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HAIR STRAIGHTENING METHOD AND APPARATUS

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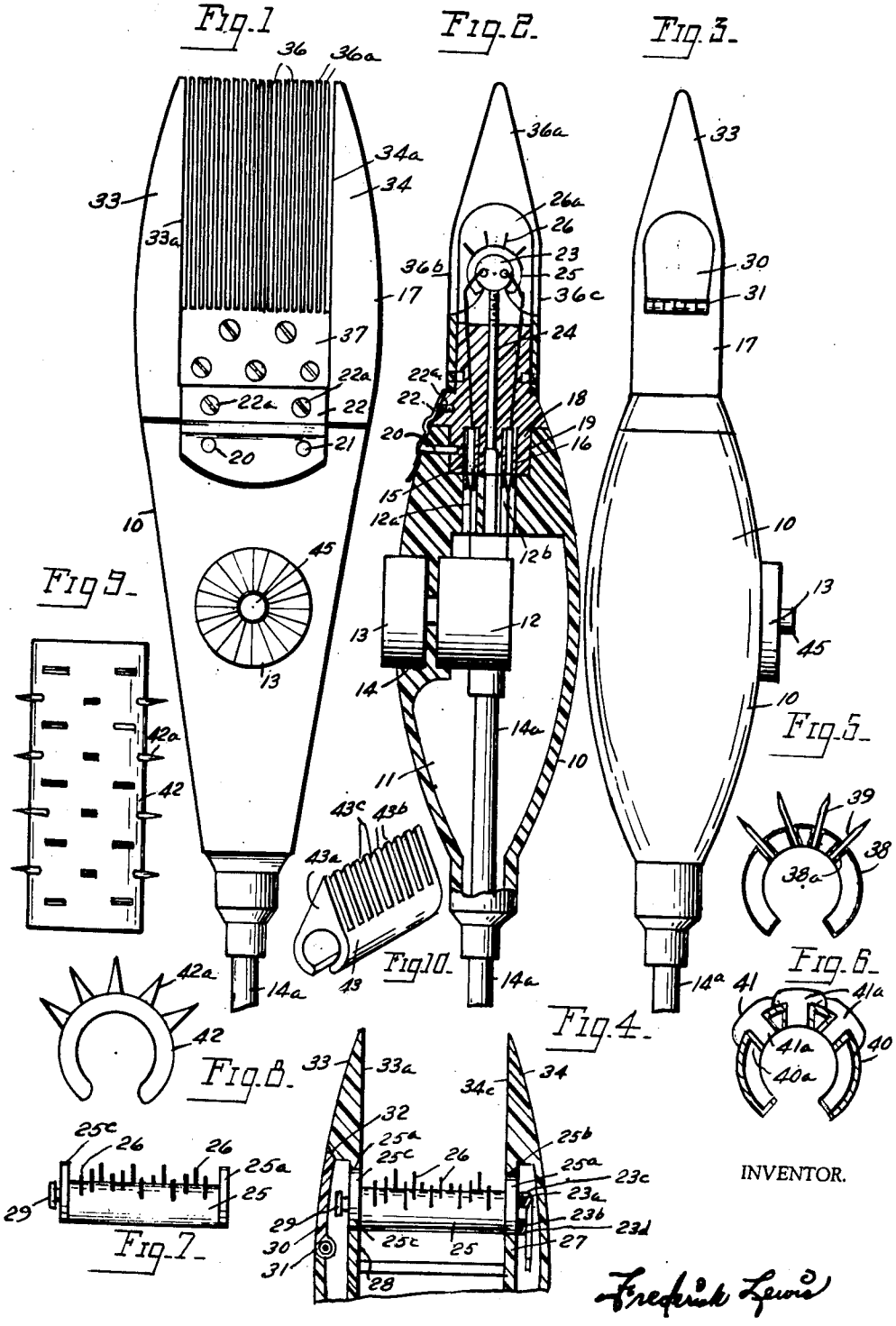

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HAIR STRAIGHTENING METHOD AND APPARATUS

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This invention relates to a new type of electrical heated hair straightener, and one of its objects is to provide a hair straightener tool or device with a comb and a hair heating unit located in line with the hair receiving slots of the comb, which will penetrate the combed hair and exert a zig-zag action on the combed hair, which will apply considerable pressure to the hair and considerable friction and transmit heat into the mass of hair passed through the comb, so that a quick and durable hair straightening action is obtained in a short period of time.

