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[54] **HAIR SETTING DEVICE**  
**8 Claims, 5 Drawing Figs.**

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**219/521, 219/542, 219/433**  
 [51] Int. Cl. .... **A45d 4/12,**  
**H05b 1/00**  
 [50] Field of Search .... **219/222-**  
**—226, 242, 385—387, 391, 392, 406, 407, 520,**  
**521, 433, 542; 132/33, 36, 39**

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**ABSTRACT:** An electrical open-mouthed oven is provided to heat hollow hair rollers which contain a heat storage material. This material undergoes a change of state as the rollers are heated in the oven. It regains its original state upon cooling with the user's hair wrapped around the rollers. At least a portion of each roller placed in the oven is adjacent a longitudinal strip heat sink which forms one internal wall of the oven. A graphite coated heating element is secured to the opposite surface of the heat sink and is covered with appropriate insulation. Layers of foam polyester insulation serve as internal oven walls on the opposite side, end and bottom of the oven. The foam insulation is enclosed within a shell which serves as a carrying case for the oven.

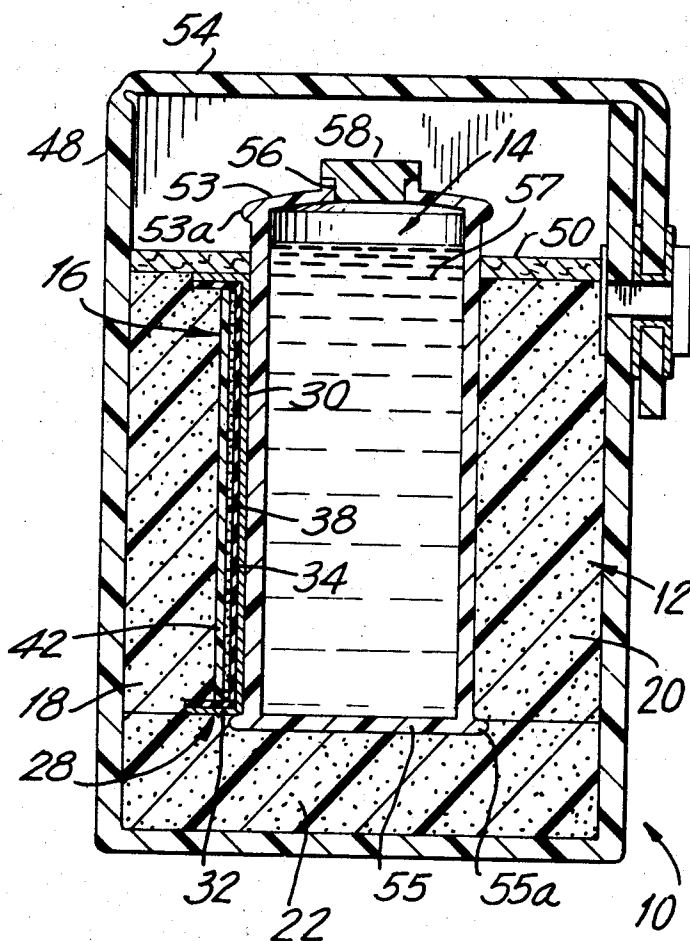


FIG. 1

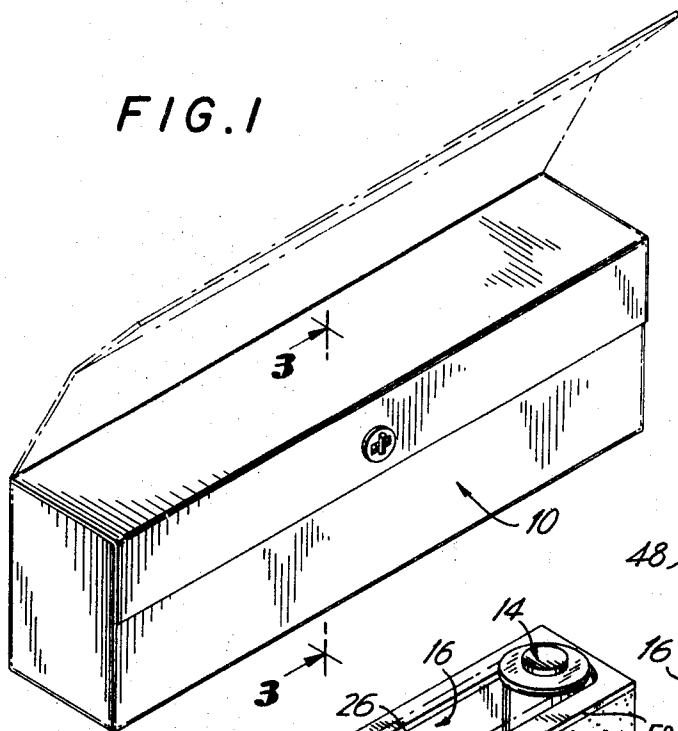


FIG. 5

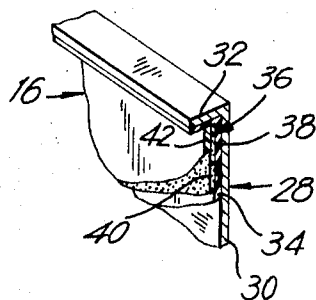


FIG. 3

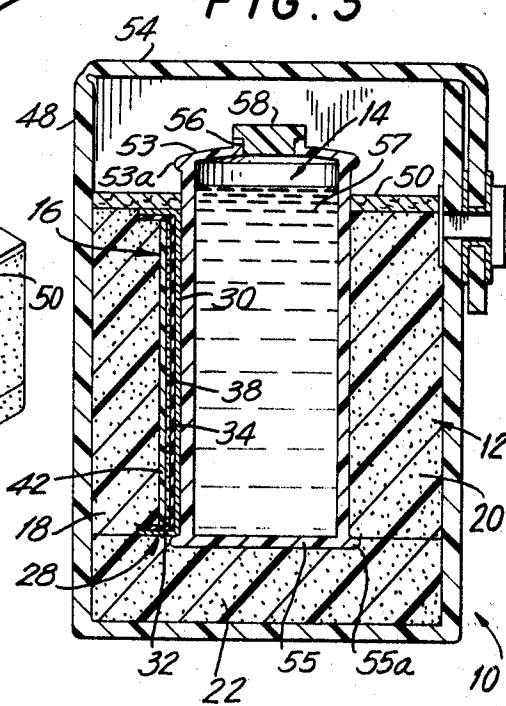


FIG. 2

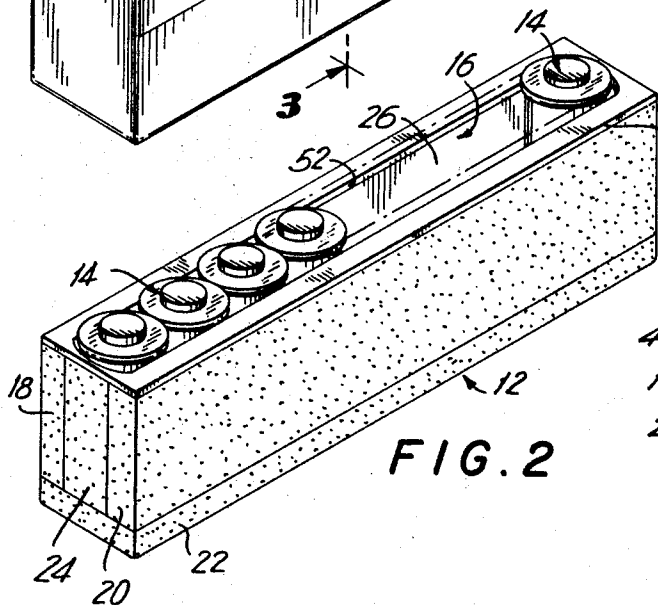
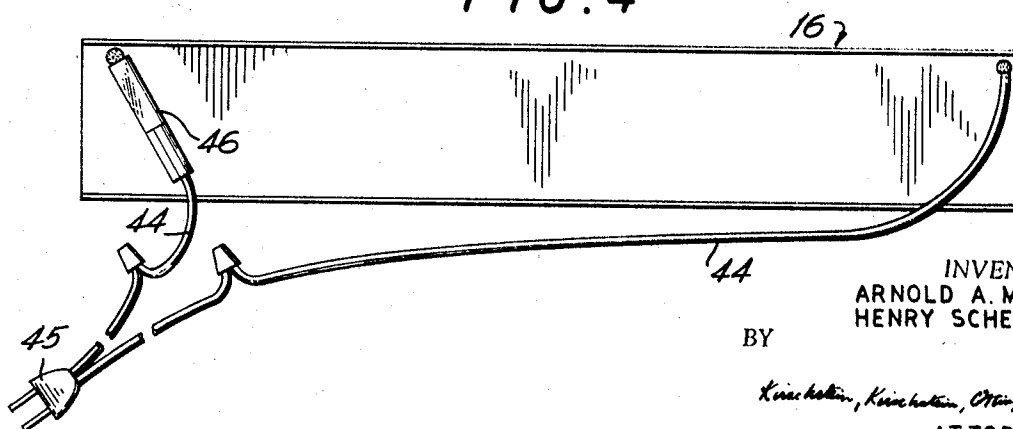


FIG. 4



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## HAIR SETTING DEVICE

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

Heating apparatus for hair rollers.

