Aug. 8, 1967 G. BEHRENS 3,334,638

HAIR CURLER WITH VARIABLY PROTRUDING PRONGS

Filed Oct. 31, 1963 2 Sheets-Sheet 1

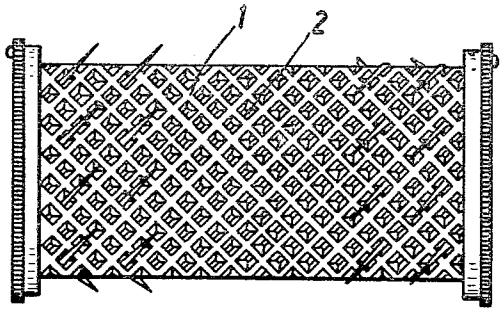


Fig.1

Fig.2

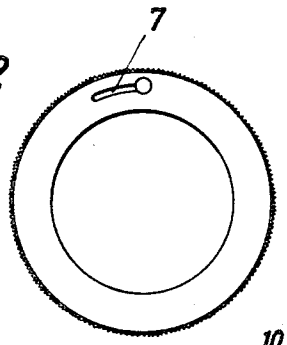
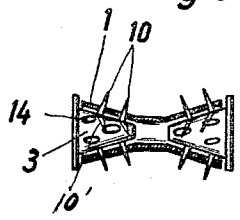


Fig.5



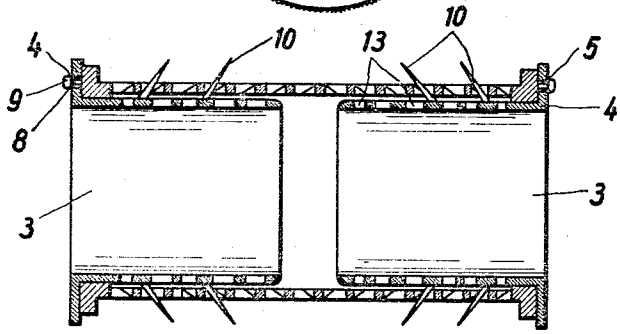


Fig.3

Fig.4

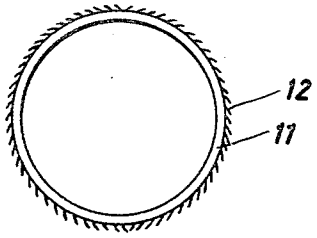
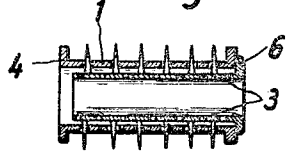


Fig.6



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HAIR CURLER WITH VARIABLY PROTRUDING PRONGS

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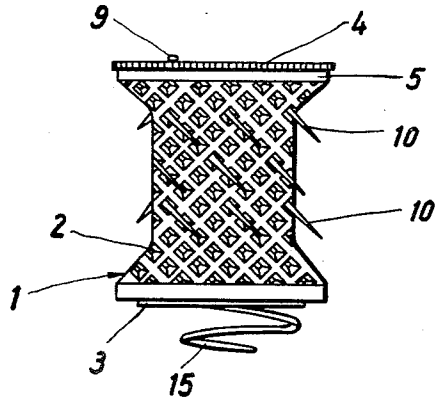
Fig. 7



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3,334,638

HAIR CURLER WITH VARIABLY PROTRUDING PRONGS

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17 Claims. (Cl. 132—40)

The present invention relates to hair curlers.

Hair curlers are used for making permanent waves as well as in general for hair settings of many different types. In general, such hair curlers are of a generally cylindrical configuration and locks of hair are wound onto the hair curlers so that with the aid of suitable treating liquids a desired hair setting can be obtained.

