This invention relates to method and apparatus for waving hair.

The invention is particularly adapted for croquignole waving by the cold method and will be illustrated by detailed description in connection with such use.

In such waving in accordance with usual procedure, a wide strand of hair is wrapped around a rigid solid rod that is slightly tapered to a central portion, chemical compositions selected to soften and harden the hair in turn are applied, the rod is removed, and the hair shampooed and dried. The chemical treatment frequently includes applying an alkaline solution which softens the hair and causes yielding conformance to the shape of the wave rod and then applying an acidic solution which neutralizes the alkali and hardens the tissue. The result is establishing of the shape of the wave.

In spite of the large amount of study that has been given to waving of hair and designing of equipment for it, there remain a number of disadvantages that are accepted in this art as necessary. Hair must either be wrapped loosely and therefore, unevenly around the wave rod initially, or wrapped tight and later subjected to objectionable tension during the chemical treatment or subsequent drying. Also it is not possible with the usual method and waving rods to apply the chemical treatment uniformly to the inside and outside of the wave. Thus, the application of the chemical treatment over the exterior of the wound hair gives overtreatment of the outside of the wave and undertreatment of the interior.

I have found the tension not only unnecessary but also undesirable, in breaking and devitalizing the hair.

The present invention provides a method and also collapsible waving rods that avoid the development of objectionable tension, makes possible uniform treatment with the waving solution, and gives a wave of improved naturalness in appearance.

Briefly stated, the invention comprises hollow waving rods including ends of fixed dimensions and intermediate portions, that may be decreased in perimeter after the hair is wrapped around the rods. The invention comprises also the method of waving hair which includes releasing the tension upon the wave after it is formed and before hair in the wave is hardened, suitably before the waving chemical is fully absorbed or even before the waving chemical is applied initially. In one embodiment, the invention comprises the application of the waving chemical to the inside as well as the outside of the wave. The invention includes also the herein described hollow perforated waving rod which makes possible this uniform application and also the collapsing of the rods.

The invention will be illustrated in greater detail in connection with the attached drawings to which reference is made.

Fig. 1 is a plan view of a waving rod with hair wrapped therearound in the manner of croquignole waving, the figure being in part diagrammatic.

Fig. 2 is a cross section on line 2--2 of Fig. 1.

Fig. 3 is a similar cross section after removal of the inner element of the waving rod to be described later.

Fig. 4 is a plan view of the rod of Fig. 1 with the inner element removed.

Fig. 5 is a plan view of the inner element in the assembly of Fig. 1.

Fig. 6 is a longitudinal sectional view of a modified form of the invention.

Fig. 7 is a sectional view on line 7--7.

Fig. 8 is a similar sectional view after removal of the inner tubular element to be described later.

Fig. 9 is a longitudinal sectional view of the assembly of Fig. 6 with the inner element removed.

Fig. 10 is a longitudinal view partly in section of another embodiment of the invention.

Fig. 11 is a sectional view on line 11--11 of Fig. 10.

In general the method used follows conventional practice except that tension on the wrapped hair is released before the waving is completed and, in one embodiment, the waving chemicals and suitably also the subsequent treating liquids such as the shampoo liquid and wash water are applied to both the inside and outside of the waves.

The release of the tension is effected to advantage by use of the waving rods illustrated in the drawings. In these rods, movement of an inner element of the assembly causes a decrease in the perimeter of the straight (intermediate portion or midpart) of the rod around which the hair is wrapped. This movement of the inner element decreases the tension on the hair before the hair is subjected to excessive tension, as, for instance, promptly after the chemical treatment is applied or promptly after the hair is wrapped around the rod.

This decrease in tension has several advantages. It loosens the waves and thus facilitates...
access of the selected chemical solution or solutions to the hair in all parts of the waves. This improved access increases the uniformity of absorption and treatment of the hair. Also the release of tension prevents cracking and breaking the desired smooth exterior of the hair, which results to a very large and highly undesirable extent when the tension on the hair is increased as the hair shrinks under the influence of the chemicals and dries as the waving is conducted normally.

The waving treatment utilizes conventional chemicals, shampoos, water washing and drying methods. In fact, the technique and materials used in waving are conventional except as specifically stated herein to be otherwise.