Another object of the invention is to provide a hair straightening device, tool or machine, with a hair heating unit having radiating pins or teeth arranged in a zig-zag pattern, and an electrical heater located under or within the member having the radiating pins, so that heat is quickly conducted to the radiating pins and the strands of hair exposed to those radiating pins will be reformed under pressure and with considerable friction, so that straightened hair will result in a very short period of time, without danger of burning the hair through overheating, and without burning the scalp.

A still further object of the invention is the provision of a hair straightener machine with a head constructed to carry the heating element and the heat transfer element with radiating pins, which can be quickly detached from the body of the tool or device, and a different head mounted in position thereon.

A further object of the invention is the provision of a hair straightening unit having a comb of plastic material, an electrical heater located within the comb, and a heat transfer unit having staggered radiating pins thereon, which can be slidably mounted over the electrical heater, and withdrawn from the head through an opening in one side thereof.

A further object of the invention is to provide a hair straightener with an electrically heated heat transfer unit having staggered projections thereon, so arranged that these projects are forced through the hair while it is being combed, and the strands will be subject to pressure, tension and considerable friction in being drawn against the staggered heated projections and a rapid removal of the natural curls of the hair being treated will result.

A still further object of the invention is to provide a low cost hair straightener which will operate without the use of an electrical motor, using heated projections or pins arranged in staggered pattern, and a comb aligned with these projections or pins, to produce rapid hair straightening.

With the above and other objects in view the invention comprises certain new and useful constructions, combinations and arrangements of parts, clearly described in the following specification of the drawings, which illustrate the practical embodiment of my invention, and in which:

FIG. 1 is a side elevation, showing the comb and heat regulating knob.

FIG. 2 is a central longitudinal sectional view, with end parts shown in elevation.

FIG. 3 is an edge view in elevation.

FIG. 4 is a detail longitudinal sectional view of the heat transfer unit and the spring closed door.

FIG. 5 is a detail sectional view of the heat transfer unit and radiating pins.

FIG. 6 is a similar view of a modified form thereof.

FIG. 7 is a detail side view of the radiating pin unit detached from the heater.

FIG. 8 is a cross sectional view of a modified form of the heat transfer unit.

FIG. 9 is a detail plan view thereof.

FIG. 10 is a perspective view of a modified internal comb unit.

Referring to the accompanying drawings, **10** designates the body of the improved hair straightening tool or device, which is made of molded plastic material, and constructed hollow, to provide a chamber **11**, in which the heater regulating unit **12** is housed. This regulation unit is provided with an operating knob **13**, which is located on the outside of the body, so that it may be manually operated, and is shown to be nested in an external pocket **14** formed in the wall of the body **10**. An electrical current cord **14***a* is connected with this regulator and extends axially through an opening formed in the tail end of the body. This body is shaped so that it may be easily and comfortably held in the hand of an operator.

From the regulator **12** current lead wires **12***a* and **12***b* extend forwardly to the connector pins **15** and **16**, mounted in the central part of the body **10**.

A head part or unit **17** is arranged to be coupled to the forward end of the body or handle **10**, and for this purpose is formed with a tapered plug **18** on its rear end, which fits in a corresponding socket **19** of the body or handle **10**. Latch pins **20** and **21**, carried by the metal spring plate **22**, attached by screws **22***a* to the head unit **17**, are arranged to pass through the wall of the handle or body and to penetrate the plug **18**, and thereby lock this plug against accidental withdrawal. By displacing the spring plate **22** outwardly these latch pins will be displaced outwardly, so that the plug **18** may be easily withdrawn.

