

United States Patent

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[54] HAIR-SETTING DEVICE
13 Claims, 10 Drawing Figs.

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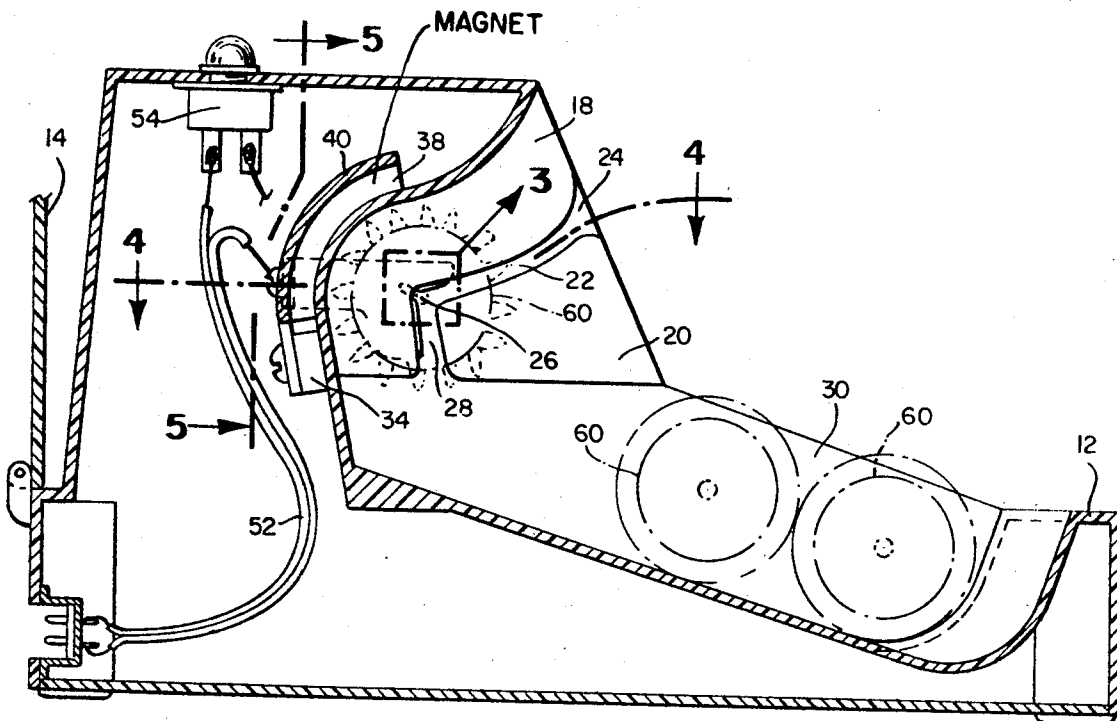
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ABSTRACT: A hair-setting device comprises a roller containing an electric heating element with exposed contacts and a ferrous alloy having a selected Curie temperature. The device also comprises a charging station having electric current supply contacts and a magnet adjacent the contacts. In use, the roller is held with its contacts in charging engagement with the contacts of the charging station by the attraction of the magnet to the alloy. When the heating element delivers sufficient heat to the alloy, the alloy is no longer attracted to the magnet and the roller drops, ready for use.



