April 23, 1957 D. H. MEFFORD ET AL 2,789,786

AIR-OPERATED HAIR CLIPPING DEVICE

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FIG. 1.

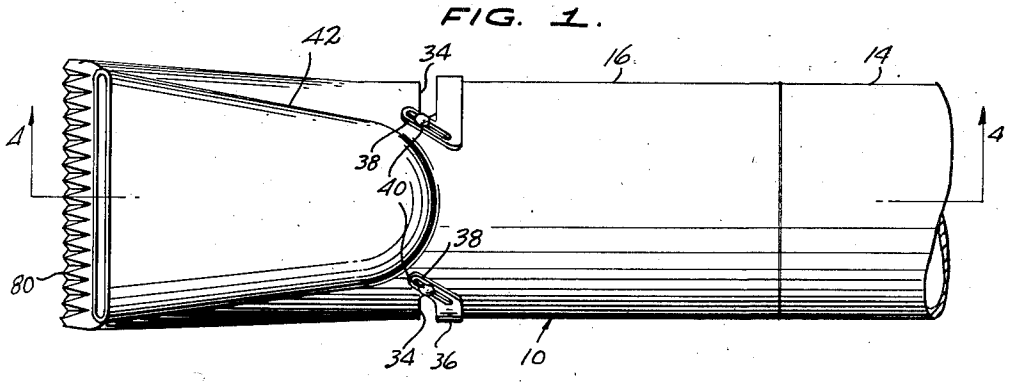


FIG. 2.

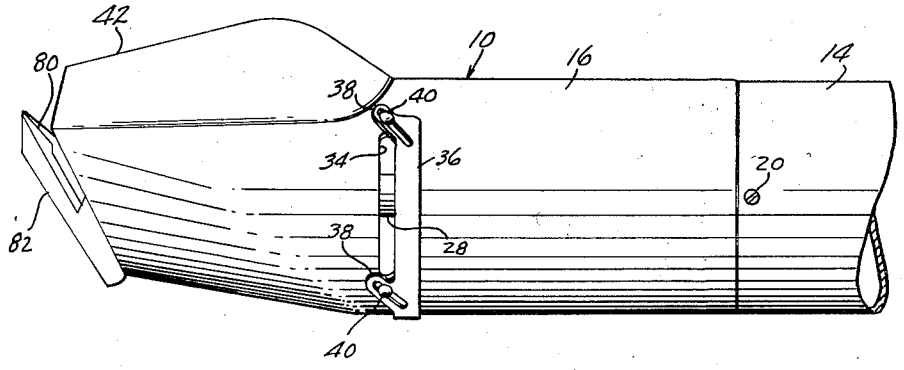
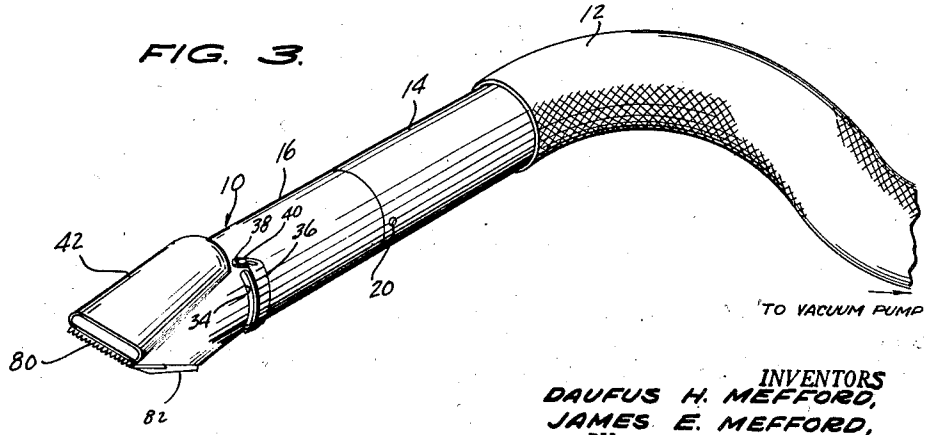


FIG. 3.



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FIG. 4.

