United States Patent

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[72] Inventor **Wilburt W. Mays**
2020 77 N. 8th St., Philadelphia, Pennsylvania 19133

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[54] **ELECTRICALLY OPERATED HAIR TREATING DEVICE WITH REMOVABLE CURLING AND COMBING MANDRELS AND INTERNAL SLIP PULLEY SAFETY FEATURE**
10 Claims, 8 Drawing Figs.

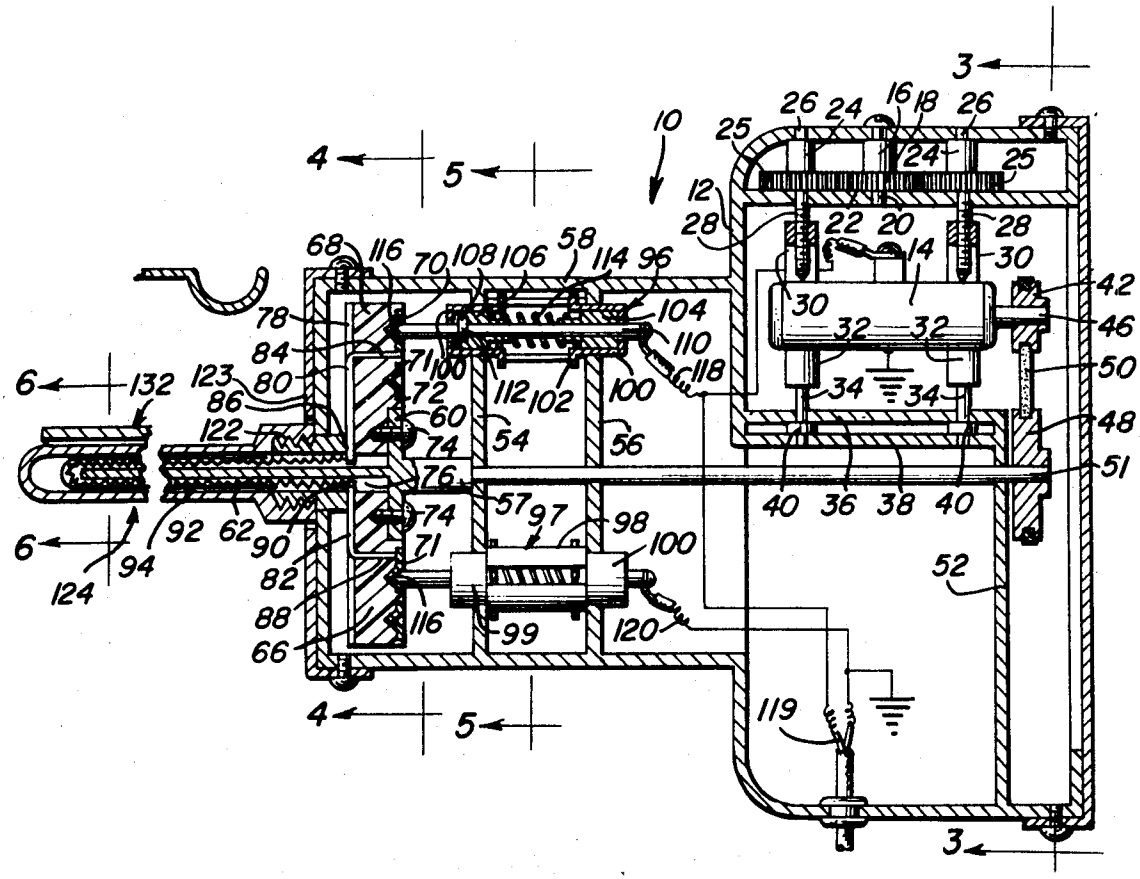
[52] **U.S. Cl.** **132/148,** 132/11, 132/34, 219/226
[51] **Int. Cl.** **A45d 2/36,** A45d 24/00
[50] **Field of Search** 132/34, 11, 33.1, 1, 148; 219/222, 229, 233, 240, 225, 226

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Primary Examiner—F. Barry Shay
Assistant Examiner—Jay N. Eskovitz
Attorney—Clarence A. O'Brien and Harvey B. Jacobson

ABSTRACT: A motor output shaft drives a first pulley wheel which is aligned with a second pulley wheel, the latter being fixedly mounted upon a drive shaft for transmission of rotation thereto. A pulley belt is positioned around the wheels whereby slippage of the belt occurs when a predetermined minimum torque is applied to the drive shaft. A commutator disk is mounted upon the drive shaft, the disk furnishing electrical connection to an enlongated heater coil. Spring-loaded brushes make contact with conductor portions of the commutator disk. A curling mandrel is disposed concentrically around the heating coil in spaced relation thereto. The curling mandrel is removable thus enabling an alternate removable positioning of a combing mandrel in its stead.



