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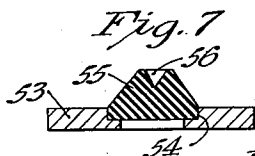
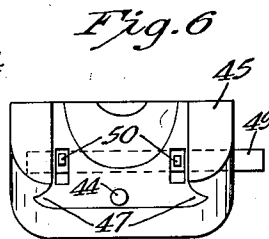
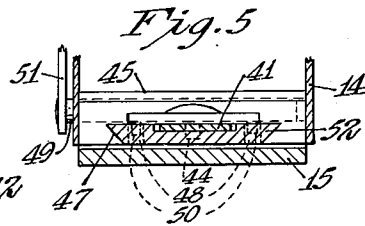
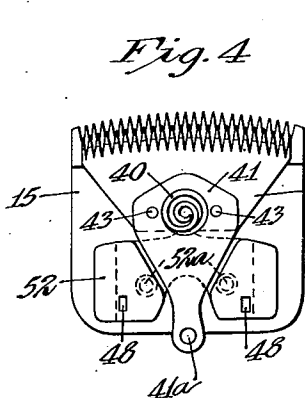
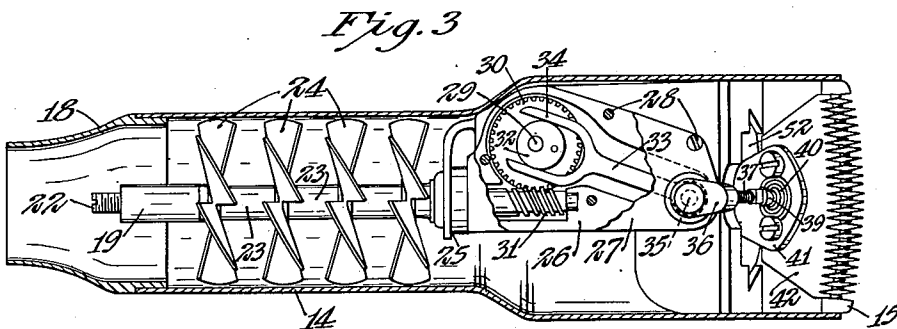
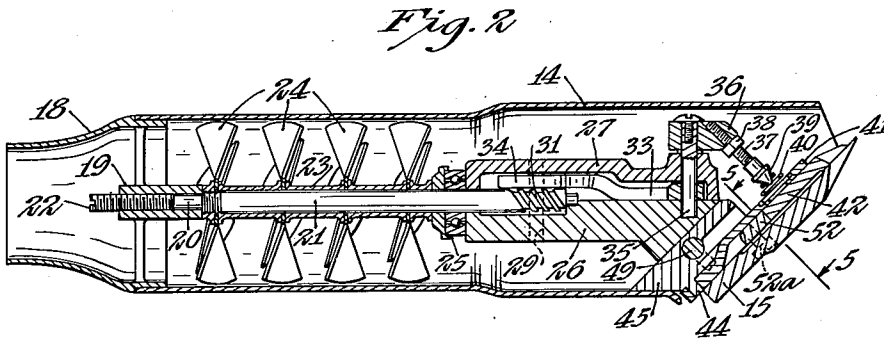
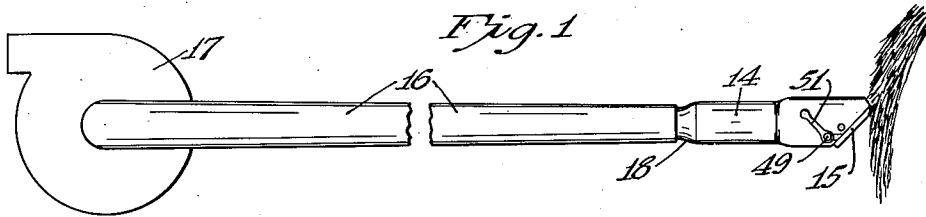
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2,292,453

