The invention relates to novel and useful method and means for curling or winding hair and, more particularly to such method and means for curling tresses or locks of hair preparatory to treating or dressing the same in the process of permanent waving.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:

Fig. 1 is a vertical longitudinal section of a mechanism embodying the invention, the lower portion thereof being shown in elevation;

Fig. 2 is a transverse vertical section taken on line 2—2 of Fig. 1;

Fig. 3 is a transverse horizontal section taken on line 3—3 of Fig. 1;

Fig. 4 is a transverse vertical section on line 4—4 of Fig. 2 showing the assembled hair-guiding channel;

Fig. 5 is an enlarged detail, in perspective, of a portion of the hair-guiding channel;

Fig. 6 is a longitudinal elevation of a permanent waving rod or mandrel;

Fig. 7 shows two detached guide rods having helical guides of different contour or pitch;

Fig. 8 is a detail view showing, in plan, a hair-binding strip;

Fig. 9 is a detail, in plan, of a detached hair-guiding and tensioning device;

Fig. 10 shows in elevation three permanent waving rods attached to tresses of hair on a human head, indicating different stages of the winding operation;

Fig. 11 is an elevation of a motor stand, showing the winding mechanism attached for motorized driving;

Fig. 12 is an enlarged fragmentary, longitudinal section of the driving connections for the winding mechanism;

Fig. 13 is a transverse horizontal section on line 13—13 of Fig. 12;

Fig. 14 is a similar section on line 14—14 of Fig. 12;

Fig. 15 is a longitudinal elevation of a modified winding mechanism having means for holding the free end of the tress of hair;

Fig. 16 is a transverse horizontal section on line 16—16 of Fig. 15; and

Fig. 17 is a horizontal section on line 17—17 of Fig. 15.

Fig. 18 is a top plan of an enlarged detail of a hair-holding clip; and

Fig. 19 is a fragmentary, enlarged elevation showing the clip attached to a tress of hair.

The invention provides a new and exceedingly efficient and simple method and means for wrapping, winding or curling a tress of hair preparatory to the dressing and heating steps in the permanent waving process. By my invention it is possible to wind a tress of hair about a permanent waving rod, core or mandrel with absolute accuracy and precision, producing a curl which is perfectly uniform, symmetrical and of exactly the desired tightness and shape.

My invention obviates the necessity for the services of highly skilled hairdressers in winding or curling the hair and also prevents the possibility of faulty and non-uniform results due to human inaccuracy or lack of skill in the hair-winding operation. By the invention the hair is coiled or wound automatically and entirely mechanically in a predetermined and perfectly symmetrical form. The invention not only reduces the hair-winding operation to a purely mechanical step, but the curls of hair produced by the invention are actually far superior to any which can be produced by the most careful and skillful manual winding.

Coincidently, the invention very greatly reduces the time and labor required to curl a head of hair, the winding operation being purely mechanical and therefore requiring substantially no exertion, skilled manipulation nor careful regulation on the part of the operator. The time required for curling a head of hair is but a small fraction of that absorbed by the former manual methods, while the comfort of the customer and the profits of the hairdresser are proportionately increased.

My invention provides a method and means whereby the hair-winding operation can be performed with maximum accuracy and efficiency by comparatively unskilled operators. The winding operation is entirely mechanical, and the most intricate, time-consuming, onerous and expensive portion of the permanent-waving process is
avoided. An entire head of hair can be curled in about ten or fifteen minutes, as compared to the hour or more previously required by manual or semi-mechanical methods. The curls produced are of perfect uniformity and of exactly the desired configuration and tightness. The hair is rapidly and substantially automatically curled around a mandrel and automatically fastened thereto during the winding operation without the use of rings or other inefficient and makeshift devices. The invention provides for winding a curl in any desired predetermined form, and for varying the form and tightness of the curl according to the nature of the hair and/or the taste and desires of the customer. The mechanism of the invention is exceedingly simple and is flexible and adaptable to all kinds of hair and for producing waves of any desired form or character.

One object of the invention is to provide a simple, rugged and efficient hair-winding mechanism which is interchangeably adapted for manual or motorized operation. If desired, the winding mechanism may be directly driven from a rotating motor shaft, thereby increasing the speed and efficiency of the winding operation without causing the slightest danger or discomfiture to the customer. The entire mechanism is quite "fool-proof" and can be safely operated without special skill or experience, both in its manual and motorized forms.

The present preferred embodiment of the invention broadly comprises hair-engaging and guiding means comprising a head mounted on and rotatable relatively to a mandrel to which the tress of hair is attached. The rotatable head is provided with a guide of predetermined contour which mechanically coacts with guiding means on the mandrel, whereby the rota
ting head is guided along and around the mandrel in a fixed and predetermined symmetrical path, thereby drawing the free portion of the tress of hair in a helical coil around the mandrel. The hair-guiding head is provided with means for regularly tensioning the tress of hair and for pressing the wound portion thereof into firm contact with the surface of the mandrel during the winding operation. The character of the curl is determined absolutely by the contour of the guide and the tension applied to the hair by the rotating head and is quite independent of the actual movements of the operator. Both the contour of the guide and the tension on the hair may be varied as desired according to the nature of the hair and to control the result of the curling operation.

The invention provides for securely fastening the tress to the mandrel both near the scalp and at the free end of the curl. The upper or free end of the tress is firmly and automatically bound to the mandrel during the winding operation by intertwining a short strip of wire or other pliable stiffening material with the tress as said free end is wrapped about the mandrel.

The invention provides instrumentals for keeping the tress of hair free from snarling and becoming caught in or twisted by the moving parts of the mechanism. For this purpose the winding head may be adapted to automatically comb the hair as it is being wound, while the frame of the mandrel may be provided with a sheath or guard for loosely holding the free portion of the tress away from the rotating mechanisms to prevent entanglement therewith.

The foregoing general description and the following detailed description as well are exemplary and explanatory of the invention, but not restrictive thereof.

Referring now in detail to the present preferred embodiment of the invention, illustrated by a way of example in the accompanying drawings, a separate rigid rod, mandrel or core 1 (Figs. 1, 6 and 10) is provided for the winding of each tress in the head of hair to be permanently waved. As exemplified, the mandrel or core 1 is composed of a hollow cylindrical tube of substantially uniform diameter, although so far as concerns many features of the invention this rod could be solid. The rod 1 is preferably of aluminum or other light, strong metal, although other light and rigid substances such as bakelite or hard rubber may also be used. The lower end of the rod is preferably provided with a downwardly decreasing taper, as at 2, and is thus adapted to facilitate starting of the curl. For convenience of manufacture and assembly the tapered portion 2 is a separate piece, the reduced end portion 3 thereof being held in the mandrel tube 4 and fixed thereto by a pin or other rigid connecting means.

