

- [54] **ELECTRICALLY HEATED HAIR CURLER**
- [72] Inventors: **Francis J. Gaffney**, East Norwalk, Conn.; **Joseph F. Degen**, Rockville; **Gerald F. Clark**, Thurmont, both of Md.
- [73] Assignee: **North American Philips Corporation**, New York, N.Y.
- [22] Filed: **Dec. 9, 1969**
- [21] Appl. No.: **883,418**
- [52] U.S. Cl. ....219/222, 132/33 R, 132/39, 219/523, 219/530, 219/534
- [51] Int. Cl. ....A45d 2/36, H05b 1/00
- [58] Field of Search .....219/221-227, 229-242, 219/530, 540, 523, 534; 132/33 R, 36 R, 39

3,487,197 12/1969 D'Elia et al. ....219/222

**FOREIGN PATENTS OR APPLICATIONS**

98,026 2/1964 Denmark .....219/222

*Primary Examiner*—A. Bartis  
*Attorney*—Frank R. Trifari

[57] **ABSTRACT**

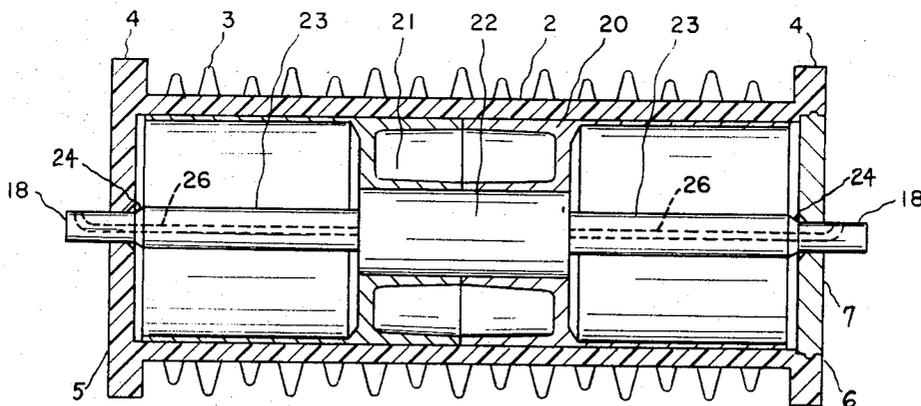
A cylindrically shaped plastic hair curler having an electrical resistor positioned therein for heat generation. Heat transfer elements positioned within the hair curler for conducting the heat from the resistors to the cylindrical walls include a heat-sink surrounding the resistor and in contact with and conforming to the inner surface of the plastic hair curler. The heat-sink is formed of two shell members having aligned, inwardly projecting cavities for housing the electrical resistor. The resistors may also be supported on a spool member which will support the heat transfer members which surround and are in contact with the resistors. A shell heat-sink member may then surround the heat transfer members to carry the heat of the resistors to the outer wall of the curler.

[56] **References Cited**

**UNITED STATES PATENTS**

- 3,515,851 6/1970 D'Elia et al. ....219/222
- 3,519,792 7/1970 Solomon .....219/222
- 3,560,704 2/1971 Albert .....219/242 X

