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Sliman, Sr.

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[54] **HAIR DRYING APPARATUS AND METHOD**

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[52] **U.S. Cl.** **132/40;** 132/9

[51] **Int. Cl.²** **A45D 2/00**

[58] **Field of Search** ..... 132/40, 42, 33 R, 37, 9, 132/7; 34/95, 96

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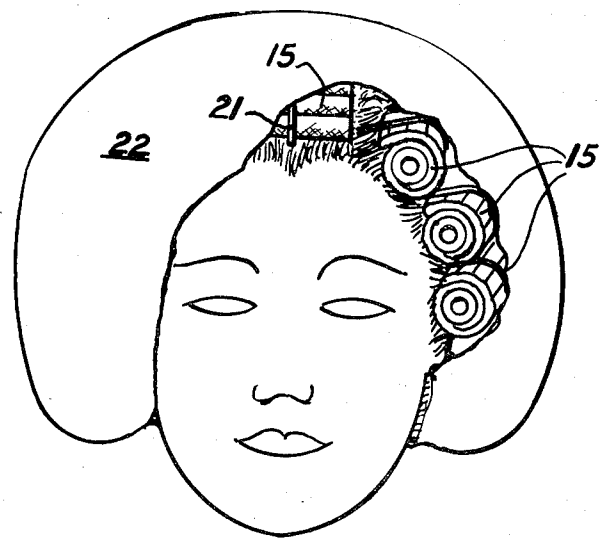
Primary Examiner—G. E. McNeill

Attorney, Agent, or Firm—D. Paul Weaver

[57] **ABSTRACT**

Sections of wet hair on the head are rolled within, around or onto a form or roller which carries an adsorbent element, package or mass, either in a preheated or cool state. The adsorbent may be in the form of molecular sieves or may be a desiccant such as silica gel. In any case, a regenerative adsorbent is employed. Adsorption of moisture from the hair takes place rapidly through intimate contact of the hair with the foraminous wall of the adsorbent container. The hair may be dried in much less time than is required with conventional methods and damage to the hair due to blown hot air is avoided. The invention offers a natural and gentle drying process which is very rapid accompanied by some degree of hair waving.

