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in-part of Ser. Nos. 551,320, May 19, 1966
and 591,939, Sept. 6, 1966, abandoned.
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[51] Int. Cl. **A45d 8/00**
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124, 41, 48, 64, 50; 124/10; 24/257, 261, 139, 137

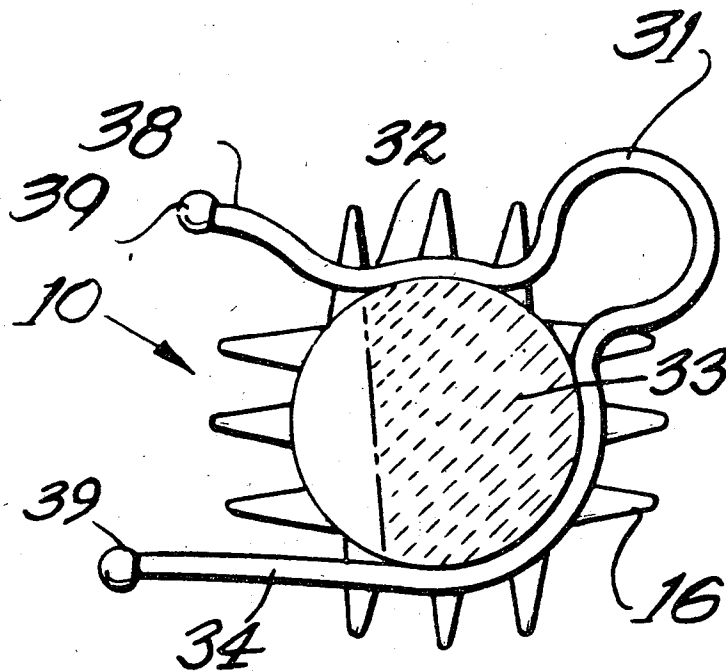
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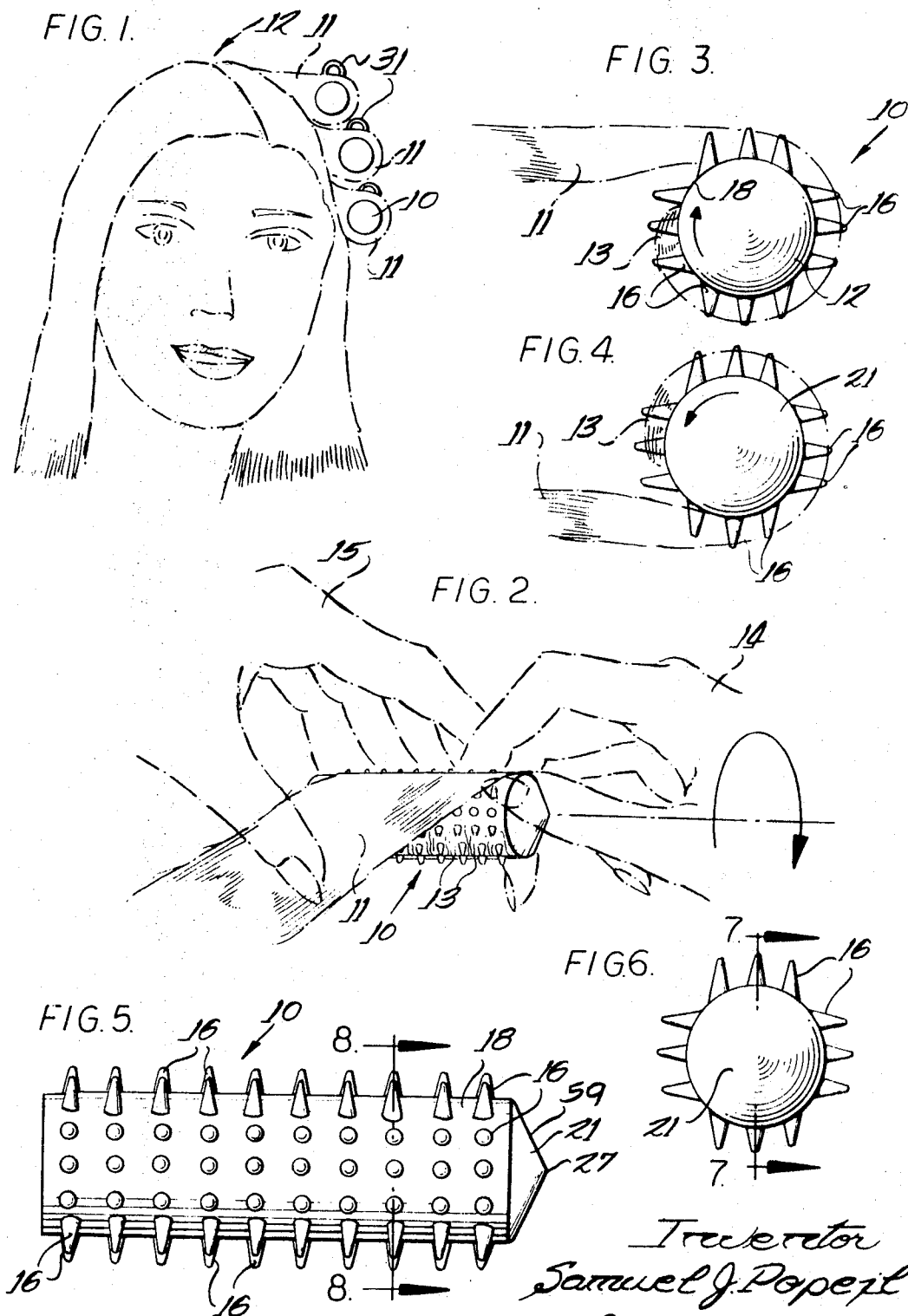
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[54] **CLIP**
2 Claims, 25 Drawing Figs.