VACUUM CLIPPER

Filed April 7, 1939

2 Sheets-Sheet 1



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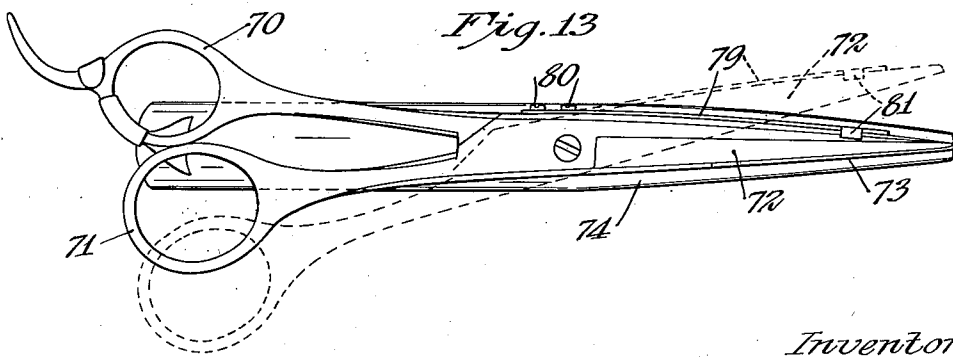
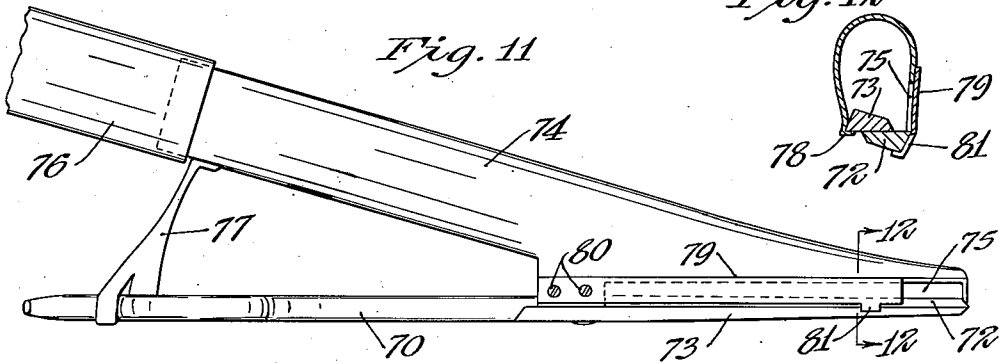
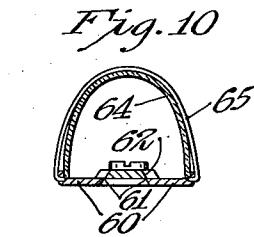
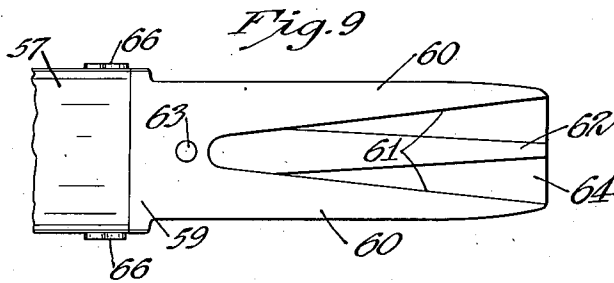
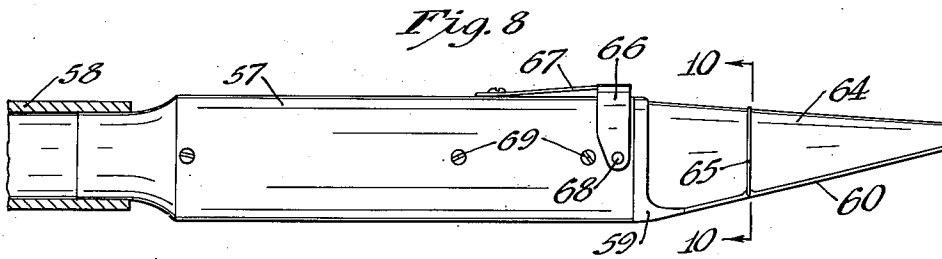
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2,292,453

VACUUM CLIPPER

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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VACUUM CLIPPER

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Application April 7, 1939, Serial No. 266,482

12 Claims. (Cl. 30—221)

This invention relates to cutting or clipping devices and more particularly to instruments for use in cutting and trimming hair.

The time-honored method of cutting the hair on human heads is to trim certain portions of the head with scissors and other portions thereof with clippers. The scissors are hand-operated and in most cases today the clippers are mechanically driven from an electric motor. In order to prevent the cut-off hair ends from dropping down the neck of the customer a large cloth is draped around his shoulders and tucked in at the neck. Also many barber shops and beauty shops use neck bands which are strips of gauze or paper wrapped around the neck at the point where the cloth is tucked into the collar. Even these precautions do not prevent the hair from working down inside the collar and the discomfort from the short cut off pieces of hair is considerable.

With the present types of hair cutting instruments it is necessary to use a comb in conjunction with the scissors to lift the hair out of the head so that the scissors can cut off certain amounts of the ends of the hairs. The cutting of a man's hair with the usual instruments and procedure usually takes about twenty minutes to half an hour.

One of the objects of my invention is to provide means in conjunction with a hair cutting instrument which will immediately pick up and withdraw all cut off hair ends to a suitable waste receptacle and which will prevent any of the cut off ends from falling down the neck of the customer. This means can be adapted for use in connection with various types of cutting devices such as scissors and clippers and dry shavers.

