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Baker

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[54] **ELECTRICALLY HEATED HAIR CURLING APPARATUS**

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[73] Assignee: **General Electric Company,** Bridgeport, Conn.

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[52] **U.S. Cl.** .....**219/400,** 34/219, 34/222, 34/231, 126/21 A, 219/222, 219/370, 219/521

[51] **Int. Cl.**.....**H05b 1/00,** F27d 7/04, A45d 4/12

[58] **Field of Search**.....219/222-226, 242, 385, 386, 392, 400, 521, 366-371, 359; 34/201, 202, 218, 219, 220, 222, 229, 231; 126/21 R, 21 A

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Attorney—Lawrence R. Kempton, Frederick P. Weidner and Leonard J. Platt

[57] **ABSTRACT**

Hair curling apparatus that employs heated air for heating hair curlers. A drum housing has bottom, side, and a removable top wall with a central opening in the top wall. An electrical resistance heating element is disposed low in the housing under a horizontal partition that forms upper and lower chambers and has openings around the partition and centrally thereof for continuous circulation of warm air from one chamber to the other. A motor-driven fan is centrally disposed in the upper chamber under the central opening and its shaft extends through the partition to a fan in the lower chamber. The motor is surrounded by a double-walled cylinder so that cool make-up air is continuously circulated through the central opening over the motor while the warmed air is continuously recirculated in the housing over the curlers.

5 Claims, 4 Drawing Figures

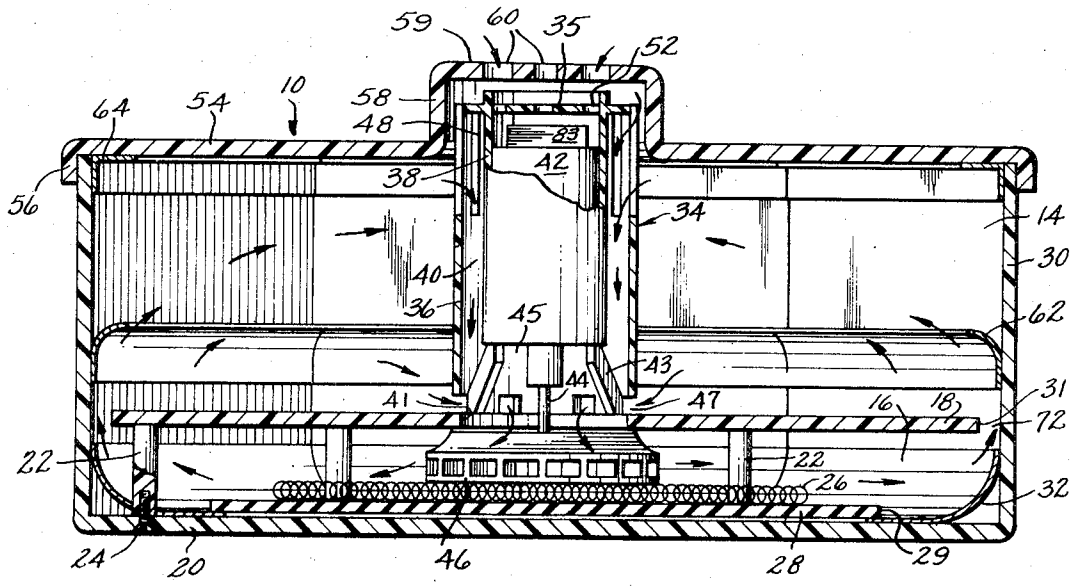


FIG. 1.