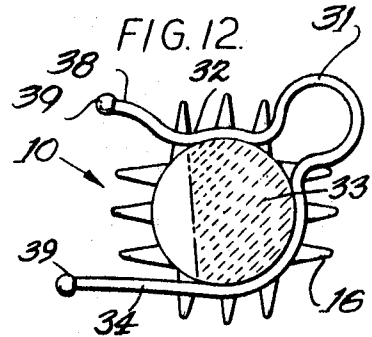
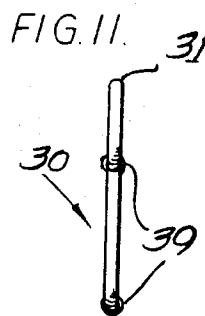
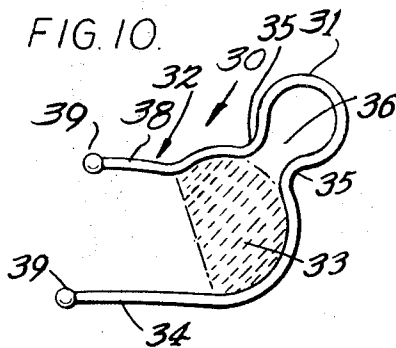
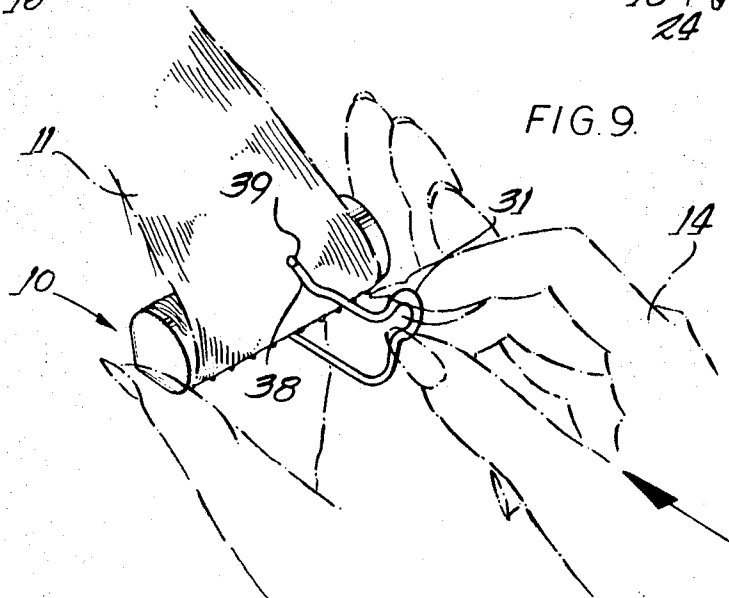
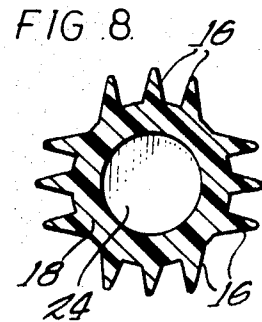
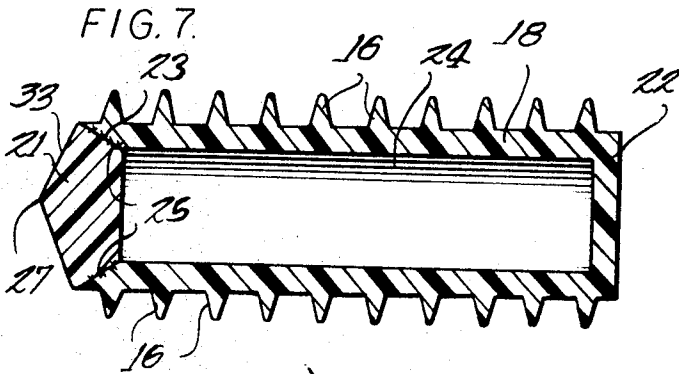
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ABSTRACT: A single wire clip with an arcuate clamping portion, yieldable outwardly bent legs for transverse mounting to a hair roller, and a grasping loop integral with the clamping portion.