Means are provided for securely fastening a tress of hair to the lower end of the rod or mandrel 1, preparatory to winding the free portion of the tress around the mandrel. As embodied, a U-shaped hook 4 having an elongated, screw-threaded shank 5, is secured to the lower end of the mandrel, said shank 5 engaging with conformably screw-threaded recess 6 tapped into the lower end 2 of the rod. A guard member is loosely swiveled about the shank 5, and comprises a horizontally-extending member 7 provided near its outer end with an eye 8 in line with the outer vertical prong of the hook 4. The swiveled guard member may be provided with a semi-cylindrical sheath 9 which loosely overlies and extends along the contiguous portion of shank 5 of the hook, thereby preventing hair from sliding down along the mandrel and working between the member 7 and the shank 5.

In securing a tress of hair to the lower end of one of the rods 1 by the mechanism hereinbefore described, the tress is laid across the open bottom of the hook 4 at a point adjacent the scalp (Fig. 10). The rod 1 is then rotated relatively to the hook, thereby engaging the rod along the hook and drawing the hook against the guard 7. As shown in Fig. 10, the lock of hair presses against the guard 7 as the screwing motion brings the base of the hook and the end of the rod 1 toward each other. In this way the lock of hair is tightly clamped between the horizontal guard member 7 and the U-shaped hook 4, the eye 8 fitting over the outer end of the hook and thus preventing egress of any of the hairs.

While I have described the present preferred form of means for attaching a tress of hair to a mandrel, it will be understood that the invention is not limited to said means. For many purposes other known devices for fixing or clamping a rod or mandrel to a tress of hair preparatory to winding the same may be used in lieu of the devices shown and described. However, the preferred form herein described is particularly well adapted for the subsequent heating operations because the usual guard washers B can be conveniently provided to the tress below the clamping hook 4. However, the preferred form herein described is particularly well adapted for use with all kinds of waving processes. Both dry and wet or "steam" waves can be given on the mandrel.
of my invention, because the relatively small space occupied by the clamping hook 4 permits the guard washers B to be attached to the tress above the roots for the overhand operation.

In accordance with the invention, means are provided for engaging and frictionally gripping the free portion of the tress of hair and for carrying the same around and about the mandrel. As embodied, a cylindrical hair-receiving and guiding head 10, of considerably greater diameter than the mandrel, is formed with a reduced sleeve portion 11 which is internally bored to fit loosely around the cylindrical rod 1 and rotate freely thereon. The head is adapted to receive and guide the free portion of the tress around and along the mandrel and for this purpose may be opened or swung apart so that the hair may be inserted therein. As shown in Fig. 2, a semi-cylindrical section of the head 10 forms a jaw 12 hinged to turn about an axis 13 in the cylindrical wall of the head, whereby the head may be opened up and the tress laid therein preliminary to the winding operation.

The winding head 10 is provided with suitable guiding means for receiving and frictionally gripping the tress of hair while feeding the same in the proper direction and amount to the winding device. As embodied, the guiding and gripping trough or channel 14 is fixed to the rigid or non-pivoted portion of the head 10 and extends outwardly therefrom. As shown in Fig. 2, the bottom of the channel 14 preferably lies in a plane substantially tangential to the surface of the core or mandrel 1, which is concentric with the rotatable winding head. The hair-guiding channel 14 is provided with upstanding sides 15 and 16 for confining the tress of hair and feeding same to the winding head in uniform width.

The hinged jaw 12 of the winding head is provided with a cooperating cover for the hair-guiding channel, comprising the overlapping channel 20, fixed to and extending outwardly from the jaw 12. As shown in Fig. 4 the cover member 20 is adapted to completely enclose the tress, being provided with depending side flanges 21 and 22 for receiving the sides 15 and 16 of trough 14. The guide and gripping jaws 12 and 10 of the winding head in closed position, whereby the tress of hair will be embraced by the guiding channel and constrained to follow the direction thereof as the hair is fed into the winding head. As embodied, the upper, flat cover 20 of the channel is provided with an angular opening 24 adjacent the flange 22, near the outer end of the channel. An upstanding lug 25 is formed near the outer end of wall 16 of the trough 14, and said lug is adapted to pass through and project above the opening 24 when the jaw or head 10 are in closed position.

A resilient locking finger 27 is mounted on the upper surface of channel member 20 and is adapted to snap into locking position beneath the overlapping lip 28 on the lug 25, as shown in Figs. 1 and 2. One end 30 of the spring finger 27 is loosely coiled about a screw 29 and is held against the surface when the spring head 27 is engaged by the screw. An upset lug 31 in the cover member 20 serves as a fulcram for bending the spring finger 27 backwardly to releasing position, while another end of said tongue is free to move a limited amount toward and away from the head 27.

Means are provided for varying and controlling the frictional pressure of the pressing finger 40 against the surface of the mandrel and the tress 75.
of hair being wound thereon. As shown, the free end of finger 40 is normally urged toward the surface of the mandrel by a coiled spring 44, one end of which bears against the finger. The spring 44 is in compression between the outer surface of finger 40 and the jaw 12 of the winding head, the outer end of the spring being set in a socket 45 formed in the controlling screw 46. The screw 46 is mounted for screw-threaded rotation in a conforming radial slot 47 formed in the jaw 12. By turning the screw 46, the amount of frictional pressure exerted by the finger 40 against the hair on the mandrel can be very nicely controlled, and for this purpose the screw 46 is provided with an enlarged knurled head 48. The variations in tangential pressure made possible by the mechanism described enable the operator to control the tightness of the curl and also to adapt the winding mechanism to hair of different thicknesses and other characteristics.

The finger 40 serves to guide the hair onto the mandrel. In addition, it is so constructed as to maintain a predetermined geometry and compactness. For this purpose, the inner end 50 of the finger is curved toward the mandrel so as to extend the pressure and guiding action of the finger over a considerable area of the mandrel. As shown in Figs. 1 and 9, the inner end of the finger, including the curved portion 50, is set at an angle to the long flat portion 46, thereby forming a partially cylindrical surface extending substantially parallel to the axis of the mandrel. Furthermore, as will be clear from Figs. 2 and 6, the hair-guiding channel 44 decreases in depth inwardly whereby the hair is pressed flat and compacted in a relatively thin and uniform ribbon as it is drawn toward the mandrel.