The drawings show waving rods with ends 12, 14, 16. These ends include means for maintaining the dimensions the same at all times, as, for instance, the abutment of the edges of shaped rigid sheet material as along the abutment lines 18 (not shown in all of the figures). The ends are hollow and suitably are somewhat tapered. Thus they may resemble frustra of hollow cones becoming more narrow towards the intermediate portion of the rods.

The intermediate portions or elements of the rods extend between the ends and suitably are continuous with the ends, that is, formed from the same piece of material. These intermediate portions are designated in the several figures by 20, 22, 24 and 26. These portions are suitably approximately semicylindrical, that is, are curved and of angular dimensions corresponding, for instance, to 120° to 210° and ordinarily about 160° to 180°.

Extending through the hollow ends and inside the curved intermediate portions in the structure of Figs. 1 and 2 is the inner element 28 that may be a tube. This tube has such a diameter that it fits approximately within the semicylindrical portion 20 and in it forms an approximately cylindrical member, in this case a cylinder which has offsets at the edges of the semi-cylindrical part 20 as shown for instance in Fig. 2.

After the hair 29 is wrapped around this approximately cylindrical assembly constituting the intermediate portion or mid-part of the rod and when the stage in waving is reached in which I desire to decrease the tension on the hair, then the inner member 28 is pulled lengthwise from the assembly, to leave the waving rod of shape shown in Fig. 4. This step releases the tension on the hair by decreasing the perimeter or distance around the intermediate portion of the rod, as shown in Fig. 3.

In the construction shown in Figs. 6, 7, 8 and 9, the mid-part of the waving rod contains an approximately semicylindrical part or member 30 and means for displacing the member alternately or away from the elements 22 or 24 while maintaining the member at all times between the flaring ends of the rod and in generally parallel relationship to the said elements, that is, without lengthwise movement of the elements 30 or 28. These means include the keys 32 engaged in holes in the ends 14, for securing this semicylindrical part so as to prevent objectionable lengthwise movement of it with respect to the rest of the rod but to make the part 30 displacable towards or away from the approximately semicylindrical part 22.

The means for displacing the said member in the structure of Figs. 6, 7, and 8 include also the inner member 34 such as a tube which extends through the midpoint of the assembly and through the hollow ends. This tube is of such size as to displace the semicylindrical part 30 in direction away from the part 22, as shown in Fig. 7. When this inner element 34 is withdrawn, then part 30 drops towards the portion 22 as shown in Figs. 8 and 9.

In Fig. 10, there is shown an inner element 36 that is rotatable, is approximately semicylindrical and of radius somewhat smaller than that of the intermediate portion 34 so as to fit therewith. When this element 36 is rotated to the closed position, the midpart of the assembly becomes approximately cylindrical. When the element is rotated to the open position, as shown in Fig. 11, then the midpart of the assembly becomes approximately semicylindrical and the perimeter is decreased, so as to release tension on the hair wrapped around the rod.

This construction includes suitably tabs 38 turned in from the intermediate portion and engaged behind shoulders 40 of the rotatable inner element, so as to restrict lengthwise movement of the element within the assembly.

In the preferred embodiment the parts of the waving rods around which the hair is wound are not only hollow but provided with closely spaced perforations as shown in the various drawings. The hollow construction and the closely spaced perforations adapt these rods for use in applying the waving solutions or chemicals to the inside of the hair wrapped around the rods, in addition to permitting application of the chemical treatment over the exterior of the waves in accordance with the usual practice. Also the hollow perforated rods permit the application likewise of the hardening solution to the inner parts of the waves.

In use, the assemblies shown in plan in Figs. 6, 10, and 12 serve as the rigid support for the hair which is waved around the support, as illustrated in Fig. 1. In other words, any of the forms of rods may be associated with the hair as is the rod of Fig. 1. After the complete process is ended and the hair is dried the interior rods (such as shown in Fig. 5) are removed lengthwise from the waves, while the midparts are in collapsed condition. After the waving operations are completed, the hair such as shown in Fig. 1 is unwound before removal of the exterior part of the waving rod from the hair. In other words, the ends of the waving rods of permanent size such as 12 and 16 are not slipped through the roll of hair.