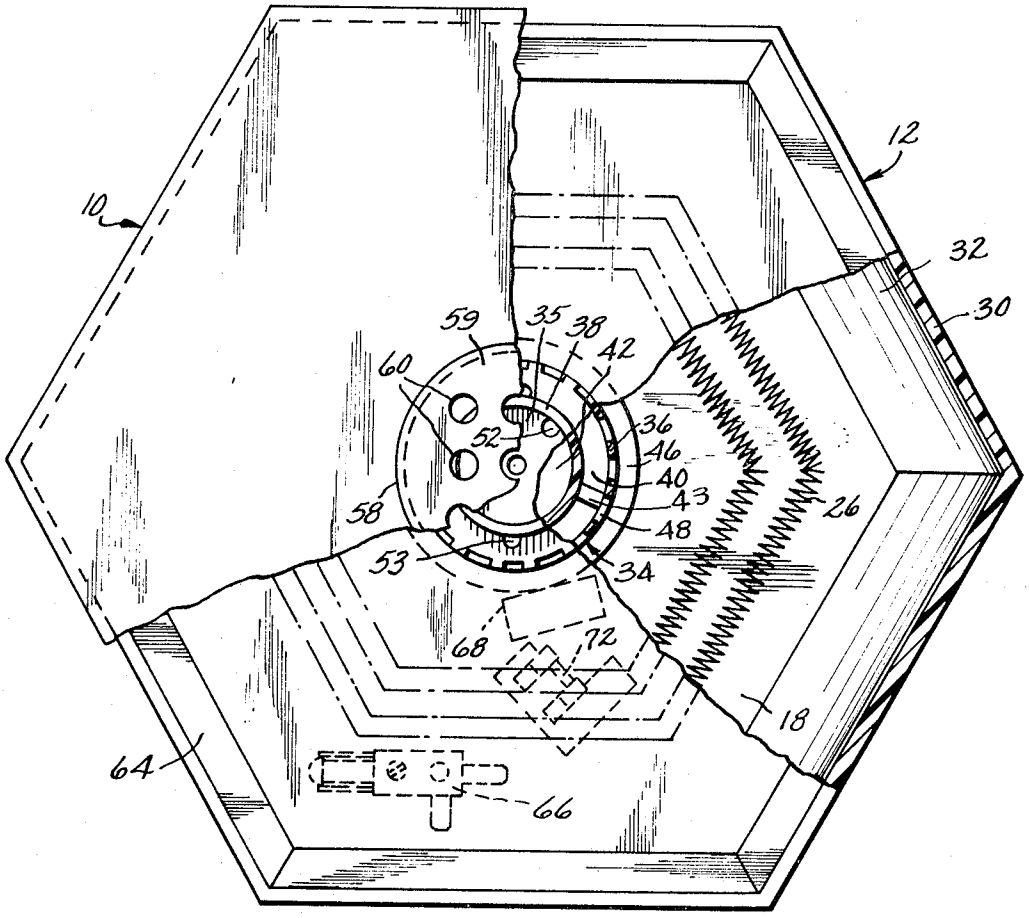
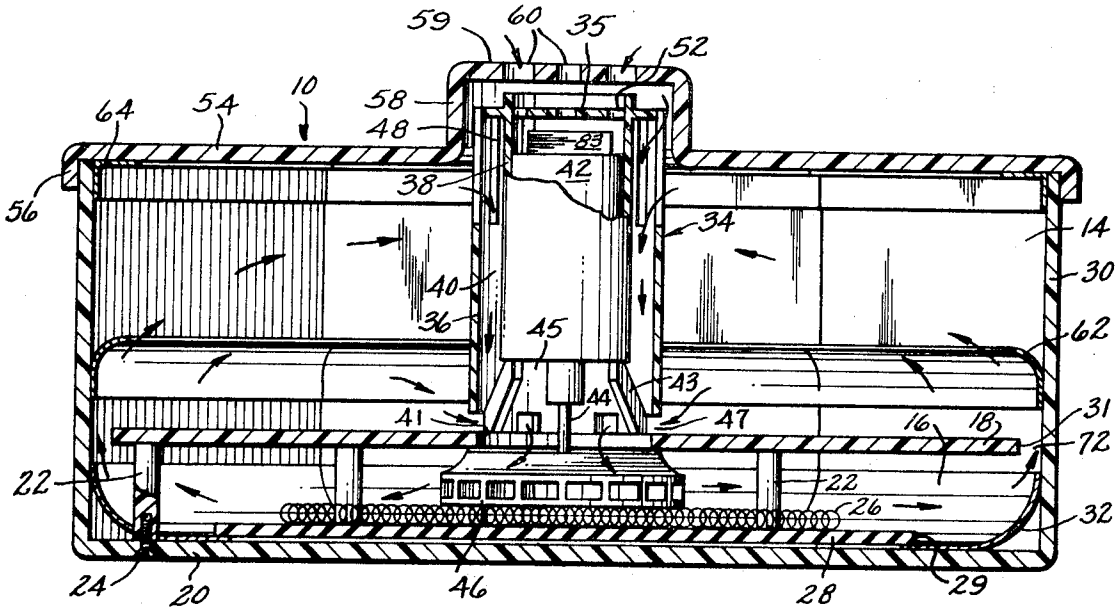

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FIG. 2.


