Feb. 6, 1962 S. L. MITCHELL 3,019,463

POWER HAIR BRUSH

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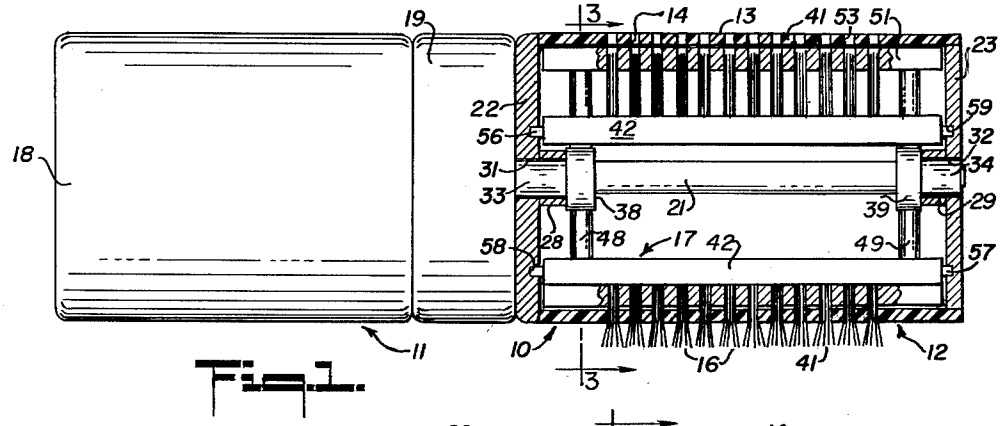


Fig. 1.

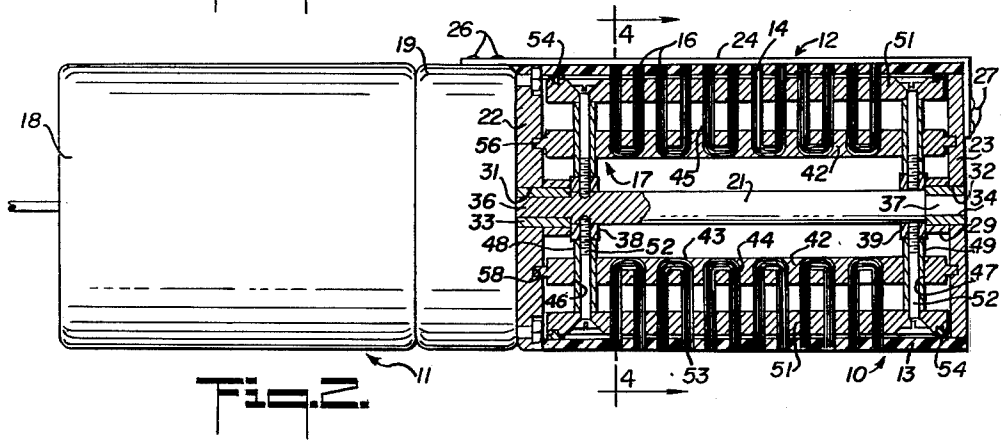


Fig. 2.

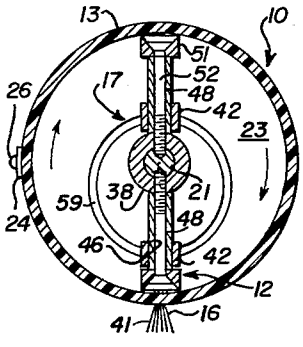


Fig. 3.

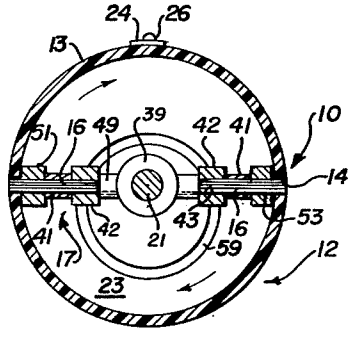


Fig. 4.

INVENTOR
SAMUEL L. MITCHELL
BY
Gardner & Zimmerman
ATTORNEYS

United States Patent Office

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POWER HAIR BRUSH

Samuel L. Mitchell, 621 5th St., Vallejo, Calif.

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The present invention relates generally to portable, power driven, brushes and the like, and is particularly directed to a power hair brush.

Power driven brushes and various other rotary utility tools for a variety of brushing applications are well known. Prominent among such applications is the brushing and massaging of hair. Cosmetologists have recommended that at least one hundred brush strokes be given the hair each day and this amounts to approximately two thousand strokes over the entire head. To accomplish such hair brushing by hand is so time consuming as to be impractical in the trend of usual modern day living. Hence for the proper luster, nourishment, growth, and health promoting brushing treatment of the hair and scalp, it is substantially essential that an electrically powered brush be employed whereby the minimum hair brushing requirements can be accomplished in a matter of a few minutes.