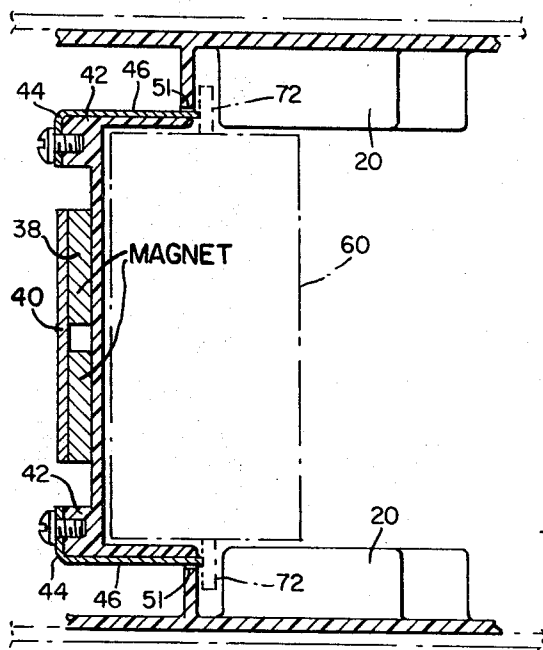


Fig. 4

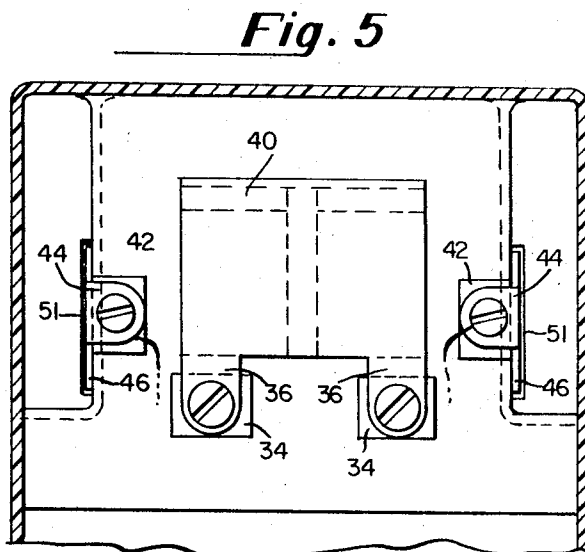


Fig. 5

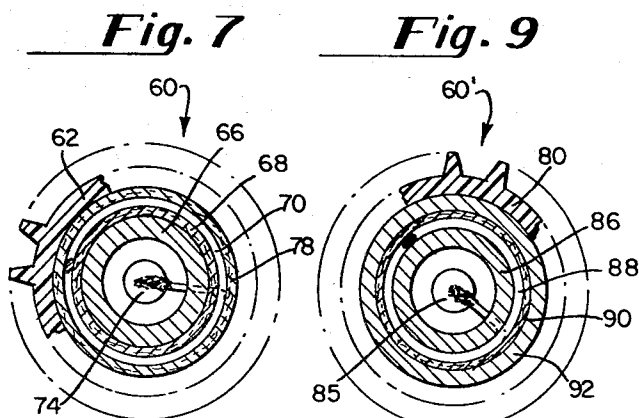


Fig. 7

Fig. 9

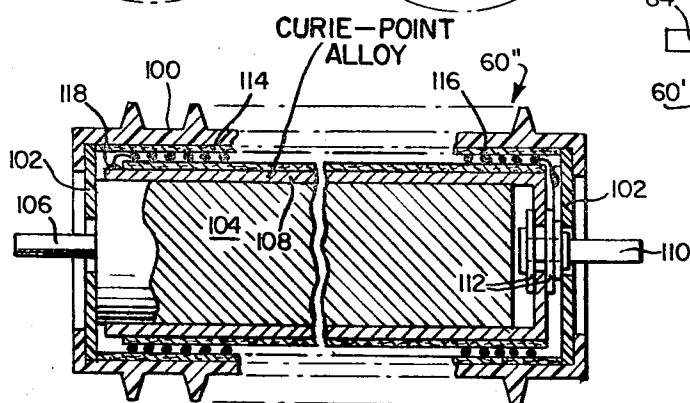


Fig. 10

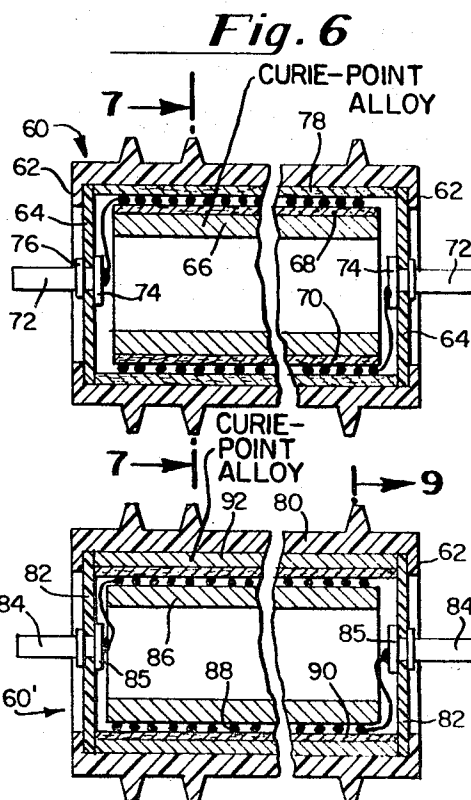


Fig. 6

Fig. 8

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HAIR-SETTING DEVICE

This invention relates to a hair-setting device of the roller type which is heated and then wrapped with hair so that the heat acting on the wound hair sets a curl or wave. More specifically, this invention relates to a hair-setting roller which is electrically heated to a preselected temperature by heating means within the roller. It also relates to a charging station by which electricity is supplied to the roller.