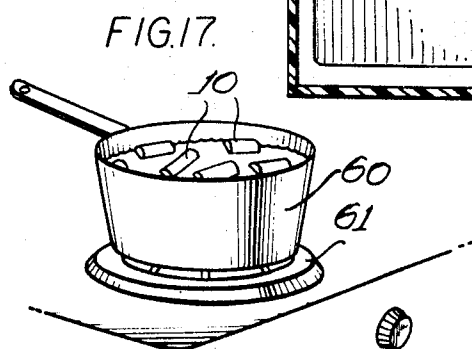
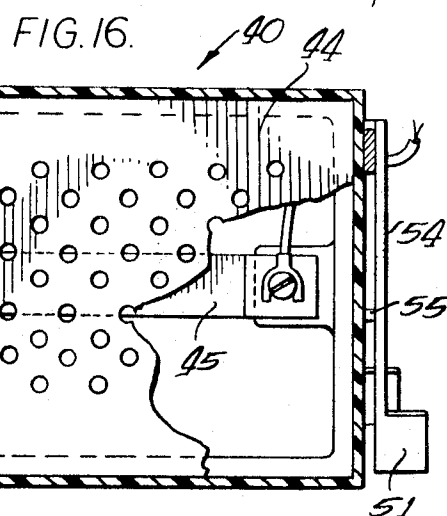
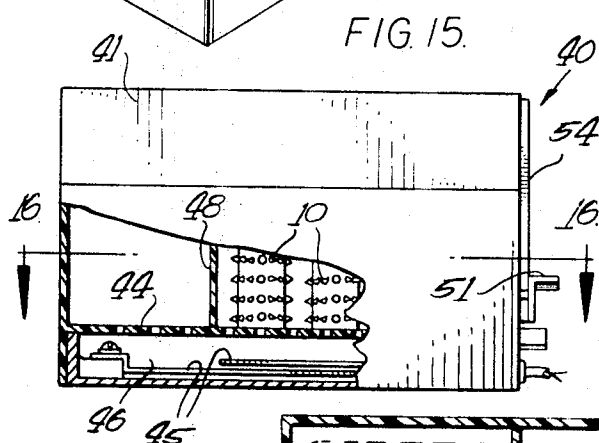
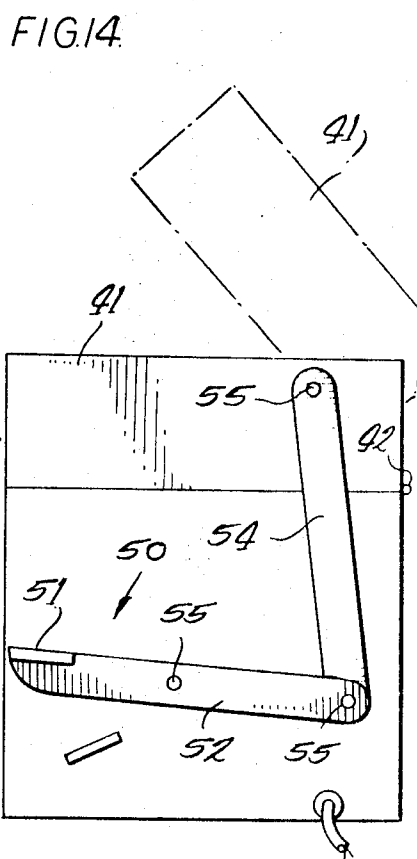
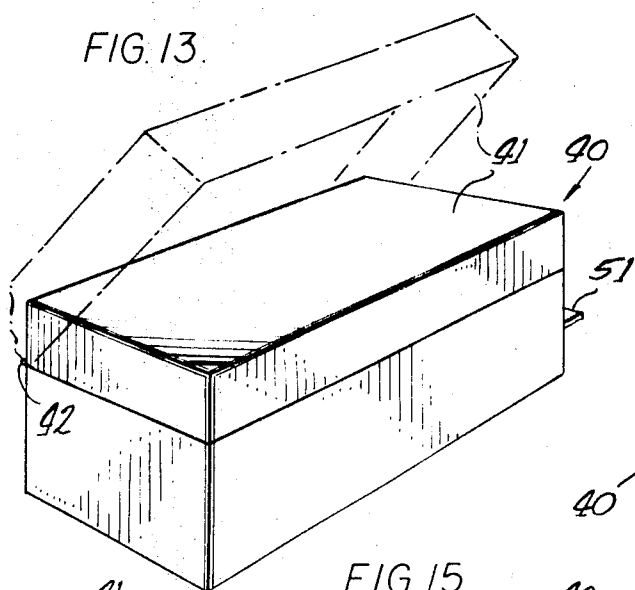