Unfortunately power hair brushes of the conventional rotary type wherein a rotary head of radially projecting brush bristles are rotated into substantially continuous engagement with the hair are variously limited. For example, where the hair of the user, particularly women, is long, the hair becomes entangled in the bristles of the brush and is uncomfortably and unhealthfully pulled as the rotary brush head rotates. The harm done by the pulling of the hair may more than offset the benefits derived from the brushing of same.

Advantages are therefore to be gained by the provision of a power hair brush which is capable of rapidly brushing the hair, whether long or short, without entangling the hair in the brush bristles and therefore without pulling same. To these ends, the present invention provides a power hair brush of unique construction wherein a brush head and enclosing apertured hood are mounted for simultaneous rotation while the bristles are caused to sequentially emerge through the apertures briefly into and out of engagement with the hair. Inasmuch as the bristles engage the hair for only a brief instant during each cycle of rotation of the head, the hair cannot become entangled in the bristles. Moreover, the speed of rotation is made sufficiently fast that bristles are in engagement with the hair substantially all of the time.

It is therefore an object of the present invention to provide a power hair brush wherein the possibility of pulling of the hair is eliminated.

Another object of this invention is the provision of a power hair brush which employs a unique eccentric mounting arrangement of rotary brush head and apertured protective hood to cause the brush bristles to sequentially move into and out of the apertures for brief engagement with the hair each cycle of rotation.

Still another object is to provide a power hair brush which simultaneously serves as a scalp massager.

It is yet another object of this invention to provide a power hair brush which is powered such that the strength of the brushing strokes is weaker than that of the hair to prevent damage thereto.

It is still another object of the present invention to provide a power hair brush which may be washed and sterilized in a minimum of time and with a minimum of effort.

A further object of the invention is the provision of a readily manipulative power hair brush.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set

forth in the following description of the preferred form of the invention, which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawings and description may be adopted within the scope of the invention as set forth in the claims.

FIGURE 1 is a side elevational view with portions broken away and shown in section of a preferred embodiment of the power hair brush and with the rotary brush head in vertical position.

FIGURE 2 is a plan view with portions broken away and shown in section of this embodiment and with the rotary brush head in horizontal position.

FIGURE 3 is a cross sectional view taken along the line 3—3 of FIGURE 1, and

FIGURE 4 is a cross sectional view taken along the line 4—4 of FIGURE 2.

Referring now to the drawing, a power hair brush **10** in accordance with the present invention is seen to generally include a portable electrical power unit **11** secured in axial alignment with and coupled in driving relation to a brush head **12** and enclosing hood **13** which are mounted for simultaneous rotation. The hood **13** is provided with perforations **14** and the bristles **16** of the head **12** are moved in and out therethrough by cam actuated means **17**. Such means, moreover, causes the bristles **16** to be receded within the perforations of the hood during the major portion and to emerge briefly from the perforations during the remaining minor portion of each cycle of simultaneous rotation of the hood and brush head. The hood **13** may hence be held to the head of a user and the bristles emerging briefly through the perforations **14** as the hood is rotated engage the hair to provide a brushing action of same. Inasmuch as the bristles recede into the perforations substantially immediately upon engagement with the hair, there is very little chance of the hair being entangled in the bristles. Consequently, pulling of the hair by the bristles is prevented. The outward thrust of the emerging bristles, moreover, is extremely effective in massaging the scalp.

As regards the structural details of the preferred embodiment herein illustrated and described, the power unit **11** preferably comprises a fractional horsepower electric motor **18**. Such motor is coupled through a gear reduction unit **19** in coaxial end attachment therewith to an axially extending rotary shaft **21**. The motor **18** and gear reduction unit **19** are preferably enclosed within a cylindrical housing serving also as the handle of the brush. The foregoing units are best selected to provide a shaft speed of the order of 800 to 1000 r.p.m. Inasmuch as power units of the variety employed as power unit **11** are conventional in a variety of portable electrical implements, the specific structure of same is not detailed herein.

The shaft **21** extending axially from the power unit **11** is journalled at its opposite ends in stationary axially spaced support discs **22, 23**. Disc **22** is rigidly coaxially secured to the end face of the gear reduction unit **19** of power unit **11**. Disc **23** is maintained in the hereinbefore noted spaced relation to disc **22** as by at least one rigid longitudinally extending L-bracket **24** secured by fasteners **26** to the periphery of the gear reduction unit **19** and by fasteners **27** to the outer face of the disc. The stationary discs **22, 23** are formed with central longitudinally projecting facing flanges **28, 29** through which axial bores **31, 32** extend. Journal bearings **33, 34** are respectively secured concentrically within bores **31, 32** and shaft **21** is provided with conformed inwardly stepped portions **36, 37** rotatably disposed within the bearings. In order to fix the shaft in longitudinal position between discs **22, 23**, retaining rings **38, 39** are

secured concentrically about the shaft in bearing relation to the faces of flanges 28, 29.