6 Claims, 11 Drawing Figures



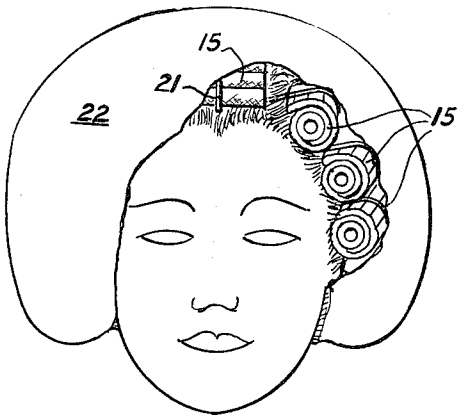


FIG. 1

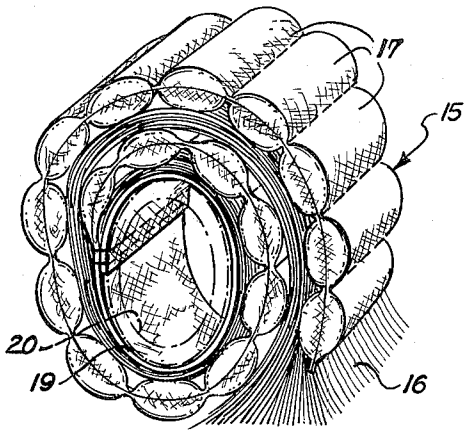


FIG. 2

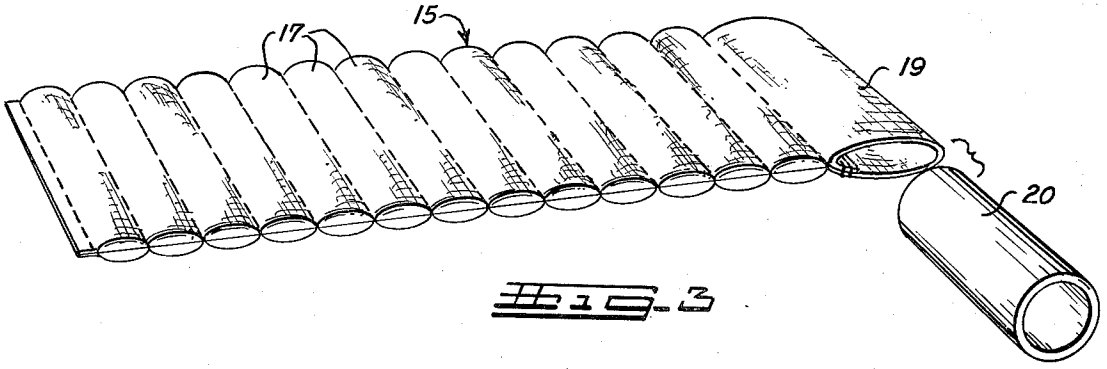


FIG. 3

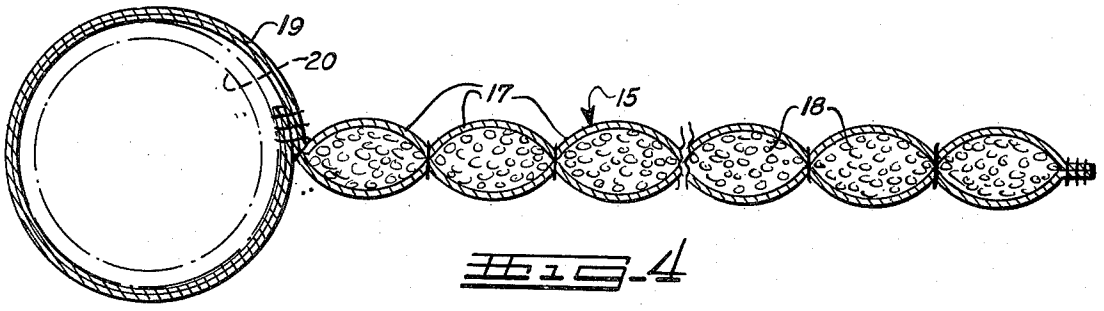


FIG. 4

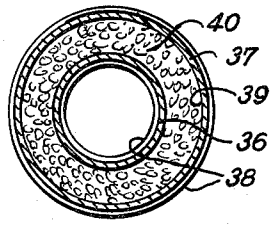


FIG. 10

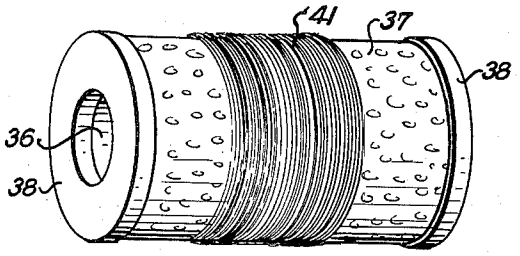


FIG. 11

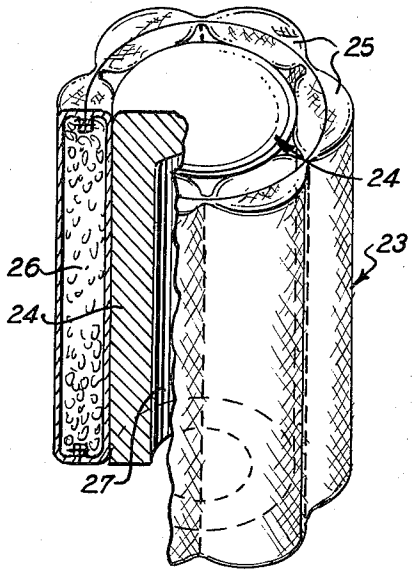


FIG. 5

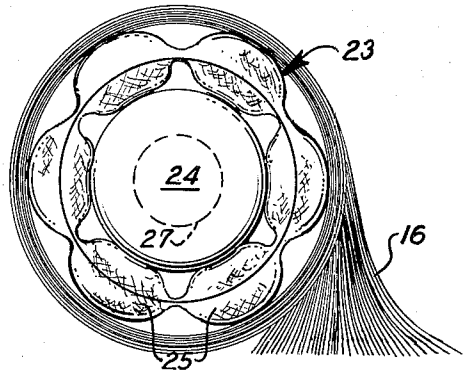


FIG. 6

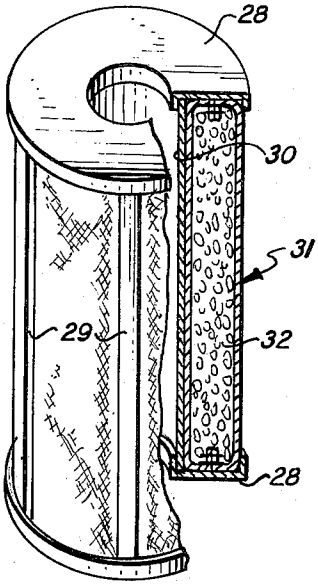


FIG. 7

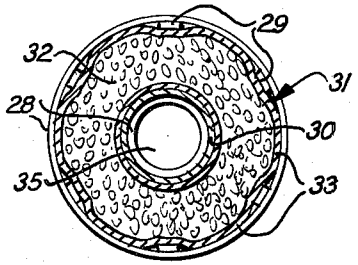


FIG. 8

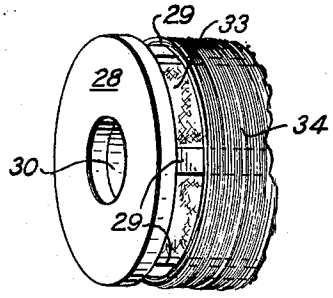


FIG. 9

HAIR DRYING APPARATUS AND METHOD

BACKGROUND OF THE INVENTION

Many arrangements are described in the prior art pertaining to drying hair on the head or to drying operations combined with other hair treatments, such as curling, waving and body building. Some such procedures involve the preheating of roller forms of various types either by dry heating means or with steam, followed by wrapping the hair sections around the preheated roller, clipping and then waiting for the hair to dry or set. Typically, in a beauty parlor, after the customer's hair is washed and put up in rollers on the head, a drying time of as much as an hour is required and considerable discomfort to the customer is involved due to the blown hot air. It is also known that repeated hot air drying of hair can seriously damage it, resulting in split ends, loss of protein, oil and other vital constituents. Additionally, the conventional hot air drying of hair at home or in a beauty parlor substantially immobilizes the subject for a considerable length of time.

Putting the hair up in preheated or unheated rollers without hot air drying allows the subject to move about freely but requires an unduly long time for drying, which is very unsatisfactory. Some individuals sleep with the hair up in rollers but many find this intolerably uncomfortable. In the day time, walking around with one's hair in rollers or curlers is obviously undesirable.

At the present time, no commercially acceptable method or means for hair drying, other than the above conventional procedures, is available and there is a great demand and need for an improved, safe, comfortable and rapid hair drying procedure which could be employed in the home or commercial establishments. It is the objective of the invention to fully satisfy this need by