Prior hair setters of the roller type have been brought up to working temperature by means of an electrically heated rack having a plurality of fingers or stems over which the individual rollers sit as the rack slowly heats them up to temperature. This heating process has taken from 10 to 15 minutes with prior art devices. Once the rollers are heated, they are individually removed from the rack and wrapped with hair. The outer surface of the rollers have been plastic and have been formed with outward nibs which have protected the operator's fingers from the heat of the cylindrical surface of the roller.

Under the present invention, the hair-setting rollers are individually heated in a much shorter period—for instance, 10 to 15 seconds—and are, immediately after being heated, cool to the touch—even the cylindrical surface of the rollers—so that the operator experiences no discomfort as she manipulates them. The present invention provides for automatic heating to a preset temperature in a charging station and an automatic rejection of the roller from the station if further heating of the roller is attempted when the roller is already at working temperature.

Briefly, the invention is a hair-setting device which includes a roller or cylinder containing an electric heating element with charging contacts on the outside of the roller. The roller contains a ferrous alloy having a preselected Curie temperature. A charging station is provided having spaced supply contacts connected to the household electric supply. A permanent magnet is mounted in the station adjacent the position the roller is in during charging. The magnet, attracting the alloy, holds the roller with its charging contacts against the supply contacts until the alloy in the roller reaches its Curie temperature, whereupon the roller drops into a tray ready for use.

Other features and objects of the invention will be apparent to one skilled in the art from a reading of the following description and reference to the drawings in which:

FIG. 1 is a perspective view of a charging station and roller embodying the invention, the station having its cover broken partly away to show the working portions thereof;

FIG. 2 is a sectional view taken on the line 2-2 of FIG. 1. The roller is shown in phantom;

FIG. 3 is an enlarged view of the area designated 3 in FIG. 2;

FIG. 4 is a fragmentary sectional view taken on the line 4-4 of FIG. 2;

FIG. 5 is a fragmentary view taken on the line 5-5 of FIG. 2;

FIG. 6 is an enlarged, broken, centerline sectional view of a roller structure embodying the invention;

FIG. 7 is a radial sectional view taken on the line 7-7 of FIG. 6;

FIG. 8 is a centerline sectional view of a modified form of roller;

FIG. 9 is a radial sectional view taken on the line 9-9 of FIG. 8; and

FIG. 10 is a centerline sectional view of a further modification of the roller.

Referring more specifically to the drawings, a hair-setting device embodying the invention is designated 10 generally in FIG. 1. It comprises a charging station having a molded housing 12 with a hinged cover 14. As shown, the mouth of the cover engages about a shelf on the housing to form a flush streamlined closed case.

As shown in FIG. 1, the front of the housing is formed with a curved roller-receiving recess 16 which is provided at either end with an inward upper block 18 and a lower block 20. Intermediate the blocks as shown in FIG. 2, there is formed a

track 22 commencing at an opening 24 and inclining downward to a charging point 26 and thence almost vertically downward as at 28 to a point above a receiving tray or recess 30.

As shown in FIGS. 2, 4 and 5, the backwall 32 is formed with a plurality of spaced rearwardly directed bosses 34. These bosses are drilled and tapped and bolts therethrough support a pair of spaced arms 36 and a permanent magnet 38. The magnet is preferably in the form of a pair of permanent magnets of flat shape which are curved and secured to a thinner ferrous plate 40 from which the arms 36 extend. As shown in FIG. 5, the two magnets are separated and are thus arranged so that the two faces against the rear wall 32 are north and south poles respectively.