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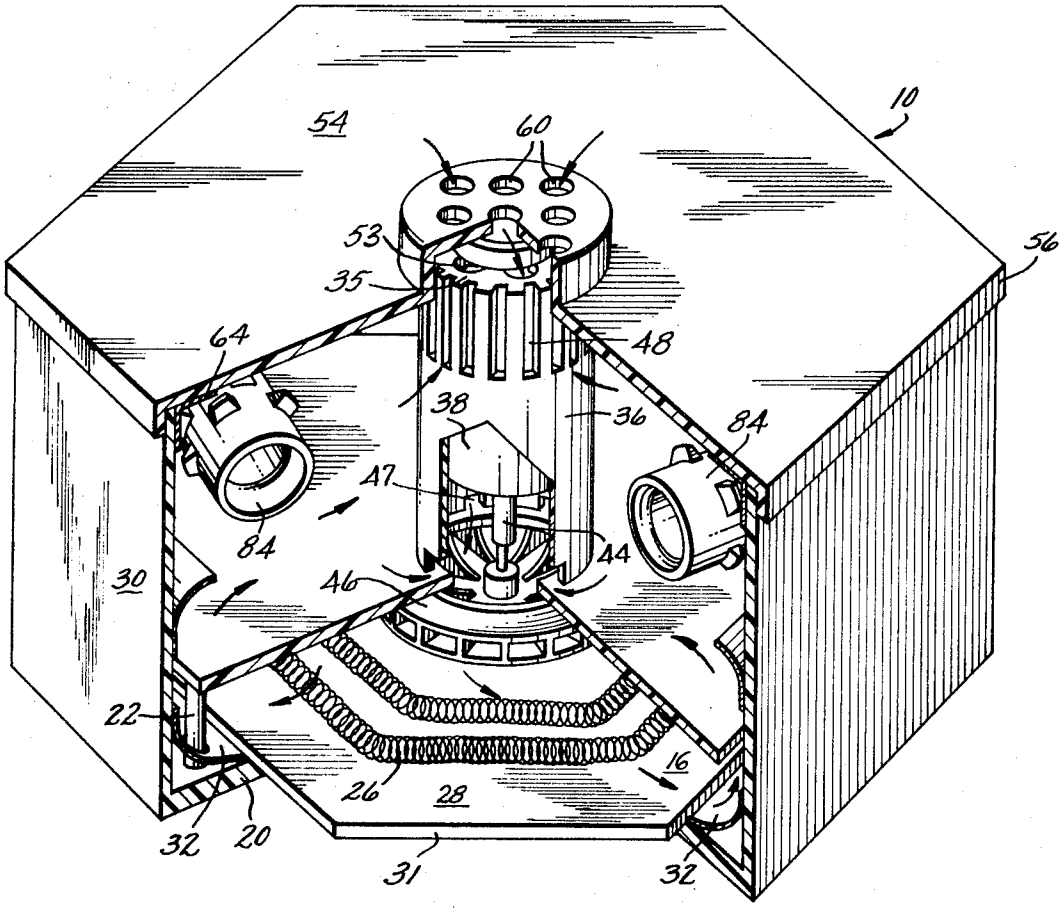
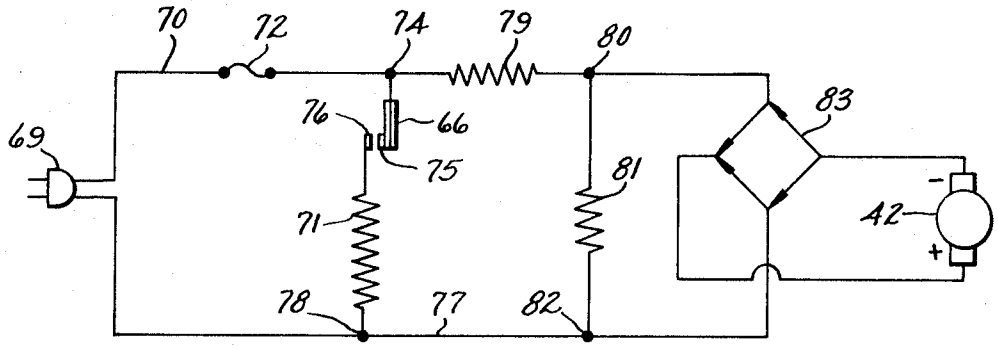

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FIG. 3.

FIG. 4.


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ELECTRICALLY HEATED HAIR CURLING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an electrically heated hair curling apparatus and, in particular, to such apparatus that employs heated air for heating the hair curlers.