providing an extremely simple and economical apparatus and method for drying the hair which is easy to employ, rapid in operation in comparison to known methods, safe and convenient. The essential elements of the hair drying apparatus are indefinitely reusable following a simple heat regeneration of the adsorbent element after each use thereof. Extremely efficient adsorbents are employed for the sake of minimum hair drying and adsorbent regeneration times at temperatures which can be easily achieved without elaborate equipment. For example, the adsorbent employed in the method can be regenerated in a household oven or even in a popcorn popping apparatus or with the heat produced by a large incandescent light bulb within a suitable enclosure.

The invention structure may be provided in several different forms or embodiments, several of which are compatible with well known commercial heaters for hair rollers. The drying method in the invention is somewhat more efficient when the adsorbent structure is in a preheated state but may be satisfactorily practiced at room temperature. In no case is excessive or uncomfortable heating far above body temperature and likely to damage the hair required.

Other features and attributes of the invention will become apparent during the course of the following description.

BRIEF DESCRIPTION OF DRAWING FIGURES

FIG. 1 is a front elevational view showing the head of a user of the invention and illustrating generally how the apparatus is employed in the method.

FIG. 2 is a perspective view showing one structural form of the invention applied to a section of hair on the head.

FIG. 3 is a perspective view of the structure in FIG. 2 removed from the hair and shown in an extended position suitable for regeneration.

FIG. 4 is an enlarged fragmentary longitudinal cross section through the structure in FIG. 3.

FIG. 5 is a perspective view, partly in section, showing a modified embodiment of the invention.

FIG. 6 is an end elevational view of the structure in FIG. 5 with a hair section wound upon it for drying.

FIG. 7 is a view similar to FIG. 5 showing a second modification of the invention.

FIG. 8 is a cross sectional view of the structure in FIG. 7.

FIG. 9 is a fragmentary perspective view of the same structure with hair wound thereon for drying.

FIG. 10 is a cross sectional view of a further modified form of the invention.