As shown in FIGS. 4 and 5, slightly above and outward from the bosses 34 are a second set of spaced bosses 42. These are similarly drilled and tapped and bolted thereto are a pair of contacts 44. Each contact comprises an arm which engages the boss and a forward planar section 46 which is mounted in the sidewall of the block 18. Block 18 is formed with a molded nib 48 fitting into a groove 50 or slot in the contact plate (FIG. 3). As shown, the edges 46a of the plates 46 extend a short distance through slots 51 in the blocks 18 so that they are available for the roller contact pins. The household current supply is appropriately introduced into the housing 12 through a recessed male plug mounted in the housing wall. The removable cord to the household outlet is not shown. Opposite wires are connected to the respective supply contacts 44. An indicating lamp 54 may be in series with one of the connections.

Referring now to FIGS. 6 and 7, a preferred form of roller 60 comprises a nibbed plastic outer case 62 of nylon or the like and which is crimped over at its ends against the insulating discs 64. The roller is centrally equipped with a tubular core 66 of special alloy which is covered on its exterior with an insulating layer 68. An electric heating element 70 is wound on the insulating layer and its opposite ends are connected to the pins 72 which are headed as at 74, penetrate the insulating discs 64 respectively and are upset on the outside thereof as at 76 to hold them solidly in place. A second insulating layer 78 preferably of asbestos, surrounds the electric heating element.

In a model of the invention, the tubular core 66 is of a special ferrous-nickel alloy selected for its Curie temperature of 390°. This is approximately twice the 180° to 190° desired exterior working temperature of the roller. One source of this (known as temperature compensator alloy 032) is Carpenter Technology Corporation, Reading, Pa.

MODIFICATIONS

In the modified form 60' of roller shown in FIGS. 8 and 9, the plastic exterior shell 80 is again nibbed and is crimped over at its ends to tightly clamp in assembly the insulator discs 82. These discs are equipped with contact pins 84 with heads 85 in a construction similar to that of FIG. 6. Centrally disposed in the FIGS. 8, 9 embodiment is a tubular core 86 which may be aluminum having its outer surface anodized to present an insulating layer. The electric heating element 88 is wound thereon and its opposite ends are secured to the heads of the contact pins 84 as described above.

Surrounding the heating element is an insulating layer 90 of asbestos. The insulating layer is tightly surrounded by a tubular element 92 composed of the alloy, for instance, mentioned above.

In the FIG. 10 embodiment, the roller 60'' presents an exterior plastic case 100 which is formed with outward nibs as in the other embodiments. The ends of the case 100 are crimped in overinsulating washers 102 at either end. Centrally disposed on the axis is a plug 104 of aluminum or the like from which extends at the leftward end (FIG. 10) an integral contact pin 106. Telescoping disposed over the plug from the pinless end is a cup element 108 which may be of the selected alloy material. To the rightward end of the cup is secured a headed

contact pin 110. The pin is headed and upset as before but insulating washers 112 insulate it from the metal of the cup. The circumferential surface of the cup-shaped element 108 is provided with a layer of insulating material 114 and the electric heating element 116 is wound thereon as shown. One end of the electric heating element is attached to the end of the cup as at 118 so that it makes electrical contact with the plug 104 and hence the pin 106. The other end is connected by a standard terminal or other means to the pin 110.

A variation of any of the rollers described above replaces the wound heating element with a thin layer of etched nichrome disposed on a sheet of silicone insulation. The sheet is then wrapped about the roller core.

OPERATION

In operation, a roller 60 or modification thereof is inserted into the charging recess 16 of the housing 12. Its charging or contact pins 70 move respectively through the tracks 22 and engage respectively against the protruding edges 46a of the charging contacts 46 (FIG. 3). The roller is held in this position (FIG. 2) by the magnetic attraction between the magnet 38 and the ferrous alloy core 66 or other alloy part depending on the modifications selected.

The electric current energizes the heating element 70, heating the roller and its alloy core. As the alloy core 66 approaches its Curie temperature and its permeability decreases, a gradual loss of magnetism occurs. When there is no longer sufficient magnetic attraction between the alloy and the magnet 38 to hold up the roller, it drops down into tray 30 ready for use.

Because there is some heat transmission delay between the hot inside of the roller and the plastic exterior, the roller is at first cool to the touch enabling the operator to wind her hair about the roller without danger of burning her fingers. However, within a matter of seconds after the roller is in place, the exterior begins to warm and shortly reaches the setting temperature.

It can be seen that I have developed a hair-setting device which heats automatically to a given temperature in a very short time. Since the heating device does not depend on timing but instead on magnetic permeability characteristics, attempts to reinsert the roller into the charging station while it is still hot will be met with the refusal of the magnet to hold the roller in place. Hence, the roller cannot be overheated. Additionally, because the heating is done from within and in a short time, the roller when ready for use is still cool to the touch giving no discomfort in handling.