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Fig. 1

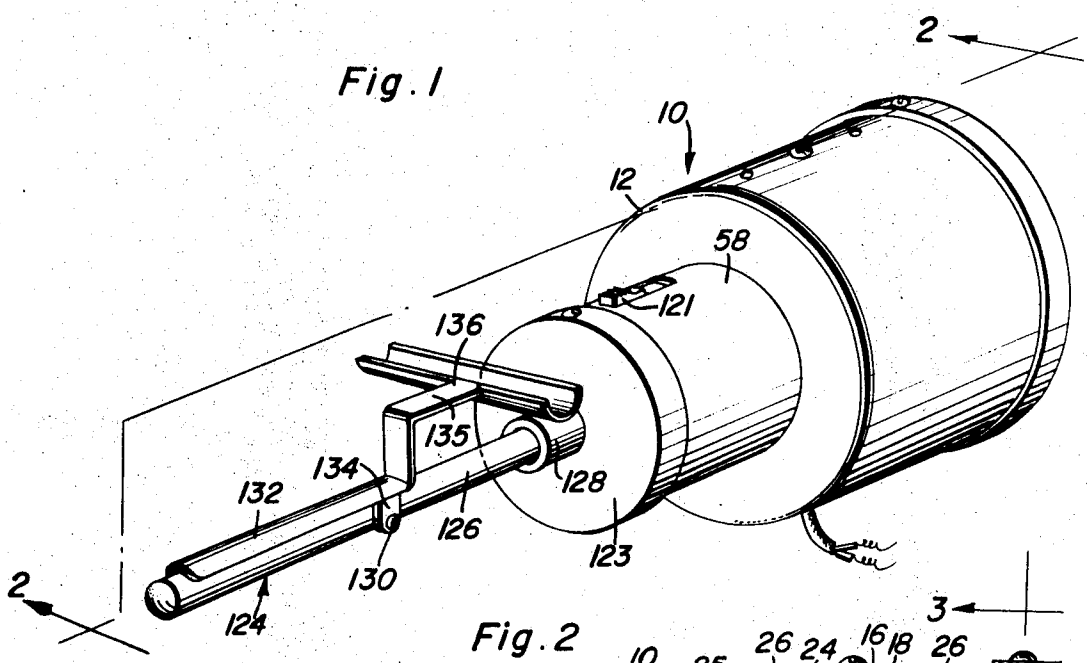


Fig. 2

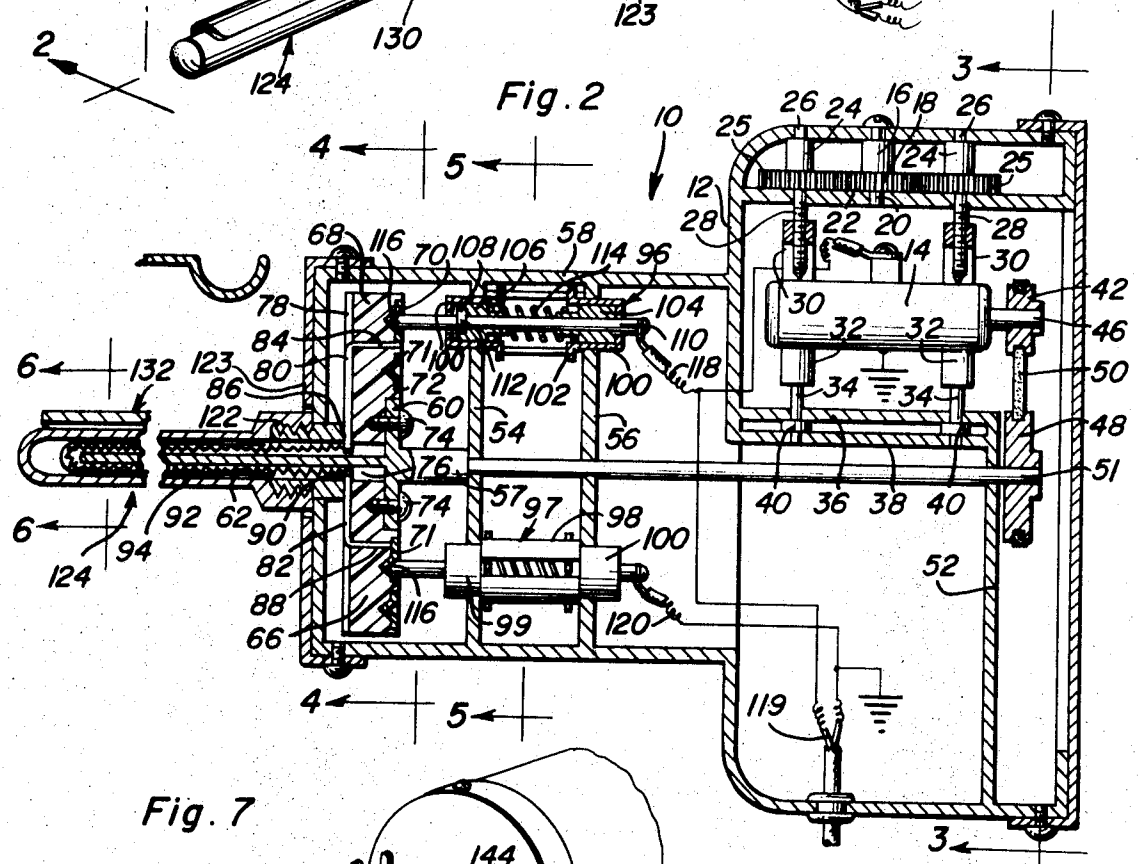
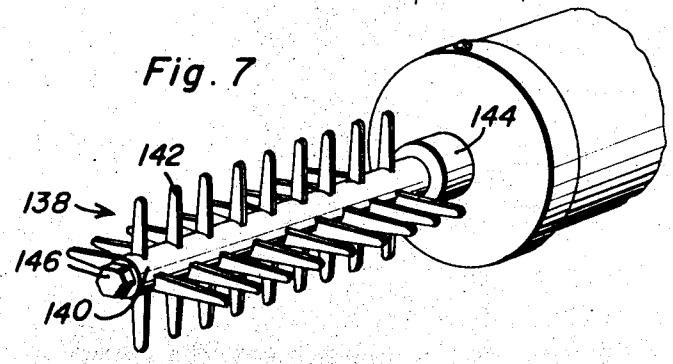