FIG. 11 is a perspective view of the same.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to the drawings in detail wherein like numerals designate like parts, the numeral 15 designates an elongated flexible body portion or package containing an adsorbent and adapted to be applied to a section of hair 16 in rolled or coiled form as illustrated in FIGS. 1 and 2. The body portion 15 is formed of foraminous fabric, such as woven fiberglass or other similar durable heat-resistant material. The fabric employed could be knitted or could be formed by other conventional nonwoven techniques. The main requirements are that the fabric or material making up the body portion 15 be capable of holding and confining the crystalline adsorbent material while being permeable to air and possessing a relatively high degree of tensile strength and resistance to heat and abrasion during repeated usages. Woven fiberglass fabric is thought to be ideally suitable for making the body portion 15 which is in the nature of a fabric envelope. While dimensions are not critical, the overall flat length of the body portion 15 may be approximately 9 to 10 inches and its width approximately 2½ inches for convenience of use.

The fabric body portion 15 or envelope is constructed with stitching or the like to form a plurality of equally-sized separated generally tubular transverse closed pockets or compartments 17, each adapted to contain a filling or mass 18 of an efficient crystalline adsorbent. Ideally, molecular sieves are employed within the pockets 17 as the adsorbent and these molecular sieves are crystalline metal aluminosilicates with the threedimensional interconnecting network structure of silica and alumina tetrahedra. The molecular sieves employed are manufactured and sold by Pigments, Additives and Adsorbents Dept./Davison Chemical Division/W. R. Grace and Co., 101 N. Charles St., Baltimore, Maryland 21203. Preferably, the particular molecular sieves utilized are spheres designated Davison Grade 527 having a nominal size 20–50 mesh U.S. Standard Sieves. This particular adsorbent has the ability in the invention to completely dry the hair in approximately twenty minutes or less. After each hair drying use, the adsorbent is regenerated while within the fabric envelope 15 by heat regeneration for approximately 4 hours at a temperature of ap-

proximately 500°F. This regeneration may be carried out conveniently in a household oven or other convenient heating device. After regeneration, the molecular sieves are allowed to cool to a sufficiently low temperature somewhat above normal body temperature so as to be comfortable to the user during the next hair drying cycle. If preferred, the adsorbent may be utilized to dry the hair at normal room temperature, but will be somewhat more efficient if employed at slightly elevated temperatures but not above the comfort range such as 120°F. approximately. The body portion **15** containing the molecular sieves within the pockets **17** may always be prewarmed by the user before use.

An alternative adsorbent slightly less desirable than the molecular sieves may also be employed within the pocketed fabric body portion **15.** This alternative adsorbent is silica gel, another regenerative adsorbent, consisting essentially of amorphous silica. This material is also available from Davison Chemical Division/W. R. Grace and Co. as Blue Indicating Gel, Grade 42, Type RD, particle size 6–16 (Tyler Sieve). Similar material is manufactured and sold by Mc/B Manufacturing Chemists, 2909 Highland Ave., Norwood, Ohio. Any good commercial grade of silica gel will satisfy the requirements of the invention.

While silica gel has a considerably shorter heat regeneration time than molucular sieves, namely, 30 to 45 minutes at about 300°F., the hair drying time is somewhat greater than with the molecular sieves, namely, about 30 minutes as compared to 20 minutes or less with molecular sieves.

At one end of the flexible body portion **15,** an enlarged open-ended fabric sleeve **19** is formed, and adapted to receive removably a rigid tubular form **20,** such as a conventional plastic or metal hair roller. During use of the invention, as illustrated in FIGS. **1** and **2,** the form or roller **20** is slipped into the sleeve **19,** see FIG. **4,** to provide a basic form for the hair section **16.** The flexible body portion **15** is then rolled or coiled around the cylindrical form with the hair section **16** simultaneously rolled up therein between the contacting generally concentric coils or layers of the structure **15,** as shown graphically in FIG. **2.** A plurality of the invention units are shown applied to the head of a user in FIG. **1,** with the individual units anchored temporarily to the head by any conventional clip **21.** When thus applied to the hair sections **16,** the latter are in intimate contact with the surfaces of the coiled foraminous fabric envelope or body portion **15** containing the efficient adsorbent **18.** When the hair is quite wet immediately following a shampoo and with the invention applied thereto in the manner described after proper regeneration of the adsorbent, the hair will be completely dried and ready for styling within about 20 minutes or less when molecular sieves are used and in a slightly greater time approximating 30 minutes when commercial silica gel is used as the adsorbent. The number of the invention units employed by the user is somewhat optional depending upon the quality and relative mass of the hair which must be dried, comfort and convenience requirements and the individual wishes of the user. A greater number of drying units, properly applied to a greater number of carefully separated hair sections, will naturally result in quicker and better drying than a fewer number of drying units carelessly employed with excessively large sections of hair.