Problems are encountered, however, with respect to holding the hair curlers in place as well as with respect to locating a large number of hair curlers very close to each other in a selected relationship relative to each other. At the present time, for example, it is necessary to use with hair curlers, rubber bands, hair pins, or the like which must be applied to the hair curler after the hair is curled thereon for the purpose of holding the hair curlers in place, and this attaching of a holding device to the hair curler is an extreme inconvenience not only because of the operations involved, but also because of the room required for carrying out these operations, this room oftentimes making it extremely difficult to locate the hair curlers close to each other. Some known hair curlers have as parts thereof fastening devices for fastening the curlers to the hair once the hair is curled thereon and such fastening devices may take the form, for example, of elongated bars which are pivoted at one of their ends to the curler and are swingable to and from the hair curler for locking and unlocking the hair curler, but such devices make the use of the hair curler extremely awkward and inconvenient because during curling of the hair it is necessary for such devices to project from the hair curler and these devices interfere with the convenient rapid performing of the operations. Some hair curlers have axially projecting elements which when the hair curler has been placed in the proper position are shifted inwardly to lock the hair curler to the hair, but these devices, of course, cause the assembly to take up much more space during curling of the hair thereon than when the hair curling is locked in position so that it is not possible with such devices to locate the hair curlers very close to each other and here again the operations are made awkward and inconvenient because of these axially projecting elements.

It is accordingly a primary object of the present invention to provide a hair curler which will avoid the above drawbacks.

Thus, it is an object of the present invention to provide a hair curler which will occupy the same space when locked to the hair as when the hair is curled thereon so that the structure of the invention is extremely convenient to use and makes it possible for a large number of hair curlers to be located very close to each other.

A further object of the present invention is to provide

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a hair curler which can become securely fastened to and released from the hair by a simple quick manipulation which is very easy to perform.

Yet another object of the present invention is to provide a hair curler which is capable of accomplishing the above objects and at the same time does not interfere in any way with the thorough treatment of the hair by the treating liquids. In particular, the hair curler of the invention does not clamp the hair in a manner similar to clamping of hair by elastic bands, hair pins, or the like. This latter type of clamping, on the one hand, results in non-uniform treatment of the hair, on the other hand, introduces undesired nicks or bends in the hair, and furthermore often results in breaking of the hair.

An additional object of the present invention is to provide a hair curler which is simple and inexpensive to manufacture from readily available plastic material which cannot be attacked by the chemical solutions used in the treatment of the hair.

It is also an object of the present invention to provide a hair curler the components of which will reliably remain assembled together.

Also, it is an object of the present invention to provide one type of hair curler suited for normal curls and another type which is particularly suited for pin curls or the like. The term "pin curls" is intended to refer to curls in the form of ringlets or the like which are curled about an axis which extends perpendicularly with respect to the scalp, whereas normal curls have an axis which extends substantially parallel to the skin of the scalp.

It is furthermore an object of the present invention to provide a hair curler which will cling to the hair during the curling of hair thereon so as to render the curling operation more convenient.

Still another object of the present invention is to provide a hair curler construction which makes it immaterial in which direction the hair curler is turned and immaterial whether the hair curler is held in one position or in a second position which is turned end-for-end with respect to said one position.

With the above objects in view the invention includes, in a hair curler, an outer tubular member, having a wall formed with a plurality of openings passing therethrough, and an inner member located within said outer tubular member and being turnable therein. A plurality of flexible springy prongs are fixed to the inner member and project therefrom into at least some of the openings, respectively, of the outer member. Thus, by turning of these members one relative to the other it is possible to control the extent to which the prongs project beyond the outer member, and these members are turnable one relative to the other between angular positions in one of which the prongs are completely retracted into the outer member and in the other of which the prongs project to a maximum extent beyond the outer member. Thus, with this structure of the invention it is possible when the prongs are completely retracted to curl the hair in the usual way, and when it is desired to fix the curler to the hair it is only necessary to turn the inner member so as to cause the prongs to project into the hair which surrounds the curler and thus fix the latter to the hair. Since the inner member is located within the outer mem-

ber and need only be turned relative thereto there are no elements projecting axially beyond the curler to interfere with the operations.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 shows one possible embodiment of a hair curler of the present invention in a side elevation;

FIG. 2 is an end view of the hair curler of FIG. 1;

FIG. 3 is a longitudinal sectional illustration of the hair curler of FIG. 1;

FIG. 4 is a schematic illustration of a possible variation of the structure of FIGS. 1–3;

FIG. 5 is a longitudinal sectional illustration of another embodiment of a hair curler according to the invention,

FIG. 6 is a longitudinal sectional illustration of a further embodiment of a hair curler according to the invention, and

FIG. 7 shows in elevation a hair curler particularly adapted for forming pin curls.