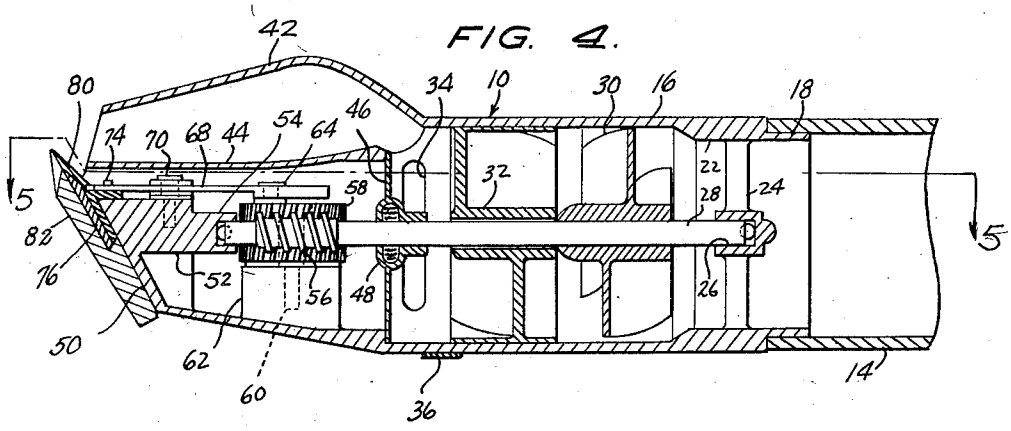


FIG. 5.

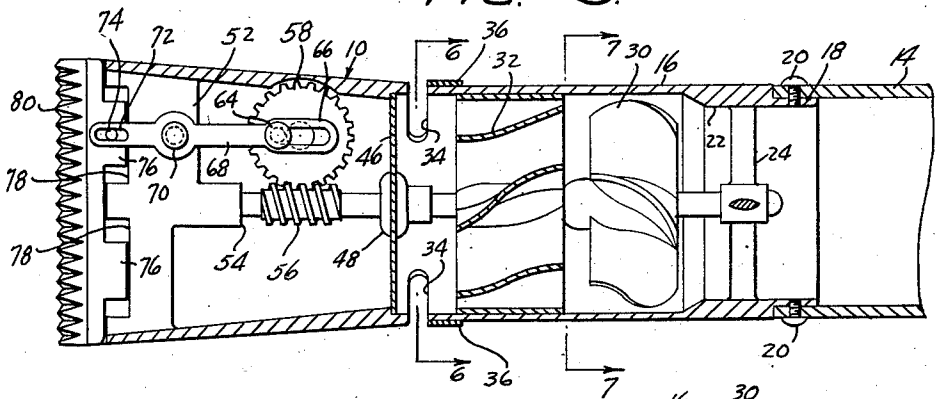
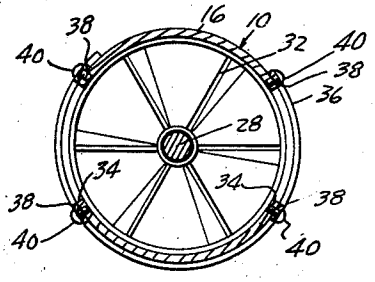


FIG. 6.



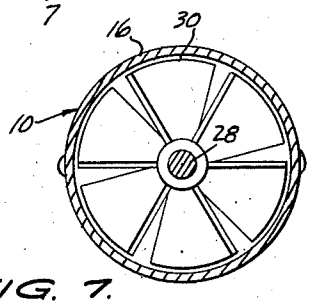


FIG. 7.

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United States Patent Office 2,789,786 Patented Apr. 23, 1957

2,789,786

AIR-OPERATED HAIR CLIPPING DEVICE

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Application August 7, 1953, Serial No. 373,032

2 Claims. (Cl. 253—38)

This invention relates to a hair cutting or clipping device, and more particularly has reference to a device of this type adapted to be powered by air drawn therethrough by a suitable means such as a vacuum pump or the equivalent mechanism.

The main object of the present invention is to provide a generally improved clipping device of the character stated, which can be connected detachably to the air inlet end of a hose leading to a vacuum cleaner or the like, the clipping device constituting the present invention being so designed as to make efficient use of air sucked therethrough for reciprocating a movable cutter head relative to a stationary cutter head.

Another object of importance is to provide an improved motion-translating connection between the reciprocating cutter head and a rotating turbine mounted within the casing, thus to cause high speed reciprocation of said cutter head and thereby improve measurably the cutting action thereof.

Another object of importance is to provide, in an air-operated clipping device, an improved means for controlling the rate at which the cutter head is reciprocated, the casing being provided, to this end, with air inlet ports each of which has a movable closure mounted adjacent thereto, said closure being capable of being adjustably positioned relative to the ports for the purpose of controlling the size of the air inlet opening defined by said ports.

Another object is to provide, in a clipping device as described, partitioning means at one end of the casing of the device, which partitioning means will divide the casing at said one end into an air inlet passage and a chamber in which the cutter head drive mechanism may be mounted, the cutter head being so disposed relative to the inlet end of the air passage as to cause hair cut by said head to be drawn through the passage.

Yet another object is to provide a hair clipping device as described wherein an air-operated turbine is rotatably mounted adjacent a stationary series of spirally arranged baffles or deflectors, said baffles or deflectors being so disposed as to change the course of air drawn through the casing so as to direct said air directly against the blades of the turbine.

