yarn fibers; and retreating the same with a chemical hair conditioner. Each of the fibers so formed and treated contain a plurality of small waves of differing sizes and extending in several radial directions about the central axis of such fiber. It has been found that the best results in restyling and bundling of fibers is obtained when the number of waves formed on each fiber ranges from about 5 to 30 waves per inch. The number of waves can be adjusted by first winding the fibrous bundles tightly to form more than the desired number of waves and then stretching the formed fibers after heat setting to reduce the number of waves per inch. The fibers are then cut to the desired hair length, stitched together to form hair sections and finally attached to a head cap or another substrate to form a wig or other hair piece.

Several different types of synthetic fibrous materials can be used to make the artificial hair of the invention and these materials include modacyrlcopolymers consisting of 56 to 60 percent polyvinyl chloride and 40 to 44 percent acrylonitrile, which are commonly known as Dynel, Elura, Kanekalon and Torylon. Additional synthetic fibers known as Vencelon, Terilon, Toyokalon, Cordelan, Milla and others well known in the art are also suitable to produce the artificial hair of the invention.

The method of manufacturing the artificial hair of the invention may be carried out in any one of several different manners, but in each case several basic steps, common to each, are required. These include cutting a suitable number of fibrous strands into a length of about 40 to 60 inches; bunching a multiplicity of such strands into at least two, but preferably 3 to 5 bundles; and treating the fibrous bundles with a 3 percent water soluble solution of wig oil in water at a temperature of about 40° to 50°C to prevent the accumulation of static electricity upon the surface of the fibers and to render the fibers more lustrous and natural looking. The treated fibrous bundles are then tightly wound by means of a rope twisting apparatus into a rope-like twine, or alternatively braided in a conventional manner; the purpose of either operation being to form the desired waves in each fiber. The twined or braided fibrous bundles are then subjected to an elevated temperature of about 60° to 180°C for a period of about 20 to 60 minutes and is then cooled to room temperature, thus heat setting the wave forms on each fiber.

The artificial hair of the invention and method of manufacturing the same are more fully explained with reference to the annexed drawings.

BRIEF DESCRIPTION OF THE DRAWINGS.

FIG. 1 is a schematic diagram showing the steps required to produce a section of artificial hair.

FIG. 2a is a plan view showing the wave formation on a single strand of the artificial hair of the invention.

FIG. 2b is a front elevation of the strand shown in FIG. 2a.

FIG. 2c is a side elevation of the strand shown in FIG. 2a.

FIG. 3a is a plan view showing the availability of movement of the fibrous hair formed in accordance with the invention.

FIG. 3b is a front elevation of the hair shown in FIG. 3a.

FIG. 4a is a plan view of a bundle of artificial hairs formed in accordance with the invention.

FIG. 4b is a front elevation of the view of the artificial hair shown in FIG. 4a.
FIG. 5 is a side view of a wig formed from the artificial hair of the invention.

FIG. 6 is a perspective view of one section of artificial hair from the wig shown in FIG. 5.

FIG. 7 is a schematic diagram illustrating the preferred steps of the manufacturing method of the invention.

FIG. 8 is a schematic diagram showing alternative steps of the manufacturing method of the invention.

FIG. 9a is a plan view of a strand of the fibrous yarn processed in accordance with the method of the invention.

FIG. 9b is a front elevation of the fibrous strand shown in FIG. 9a.

FIG. 9c is a side elevation of the fibrous strand shown in FIG. 9a.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS.

Referring now to FIG. 1, the various steps required to form lengths of conventional artificial hair or artificial and curled hair section in accordance with the invention into a stitched and curled hair section is shown. Firstly, a plurality of synthetic fibrous yarns are cut into any desired length, depending upon the particular hair piece to be formed therefrom. The lengths of hair 1 are then stitched with suitable thread along the lines 2 and 3 at a midpoint thereof. After stitching, the hair 1 is folded along a line central of stitches 2 and 3 to form a long strand 4 and a shorter strand 5, together with a loop 6. Finally loop 6 is folded in half and a third series of stitches 7 is provided to secure the fold in place, thereby forming a completed hair section 8.

A hair section 8 is then wound on a cylindrical member 9 having a diameter corresponding to the size of any desired curl 9a to be formed therein. The hair section is then cured at an elevated temperature ranging from about 60° to 180°C for about a period of about 20 to 60 minutes and then cooled completely to set curl 9a in place. An array of such hair sections are then fastened to a head cap 10 to form a wig or any other desired hair piece, such as the wig shown in FIG. 6.