2. Description of the Prior Art

Curling hair may be accomplished in several ways. One popular way is by the use of a hair curler or roller which may be heated and applied to the hair. A lock of hair is wound circumferentially around each heated hair curler and the hair curler then retained in place in the hair for a period of time. The hair curler gives off heat while the hair is wound around it, thus softening the cortex layer of the hair. After a short period of time the hair will be set or curled whereupon the curlers are removed from the hair.

There are several commonly used methods for heating hair curlers such as, for example, by immersion in hot water, subjecting the curlers to steam, heating the curlers individually bypassing electrical current through the curlers, and by utilizing an electrically heated plate with upstanding heat conductive posts upon which hollow hair curlers are placed for heating. Each of these methods have inherent drawbacks. For instance, in the case of heating the hair curlers by immersion in hot water, heating the water takes a considerable length of time and extracting the curlers from the hot water is quite troublesome and potentially hazardous. In the method of heating hair curlers by steam, one main difficulty is that during the hair curling operation the lid of the steam heating apparatus is opened to gain access to the hair curlers thereby dumping the steam resulting in the hair curlers cooling quite rapidly. Heating curlers individually by passing electrical current through them can be a potential electrical shock hazard and the manufacture of such curlers is quite expensive. Heating curlers by an electrically heated plate with upstanding heat conductive posts is a popular way of heating such hair curlers. However, one difficulty with this method is that a wide variety of curler sizes either require different diameter heating posts for different size curlers or if the posts are all one diameter then the wall thickness of the hair curlers will necessarily vary resulting in their heat storage qualities varying. Moreover, hair curlers heated by this method must be placed one-by-one on individual heating posts which is troublesome and time consuming.

By my invention there is provided electrically heated hair curling apparatus that heats the curlers by circulating warm air and is constructed so that the above mentioned disadvantages of other types of previously known hair curling apparatus are overcome.

SUMMARY OF THE INVENTION

In accordance with this invention, there is provided an electrically heated hair curling apparatus that includes a housing with bottom, side and top walls with the top wall having a central opening means for ambient air. An electrical resistance heating element is located inside the housing. There is also a horizontal partition inside the housing which is utilized to support the hair curlers to be heated and divides the inside of the housing into a lower chamber and an upper chamber. An electric motor-driven air moving means is surrounded by a double-walled cylinder which is located at the center of the housing under the top wall opening means and air passage means is provided through the partition at the center and near warm sides of the housing to permit continuous circulation of the air from one chamber to the other while drawing cooling ambient make-up air as a curtain over the motor to cool it.

It is an object of this invention to provide electrically heated hair curling apparatus that utilizes warm air for heating hair curlers.

It is another object of this invention to provide electrically heated hair curling apparatus that utilizes warm air for heating hair curlers and maintains the curlers warm even with the top of the apparatus removed to allow access to the hair curlers during the hair setting operation.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partially broken away top plan view of the electrically heated hair curling apparatus.

FIG. 2 is a side elevational view partially in cross section of the electrically heated hair curling apparatus.

FIG. 3 is a cut-away perspective view of the electrically heated hair curling apparatus.

FIG. 4 is a circuit diagram showing schematically the electrical circuit of the electrically heated hair curling apparatus.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail, there is illustrated my hair curling apparatus **10** which generally includes an enclosing case or housing **12,** which may be molded from suitable plastic material. Preferably, the apparatus is drum-shaped, such as for example circular or hexagonal, as shown in the drawings, to afford good air movement characteristics. The hair curling apparatus is divided into two chambers, an upper chamber **14** and a lower chamber **16.** The two chambers are divided by a horizontal shelf or partition **18** that acts as a support for the hair curlers when they are retained in the upper chamber **14** of the heating apparatus. The partition **18** is supported in its proper position within the heating apparatus near the bottom **20** of the housing on upstanding bosses **22** secured to the bottom **20** by means of screws **24.** Positioned below the partition **18** and near the bottom **20** of the housing is the heating element **26,** which in this case is a coiled resistance wire. The heating element is secured to an electrically insulating board **28** which is attached to the housing bottom **20** in any convenient manner. The periphery or edge **31** of the insulating board is spaced inwardly of the housing side walls **30.** It should be noted that the heating element is distributed uniformly over the insulating board **28** for good heat distribution. Positioned under the periphery of the insulating board **28** and abutting the housing side wall **30** is a circumferential upwardly curved air deflecting member **32.** The curved air deflecting member **32** extends from the housing side wall **30** to the bottom wall **20** at the junction of these two walls. The function of the air deflector member **32** will be explained subsequently in connection with the operation of the apparatus.

