April 25, 1961 J. A. STACHON 2,980,994

VACUUM OPERATED HAIR CLIPPER

Filed Jan. 4, 1960

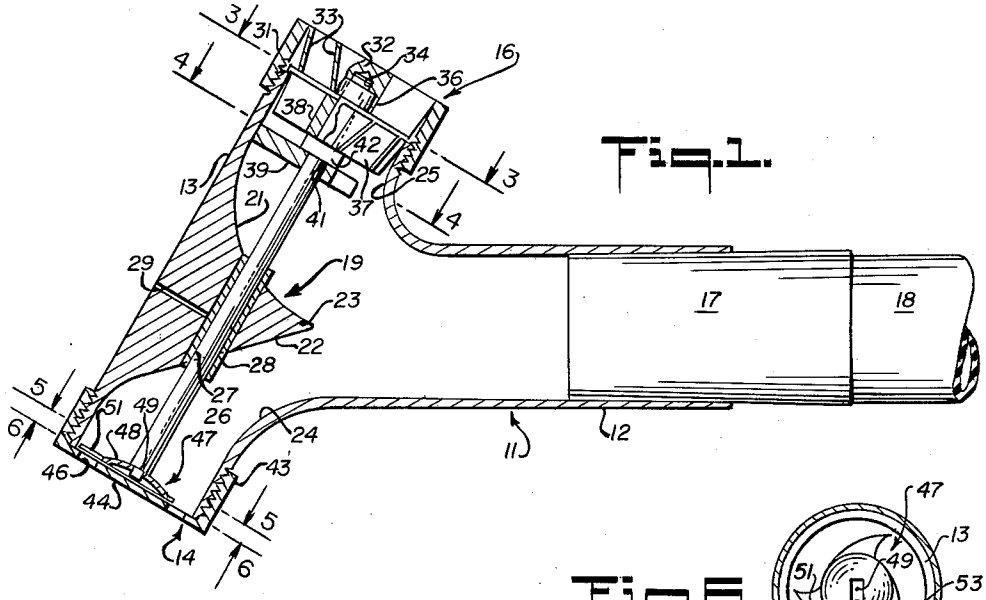

Fig. 1.

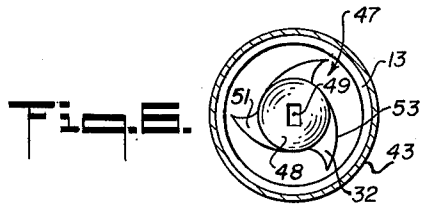

Fig. 6.

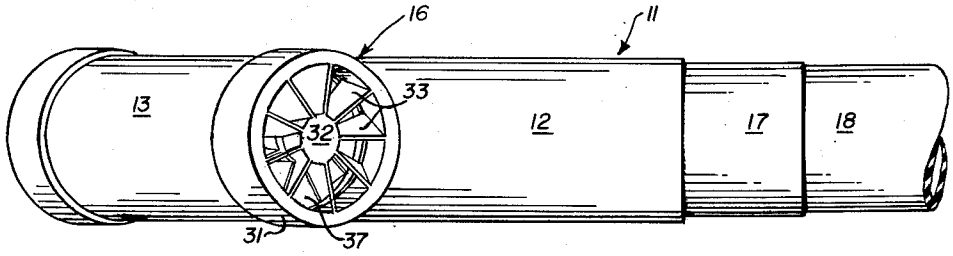

Fig. 2.

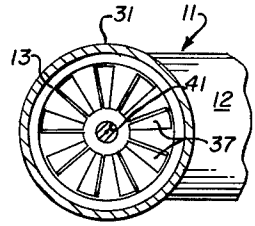

Fig. 3.

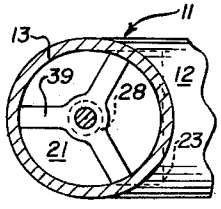

Fig. 4.

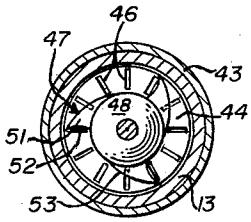

Fig. 5.

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United States Patent Office

2,980,994
Patented Apr. 25, 1961

2,980,994

VACUUM OPERATED HAIR CLIPPER

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Filed Jan. 4, 1960, Ser. No. 101

9 Claims. (Cl. 30—133)

The present invention relates to hair cutting implements and more particularly to an efficient and trouble free powered clipper of the class operated by attachment to a vacuum cleaner or other air pump.

The cutting or trimming of hair is preferably done with a power driven clipper, such implements being both faster and more convenient in comparison with hand manipulated shears. One means of operating power clippers is the suction generated by an air pump, such clippers having advantages over electrically driven instruments since the device is usually less costly and since the air suction offers a means of removing the trimmings.

