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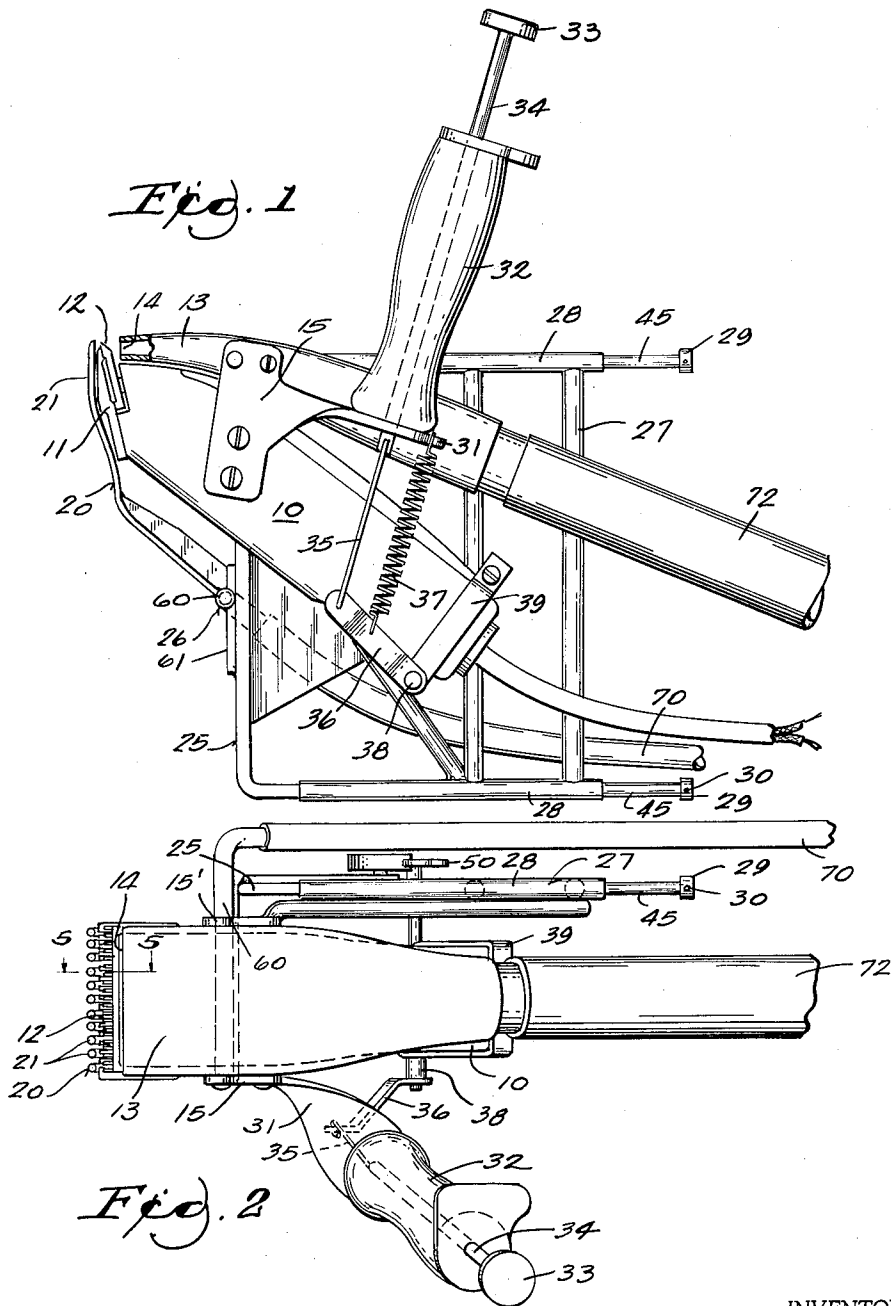
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HAIR CUTTING APPARATUS