Referring to FIGS. 1–3, the hair curler illustrated therein includes an outer tubular member **1** which is of a generally cylindrical configuration and which has formed in its wall a plurality of openings **2** passing therethrough, as shown in FIGS. 1 and 3. These openings **2** can be uniformly or non-uniformly distributed over the outer tubular member **1**.

In the FIGS. 1–3 a pair of inner members **3** are located in the interior of the outer tubular member **1**, and these members **3** are freely turnable relative to the outer tubular member **1**. As is particularly apparent from FIG. 3, each inner member **3** is located almost entirely within the outer member **1**. Each member **3** is provided at one end with an outwardly directed annular flange **4**, and these flanges **4** respectively overlap and are located next to the end faces of the tubular member **1**, as shown in FIG. 3. Of course, whether or not the ends of the tubular member **1** are also flanged is immaterial.

As may be seen from FIG. 6 it is also possible to arrange only one inner member **3** within the outer member **1** and in this case the inner member **3** has a flange **6** overlapping one end of the outer member **1** while the flange **4** at the other end of the hair curler is integral with the member **1**. Of course, where a single inner member is provided, as shown in FIG. 6, this inner member will extend substantially along the entire length of the outer member.

The members **3** of FIGS. 1–3 are, of course, turnable independently of each other. A pair of pin-and-slot means respectively connect the members **3** to the member **1**. Each pin-and-slot means includes a pin **8** fixed to an end face of the tubular member **1** and extending through an arcuate slot **7** formed in the flange **4** of each member **3** (FIG. 2), and at the exterior surface of the flange **4** the pin **8** has an enlarged head **9** of a cross-section greater than the width of the slot **7** which extends along a circle whose center is in the turning axis of the member **3**. The members **1** and **3** are made of a springy yieldable plastic material so that it is possible for the enlarged head **9** of the pin **8** to yield and be deformed while being pushed through the slot **7** and the head **9** springs back to its original configuration after having passed through the slot **7** so that in this way the parts are reliably held in their assembled condition. Moreover, the length of the slots **7** determines the extent to which the members **1** and **3** can be turned one relative to the other, these members having relative to each other end positions where the ends of the slots **7** respectively engage the pin **8**.

The inner members **3** fit with a relatively large clearance in the outer member **1**, and a plurality of flexible springy prongs **10** are fixed to the exterior surface of the members **3** and project therefrom into at least some of the openings of the member **1**, respectively, and in the position of the parts shown in the drawings these prongs **10** project substantially beyond the exterior surface of the outer member **1**. The prongs **10** may be formed integrally with the members **3** and can be uniformly or non-uniformly distributed thereover. With the embodiment of FIGS. 1–3 the prongs **10** of the pair of members **3** are oppositely inclined, which is to say the prongs **10** carried by one of the members **3** are inclined oppositely to the prongs **10** carried by the other of the members **3**, and as it apparent from FIGS. 1 and 3, the tips of the prongs connected to one of these members **3** are directed toward the tips of the prongs **10** connected to the other of the members **3**. Moreover, as is apparent from FIG. 1, the prongs extend helically with respect to the members **1** and **3**, and in addition, it will be noted that the openings **2** are provided with surface portions which give these openings a configuration conforming generally to the directions in which the prongs **10** extend so that the prongs **10** shift very easily through the openings **2**. Thus, it will be seen that the two groups of prongs **10** are directed toward the center of the curler and thus when the members **3** are turned so as to extend the prongs **10** outwardly beyond the exterior surface of the member **1** these prongs **10** will enter into the hair on the curler in opposed directions providing a very secure connection of the curler to the hair.