Other objects will appear from the following description, the claims appended thereto, and from the annexed drawings, in which like reference characters designate like parts throughout the several views, and wherein:

Figure 1 is a top plan view;

Figure 2 is a side elevational view;

Figure 3 is a perspective view, a hose to a vacuum pump being illustrated fragmentarily;

Figure 4 is a longitudinal sectional view on line 4—4 of Figure 1;

Figure 5 is a longitudinal sectional view on line 5—5 of Figure 4;

Figure 6 is a transverse sectional view on line 6—6 of Figure 5, showing the means for controlling the amount of air drawn through the casing; and

Figure 7 is a transverse sectional view on line 7—7 of Figure 5, showing the rotating turbine.

The reference numeral **10** has been applied generally in the several figures of the drawing to designate a hollow, generally cylindrical casing, which can be formed of light sheet metal or the like. The casing is so designed as to have an inner or outlet end adapted for detachable connection to the inlet end of a hose **12** extending to a vacuum cleaner, vacuum pump, or equivalent mechanism.

The casing **10** includes, at its inner end, a cylindrical shell **14**, one end of which abuts against a main casing portion **16**. The main casing portion **16**, at its inner end, has a reduced extension **18** adapted to fit into the adjacent end of the shell **14**, the reduced extension serving to provide a circumferential shoulder on the main casing portion against which the shell **14** abuts. The lapping portions of the shell and extension **18** have registering openings, receiving screws **20**, whereby the shell **14** and main casing portion are detachably connected. It will be understood that the shell **14** would ordinarily remain permananently associated with the hose **12**, the portion **16** being detachably connected to the shell **14** in the manner shown in Figures 3 and 5 whenever the hair clipping device is to be used.

That portion of the casing adjacent the extension **18** is thickened as at **22**, and rigidly mounted on said thickened portion, within the casing, is a spider **24** having a centrally disposed bearing recess **26** in which is journaled one end of an elongated shaft **28**. The shaft **28** is disposed longitudinally and centrally of the casing, and secured fixedly to said shaft, for the purpose of rotating the same, is a turbine **30**. The turbine **30** has uniformly spaced, spirally pitched blades located in the path of air drawn through the casing, and circumposed about the shaft adjacent the turbine **30** is a baffle assembly **32**. Assembly **32** comprises a circumferential series of uniformly spaced baffles (see Figure 6) so pitched as to change the course of air moving past the baffle assembly, thereby to direct the air against the spirally pitched blades of the rotating turbine **30**.

At its center, the baffle assembly has an opening through which the shaft passes, said opening being of such a diameter as not to interfere with the rotation of the shaft in any way.

Disposed forwardly of and located in closely spaced relation to the baffle assembly **32** is a pair of circumferentially extending air inlet ports or slots **34**. These are disposed diametrically opposite one another as best shown in Figure 6, and controlling the movement of air into said ports or slots is an arcuate closure **36** slidably mounted upon the outer surface of the casing. The closure **36** is formed as a curved strip of sheet metal material or the like, said strip being provided, at selected locations spaced longitudinally thereof, with obliquely extending ears **38** (Figure 2). Rivets or screws **40** extend through slots formed in the ears **38** into the wall of the casing, to provide means carried by the casing on which the closure **36** is movably mounted. The closure **36**, when partially rotated upon the casing, is biased longitudinally of the casing into position over the air inlet ports or slots **34**, thus to either close said slots entirely or partially close the same. In this way, the movement of air through the slots into the casing is accurately controlled, it being understood that the speed of rotation of the turbine **30** will be correspondingly controlled, by selective positioning of the closure **36**.

At its inlet end, the casing has an outwardly offset hood portion **42**, and within the casing, in spaced relation to said hood portion, a longitudinal partition **44** is fixedly mounted. The partition **44** and the hood portion **42** cooperate to define therebetween an air inlet passage, the

inlet end of said passage being flattened as best shown in Figures 1 and 3. It will be understood that on the setting up of a vacuum condition within the hose **12**, air will be drawn at high speed through the passage defined between hood portion **42** and partition **44**, past the turbine **30**, thereby to rotate said turbine. Air will also be drawn inwardly through the air inlet ports or slots **34**, to supplement the air passing into the casing through said passage. The overall quantity of air passing the turbine **30** is, as previously noted herein, controlled by adjustable positioning of the closure **36**.

Within the casing, at the inner end of the longitudinal partition **44**, we provide a transverse partition **46**, the partition **46** cooperating with the partition **44** in defining a chamber adjacent the air inlet passage, in which chamber the drive mechanism of the device can be mounted.

The partition **46** has a center opening, and circumposed about said center opening is a gland **48** for lubricating the shaft during the rotation of the same.

That end of the casing at which the hood portion **42** is provided has an obliquely disposed end wall **50**, said end wall having a boss **52** integral therewith. The boss **52** is integral with an axial extension or shaft bearing member **54** having a recess receiving that end of shaft **28** remote from the spider.