As regards the brush head 12 of previous mention, it is to be noted that the bristles 16 of same project radially outward and are preferably arranged in longitudinal rows 41 spaced radially outward from shaft 21. In the preferred embodiment only two rows 41 in diametric opposition are employed in the brush head 12, however, it will be appreciated that more than two rows may as well be utilized.

In order to mount the bristles 16 in the rows 41, an elongated support bar 42 is provided for each row and adapted for longitudinal radially translatable disposition relative to shaft 21. Each bar is provided with a plurality of longitudinally spaced radially extending bores 43, and longitudinal recesses 44 at the inner side of the bar extend between the bores of each adjacent pair thereof. The bristles 16 are then arranged in U-shaped piles 45 with the legs thereof passing radially outward through the bores 43 of each pair and the portion interconnecting the legs secured within the corresponding recesses 44 as best shown in FIGURE 2. Each bar 42 further includes a pair of radial bores 46, 47 respectively spaced longitudinally inward from its opposite ends. If desired, a pair of sleeves 48, 49 secured radially to the retaining rings 38, 39 on shaft 21 may be additionally provided for each bar 42. These sleeves 48, 49 extend radially through bores 46, 47 in loose fitting engagement therewith. Hence the bars 42 and therefore the rows 41 of bristles 16 may be translated radially on the sleeves 48, 49 with respect to shaft 21. It is to be noted that the retaining rings 38, 39 thus serve as the hubs and the sleeves 48, 49 as the spokes of the brush head 12.

The brush head 12 further includes a second longitudinal bar 51 spaced radially outward from each bar 42. More particularly, each bar 51 is secured between the ends of sleeves 48, 49 as by means of threaded fasteners 52 extending through the sleeves into threaded attachment with the rings 38, 39 and shaft 21. The fasteners 52 thus serve to secure the rings to the shaft and the sleeves to the rings as well as securing the bars 51 to the sleeves. A plurality of longitudinally spaced bores 53 are provided in each bar 51 in registry with the bores 43 of the corresponding bar 42 for traversal by the piles 45 of bristles 16. Hence, the bristles are radially translatable through the bores 53 of the bars 51.

Considering now the protective hood 13 of the power hair brush 10, such hood is provided as an elongated cylindrical shell having substantially the same diameter as that of the housing which encloses power unit 11. This hood is best formed of a shatter-proof material and is preferably transparent. Hence Plexiglas or an equivalent plastic material is indicated in the construction thereof. As previously indicated, the hood 13 is mounted concentrically about the brush head 12 and is simultaneously rotatable therewith. To this end, the hood 13 is disposed with one end concentrically about disc 23 and the other end in longitudinally facing relation to disc 22, the hood slideably engaging both discs. The hood moreover is disposed inwardly of the L-bracket 24 and is free to rotate relative thereto. Such bracket, however, serves to prevent longitudinal movement of the hood. The hood 13 frictionally engages the brush head 12, as by means of rubber friction discs 54 secured to the ends of bars 51, or is otherwise secured to the head whereby simultaneous rotation of the head and hood is effected. The perforations 14 through the hood 13 are arranged in longitudinal rows to conform to the bores 53 of bars 51. The bristles 16 of each longitudinal row 41 may hence be moved radially in and out through the perforations 14 upon radial translation of bars 41.