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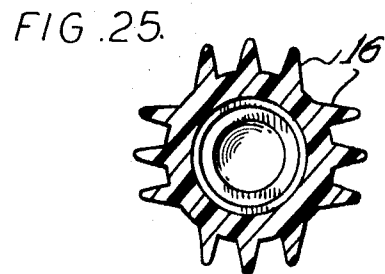
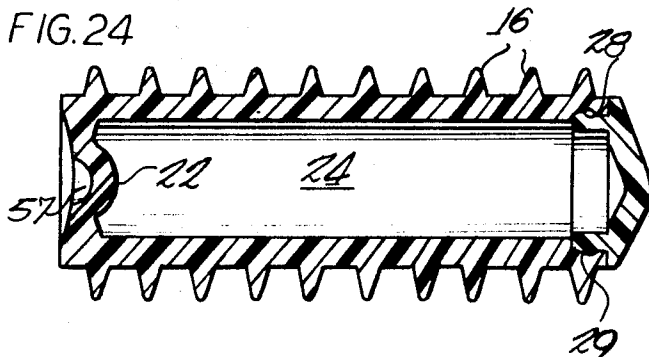
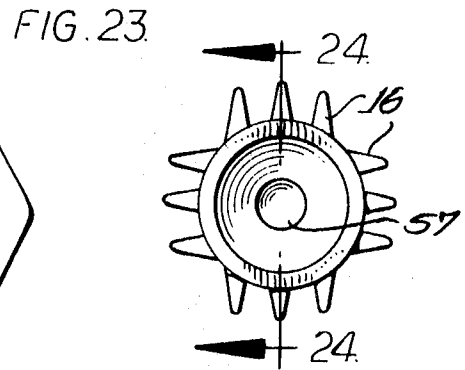
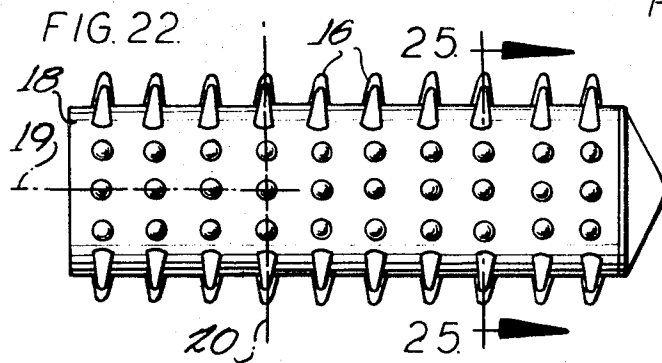
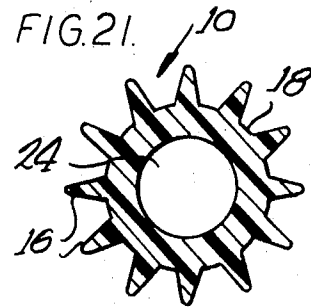
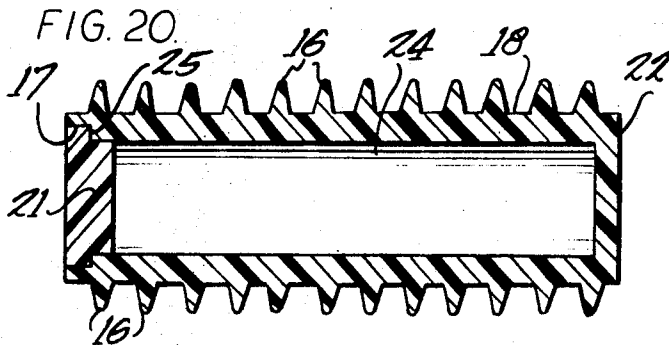
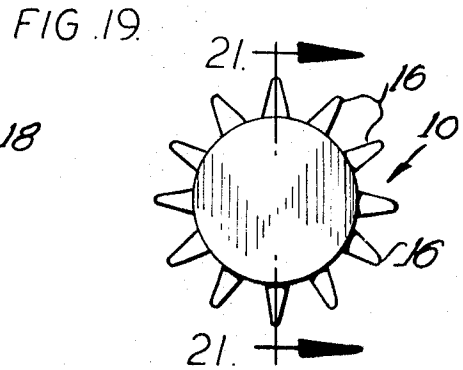
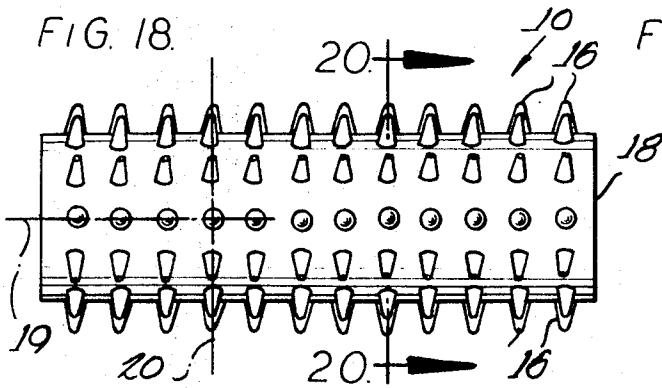


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CLIP

This application is a divisional application of U.S. Pat. application, Ser. No. 693,432 now Pat. No. 3,480,019, filed Dec. 26, 1967, which, in turn, is a continuation-in-part of earlier filed applications, Ser. No. 551,320, filed May 19, 1966 and Ser. No. 591,939, now abandoned, filed Sept. 6, 1966.

The present invention relates to a roller, a composition of matter for the roller, and a clip, all of which combine in use for setting the hair. In use, the roller is heated preferably by steaming. The hollow rollers have a plurality of spines extending radially from the roller body. Strands of hair are rolled over the rollers and secured by clips until the rollers have transferred their moisture and heat to the hair thereby setting the curl. In particular, this invention relates to an improved clip which is particularly adapted for use in combination with a roller having a cylindrical-shaped body, for securing said rollers in the hair.

Accordingly, an object of the present invention is to provide an improved clip for securing rollers in the hair.

Still another object is to provide improved clips which are particularly adapted for use in combination with rollers having cylindrical-shaped bodies, for securing said rollers in the hair.