Another object of the invention is to provide hair removing means in connection with clippers and scissors wherein it is unnecessary to use a comb and wherein the hair removing means functions to pull the hair out from the head in a position similar to that resulting from use of a comb.

Another object of the invention is to provide hair suction means for removing the cut off hair ends and to utilize this suction for driving the blades of a clipper.

Still another object of the invention is to provide a clipper device and hair suction means associated therewith in such a manner that the clipper can be used for the entire hair cutting operation and wherein the time required for cutting the hair is very materially reduced.

Still a further object of the invention is to provide an improved clipper construction wherein

the operating mechanism for the relatively movable blades is simplified and wherein such mechanism functions smoothly and quietly.

These and other objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawings, wherein like reference characters refer to the same parts throughout the views, and, in which:

Fig. 1 is a side elevation in a more or less diagrammatic form of a suction operated clipper with the suction device and air conveyor tube;

Fig. 2 is a longitudinal vertical section through the clipper with its drive mechanism;

Fig. 3 is a horizontal section therethrough;

Fig. 4 is a plan view of the relatively movable blade structure;

Fig. 5 is a section taken approximately on the line 5—5 of Fig. 2;

Fig. 6 is a bottom view of the blade supporting block;

Fig. 7 is a section through the movable clipper blade with a form of flexible drive connection different from that shown in Fig. 4;

Fig. 8 is a side elevation of a motor driven suction operated scissors structure;

Fig. 9 is a bottom view of the blade arrangement of the scissors structure shown in Fig. 8;

Fig. 10 is a section approximately on the line 10—10 of Fig. 8;

Fig. 11 is a side elevation of a pair of ordinary hand scissors with a suction device associated therewith;

Fig. 12 is a section approximately on the line 12—12 of Fig. 11; and

Fig. 13 is a bottom view of the embodiment shown in Figs. 11 and 12.

In Fig. 1 there is shown a clipper casing 14 having a clipper blade 15 at the forward end thereof. The rear end of the casing 14 is open and is connected through the medium of a flexible tubing 16 to a suction fan 17. The fan 17 is adapted to draw air from adjacent the clipper blade assembly through the casing 14 and the tubing 16. The outlet of the fan may be connected with a suitable waste receptacle to receive cut off hair ends. In Fig. 2 the casing 14 is shown provided with a sleeve 18 adjacent the rear end of the casing and in the rearward tubular portion of said casing. The sleeve supports an axial bearing 19. The bearing 19 receives a reduced end 20 of an axially disposed shaft 21, and a set screw 22 in the bearing 19 is adapted to bear against the end of said shaft. A plurality of sleeves 23 are crimped into engagement with a number of fan

blades 24, there being a plurality of fans disposed adjacent each other along the shaft 21. The forward portion of shaft 21 rides in a suitable bearing generally indicated at 25, and the extreme forward end of said shaft enters a gear box composed of a main lower housing portion 26 and an upper cap portion 27. Stud 28 detachably connect the two housing sections. A shaft 29 is journaled between the sections of the housings and said shaft carries a worm gear 30 which meshes with a worm 31 formed on the forward end of the main shaft 21. The upper end of the short vertical worm gear shaft 29 is provided with an eccentric or cam 32 which rotates with the shaft 29 and the worm gear 30. A lever arm 33 has a forked rear end 34 which is adapted to relatively closely fit the cam 32 and said lever 33 extends forwardly in the gear housing to rigidly connect with a vertically disposed pin 35. This pin extends upwardly through the top of the housing portion 27 and the upper end of said pin carries a small block or lug 36. Extending diagonally forwardly and downwardly from the lug 36 is a threaded drive element 37 adjustably secured in the block by means of a lock nut 38. The lower end of the drive element 37 is provided with a substantially conical point 39 which is adapted to fit into the small upper end of a substantially frusto-conical spring element 40. This spring element provides a flexible drive connection between the drive pin 37 and a plate 41 which is secured to a movable clipper blade 42 by means of suitable rivets or screws in the holes 43. The plate 41 extends rearwardly of the movable blade and terminates in an apertured end 41a which fits on a pin-like projection 44 extending from the lower slanting face of a supporting block 45, the latter being suitably secured to the lower gear housing element 26.

A plate 52 is connected to the lower blade 15 by means of short screws 52a which extend through the lower blade and into the plate. As shown in Fig. 4, the plate 52 has a cut-away upper central portion in which the plate 41 is positioned, and this cutaway portion is wide enough to permit the plate 41 and the upper blade 42 to oscillate. The plate 52 is provided with a pair of spaced apertures 48 and its sides are bevelled downwardly and inwardly to slidably fit a bevelled channel 47 which is formed in the blade supporting block 45. A cross shaft 49 is journaled in the main block 45, and said shaft has a pair of downwardly projecting lugs 50 which extend into openings 48 in said plate 52. One end of the cross shaft 49 extends outwardly from the block 45 and a lever 51 is secured thereto to permit partial rotation of said shaft 49 to move the plate 52 and lower blade 15 forwardly or rearwardly with respect to the upper blade. This is provided to permit desired adjustments of the cutting teeth of the blades relative to each other.