The desired heat vs. time characteristics can be tailored by selecting the appropriate structure among the many modifications. For instance, for normal heat vs. time characteristics during the curling period the version of FIG. 6 may be selected, while if extra setting time is needed for hard-to-set hair, the version having the aluminum plug (FIG. 10) which provides a large heat sink may be selected.

It should be understood that the dropping of the roller away from its charging position into the tray 30 occurs when the force of gravity acting on the roller is greater than the gravity-opposing force of the magnetic attraction between the alloy and the magnet. This may be, strictly speaking, when the alloy has not yet reached its precise Curie temperature. However, for simplicity herein, the alloy is described as having reached its Curie temperature.

What I claim is:

1. A hair-setting device comprising:

- a. a setting element containing an electric heating element with charging contacts at spaced points thereon and alloy means of a preselected Curie temperature, the alloy means being in heat exchange relation with the heating element, and
- b. a charging station presenting spaced electric-supply contacts and magnet means adapted by cooperative relation with the alloy means to hold the setting element with its charging contacts engaging the supply contacts respec-

tively in conductive relation until the heating element heats the alloy means to its Curie temperature whereupon the setting element is released by the magnet means from the conductive relation, and means for disengaging the released setting element from said supply contacts.

2. A hair-setting device as described in claim 1 wherein the setting element is a cylinder on which hair may be wound.

3. A hair-setting device as described in claim 2 wherein the spaced contacts are spindles at the respective ends of the cylinder projecting endwise of the cylinder.

4. A hair-setting device as described in claim 3 wherein the charging station provides spaced aligned tracks for the spindles leading the cylinder with spindles in horizontal disposition first downward and toward the supply contacts from a loading means and then downward and away from the supply contacts to a receiving means.

5. A hair-setting device as described in claim 4 wherein a portion of the station surrounds the tracks and protects the supply contacts from exposure.

6. A hair-setting device as described in claim 1 wherein the electric heating element is wound on an insulated cylindrical surface and the ferrous alloy means is in sleeve form and surrounds the electric heating element.

7. A hair-setting device as described in claim 6 wherein the cylindrical surface is the exterior of an anodized aluminum core and a layer of heat-insulating material is disposed between the electric heating element and the sleeve.

8. A hair-setting device as described in claim 2 wherein the exterior of the curling cylinder is plastic and formed with nibs.

9. A heating station and an object to be heated, the object containing an electric heating element connected to spaced electric contacts and magnetic alloy means having a selected Curie temperature, the alloy means and the heating element being in heat exchange relation; the station having spaced charging contacts with means for supplying power thereto and a magnet adapted to hold the object by cooperation with the alloy means with the contacts of the object engaging the contacts of the station until the alloy means reaches the Curie temperature of the alloy means whereupon the heated object is released from the influence of the magnet, and means to move the object away from the magnet when the influence of the magnet is absent.

10. An electric supply station and an object containing a heating element to be heated, the object also containing Curie alloy means in heat exchange relation to the heating element, the element being connected to electric pickup contact means on the object; the electric supply station having electric supply contact means and a magnet adapted to cooperate with and magnetically attract the alloy means to thereby hold the object with the supply and pickup contact means in electrically complete relation activating the heating element until the alloy means reaches its Curie temperature whereupon the magnetic attraction ceases, and means to move the object away from the electrically complete relation when the magnetic attraction ceases.

11. The combination as described in claim 10 wherein the means for moving the object away is the force of gravity.

12. The combination as described in claim 10 wherein the means for moving the object away operates continuously but is not effective to move the object during the magnetic attraction.

13. A heating station and an object having at least a part to be heated, the object containing an electric heating element in the part and connected to electric pickup contact means on the object, and a member of Curie alloy, the element and the member being in heat exchange relation; the station having spaced electric supply contact means with means for supplying electric power to the supply contacts, and magnet means adapted to hold the object by attraction to the alloy means with the pickup contact means in electrically conductive relation with the supply contact means until the alloy means reaches its Curie temperature and the magnet means no longer attracts the alloy means, and means to move the object away from the magnet means so that the contact means are not in conductive relation.