In the head unit **17** an electrical heater **23** is mounted, as by means of the centrally located clamping screw **24**. This electrical heater unit is formed with a convex upper side, of uniform longitudinal diameter or shape, and on this semi-cylindrical heater the heat transfer metal sleeve **25** is slidably mounted. This sleeve is provided with a plurality of radiating hair combing pins or projections **26**, arranged in a plurality of longitudinal rows. As shown these pins may be of sewing needle or garment pin diameter, but stiffened by the use of high quality material, and provided with sharp pointed outer ends.

The sleeve **25** is C-shaped in cross-section, and has a snug fit on the semi-cylindrical heater unit **23**. This sleeve may be provided with a flange **25***a* on its inner end, which fits snugly in the opening **25***b* of the internal partition **27** of the head unit **17**, and a flange **25***c* on its outer end which fits in the opening **25***d* of the partition **28** of the head unit. The sleeve **25** may also be provided with a pull knob **29**, so that it will be easy to manually withdraw the sleeve from the heater unit.

For this general purpose the body shell **10** is provided with a spring closed door **30**, mounted in place by means of the spring hinges **31**, and designed to fit snugly in an opening **32** formed in the wall of the body. By opening this door against its spring hinges, the operator may insert a plier or tool, or a hook and remove the sleeve **25**, and replace it with another type of sleeve or one of the same type. Later other types of sleeves will be disclosed.

The head unit **17** is formed with two longitudinal comb fingers **33** and **34**, having parallel inner surfaces **33***a* and **34***a*, and the projections or combing pins **26** of the heat exchanger sleeve **25** project into the opening between these fingers. This opening is closed by means of a comb of nlyon or other high strength plastic material, comprising a main combing section **35** formed with longitudinal hair receiving slots **36** and combing teeth **36***a*,

and unslotted holding end portions 37, which are fastened or otherwise secured to the sides of the head unit 17. The combing teeth 36*a* have solid ends, as shown in FIG. 2. The combing section 35 thus comprises two rows of opposite vertical parallel legs 36*b* and 36*c* and one row of solid common ends 36*a*. Each tooth 36*a* defines an arched opening 26*a*.

The heater unit 23 is provided with terminal pins 23*a* and 23*b*, which are connected to the feed wires by the terminal caps or sleeves 23*c* and 23*d*.

In FIG. 5 I show a combing sleeve formed of sheet metal 38 and provided with extruded sockets 38*a* in which the combing pins 39 are permanently secured, by silver solder, or pressure fitting.

In FIG. 6 I show a similar sleeve 40, having sockets 40*a* which receive the studs 41*a* of the arched combing lugs or teeth 41. In FIGS. 8 and 9 I show a precision cast combing sleeve 42 having V-shaped and sharply pointed combing teeth 42*a* formed thereon. This casting may be made by the so-called lost-wax process, or in plaster of Paris molds. In all cases the combing teeth or lugs on the heat transfer sleeve are arranged in parallel rows, with the members of two rows arranged in staggeerd relation to the members of the adjacent rows.

When the assembled hair straightening device, tool or machine, is used, the comb is forced into the hair and pushed along. This causes the hair to be divided by the comb teeth, allowing the hair to enter the parallel slots of the comb and come into actual physical contact with the combing pins or teeth of the heat transfer sleeve within the head unit. The heat of this sleeve is transferred by the sleeve itself and by these combing teeth to the hair, and due to the lengths of these combing teeth or pins, the heat is conducted or transferred deep into the strands of hair.