In the embodiment of FIG. 7 where the curler is adapted to be used for making pin curls the lower end of the curler of FIG. 7 is adapted to be placed next to the scalp and in this case all of the prongs **10** are directed toward the scalp. The members **3** of FIGS. 1 and 3 can be turned in opposite directions for displacing the projections **10** outwardly beyond the outer member **1** and it is clear that whether the curler is used in the position shown in FIG. 1 or turned end-for-end is immaterial. In order to retract the prongs **10** the members **3** are simply turned in the opposite directions, and these prongs **10** can be retracted all the way into the outer member **2**, the clearance between the members **3**, on the one hand and the member **1**, on the other hand, being sufficiently great to accommodate the prongs **10** in this clearance space. In order to facilitate turning of the members **3** the outer peripheries of the flanges **4** are knurled. When the hair is curled on the curler the prongs **10** are entirely retracted so that they do not in any way interfere with the curling operations. In order, however, for the surface **11** of the curler to reliably remain connected with the tips of the hair so as to render the starting of the curling operations convenient to carry out, the exterior surface **11** of the tubular member **1** is provided with integral bristles **12** (FIG. 4) so that these bristles will reliably maintain the tips of the hair in engagement with the curler. As is apparent from FIG. 4 the bristles **12** are divided into at least two groups with the bristles of one group extending circumferentially in a direction opposite from the bristles of the other group. As a result of this feature the curler can be turned in either direction during the curling operations. Thus, the operator can hold the curler at either end and the curling operations will be efficiently carried out. After the hair has been curled onto the curler the inner members **3** are turned so as to cause the prongs **10** to project into the hair for securely holding the curler on the hair. Of course, the extent to which the prongs **10** project from the outer member **1** can be regulated by the extent of turning of the members **3** relative to the member **1**. Because of the flexibility of the prongs **10** they are easily bent into a position lying against the inner surface of the tube **2** and the outer surface of the members **3** when the prongs are completely retracted. The prongs **10** and the members **3** are made of a suitable plastic, such as polyethylene, for example, or any other readily available plastic which will not be attacked by the chemicals and

which has the desired flexibility and resiliency. It is, of course, possible to provide at the exterior surface of the members **3** cutouts **10'** located behind the members **10** and receiving them when the members **10** are retracted (see FIG. 5), so that with such construction the outer diameters of the members **3** can be approximately equal to the inner diameter of the member **1**, and the play between the inner and outer members can be greatly reduced. In such a construction the cutouts would also extend spirally.

As is apparent from FIG. 5 the invention is also applicable to that type of curler which is not cylindrical but instead has a central portion of a minimum diameter and diverges from the central portion toward both ends. Such a construction is, of course, particularly suitable for permanent waves, and in this case the inner members **3** are solid rather than hollow and have the frustoconical configuration shown in FIG. 5. In this embodiment the flanges **4** at the ends of the members **3** are made relatively large and extend to a greater extent beyond the exterior surface of the outer member **1** so that it is easier to turn the members **3**, and here again the outer peripheries of the flanges are knurled.

In all embodiments the liquid treating materials can flow freely through the curler so as to provide a thorough treatment of the hair, and also such treating fluids include streams of warm air used for drying. Thus, it will be seen that the members **3** of FIGS. 1–3 are formed with openings **13** so that these openings together with the openings **2** provide for free passage of fluid through the curler, and in FIG. 5 the outer tubular member **1** is also provided with a large number of openings and the inner solid members **3** are formed with openings **14** of relatively large size passing therethrough so that even with the solid inner members **3** an unobstructed passage of treating fluid is guaranteed.

In the embodiment of FIG. 6 the single inner member **3** is provided with prongs shown in FIG. 6, and while these prongs are not inclined toward one or the other of the ends of the curler they may be inclined in a manner similar to the bristles **12**.

As has been mentioned above the embodiment of FIG. 7 is particularly adapted for making pin curls. This embodiment may have a single inner member **3**, as was the case with FIG. 6, and FIG. 7 clearly illustrates how the prongs **10** of such construction extend spirally. The member **3** of FIG. 7 has a single flange **4** at its upper end, and this flange **4** is connected to the outer tubular member **1** through a pin-and-slot connection as described above. In this embodiment the lower end of the inner member, as viewed in FIG. 7, is integrally formed with an elongated projection **15** of spiral configuration, so that when the member **3** is turned relative to the member **1** for causing the prongs **10** to project into the curler the prong **15** will also turn itself into the hair so as to provide a very secure connection of the pin curler to the hair.

It is to be noted that with the structure of the invention not only can a large number of curlers be placed very close to each other extending in any desired direction without any particular care being taken by the operator to grasp one or the other of the ends of the hair curler, in addition, when it is desired to remove the hair curler the retraction of the prongs **10** all the way into the interior of the outer tube, **1** makes separation of the curlers from the hair very simple and easy to carry out and prevents pulling of any hair with the curler.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of curlers differing from the types described above.