A still further object is to provide improved clips of the above type which are fabricated easily and inexpensively from a single length of wire.

Another object is to provide improved clips of the above type which have orienting loops that serve the twofold purpose of supplying a spring action, and an orientation point.

Further objects and advantages and details of the present invention will become apparent as the following description proceeds accompanied by the explanation of the details of the illustrative drawings in which:

FIG. 1 is a diagrammatic view of the rollers partially inserted in a lady's hair in the manner illustrative of the present invention.

FIG. 2 is a perspective partially diagrammatic view showing how the hair is wrapped upon a roller.

FIG. 3 is an end view of the roller illustrating how the hair is rolled underneath.

FIG. 4 is a view similar to FIG. 3 illustrating how the hair ends are rolled over the top of the roller.

FIG. 5 is a front elevation of a roller illustrative of the structure of the present invention.

FIG. 6 is an end view in the same scale as that of FIG. 5 of the roller shown in FIG. 5.

FIG. 7 is a longitudinal sectional view of the roller taken along section line 7-7 of FIG. 6.

FIG. 8 is a transverse sectional view of the roller taken along section line 8-8 of FIG. 5.

FIG. 9 is a diagrammatic perspective view illustrating how the clip is placed in position on a strand of hair to tightly retain the hair strand against the roller after the hair has been rolled on the roller.

FIG. 10 is a front elevation of a clip of the character shown diagrammatically in FIG. 9.

FIG. 11 is an end view of the clip shown in the same scale as FIG. 10.

FIG. 12 is a front elevation of the clip shown in FIGS. 9 through 11 inclusive, illustrating its conformed relationship to the roller.

FIG. 13 is a perspective partially diagrammatic view of a steam chest of the character useful in preheating and steaming the rollers.

FIG. 14 is an end view of the steam chest shown in FIG. 13 illustrating diagrammatically how a linkage mechanism may be employed to pen the lid portion for removing the rollers.

FIG. 15 is a front elevation in reduced scale of the steam chest shown in FIGS. 13 and 14, partially broken to illustrate the interior structure.

FIG. 16 is a longitudinal sectional view of the steam chest taken along section line 16-16 of FIG. 15 looking downwardly on the heating element and base of the roller.

FIG. 17 is a perspective view illustrating an alternative form for heating and moistening the rollers.

FIG. 18 is a front elevation of a roller illustrative of the structure of the present invention.

FIG. 19 is an end view in the same scale as that of FIG. 18 of the roller shown in FIG. 18.

FIG. 20 is a longitudinal sectional view of the roller taken along section line 20-20 of FIG. 19.

FIG. 21 is a transverse sectional view of the roller taken along section line 21-21 of FIG. 18.

FIG. 22 is a front elevation of a roller illustrative of the structure of the present invention.

FIG. 23 is an end view in the same scale as that of FIG. 22 of the roller shown in FIG. 22.

FIG. 24 is a longitudinal sectional view of the roller taken along section line 24-24 of FIG. 23.

FIG. 25 is a transverse sectional view of the roller taken along section line 25-25 of FIG. 22.

In the above-identified copending application, Ser. No. 693,432, the present application being a division of the same, there is disclosed a roller, a composition of matter for the roller, and a clip, all of which combine in use for setting the hair. The apparatus preferably employed in the method comprises a roller 10 and means for heating the same not to exceed the boiling temperature of water. While the heating may be accomplished by boiling the roller in water (see FIG. 17), it is preferred that a steam chest 40 (see FIGS. 13 to 16) be employed which will assure heating and surface retention of distilled water. Before turning to the specific configuration of the roller 10 and steam chest 40, they will be discussed generally in terms of the material and the properties which are desirably exhibited by the material and the particular configuration. While certain plastics are discussed extensively, other materials with comparable heat and moisture retention characteristics are contemplated.

Test results have indicated that it is important that the roller body 18 retain a temperature in the range of 185° F. to 150° F. for 2 minutes. Employing a generally annular cylinder of 2 inches to 4 inches in length, and approximately 1 inch in diameter with a body wall in the range of one-eighth inch to one-fourth inch will produce a satisfactory usable and manageable roller. When the roller is hollow with closed ends superior thermal results are achieved. Whatever plastic material is employed for molding the rollers should be stable at sustained temperatures in excess of 212° F. polypropylene will exhibit good temperature characteristics particularly when hollow and both ends are sealed. The addition of talc to polypropylene in a 40 percent composition by weight exhibits excellent moisture and heat retention properties. A material marketed under the trademark DELRIN which is a generally acetal material produces excellent results. The hollow roller 10 with an uninterrupted interior having closed ends is most desirable thermally, and also because of its lighter weight and lower material cost as compared to a solid roller.