Besides preventing breaking and damaging of the hair, permitting application of the treating solutions to both the inside and outside of the waves, and causing adequate looseness of the hair so as to give more even absorption of the various liquids applied in turn to the hair, the present invention also gives a more even and natural appearance to the waves finally made than is obtained when the hair is initially wrapped loosely or is subjected during the waving process to the excessive tension that characterizes the conventional waving treatment of hair wrapped at the outset sufficiently firmly to give uniform waving, and gives longer life to the permanent.

The rods may be constructed of any suitable material as, for instance, shape retaining plastic, aluminum, hard rubber, or the like.

The waving operation is illustrated in greater detail by the description of a representative procedure which follows.

First, the inside element is moved until the waving rod presents an unbroken and full surface.
Then the hair is wrapped firmly and evenly around the rod, with the correct tension, as in heat permanent waving, to obtain a nearly perfect and equal rotundity of every hair. The alkali compound to soften the tissue is applied to the hair. To get a more complete saturation, the solution of alkali compound is applied externally and also through the hollowed ends of the rod. The chemical may be applied also before the hair is wrapped. Now, by removing or turning the internal element or pin, the overall calibre or perimeter of the rod is reduced to such extent as to eliminate completely the tension on the hair. The inside strand of the hair has now the opportunity to expand and conform itself to a size of coil permitted by its own texture and natural elasticity which differs from person to person and sometimes from strand to strand in the same head as is the case of bleached or dyed hair.

After the first process of softening the hair has been completed, the second process of hardening again the cornice tissue begins. A second lotion is applied over the hair and through the ends of the hollow perforated rod and left for a usual although preferably somewhat shortened period of time. This process is doubly important because the hair first softened by the first alkali compound must be thoroughly rehardened in every single part, in order to reacquire its initial condition. The perforated rod permits a complete circulation in contrast to the rigid and solid rod used until now. This uniformity of application prevents the hair from becoming gummy or rubbery which is often the result when the hair has not been completely hardened.

This terminates the permanent wave process. The waving rods are removed. The next steps are the shampoo and finger wave. These may be performed in usual manner. Then the hair is dried.

The method and apparatus permit standardization of all operations in the waving process. Since there is no danger of breaking the hair, no matter how long within reason it is left on the contracted rod, all conditions may be fixed in advance and need not be varied for individuals with different types of hair. Thus, there may be used a standard temperature, concentration of waving solution, and period of contact before the composition is removed.

It has been proposed that the tension on the hair should be increased by expanding the waving rods after the hair is wound around the rods. This effect, heretofore considered desirable is the opposite to that which I now find advantageous and which I use. I wind the hair in normal manner and then collapse the rod. As a result, tension on the hair is released and the hair is not subjected to undue tension at any stage in the waving operation. In fact I cause the curl of hair to loosen soon after it is formed. When loosened, the curl assumes the general form that is characteristic of that particular hair. As a result, the waves are more natural in appearance than otherwise would be the case. Other advantages have been stated previously.

It will be understood that it is intended to cover all changes and modifications of the examples of the invention herein chosen for the purpose of illustration which do not constitute departures from the spirit and scope of the invention.

What I claim is:

1. A hair waving rod comprising hollow ends of fixed dimensions, an intermediate approxi-
mately semicylindrical portion continuous with the said ends, and an inner element engaged within the said ends, extending through at least one thereof, and having a part of generally semi-
tubular shape fitting in rotatable manner within the said semicylindrical portion, so that rotation of the inner element to one angular position causes the midpart of the rod between the said ends to assume approximately cylindrical shape and rotation of the element to another position causes the midpart of the rod to assume approximately the form of a semicylinder and thus decreases the perimeter of the said midpart of the waving rod.

2. A hair waving rod as described in claim 1 including tabs turned in from the said intermediate portion and engaging shoulders formed in the inner element so as to restrict lengthwise movement of the inner element with respect to the semicylindrical portion.

3. A hair waving rod comprising frustro-conical ends of fixed dimensions, an intermediate portion of approximately semicylindrical shape continuous with and extending from the smaller parts of the ends, another intermediate approximately semitubular part forming with the said portion a divided approximately tubular midpart, means holding the semitubular part to the ends and causing it to be displaceable in direction away from the said intermediate portion, and a withdrawable cylindrical element passing through the ends and between the said intermediate portion and part, the cylindrical element displacing the said part in direction away from the intermediate portion and, when the element is withdrawn, causing the said part to be movable towards the intermediate portion so as to decrease the perimeter of the hair waving rod at positions between the two ends thereof.

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