March 25, 1969 H. W. MEYER 3,434,193

PROCESS OF MANUFACTURING HAIR ROLLERS

Filed Jan. 18, 1965 Sheet 1 of 4

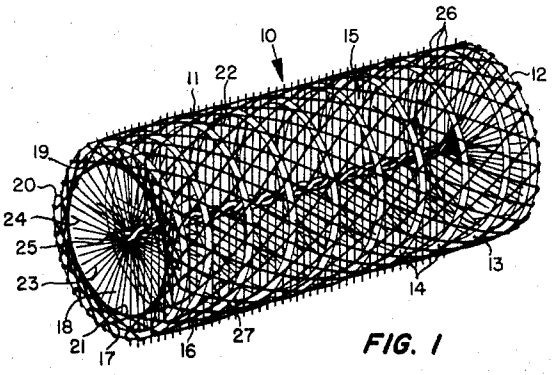

FIG. 1

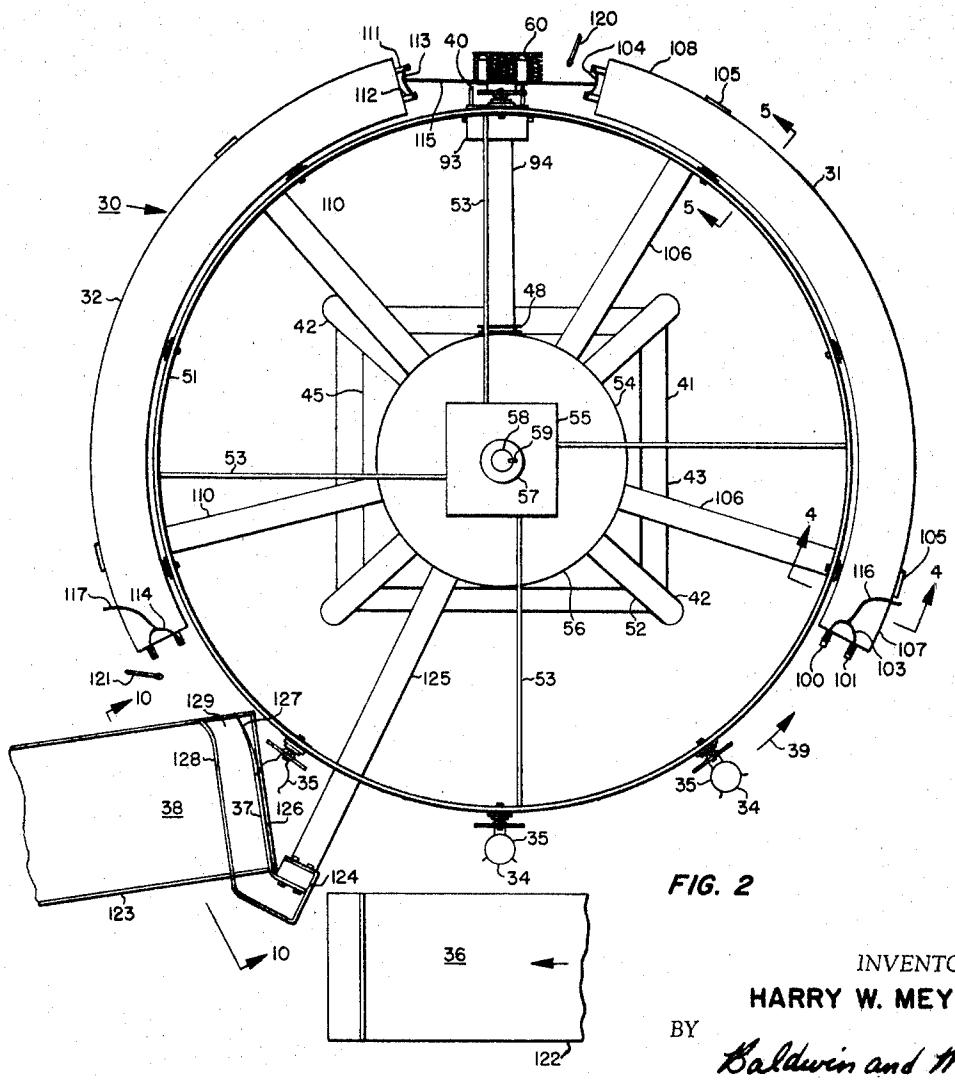

FIG. 2

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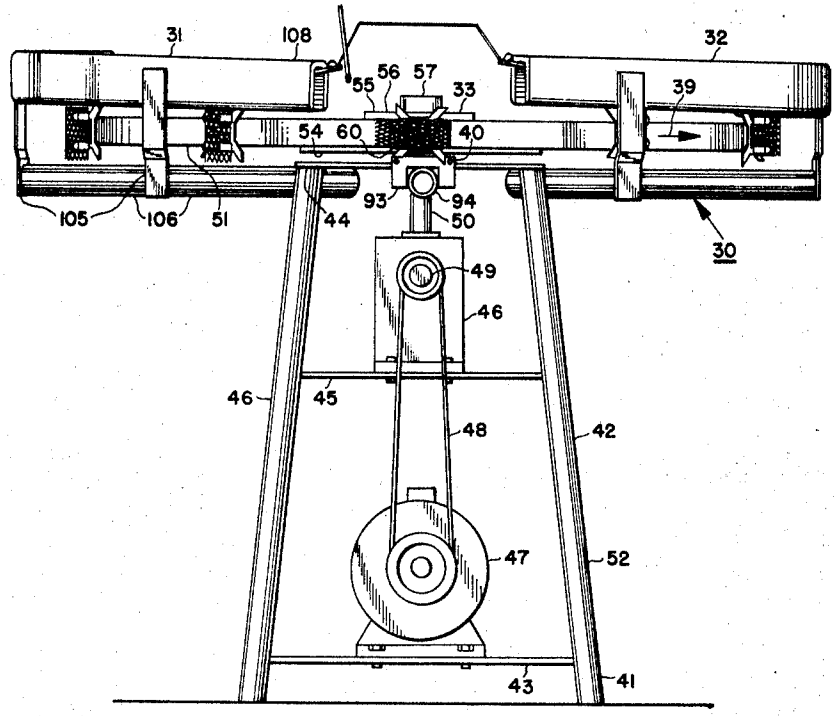