The air driven clipper is of particular value to the home user both by reason of the lower cost and the fact that most homes are provided with a ready made power unit in the form of a vacuum cleaner. The ability of the clippers to draw in the hair which has been cut is important in home use since the householder is generally not provided with the aprons, neck bands and other facilities which are used in professional establishments to prevent the trimmings from falling and lodging on the customer. In addition it is preferable, in the home, that the hair not be allowed to fall on the surrounding furnishing or on the floor as commonly occurs in commercial hair cutting establishments.

Vacuum operated hair clippers as heretofore designed comprise a housing forming a single duct one end of which is connectable with the vacuum source and the other end of which is provided with some form of cutting mechanism. A turbine mechanism is mounted within the duct and is turned by the air flow therethrough, the turbine being connected to operate the cutting mechanism.

In the operation of such clippers considerable trouble has been encountered in that the cut hair tends to interfere with the turbine. The trimmings may accumulate on the turbine blades and reduce the efficiency thereof and, in extreme cases, may clog the turbine to the point where it ceases to operate. Further deleterious effects of the hair clippings are an increase in friction in the bearings which support the turbine and an acceleration of wearing therein. The loding of cuttings within the mechanism tends, in addition, to create a somewhat unsanitary condition. Cumulatively these effects have detracted considerably from the general utility of this class of clipper.

The present invention provides a novel form of vacuum operated clipper in which the foregoing difficulties are overcome. Specifically the invention provides a housing having two separate air intake passages which converge and communicate with an outlet connectable to the vacuum. A cutting blade, preferably of the rotary type, is mounted at the end of a first of the separate intakes and the motor, preferably a bladed turbine, is mounted within the second intake, suitable intermediate drive means being provided so that the motor turns the cutting blade. As a consequence of the divided air intake, the clippings are drawn directly to the outlet and into the vacuum source without passing through the turbine. In addition to the separation of the route of the clippings from the turbine area, the inflow of air through the turbine acts to positively prevent any of the clippings from reaching the area. Thus the disadvantages hereinbefore discussed are completely overcome.

The foregoing principle, moreover, may be further applied to other areas of the clipper which are to be kept free from clippings. Any bearings, for example, which are exposed to the path of movement of the clippings may be provided with an additional small air intake so that the air flow through the bearing is in a direction towards the path of the clippings.

It is accordingly an object of this invention to provide an air-driven hair cutting implement free from deleterious effects resulting from the accumulation of clippings therein.

It is an object of this invention to provide a power hair clipper operable by connection with an air pump which clipper is free from clogging and loss of efficiency arising from the lodging of trimmings therein.

It is a further object of this invention to provide a more durable and friction free vacuum operated hair clipper.

It is an object of the invention to provide a power hair cutting implement operable by connection with a vacuum cleaner or other suction generator which implement has provision for carrying cuttings away from interior mechanisms which might be deleteriously effected thereby.

It is still another object of this invention to provide a vacuum cleaner or other suction generator which implement has provision for carrying cuttings away from interior mechanisms which might be deleteriously effected thereby.

It is still other object of this invention to provide a vacuum operated hair clipper of the class having a suction driven turbine and a cutting mechanism driven thereby wherein cuttings do not pass through said turbine, the invention having further provision for preventing cuttings from moving towards said turbine.

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

Figure 1 is a longitudinal section view of an exemplary embodiment of the invention.

Figure 2 is a top view of the hair clipper shown in Figure 1.

Figure 3 is a section view taken along line 3—3 of Figure 1 and showing details of a turbine element contained within the clipper.

Figure 4 is a section view taken along line 4—4 of Figure 1 and further illustrating interior components of the clipper.

Figure 5 is a section view taken along line 5—5 of Figure 1 and showing details of the cutting mechanism within the clipper, and

Figure 6 is a section view taken along line 6—6 of Figure 1 and showing further details of the cutting mechanism.

Referring now to the drawing and more particularly to Figures 1 and 2 thereof, there is shown a housing 11 having a first tubular section 12 which opens into the central portion of a second tubular section 13. The second section 13 is preferably inclined with respect to the first section 12 so that the forward end 14 of section 13 forms an oblique angle with respect to section 12 and the rearward end 16 forms an acute angle therewith. Ends 14 and 16 of section 13 are externally threaded to

receive additional elements of the clipper as will hereinafter be described.

The interior bore of the extremity of first section 12 is slightly flared to receive the terminal cylinder 17 of a standard vacuum cleaner hose 18, the section thus providing an air flow outlet communicating with the cleaner. It should be understood that the clipper may, if desired, be adapted for operation by other forms of suction generating air pumps and that the end of section 12 may be provided with other forms of fitting to facilitate connection with such pumps.