The hair-guiding finger 40 is adapted to prevent entanglement or snarling of stray hairs with the winding head, especially at critical points in the winding operation. For this purpose, the inner end of the finger extends downwardly along the mandrel below the bottom of the head 10 to form a guiding tongue 51, provided with an outwardly curved flange 52 for preventing stray hairs from working over the guiding and pressing finger 40 and into the winding head. The tongue 51 also acts to extend the pressing and tensioning action of the finger 40 along the surface of the curl beyond the bottom of the winding head 10.

If desired, additional means may be provided for frictionally engaging, guiding and tensioning the tress of hair as it is drawn into the winding head. As embodied, a curved, pressing foot 55, formed of thin resilient metal or the like, is mounted in the guiding channel near the outer end thereof, being preferably riveted to the outer surface of the channel by the rivets 42. As shown, the tensioning foot 55 imparts an initial friction to the hair as it is drawn into the channel, spreading it flat across the channel and pulling it in a substantially straight line tight against the mandrel surface. If desired the tension exerted by the foot 55 may be variable, as by means similar to that shown in connection with the finger 40. Ordinarily, however, the shape and inherent resiliency of the member 55 itself will be sufficient for normal variations in thickness and tractability of different heads of hair.

Referring now to the means for wrapping a tress of hair around the mandrel in a predetermined and symmetrical curl, the invention provides devices for progressing the hair-engaging and guiding head 10 along and around the mandrel in a predetermined and preferably helical path. As embodied, a helical guide, comprising a cylindrical rod 60 having a helical groove 61 of predetermined pitch and symmetry cut in its surface, is attached to the winding head 10 by a suitable connecting and supporting frame so as to turn with the head relatively to the mandrel 1. The upper, reduced end 62 of rod 60 is screw-threaded and set in a conformably threaded bore 63 in the assembling head 64. The head 64 is 10 provided with an enlarged circular flange 65, adapted to receive and support two diametrically spaced-apart frame rods 66 and 67. The lower ends of these rods are fixed in a collar 68 which is interiorly threaded at 69 to engage with the threaded neck 70 of the reduced upper end 11 of the winding head 10. Preferably a supporting shoulder 71 in the member 11 provides a seat for supporting the collar 68 and the frame rods 66 and 67.

As will be clear from the foregoing description, taken in connection with the drawings, the helically grooved guide rod 60 is mounted to turn with the winding head 10 relatively to the stationary mandrel 1. The helical guide 60 is 25 mounted concentrically with the cylindrical winding head 10 and the tubular mandrel 1 and said guide 60 acts to progress the hair within the tubular mandrel 1 so as to freely rotate therewithin and progress axially along the interior thereof. It will thus be clear that rotation of the winding head 10 about the mandrel, as by manually turning the frame 66—68, will cause the helically grooved rod 60 to rotate inside the tubular mandrel 1.

Suitable devices are provided for manually rotating the winding head relatively to the mandrel together with the attached helical guide 60 and its connecting and supporting frame. For this purpose a circular knob or handle 12 is adapted to rest upon the upper flat surface of the circular flange 65 of the assembling head 64. The interior of knob 72 is provided with a square socket 73, adapted to fit over the squared end 74 of the assembling head 64, whereby the knob and handle 12 will be rotated together. The knob 72 is bored to loosely receive the reduced, screw-threaded shank 52 of the helical guide-rod 60, which projects through the upper end of the square head 74. The upper end of the knob 50 72 is recessed to receive a locking nut 75 which firmly secures the projecting end of the helical guide-rod to the knob and tightly locks the entire assembly.

In accordance with the invention, devices are provided for effecting a mechanical and positive coaction between the winding head and the stationary mandrel, whereby the head will be progressed along and about the mandrel in a predetermined symmetrical path. In the present preferred embodiment, the mandrel is provided with a feeder or follower 80 which engages the helical groove 61 in the guide-rod 60 and thus causes the guide-rod and the attached frame and winding head to travel along and about the stationary mandrel in paths conforming to the helical groove. As shown, the follower 80 comprises a short pin disposed radially with respect to the mandrel tube 1 and having a rounded inner end which projects into and engages the helical groove 61.

Preferably the pin 80 is detachable from the mandrel proper, although mechanically it forms an integral co-acting part thereof. For this purpose, the pin 80 is fixed in a sleeve 81 which has 75
the same interior bore as the mandrel tube 1, but is fixed to the upper end of the tube by a screw-threaded connection. The lower end of the sleeve 51 is tapped at 52 to receive the upper end of the mandrel tube, the latter being conformably threaded at its upper end 53 for a short distance.

The hereinbefore described mechanism is operated substantially as follows:

10. A mandrel or rod 1 (Fig. 6) is secured to a selected tress of hair near the scalp by placing the tress in the U-shaped hook 4 and rotating the mandrel with respect to the hook until the tress is tightly gripped between the hook and the guard member, the tress then being in the condition shown in the right hand third of Fig. 10. The winding head 10, together with the helical guide 50 and its frame, are then fitted over and into the mandrel. The head 10 slides easily over the mandrel, while the guide rod 60 is loosely inserted into the open end of the tube 1. At this time the sleeve 51 may be loosely carried on the helical guide rod 60, preferably ridged at the upper end adjacent to the head 64. Thus substantially the full length of the guide rod 50 may project into the tube 1, so that the winding head 10 is about the mandrel just above the end of the hair gripping hook 4.

20. The operator now firmly attaches the sleeve 51 to the upper end of the mandrel by screwing the sleeve onto the threads 52. For this operation the upper end of the guide-rod 50 is preferably provided with a completely circular groove 55.

30. Whereby the sleeve 51 may be rotated freely about the guide rod without engaging the helical groove 51 and displacing the guide-rod frame and winding head along the mandrel. The sleeve 51 may thus be tightly screwed onto the upper end of the mandrel without disturbing the position of the winding head with respect thereto.

40. The next step is to secure the free portion of the tress to the winding head. For this operation the jaw 12 of the winding head is swung open and the free portion of the tress laid into the guiding channel 14, preferably with a preliminary tress or tress of hair around it. The guide 14 is then closed, care being taken that no hair is trapped in the guiding channel 14 or in entanglement with any of the mechanism. The frictional grip of the finger 55 may then be preliminarily regulated to conform to the thickness and tractability of the particular hair being treated. The hair is now ready to be wound about the mandrel.

50. For manually winding the tress, the operator rotates the winding head and frame about the mandrel, preferably by turning the knob 72. With the other hand the mandrel may be held stationary, preferably at its lower end adjacent the hair gripping hook 4. Preferably, however, the operator will engage the bottom of the mandrel with a pair of pliers A or other means for firmly and easily gripping the mandrel and holding same from turning. As the winding head, frame and helical guide 60 rotate with respect to the tress of hair, the lower end of the mandrel, the forked or pin 80 engages the helical groove 61 and forces the guide rod 60 together with the assembled frame and winding head 10 to travel along and about the mandrel in a helical path conforming exactly to the groove 61.