FIG. 3

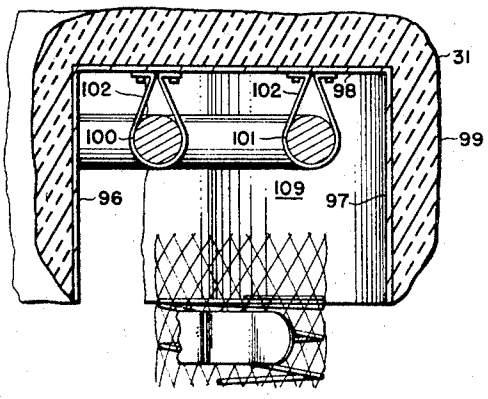

FIG. 4

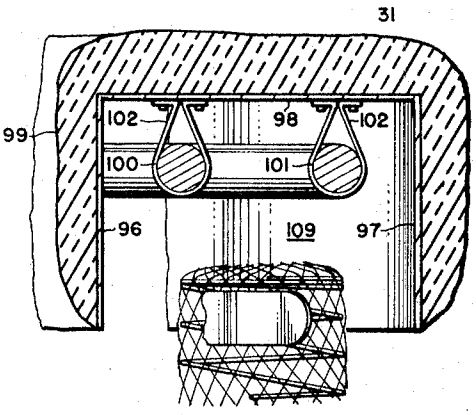

FIG. 5

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PROCESS OF MANUFACTURING HAIR ROLLERS

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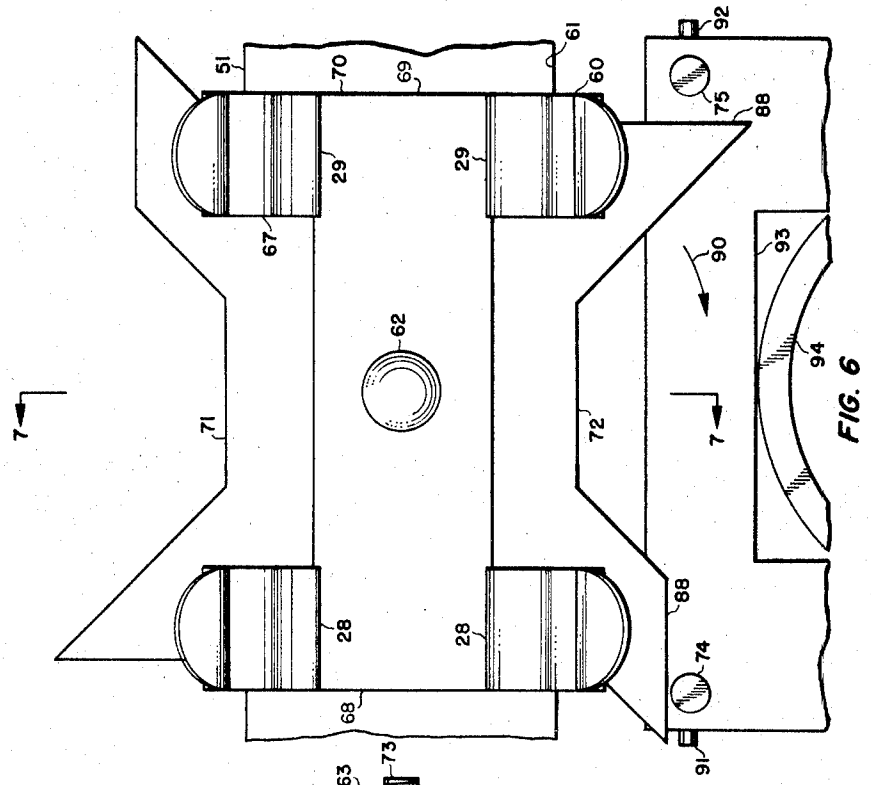