The upper chamber **14** has a centrally located double walled cylinder **34** having a transverse end wall **35,** an outer cylindrical wall **36,** and an inner cylindrical wall **38** with an air space **40** between the outer and inner

walls. Housed within the inner cylindrical wall **38** is a small dc electric motor **42** and a rectifier **83.** The motor **42** has its motor shaft **44** extending downwardly through an opening **41** at the center of partition **18.** The end of the motor shaft **44** opposite the motor has secured to it a fan **46** that is rotated within the lower chamber **16** by the rotating motor shaft. The outer cylindrical wall **36** of the double walled cylinder **34** has vertical elongated slots **48** around and at the top of the wall to allow air from the upper chamber **14** to pass into the air space **40** between the outer and inner cylindrical walls **36** and **38.** The transverse end wall **35** of the double walled cylinder **34** also has a number of openings **52** and **53** to allow air to move downwardly around the electric motor **42** and rectifier **83** and between the double walls of cylinder **34** respectively. The double walled cylinder **34** is vertically spaced from the partition **18** by legs **43** attached to the partition and to the bottom of the inner wall **38** of cylinder **34** such that air passageways **45** are provided from the air space **40** between the cylinder walls to the partition opening **41.** Air passageways **47** are also provided between the base of the outer wall **36** of cylinder **34** and the partition **18.** These passageways cooperate to allow air to flow from the upper chamber **14** to the lower chamber **16** through the central partition opening **41** as shown by the arrows in FIGS. **2** and **3.**

The housing **12** has a removable lid or top wall **54** slightly larger in diameter than the chamber **14.** The top wall has a downwardly depending peripheral flange **56** to aid seating the top wall properly over the upper chamber **14** when in the closed position. The center of the top wall **54** has an upstanding cylindrically shaped hollow boss **58** with a top transverse end wall **59** which contains air passage holes **60** to allow some air to pass from outside the apparatus into the apparatus. This raised boss **58** is used as a handle for the user to grip the lid or top wall **54** for removing and replacing it on the upper chamber **14.** The top wall **54** may be hingedly secured to the side wall **30** of the housing, if so desired.

Within the upper chamber **14** are two circumferential air deflectors, both of which are inwardly directed and secured to the side wall **30** of the housing **12.** One of the air deflectors **62** is located just above the partition **18** and the other air deflector **64** is located at the top of the housing side wall **30** adjacent the top wall **54.** The function of these air deflectors will be explained subsequently in connection with the operation of the apparatus.

To automatically control the maximum temperature of the air within the apparatus, a thermal responsive switch assembly **66** is located in the lower chamber **16** and is secured to the insulating board **28.** The switch assembly **66** is a conventional type thermal responsive switch having a bimetallic blade which when sumbitted to heat bends sufficiently so that electrical contacts are opened at some desired predetermined set temperature thus breaking an electrical circuit. Also secured to the insulating board **28** is a terminal board **68** used for connecting various electrical leads and particularly the leads to the electric motor **42.** For a detailed discussion of the electrical arrangement of the hair curling apparatus, reference may be had to FIG. **4** of the drawings, where the electrical circuit diagram of the preferred embodiment is schematically illustrated. With power plug **69** inserted into a proper wall outlet for providing a.c. electric current, current flows in one side of the line **70** through a fuse link **72** to junction **74** where it divides. Some of the current passes to the thermal responsive switch assembly **66** and with the contacts **75** and **76** closed it continues to the main electrical resistance heating element **71** and then to the other side of the line **77** at junction **78** and back to power plug **69.** The other portion of the current leaving junction **74** passes through a series resistance heating element **79** to a junction **80** where it is divided with one portion going to a parallel resistance heating element **81** and then to the other side of the line **77** at junction **82.** The remaining portion of the current from junction **80** passes to the rectifier **83** and then to the d.c. electric motor **42,** back to the rectifier **83,** to line **77** and then to power plug **69.** The rectifier is used conventionally to convert the line current from a.c. to d.c. to operate the electric motor **42** efficiently. When the temperature within the hair curling apparatus reaches the preset temperature of the thermal responsive switch the switch functions as described above, with the contacts **75** and **76** automatically opening and the main heating element **71** is thereby de-energized. The series resistance heating element **79,** parallel resistance heating element **81,** and motor **42** continue to be energized to maintain the circulating air within the apparatus at the desired temperature. The main heating element **71,** series resistance heating element **79** and parallel resistance heating element are all shown as combined in FIGS. **1–3** as the heating element **26.**