Adjacent the bearing member **54**, we fixedly secure to the shaft, for rotation therewith, a worm **56** meshing with a worm wheel **58** rotatably mounted in the casing. Worm wheel **58**, for example, can have a spindle or stub shaft **60** fixedly secured thereto, said stub shaft being journaled in a socket formed in a worm wheel support portion **62**.

Eccentrically disposed upon the worm wheel is a pin **64**, extending into a closed, longitudinal slot formed in the widened inner end **66** of an arm **68** pivotally mounted intermediate its ends as at **70** upon the boss **52**. In the outer end of the arm **68** a closed, longitudinal slot **72** is formed, and extending into said slot **72** is a lug **74** upstanding from one of a pair of spaced ears **76** integrally formed upon a movable cutter head. The ears **76** are disposed within spaced recesses provided in the boss **52**, the end walls of said recesses limiting movement of the ears **76** in opposite directions therein.

The cutter head to which the ears **76** are integrally attached has been designated by the reference numeral **80**, and is formed as an elongated, flat bar arranged transversely of the casing, said bar sliding upon the outer surface of the obliquely disposed end wall **50**. The cutter head **80**, for its full length, has a series of cutting teeth, said teeth extending into the path of air drawn into the inlet passage of the casing. The cutter head **80** is reciprocated over the face of a stationary cutter head **82**, the cutter head **82** being recessed to receive the movable cutter head **80**. Cutter head **82** has, for its full length, a series of teeth over which the teeth of the movable cutter head are shifted at high speed, the stationary and movable teeth cooperating to cut hair when the device is in use.

The hair, of course, will be drawn into the air inlet passage due to the disposition of the teeth at the inlet end of said passage, the cut hair thus being drawn into the dust bag or equivalent receptacle of the vacuum cleaner or other device on which the hair clipper is mounted.

It is important to note that the particular construction illustrated and described is adapted to facilitate the attachment of the clipping device directly to the conventional fitting provided at the inlet end of an ordinary vacuum cleaner hose. The hair clipping device can thus comprise an accessory for a vacuum cleaner, and can be used to advantage in clipping hair efficiently and at low cost.

It is also thought to be an important characteristic of the invention that the arrangement facilitates the control of the speed of the rotation of the turbine **30**, this characteristic obtaining by reason of the provision of the

air inlet ports **34** used to supplement the main inlet defined by the passage formed by hood portion **42** and longitudinal partition **44**.

Still further, it is thought to be an important feature of the invention that an association with the rotary turbine, there is provided a fixed baffle assembly which is so designed as to cause air to be directed broadside against the several spirally pitched blades of the turbine, thereby to increase the efficiency of said turbine during use of the device.

Still further, the particular partitioning arrangement shown at **44**, **46** is thought to have an important advantage, in that it defines an air inlet passage that is wholly separate from the motion-translating drive mechanism connected between the turbine and cutter head, said drive mechanism being wholly confined in an area through which air will not pass, and within which the cut hair will not lodge, except perhaps to a minor extent.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles of operation and the means presently devised to carry out said principles, it being considered that the invention comprehends any minor change in construction that may be permitted within the scope of the appended claims.

What is claimed is:

1. A motor and control assembly for an air-operated hair clipper comprising: a hollow, open-ended casing forming an air duct for the passage of air therethrough; turbine means mounted in said casing for rotation by air drawn through the casing, the casing having intermediate its ends, circumferentially extending slots providing air inlet ports; an elongated closure mounted upon and extending circumferentially of the casing adjacent the respective air inlet ports, for movement across the ports selected distances, in a direction having both a transverse and longitudinal component in respect to the ports, thereby to vary the open area of the ports and thus control the speed of rotation of said turbine.

2. A motor and control assembly for an air-operated hair clipper comprising: a hollow, open-ended casing forming an air duct for the passage of air therethrough; turbine means mounted in said casing for rotation by air drawn through the casing, the casing having intermediate its ends, circumferentially extending slots providing air inlet ports; and a plurality of closures corresponding in number to the respective air inlet ports, each closure being longitudinally curved and being mounted upon the outside of the casing in position to extend circumferentially of the casing adjacent the respective ports, each closure extending at its opposite ends beyond the corresponding ends of the port adjacent thereto, each closure being formed at its ends with laterally projected ears extending transversely of the adjacent port beyond the opposite ends of the port, each closure having parallel slots in the respective ears thereof extending obliquely to the lengths of the closure and of its associated port, the casing including pins extending radially outwardly therefrom through the slots of the closure, whereby to mount the closures upon the casing for movement across the ports selected distances in a direction having both a transverse and longitudinal component in respect to the ports, for varying the open area of the ports and thus regulating the speed of the turbine.

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