The following tables are indicative of the temperature curve at average room temperatures when DELRIN with a cored center but open end, and a cored center with closed ends respectively have been employed after rising to the temperature of boiling water and removing:

	Open End DELRIN- cored, degree	Closed End DELRIN- cored, degree
Removal.....	190	190
15 seconds.....	190	180
30 seconds.....	185	178
45 seconds.....	182	178
1 minute.....	177	178
1 minute 15 seconds.....	173	176
1 minute 30 seconds.....	169	176
1 minute 45 seconds.....	166	175
2 minutes.....	163	173
2 minutes 15 seconds.....	160	172
2 minutes 30 seconds.....	157	170
2 minutes 45 seconds.....	155	168
3 minutes.....	153	166
3 minutes 15 seconds.....	151	165
3 minutes 30 seconds.....	148	164
3 minutes 45 seconds.....	145	162
4 minutes.....	144	161

It will be noted that in all instances the temperature at the end of 2 minutes was in excess of 160° F., but that the DELRIN with an open end cored center achieved a slightly higher initial temperature. With the hollow roller having closed ends, a thinner wall section may be employed to arrive at the same temperature characteristics as above with the open ended roller. As indicated above, the net result is a lighter, more comfortable roller with a lower cost and superior curling characteristics.

Materials such as polyethylene have low water retention characteristics, and accordingly are less desirable. Furthermore, such materials as styrene and polystyrene distort at relatively low temperatures, and thus are less desirable, even though less expensive. In addition, their water retention characteristics are also relatively low.

Nylon has good water retention characteristics and temperature characteristics, but is considerably more expensive. A preferred material for the rollers 10 is polypropylene with an additive of 40—50 percent by weight of talcum powder. If more than 50 percent of the talcum powder is used, the spines 16 thereon (described more fully below) become brittle and break and the general strength of the rollers is reduced. If less than 40 percent of the talcum is used, the heat retention characteristics of the polypropylene are substantially reduced.

Talcum powder has heretofore been added to polypropylene to improve its dimensional stability and stiffness, and also has been recommended to improve heat distortion and to minimize sink marks. The fact, however, that it can be used for the purpose of retaining moisture and a high latent heat as employed with the rollers 10 of the present invention has never been recognized nor employed.

With rollers 10 formed of polypropylene and the talcum powder additive, in approximately 2 minutes, all of the moisture is transferred from the rollers and yet the temperature of the rollers remains between 185° and 150° for 4 to 5 minutes. Thus, the talcum polypropylene rollers have the temperature retention characteristics and good moisture transfer characteristics important to fast setting. In addition, the rollers do not distort at sustained temperatures of boiling water.

Rollers 10 fabricated of the polypropylene with the talcum powder additive also provide substantial economic advantages. Ordinary polypropylene costs in the range of 20 to 25 cents a pound. With the talcum powder additive, it costs approximately 27 cents a pound. DELRIN, while prior to the discovery of the advantages provided by polypropylene talcum powder mixture, was considered a preferred material and costs 70 to 80 cents a pound. The characteristics of the polypropylene talcum powder mixture are superior to those of DELRIN, hence both substantial savings in cost and improved operating characteristics are realized.

Rollers formed of polypropylene with a talcum powder additive also exhibit an off-white color somewhat pearlescent. This color matches quite closely the color of an end cap 21 (described below) formed of pure polypropylene so that the finished rollers have an attractive appearance.

As new and different plastics, metal, alloys and sintered materials are developed, there will undoubtedly be improved materials which can be employed. It will still remain essential to the invention that the roller have good temperature retention characteristics, moisture transferring characteristics, and not distort at sustained temperatures of boiling water. The best results are achieved when the roller will remain within the range of 175° F. to 185° F. for the first 2 minutes after being taken from a 212° F. aqueous environment, and still have a temperature of 150° F. 3 minutes after such removal.

The above results can be shown by way of improvement and comparison with the typical electrically heated dry rollers of the type referred to above. In the table below, a typical dry curler was removed from its electrical heating unit after 2 minutes of heating and its temperature read for 15 minutes (the first minute appearing in 15 second intervals). The FIGS. set forth below are to be contrasted with a polypropylene roller made in accordance with the invention which has a hollow uninterrupted interior, a conical sealed end cap, and a

plurality of spines exemplary of the present invention, after the same had been heated for 10 minutes in a steam chest:

	Hot Dry Curler, degree	Roller Illustrative of the Invention ¹
Time after Removal:		
15 seconds	325	174
30 seconds	360	172
45 seconds	355	168
1 minute	350	163
2 minutes	308	167
3 minutes	270	153
4 minutes	243	149
5 minutes	218	144
6 minutes	200	138
7 minutes	178	134
8 minutes	163	130
9 minutes	142	125
10 minutes	142	121
11 minutes	134	117
12 minutes	127	115
13 minutes	121	112
14 minutes	116	110
15 minutes	112	107

¹ After 10 Min. in Steam Chest (polypropylene with sealed ends), degree.

It will thus be seen that the hot dry curler actually can remain in the hair for a full 5 minutes at a temperature above that of boiling water, and accordingly literally steams the moisture out of the hair. The very opposite is the case with the illustrative polypropylene roller, where during the first 3 minutes in a temperature range beneath that of boiling water, it transfers its heat as well as moisture into the hair, the moisture dissipating naturally to set the curl without removing the natural moisture from the hair.

More specifically, it will be noted that the embodiment of the roller 10 as disclosed in the drawings has an exterior cylindrical roller body 18. The outer face of the body 18 is preferably smooth to reduce the tendency to tangle the hair upon unwinding. A plurality of spines 16 are integrally molded into the body 18 and extend therefrom radially a distance anywhere from 5 percent to 15 percent of the diameter of the cylinder and approximately the thickness of the body. The spines are desirably on centers 30° or less.