A hair section formed in accordance with the steps shown schematically in FIG. 1, and comprising artificial hair strands 14 having small wave forms therein in accordance with the invention is illustrated in FIG. 5 and is designated 11. Wig 12 shown in FIG. 6 comprises a plurality of such hair sections 11, the fibrous strands 14 of which are shown in FIGS. 1a to 1c, wherein it can be seen that the plurality of small waves 15 formed on the strands are of varying size and extend in several directions. As noted hereinabove the wave formations on each fiber facilitate the restyling of wig 12 by permitting the bending, twisting or curling of each strand about any of the small wave formations 15 and by enhancing the bundling or intertwining of adjacent fibers due to the increased number of cross over points to hold the artificial hair in the desired position. This is illustrated in FIGS. 3 and 4. It can be seen that, although the hair sections 11 have curls 16 (as shown in FIG. 5) initially set in a definite direction, such direction and the pattern of such curls may be easily altered by the wearer of the wig merely by combing the hair in any desired style.

In FIGS. 3c and 3b, fiber strands 17, 18, 19 and 20 formed with small waves 15 in accordance with the invention are stitched together at one end. The position occupied by strand 17 represents the initial set in which all of the fibers are placed, while strands 18, 19 and 20 occupy alternate positions into which any of the strands can be placed. Similarly, FIGS. 4a and 4b illustrate bundles of fiber strands 21, 22, 23 and 24 stitched together and placed in alternate styling positions. It will be apparent to those skilled in the art that when the synthetic fibrous yarns of the invention which are curled in a definite direction are bundled, it is rather easy to alter the direction of such curls into optional directions because of the non-linearity of the fibers having uneven waves. Moreover, the preservation of a curl in any desired altered direction is maintained very firmly, because of the bundling characteristics of the fibers.

FIGS. 7 and 8 illustrate two alternative procedures for implementing the method of manufacturing the artificial hair of the invention. In the procedure of FIG. 7, extended lengths of synthetic fibrous yarn 33 are grouped together in four bundles 25, 26, 27 and 28. The bundles are then treated with a solution of 3 percent water soluble wig oil in water at a slightly elevated temperature of about 40° to 50°C by spraying the same via nozzle 29 connected to a suitable reservoir of the solution. The oil coats the fibers and thereby eliminates static electricity which tends to build up in the fiber bundles. In addition the wig oil protects the fibers and improves their natural hair appearance. It is preferable that after such spraying, the moisture content of each of the fibrous yarn bundles be about 50 percent. It should be noted that the term "wig oil" as used herein refers to various oils recommended by the fiber manufacturers for the purpose of reducing or eliminating static electric build-up. Specific designations of such de-electrification oil is known to those skilled in the art.

The treated fibrous bundles 25 to 28 are then conveyed through a conventional rope making machine 30, which twists the bundles of fibers into a rope-like configuration 31. It can be seen that the twisting of the fibers into the rope like configuration 31 causes the individual strands which comprise each bundle to be formed with a series of waves or crimps thereon extending along their entire length. The number and size of such waves formed on each fiber in a unit length thereof is determined by the number of fibrous bundles used in the rope twisting operation and the quantity of synthetic fibrous strands in each bundle, as well as the number of turns per unit length of the rope. Accordingly, the number of waves in a unit length of fibrous strand of artificial hair is inversely proportional to the number of bundles passed through the rope making apparatus 30 and the quantity of fibrous strands per bundle. In addition, the number of waves is also directly proportional to the number of turns per unit length of rope. Consequently, the amount of waves in a unit length of fiber can be altered by adjusting the number of bundles utilized, the number of fibers per bundle and the number of turns per inch produced by the rope making apparatus. Moreover, it should be noted that the number of waves formed on a unit length of fibrous yarn is inversely proportional to the size of such waves, so that the less the number of waves in a definite length of fibrous yarn, the larger the size of such waves. The direction of the wave can also be set, depending upon the particular method of twisting the bundle into the rope-like configuration, such as an "S" twist, a "Z" twist or a combination thereof.
It should also be noted that the waves formed on each fibrous strand of the artificial hair of the invention, as well as permitting the alteration of hair style, also affects the texture of the hair which in and of itself creates varying styles. For example, utilizing the method of the invention the artificial hair can be made either slightly wavy or extremely kinky, as well as varying degrees of waviness therebetween. In each instance, the number of waves and the size of such waves formed in each strand of artificial hair can be adjusted as specified above. However, in most instances to accomplish the desired styling effect, the number of waves formed in each fibrous strand should be between five and thirty waves per inch.

After twisting, the rope 31 is conveyed through a dryer 32 by means of suitable rollers 34. In the oven the twisted rope is heat set at a temperature ranging from about 60°C to 180°C for a period of about 20 to 60 minutes, thus fixing the waves on the individual fibers in the position obtained by twisting the bundles into the rope pattern. The rope is then cooled and fed via pinch rollers 35 through a second rope-making machine 36, arranged in a manner opposite that of rope-making machine 30, so as to untwist bundles 25, 26, 27 and 28.

The individual bundles are then conveyed via pinch rollers 37, 38, 39 and 40, respectively, to insure complete untwisting and separation of such bundles.