While the invention has been illustrated and described as embodied in hair curlers, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. A hair curler comprising, in combination, a tubular member having a wall formed with a plurality of openings passing therethrough; carrier means including two independent carriers extending from opposite sides into the interior of said tubular member and each being turnable therein; and two groups of springy flexible prongs, each of said groups of springy flexible prongs fixed to one of said carriers rotatable together with the same and projecting therefrom through at least some of the openings of said tubular member in a direction inclined to the prongs of the other of said groups of prongs in at least one angular position of the respective carrier relative to said tubular member, so that each of said independent carriers may be turned relative to said tubular member into said one angular position for extending said prongs beyond the exterior of said tubular member and from said one angular position into another angular position for withdrawing said prongs from said extended position thereof.

2. A hair curler comprising, in combination, an outer tubular member having a wall formed with a plurality of openings passing therethrough; a perforated inner tubular member extending into the interior of said outer tubular member and being turnable therein; and a plurality of springy flexible prongs fixed to said perforated inner tubular member and projecting therefrom through at least some of the openings of said outer tubular member, respectively, beyond the exterior surface thereof in at least one angular position of said perforated inner tubular member relative to said outer member, so that said members may be turned one relative to the other for retracting said prongs toward the interior of said outer member and for extending said prongs beyond the exterior of said outer member, said perforated inner tubular member being located substantially entirely within said outer member and having an end accessible adjacent an end of said outer member for turning said perforated inner tubular member relative to said outer member.

3. A hair curler comprising, in combination, an outer tubular member having a wall formed with a plurality of openings passing therethrough; a perforated inner tubular member extending almost entirely into the interior of said outer member and being turnable therein, said perforated inner tubular member having at one end a flange overlapping an end of said outer member so that said flange is accessible to the operator for manually turning said perforated inner tubular member relative to said outer member; and a plurality of springy flexible prongs fixed to and projecting from said perforated inner tubular member into some of said openings of said outer member, respectively, so that the extent to which said prongs project outwardly of the said outer member can be regulated by turning of said perforated inner tubular member relative to said outer member.

4. A hair curler comprising, in combination, an outer tubular member having a wall formed with a plurality of openings passing therethrough and said wall carrying at its exterior surface a plurality of bristles, a perforated inner tubular member located in the interior of said outer member and being turnable therein; and a plurality of springy flexible prongs fixed to said perforated inner tubular member and extending into at least some of said openings of said outer member so that by turning one of said members relative to the other the extent to which

said prongs project beyond the exterior surface of said outer member can be regulated.

5. A hair curler comprising, in combination, an outer tubular member having a wall formed with a plurality of openings passing therethrough and said wall carrying at its exterior surface a plurality of bristles, said bristles being divided into at least two groups which respectively extend in opposite circumferential directions at the exterior of said tubular member; a perforated inner tubular member located in the interior of said outer member and being turnable therein; and a plurality of spring flexible prongs fixed to said perforated inner tubular member and extending into at least some of said openings of said outer member so that by turning one of said members relative to the other the extent to which said prongs project beyond the exterior surface of said outer member can be regulated.

6. A hair curler comprising, in combination, an outer tubular member having open ends and a wall formed with a plurality of openings passing therethrough; a pair of inner members located in said outer tubular member adjacent said open ends thereof, respectively, and being turnable relative to said outer tubular member; and a plurality of springy flexible prongs fixed to each inner member and projecting therefrom into at least some of said openings of said outer tubular member so that the extent to which said prongs project beyond said outer tubular member can be regulated by turning of said inner members relative thereto, the prongs which are connected to one of said inner members being inclined oppositely to the prongs which are connected to the other of said inner members.

7. A hair curler as recited in claim 6 and wherein the tips of the prongs connected to one of said inner members are directed toward the tips of the prongs connected to the other of said tubular members.

8. A hair curler comprising, in combination, an outer tubular member having a wall formed with a plurality of openings passing therethrough; a plurality of springy flexible prongs extending from the interior of said tubular member into at least some of the openings thereof, respectively; and an inner member located in the interior of and turnable with respect to said outer member, said inner member fixedly carrying said prongs so that turning of said members one relative to the other will control the extent to which said prongs project beyond said outer member, said inner member being hollow and having a wall formed with openings passing therethrough so that liquid treating agents can pass through both of said members.