Best results have been achieved when the spines 16 are oriented in longitudinal spine rows 10 and circumferential spine rows 20 symmetrically arranged with 10 spines in each direction. The symmetrical arrangement of the spines 16 offers the twofold advantage of permitting a combing of the stand of hair before it is rolled on the roller, and also reducing the tendency for the roller to tangle in the hair before unrolling. Furthermore, it will be noted that the outer circumferential rows of spines are oriented closely to the ends of the roller body 18 so that the rollers can be gripped by the hands at their very ends without the fingers touching the roller body 18. The natural action of the user is therefore to shape the strand inwardly thereby reducing the tendency of the outer strands to slip over the ends of the roller. The ends of the spines 16 are dull to prevent scalp irritation and make them more comfortable to handle. The smooth finish on the spines 16 further inhibits tangling.

After the rollers are removed from the hot aqueous environment they do not burn the fingers while rolling the curl because the fingers contact only the spine ends. The body portion 18, however, must necessarily remain hot as long as possible. By arranging the spines in the manner disclosed, comfortable handling is achieved almost immediately after removal. As to size, the diameters of the roller body 18 can vary between five-eighths inch to 2 inches. An ideal length is approximately 3 inches, with the tips of the outer spines spanning at least 2½ inches. In the average kit, 12 of the larger diameter rollers will be employed, with 6 of a smaller size. Naturally, this mix will vary in accordance with the user depending upon the texture and the amount of hair as well as the hair style to be set.

From a manufacturing standpoint, the roller body 18 is molded with a hollow uninterrupted core 24, and a closed end 22. A recessed collar 17 (FIG. 20) is molded into the open end of the roller body 18, and an end cap 21 with a stepped end cap shoulder is provided to close the open end of the roller body 18. Alternatively, and preferably, the end cap 21 terminates in a point or peak 27 defined by a conical face 59, as illustrated in FIG. 5. It is desirable that the included angle of the taper approximate 120° and that the conical face 59 have a polished surface to inhibit the deposit or retention of large droplets of hot water. The end cap 21 can be affixed to the roller body 18 in several different fashions. For example, it is pressure fitted as shown in FIG. 20. Alternatively, a tapered shoulder 23 can be molded into the open end of the roller body 18, and a mating tapered end cap shoulder 25 formed on the end cap 21, as illustrated in FIG. 7. The interface defined by the conical shoulders 23, 25 is spin welded by rotating the end cap 21 in accordance with accepted manufacturing techniques.

A preferred fit results from molding a recessed annular locking groove 28 into the open end of the roller body 18, and a mating raised annular locking collar 29 on the end cap 21, as illustrated in FIG. 24. With this construction, the end cap 21 can be easily and quickly snap-fitted to the roller body to assemble a roller 10. Whether high speed spinning or snap-in techniques are used to accomplish the tight fit at the interface, it is most important that a near watertight seal be effected.

The closed end 22 of the roller body 18 also preferably and advantageously has a self-contained measuring cavity 57 formed in it (FIGS. 23 and 24) which is proportioned to measure out the proper amount of baking soda to add to 1 cup (approximately 8 ounces) of distilled water, to provide the proper amount of ionization and conductivity to the water. In certain areas, by experiment, the user will determine that ordinary tap water has sufficient conductivity to generate steam quickly and efficiently. In areas where the water is extremely hard, by using distilled water and adding one measuring cavity full of baking soda, cleanliness and uniformity of operation can be achieved. At least one roller in a set desirably utilizes the measuring cavity.

It will also be appreciated that each separate end plug can be colored to code the size of the roller, and because of the taper at one end of the roller, the roller must be properly oriented with the colored end upward so that the user can quickly determine the size of roller she is grasping. In addition, of course, because the tapered end is upward, the tendency to retain hot moisture droplets which could scald the hand or the scalp is virtually eliminated.

As will be noted in FIGS. 3, 4, 5, 6 and 8, the 12 rows of spines 16 are oriented in four separate directions. This configuration is desirable from a molding standpoint, but not essential to the invention. Just as readily the 12 rows of spines could all be oriented radially from the center of the roller body 18. What is important, however, is that there be a symmetrical orientation of the spines 16, that the length of the longitudinal rows of the spines 16 be at least 2 1/2 inches, that the hollow core 24 be uninterrupted, and that the interior of the core 24 be effectively sealed against leakage of moisture by means of the attachment of the end cap 21 to the roller body 18.

Irrespective of the type of roller employed, when a lady is setting her own hair, there is always a problem of securing the tightly wrapped hair strand in place. This is particularly true when setting the hair at the rear of the head, where the sense of touch is the only guide available when self-setting techniques are employed. Thus, it is highly desirable to have a hair clip which not only will secure the hair tightly in its wrapped configuration about the roller, but also be easy to insert, locate and remove. Turning now to FIGS. 9 through 12 inclusive, it will be seen that a hair clip 30 has been provided which has a looped tab 31 which serves the two-fold purpose of providing resiliency to the clip 30, and also rendering it easy to locate, insert and remove. Referring to FIG. 1, it will be seen there that the looped tabs 31 remain at the outside of the roller, and are easy to observe as well as physically locate.