**4 Claims, 6 Drawing Figures**



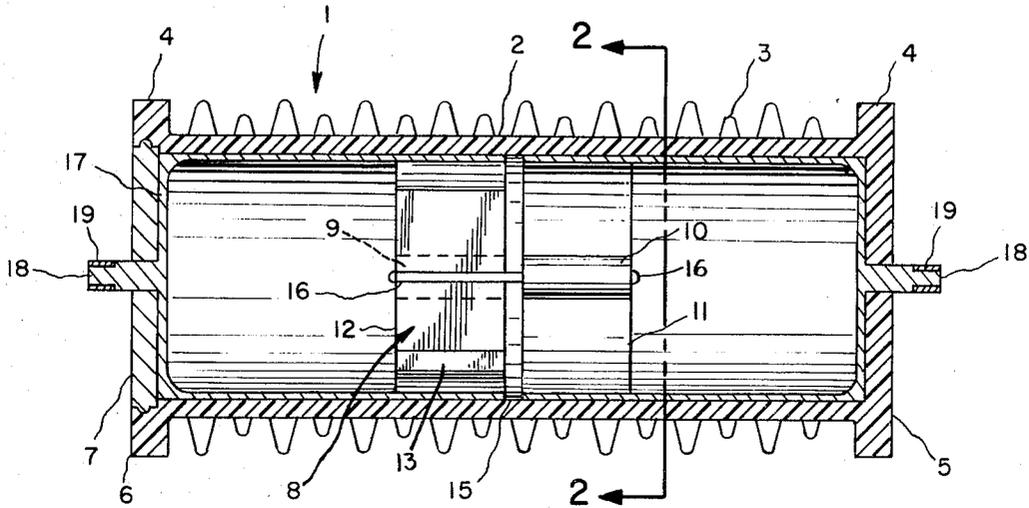


Fig. 1

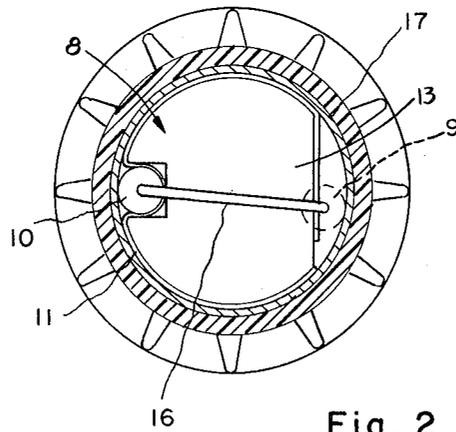


Fig. 2

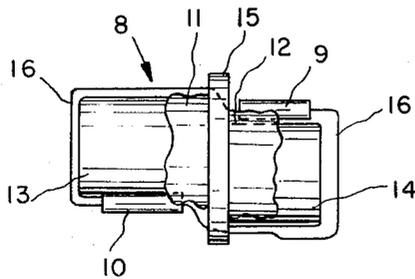


Fig. 3

INVENTORS.  
FRANCIS J. GAFFNEY  
JOSEPH F. DEGEN  
GERALD F. CLARK

BY

*Frank R. ...*

AGENT

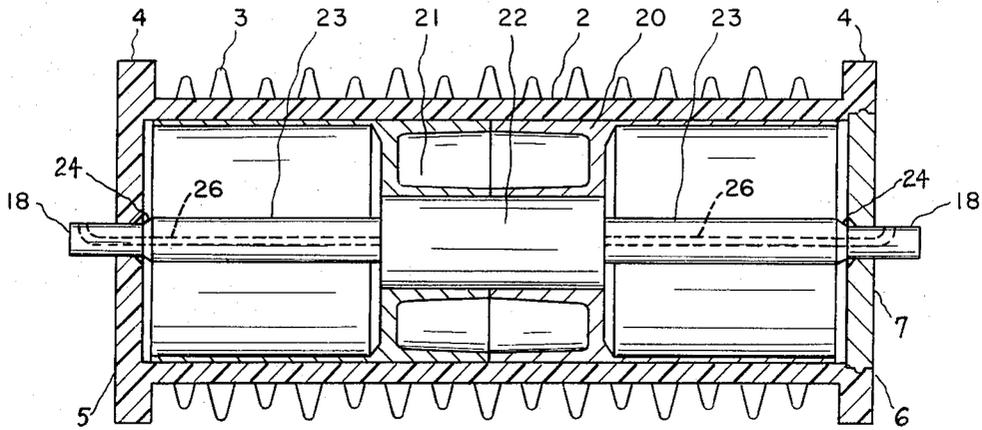


Fig. 4

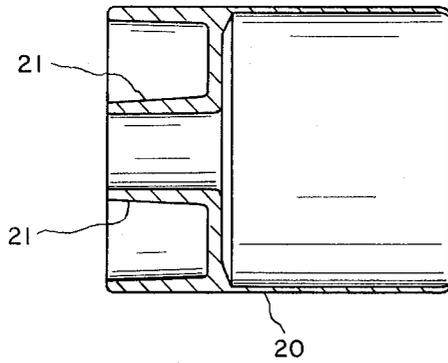


Fig. 5

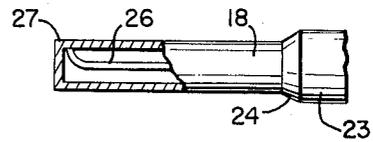


Fig. 6

INVENTORS,  
FRANCIS J. GAFFNEY  
JOSEPH F. DEGEN  
GERALD F. CLARK

BY

*Frank R. Siefert*  
AGENT

## ELECTRICALLY HEATED HAIR CURLER

This invention relates to hair curlers, in particular to electrically heated hair curlers especially adapted for use with the dispenser of the co-pending U.S. patent application, Ser. No. 872,247 filed Oct. 29, 1969, now Pat. No. 3,626,150, granted Dec. 7, 1971. The hair curler of this invention is of the type wherein the heat generating means are contained within the hair curler and are activated by an electrical circuit which passes current through the hair curler and heat generating means.

Heated hair curlers of the prior art have employed numerous heating means including external heating such as by passing warmed air around the curler or by immersing the hair curler in a hot fluid. Usually these hair curlers contain a heat absorbing medium for retaining the externally applied heat. Another heating means utilizes internal heating of the hair curlers, one method encompassing the employment of electrically heated posts or stems affixed to a base member. The hair curlers have an open end and are placed over these posts or stems such that the heat may be transferred to the inside portions of the hair curlers. This type of hair curler also contains a heat storing medium such as water or a water-wax mixture.

All of the above described systems are both rather time consuming to use and present the danger that the user may be burned by inadvertently touching one of the heat producing elements. A more effective and direct method of heating hair curlers is by placing a heat generating means within the hair curler and making same as integral part thereof. One of the problems present in this last mentioned arrangement is that of providing for quick efficient transfer of heat from the heat generating means to the walls of the hair curler and the retention of the heat by the hair curler for a sufficient length of time. Although hair curlers have been developed using electrical heat generating means positioned within same, the heat transfer from the heat source to the walls of the hair curler through the air within the hair curler and the retention of this heat by the hair curler has proved rather inefficient.