As the hair develops a wiping action on the heat transfer sleeve and against its combing teeth or pins, the hair is bent into zig-zag pattern, while the hair is being pulled through the comb teeth under tension in the presence of the heat generated by the electrical heater and transferred to the hair by the heat transfer sleeve and combing teeth or pins thereof. The heat softens the hair and is transferred deep into the strands moved through the slots of the comb and against the combing pins or teeth of the heated sleve, and to pass the hair through all combing elements it is necessary to apply considerable pressure to the comb and this pressure serves to maintain the hair, after it is softened by the electrically generated heat, in pressure contact with the heated sleeve and the combing pins or teeth thereof. But the teeth of the heated sleeve do not offer straight slots or passages for the hair strands and develop considerable frictional resistance to the movement of the hair strands, so that natural waves are ironed out and the hair straightened by this action. The hair remains in an attractive straightened condition when it cools.

The electrical heater and the heater sleeve and its combing pins or projections are located within the head unit, so that they cannot actually contact with the scalp of the user. The head unit, the comb unit, and the body shell are all made of high impact plastic, which is a poor conductor of heat, and there is no danger of the scalp of the head or any flesh of the head being scorched or overheated, as all contacting surfaces are merely comfortably warm, not dangerously hot, during the hair treatment.

This unit is designed to provide women with an instrument or tool by which they can maintain natural waved hair in an acceptable straight condition, using no more skill than is required to operate a comb or brush, and in complete safety.

The device may be provided for safety purposes with an automatic thermostatic heat control (not shown). A manual switch is provided on the body (not shown).

In actual professional service use, each type of heated sleeve may be mounted in a head unit, and when it is found necessary or useful to change the type of the heated sleeve, the head attached to the body may be removed and a head unit with the preferred heated internal combing part or unit may be placed in service position on the body.

In FIG. 10 I show a modified form of the internal comb and heat exchanger, which includes a solid metal body 43, having a longitudinal opening to receive the electrical heater unit, which is C-shaped in cross section, and is provided with a series of integral V-shaped comb teeth 43*b* formed on a V-shaped extension 43*a*, and provided with slots 43*c* between these V-shaped teeth 43*b*, thereby providing a solid internal comb unit.

Long experience in the field of straightening naturally curly hair has established the importance of using a hair heating unit with high temperature and of providing complete protection to the customer being treated. If the temperature of the heated hair softening element is within the range which will not burn the flesh of the customer being treated, then it will completely fail to straighten the hair.

Straightening hair in commercial parlors calls for a tool which will rapidly straighten naturally curly hair, and to keep the customer in a pleasant mood, without tension, and to avoid scorching or burning of the flesh, or hot contact with the flesh which would excite the customer, and increase the difficulties of the operator in completing the hair treatment in a reasonably short period of time, and with maximum styling effects.

These considerations have led to the present construction, which includes an internal unit having an electrical heater enclosed by a metal sleeve provided with external metal pins which are arranged in staggered relation to each other: the electrical heater being designed to produce a temperature greatly in excess of what human flesh can endure, even for a moment of passing contact, but which is capable of rapidly softening the human hair through which the device is combed.

The human hair is shielded on all sides of this internal electrical heater by a plastic comb, having combing teeth of U-shaped construction, so arranged that a cavity or heating chamber is provided within the body of the comb, which houses the high temperature generating electrical unit and internal comb.

It is found that by using metal pins on the heat conductive metal sleeve of the electrical heater, arranged in a zig-zag order, that sharp bends can be made in the strands of human hair, to subject the same to considerable tension in drawing the internal and the external comb through the human hair, and that very rapid and complete straightening of the hair results, due to the rapid softening of the hair and the use of tension generating heat conducting metal pins forming a zig-zag internal comb.

The external comb is constructed of nylon or some similar non-metallic material, which may be plastic, which has well known dependable hair combing qualities. At no point is the internal electrical heated metal cylinder and its external combining pins in physical contact with the external comb, and it is not possible for the metal pins of the internal comb to have physical contact with the scalp or flesh of the person being treated. The external comb has extremely low heat conducting properties and does not store up heat generated by the electrical heater, and remains comfortable at all times and may be kept in continued contact with the flesh of the user, without being offensive or painful.