FIG. 6

FIG. 7

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PROCESS OF MANUFACTURING HAIR ROLLERS

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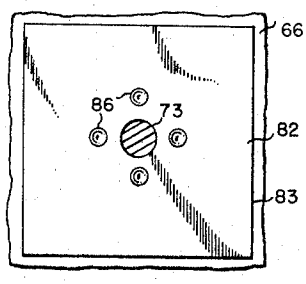

FIG. 8

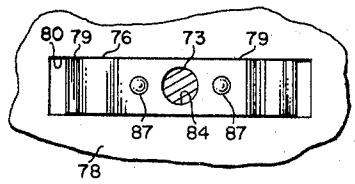

FIG. 9

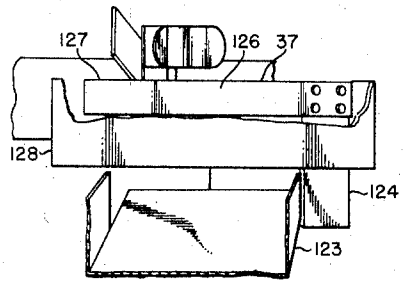

FIG. 10

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3,434,193

PROCESS OF MANUFACTURING HAIR ROLLERS

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Int. Cl. B23p 11/02
U.S. Cl. 29—419 4 Claims

ABSTRACT OF THE DISCLOSURE

A hair roller has a brush and an internally supported tubular net component that is provided with shrunken filaments at its ends to retain the support in a proper position in the assembly. With heat shrinkable netting material, the filaments at the ends of the supported tubular component are heat shrunk and then followed with a water or air quench to ambient temperatures before the brush is inserted in the tubular net. Heating and quenching are accomplished with an apparatus having spaced heaters with associated quenching devices, and a carriage for conveying the internally supported tubular component through the heaters. The carriage is equipped with cam actuated holders for inverting the held items between heaters.

This invention relates to the manufacture of hair rollers or curlers.

A general object is to provide improvements in the manufacture of hair rollers.

A more specific object is to provide improved methods of manufacturing hair rollers of the kind having a net component on which the hair is wound by the user.

A particular object of the invention is to provide improved and more economic methods of manufacturing hair rollers of the kind having a net component and where the methods permit the use of less netting material, and, in addition, enable the production of rollers that are more convenient and safer to use than other net type hair rollers currently being marketed.

Yet another object in the invention is to provide improved methods of manufacturing net type hair rollers of the kind having a brush component that is used for retaining the hair on the roller during use, and where hair rollers are easier and less costly to assemble during the manufacture thereof than other and more conventional hair rollers of this kind.

One object is to provide a process of assembling the components of net type hair rollers having a brush element and which avoids problems commonly occuring as the elements are assembled because the brush component becomes entangled with the net component.

A further objective of the invention is to provide a process for assembling collapsible net components and the support components of net type hair rollers, and which provides a finished assembly in which the support component is less readily displaced from its supporting position in the assembly than is the case with more conventional net type rollers.

One of the more popular hair rollers used by women for curling their hair has a tubular net component which is internally supported against collapsing during use by an elongated helical component, the helical wire element being housed in the hollow of the net component. The support component is retained in the hollow by tucking the opposite ends of the net component in the open ends of the helical member during the manufacturing process. These end tucks frequently become displaced during subsequent steps involved in the manufacture of the rollers, as well as when used by the ultimate user. They also fail

to provide a tight assembly that avoids movement of the components when the roller is manipulated by the user. When the tucks become dislodged during the manufacturing process, excess labor is required to correct the situation and on occasions the workers have been known to injure their fingers in correcting the situation. Not infrequently the user finds that the need arises to replace the tucks, and when this happens, it occasionally occurs that the user engages the end of the wire component used in forming the helical support member and similar injury results to the finger.

In addition most of the net type hair rollers also contain a brush component which is lodged in the hollow of the assembled net and support component. During the manufacture of the roller, the brush is placed in the assembly after the net and support components have been assembled. This creates a problem in the manufacture of the roller when the net and support are retained in position by end tucks for frequently the brush bristles become entangled in the net and pull out one or more of the tucks. This of course requires considerable labor and time to correct the situation, and among the objectives of the invention is to provide processing features that avoid or eliminate one or more of the mentioned objections or problems.