Fig. 7



Wilburt W. Mays
INVENTOR.
BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

Fig. 3

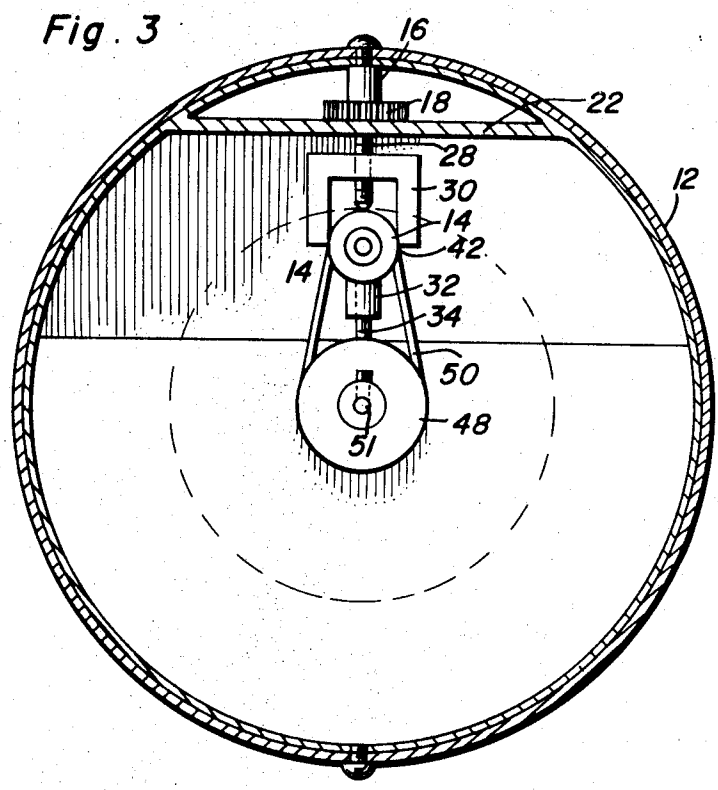


Fig. 6

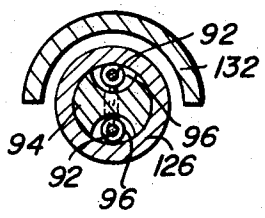


Fig. 8

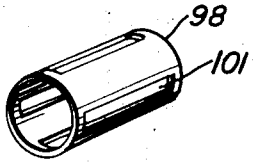


Fig. 4

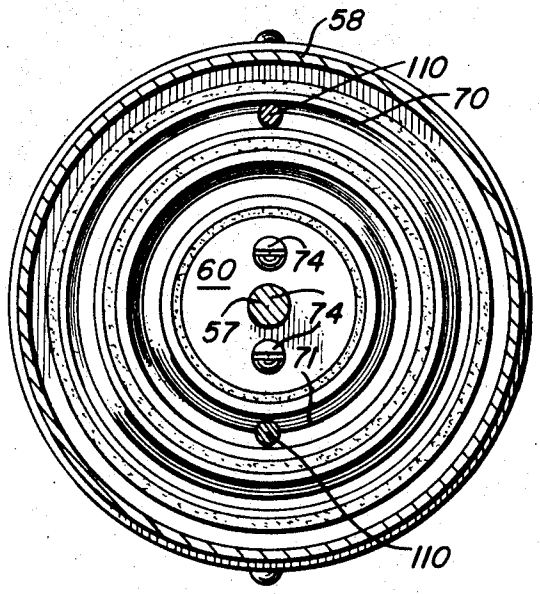
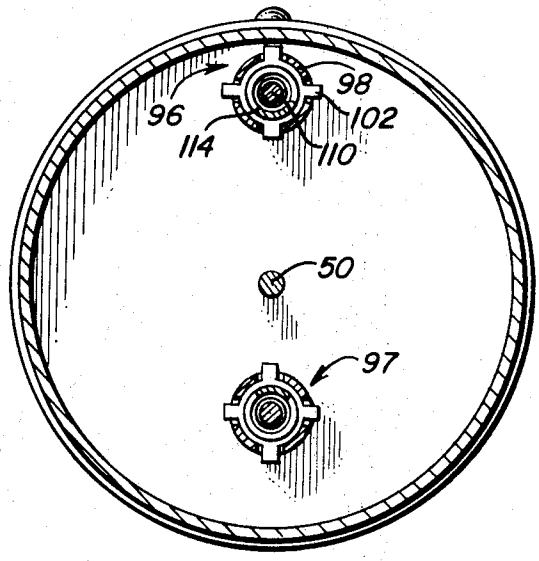


Fig. 5



Wilburt W. Mays

INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

ELECTRICALLY OPERATED HAIR TREATING DEVICE WITH REMOVABLE CURLING AND COMBING MANDRELS AND INTERNAL SLIP PULLEY SAFETY FEATURE

The field of the present invention relates to hair treatment devices and more particularly to an electrically operated hair treating device with removable curling and combing mandrels.

The prior art includes a number of electrically driven devices for curling and combing hair by means of engaging hair strands with a rotating curling or combing mandrel. One object of such devices is to permit slipping of the rotating drive when a preselected minimum torque load is applied to the aforementioned mandrel. Otherwise, the user would encounter pain and damage to the hair due to excessive pulling forces. Certain prior constructions have sought to eliminate this problem by utilizing a friction drive between an electric motor and a rotating shaft. However, such constructions are prone to rapid wear due to the friction heat generated between these moving parts. Such wear requires frequent replacement of parts as well as frequent readjustment to achieve proper slipping. These prior devices generally require disassembly when such an adjustment is needed. The prior art also includes a number of constructions which apply heat to the hair during the curling thereof which increases the set to which the hair is subjected. These latter devices use an elongated rotating heating coil disposed interiorly of the aforementioned mandrel which uniformly distributes the heat generated from the coil to the treated hair. As will be appreciated, a commutating device is generally required to supply electrical energy to the