#### 2. Description of the Prior Art

It was heretofore known to utilize hollow hair rollers which contained a heat storage material. The rollers would be heated and the heat storage material would undergo a change in state from solid to liquid. When a user's hair was subsequently wrapped around the rollers, the heat storage material would cool, returning to its original solid state while heating the hair. This method was beneficial as it had been found that the application of heat greatly aided in decreasing the time necessary for setting hair and improved the life of the set.

The heating apparatus used in conjunction with the aforesaid rollers has been a major drawback in the widespread acceptance of this method of setting hair. This was due to the fact that the devices known heretofore were unable to efficiently heat the hair rollers in a minimum period of time within safe temperature limits and at a commercially desirable cost.

One heating device used heretofore includes vertical sheathed electrical resistance rod heating elements over which were inserted tubular hair rollers containing heat storage material. As the rollers were heated their exterior surfaces would of course, be exposed to and cooled by the open air, an inefficient procedure requiring a greater heating period or a higher temperature for the rods. Furthermore, an operator could easily burn her fingers on the projecting tips of the rods or on exposed rods from which rollers had been withdrawn. An additional problem was that as the heat storage material must be contained between inner and outer cylindrical walls, a relatively small volume of such material could be utilized with each roller. Hence, the efficiency and heat exchange capacity of the rollers were accordingly reduced.

Additionally used heretofore was the method of heating cylindrical hollow rollers filled with heat storage material by inserting the rollers in boiling water. However, this method had a serious drawback, which was that a woman would sometimes be distracted by an emergency or a telephone call and would allow the water to boil out, whereupon the rollers, which were made of a thermoplastic synthetic resin, would melt and permit the heat storage material to escape. This material, when free, presented a potential hazard.

A further disadvantage encountered with the prior known heating devices includes the fact that they were unable to economically provide sufficient heat to affect a change of state in the heat transfer material within a minimum period of time yet still remain within safe temperature limits.

An additional disadvantage of prior heating devices includes higher costs which were inherent in both the manufacture of specially designed hair rollers and, additionally, the higher costs incurred with the elaborate heating equipment used.

### SUMMARY OF THE INVENTION

Briefly, the present invention is achieved by providing a hair setting device which includes an oven of special construction which cooperates with cylindrical heat storage rollers, preferably of the end flanged type. The oven constitutes a rectangular casing which is lined at its sides, ends and bottom with slabs of foamed synthetic plastic that serve as a lightweight heat insulator. The inner surfaces of these slabs which are the surfaces remote from the casing define an open top heating well of rectangular configuration. A flat broad-surfaced electrical heating element is provided, the same having electrically insulating layers overlying and abutting the opposite broad surfaces thereof. The heating element along with the aforesaid layers are placed in abutting contact and coextensive with one of the inner surfaces of a side slab and the heating element and its said overlying layers are covered by a

channel-shaped metal heating sink which likewise is substantially coextensive with the heating element and its overlying layers. Thereby at least this surface of the well is maintained at an elevated temperature when the electric heating element is energized. The slabs are resilient and the space between the sides of the well is less than the diameter of the heat storage rollers so that the rollers must be forced into the well. However, the resiliency of the slabs permits this. Because the rollers are forced into the well they physically contact the heat sink, thus enabling heat to be transferred from the heat sink to the heat storage rollers by conduction as well as by convection and radiation. Moreover, when the rollers are inserted into the well the bottom flange of each roller will slide under the lower flange of the heat sink so as to captively retain the rollers in the well against accidental displacement although to permit deliberate withdrawal. The resilient nature of the slabs is relied upon to permit this sliding action.

It is an object of the present invention to provide a hair setting device which, is so constructed that it is not subject to any of the foregoing disadvantages.

More specifically it is an object of the invention to provide a hair setting device of the character described which is simple and rugged in construction, yet can be fabricated by mass production methods at an appreciably lower cost than prior devices designed to serve the same function.