Filed March 12, 1964

3 Sheets-Sheet 1



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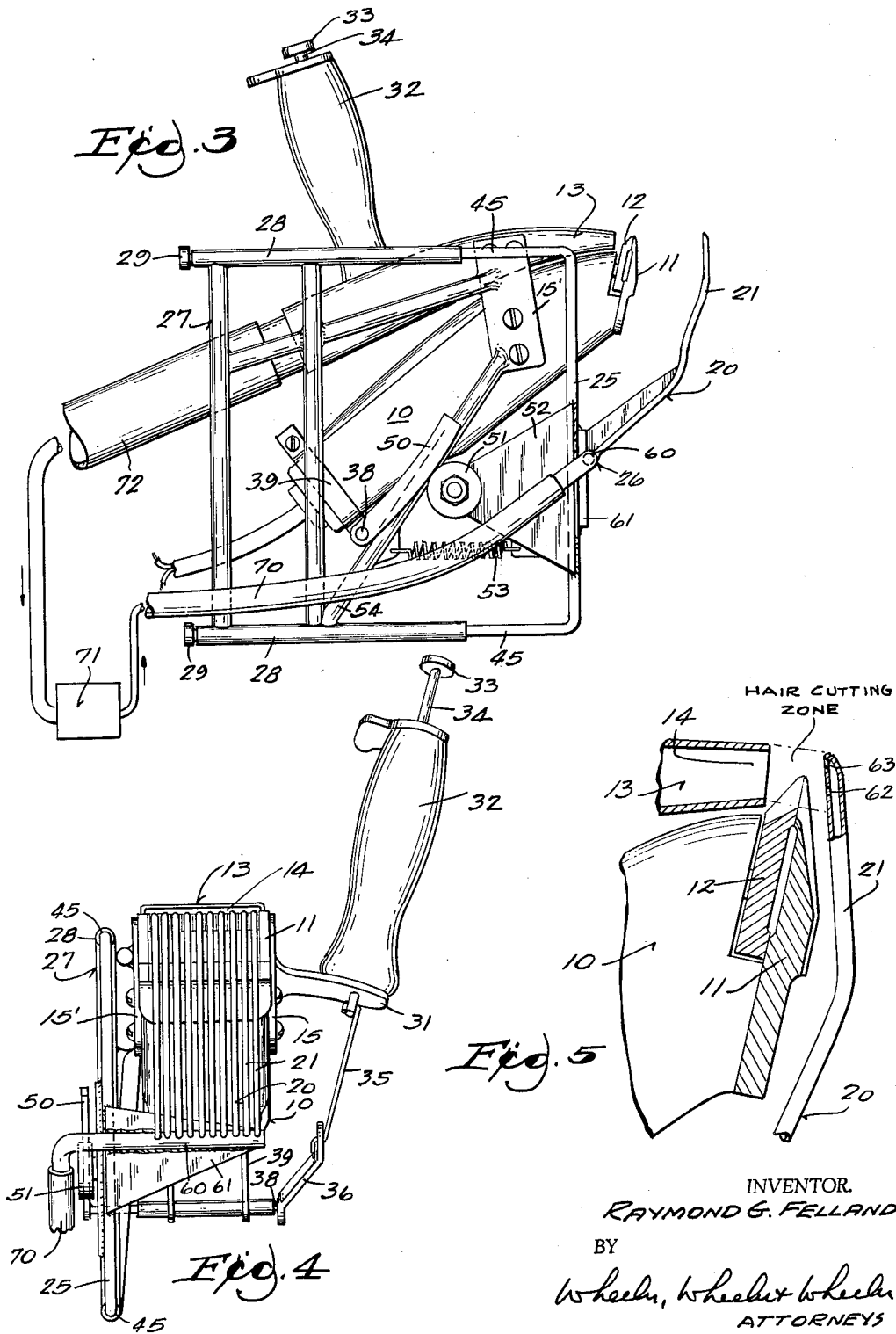
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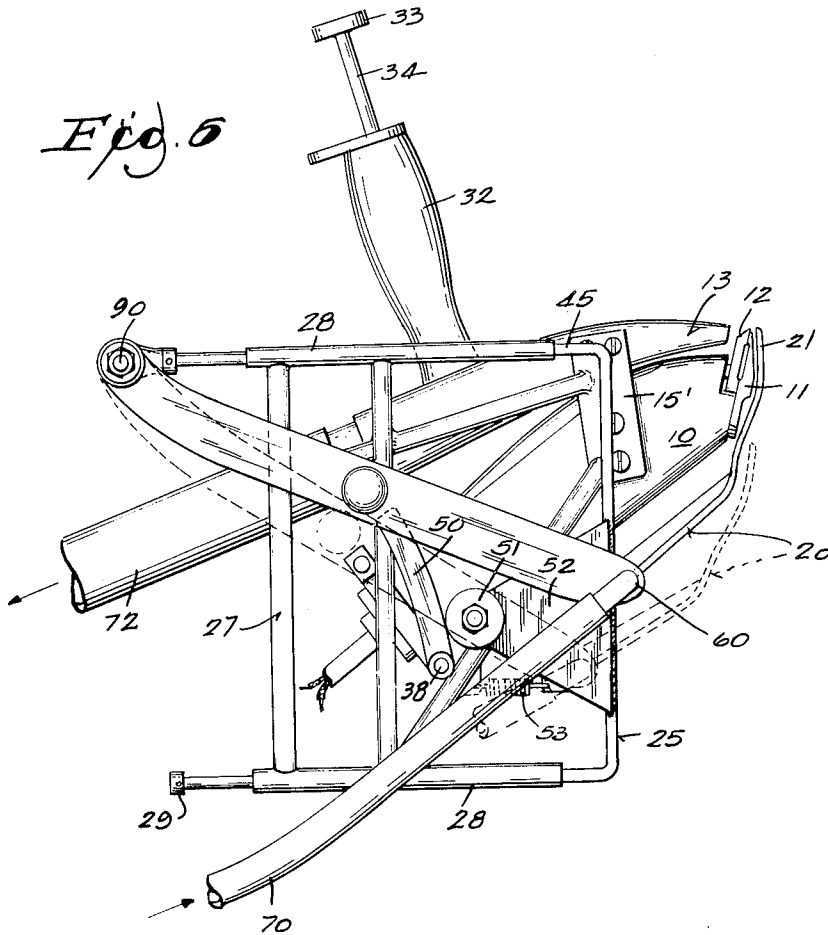
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HAIR CUTTING APPARATUS

