

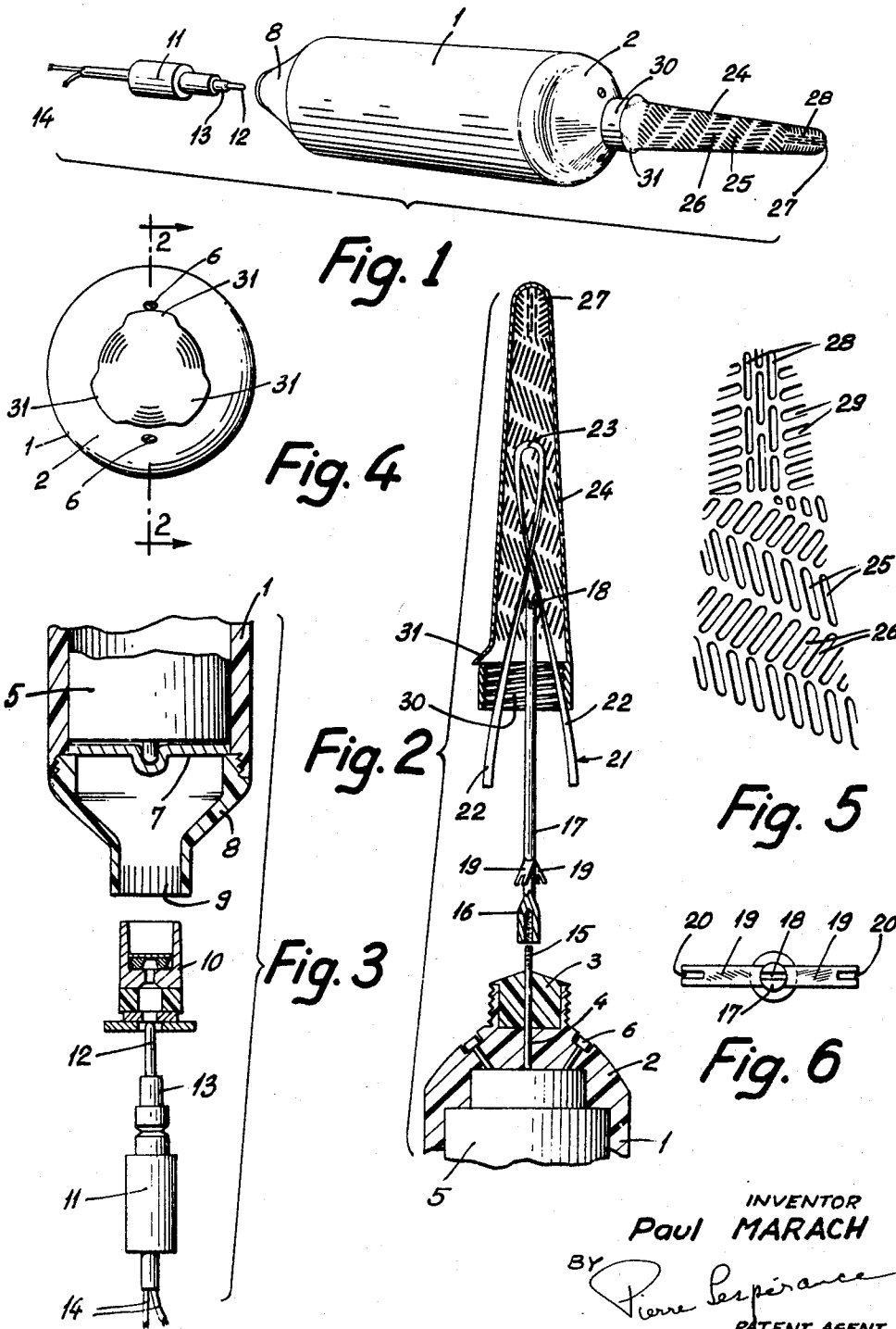
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ELECTRIC SHAVER

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ELECTRIC SHAVER

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7 Claims. (Cl. 30—29.5)

The present invention relates to an electric shaver of the type in which the shaving head is directly attached to the electric motor housing to form a lightweight unit which is easily handled by the user.

The general object of the present invention is the provision of an electric razor of the character described having an improved shaving head which is characterized by its elongated shape for effectively cutting nose and ear hairs, as well as for ordinary shaving.