heating coil as it rotates within the mandrel. However, these latter mentioned prior constructions have failed to develop a commutating device which is efficient, long lasting, and requires a minimum of space. Also, many known devices are not equipped to accept interchangeable mandrels which may be separately used for curling or combing hair while applying heat thereto.

In summary, the present invention includes a drive shaft which is driven by pulley means, the tension of which may be adjusted. Accordingly, should the drive shaft experience a preselected minimum torque load, a belt entrained about the pulley means slips thereby preventing injury to the user or damage to her hair. The tension is simply adjusted by external means which cause a displacement between pulley wheels of the pulley means thereby varying the tension on the entraining belt. The drive shaft in turn drives a commutator disk which includes concentrically spaced conducting grooves therein. Spring-loaded conductor brushes are respectively positioned in each of these grooves. This arrangement permits efficient and long lasting utilization of brushes and commutator in a satisfactory minimum space. An elongated heater coil is connected to the commutator disk thereby causing the heater coil to rotate therewith during operation of the device. This rotation of the heater coil causes a uniform heat distribution across a hair treating mandrel which is disposed concentrically about the heater coil in spaced relation therewith. This mandrel may take one of two forms: a curling mandrel principally utilized when setting hair; and a combing mandrel which includes a number of columns of teeth circumferentially spaced around the combing mandrel. As will be appreciated, the user may selectively interchange the type of treating mandrel used which increases the flexibility of the device. Thus, the present invention accomplishes a number of objects heretofore not achieved in toto.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a perspective view of the present hair treating device.