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11 Claims. (Cl. 30—133)

This invention relates to hair cutting apparatus.

More specifically, this application relates to means for cutting hair to a uniform controllable length at any given location of a customer's head. The apparatus includes a hair cutting apparatus which may be a conventional hair clipper, with the fixed teeth and the movable teeth of the clipper positioned within a hair clipping zone, within which there is a stream of air moving outwardly from the skin of the person whose hair is to be cut, past the teeth of the clipper. This stream of air entrains the hair and keeps it upright so that as the clipper is moved, the hair is all cut to a uniform length.

The stream of air is produced by mounting a vacuum nozzle having a width approximately equal to the width of the clipper immediately adjacent to the upper blade of the clipper, and by additionally supplying air under pressure to comb teeth having nozzles which direct the air toward the clipper teeth and the vacuum nozzle from a point below the clipper. In use, it is intended that the air supply comb will be moved along the skin of the customer so that the exact length of the hair after it is cut may be predetermined by controlling the distance between the air supply comb and the clipper teeth or other hair cutting means.

I also provide a series of air jets in the air comb or air supply means which are directed forwardly at an angle to the first mentioned air jets in order to raise the hair ahead of the clipping zone. This ensures that the hair will be in a position in which the stream of air from the first air jets toward the vacuum nozzle will entrain it.