It has been found that by shrinking the end portions of the tubular net component after the support component has been inserted in the hollow of the net that the support component is better and more permanently secured in its proper place in the assembled roller. The need for reinserting the tucks when they become loosened is avoided and, from a manufacturing point of view, less netting material is required. In the shrinking process carried out during the manufacture of the improved rollers, the end openings in the tubular net component are reduced in size due to the shrinkage of the filaments of the net at such openings, and the support component is trapped in the hollow of the net and thereby prevented from being dislodged or removed through the shrunken end openings.

In general, it has been found that the net may be drawn into a tighter fitting relation on the support component by virtue of the process, thus providing a tighter assembly which minimizes movement of the net relative to the support component during use as compared to more conventional net type hair rollers. This makes the roller more attractive to the user because of the feeling of tightness realized upon manipulation by the user. In addition, it has been found that less net material is needed in manufacturing net type hair rollers of comparable sizes currently being marketed when the opposite ends of the net are shrunk to secure the support component in place.

Yet another advantage to the invention lies in the manufacturing process per se. It has been found, for example, that the problems that heretofore have been encountered during the manufacturing process of assembling the rollers, as when the brush component is housed in the partial assembly and becomes entangled with net, are completely avoided when the support component and net component are secured in place by means of the shrinking process described hereinafter. In effect, it has been found that if the support component is secured in the hollow of the net by a process of shrinking the ends of the net, that the brush component may thereafter be easily and efficiently inserted in the partially assembled roller without dislodging the net component through entanglement with the brush bristles.

The novel features which are believed to be characteristic of this invention are set forth with particularity in the appended claims. The invention, itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description

taken in connection with the accompanying drawings, in which:

FIG. 1 is a perspective view of an assembled hair roller or curler which has been manufactured in accord with the improved process;

FIG. 2 is a plan view of an apparatus that may be used in carrying out the shrinking process in accord with certain aspects of the invention;

FIG. 3 a rear side elevational view of the apparatus seen in FIG. 2;

FIG. 4 is an enlarged section view of a heating unit embodied in the apparatus seen in FIG. 2 and shows the general relation of the end of a partially assembled roller to the heating elements of the unit at one stage in the heating process, the view being taken at the feed end of the unit and generally along the lines 4—4;

FIG. 5 is another enlarged section view through the heating unit seen in FIG. 2 and in FIG. 4 and shows the general relation of the end of another partially assembled roller to the heating elements at a more advanced stage of shrinkage of the end, the view being one nearer the discharge end of the unit and generally along the lines 5—5 of FIG. 2;

FIG. 6 is an enlarged sides elevational view of one of the holders seen in FIGS. 2 and 3, the roller having been removed to better expose the parts of the holder and the view showing the holder in relation to certain other parts of the apparatus at the time the holder is being inverted so that the untreated end of the hair roller may be subjected to a heat type shrinking step in the second heat treating unit of the apparatus;

FIG. 7 is a section view along the lines 7—7 of FIG. 6;

FIG. 8 is a face view of a component of a retainer mechanism shown in FIG. 7 and which is used to restrict rotary movement of certain parts of the holder, the view being taken generally along the lines 8—8 therein to show the relation of the component to certain adjacent structure in the assembled holder;

FIG. 9 is a rear elevational view of a fragment of a cam wheel and a spring component of the retainer seen in FIG. 7, together with adjacent structure as seen generally along the lines 9—9 of FIG. 7;

FIG. 10 is a perspective view of certain parts of the apparatus at the discharge station for the heat treated elements as seen more or less along the lines 10—10 in FIG. 2.

With reference to FIG. 1, an assembled hair roller which has been manufactured in accord with the invention is designated at **10**. It has an elongated hollow tubular net component **11** which is supported internally against collapse by an elongated cylindrical component **12**. Component **12** is formed from an elongated wire element **13** which has been wound in the shape of a helix. The convolutions **14** of component **12** are generally spaced apart in the hollow **15** of the net component **11** and they support the cylindrical meshed wall portion **16** of the net component against collapse into the hollow.

The opposite end portions **17** of the net component **11** have been shrunken by the shrinking process referred to hereinafter and partially close the end openings **18** into the hollow **19** of the support component. In their shrunken condition they form annular flanges which project radially inwardly at the opposite ends of wall portion **16** and restrict axial movement of the support component **12** as well as protect or shield the end extremities **20** of the wire element **13** from practical direct contact by the user.

In the process of shrinking the end portions **17**, the flexible filaments **21** contract linearly and deform the end portions. As such, the size of the end openings **18** into the hollow **15** is diminished and the support component is trapped in place. The hair is wound on the exterior surface **22** of the meshed wall portion **16** by the user and is maintained in place by a cylindrical brush component **23** that is housed in the hollow **19** of the helical component. The bristles **24** of the brush are secured between twisted wire elements **25** arranged along the axis of the brush, and the bristles **24** project radially thereof in the assembled roller **10**. The ends **26** of the bristles **24** extend between the convolutions **14** and through the meshes **27** in the wall surface **22**, and the hair is kept in place on the roller surface through entanglement with the outwardly extending bristle ends **26**.