A further object of the present invention is to provide a hair setting device of the character described wherein an open-mouthed oven may readily accommodate and heat hollow hair rollers filled with heat transfer material.

Yet another object of the invention is to provide a hair setting device wherein an elongated heat sink abuttingly and simultaneously contacts a plurality of hollow hair rollers filled with heat storage material.

A further object of the invention is to provide an open-mouthed oven for hair rollers which includes a heater with an elongated heat sink and a strip heating element secured to one face thereof.

Yet another object of the present invention is to provide an open-mouthed oven having a strip heater enclosed within a casing and a lid positioned above said open mouth.

A still further object of the present invention is to provide a portable open-mouthed oven for heating hair rollers which oven can be used for the storage and transportation of said rollers when not used for heating the same.

Still another object of the invention is to provide an open-mouthed oven wherein the heating surface is not readily accessible to a user's hands so that the chance of burning her hands is minimized and wherein the temperature of the oven cannot be increased to a point wherein it will melt the plastic rollers.

Other objects of the invention in part will be obvious and in part will be pointed out hereinafter.

The invention accordingly constitutes the features of construction, combinations of elements and arrangements of parts which will be exemplified in the hair setting device hereinafter described and of which the scope of application will be indicated in the appended claims.

### BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings in which is shown one of the various possible embodiments of the invention:

FIG. 1 is an isometric view of a hair setting device constructed in accordance with and embodying the invention and showing, in dotted lines, the open position of the carrying case lid;

FIG. 2 is an isometric view of the oven with the outer casing removed;

FIG. 3 is an enlarged cross-sectional view taken substantially along line 3-3 of FIG. 1;

FIG. 4 is a vertical side view of the heating element and the electrical circuit therefore; and

FIG. 5 is an enlarged fragmentary sectioned view of the heating element.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawings, the numeral 10 designates a hair setting device constructed in accordance with and embodying the present invention. The hair setting device includes an elongate open-mouthed oven 12 in which are inserted hair rollers 14 to be heated to a desired temperature by a strip heating element 16 which forms an internal wall of said oven. Sidewalls 18, 20, bottom wall 22 and end walls 24 of the oven 12 are constructed of relatively thick foamed slabs of resilient polyester material. The rectangular slabs of the aforesaid foamed polyester are secured together by suitable means such as an adhesive in the respective positions so as to form the oven with a U-shaped transverse cross section as illustrated in FIG. 3. The sidewalls 18 and 20 project upwardly from opposite edges of the bottom wall 22 leaving an open mouth 26. When viewed from the top, the oven is shaped in the form of an elongate rectangle with a central elongate well.

The dimensions of the well are such as to snugly admit the hair rollers 14 with a slight portion of each hair roller projecting upwardly through the open top 26 to facilitate gripping the rollers for removal and insertion. The opposed foamed sidewalls 18 and 20 will yield somewhat to accommodate the rollers as they are inserted and will maintain lateral pressure on said rollers to prevent accidental removal.

In order to evenly and effectively impart heat to the hair rollers 14 inserted within the oven through the open mouth 26, the strip heating element 16 is positioned so that an exposed flat surface thereof forms an interior face of the sidewall 18 of the well.

Referring specifically to FIGS. 3, 4 and 5 it will be seen that the strip heating element 16 includes a heat sink fabricated from a U-shaped sheet metal channel 28. The channel 28 is formed of a vertical flat longitudinal wall 30 and parallel opposed horizontal flanges 32 projecting perpendicularly outwardly from the top and bottom edges thereof. The heat sink serves as a frame which supports the remainder of the elements which constitute the strip heating element and is constructed, preferably, of a metal so that it may readily conduct heat generated by heating means to be described hereinafter. When the strip heating element is positioned within the oven the exposed side of the wall 30 serves as an interior surface of the oven wall 18 and is in abutting contact with rollers 14 inserted in said oven.

The strip heating element is constructed with a longitudinal thin flat broad-surfaced resistance electrical heating element sandwiched between two layers of insulation and secured to the channel 28 which conducts the heat generated therefrom to the rollers 14.

In the illustrated construction of the strip heating element a sheet layer 34 of electrical insulation, such as fiber glass, is positioned and secured, as by an adhesive, within the channel 28 in abutting contact with the surfaces of both the longitudinal wall 30 and the opposed flanges 32 that face the associated foamed polyester slab. This layer 34 serves to electrically insulate the heating element from the metal channel 28 yet presents minimal interference to the conductive transfer of heat from the heating element to said channel.