The air supply comb is movable with respect to the hair cutting device, to lengthen the hair cutting zone. I find that with my device hair can be cut accurately and uniformly to a length of as much as six or seven inches. In the prior art devices of which I am aware, the maximum length practically attainable is a little over one inch. I am not aware of any prior art device in which a stream of air is used to position the hair, as opposed to a device in which air is used to dispose of the cuttings, nor of any device which controls the path of the air at both ends of a clipping zone. It will be understood that the device of my invention does dispose of the hair clippings, as do other prior art devices which employed an air blast or a vacuum nozzle for this purpose, but it requires both the vacuum nozzle and the jet nozzles to control the attitude of the hair for accurate cutting.

Means for controlling the position of the air supply comb with respect to the clipper blades may take a variety of forms. The example which is illustrated shows the air supply comb on a movable frame which is telescopically related to a fixed frame attached to the clipper. The movable frame bears a cam follower roller, and a fixed frame bears a cam whose position is controlled by the operator. As illustrated, the control is manual, through a push-button and cam, but if desired my invention may be incorporated in an automatic hair cutting device. However, such means form no part of the present invention.

In an alternative form of the invention, I provide a pivot for the air supply comb to move with respect to the movable frame so that it may be swung rearwardly out of registration with the hair cutting means. In this way, the same hair clipper which is used for cutting the

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longer hair may also be used for trimming the shortest hair that may be cut by any conventional clipper.

In the drawings:

FIG. 1 is a side elevational view of my device with a portion of the vacuum nozzle broken away.

FIG. 2 is a top view of my device.

FIG. 3 is a right side view.

FIG. 4 is a bottom view.

FIG. 5 is a fragmentary cross-sectional view on lines 5—5 of FIG. 2.

FIG. 6 is a fragmentary view in which the optional pivot for the air comb is shown.

As shown in FIG. 1, my device consists of a conventional hair clipper 10 having fixed comb teeth 11 and movable clipper teeth 12. Fixed directly above the clipper is a vacuum nozzle 13 which terminates in an opening 14 the width of the clipper and directly above the movable clipper teeth 12. Brackets 15 and 15' secure the vacuum nozzle 13 to the clipper 10. The vacuum nozzle is preferably curved to generally conform to the shape of the clipper so that it is not unduly bulky.

At the underside of the clipper is a comb shaped air supply means 20 having hollow teeth 21. Each tooth is shaped to conform generally to the shape of the bottom of the clipper and the comb plate or fixed teeth 11.

The entire comb structure is mounted on a framework which permits it to move in a path generally parallel to a line through the vacuum nozzle and the teeth of the clipper. As shown in the drawings, this frame consists of a U-shaped member 25 which is attached at 26 to the air supply comb. A fixed frame 27 is provided with straight tubes 28 through which the parallel straight arms 45 of U-shaped tube 25 extend. If desired, the ends of U-shaped frame member 25 may terminate in a collar 29 having a set screw 30 to limit the outward movement of the air comb from the clipper blades, or the collars 29 may be omitted to permit removal of the comb 20 and frame 25 for close cutting.

As shown in FIG. 3, bracket 15' connects the vacuum nozzle 13 and clipper 10, and also supports fixed telescopic frame 27. As shown best in FIGS. 1 and 2, the bracket 15 which supports vacuum nozzle 13 and clipper 10 is also provided with an extension 31 to which tubular handle 32 is secured. A push-button 33 and push rod 34 are slidably mounted with respect to the handle so that the operator may operate push-button 33 with his thumb for the purpose of controlling the spacing between the air supply comb teeth 21 and the fixed teeth 11 of the clipper. The end of push rod 34 is pivotally connected to a link 35, which in turn is pivotally connected to bell crank arm 36. Spring 37 extends between bell crank arm 36 and bracket extension 31 to bias push rod 34 in an upward direction, that is, in a direction in which push-button 33 is farthest from handle 32.

Bell crank arm 36 is fixed to shaft 38 which is rotatably carried on a bracket 39 at the rear of clipper 10. Carried on the other end of shaft 38 is a cam 50 which oscillates in a plane parallel and adjacent to telescopically related frames 25 and 27 as best shown in FIG. 2.