FIG. 2 is a sectional view taken on a plane passing through section line 2–2 of FIG. 1.

FIG. 3 is a sectional view taken along a plane passing through section line 3–3 of FIG. 2.

FIG. 4 is a sectional view taken along a plane through section line 4–4 of FIG. 2.

FIG. 5 is a section view taken along a plane passing through section line 5–5 of FIG. 2.

FIG. 6 is a sectional view taken along a plane passing through section line 6–6 of FIG. 2.

FIG. 7 is a perspective view illustrating the combing mandrel.

FIG. 8 is a perspective view illustrating a sleeve member utilized in a brush assembly.

Referring specifically to the drawings, the present hair treating device is generally denoted by reference numeral **10**. A first cylindrical housing portion **12** encloses an electric motor **14** shown in FIG. 2 of the drawings, the motor rotatably driving hair treating members as hereinafter explained. In order to limit the torque deliverable by the hair treating members, a drive slipping mechanism is provided to cooperate with the motor **14**. This mechanism includes an adjusting pin **16** which extends through the cylindrical wall of the housing **12**. An intermediate length of the pin receives a spur gear **18**. The inward end **20** of the rod terminates in a journal block **22**, the latter being disposed inwardly of the cylinder wall **12** in spaced relation thereto. Similar rods **24** are disposed in parallel spaced relation with the aforementioned rod **16**. The outward end **26** of each said latter rods are secured within bearing apertures formed within the cylindrical wall of the housing **12**. Spur gears **25** are disposed along respective intermediate lengths of these latter mentioned rods **24** for meshing engagement with the aforementioned gear **18**. Threaded fasteners **28** are suitably affixed to the inward surface of the latter mentioned gears **25** in coaxial alignment with their respective rods **24**. These latter mentioned threaded fasteners are received within mating tapped bores formed within the bight portion of a generally U-shaped bracket **30** as clearly shown in FIG. 3 of the drawings. This figure further illustrates how the outward end portions of the U-shaped brackets are suitably fastened to the cylindrical casing of a motor **14**. It is noted that each of the aforementioned brackets **30** are disposed at a respective end of the motor casing. A cylindrical spacer **32** is disposed diametrically opposite each bracket **30** in abutting relation with the motor casing. These spacers include a concentrically bored aperture therein to receive an end of a mounting pin **34** therethrough, the opposite end of the pin **34** being journaled by two parallel bearing blocks **36** and **38** in spaced relation. A shoulder portion **40** of each pin **34** is sandwiched between the aforementioned bearing blocks. As will be appreciated, the brackets **30** provide structural support for the motor **14** while the spacers **32** prevent lateral play thereof.

Attention is directed to FIG. 2 which shows a pulley wheel **42** suitably mounted and fixed to the output shaft **46** of the motor **14**. A second pulley wheel **48** aligned with the pulley wheel **42** is axially disposed within the cylindrical housing **12**. A pulley belt **50** is entrained around the pulleys thereby providing transmission of force from the pulley wheel **42** to the pulley wheel **48**. The pulley wheel **48** is suitably mounted and affixed to a drive shaft **51** which extends axially along the cylindrical housing **12**. A bearing block **52** is transversely disposed inwardly from the cylindrical housing wall **12** for supporting the drive shaft end adjacent the pulley wheel **48**.

As will be seen from FIGS. 1 and 2 of the drawings, a second cylindrical housing section **58** of smaller diameter than the first cylindrical housing section **12** appends outwardly from said larger cylindrical housing section in concentric relation with said extending drive shaft. Two parallel bearing blocks **54** and **56** are disposed transversely inwardly of the second cylindrical housing section **58**. These bearing blocks render lateral support to the outward end of the drive shaft **51**. A shoulder portion **57** appends concentrically from the latter mentioned outward end of the drive shaft **51**. The surface of the shoulder **57** confronting the bearing block **54** is maintained in bearing relation therewith for preventing axial inward play of the drive