A thin flat broad-surfaced resistance electrical heating element 36 is affixed, as by an adhesive, to the layer 34 of electrical insulation. The element 36 is of conventional construction and preferably is formed of an elongate base web 38 of electrically nonconductive material, e.g. graphite particles 40 uniformly dispersed in a resinous binder. An electrical current is passed through the graphite layer 40 which acts as an electrical resistor. The current will generate heat uniformly throughout the resistance layer.

A layer 42 of insulation, such as a fiber glass sheet, is positioned over the heating element 36 and is suitably secured thereto, e.g. by an adhesive. This layer 42 acts as an electrical insulator. It additionally serves as a heat insulator in a manner to be subsequently described.

The electrical circuit which is utilized to energize the strip heating element 16 is illustrated in FIG. 4. It consists of two

leads 44 running from a twin-pronged plug 45 adapted to be connected to a source of electric power, such as a wall outlet, and connected to the graphite layer 40 adjacent the opposite ends of said heater 16.

In order to prevent overheating of the oven and to maintain the rollers 14 within safe temperature limits which will preclude burn injuries to the scalp and/or hands of a user or melting of the rollers, a thermostat 46 connected in series in one of the leads 44. This thermostat 46 is of a conventional type and will maintain the strip heating element at a temperature of approximately 200° F.

The strip heating element is secured to the foamed polyester slab constituting the sidewall 18 with portions of the wall 18 positioned between the opposed flanges 32 to form the completed oven structure. The layer 42 serves as a heat insulator between the element 36 and the foamed polyester wall 18 and for this purpose may be made thicker than the inner layer 34.

The oven 12 is snugly received within a carrying case 48 and held in position by an adhesive which will secure the outer surfaces of the foamed polyester walls to the inner surfaces of the carrying case. The electrical leads extend from the oven 12 through an appropriate opening in the carrying case. The foamed polyester walls additionally serve as heat insulators between the roller-receiving well and the carrying case 48 so that the carrying case remains cool enough to handle with comfort.

An elongate rectangularly shaped cardboard plate 50 having an appropriately dimensioned opening 52 is placed over said oven 12. The opening 52 is in alignment with the open mouth 26 of the oven to permit insertion of the hair rollers 14. The undersurface of said plate 50 abuts the upper edges of said polyester side and end walls and, additionally, the upper of the two flanges 32. It is secured to both the carrying case 48 and the side and end walls of the oven 12 at the abutting surfaces by an adhesive.

In order to provide maximum heating efficiency, the entire oven may be covered within the carrying case 48 by a hinged lid 54. A conventional twist latch is provided on the carrying case 48 to maintain the lid 54 in closed position when desired, e.g. when the device 10 is to be transported with rollers therein or when it is desired to more speedily raise the oven to operating temperature.

The hair rollers 14 are of hollow cylindrical construction with top and bottom walls 53 and 55 respectively. The walls 53 and 55 project beyond the cylindrical periphery of the rollers 14 forming top and bottom ledges 53a and 55a respectively. A suitable heat storage material 57 is contained within the rollers. Preferably the rollers are made of a plastic, for example, polypropylene. The heat storage material 57 is inserted through an opening 56 in the top 53 of the rollers. A plug 58 subsequently closes the opening 56, desirably being permanently fixed in place, as with adhesive, after the material 57 is emplaced.

The heat storage material 57 is one which preferably has a high specific heat and a high latent heat of fusion, experiencing a change in state between solid and liquid at about 140° F. to 180° F. It can be in a gel or solid state at normal room temperature. When heated rollers are cooled with the user's hair wrapped about them, the heat storage material will return to its original nonliquid state and the heat of solidification will be transmitted from the heat storage material to the user's hair.

Suitable substances for use as heat storage material are: wax and the material described in U.S.L.P. 2,936,741.

A person desiring to use the hair setting device of the present invention would insert the hair rollers 14 into the oven 12. The bottom 55 of the rollers 14 will abut the bottom foam polyester wall 22 of the oven and slightly depress it so that the ledge 55a will engage under the bottom flange 32 of the heater 16. Electrical current passing through the graphite layer 40 will uniformly heat the U-shaped channel 28 and its wall 30. The wall 30 will serve to heat the rollers 14 and the well of the oven and to transfer heat to the storage material contained in the rollers.