The present invention consists of a cylindrically shaped hollow plastic hair curler having finger-like projections extending outward along the cylindrical periphery thereof. Electrical resistors are positioned within the hair curler and contact a heat conducting metallic element which transfers the heat from the resistor to the outer periphery of the plastic hair curler. This heat transfer element may also serve as an electrically conductive component of the circuit which passes a current through the hair curler and resistors. The particular arrangement of resistors and metallic heat transfer elements permit for a rapid and uniform heating of the hair curlers and for retention of the heat for a sufficient length of time.

For example, by employing two ½ watt resistors a temperature of between 180° and 190° F can be achieved within 12 to 15 minutes and the curler when removed from the circuit will retain this heat for an equal length of time. This temperature, it should be noted, is not sufficiently hot to burn the fingers of the user or to be uncomfortably hot when handled or removed from the dispenser, yet is sufficient for hair curling.

Another feature of the hair curler construction resides in the rim portion provided in the periphery of the cylindrical surface. This rim portion extends outward from the periphery a distance equal to or greater than the finger-like projections and serves to separate adjacent curlers as when in a stacked position such as when placed in the previously mentioned dispenser and will thus prevent the undesirable interlocking of the finger-like projections of the adjacently placed hair curlers and permit dispensing of the individual hair curlers.

An object thereof of this invention is to provide an electrically heated hair curler which will quickly, effectively, and uniformly heat to a proper hair curling temperature and will retain such heat for an optimum length of time.

Another object of this invention is to provide an electrically heated hair curler having self-contained heat generating and heat transfer means.

A further object of this invention is to provide a hair curler which adaptable for placement and use in conjunction with a dispenser.

The above and other objects, features and advantages of the present invention will be apparent in the following description of the preferred embodiments when considered in connection with the accompanying drawings wherein like numerals are used to represent similar parts in the various views and embodiments shown.

FIG. 1 represents a cross-sectional view of the hair curler.

FIG. 2 represents a sectional view taken along lines 2—2 of FIG. 1.

FIG. 3 represents the spool element shown with two resistors in place and a partial view of the heat transfer member.