60. As the winding head is rotated in the direction of the arrow in Fig. 1, the tress of hair is wrapped or coiled around the mandrel, the free portion of the tress sliding through the guiding and combing channel 14 at exactly the desired tension. The hair is thus symmetrically and accurately wound around the mandrel in a positively controlled movement and the tightness or compassion of the curl regularly controlled. The operator's movements have no influence upon the character of the curl, but affect only the rapidity with which the winding operation takes place.

70. The invention is provided with devices for rendering it harmless and safe, and entirely "fool-proof" even in the hands of an unskilled operator. By virtue of one feature of the invention, it is impossible for an inattentive operator to continue rotating the winding head indefinitely after the tress has been completely wound. If the operator continued to rotate the winding frame and head, the upper end 64 of the neck 70 on the winding head 10 would come into contact with the lower surface of the sleeve 81. If the sleeve 81 were fast to the mandrel, continued rotation of the winding frame would lock the sleeve 81 to the end 64 of neck 70, thereby causing the mandrel to turn and pull away from the customer's scalp. However, by virtue of the threaded connection between the sleeve 81 and the end 83 of the mandrel, frictional contact between the rotating surface 84 and the stationary sleeve 81 will cause the latter to turn with the surface 84 and unscrew from the end 83. Consequently a continued rotation of the winding mechanism will merely result in unscrewing the threaded sleeve 81 and backing it off the end of the mandrel along the helical guide 60.

80. If desired, the surface 84 of the neck 70 may be roughened or provided with means for positively engaging the lower surface of sleeve 81, although it will be found that the ordinary friction between these surfaces will be sufficient to turn the sleeve on the mandrel and unscrew it. As a result of this unscrewing action, it is impossible for the mechanism to jam, lock or twist in the event of undue or prolonged winding, and consequently any danger of injury or discomfort to the customer or mechanism is obviated.

90. The winding device is successively connected to the various mandrels and unscrewed from the mandrel when the curl is completed. By screwing the nut 81 onto the open end of the mandrel they are brought into operative relation to curl the tress, and by unscrewing the nut 81, the winding device is disconnected, preparatory to connecting it to another mandrel to wind a tress thereon.

100. The turning of the winding head about the mandrel may have some tendency to rotate the mandrel and possibly affect the tightness of the screw-threaded gripping hook 4 at the bottom of the rod. In order to overcome any loosening effect on the hair-gripping hook, the screw threads of the shank 5 are turned in the opposite direction from the helical groove 61. For example, if the winding head is set to turn with a right-hand screwing motion, as shown in Fig. 1, the threads on the shank 5 will be left-handed, or vice-versa, thereby tending to tighten the hair gripping hook during the winding operation rather than loosening the same.

110. The invention provides means for readily and accurately adapting the winding mechanism to hair of different characteristics. For example,
very thick hair cannot be wound so closely as fine hair and it is therefore desirable to con-
trol the number of turns per inch, (i.e., the pitch of the coil) according to the
nature of the hair. For this purpose, the helical
guide rod 60 is made interchangeable with simi-
lar rods having helical guides of different pitch, which may be substituted for the rod shown in
Fig. 4. I have found that three standard rods
having pitches of four, six, and eight turns per
inch respectively will suffice for most normal
hair-winding purposes. In Fig. 7, a rod 60 hav-
ing a pitch of four turns per inch is shown with an
interchangeable rod 60a having a helical
groove of four turns per inch.
Similarly, the configurations of the guide
groove 61 may not necessarily be of the same
pitch throughout the length of the rod in case
it is desirable to wind one part of the tress dif-
ferently from the rest. For example, most
tries, and especially those in bobbed hair, thin
out toward their upper ends. For proper wav-
ing, the tresses should be wound as uniformly as
possible, so that each length of the mandrel will
be covered by a substantially equal amount of
hair. To obtain the desired uniformity of wind-
ing, the thin, upper portion of the tress should
be wound more closely than the lower and thick-
er portion thereof. The invention provides guide
rods 60b of differential pitch or contour for this
purpose, and it will be understood that the changes in pitch along the guide rods may be as
gradual or abrupt as is found necessary in prac-
tice.
In interchanging the helically grooved rod 60
with one of a different pitch, the nut 62 is un-
screwed from the end of the rod which is then
extracted from the head 64 by unscrewing the rod from the threaded socket 63. For bobbed
hair, shorter mandrels and guide rods may be
provided, although this is not necessary.
The invention is further adapted to produce
curls of the necessary and desirable uniformity
and closeness. When the hair to be wound
is relatively thin, a change to a guide rod
of closer pitch is inconvenient or the closer pitch is not exactly of the desired configuration, a
closer curl may be produced by using the comb-
ing teeth 35 to segregate the hair in a selected
portion of the channel. These teeth permit the
fres to be subdivided and maintained in
the desired position of the guiding channel.
For example, with a relatively thin or meagre
tress, the hair may be grouped between a se-
lected number of the teeth and the spaces be-
tween the outer teeth and the sides 15 and 16
of the channel left bare. Thus the thinner fres
may be maintained of proper thickness by effec-
tively narrowing the width thereof during wind-
ing. Again, if a thicker curl is desired, the hair
can be more closely bunched among the lower
teaches of the channel, so that a greater overlap-
ing of the hair on the mandrel is effected.
In accordance with one feature of my inven-
tion I provide a method and means for automa-
tically securing the free end of the wound tress
t of hair to the mandrel so as to leave the coiled
tress securely bound to the mandrel when the
winding operation has been completed. For this
purpose, I provide a relatively thin strip of bind-
ing material, preferably containing one or more
relatively stiff and pliant wires of fibres which
can be twisted around the coiled tress and made
to retain the same in wound position. A pre-
ferrred form of binding material is shown in Fig.
8, comprising a strip of thin gauze or similar fab-
ric 87 having two thin, pliant wires 88 and 89
woven or bound along the edges thereof.
The invention provides means for intertwining
the binding strip 87 with the upper portion of the
tress as it is wound about the mandrel, whereby
the binding strip will be twisted tightly about the
mandrel and grip hold the end of the tress thereeto. As embodied, the winding head
90 is provided with an auxiliary slot 90a adjacent
to the hair guiding channel 14, for permitting the
binding strip 87 to be inserted into the winding
head at the desired time and position. As shown, the
winding head may be provided with a slotted
channel 91 for guiding the strip into the slot
90 and onto the hair-covered mandrel. It will
be clear that the binding strip 87 will be drawn
onto the mandrel and tightly intertwined with
the remaining portion of the tress. As shown in
the left-hand portion of Fig. 10, the binding
strip is preferably inserted sufficiently late in
the winding operation so that the end of the strip
will overlap the end of the tress and completely
cover it up, whereby loosening or escape of any
stray hairs at the end is completely prevented.
For making certain that the tress will not be
more closely wound about the mandrel, the invention provides additional means for securing the wound tress to
the mandrel. As embodied, the fabric strip 87 is
preferably impregnated with a dry mucilaginous
filler, such as a paste soluble in or adapted to
swell in water. In practice the strip will be moist-
ened before it is inserted into the winding head,
whereby the paste will bind the wound tress firm-
lly to the mandrel during the subsequent oper-
ations. Of course, the paste or filler for the strip
will be composed of suitable ingredients which are
harmless to the hair and can be easily re-
moved so that the hair will not be injured or its
appearance impaired.
By another feature of my invention, I option-
ally provide means for loosely holding and
guiding the free end of the tress during the wind-
ing operation so that entanglement thereof with
the winding mechanism is prevented. As shown
in the modified form of the invention illustrated
in Figs. 15, 16, and 17, the winding frame is pro-
vided with a sheath or pouch 95 for loosely con-
taining the free and unwound portion of the
tress. The sheath 85 comprises a portion of the
winding frame, being suitably journaled in the frame
members 65 and 66. The upper end of sheath 95
is suspended from clamping arms 98 which are
fixed to the winding frame in the same manner as
rods 86 and 87 in the forms shown in Fig. 1, but rod 96 is rotatable with respect to the winding
frame, being suitably journaled in the frame
members 65 and 66. The upper end of sheath 95
is suspended from clamping arms 98 which are
fixed by suitable means to the respective rods 96
and 97, while the lower end of sheath 95 is simi-
larly engaged and supported by clamping arms
99 and 100, respectively.
Means are provided for opening the sheath 95
per permit insertion of the tress. As embodied,
the lower end of rod 96 is provided with a coiled spring 101 having its upper end fast to the rod,
while its lower end projects along and lies against
the neck 76 of the winding head. The spring 101 is normally under compression so as to urge the rod 96 and its attached clamping arms 88 and 89 toward the fixed rod 97 and clamping arms 93 and 100. A handle 102 is fixed to the upper end of rod 96, whereby the rod and its attached clamping arms may be moved out from the fixed portion of the sheath, against the compression of spring 101, whereby the sheath may be inserted into the sheath.