With the cover 54 of the carrying case 48 in closed position, the time necessary to uniformly heat the rollers to the desired temperature will be materially decreased. Overheating will be prevented by the thermostat 46.

Once the temperature of the rollers reaches the desired level, the user will, at her convenience, remove the rollers from the oven, wrap her hair about them and secure it with a roller clip. The rollers will thus serve to reduce the time necessary for setting one's hair and produce improved results as the heat storage material 57 contained therein serves to heat the hair during setting.

The carrying case 48 serves the additional function of providing an attractive medium for compactly storing and transporting the rollers 14 when the oven 12 is not operating.

It would be, of course, possible to utilize two or more strip heating elements 16 forming the internal surfaces of both longitudinal internal walls of the oven 12 to thus increase the heating capacity of the oven 12. It is additionally feasible to utilize strip heating elements 16 on the end walls of the oven so that all of the surfaces of the oven which contact the rollers 14 will be the heat sink portions of the strip heaters.

Thus it will be seen that there is provided a hair setting device which achieves the various objects of the invention and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the present invention and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein described or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

We claim;

1. An electrical hair setting device comprising an outer casing, an open-mouthed rectangular hair roller oven having a rectangular heating well, a plurality of hollow hair rollers containing heat storage material, said rollers being disposed in said well to be uniformly and simultaneously heated therein, the diameters of said rollers being greater than the side-to-side dimension of the well whereby the rollers are snugly admitted into the well, said oven comprising opposed side, bottom and end heat insulation planar slabs of foamed synthetic plastic positioned within said casing, said slabs having outer and inner surfaces, said outer surfaces abutting contacting the interior of said casing, said inner surfaces being mutually spaced and forming said well, said well being open at its top, the upper ends of said rollers projecting above the top of said well, a flat broad-surfaced electric heating element having electrical insulation layers overlying and abutting and being coextensive with opposite broad surfaces thereof, a flat broad-surfaced heat sink coextensive with said heating element and layers, one insulating layer overlying and abutting an inner face of one side slab, the heat sink overlying and abutting the other insulating layer, said heating element, layers and heat sink being

coextensive with an inner side face of the well, the heat sink being exposed at the inside of the well to be engaged by the rollers in the well, and electrical means controlling said heating element to regulate the temperature within said well.

2. The electrical hair setting device of claim 1 wherein a lid is hingedly connected to said outer casing and movable from a position wherein the top of said well is exposed, to a position wherein said lid closes the top of said well within said casing.

3. The electrical hair setting device of claim 1 wherein said heat sink is in the form of a channel with an elongate flat surface and parallel opposed flanges projecting normally outwardly from said flat surface.

4. The electrical hair setting device of claim 3 wherein portions of one of said slabs forming said well are positioned between said opposed flanges.

5. The electrical hair setting device of claim 3 wherein each said roller is cylindrical in shape, a closed circular bottom positioned on said roller, said bottom extending beyond the cylindrical periphery of said roller and a portion of said bottom abutting the undersurface of one of said opposed flanges.

6. The electrical hair setting device of claim 1 wherein at least one of said slabs forming said well is constructed of resilient material, wherein the rollers are cylindrical in shape, and wherein because the diameter of the rollers is greater than the side-to-side dimension of the well the rollers must be forced into the well and the resilience of the side slabs biases the rollers and heat sink together.

7. An electrical hair setting device, said hair setting device comprising an outer rectangular casing, an open-mouthed rectangular oven disposed within said casing, a plurality of hollow cylindrical hair rollers containing a heat storage material disposed within said casing, said oven having opposed sidewalls, walls, end walls and a bottom wall, said walls being of planar shape, the diameters of said rollers being greater than the side-to-side dimension of the well whereby the rollers must be forced into the well, a flat broad-surfaced heating element comprising an electrical resistance connected between current leads and having insulation on opposite sides thereof, said heating element being coextensive with and overlying an inner side face of the well, mounting means within said casing for supporting said heating element in its aforesaid position and spaced from the casing, and resilient means within said oven urging said heating element toward the opposed wall of the well so that the rollers must be forced into the well and the resilient means causes the rollers to be contacted by an element at an elevated temperature.

8. The electrical hair setting device of claim 7 wherein said electrical resistance is secured to a first face of a heat sink layer, said heat sink layer having a second opposed face in abutting contact with said hair rollers, said resilient means maintaining said hair rollers in juxtaposition against said second face of said heat sink.

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