My invention, therefore, embraces an external comb which provides a safe shield for an electrical heater on which is mounted a heat transferring metal comb, always kept out of direct physical contact with the person being treated, and so arranged that it is never overheated or capable of scorching the scalp or flesh of the person being treated, or of burning the hair. The staggered arrangement of the metal heat conducting pins forming the internal comb subjects the strands of hair to high ten-

sion when the device is forced through the hair, so that the natural curls of the hair are ironed out while they are exposed to the high heat of the internal comb. The use of the rounded metal pins in staggered order, provides zig-zag paths for the movement of the hair through the two combs, and the hair in emerging from the combs is formed to be devoid of its natural curls.

This action is completed in minutes, and makes my invention particularly useful to women who have outside employment, as they can quickly complete their hair conditioning.

Although the present invention has been described in conjunction with preferred embodiments, it is to be understood that modifications and variations may be resorted to without departing from the spirit and scope of the invention, as those skilled in the art will readily understand. Such modifications and variations are considered to be within the purview and scope of the invention and appended claims.

Having disclosed and described my invention, I claim as new:

1. A hair straightener, comprising a hair comb having a plurality of parallel teeth and slots between the teeth, a hair heater disposed across the slots and disposed inwardly of said comb and spaced apart therefrom and a heat transferring member detachably mounted on the heater and provided with hair combining projections disposed in the path of the movement of the hair moved through said slots and offset relative to each other to cause said hair intercepted by said projections to bend in opposite directions to increase the frictional resistance of said projections to said hair, whereby natural waves in the hair will be subject to a heat softening action and simultaneous tension and friction displacement to straighten the same.

2. A hair straightener, comprising a body forming a handle, a head unit detachably coupled to the body and provided with a comb having parallel teeth of material of low heat conductivity and slots between said teeth, an electrically heated metal member having high heat conductivity disposed inwardly of said comb and spaced therefrom and across said slots, the slots being continued to cause hair moved into said slots to contact said metal member, and means on said metal member for causing the hair to bend in opposite directions in moving across said member, said means comprising hair combining projections relatively offset to each other and disposed in the path of movement of the hair whereby the heated metal member will soften the hair being treated and the softened hair will be subject to simultaneous tension and frictional resistance by said means.

3. A hair straightening device, comprising an external comb having U-shaped combing teeth providing parallel hair receiving slots and a chamber within the comb, an electrical heating unit located in the chamber and spaced out of physical contact with the external comb and disposed across said slots, and a series of metal pins mounted on said heating unit and projecting toward the slots of the external comb and spaced from direct contact with said external comb and arranged to form an internal comb for hair passed through said slots into said chamber.

4. A hair straightening device, comprising a body, an external comb of U-shaped construction of non-metallic material mounted on one end of the body and providing outwardly of the body a heating chamber between the body and the comb, the comb having parallel teeth spaced apart to provide hair receiving slots and having slotted side walls, an electrical heater having a metallic heat-conducting surface disposed in said chamber across said slots, means for supplying electrical current to said heater, and combing means of heat conducting material arranged on said heater and providing zig-zag hair paths across said heater, the heater being adapted to have a high temperature for softening hair rapidly passed through the slots into said chamber against said heater and the external comb having low heat conducting qualities and adapted to remain at a temperature below the flesh scorching range when the electrical heater is energized for hair straightening service.

5. A hair straightening device, comprising in combination, a hollow body forming a handle, a non-metallic comb having a plurality of projecting teeth at one end thereof and a hollow portion at the other end thereof, said comb being removably secured to said body at the end having said hollow portion, a heating unit removably supported in said body opposite said plurality of projecting teeth, said heating units having a plurality of staggered rows of heat-conducting projections extending towards said plurality of teeth and electric heating means operatively connected to said heating unit.

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