Looking now at FIG. 3, the cam 50 bears on a cam follower roller 51. Roller 51 is rotatably mounted on a bracket 52 secured to movable frame 25, which carries the air supply comb 20. A spring 53 extends between bracket 52 and bar 54 of fixed frame 27 to bias the movable frame 25 toward a position in which the air comb 20 is directly adjacent to the fixed clipper teeth 11.

Upon actuation of push-button 33 toward handle 32, against the bias of springs 37 and 53, the cam 50 is urged against roller 51, thus moving air supply comb 20 away from the fixed clipper teeth 11 along a path which keeps the ends of the comb 20 aligned with the clipper teeth 11 and 12 and the vacuum nozzle inlet 14.

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As best seen in FIG. 4, the air supply comb includes a main air supply conduit 60 and a series of comb teeth 21. The main air supply conduit 60 is fixed to bracket 61, which is secured to movable frame 25.

As shown in FIG. 6, a pivot 90 may be provided for the air comb 20. Pivot 90 is placed above the clipper and well forward, so that there is no downward component of motion of the comb. Thus the comb may be swung forwardly or rearwardly, either manually or automatically during the hair cutting operation, without loss of control of the length to which the hair is cut. With this feature the same clipper may be used for the closest cuts and for cutting the longer hair.

FIG. 5 is an enlarged cross-sectional view showing the air orifices in air supply comb teeth 21 and their relationship to the hair cutting zone. Each comb tooth 21 is provided with an air orifice 62 directed toward the clipper teeth 11 and 12 and toward the vacuum nozzle inlet 14. Each comb tooth 21 is also provided with an orifice 63 directed forwardly at an angle to the hair cutting zone and to air orifices 62.

The main air supply conduit 60 of the air supply comb is connected to a flexible conduit 70, which in turn is connected to the outlet of an air supply means 71, such as a fan or other air moving device which is capable of supplying air under pressure. Vacuum nozzle 13 is connected to a flexible air conduit 72 which is connected to the inlet of a fan or other air moving device 71. If desired, both air moving devices 71 may comprise a single mechanism, similar to a conventional tank type vacuum cleaner, which is provided with both air supply and air removal ports to which flexible conduits 70 and 72 may be attached, and which is provided with filter means to prevent foreign objects such as cut hair from being recirculated in the system. These air moving devices may also comprise separate units, if desirable.

In operation, the orifices or jets 62 and the vacuum inlet 14 establish a current of air propelled by the air moving device 71. Since there is an orifice 62 in each comb tooth 21, and vacuum inlet nozzle 14 extends across the entire width of teeth 11 and 12, this stream of air is essentially the width of the clipper blades and its length is determined by the operator, using push-button 33. I have designated the zone in which this curtain of air flows, and in which the hair cutting device operates, as the cutting zone. Ahead of this hair cutting zone is a stream of air from orifices or jets 63, which impinges on the hair at an angle, and lifts it to a more erect position. As applicant's device is advanced, hair which has been lifted by the air from jets 63 is entrained in the stream of air from jets 62 to vacuum nozzle 14, and is held essentially straight as clipper teeth 11 and 12 cut it off. During normal operation, air supply comb teeth 21 will be resting upon the skin and gliding along it, so that the length to which the hair is cut is a function of the distance between air supply comb teeth 21 and clipper teeth 11 and 12. Other hair cutting means may be substituted for clipper 10 and clipper teeth 11 and 12, as long as the hair cutting means is capable of cutting hair at a location a fixed distance from one end of a hair cutting zone, the zone being established by a fixed air conduit and a movable air conduit with a stream of air flowing between the two conduits. I have found that this combination permits accurate cutting of hair up to a length of seven or more inches, whereas prior devices are not capable of accurate work in which the hair is to be cut more than about one inch long. This means that my device is capable of cutting both men's and women's hair.