The filaments **21** of the net may be made from any material which may be shrunk by a suitable shrinking process during the process of assembling the components in accord with the broader concepts of the invention. Preferably, however, filaments of synthetic plastic material that will shrink when heated to elevated temperatures are used in the construction of the tubular net component. Synthetic plastic material such as the polyallomers marketed by the Eastman Kodak Company under the trademark "Tenite," as well as those marketed by the E. I. du Pont de Nemours Company under the trademark "Vexar" have been found eminently suitable materials for use as filaments of the tubular net components. These materials have been found in filament form to permit the filaments to shrink and decrease in length when subjected to temperatures at which the materials become more or less semi-fluid and tacky.

In the preferred process of assembling hair rollers embodying net components made from heat shrinkable filaments of synthetic plastic material, the support component is first inserted in one of the open ends of the net component and lodged in the hollow thereof between the opposite end portions of the net. Thereafter, the filaments of the end portions are subjected to a heat treatment that decreases the lengths of the filaments and causes the end portions to shrink. The shrinking process diminishes the sizes of the end openings in the net and thus traps the support element in place. The filaments tend to become tacky and semi-fluid at the elevated temperatures to which they are subjected during the heat treatment step and hence it is preferable to rapidly cool the end portions immediately after their heat treatment. This can be accomplished by spraying a fine mist of water or other cooling liquid on the heat treated ends so as to quench the ends and rapidly cool the filaments to ambient temperatures. Thereafter, the brush component can be inserted through one of the openings of diminished size in the net and housed in the body of the roller without dislodging the assembled components.

The process of the invention will become more apparent from consideration of the apparatus shown in FIGS. 2–10 and which is adapted to automatically heat treat the opposite ends of the net components of the partially assembled rollers fed thereto.

With reference to FIGS. 2 and 3, the heat treating apparatus is generally designated at **30** and includes a pair of elongated arcuate tunnel-like heating units **31** and **32** and a carriage mechanism **33**. The partially assembled rollers **34** are hand fed to individual holders **35** therefor from a feed station designated at **36**, and are automatically discharged from the carriage after the heat treatment at a discharge station **38** by means of a device designated at **37**. Mechanism **33** is adapted to carry the partially assembled rollers **34** along a path **39** that exposes the opposite ends of the net components to a heat treatment which is carried out successively in units **31** and **32**. The heating units **31** and **32** are arranged on the same side of the path traversed by the rollers, and hence means **40** that cooperates with certain components of the holders is provided for inverting the assemblies between the units **31** and **32**. In this way, one end of the partially assembled roller held by each holder is treated in unit **31** and the opposite end is treated in unit **32**.

The principal parts of the apparatus **30** are supported on a framework **41** that includes four inclined posts **42**

which are rigidly interconnected at the bottom by a flat horizontal plate 43. The upper ends of the posts are fixed and held in spaced relation by another rigid plate element 44. A horizontal support plate 45 is connected to the posts in the center of the framework for supporting a gear mechanism 46. A variable speed electric motor 47 is mounted on plate 43 of the frame and the input shaft 49 of the mechanism 46 is driven by motor 47 by means of a belt connection 48. The output shaft 50 of the gear mechanism extends vertically through a centrally located opening therefor in plate 44, whereas the belt connection between motor 47 and mechanism 46 is slightly offset from the rear edge of plate 45. Motor 47, through gear mechanism 46, serves to continuously drive an annular or ring component 51 of the carriage 33 about the axis of shaft 50 and in the direction of arrow 39 when the apparatus is in operation.

Ring component 51 consists of a narrow metal element which has been bent in the shape of a circle and the opposite ends butt welded together. Ring 51 is supported above the base portion 52 of the framework 41 on shaft 50 through four elongated members 53 which are welded at their outer ends to the inside face of the ring. Members 53 extend more or less radially of the rotary axis of component 51 and are fixed at their inner ends between a flat circular bottom plate 54 and a square plate 55. Plate 55 is spaced above plate 54 to accommodate the location of the inner ends of the members 53 therebetween at the hub 56 of the wheel-like structure. These inner ends are somewhat offset from the axis of the shaft 50 as seen in FIG. 2 to provide structural strength in the wheel-like structure. The upper end 58 of shaft 50 is threaded in centrally located openings in plates 54 and 55. A portion of the upper end 58 of shaft 50 projects above plate 55 and engages a nut 57 that is fixed to the upper surface of plate 55 coaxially with the threaded openings in the plates 54 and 55 therebetween. At this point, the wheel-like structure is keyed for rotation by and about the vertical axis of shaft 50 by key 59.