It should be mentioned in connection with the structure **15** that the ends of the pockets **17** are closed and the entire fabric envelope is closed so that the crystalline adsorbent will not escape. The structure is very durable and may be reused for drying the hair almost indefinitely. The adsorbent should be regenerated after each usage to remove the adsorbate from the surfaces of the adsorbent crystals.

Additionally shown in FIG. **1** is a required element of the invention, namely, a cap **22** of loose-fitting fabric applied over the head and covering all of the invention units and enclosing them during the drying cycle. The cap is made of fabric which may "breathe" by allowing the passage therethrough of some air. The purpose of the cap is to exclude ambient humidity or moisture during the hari drying process while confining the warmth within the chamber formed by the cap and promoting the efficient adsorption of moisture from the wet hair by the crystalline adsorbent. Without the use of the cap **22,** the drying process would be much less efficient and seriously interfered with by surrounding moisture-laden air.

FIGS. **5** and **6** show a modification of the invention wherein a closed and compartmented flexible fabric body portion **23** in tubular form is telescopically mounted upon an internal rigid cylindrical form or roller **24** of metal, plastic, or the like. The element **23** may be secured frictionally to the form **24** so as to embrace it snugly or may be secured in any other preferred manner. The body portion **23** has separated pockets **25** similar to the pockets **17** and these are filled with one of the previously-described crystalline adsorbents **26,** as shown in FIG. **5.** The cylindrical wall of the internal form **24** may be thick to form a heat sink, if desired, and the form has a central bore **27** to receive a commercial-type heating element or spindle. During usage for drying the hair, FIG. **6,** the structure shown in FIG. **5** has the hair section **16** rolled thereon in the manner illustrated and the device may be clipped to the hair in a conventional way. The hair section **16** is in direct contact with the exterior of the adsorbent containing fabric structure **23** and the adsorbent draws the hair moisture through the fabric and deposits it onto the surfaces of the crystals to dry the hair in a rapid manner. Basically, the mode of operation is identical in both-described forms of the invention. The form shown in FIGS. **5** and **6** is somewhat more conventional in its mode of application to the hair and perhaps a bit easier to use. The form shown in FIGS. **1** and **2,** however, has the advantage of affording a greater contact surface between the hair section **16** and the coils of flexible body portion **15.** However, both embodiments are highly efficient in practice for drying the hair. The same requirement for regeneration of the adsorbent described in detail in the previous embodiment applies equally to the embodiment of FIGS. **5** and **6.** The construction of the form **24** with a thick wall to retain heat and the bore or cavity **27** to slip over a heating element is ideal for prewarming the unit.

FIGS. **7** to **9** show a third embodiment wherein a plastic or metal form comprises end caps **28** and a small number of widely spaced connecting bars **29,** such as five or six bars. The form or roller also embodies an inner sleeve **30** between the end caps **28** and spaced radially inwardly of the bars **29.** An annular prefabricated fabric envelope or package **31,** somewhat similar to the structure **23** but without the necessity for separated

compartments **25**, is slipped into the chamber defined by the bars **29** and sleeve **30**, see FIG. **8**. The end caps **28** are removable for this purpose. The fabric envelope **31** affords an annular chamber for the adsorbent **32** between its inner and outer fabric walls and the entire flexible package of adsorbent is retained between the spaced bars **29** and interior sleeve **30** with intervening portions **33** of the adsorbent package disposed between adjacent pairs of bars **29** for direct contact with hair **34**, FIG. **9**, wound about the structure in essentially the same manner shown in FIG. **6**. The same crystalline adsorbents requiring regeneration described in the prior embodiments are used in the form shown in FIGS. **7** to **9** with all of the attendant advantages. The structure in these figures is also adapted to receive through its central bore **35** a conventional heating element or spindle, such as one of the popular commercial devices for heating hair rollers.