shaft 51. The opposite end of the shoulder portion 57 terminates in a circular disk or flange 60 in concentric relation therewith. An elongated rod-like extension 62 of the drive shaft 51 appends from the outward surface of the circular flange 60. This latter extension provides rotating support for a hair treating member as hereinafter explained. The aforementioned circular flange 60 is received within a circular recess 72, the latter formed within a commutator disk 66. The body portion 68 of the disk is disposed perpendicularly of and concentrically with the shoulder portion 57 of the drive shaft 51. The body 68 of the disk is fabricated from a suitable insulating material. The inwardly planar portion of the disk includes a V-shaped circular conductor track 70 recessed within the inward planar disk surface. A similarly formed track 71 is disposed concentrically inwardly from the first mentioned track 70. It is noted that the tracks 70 and 71 are separated by the insulating material of the commutator disk 66. It is further noted that the circular flange 60 is secured within the recess 72 by means of suitable threaded fasteners 74. A bored center 76 is formed through the commutator disk 66 to permit passage of the extension shaft 66 therethrough. The outward planar surface of the commutator disk 66 includes grooves 78 therein for receiving a first conductor lead 80 and a second conductor lead 82. These leads are connected to the respective conductor tracks 70 and 71 at points denoted by 84 and 88. The opposite ends of the aforementioned leads are connected to the terminals of a heater coil 92 at points denoted by 86 and 90. A tubular extension 94 with an outwardly closed end contains an interior longitudinal groove 96 therein for retaining the heater coil 92 in an elongated manner thereby providing a radiator surface for distributing heat from the heater coil. It is noted that the heater coil and tubular extension 94 rotate as one. Brush assemblies generally denoted by 96 and 97 are disposed to contact respective grooves in the commutator disk 66. Each of the aforementioned brush assemblies includes a cylindrical sleeve 98 shown in FIG. 8 of the drawings, where it will be seen that the sleeve 98 includes four longitudinally formed rectangular slits 101 in equal spaced relation to one another. FIG. 2 illustrates the insertion of two cylindrical tubular members at both ends of the sleeve 98 and denoted by reference numerals 99 and 100. It will be noted that a shoulder is formed between confronting ends of the sleeve 98 and the respective end tubular members 99 and 100. These shoulders abut against the inwardly confronting surfaces of bearing plates 54 and 56. As further noted, the tubular members 99 and 100 are received within aligned apertures formed within these bearing blocks. The tubular members 99 and 100 are retained within the sleeve 98 by means of integrally formed lobes 102 projecting outwardly from each tubular member and received within respective slots 100. Bearing elements 104 and 106 are disposed within the end portions of the tubular members 100 and 99 respectively. The bearing element 106 includes a circular recess 108 on the outwardly disposed surface thereof for retaining a shoulder portion 112 of a brush or conductor rod 110 axially disposed within each brush assembly 96 and 97. The aforementioned bearing elements 104 and 106 contain central bores therethrough for permitting passage of the conductor rods therethrough. A compression spring 114 is disposed concentrically about the conductor rod 110 and are bounded at either end by confronting surfaces of the bearing elements 104 and 106. As will be appreciated, the compression spring yieldingly urges the conductor rod 110 outwardly from the sleeves 98. The ends 116 of the conductor rods 110 are yieldingly urged into a respective groove 70 and 71 in the commutator disk 66. Each end 116 of the conductor rods 110 is fashioned into a ball point tip to smoothly ride within a respective groove accompanied by a minimum of friction. The opposite end of each conductor rod 110 includes a binding post for permitting connection of a conductor lead. The brush assembly 96 includes such a conductor lead 118 which is connected to the "hot" lead of an input power cord 119. Also, this lead is connected in parallel with the "hot" input terminal of the motor 14. In a similar manner, the brush assembly 97 includes a conductor lead 120 connected to the binding post of the respective conductor rod 110. This lead is connected to the grounded side of the power cord 119. It is noted that a second electrical input terminal of the motor 14 is suitably grounded. Although FIG. 2 does not show a control switch, it will of course be understood that such a switch 121 as shown in FIG. 1 may provide on–off control of the electrical circuit. Thus, an electrical circuit is completed through the electrical motor 14 upon actuation of the switch 121 which initiates rotating operation of the present device. Also, a parallel electrical circuit is completed through the series connection of: brush 96; commutator disk groove 70; lead 80; heater coil 92; lead 82; commutator disk groove 71; and return to ground through brush assembly 97.