To operate my hair curling apparatus the user removes the lid or top wall **54** and places in the upper chamber **14** the desired number and size of hair curlers **84.** The hair curlers **84** are supported on partition **18** and are randomly distributed around the inside of the upper chamber **14.** By inserting the power plug **69** into a wall receptacle the apparatus is energized and the electric motor **42** causes shaft **44** to rotate which in turn rotates the fan **46.** Simultaneously, the heating element **26** is energized and due to the electrical resistance characteristics of the heating element it heats the air within the hair curling apparatus. The rotation of the fan **46** and the interior structural arrangement of the apparatus causes the air within the apparatus to move as shown by the arrows in FIGS. **2** and **3.** The various components of the hair curling apparatus are arranged so that the air being moved by the rotating fan **46** is drawn downwardly through central air passage opening **41** in partition **18** into lower chamber **16.** Some make-up and cooling air is also being drawn in from outside the housing through air holes **60** in the end wall **59** of raised boss **58** and then through air passage openings **52** in the top end wall **35** of the double walled cylinder **34.** This ambient outside air helps keep the motor **42** and rectifier **83** cool and also acts as a flowing curtain of cool air to prevent the warm air within the housing from reaching the motor which could cause it to overheat thus insulating the motor from the recirculating warm air. The air passing through the partition central opening **41** is forced outwardly from the fan **46** past and through the heating element **26.** The air so forced contacts upwardly directed air deflector member **32** around the periphery of the insulating board **28** and is deflected upwardly through the space **72** between the edge **31** of partition **18** and the sidewall **30** of the housing into upper chamber **14.** The upwardly moving air contacts inwardly directed air

deflector 62 located slightly above partition 18 and is directed toward the center of the housing whereupon it engulfs the hair curlers. Some of the warm air when reaching the center of the housing passes through slots 48 in the outer wall 36 of the double walled cylinder 34 and passes downwardly through the air passage 40 between the double walls under the influence of the fan 46. A portion of the air in upper chamber 14 also passes through air passageways 47 between the partition 18 and the bottom of outer wall 36 of the double walled cylinder 34. The flowing air then passes through the partition central opening 41 to the fan 46 where it is recirculated in a like-manner. This continuous recirculation of air within the housing allows the warm air to continually and evenly contact the hair curlers 84 in the upper chamber 14 and the air is also continually reheated by the heating element 26. When the air has heated the hair curlers sufficiently for the hair curling operation the lid or top wall 54 is removed and the curlers may then be taken from the upper chamber one-by-one as they are used. The top wall may remain removed from the apparatus as the air deflector member 64 located at the top of the housing side wall 30 helps to direct the circulating warm air toward the center of the housing where the influence of the rotating fan draws the air downwardly through the double walled cylinder 34 before any significant amount of air is expelled from the open top.

The foregoing is a description of the preferred embodiment of the invention, and variations may be made to the structure without departing from the spirit of the invention, as defined in the appended claims.

I claim:

1. Apparatus for heating hair curlers comprising:

a. a drum-shaped housing having a bottom wall, side walls, and a removable top wall having centrally disposed air passage means therethrough,

b. an electrical resistance heating element secured to an electrical insulating board and located inside the housing near the bottom wall thereof,

c. a horizontal curler supporting partition located above the heating element, said partition dividing the inside of the housing into a lower chamber and an upper chamber,

d. air passage means through the partition at the center and near the side walls of the housing around said partition to permit continuous circulation of air from one chamber to the other,

e. an electric motor located in the upper chamber at the center of the housing under said top wall passage means and having a shaft projecting through the central air passage, and

f. a fan secured to said motor shaft and located in the lower chamber to provide said continuous circulation of warm air from one chamber to the other and induce outer air flow through said top wall passage means over said motor.

2. The apparatus of claim 1 wherein the centrally located electric motor is surrounded by vertical cylinder means having spaced double walls and air passage openings at the top and at the bottom in both of said double walls whereby the warm air is recirculated by said fan and said motor is insulated from said warm air by a flowing curtain of cool air through said top air passage openings.

3. The apparatus of claim 1 wherein an upwardly directed air deflector member is positioned circumferentially around the housing at the junction of the bottom wall and the side walls.

4. The apparatus of claim 3 wherein the upper chamber has a circumferential inwardly directed air deflection member secured to the side walls and located in close proximity to and above the horizontal partition.

5. The apparatus of claim 3 wherein an additional circumferential inwardly directed air deflecting member is located near the top of the side walls of the housing.

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