The looped tab 31 is generally circular terminating in neck bends 35 which define a looped tab neck 36. Extending from the looped tab neck 36 are outer leg 32 and inner leg 34. The base portion of the legs 32, 34 define an arcuate-shaped roller body clamping portion 33 (shown in shaded lines in FIGS. 10 and 12). A clamp opener portion 38 is reversely bent at the open end of the outer leg 32, and engages the roller body in the manner shown in FIG. 9, thereby springing the two legs 32, 34 outwardly to thereby receive the strand of hair and roller 10. The blunted ends 39 formed at the tips of the legs 32, 34 are provided to prevent scratching, and assist in rendering the insertion of the clip 30 an easier task.

More specifically it will be seen in FIG. 2 that the user is able to hold the roller 10 and manipulate same with the fingers of one hand 14 twisting the same, and the other hand 15 guiding the hair strands to curl tightly in the roller 10. As illustrated diagrammatically in FIGS. 3 and 4, the fine ends 13 of the hair strand 11 adhere to the roller body 18 because the peripheral portion of the body is moist after having been removed from the steam chest 40 or boiling water. Because the hair ends 13 adhere closely to the roller body 18, a much tighter wrap can be achieved, the balance of the hair strand 11 reinforcing the tightness of the curl until the roller 10 approximates a contact position with the scalp 26 as shown in FIG. 1. At this point the clip 30 is positioned with the legs circumferentially opposed over the roller 10 as shown in FIG. 12. The symmetrical orientation of the spines 16 of the roller 10 divides the hair strand 11 into separate segments between the spines. This orients the clip 30 and prevents the hair from slipping sideways, thereby insuring a tightly retained curl.

As set forth above, the preferred embodiment contemplates that the interior of the roller 10 have a hollow core 24 with closed ends, but limited effective curling results may be achieved in the event one end is open or both ends are open, so long as the roller is first steamed or boiled, or otherwise subject to an aqueous environment at approximately the boiling point of water.

Referring now to FIGS. 13 through 16, a steam chest 40 is shown which will effectively steam the roller 10 in accordance with the method of the invention. As shown in FIG. 13 the steam chest 40 has a lid 41 which is secured at its rear portion by means of hinges 42 to the body 43.

The lid 41 may be raised by means of the lid release linkage 50 which opens up the interior where the rollers (as shown in FIG. 15) set upon a perforated base 44. Beneath the perforated tray 44 is a water trough 46 which is filled with water. A pair of heating elements 45 are within the water trough, and serve as a safety in that the circuit for heating is not closed unless the elements are submerged in water.

A divider wall 48 may be provided, or several, to divide various sizes of the rollers.

As noted in FIG. 14, the lid release linkage 50 may be activated by a finger tab 51 with one hand. The finger tab 51 is on the tab crank 52 which is pivoted at a central pivot 55, so that when it is depressed, the end pivot 55 activates the lid lever 54 which is in turn pivotally connected to the lid 41. Therefore, by pressing the finger tab 51, the lid 41 is opened to the position as shown in the phantom lines in FIG. 14.

An alternative form of heating the rollers, most simple, expeditious, and yet useful, is shown in FIG. 17. There a pot 60 is selected by the user from many cooking pots, filled with water, and heated over a conventional stove burner 61. Since the rollers 10 are hollow, they will float on top of the water and can be picked out by kitchen tongs or any other conventional method after they have been boiled for approximately 8 to 10 minutes. Since the rollers are light in weight, and only boiling water is required for use, they are ideal for travel use.

Because the method of the invention requires steaming or boiling the rollers, the temperature of each roller is automatically controlled not to exceed 212° F. Depending upon the hardness of the water, steaming between 10 and 12 minutes is preferred for best results. When the roller has been properly steamed, and removed, all of the moisture will evaporate off its surface in one minute or less when exposed to ambient en-

vironment out of the hair. Naturally the same roller placed promptly in the hair will first transfer its moisture to the hair, and then give up the balance of its heat in setting the hair.

When hard water is used to generate the steam, the natural action of evaporation and condensing steam insures that the rollers 10 will only be contacted with pure distilled water. Thus the hair uniformly treated in terms of temperature as well as the type of moisture which contacts the hair. Furthermore, as set forth in the objects of the invention, each roller is necessarily sterilized before use, and cannot be effectively used until it has been sterilized.

While the invention has been described in connection with specific embodiments and applications, it is not applicant's intention to restrict himself thereto, but to include within the invention all of the subject matter defined by the spirit as well as

the letter of the annexed claims.

I claim:

1. A clip in combination with a roller having a uniform curvilinear cross section, said clip having an arcuate shaped roller clamping portion defined by a yieldable member terminating in inner and outer legs and a loop integral with the arcuate-shaped portion to define a tab for manipulating the clip and removably securing the same circumferentially on said roller transversely to the longitudinal axis thereof, and an outwardly bent clamp opener portion at the end of the outer leg, the entire clip being formed from a single piece of wire material.

2. The combination of claim 1, wherein said roller has a circular-shaped cross section.

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