The air flow through section 12 and into the vacuum cleaner is derived from separate intakes at opposite ends 14 and 16 of section 13. To prevent turbulence at the central portion of the housing where the two oppositely directed intake flows come together, a cuspate baffle 19 is formed at the central area of the interior forward wall of section 13. The baffle 19 has oppositely curved upper and lower surfaces 21 and 22 which converge to form a broad point 23 directed at the center of section 12. Since the air volume to be drawn through the cutting mechanism is generally less than that to be drawn through the turbine, the surfaces 21 and 22 may be so placed as to form a narrower air intake passage 24 leading to the forward end of section 13 than the intake passage 25 leading to the rearward end thereof.

A drive rod 26 is mounted on the axis of section 13, the rod being transpierced through a bore 27 in baffle 19 and a cylindrical bushing 28, a small passage 29 extends from the center interior of the bushing through baffle 19 to the forward face of section 13. The foregoing passage 29, in addition to providing for lubrication, acts to prevent the accumulation of hair within the bushing and thus to reduce friction and wear therein. This results from the small air current which flows in through the passage 29 and outward towards each end of the bushing along the surface of rod 26, such current acting to prevent the entry of foreign matter into the bushing and acting to remove any such matter that may have become lodged there.

Considering now the air turbine structure at the rearward end 16 of housing section 13, an annular internally threaded sleeve 31 is engaged on the end of the section, the sleeve 31 being coaxial with respect thereto. A solid circular hub or center member 32 is positioned at the axial center of the sleeve 31 and is supported by a number of vanes 33 which are formed integral with and extend between the member and sleeve 31 in radial directions with respect to the latter. The vanes 33 are each inclined with respect to the axis of sleeve 31 in similar directions in order to deflect incoming air in a direction most favorable to turning a turbine therein.

The end of drive rod 26 is entered in a well 34 in the center member 32, a thrust bearing 36 being mounted in the well and engaging the end of the rod. The turbine proper is formed by a number of radially directed vanes 37 projecting from an annular collar 38 which collar is secured coaxially on the drive rod 26 adjacent the stationary vanes 33. The turbine vanes 37 are each inclined with respect to the axis of the rod 26 in a direction opposite to the inclination of the stationary vanes 33 so that the inflow of air in passage 25 acts to rotate the rod. To further support the rod 26 a three armed spider 39 is secured within passage 25 a small distance forward from the turbine vane structure, such spider having a central aperture 41 through which the rod passes. To limit longitudinal motion of the rod 26, an enlarged portion 42 is formed on the rod between the spider and collar 38.

Considering now the cutting mechanism, with reference to Figures 5 and 6 in conjunction with Figure 1, a threaded cylindrical cap 43 is engaged on the forward end 14 of housing section 13, the cap having an endplate 44 which is disposed over the end of passage 24 and forms a stationary shear. As shown in Figure 5 in particular, endplate 44 is provided with a number of radially directed narrow slots 46 which are confined to the outer portion of the plate and which are proportioned to admit hair without allowing a fold of skin to enter a significant distance.

The moving cutting element is a rotary shear 47 disposed against the endplate 44, the shear having a dished circular central portion 48 provided with a rectangular central opening 49. As shown in Figure 6 in particular, the forward end of drive rod 26 is of rectangular cross-section and is entered in the opening 49 so that rotation of the drive rod acts to rotate the shear 47. A number of cutting blades 51, in this instance three, project in a radial direction from the shear center portion 48, the blades being spaced equi-angularly around the periphery of the shear and each having an arcuate cutting edge 52 and an arcuate trailing edge 53. The cutting edges 52 are proportioned to extend along the entire lengths of the slots 46 in endplate 44 so that movement of the blades 51 across the slots clips any hair which is protruding therethrough.

In operation the clipper is coupled to a vacuum cleaner as hereinbefore described. Upon actuation of the vacuum cleaner, air is drawn in through both passages 24 and 25, the air flow through the latter acting to turn the turbine vanes 37 and thus to rotate drive rod 26 and the shear 47. The inflow of air through slots 46 in the end plate 44 will act to draw hair into the slots where the hair will be cut by the moving blades 51. The clippings are drawn through passage 24 directly to the outlet housing section 12 and thus bypass the turbine mechanism in passage 25. The entry of clippings into the turbine region is further prevented by the inflow of air through passage 25 and thus the clipper remains free from clogging, loss of efficiency, wear, and the other deleterious effects hereinbefore discussed.