A threaded mounting post 122 extends perpendicularly outwardly from the planar surface of the commutator disk 66 opposite the groove containing surface. This mounting post passes through a centrally disposed aperture formed within a cover plate 123 transversely disposed at the outward end of housing section 58. Referring to FIG. 1 of the drawings, a curling mandrel assembly is illustrated and generally denoted by reference numeral 124. This assembly includes a mandrel 126 closed at the outward end thereof and concentrically disposed over the shaft extension 94 in overlying relation therewith. This mandrel is fabricated from a heat conducting material which will cause even distribution of the heat radiated from the heater coil 92. The inward end of the mandrel includes a threaded coupling 128 which is mounted upon the threaded mounting post 122 and removable therefrom. Two pins 130 project outwardly from the mandrel 126. A sheath-like hair clamping blade 132 includes a channel portion which conforms to the outward surface of the mandrel. It is noted that this clamping blade is normally positioned in yieldably urged overlying relation with the mandrel by means of a suitable spring (not shown). Attaching ears 134 append from the channel portion of the blade thereby permitting pivotal mounting of the same on the pins 130. The inward end of the clamping blade 132 includes an L-plate section 135 longitudinally disposed therewith and terminating in a transversely disposed channel element 136 which accomodates a user's finger and helps achieve lever action of the blade 132 when it is desired to open the blade from its overlying position on the mandrel 126.

Attention is directed to FIG. 7 of the drawings which shows an alternate embodiment of the present invention utilizing the same driving unit as the previous embodiment but entailing removal of the curling mandrel 124 and insertion of a combing mandrel assembly 138 in its stead. The removal of the curling mandrel is accomplished by the unscrewing thereof from the mounting post 122. Likewise, the mounting of the combing mandrel assembly 138 is accomplished by a screwing thereof on the mounting post 122. In order to protect the fragile teeth of the comb, a hexagonal head 146 is affixed to the outward end of the combing mandrel assembly 138 thereby facilitating the mounting thereof on the mounting post 122. The combing mandrel assembly 138 includes a mandrel 140 mounted in concentric overlying relation with the shaft extension 94 in a manner similar to the curling mandrel 124. Four columns of comb teeth 142 are disposed longitudinally along the mandrel 140 in circumferential equally spaced relation. The inward end of the mandrel 140 includes a threaded coupling 144 thereby permitting the mounting thereof to the mounting post 122.

Although the aforementioned description entails the completion of an electrical circuit through the heater coil for both curling and combing operations, it will be apparent from the present description that an additional switch may be included to selectively control energization of the heater coil 92. Thus, the user would have control over the application of heat during both the curling and combing hair treatments.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is

not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

I claim:

1. A hair treating device comprising motor means, a drive shaft, means drivingly connecting the motor means to said drive shaft, a voltage source for energizing said motor means, an electrical commutator disk having first and second surfaces, said disk mounted transversely upon the drive shaft and rotatable therewith, brush means connected with said voltage source and in slidable contact with said commutator disk, a heater coil connected to said commutator disk thereby completing a circuit through said voltage source, mounting post means connected to said commutator disk and rotatable therewith, and means mounted upon said mounting post means for treating hair, said heating coil being disposed inwardly of said hair treating means in spaced relation thereto, said motor means including an output shaft, said means drivingly connecting the motor means to the drive shaft including pulley means on said output shaft and pulley means on said drive shaft and belt means interconnecting the pulley means, and means for adjusting the tension of said belt means to a preselected value resulting in slippage thereof when a predetermined minimum torque load is applied to said drive shaft.

2. The apparatus set forth in claim 1 wherein said pulley means includes a pulley wheel mounted upon said motor output shaft, a pulley wheel mounted upon said drive shaft, said belt means including a belt entrained about said pulley wheels, and further wherein said tension adjusting means comprises a plurality of bracket means affixed to said motor, each said bracket means including threads therein, a plurality of threaded fasteners, each said fastener threadedly engaged within a respective bracket, gear means associated with said fasteners for synchronously varying the engagement between said brackets and said fasteners thereby varying the distance between said pulley wheels.

3. A hair treating device comprising motor means, a drive shaft, means drivingly connecting the motor means to said drive shaft, a voltage source for energizing said motor means, an electrical commutator disk having first and second surfaces, said disk mounted transversely upon the drive shaft and rotatable therewith, brush means connected with said voltage source and in slidable contact with said commutator disk, a heater coil connected to said commutator disk thereby completing a circuit through said voltage source, mounting post means connected to said commutator disk and rotatable therewith, and means mounted upon said mounting post means for treating hair, said heating coil being disposed inwardly of said hair treating means in spaced relation thereto, each brush means being characterized by rod-like conductor means including a shoulder thereon, a cylindrical sleeve for housing said conductor, a plurality of bearing members concentrically enclosed in said housing at both ends thereof, said bearing members including a bored aperture therein for permitting passage of said conductor therethrough, one said bearing member further including a recess therein for receiving said shoulder, and spring means for yieldingly urging said latter bearing member outwardly thereby forcing said conductor outwardly for sliding engagement with said commutator disk.