It will be clear that the described mechanism will operate to hold the tress in a relatively loose frictional grip so that it may slide evenly along the sheath as it is drawn into the winding head.

5 For guiding the tress into the winding head, the guiding channel 14 may be provided with a curved guard 105 for easing the hair around the turn into the guiding channel.

Referring now to those features of the invention whereby the hair-winding mechanism may be driven from a motor or other source of power, a preferred mechanism is shown in Figs. 11 to 14 for connecting and driving the hair-winding devices from a portable electric motor. It will be understood that the hair-winding devices hereinbefore described may be operated very efficiently by hand and so operated will produce curls of unusual symmetry and tightness with very little labor and skill and in a very small fraction of the time heretofore required for manual winding. Nevertheless in many cases it will be desirable to perform the winding operation by mechanical power, whereby substantially entirely removing hair-winding from the sphere of manual performance.

As embodied, the hair-winding mechanism herebefore described is adapted to be driven from a power source without any substantial change in the mechanism. Preferably the square end 74 of the assembling head 94 of the winding frame (Fig. 1) is adapted to be connected to a motor drive. By simply unscrewing the nut 75, the knob or handle 72 may be removed and, when the nut 75 is replaced, the square head 74 is ready to be inserted into a suitable driving mechanism. Thus the winding mechanism of my invention may be manufactured and sold for either manual or motorized operation or both, according to the desires and requirements of the user. The mechanism may be purchased first and if the user later expands his business or requires more rapid performance he may acquire the motor and driving connections and apply them to the standard winding mechanism.

55 For mechanically driving the hair-winding mechanism, a small electric motor 110 is preferably mounted on a portable stand comprising a base 111 having casters or wheels 112 and an upright tubular shaft 115. The motor is preferably supported on a horizontally extending bracket 116 which is vertically and angularly positionable with respect to the movable base 111. As embodied the bracket 114 is rotatably mounted about a vertical shaft 115 which fits loosely into the tube 113. Bracket 114 is attached to a rotatable sleeve 116 which is loosely supported near the upper end of shaft 115 by any suitable means such as a fixed collar 117. The means provided for vertically positioning the motor comprise a set screw 119 near the lower end of the tubular shaft 115, said screw being adapted to fix shaft 115 in any desired vertical position within the tube 113. For connecting the driving shaft of the motor to the winding mechanism, a flexible shaft of any known or suitable form may be connected to the motor shaft by suitable reduction gearing. As embodied, a flexible driving shaft 120 is housed in a flexible metal guard-tube 121 and the tube and shaft are adapted to hang from the motor so that the driving force may be easily directed to any tress of hair on the head of a customer seated near the motor stand. The driving shaft 120 is adapted to be driven from the motor shaft 122 at a relatively slow uniform speed, whereby the winding mechanism will be rotated at a speed approximating that of the manual operation. Preferably the shaft 120 is connected to the motor shaft by a worm-gear drive, diagrammatically indicated at 123.

Means are provided for transmitting the rotary driving force of the flexible shaft 120 to the standard hair-winding mechanisms herebefore described. For this purpose I preferably provide a hand-controlled clutch mechanism whereby the application and regulation of the driving force is completely under the control of the operator, so that the winding mechanism may be rotated or stopped instantaneously and be driven as slowly or rapidly as desired up to the maximum speed of the driving shaft 120. As shown in Fig. 11, a hand grip 125 is provided at the end of the flexible shaft 120 for housing the clutch mechanism and permitting the operator to manually control the operation thereof. A spring-seated lever 126 for controlling the operation of the clutch is set in the hand grip 125 and, as shown, is adapted to normally hold the clutch in disengaged position, whereby the winding mechanism will be driven only when the handle 125 is gripped by the operator and the lever 126 pressed thereagainst.

While I have shown a clutch between the motor shaft and winding mechanism as the preferred driving connection, it will be understood that the invention is not limited thereto. In many cases the objects of the invention could be realized by directly connecting the winding mechanism to the flexible shaft and controlling the drive by a switch to the motor. The invention comprises any suitable or known motor for driving the winding mechanism from a source of power such as a motor or other mechanical driving means.