The control mechanisms are intended to be exemplary, since many forms of mechanism could be adopted to achieve the desired control over the position of the air supply comb 20. For instance, it would be possible to place my entire mechanism on a device which is movable along paths which are so related to a customer's head as to cut the hair in a predetermined hair style. Control means may also be provided which record the movements and

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adjustments of my device during an initial manual hair cutting operation so that these movements and adjustments may be duplicated through the use of automatic, rather than manual control mechanisms in subsequent automatically controlled hair cutting operations for the same customer. This is possible because of the extreme length to which my device can cut hair accurately. It was impossible with prior art devices, even though the automatic control devices are available, because of the limited length to which they could cut the hair accurately.

I claim:

1. Means for clipping hair to a uniform length, comprising a hair cutter having a hair cutting zone, hair cutting means positioned for operation in said hair cutting zone, at least one air moving device, air supply means provided with connections to the outlet of a said air moving device, said air supply means having a terminal portion defining one end of said hair cutting zone, said terminal portion being provided with first orifice means, air removal means connected to the inlet of a said air moving device, said air removal means having a terminal portion defining the other end of said hair cutting zone, said first orifice means being adapted to discharge air within said hair cutting zone past said hair cutting means and toward said air removal means, the hair within said hair cutting zone being maintained erect between said first orifice means and said air removal means by air passing from said first orifice means to said air removal means, said hair cutting means having a fixed relationship to said air removal means, whereby hair within said hair cutting zone is cut to a uniform length determined by the length of the zone.

2. The device of claim 1 in which said terminal portion of said air supply means is provided with second orifice means, said second orifice means being adapted to discharge air at a forwardly inclined angle to air discharged by said first orifice means to lift the hair in a zone ahead of said hair cutting zone.

3. The device of claim 1 in which said air supply means comprises a plurality of generally parallel air tubes spaced laterally from each other to form a comb underlying said hair cutting means, a said first orifice on each said air tube, said first orifices being aligned in an array parallel to the operative parts of said hair cutting means and directed thereat.

4. The device of claim 2 in which said air supply means comprises a plurality of generally parallel air tubes spaced laterally from each other to form a comb underlying said hair cutting means, a said second orifice on each said air tube, said second orifice being aligned in an array parallel to the operative parts of said hair cutting means.

5. The device of claim 1 including means for varying the spacing between said air supplying means and said hair cutting means, said means for varying the spacing being adapted to move said air supply means substantially in a path which is an extension of a plane extending through said air removal means and said hair cutting means.

6. The device of claim 1 in which said air supply means is pivotally mounted on a pivot axis spaced upwardly from the hair cutting zone whereby said air tube means may be oscillated into and away from said zone.

7. The device of claim 1 in which said air supply means is detachably secured to said hair cutting means.

8. The device of claim 7 in which said air supply means is mounted on a first U-shaped frame having parallel legs, said hair cutting means and said air removal means being secured to a second frame provided with parallel tubes, the parallel legs of said first U-shaped frame being telescopically related to said parallel tubes of said second frame, said tubes being substantially parallel to a line from said first orifices of said air supply means through said air removal means, spring means connected to said frames adapted to bias said first U-shaped

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frame for movement of said air supply means toward said hair cutting means, and control means associated with one of the frames adapted to move the other said frame in a direction to increase the distance between said air supply means and said hair cutting means to predetermine the length to which the hair will be cut.

9. The device of claim 8 in which said control means comprises a roller mounted for rotation with respect to said first U-shaped frame, a cam oscillatably secured to said second frame and mounted to bear on said roller, and manual control means to position said cam.

10. A hair cutting device comprising a hair clipper having a body, fixed clipper teeth and movable clipper teeth, said fixed and movable clipper teeth extending laterally at the front of said body, a vacuum nozzle having an open end positioned above said fixed and movable teeth and having substantially the same lateral extent as said teeth, an air supply comb having hollow teeth con-

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nected to an air supply conduit, a plurality of said hollow teeth being provided with orifices directed toward said clipper teeth and said vacuum nozzle.

11. The device of claim 10 in which said comb is mounted on a pivot for oscillation rearwardly with respect to said clipper teeth, said pivot being so located that said comb has no component of motion away from said nozzle along the axis of said nozzle.

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