4. A hair treating device comprising motor means, a drive shaft, means drivingly connecting the motor means to said drive shaft, a voltage source for energizing said motor means, an electrical commutator disk having first and second surfaces, said disk mounted transversely upon the drive shaft and rotatable therewith, brush means connected with said voltage source and in slidable contact with said commutator disk, a heater coil connected to said commutator disk thereby completing a circuit through said voltage source, mounting post means connected to said commutator disk and rotatable therewith, and means mounted upon said mounting post means for treating hair, said heating coil being disposed inwardly of said hair treating means in spaced relation thereto, said commutator disk being characterized by an insulator body, first and second independently disposed circular conductor grooves concentrically formed within said first surface of said disk and confronting said brush means, said second surface thereof having groove means therein, and conductor leads received within said latter mentioned grooves connected respectively thereto, said conductor leads being further connected to said heater coil.

5. A hair treating device comprising motor means, a drive shaft, means drivingly connecting the motor means to said drive shaft, a voltage source for energizing said motor means, an electrical commutator disk having first and second surfaces, said disk mounted transversely upon the drive shaft and rotatable therewith, brush means connected with said voltage source and in slidable contact with said commutator disk, a heater coil connected to said commutator disk thereby completing a circuit through said voltage source, mounting post means connected to said commutator disk and rotatable therewith, and means mounted upon said mounting post means for treating hair, said heating coil being disposed inwardly of said hair treating means in spaced relation thereto, said hair treating means comprising a hollow curling mandrel, attaching posts affixed to and extending outwardly from said mandrel, a sheath-like hair clamping blade having mounting ears thereon for pivotal securement with said attaching posts, said blade being spring-biased for normally urging said blade in overlying relation with said mandrel, and handle means affixed to said blade for selectively separating said blade and said mandrel.

6. A hair treating apparatus comprising motor means having an output shaft, a voltage source for energizing said motor means, pulley means driven by said output shaft, a drive shaft driven by said pulley means, means for adjusting the tension of said pulley means to a preselected value resulting in slippage thereof when a predetermined minimum torque load is applied to said pulley means, said pulley means including a first pulley wheel mounted upon said motor output shaft, a second pulley wheel mounted upon said drive shaft, a belt entrained about said pulley wheels, said tension adjusting means comprising a plurality of bracket means fixed to said motor, each said bracket means including threads therein, a plurality of threaded fasteners, each said fastener threadedly engaged within a respective bracket gear means associated with said fasteners for synchronously varying the engagement between said brackets and said fasteners thereby varying the tension of said belt, an electrical commutator disk having first and second surfaces and mounted on the drive shaft and rotatable therewith, brush means connected with said voltage source, and being in slidable contact with said commutator disk, each said brush means characterized by rod-like conductor means including a shoulder thereon, a cylindrical sleeve for housing said conductor, a plurality of bearing members concentrically enclosed in said housing at both ends thereof, each said bearing member including a bored aperture therein for permitting passage of said conductor therethrough, one said bearing member further including a recess therein for receiving said shoulder, spring means for yieldingly urging said latter bearing member outwardly thereby forcing said conductor outwardly for sliding engagement with said commutator disk, a heater coil connected to said commutator disk thereby completing a circuit through said voltage source, mounting post means connected to said commutator disk and rotatable therewith, and means mounted upon said mounting post means for treating hair, said heating coil being disposed inwardly of said hair treating means in spaced relation thereto.

7. The apparatus set forth in claim 6 wherein said commutator disk is characterized by an insulator body, first and second independently disposed circular conductor grooves concentrically formed within said first surface of said disk and confronting said brush means, said second surface thereof having groove means therein and conductor leads received within

said latter mentioned grooves and connected respectively thereto, said conductor leads being further connected to said heater coil.

8. The apparatus set forth in claim **7** wherein said hair treating means comprises a hollow curling mandrel, attaching posts affixed to and extending outwardly from said mandrel, a sheath-like hair clamping blade having mounting ears thereon for pivotal securement with said attaching posts, said blade being spring-biased for normally urging said blade in overlying relation with said mandrel and handle means affixed to said blade for selectively separating said blade and said mandrel.

9. The apparatus set forth in claim **6** wherein said hair treating means comprises a hollow mandrel having a plurality of comb teeth columns longitudinally disposed along the length of said mandrel, said teeth extending outwardly therefrom, each said column circumferentially spaced from an adjacent column.

10. A hair treating device comprising a motor having an output shaft, a drive shaft, pulley wheels mounted on the shafts, a belt entraining the wheels to translate motion from the output shaft of the drive shaft, hair treating means connected to the drive shaft for rotation therewith, and means for adjusting the tension of said belt to a preselected setting resulting in slippage thereof when a predetermined minimum torque load is applied to said drive shaft.