FIG. 4 represents another embodiment using a separate heat-sink.

FIG. 5 represents one of the two sections of the heat-sink.

FIG. 6 shows the lead wires used in the embodiment of FIG. 4 positioned within the sleeve member which is partially broken away.

The electrically heated hair curler indicated generally as 1 in FIG. 1, consists of a hollow outer cylindrical member 2, preferably made from a flame retardent plastic material. Finger-like projections 3, extending outward along the periphery of the cylindrical member are used for engaging strands of hair to be curled. The cylindrical surface also contains rim portions 4, shown at both ends of the cylindrical hair curler. These rim portions, can be formed as an integral part of the curler and will serve to separate adjacently placed hair curlers when they are in a stacked position such as in a dispenser, and thus preventing the undesirable interlocking of the finger-like projections. It should be apparent that the particular shape of the hair curler, the use and placement of the finger-like projections and rim portions are described in a preferred shape and arrangement; the choice however, would be subject to obvious modifications by one skilled in the art.

The hair curler as disclosed in FIG. 1 consists of a cylindrical member having a closed end 5 and open end 6, the open end being closed by a snap-fitting cap 7. A spool member 8, preferably consisting of a flame retardent material is centrally positioned through the open end 6, within the hair curler and can be shaped as shown in FIG. 3. This shape may be varied or modified by one of ordinary skill in the art and its primary importance is as a supporting element for the resistors and thermal conducting members and also as an insulator for separating these members. Specifically, the spool 8 supports the resistors 9 and 10 and the heat transfer members 11 and 12. The spool has two lug portions 13 and 14 and a lip portion 15, the lip extends radially outward beyond the outer periphery of the two lug portions. The electrical resistors 9 and 10 are positioned on the spool member and electrically interconnected as shown on FIG. 3 by the conductive wires or strips 16. The heat transfer members 11 and 12, are preferably made of stainless steel and are sufficiently resilient so as to maintain intimate contact with the shell heat-sink member 17. These members are positioned around each of the lug portions 13 and 14 and partially surround the resistors 9 and 10 as best shown in FIG. 2. The wire conductors 16 are also in electrical contact with the heat transfer members and can be soldered thereto. Thus the wire conductors 16 electrically interconnect the two resistors and the heat transfer members. The lip portion 15 of the spool serves as an electrically insulating separator between the two heat transfer members so that the two resistors 9 and 10 are effectively connected in a parallel circuit.

A shell heat-sink member 17 preferably made of extruded aluminum, is positioned around each of the heat transfer members and is in electrical and thermal contact with same. The two aluminum shell members are, however, separated from contact with each other by the lip portion of the spool member. Each of the ends of the aluminum shell members contain projecting studs or terminals 18, extending through the closed end 5 and the snap-fitting cap 7 of the hair curler and these studs serve as electrical contact terminals. The studs

may also have a brass sleeve 19, press-fitted around the end of the stud to improve the electrical contact and durability of these terminals.

In operation, the electrically heated hair curlers are usually stored in a stacked position in the dispensing device such as the one previously mentioned. The curlers are activated by an electrical current which passes through the hair curler and resistors via the terminals 18, the aluminum shells 17, heat transfer members 11 and 12 and conductive wires 16 so as to activate the two resistors 9 and 10. Within a short period of time, approximately 12 to 15 minutes, using two ½ watt resistors and normal house current, the desired heat will be generated by the resistors and thermally transferred by the heat transfer members which are in contact with and surround each of the resistors; thence from the said heat transfer member to the aluminum shell and therefrom to the plastic hair curler. The aluminum shell member will retain the heat once the hair curler is removed from the dispenser and hence separated from the electrical circuit.