The holders 35 are spaced from each other along the outside of the ring 51, and the structure of the individual holders is best seen in FIGS. 6–9 by reference to that of holders 60. Holder 60 is seen in FIGS. 6 and 7 with the partially assembled roller element removed and with the longitudinal axis of the clamp component 67 of the holder in the horizontal position it assumes at the half-way point in being inverted between the heating units through contact made with certain fixed elements of mechanism 40. This position is also illustrated in FIGS. 2 and 3.

The assembled holder 60 is connected at the outer face 61 of the ring 51 by a round headed bolt 62 which is threaded in a suitable opening therefor in the ring. The bolt 62 is secured in place by a nut 63 and lockwasher 64 located at the inner face 65 of the ring 51. Ring 51 is strengthened at the opening by a square metal plate element 66 which is welded to the outer face of the ring and in which the bolt is also threaded.

The clamp 67 of holder 60 has a rectangular back plate 70 which is fixed to the front face of a cam wheel component 72 of holder 60. The opposite end portions 68 and 69 of plate 70 are provided with spaced prongs 28 and 29 which are integrally connected to the back portion 70 and made from spring steel so as to yield when a partially assembled roller is fed to the clamp 67 at the feed station. Prongs 28 and 29 are adapted to grasp the partially assembled rollers at the opposite ends of the housed support component and extend outwardly from the back plate 70. The axis of the clamp 67 is arranged transversely of bolt element 62 and the prongs are arranged to hold the roller elements with its longitudinal axis extending transversely of the axis of rotation of the holder. The prongs 28 and 29 are further adapted and arranged to hold the roller element in a position which is offset from the face of the back plate so as to enable the roller to be removed from the clamp 67 by device 37. Plate 70 is fixed to the front face 71 of the cam wheel 72 and the openings in plate 70 and wheel 72 for bolt 62 are such as to enable these elements to be rotated together about the bolt stem 73 when the cams encounter the fixed elements 74 and 75 of mechanism 40.

During the operation of the apparatus 10, the prongs 28 and 29 of clamp 67 are normally aligned vertically in the assembled holder 60 so that the longitudinal axis of the partially assembled roller is also arranged vertically during the passage of the roller through the heating units. Between units 31 and 32, however, the holders are caused to rotate 180° to invert the prongs and the roller elements held thereby so as to place the untreated net ends of the rollers subjected to the heat treatment step in unit 31 in an upright vertically extending position for subsequent heat treatment in unit 32. During the process of inverting the holder 60, the cam wheel 72 of the holder engages two fixed elements in succession and each element is so arranged as to cause the wheel to rotate 90° upon engagement by the cam of the wheel 72 as the holder passes the element.

Provision is also made for restricting rotary movement of the holders when the cams are disengaged from the elements 74 and 75 and thus for retaining the holders in the position assumed after such engagement. Thus, in addition to a cam wheel component, each of the assembled holders is also provided with a spring component that cooperates with the cam wheel and is rotated thereby, as well as with another component that is secured to the ring and cooperates with the spring component in restricting rotary movement of the holders.

The spring component of holder 60 is designated at 76 and best seen in FIGS. 7 and 9. It consists of an elongated flat rectangular member made of spring steel and which is arcuate in shape. The concavity 77 of the member faces the back side 78 of the cam wheel 72 and the opposite ends 79 of the member are provided with return bends which bear against the back face of the wheel on opposite sides of the bolt stem and in an elongated groove 80 provided in the wheel face 78. An opening 81 is provided between the opposite ends of the spring; for the free passage of bolt stem 73 through the member 76, and by virtue of the arrangement, the spring member 76 is engaged by the walls of the groove and caused to rotate about the stem of the bolt when the cams engage the fixed elements 74 and 75.

Spring 76 is held under compression between the back face 78 of the cam wheel and the front face 82 of component 83 in the assembled holder 60. Component 83 consists of a flat rectangular block which fits in a matching rectangular recess 84 in the front face of the metal plate element 66. Block 83 has a central opening 85 through which the stem of the bolt extends as seen in FIGS. 7 and 9, and is provided with four more or less semispherical surface recesses 86 which are offset from the axis of the bolt. These recesses 86 are spaced at 90° intervals about the axis thereof. Spring component 76 is provided with a pair of dents in the face of the concavity and which provide spaced bulbular portions 87 on opposite sides of the center opening in the back of the spring. These bulbular portions 87 are adapted to fit in the horizontally aligned recesses seen in FIG. 8 when the axis of the clamp 67 and held roller element are vertically arranged and in the vertically aligned recesses seen in FIGS. 7 and 8 when the axis of the clamp and held roller are horizontally arranged. When the clamp 67 is rotated to a new position by virtue of the cam action, the spring 76 is also rotated. This forces the bulbular portions 87 to ride out of the engaged recesses in face 82 and therealong until they engage in the next recesses available in the direction of rotary movement. Block 83 is preferably made from Teflon or polyethylene to provide a self-lubricated surface for the bulbular portions to bear against during rotation of cam wheel 72,

although other suitable materials may obviously be employed.