Referring now to the structural details of the mechanism for driving the hair-winding device from the flexible shaft 120, Fig. 12 shows the assembled clutch structure of the present preferred embodiment. A driving head 130, having a friction surface 131 of leather, fabric or other suitable clutching material, is fixed to the end of flexible shaft 120 to rotate therewith, said head 130 having a stem 132 of reduced diameter, which is provided with a cylindrical socket 133 for receiving the lower end of shaft 120. The head 130 is fixed to shaft 120 to rotate therewith, as by a set screw 134 which passes through the wall of socket 133 and is seated in a suitable indentation in the surface of shaft 120.

The driving head 130 and the lower end of shaft 120 are suitably assembled and housed in the hand grip 125. As embodied the hand grip 125 is formed of two semi-cylindrical pieces 135 and 136 of hard rubber, wood or other suitable material which are internally bored to receive the tube 121 in the upper end of the hand grip, while in the lower portion thereof a larger cylindrical 70 chamber 137 is provided for housing the mechanism. The two pieces 135 and 136 of the hand grip are bound together near their upper end by a pair of counter-sunk bolts 138 on either side of the tube 121, while the lower reduced end 75
the clutching mechanism and driving connections hereinbefore described. As embodied, the square head 74 of the winding frame is provided with a notch or recess 155 adapted to receive and be held by a spring pressed detent 156 in the chuck head 151. The chuck 157 is provided with a square recess 152 adapted to fit over and receive the square head 74 whereby the detent 156 will slip into and hold the winding frame in driving position with respect to the chuck.

25 The chuck 157 is adapted to be driven from the flexible motor shaft 150, being fixed to the end of driven shaft 152 to rotate therewith. The shaft 150 is driven from the clutch head 130, having a driven clutch face 160 on the driven head 151, which is fixed to the upper end of shaft 150 and normally spaced apart from the clutching head 150. The driven head 151 is mounted for limited axial movement along shaft 150 to engage with the driving face 131 of clutch head 130. For this purpose, the head 161 is provided with a radial pin 152 which projects into and is adapted to move along the longitudinal keyway 163 in the upper end of shaft 150. The lower end of head 151 rests against an annular flange 164 on the shaft 150, the bottom of said flange being supported by the bottom of the cylindrical chamber 131 of the hand grip housing. A suitable bearing-shaft 165 may be provided for spacing and supporting the shaft 150 from the lower, constructed end 139 of the hand grip.

As embodied, the driving and driven faces of the clutch are adapted to be brought into engagement by closing movement of the grip lever 126. Said lever is provided with a horizontally-disposed arm 178 which projects into the chamber 131 of the hand grip through a suitable slot 171. The inner portion of arm 170 is bifurcated to form a yoke having arms 172 and 173. The inner ends of said arms are pivoted to turn about a horizontal axis 174 in the side 135 of the hand grip opposite the opening 171. A spring 175 between the lever 126 and the side 136 of the hand grip serves to normally hold the yoke in its lower or horizontal position. The head 161 is provided with an annular recess 180 adapted to receive the rollers 161 which are hung on pins 182 and project radially inwardly from the arms of the yoke.

It will be clear that by gripping the hand grip and pressing the lever 126 inwardly, the horizontal arms 172 and 173 of the yoke will be tilted upwardly about the axis 174, thereby raising the head 161 and sliding same along the shaft 150 to engage the clutching faces. The head 161 will thus be driven from the rotating head 130 and this drive will be transmitted through the shaft 158 and chuck 157 to the winding frame. The rotating force may be applied as slowly and carefully as desired by slipping the clutch and the drive may be stopped at any time by releasing the spring lever 125. The spring-mounted lever 125 also provides a safety feature in the mechanical drive of the winding means, because the clutch automatically disengages as soon as pressure on the lever 125 is released.

The invention provides means for preventing accidentally pulling or twisting hairs, near their roots during the winding operation and subsequently especially while the washers B are being attached to a tress below the end of a mandrel. In giving a wet or steam wave, it is necessary to apply the guard washers B to the tress below the mandrel to prevent hot liquid from coming onto the scalp and burning the customer. When the guard washers B are applied to the hair, they tighten the hair near the roots and take up any slack therein below the mandrel. If the air is already taut below the mandrel end, application of the washers B with the attendant gripping and torsion of the hair will cause pain and discomfort.

As shown in Figs. 18 and 19, the invention provides a hair-binding clip or collar which may be attached to the tress just above the scalp prior to the attachment of the clamping hook 4 of the mandrel. As embodied, the clip comprises a cylindrical collar composed of two semi-cylindrical, hinged members or jaws 200 and 201 pivoted to turn about a vertical pin 202. Means for fastening the jaws together so as to grip the tress with the desired firmness comprise the angular resilient arms 203 and 204 extending from the jaws 200 and 201 respectively. Arm 204 comprises a substantially radial extension of jaw 201, while arm 203 is bent inwardly at substantially a right angle and extends through a suitable aperture 205 in arm 204. The arm 203 is provided with a plurality of holding teeth 206 which catch against the inner edge of aperture 205 and serve to hold the clip in the selected clamping position. The inner surface of the clip may, if desired, be provided with a plurality of hair-engaging teeth comprising upset tongues 207 projecting into the collar. For loosening and opening the clip, the outer ends of the arms 203 and 205 may be pressed toward each other, whereby the teeth 206 are released.

In operation, the clip will be fixed to the tress before the mandrel is attached, some slack hair being gathered into the clip. When the winding operation is finished, the clip will be removed and the washers B and their accompanying fastening means can be attached to the tress without pulling the hair.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:
1. A hair-curving mechanism for permanent waving including in combination a mandrel substantially smooth mandrel, means slidably engaging a growing tress of hair and cooperating means for curling the tress about the mandrel in predetermined symmetrical form, conforming to a fixed mechanical configuration.

2. A hair-curving mechanism for permanent waving including in combination means for engaging a growing tress of hair and means cooperating to curl the tress in a predetermined symmetrical helical shape of varying pitch.

3. A hair-curving mechanism for permanent waving including in combination a mandrel for
fixedly engaging a growing tress of hair and means mechanically cooperating therewith for winding the free portion of the tress overlapping around the mandrel in predetermined symmetrical form.

4. A hair-curling mechanism for permanent waving including in combination a rotatable head for engaging a tress of hair with regulable friction and means for rotating the head in a mechanically predetermined path as the tress slips through the head under friction.

5. A hair-curling mechanism for permanent waving including in combination a mandrel, a separate device rotatable relatively thereto for winding a tress of hair about the mandrel including a helical guide for guiding the winding device in a mechanically predetermined helical path along and about the mandrel.

6. A hair-curling mechanism for permanent waving including in combination a mandrel, a hair-guiding head rotatable around the mandrel for winding a tress of hair and means for engaging devices on the exterior of the mandrel and head for progressing the head along and about the mandrel in a helical path.