Another embodiment of the electrically heated hair curler is illustrated in FIG. 4. This embodiment is similar to the one shown in FIG. 1 and will be described using the same reference numerals for like elements. The curler includes an outer cylindrical shell 2 preferably made from a flame retardant plastic material, the cylindrical shell has a closed end 5, an open end 6, and a snap-fitting cap 7 adapted to close the open end. Finger-like projections 3 extend outwardly along the periphery of the cylindrical shell and outwardly extending rim members 4 are circumferentially placed at both ends of the shell. The internal structure is somewhat simplified by the use of a shell or heat-sink 20 designed to conform to and fit snugly within the hair curler when inserted through the open end, and is preferably made of aluminum. An inwardly projecting edge portion 21 forms a cavity for accommodating the resistor 22. A sleeve assembly 23 is affixed on either end of the resistor and the lead wires 26 are passed therethrough and terminate (as shown at 27 in FIG. 6) in terminals 18 extending through both ends of the hair curler. The sleeve 23 is useful for providing rigidity to the lead wires to insure the correct positioning of the resistor within the curler. The terminals 18 may be an integral part of the sleeve, as shown in this embodiment, and can be formed by a necked-down portion of the sleeve. This necked-down portion will provide a shoulder 24 which abuts against the respective closed end and cap to securely hold the resistor within the curler. The sleeve is preferably made of a conductive material, such as copper, and can be secured to the lead wires by soldering, crimping the sleeve around the wire, using a conductive epoxy or other like means which will provide a conductive contact between the wire and sleeve. It should be obvious that other methods of providing structural support for the resistor and lead wires can be equally as effective. The heat-sink 20 can be fabricated in two complementary sections as shown in FIG. 5 such that when assembled, by insertion through the open end, the hair curler can assume the position shown in FIG. 4. It should be apparent that the heat-sink can be designed and the edges shaped accordingly so as to accommodate more than one resistor placed therein.

In operation, the electrically heated hair curler will work in much the same manner as the hair curler described with

reference to FIG. 1. The heat-sink used in place of the shell member 17 and heat transfer members 11 and 12 of that previously described hair curler. The heat generated by the resistor 22 will be thermally transferred through the shell to uniformly heat the outer walls of the cylindrical hair curler. This curler will also be particularly adapted for use within the dispensing device referred to herein.

It has been found that the plastic hair curler will retain an operative temperature of about 180° to 190° F for approximately 12 to 15 minutes which has been determined as a sufficient length of time for proper usage in hair curling.

The above cited embodiments are intended as exemplary, and while they have described the invention with a specific implementation thereof, other modifications will be apparent to those skilled in the art.

What is claimed:

1. An electrically heated hair curler which will uniformly and quickly heat to proper hair curling temperature comprising a hollow-walled cylindrically shaped curler member, means enclosing both ends of said curler member, at least one electrical resistor housed within said curler member for generating heat, a pair of shell members positioned within the curler member for uniformly transferring the heat generated by said electrical resistor to the outer wall of said curler member, each shell member being constructed of heat conducting material and comprising a cylindrically shaped outer wall conforming to the shape of the curler wall arranged in intimate contact with the curler wall, an inwardly extending cavity defined by inwardly projecting edges of said shell for accommodating therein at least a portion of said electrical resistor, said pair of shell members arranged in end-to-end relation within said curler member so that said cavities are aligned and abut each other so as to form a single cavity for housing therein the entire electrical resistor, said resistor being in thermal contact with the inwardly projecting edges defining the cavity of said shell members so that the heat generated by said resistor is transferred to the outer wall of said shells, a sleeve member extending from opposite ends of said resistor longitudinally through each of said shells for carrying therethrough lead wires of said resistor, said lead wires being in electrical contact with said sleeve members, electrical terminals connected to the ends of said sleeve members and extending externally of both opposite ends of the curler member for connection to a source of electric current, and a plurality of finger-like projections extending outwardly about the periphery of the cylindrical shaped curler member for engaging strands of hair to be curled.

2. A hair curler as claimed in claim 1 further including a rim member formed on the surface of the cylindrical curler member and projecting outwardly around the periphery of the curler a distance at least equal to the extension of the finger-like projections, said rim preventing the interlocking of the finger-like projections of adjacently placed curlers.

3. A hair curler as claimed in claim 2 wherein the sleeve assembly has a shoulder portion for abutting engagement with the end of the curler and to rigidly position the resistor within the curler.

4. A hair curler as claimed in claim 3 wherein the hair curler is made of flame-retardant polypropylene and the shell is made of extruded aluminum.

\* \* \* \* \*