Another important object of the present invention is the provision of a new electric shaver shaving head and cutter blade which is very effective and which also form means for effectively rejecting the cut hairs away from the active surface of the blade and out of the shaving head itself.

Still another important object of the present invention is the provision of means for removably mounting the cutting head, the cutter and the cutter axis on the motor housing.

Still another object of the present invention is the provision of a shaver of the character described which is relatively inexpensive and simple to manufacture.

The foregoing and other objects of the present invention will become more apparent during the following disclosure and by referring to the drawings in which:

Figure 1 is a perspective view of the electric shaver;

Figure 2 is an exploded longitudinal section of the shaver head assembly, and front part of the motor housing assembly, the section being taken along line 2—2 of Figure 4;

Figure 3 is an exploded partial longitudinal section of the rear part of the motor housing assembly and showing the electric connection therefor;

Figure 4 is a top end view of the shaver head and motor housing assembly;

Figure 5 is an enlarged developed view of the tip part of the grille of the shaving head; and

Figure 6 is an end view of the cutter shaft.

Referring now more particularly to the drawings in which like reference characters indicate like elements throughout, reference numeral 1 indicates an electric motor housing of generally cylindrical shape having an integral tapered front end portion 2 terminated by an externally threaded nipple 3 which is axially bored for the passage of motor shaft 4 of an electric motor 5 which is disposed within the housing 1 and is retained therein by means of bolts 6 passing through the tapered front end portion 2 of the housing and sunk therein. The other end of the motor 5 is retained by a plate 7, shown in Figure 2, which is in turn retained by the screwed end cap 8 which has an opening 9 for removably receiving a conventional connecting socket 10 providing electric connections between the motor 5 and a removable electric plug 11 having a pin terminal 12 surrounded by a sleeve terminal 13 electrically insulated therefrom, the two terminals being respectively connected to wires 14. This arrangement is of conventional construction.

The motor shaft 4 is threaded at its outer end 15 in

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such a direction as to tend to screw more tightly within the inwardly threaded terminal bushing 16 of the cutter shaft 17 upon rotation of the motor shaft 4 by the electric motor 5. The opposite end of the cutter shaft 17 has a transverse slit 18. Resilient wings 19 forming an inverted V-shape are diametrically opposed and extend on each side of the cutter shaft adjacent the bushing 16. The wings 19 are slit at their outer ends as shown at 20. These wings are preferably transversely inclined like the blades of an air screw, so as to produce air circulation towards the motor housing 1 during rotation of the cutter shaft.

A cutter blade 21 is mounted on the cutter shaft; the blade 21 consists of a thin resilient hard metal strip of rectangular or square cross section bent into an inverted generally V-shape such that the legs 22 are outwardly inclined away from their curved connecting portion 23. The V blade 21 is twisted through about 90° or more, so that each leg is longitudinally curved, as shown in Figure 2 and connecting portion 23 leads with respect to the outer portion of the legs relative to the direction of rotation of the cutter and lies in a plane making an angle of 90° with respect to the plane containing the outer ends of the legs 22. The cutter is fixed to the shaft by inserting the cross portion 23 into end slit 18 of the cutter shaft, while the slits 20 at the ends of the wings 19 receive the legs 22 near the outer ends thereof. The cutter blade may be either tightly fitted or soldered within the slit 18. The legs are arranged to slide in slits 20 or may be fixed to the wings 19 and the latter arranged to slide on shaft 17. The cutter blade and its cutter shaft are inserted within an elongated finger shaped grille 24 for rotation therein. The grille 24 has an elongated conical shape and is at least four times as long as its widest base part. Grille 24 is made from very thin flexible metal sheet which has been submitted to an etching process to provide a plurality of closely spaced elongated slots arranged over the main body of the grille in parallel spiral rows in which the slots are inclined and are all parallel to each other but the inclination of which alternate from one row to the other as shown by slots 25 and 26. At the tip 27 of the grille 24, there is provided a central portion made of about three rows of slots 28 extending longitudinally in end to end relation but staggered in the different rows, while on each side of said central portion there are provided inclined slots 29.

The base end of the grille 25 forms a threaded socket 30 for threaded connection of the grille to the outwardly threaded nipple 3 of the motor housing 1.