7. A hair-curling mechanism for permanent waving including in combination a mandrel, a hair-receiving and guiding head rotatable about the mandrel for coiling a tress of hair therein, and interior means on the mandrel for positively controlling the path of movement of said winding device.

8. A hair-curling mechanism for permanent waving including in combination a mandrel, a hair-guiding head rotatable about the mandrel for coiling a growing tress of hair thereof and cooperating members for positively progressing the winding device in a predetermined helical path along and about the mandrel, said members being connectible and disconnectable from successive mandrels.

9. A hair-curling mechanism for permanent waving including in combination a mandrel, means for fixing one end thereof to a tress of hair adjacent the scalp, a member rotatable about the mandrel for winding the tress thereon, and means for guiding the head in a helical path of predetermined pitch to coil a tress of hair about the mandrel and a guide traveling within the hollow mandrel.

10. A hair-curling mechanism for permanent waving including in combination a hollow mandrel, a hair-receiving and guiding head rotatable about the mandrel, and means for guiding the head in a helical path of predetermined pitch to coil a tress of hair about the mandrel and a guide traveling within the hollow mandrel.

11. A hair-curling mechanism for permanent waving including in combination means for coiling a tress of hair around a mandrel in a mechanically predetermined path and means for mechanically driving said coiling means.

12. A hair-curling mechanism for permanent waving including in combination a mandrel, means for fixing one end thereof to a tress of hair adjacent the scalp, means for coiling the free portion of the tress around the mandrel, including a mechanical guide for controlling the movement of the coiling means, and means for mechanically driving the coiling means.

13. A hair-curling mechanism for permanent waving including in combination a manually rotatable device for coiling a tress of hair about a mandrel including a mechanical guide for positively controlling the shape of the coil, and means for optionally connecting the device to a mechanically driven shaft.

14. A mechanism for curling hair for permanent waving including in combination a mandrel, a cylindrical head surrounding the mandrel and rotatable thereon, means connected to the head for holding and guiding a tress of hair, a helically grooved member rotatable with the head and means on the mandrel for engaging the helical groove to progress the rotating head and tress of hair in a helical path along and about the mandrel.

15. A mechanism for curling hair for permanent waving including in combination a tubular mandrel, a hair-engaging head rotatable about the mandrel, a guide for controlling the movement of the head rotatable within the mandrel, said head being adapted to wind a tress of hair about the mandrel in a helical path determined by the movement of the guide with respect to the mandrel.

16. A hair-winding mechanism for permanent waving including in combination a guide member having configurations corresponding to those to be imparted to a tress of hair, a mandrel, a hair-engaging device rotatable about the mandrel, and means for causing the hair-engaging device to travel about the mandrel in a path corresponding to the configurations of the guide member.

17. A hair-winding mechanism for permanent waving including in combination a guide member having a helical configuration of varying pitch, a mandrel, a hair-engaging device rotatable about the mandrel, and means for causing the hair-engaging device to travel about the mandrel in a path corresponding to the configurations of the guide member.

18. A hair-winding mechanism for permanent waving including in combination a tubular mandrel, a hair-engaging device, and means engaging the interior of the mandrel for guiding said device in a helical path with respect to the mandrel.

19. A hair-winding mechanism including in combination a hollow mandrel, a frame rotatable with respect to the mandrel, a hair-engaging head fixed to the frame and rotatable about the mandrel, a guide member fixed to the frame and extending into the interior of the mandrel and having guiding engagement therewith, the frame serving to transmit to the head the movement of the guide member with respect to the mandrel.

20. A device for winding hair preparatory to imparting a permanent wave thereto including a combination a mandrel having one end attachable to a tress of human hair adjacent the scalp and a mechanism applicable to said mandrel for winding the tress thereon in a coil of predetermined configuration, said mechanism embodying means for engaging the tress of hair and means for guiding the hair engaging means along and about the mandrel for substantially conforming to a fixed mechanical configuration, said mechanism being removable from the mandrel after the hair is wound to permit application of heating means to the coiled tress.

21. Hair waving mechanism including in combination a plurality of mandrels attachable to tresses on a head, a curl winding device including a helical guide and adapted to be brought into
operative relation with the mandrels successively and power means for rotating the winding device about the mandrels.

23. Hair winding mechanism including in combination a plurality of mandrels attached to tresses near the scalp, a curl winding device grasped by the operator and including a helical guide and adapted to be brought into operative relation with the mandrels successively, hair flattening and tensioning means associated with said device, power means for rotating the winding device and a clutch controlled by the operator for connecting and disconnecting the winding device and power.

24. Hair winding mechanism including in combination a plurality of mandrels attachable to tresses on a head, a curl winding device grasped by the operator and comprising a helical guide adapted to be brought into operative relation with the mandrels successively, an electric motor and a support thereon, and a flexible shaft for driving the winding device from the motor.

25. Hair winding mechanism including in combination mandrels attachable near the roots of tresses on a head, a curl winding device movable into operative relation from the free end of a mandrel attached to a tress, and comprising means for engaging a tress and winding it about the mandrel in a predetermined helical path and means for lapping a binding tape or the like about the exterior of the tress during the winding thereof.

26. Hair winding mechanism including in combination mandrels attachable near the roots of tresses on a head, a curl winding device movable into operative relation from the free end of a mandrel attached to a tress, comprising means for engaging a tress and winding it about the mandrel in a predetermined helical path and rotatable power driven means connectible to and disconnectable from the winding device by the operator.

27. Hair winding mechanism including in combination mandrels attachable near the roots of tresses on a head, a curling winding device comprising an operating handle grasped by the operator and movable into operative relation from the free end of a mandrel attached to a tress, and comprising means for engaging a tress and winding it about the mandrel in a predetermined helical path and means for moving the device and handle away from the head during the winding operation.

28. Hair winding mechanism including in combination hollow mandrels attachable near the roots of tresses on a head, a curling winding device movable into operative relation with the hollow interior of a mandrel and having tress guiding means near its inner end, and means for effecting combined rotational and linear movement of the winding about the mandrel to curl the tress thereon.

29. Hair winding mechanism including in combination hollow mandrels attachable near the roots of tresses on a head, a curl winding device grasped in the hand of the operator movable into operative relation with the hollow interior of a mandrel and having tress guiding tensioning and compressing means near its inner end, and means for effecting combined rotational and linear movement of the winding about the mandrel to curl the tress thereon and power means for rotating the winding device.

30. Hair winding mechanism including in combination a mandrel, a winding device movable into operative relation with the hollow interior of a mandrel and having tress guiding means near its inner end, means for effecting combined rotational and linear movement of the winding about the mandrel to curl the tress thereon and power means for rotating the winding device.