The cam wheel **72** of each holder is provided with four cam arms that extend radially of the rotary axis of the wheel and the arms are arranged 90° apart. The cam surface **88** of each arm is inclined from the longitudinal axis of the arm. When the arm is is position for the cam surface to engage one of the fixed elements **74** and **75**, it extends downwardly and to the right, toward the leading edge of the holder, as seen in FIG. 9. In this position, the surface is vertically arranged and aligned to engage the fixed element. Upon engaging the element, the cam wheel and clamp are rotated 90° in the direction of arrow **90** as the carriage moves forward along the path and further rotation is restricted by the spring mechanism, once the cam surface becomes disengaged from the element. During the cam action, the next arm of the cam wheel is drawn down and placed in position to encounter the next fixed element along the circular path. Overall it requires two revolutions of the ring component **51** in order to rotate the cam wheel and clamp 360°.

The fixed elements **74** and **75** are elongated cylindrical members that are held by set screws **91** and **92** in suitable holes in a bracket **93**. Bracket **93** is supported beneath the ring **51** on the outer end of an elongated tubular component **94** of the frame. The inner end of component **94** is welded to the underside of plate **44**. As the carriage moves along the circular path, element **74** is the first element engaged by the cam wheels of the holders. This engagement causes the holders to first rotate 90°, thereby placing the held roller elements in a horizontally extending position, such as illustrated in FIGS. 1 and 2 by reference to holder **60**. Element **75** is spaced in advance of element **74** and is next to be contacted by the cam wheel of the holders as they move between units **31** and **32**. Upon such contact, the holder is again rotated another 90°. This completes the inversion of the clamp and places the untreated end portion of the net in an upstanding position for subsequent heat treatment in unit **32**.

The structure of the heating units **31** and **32** is similar and is best illustrated by reference to FIGS. 4 and 5. Each unit has arcuate inner and outer side walls **96** and **97** which are spaced and rigidly interconnected by a flat arcuate top wall **98**. These walls are covered exteriorly with insulation designated at **99**, and form an elongated open-bottom arcuate tunnel-like structure which is more or less inverted U-shape in cross section.

Unit **31** has a pair of elongated electrical resistance heating elements **100** and **101** which are hung from the top wall of the unit on spaced hangers designated at **102**. The elements are electrically connected in parallel in the circuit by end wires **103** and **104**. Unit **31** is bolted to metal straps **105** which are fixed upright at the outer ends of spaced radially extending tubular components **106** of the framework. Components **106** are welded to the underside of plate **44** and project outwardly to the straps at the underside of the annular ring **51**.

Unit **31** is arranged to cup the upper ends of the rollers between the sidewalls during their passage through the unit, and is supported on the framework in a manner such as to incline downward toward the ring **51** from the feed end **107** to the discharge end **108** of the unit. This is best illustrated in FIGS. 4 and 5 wherein it will be seen that the space **109** between the ends of the nets of the rollers depicted therein and the heating elements **100** and **101** remains about the same as the net ends shrink during the heating step and drawn down toward the end of the support element.

Unit **32** is similarly constructed and arranged an is supported on frame components **110** which are similar to components **106**. Like the elements **100** and **101** of unit **31**, the heating elements **111** and **112** of unit **32** are electrically connected in parallel by end wires **113** and **114** in the circuit. The heating elements of the respective units are connected in series in the electrical circuit by an electrical element which connects wires **113** and **104**. Wire **103** is connected to one side of an AC source of electricity by wire **116** and wire **114** is connected to the other side of the source by wire **117**.

Nozzles **120** and **121** are provided at the discharge ends of units **31** and **32** for directing fine sprays of cooling water on the heat treated roller ends as they emerge from the units. These nozzles **120** and **121** are supported on standards not shown, and are connected to a suitable source of fluid therefor.

The partially assembled rollers are delivered to the feed station **36** on a conveyor belt **122** seen in FIG. 2 and which is suitably supported in a position for the operator of the apparatus **10** to hand feed the partially assembled rollers to the clamps as they pass in front of the belt.

The discharge station **38** has an inclined chute **123** which is adapted to catch the rollers as they are dislodged from the clamps by discharge device **37**. Chute **123** is suspended from a depending bracket **124** which is connected to a tubular component of the frame. Component **125** is connected to the underside of plate **44** and extends outwardly from beneath the ring **51** as seen in FIG. 2.