9. A hair curler comprising, in combination, a flexible plastic outer tubular member having a wall formed with a plurality of openings passing therethrough; a flexible plastic tubular perforated inner member located within said outer member and being turnable relative thereto; and a plurality of flexible springy prongs fixed to said tubular perforated member and projecting therefrom into at least some of said openings of said outer member so that the extent to which said prongs project beyond said outer member can be regulated by turning of one of said members relative to the other.

10. A hair curler, comprising, in combination, an outer tubular member having a wall formed with a plurality of openings passing therethrough and having at least one open end; a perforated inner tubular member extending into said outer member and being turnable therein, said perforated inner tubular member having at one end an outwardly directed annular flange overlapping an end face of said outer member at said open end thereof; pin-and-slot means operatively connected to said flange and said end face of said outer member for connecting said members to each other and for limiting the extent of turning of said members one relative to the other; and a plurality of springy flexible prongs fixed to said perforated inner tubular member and extending into at least some of said openings, respectively, so that the extent to which said prongs project beyond the exterior of said outer tubular member can be regulated by turning of one of said members relative to the other.

11. A hair curler as recited in claim 10 and wherein said pin-and-slot means includes a portion of said flange formed with an arcuate slot extending along a circle whose center is in the turning axis of said carrier means member and a pin fixed to said end face of said outer member, extending through said slot, and having a head end of a cross-section greater than the width of said slot.

12. A hair curler comprising, in combination, a perforated inner tubular member; a plurality of springy flexible prongs projecting angularly from the exterior of said perforated inner tubular member; and an outer member surrounding said perforated inner tubular member and being turnable relative thereto, said outer member being formed with a plurality of openings and said prongs extending into at least some of said openings, respectively, so that the extent to which said prongs project beyond said outer member can be regulated by turning of said members one relative to the other, said openings being defined at least in part by surface portions of said outer member which extend in the same general direction as said prongs to facilitate the movement thereof relative to said outer member.

13. A hair curler comprising, in combination, an outer tubular member having a wall formed with a plurality of openings passing therethrough; a plurality of flexible springy prongs extending from the interior of said tubular member into at least some of said openings; and a perforated inner tubular member located within said outer member and being turnable with respect thereto and fixedly carrying said prongs, so that the extent to which said prongs project beyond said outer member can be regulated by turning of one of said members relative to the other, said perforated inner tubular member being formed at its exterior surface with a plurality of cutouts respectively located behind said prongs for receiving said prongs, at least in part, during retraction of said prongs into the interior of said outer tubular member.

14. A hair curler as recited in claim 13 and wherein the outer diameter of said perforated inner tubular member is approximately equal to the inner diameter of said outer member.

15. A hair curler as recited in claim 13 and wherein said cutouts extend helically relative to said perforated inner tubular member.

16. A hair curler one end of which is adapted to be placed next to the scalp for forming pin curls or the like, comprising, in combination, an outer tubular member having a wall formed with a plurality of openings passing therethrough; an inner member loacted almost entirely within said outer member and having an end adapted to be located next to the scalp; a plurality of springy flexible prongs fixed to said inner member and projecting therefrom into at least some of said openings, respectively, so that the extent to which said prongs project beyond said outer member can be regulated by turning of one member relative to the other; and an elongated flexible springy prong of spiral-shaped configuration fixed to said end of said inner member and projecting therefrom at the exterior of said outer member.

17. A hair curler comprising, in combination, an outer tubular member having a wall formed with a plurality of openings passing therethrough; a perforated inner tubular member located within said outer member and turnable therein; and a plurality of springy flexible prongs fixed to said perforated inner tubular member and projecting therefrom into at least some of said openings of said outer member so that the extent to which said prongs project beyond said outer member can be regulated by turning of one of said members relative to the other, said perforated inner tubular member having with respect to said outer member one angular position where said prongs project to a maximum extent beyond said outer mem-

ber and another angular position where said prongs are completely retracted into the interior of said outer member and are located between the latter and said perforated inner tubular member.

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