31. Hair winding mechanism including in combination hollow mandrels attachable near the roots of tresses on a head, a curl winding device movable into operative relation with the hollow interior of a mandrel and having tress guiding means near its inner end, means for effecting combined rotational and linear movement of the winding about the mandrel to curl the tress thereon and power means for rotating the winding device.

32. Hair winding mechanism including in combination a mandrel, a winding device supplying tape and winding the curl and the tape along a predetermined path, the tape being laid over the hair to bind and prevent escape of wound and tensioned hairs.

33. Hair winding mechanism including in combination a mandrel, a winding device supplying tape and winding the curl and the tape along a predetermined path and in overlapping relation, the tape being laid over the hair to bind and prevent escape of wound and tensioned hairs.

34. Hair winding mechanism including in combination a mandrel engaging a tress near its roots, a hair having a guide and a guide near its inner end, means for moving the winding in a predetermined helical path about the mandrel to wind the hair and tape thereon and means for compressing the hair and tape together as they are wound on the mandrel.

35. Hair winding mechanism including in combination a mandrel, a curl winding device supplying tape and winding the curl and the tape along a predetermined path and in overlapping relation, the tape being laid over the hair to bind and prevent escape of wound and tensioned hairs.

36. A permanent waving mechanism including in combination a hollow mandrel, a winding device rotatable about the mandrel for coiling a tress thereon and a guide longitudinally movable within the mandrel.

37. A permanent waving mechanism including in combination a hollow mandrel, a winding device rotatable about the mandrel for coiling a tress thereon, and a guide longitudinally movable within the mandrel, the winding device and guide being attachable to and detachable from successive mandrels.

38. A permanent waving mechanism including in combination a hollow mandrel, cooperating tress guiding and winding members including a member traveling within the hollow mandrel, said members being attachable to and detachable from the mandrel.

39. A permanent waving mechanism including in combination a hollow mandrel, cooperating tress guiding and winding members including a member traveling within the hollow mandrel, said members being attachable to and detachable from the mandrel.

40. A permanent waving mechanism including in combination a hollow mandrel, a device for laying tape upon the guided and wound tress, and means for pressing the hair and tape together as they are wound.

41. The method of winding hair for permanent waving which comprises fixing a mandrel to a growing tress and winding the free portion of
the tress around the mandrel with a continuous winding movement in a curl of predetermined configuration.

42. A hair curling appliance comprising a device for tensioning and coiling growing hair about a rod and a guide forming part of the appliance and separate from the rod for guiding the device in a predetermined mechanical path along and about the rod.

43. A hair curling appliance comprising a device for tensioning and coiling the hair about a rod, a power driven mechanism for rotating the device about the rod and means separate from the rod having a helical guide for causing the device to move along the rod.

44. A hair curling mechanism including in combination means engaging a growing tress of hair and cooperating means for winding same from the scalp outwardly in a curl of predetermined helical configuration, the path thereof varying to conform to the thickness of the tress whereby a curl of substantially uniform thickness may be formed in spite of said variations in thickness of the tress.

45. In a device of the class described, a spindle, hair clamping means carried by said spindle comprising a clamping jaw, a cooperating movable clamping member adapted to press the hair against said clamping jaw, and a screw threaded member mounted directly on said movable member for locking the same in clamping position, said jaw and said screw threaded member having cooperating surfaces for pressing the hair downwardly against said jaw upon tightening movement of said member.

46. In a hair waving device, a spindle, clamping means mounted at one end of said spindle and extending normal thereto comprising a clamping jaw, a clamping member having relative pivotal movement with respect to said jaw, and means for locking said member in clamping position, and a winding member having longitudinal movement along said spindle for winding the hair thereabout.

47. In a hair waving device, a spindle, clamping means mounted at one end of said spindle and extending normal thereto comprising a clamping jaw, a clamping member having relative pivotal movement with respect to said jaw, means for locking said member in clamping position, and a winding and combing member having longitudinal movement along said spindle.

48. A hair-curling mechanism for curling hair on the human head, including in combination a winding device for engaging a growing tress near the scalp and winding the free portion thereof along and about a curling rod, and means for imparting a continuous helical movement to the winding device during the winding operation of a curl.

49. A hair curling mechanism for curling hair on the human head, including in combination a winding device for engaging a growing tress near the scalp and winding the free portion thereof along and about a curling rod, means for imparting a continuous helical movement to the winding device during the winding operation of a curl.

50. A hair curling mechanism for curling hair on the human head, including in combination a winding device for engaging a growing tress near the scalp and winding the free portion thereof along and about a curling rod, means for rotating the winding device and means for continuously forcing said device away from the scalp during the winding operation of a curl.

51. A hair curling mechanism for curling hair on the human head, including in combination a winding device for engaging a growing tress near the scalp and winding the free portion thereof along and about a curling rod, means for imparts a continuous helical movement to the winding device and tape wrapping means.

52. A hair curling mechanism for curling hair on the human head, including in combination a winding device for engaging a growing tress near the scalp and winding the free portion thereof along and about a curling rod, means for wrapping binding tape about a portion of the wound curl to preserve the tension thereof, and means for imparting a continuous helical movement to the winding device and tape wrapping means.

53. A hair curling mechanism for curling hair on the human head, including in combination a winding device for engaging a growing tress near the scalp and winding the free portion thereof along and about a curling rod, means for imparting a continuous helical movement to the winding device and tape wrapping means.

54. A hair wrapping device comprising a body having means for rotatably mounting it on a hair holding mandrel, said body having a passageway through which the lock of hair is passed, and extended coating lips at the outlet side of said passageway and between which the lock frictionally passes as it is directed to the mandrel, said lips coating to transversely flatten the lock for application to the mandrel.

55. A hair wrapping device comprising a body having means for rotatably mounting it on a hair holding mandrel, said body having means for guiding a lock of hair to the mandrel as it is wrapped on the latter by the body, and coating lips on the body at the outlet end of said guiding means and between which the lock passes, at least one of said lips being of yielding material.

56. A hair wrapping device comprising a body having a bore for the reception of a hair holding mandrel to permit their relative rotation and having a transverse passageway ending at the bore and through which the lock is passed, and means at the juncture of the passageway and bore that frictionally engages the hair to resist its movement and put tension thereof.

57. A hair wrapping device comprising a body having a bore at one end providing a bearing for rotatably receiving a hair holding mandrel and an open chamber at its other end in which the hair is wrapped on the mandrel as said mandrel and body are relatively rotated, a transverse passageway in the body opening into the chamber and constituting means for directing the hair to the mandrel, and a comb in the passageway.

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