FIGS. **10** and **11** show another embodiment of the invention wherein a cylindrical hair form or roller embodies inner and outer concentric foraminous sleeves **36** and **37** held in assembled relation by end caps **38** which are removable. The two sleeves may be metal or plastic. Between them is a single annular chamber **39** adapted to be filled with one of the described regenerative crystalline adsorbents **40**. This form of the invention eliminates the necessity for the flexible fabric envelope. The hair **41** is simply wound about the exterior foraminous sleeve **37** during the use of the device for drying the hair. For regeneration, the entire assembly can be placed in a heated chamber or oven.

It should be understood that the foraminous cap **22** shown only in FIG. **1** must be worn for proper efficiency of drying in all forms of the invention. It should also be understood that each form of the invention is utilized on the head in plural units as illustrated in FIG. **1**.

While not illustrated in the drawings, a further structure embodying the method could consist of a long flexible section of non-woven soft fibrous material, such as cellulosic material, capable of being coiled up into a supply roll and cut to length to produce a strip somewhat similar to the flexible body portion **15**. Such strip material would have embodied within it in dispersed relationship a multitude of crystals of either silica gel or molecular sieves so that the strip would have distributed throughout its mass a substantial amount of crystalline adsorbent. The cut-off strips would then be coiled with the hair in a manner similar to the showing in FIG. **2**.

Prior to assembling and use, the adsorbent, the fabric body portion and the rigid forming elements are washed with a glycerin base wetting agent followed by thorough drying of the components. This tends to increase the drying efficiency of the apparatus.

It is to be understood that the forms of the invention herewith shown and described are to be taken as preferred examples of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claims.

I claim:

1. Hair drying apparatus comprising a foraminous hair coiling form having a chamber for a mass of crystalline adsorbent and onto which a section of wet hair on the head may be coiled in direct contact with a foraminous portion of the form, said form consisting of a flexible fabric envelope having plural compartments for said crystalline adsorbent, and a flexible fabric sleeve element carried by one end of the envelope adapted to receive a substantially rigid hair roller element, and a cap formed separately from said form and adapted to be worn on the head enclosing a plurality of the forms with sections of wet hair coiled thereon and producing a drying chamber common to the forms while excluding ambient moisture.

2. Hair drying apparatus comprising a foraminous hair coiling form having a chamber for a mass of crystalline adsorbent and onto which a section of wet hair on the head may be coiled in direct contact with a foraminous portion of the form, said form comprising a substantially rigid sleeve body having a bore and a foraminous fabric compartmented envelope mounted on and surrounding said sleeve body and containing said crystalline adsorbent in the compartments thereof, and a cap formed separately from said form and adapted to be worn on the head enclosing a plurality of the forms with sections of wet hair coiled thereon and producing a drying chamber common to all of the forms while excluding ambient moisture from said chamber.

3. Hair drying apparatus according to claim **2**, and said fabric compartmented envelope comprising a sleeve element having plural separated sleeve-like compartments and being telescoped over said rigid sleeve body.

4. Hair drying apparatus comprising a foraminous hair coiling form having a chamber for a mass of crystalline adsorbent and onto which a section of wet hair on the head may be coiled in direct contact with a foraminous portion of the form, said form comprising a substantially annular sleeve-like fabric envelope containing said mass of crystalline adsorbent, a substantially rigid sleeve-like roller cage containing the fabric envelope and said adsorbent and supporting and maintaining the shape of the envelope, said cage having a bore adapted to receive a heating element, and a cap formed separately from said form and adapted to be worn on the head enclosing a plurality of the forms with sections of wet hair coiled thereon and producing a drying chamber common to all of the forms while excluding ambient moisture from said chamber.

5. Hair drying apparatus comprising in combination a plurality of drier units each having a chamber means substantially filled with a crystalline adsorbent, each drier unit adapted to receive a section of wet hair on the head in coiled contacting relation with the unit, each unit possessing a foraminous wall portion between said chamber and said section of wet hair in contact with the unit, and a non-porous moisture-impervious cap constructed as a separate element from the drier units adapted to be worn on the head in covering relationship to said plurality of units and sections of wet hair and forming a drying chamber common to all of said units while excluding ambient moisture from the common drying chamber during the drying of hair by said units.

6. Hair drying apparatus according to claim **5**, and each drier unit comprising a generally cylindrical element having inner and outer substantially concentric walls forming therebetween an annular chamber filled with said crystalline adsorbent, each unit additionally having imperforate end walls closing the ends of said annular chamber, and at least the outer cylindrical wall being perforated over a major part of its area.

* * * * *