At this point in the procedure each individual fiber appears as shown in FIG. 9c through 9e, that is with a plurality of waves 41 formed thereon in a diverse pattern and direction. When such fibers are placed together in bundles to form a wig, they create a relatively larger volume and are easily entangled, which can be seen in the side elevation view of FIG. 9c. If the fibrous yarn bundles are larger in volume, it is extremely difficult to accomplish the stitching and curling steps illustrated in FIG. 1. To overcome these difficulties it is desirable to stretch or elongate the fibrous bundles.

In the procedure illustrated in FIG. 7 such elongation is accomplished by utilizing two pairs of power driven rollers 42 and 43, which are arranged such that the speed of rollers 43 is slightly greater than the speed of rollers 42. Each of the untwisted fibrous bundles 25, 26, 27 and 28 are combined into a single bundle 44 and fed simultaneously through rollers 42 and 43. Since the shorter configuration is greater than the longer, it is apparent that the individual fibers comprising 44 will be stretched between the two pair of rollers.

To prevent the further build-up of static electricity within the fibers of bundle 44 a second spray nozzle 45 is disposed above the space between rollers 42 and 43. As in the case of nozzle 29, nozzle 45 is connected to a reservoir containing a 3 percent solution of water soluble wig oil in water at a temperature of about 40°C to 50°C and is adapted to spray such solution on bundle 44 as it passes beneath. After such treatment bundle 44 is conveyed via rollers 47 through a second drying and curling oven 44 in which the fibers comprising the bundle are once again heat set at a temperature ranging from about 60°C to 180°C for a period of 20 to 60 minutes to fix the waves in an elongated position on each fiber. After such heat setting, the fibrous bundle is cooled and wound on a storage reel 48.

The individual fibers comprising bundle 44 after elongation, treatment with wig oil, drying and cooling appears as that shown in FIGS. 2a to 2c and is described hereinabove. It can be seen that such fiber has a lower wave height and a reduced number of waves than the fiber shown in FIGS. 9a to 9c. It will be apparent to those skilled in the art that the volume of a bundle of fibers of the type shown in FIGS. 2a to 2c will be considerably less than the volume of a bundle of fibers of the type shown in FIGS. 9a to 9c. In this manner, a natural looking wig or other hair piece can be formed which can be easily restyled by the user.

The alternative procedure for carrying out the method of the invention is illustrated in the schematic of FIG. 8. In this instance a multiplicity of synthetic fibrous strands are cut into lengths of about 40 to 60 inches, are grouped together in three bundles 49, 50 and 51 and then subjected to a treatment of a water solution of wig oil by means of nozzle 52. The treated bundles are then formed into a braid-like configuration 53, which can be accomplished either manually or through the use of suitable braiding apparatus, which are well known in the art. The braided bundle 53 is then heat set in a drying oven 54 in the same manner as that described with reference to the procedure shown in FIG. 7, and then formed into bundles 49, 50 and 51. Such bundles are then bunched together in a single bundle 55 and treated once again with a solution of wig oil by means of the nozzle 56. The fibrous bundle 55 is then wound on a spiral type member 57 to accomplish the necessary elongation of the individual fibers which comprise the bundle, so as to reduce the volume of the final fibrous bundle and create individual fibers, as shown in FIGS. 2a through 2c. In the procedure of FIG. 7, the degree of elongation of the fibrous bundle was determined by the speed of the roller pairs 42 and 43. In the procedure of FIG. 8, the degree of elongation is adjusted by the strength of the winding on the spiral type member 57. After elongation, the fibrous bundle is once again heat set in the manner described or with reference to FIG. 7 in a drying oven 58. A fibrous bundle 59, the fibers of which are as shown in FIGS. 2a through 2c is obtained after cooling. The fibers produced by the procedures outlined with reference to FIGS. 7 and 8 are then cut and stitched as shown and described, with reference to FIG. 1 to produce a wig or other hair piece of any desired size, shape and configuration.

Although the artificial hair and the method for manufacturing the same of the present invention has been described with reference to specific embodiments and configurations, it is to be understood that any and all configurations and embodiments within the scope of this invention will be apparent to those skilled in the art.

What is claimed is:

1. Improved artificial hair for use in wigs and the like comprising a multiplicity of synthetic fibers bundled together, each of said fibers having a plurality of waves of various sizes formed therein ranging in number from about 5 to about 30 waves per inch and extending in various directions, said waves being adapted to facilitate the curling and styling of the hair by bending the fibers in any desired shape or direction along the longitudinal axis of the waves.

2. An artificial hair wig comprising a series of bundles having a multiplicity of synthetic fibrous strands stitched together, each of said strands having a plurality of waves of various sizes extending in various directions formed therein and ranging in number from about 5 to about 30 waves per inch, to facilitate the curling of the artificial hair into any desired style by bending the fibrous strands along the longitudinal axis of any of said waves.

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