The discharge device is also connected to bracket **124** and includes an elongated arm **126** that has an arcuately curved end **127**. The curved end **127** is arranged in the path of the elements held by the holders as they emerge from the discharge end of heating unit **32**. The curved end portion **127** is adapted and arranged to extend between the vertically spaced prongs of the clamp and between the element held by the clamp and the face of the clamp back plate as the holder advances from the discharge end of unit **32**. As such, the elongated arm is engaged by the clamped roller and the roller is dislodged from the grip of the clamp as the carriage mechanism moves the holder by the discharge device. The discharge device **37** has a wall component **128** that is offset from the outer face of the arm **126** and which is also connected at one end to bracket **124**. Wall **128** serves to deflect the dislodged roller into the feed end **129** of the chute suspended therebelow. Thereafter, the roller passes beneath the wall as it falls down the chute.

The operation of the apparatus is believed evident from the previous disclosure. Briefly, however, the empty holders **35** of the carriage mechanism enter the feed station **36** area of the apparatus with the prongs of the clamps aligned vertically. The partially assembled roller elements are hand fed to the empty holders thereat and at this point in the operation of the apparatus, the clamps hold the partially assembled rollers in a manner such that one of the end portions of the net component extends upright, whereas the other end portion extends downwardly. As each holder is thereafter conveyed into the feed end of unit **31**, the upright net end portion is radiantly heated and ultimately in the unit **31** to a temperature at which the filaments of the end portion start to shrink. This heat treatment continues as the end of the roller passes through unit **31**. As the roller emerges from the discharge end of unit **31**, the shrunken net end portion is rapidly cooled to ambient temperatures through contact with the spray from nozzle **120**. Thereafter the cam wheel of the holder encounters the fixed elements **74** and **75** and this inverts the clamp and roller element. In this inverted position, the untreated end portion of the net component extends upwardly and in a position to thereafter be subjected to the heat shrinking process accorded the element in unit **32**. The heat treatment step carried out in unit **32** is like that carried out in unit **31** and upon emerging from the discharge end of the unit **32**, the shrunken net end portion is similarly cooled to ambient temperatures through contact with the spray from nozzle **121**. Thereafter, the roller is dislodged from the

holder by device 37 and is discharged from the apparatus via chute 123.

While only a certain preferred embodiment of the invention has been shown and described by way of illustration, many modifications will, of course, occur to those skilled in the art and it is therefore desired that it be understood that it is intended in the appended claims to cover all such modifications as fall within the true spirit and scope of the invention.

What is claimed as new and what is desired to be secured by Letters Patent of the United States is:

1. In a process of assembling a hair roller from components that include: an elongated hollow tubular net component made from flexible filaments and which component has opposite meshed end portions and a meshed wall portion therebetween on which the hair is wound by the user, and an elongated support component for supporting said wall portion against collapsing into the hollow of the net component during use of the roller; the improvement comprising steps of housing the support component in the hollow of said net component between said opposite meshed end portions, and thereafter treating the filaments of said opposite meshed end portions to shrink such filaments and thereby decrease the size of the openings into the hollow at the opposite ends of said tubular net component.

2. In a process of assembling a hair roller from components that include: an elongated hollow tubular net component made from flexible filaments and which component has opposite meshed end portions and a meshed wall portion therebetween on which the hair is wound by the roller user, and an elongated support component for supporting said wall portion against collapsing into the hollow of the net component during use of the roller; the improvement in accord with claim 1 wherein said flexible filaments are synthetic plastic filaments which contract in length at elevated temperatures, and wherein the treating step comprises heating the opposite end portions of the net component to said elevated temperatures.

3. In a process of assembling a hair roller from components that include: an elongated hollow tubular net component made from flexible synthetic plastic filaments that contract in length at elevated temperatures and which component has opposite meshed end portions and a meshed wall portion therebetween on which the hair is wound by the roller user, and an elongated support component for supporting said wall portion against collapsing into the hollow of the net component during use of the roller; the improvement comprising steps of inserting the support component in the hollow of the net component through one of the end openings of the net component thereinto and in a position between said opposite meshed end portions for supporting said wall portion, heat treating said meshed end portions at said elevated temperatures to shrink the filament lengths thereof and thereby decrease the size of said end openings, and immediately after said heat treating step, rapidly cooling said mesh end portions to ambient temperatures.

4. In a process of assembling a hair roller from components that include: an elongated hollow tubular net component made from flexible filaments and which component has opposite meshed end portions and a meshed wall portion therebetween on which the hair is wound by the roller user, an elongated helical support component having spaced convolutions and being adapted for supporting the meshed wall portion in the hollow of the next component against collapsing thereinto during use of the roller, and an elongated brush component adapted for axial placement in the helical support component and having bristles arranged to extend between the spaced convolutions and through the meshes in said wall portion; the improvement comprising housing the support component in the hollow of said net component between said opposite meshed end portions, thereafter shrinking the filaments of one of said opposite meshed end portions to thereby diminish the size of the opening into the hollow of said tubular net component thereat, and thereafter inserting the brush component into the housed support component through the diminished size opening of said tubular net component.

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