The grille is cut adjacent the socket 30 at three peripherally spaced portions of the grille and the sheet material is swaged outwardly to provide three equally spaced slots 31 facing the motor housing and arranged for the discharge of the hairs cut by the cutter blade 21.

The legs or branches of the V-shaped cutter blade 21 are also twisted upon themselves longitudinally thereof so as to have their cutting outer edge face in substantially right angular contact with the inside face of the grille 24 over the entire length of said legs 22 despite the fact that they are inclined with respect to the axis of rotation of the blade.

As previously said, during rotation of the cutter blade, the portion of said blade adjacent the connecting portion 23 is leading with respect to the outer end portions of the legs 22, blade has a shearing action in cooperation with the edges of the slots 25, 26; the hair entering these slots as well as the slots at the tip of the grille are thus efficiently cut by the blade and are also pushed by the latter towards the base of the shaving head to be discharged through the slots 31. Air circulation towards the head base and through slots 31 is also produced by the rotating blade and by the supporting wings 19. This air cir-

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culation assists in the discharging of the cut hair. The different inclination of the slots 25, 26 assist in catching the hairs at the skin surface.

The tip 27 of the shaving head is of such a small diameter that it is easily insertable in the nostrils and in the ears to enable cutting of the hairs therein. The cross portion 23 of the cutter blade provides radially extending parts in cutting cooperation with the slots at the tip portion of the grille to provide cutting of the hairs right at said tip. The hairs easily enter the slots 28, 29 of the tip.

Friction between the internal surface of the grille and of the cutter blade 21 provides for sharpening of the blade. This friction may be adjusted by controlling the outward pressure exerted by wings 19.

It is very easy to remove the grille and the cutter blade assembly from the motor housing and motor shaft by simply unscrewing the threaded socket 30 of the grille from nipple 3 and unscrewing the cutter shaft 17 from the motor shaft 4. Thus the shaving head may be easily cleaned.

The motor and its motor shaft can also be used to actuate another implement, such as a nail filer.

The shaver of the present invention is suitable for cutting long hairs such as on legs, and armpits, as well as facial hair. Due to the somewhat tapered form of the shaving head, it is easy to hold the latter against the face with the motor housing being slightly inclined away from the face so as to clear the latter. Preferably, the motor housing is held towards the back of one's head such that one has a clear view of the face area being shaved.

While a preferred embodiment in accordance with the present invention has been illustrated and described, it is understood that various modifications may be resorted to without departing from the spirit and scope of the appended claims.

What I claim is:

1. An electric shaver comprising a housing, an electric motor disposed within said housing and having a motor shaft, a shaving head removably attached to said housing and including an elongated grille of finger like

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shape having a tip of reduced width adaptable to be inserted in the nostrils and ears, a cutter shaft removably attached to the motor shaft and extending axially within said grille, and a cutter blade mounted on said cutter shaft, said cutter blade being formed of a thin resilient strip bent into an inverted U with its cross portion in sliding contact with the end tip portion of the grille, and with its legs in sliding contact with the side wall of the grille, said legs being twisted such that the outer ends of the legs extend in a plane lying at a substantial angle to the plane containing the cross portion of said blade.

2. A shaver as claimed in claim 1, wherein said legs are outwardly inclined with respect to the cutter shaft in a direction towards the free ends of said legs.

3. A shaver as claimed in claim 1, wherein the outer end of said cutter shaft is slit to receive the cross portion of said cutter blade and further including resilient wings attached to the opposite end of said cutter shaft and to the legs of said cutter blade adjacent the outer ends of said legs.

4. A shaver as claimed in claim 3, wherein said grille has peripherally spaced slots near the base thereof for the discharge of hair cut by said blade.

5. A shaver as claimed in claim 1, wherein said motor housing has a threaded nipple bored for the passage of said motor shaft, said grille having a threaded socket in threaded engagement with said nipple for securing the grille on said housing.

6. A shaver as claimed in claim 1, wherein said grille has spirally arranged rows of slots, the slots in each row being parallel to each other and being inclined with respect to the slots of the adjacent rows.

7. A shaver as claimed in claim 6, further including additional slots in the tip portion of said grille, said slots consisting of a central zone of parallel rows of longitudinally extending elongated slots in end to end relation and of lateral slots inclined with respect to the slots of the central zone.

No references cited.