It will be noted that dismantling of the clipper is easily effected by disengaging sleeve 31 from the upper end 16 of the housing section 13 and withdrawing the turbine and drive rod therefrom. The tension on the shear 47 may be adjusted in the same manner, that is by rotation of the sleeve 31. As a further preferred feature, the turbine and drive rod 26 should be made sufficiently heavy as to possess considerable inertia. The resultant flywheel effect serves to insure continued operation at such times as when an unusual quantity of hair enters the slots 46 and produces a high degree of resistance to the motion of the shear blades 51.

What is claimed is:

1. A vacuum operated hair clipping implement comprising, in combination, a housing forming a branched air duct having spaced apart separate inlet passages converging to an outlet passage, said housing having provision for connecting said outlet passage with a partial vacuum generating device, a perforate stationary shear plate disposed across the end of a first of said inlet passages, a bladed rotary shear mounted within said first inlet passage against said stationary shear plate, a vaned turbine element mounted in the second of said inlet passages for rotation therein, and a drive rod linking said rotary shear with said turbine element, said inlet passages having a common axis in oblique relation to the axis of the outlet passage and in such manner that an obtuse angle is provided between the axis of the outlet passage and the axis of the inlet passage in which the shear is mounted, the portion of the housing in which said outlet passage is disposed being in the form of a handle for the clipper.

2. In a vacuum operated hair clipper, the combination comprising a housing having a first tubular section communicating at a first end with the central portion of a second tubular section, the second end of said first tubular section having provision for connection with an air suction pump and the first and second ends of said second tubular section forming separate air intakes, a

stationary perforated shear plate disposed across said first end of said second tubular section, a rotary shear having at least one radially projecting cutting blade disposed within said second tubular section against said stationary shear plate, a turbine element having a plurality of radially projecting inclined vanes, said turbine element being coaxially mounted within said second end of said second tubular section for rotation therein, and a drive rod extending along the axis of said second tubular section and coupling said turbine element with said rotary shear whereby said turbine drives said rotary shear.

3. A vacuum operated hair clipper substantially as described in claim 2 and wherein said second tubular section of said housing is inclined with respect to said first tubular section thereof to form an oblique angle between said first tubular section and said first end of said second section whereby the manipulation of said clipper is facilitated.

4. A vacuum operated hair clipper substantially as described in claim 2 and comprising the further combination of an annular sleeve threadably engaged on said second end of said second section of said housing and carrying a center member bearing on the adjacent end of said drive rod whereby the pressure at which said rod holds said rotary shear against said stationary shear may be adjusted.

5. A vacuum driven hair clipping implement comprising, in combination, a housing having a first tubular section communicating at a first end with the central portion of a second tubular section which second section is inclined with respect to said first section and which second section has a first and second end providing separated air intakes, said housing having provision at the second end of said first section for connection with a partial vacuum generating device, an air flow baffle disposed within said second section of said housing at said central portion thereof opposite said first end of said first section and having a projecting portion extending towards said first end of said first section, said baffle being transpierced by a bore aligned with the axis of said second section of said housing, a multiply perforated stationary shear plate disposed across said first end of said second section of said housing, a rotary shear mounted in said second section against said stationary shear and having at least one radially projecting cutting blade, a vaned turbine element mounted within said second end of said section for rotation therein, and a drive rod disposed along said axis of said second section and connecting said turbine element

to said rotary shear for driving thereof, said drive rod extending through said bore in said baffle.

6. A vacuum driven hair clipping implement substantially as described in claim 5 and wherein a small air passage is formed in said second section of said housing which passage connects the exterior thereof with the center of said bore in said baffle whereby a small inflow of air occurs through said passage and towards the ends of said bore thereby preventing foreign matter from lodging therein.

7. A vacuum operated hair clipper comprising, in combination, a first tubular section having two ends each providing an independent inlet passage, a cutter assembly disposed adjacent one of said ends, a turbine motor housed within the inlet passage of the other of said ends and operatively coupled to said cutter assembly, and a tubular outlet section communicating with said first section intermediate said two ends.

8. A vacuum operated hair clipper comprising, in combination, a first tubular section having two end portions thereof each comprising an inlet passage, a rotary cutter assembly disposed at one of said inlet passages coaxially therewith, a turbine motor housed within the other said inlet passage, a drive shaft extending along the axis of said section coupling said motor to said cutter assembly whereby said motor operates said cutter, and a tubular outlet section extending angularly from said first section and communicating therewith intermediate said ends thereof.

9. A vacuum operated hair clipper comprising, in combination, a first tubular section having two ends each providing a separate inlet passage, a cutting assembly disposed at one of said ends, a turbine motor housed within the inlet passage of the other of said ends and operatively coupled to said cutting assembly, and a handle connected to said section, said handle having an outlet passage therein communicating with said section intermediate the ends thereof.

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