The movement of the bristles 16 out of the perforations 14 in the hood 13 during only a brief portion of each cycle of simultaneous rotation of the hood and head 12 and at the same circumferential position relative to the handle-housing of power unit 11 is uniquely accomplished by the cam actuated means 17 of previous mention. To facilitate such movement of the bristles which prevents catching of the hair of a user therein during the brushing operation, the cam actuated means preferably comprises cam followers 56, 57 projecting longitudinally outward from the opposite ends of each bar 42. The followers 56, 57 slide in circular cam grooves 58, 59 respectively formed in the inner end faces of the stationary discs 22, 23 and similarly eccentrically disposed about the common axis thereof. Hence as the brush head 12 and hood 13 simultaneously rotate with the revolving shaft 21, the cam followers 56, 57 ride in the eccentric cam grooves 58, 59 and cause the bars 42 to slide radially in and out upon the sleeves 48, 49. The diameter and eccentricity of the grooves 58, 59 moreover are selected relative to the other components of the brush such that the bars 42 slide between end limits respectively determined by the periphery of rings 38, 39 and the inner sides of bars 51. These two extremes of radial travel are depicted in FIGURE 3 wherein the upper bar 42 is depressed and the diametrically opposed lower bar 42 is fully extended. The bristles 16 secured to the upper bar are similarly entirely depressed and those to the lower bar fully extended through the perforations 14 of hood 13 for engagement with the hair of a user. It is further important to note, as illustrated in FIGURE 4, that with the bars 42 in horizontal opposition, the bristles secured to each bar are still recessed within the hood perforations 14 and by equal amounts. Hence approximately only one quadrant of rotation is required to move the bristles from fully extended to completely recessed position and vice versa. The bristles hence protrude through the hood perforations 14 for only a minor portion of each cycle of rotation and are depressed the remainder of the time. The hair of a user consequently has no chance to become entangled in the bristles and yet the rotation of the hair brush may be selected sufficiently fast that, in effect, bristles are in engagement with the hair all of the time. Furthermore, inasmuch as the bristles protrude through the perforations 14 of the hood 13 at the same circumferential position each rotational cycle relative to the handle (e.g., at the bottom of the handle with the orientation depicted in the drawing), the hair brush 10 may be readily manipulated over the hair without uncomfortably brushing surrounding skin areas. Moreover, the relatively few bristles utilized in the power hair brush render the brush relatively simple and non-time consuming to clean and sterilize.

What is claimed is:

1. A power hair brush comprising a rotatable perforated hood, a brush head disposed within said hood and mounted for simultaneous concentric rotation therewith, said brush head having a body with projecting bristles translatable with respect thereto in and out of the hood perforations, power means coupled to said head and hood for effecting said simultaneous concentric rotation, and cam actuated means coupled to said head for translating the bristles relative to the body in and out of said perforations during said rotation.

2. A power hair brush as defined by claim 1, further defined by said cam actuated means translating the bristles into receded position within said perforations for a major portion of each cycle of revolution of said head and hood while briefly translating the bristles into an extended position of projection from the perforations during the remaining minor portion of the cycle.

3. A power hair brush comprising a power unit having a rotary shaft extending therefrom, a plurality of longitudinal rows of bristles secured to said shaft and respectively radially translatable with reference thereto, cam actuated means coupled to each of said rows of bristles for trmanslating same radially in and out relative to said

shaft during rotating of same, and a cylindrical protective hood concentrically mounted about said shaft and simultaneously rotatable therewith, said hood having perforations in registry with the bristles of each row thereof.

4. A power hair brush as defined by claim 3, further defined by each of said rows of bristles being secured to a longitudinal bar disposed in parallel relation to said shaft and movable radially relative thereto.

5. A power hair brush comprising an electric power unit having a rotary shaft extending therefrom, at least two diametrically opposed sleeves projecting radially outward from each end of said shaft with the sleeves at opposite ends in respective longitudinal alignment, a bar radially slideable upon each longitudinally aligned pair of said sleeves, a plurality of longitudinally spaced bristles extending radially from each bar, a pair of stationary end plates at the opposite ends of said shaft transversely thereto and having like circular cam grooves in the facing ends thereof eccentrically disposed relative to said shaft, cam followers projecting longitudinally from the ends of each of said bars and engaging said cam grooves, and a cylindrical protective hood concentrically mounted about said shaft and simultaneously rotatable therewith, said hood having perforations in registry with the respective bristles of each of said bars.

6. A power hair brush comprising an electric power unit enclosed within a handle housing and having a rotary shaft projecting therefrom, a pair of longitudinally spaced fixed discs secured to said handle housing and journalling said shaft, said discs having like circular cam grooves in their facing ends eccentrically disposed relative to said shaft, at least two pairs of longitudinally aligned radially extending sleeves secured to said shaft with the pairs of sleeves in diametric opposition, a bar radially slideable upon each pair of sleeves, a plurality of longitudinally spaced radially projecting bristles secured to each bar, a second bar fixedly secured between the ends of each pair of sleeves and having longitudinally spaced bores in registry with said bristles, said bristles slideably extending through said bores, a pair of cam followers extending longitudinally from the opposite ends of each of said first bars and respectively slideably engaging said cam grooves, and a protective cylindrical hood concentrically disposed relative to said shaft and secured to said second bars, said hood having perforations in registry with the bores through said second bars for radial traversal by said bristles.

7. A power hair brush as defined by claim 6, further defined by said hood being secured to said second bars by O-rings concentrically secured about the ends thereof and in frictional engagement with said hood.

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