As shown in Figs. 3 and 4 the ends of the teeth of the two cutting blades are located on arcuate lines and permit more even and close cutting in depressions such as the depression at the top of the neck where it meets the rear portion of the head and where it is frequently difficult to cut smoothly with ordinary straight edge clippers.

The above described structure is such that the gear casing, the blade supporting block 45, and the two cutting blades can be slipped forwardly out of the forward open end of the more or less tubular housing 14 as a unit with the fan shaft 21 and the fan units mounted thereon. The

housing or tubular casing may be secured to the blade supporting block 45 by means of suitable screws which are not shown. It will be seen that the housing 14 is substantially straight and carries the various units of the device in more or less alignment and the rear rounded portion of the housing provides a handle as well as a flow conduit for the air drawn therethrough by the suction fans 17. It will be further noted that there is an appreciable opening between the upper front portion of the housing and the cutting teeth on the blades 42 and 46 so that hair cut off by said teeth will be drawn backwardly through the housing and through the conduit 16. The gear casing is completely sealed and there are no exposed moving parts which can be clogged by the possible accumulation of hair on such parts. These moving parts which are exposed include the upper blade and the portion of the drive connection which includes the movable lug 36, the drive pin 37, and the flexible drive connecting spring 40. It is very clear that none of these parts can be affected through slight accumulation of short hair ends which might strike against them. The flow of air against the fan blades 24 causes rotation of the shaft 21 which through its worm portion 31 rotates the worm gear 30. The cam or eccentric 32 is in turn rotated to oscillate the lever arm 33, the element 36 and the drive pin 37. This pin oscillates the movable blade 42 through the flexible connection provided by the spring 40. This flexible connection provides a relatively simple drive connection wherein the different cooperating parts need not be machined and assembled with any great degree of accuracy and in addition the flexible or yielding drive eliminates considerable noise. Noise is also reduced through the worm drive.

In Fig. 7 there is shown a movable blade 53 which may be substituted for the blade 42 above described and this blade has a recess 54 to receive a rubber element 55 having a substantially conical depression 56 in its upper portion. This depression 56 is adapted to receive the substantially conical end 39 of the drive pin 37, and the rubber element 55 can be used in place of the frusto-conical coil spring 40 as desired.

From the foregoing description it will be seen that I have provided hair cutting devices which withdraw the cut off hair ends as they are being cut and convey them by means of air currents induced by a suction fan to a suitable waste receptacle. As a result the customer is never inconvenienced by cut off hair ends which might otherwise creep down the neck inside of the collar. In addition the draft of air set up creates a suction on the uncut portions of the hair which causes it to stand out from the head and materially assist in the cutting and trimming of the hair. The use of a brush to wipe hair from the neck and face is eliminated. These brushes, while prohibited by legislation in many states, are still being used and are considered dangerous carriers of hair diseases and skin ailments.

I have also provided an extremely efficient power means for operating the blades of hair cutting devices by utilizing the same flow of air which is used to carry off the cut off hair ends, and I have provided a drive construction which renders the device extremely convenient to operate and handle. The tubular housings which enclose the operating mechanism are relatively small and disposed at such an angle that they provide a convenient handle for grasping and manipulating the cutting device, this handle be-

ing as easily grasped as those on other types of mechanical cutters wherein flexible shafting connects the cutter directly to an electric motor. The working parts which must be lubricated are enclosed in a dust proof housing so that the particles of hair cannot possibly interfere with efficient operation.

Attention is again called to the flexible drive connection which in itself and through the medium of the adjustable driving pin 37 permits the adjustment of tension between the blades. It will be seen particularly in Fig. 2 that the blades 15 and 42 are only in contact adjacent the cutting teeth, the lower blade 15 having a cut-away portion beneath most of the bottom face of the upper blade 42. Most clipper constructions have blade heel portions which are in frictional contact and the blades are pressed together under spring tension and a considerable amount of friction results. My construction eliminates friction at the heel of the blade and greatly increases the operating efficiency of the device.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of my invention.

What is claimed is:

1. In a hair cutting device, a substantially straight open ended tubular housing having a portion shaped to provide a handle, relatively movable cutting blades positioned across the front end of said housing, a rotary air motor mounted axially of and within said housing to the rear of said cutting blades, power transmission gearing connected between said air motor and said cutting blades and positioned within said housing, and a dust proof casing within said housing and enclosing said transmission gearing.

2. In a hair cutting device, a stationary blade, a cooperating blade slidably movable with relation to said stationary blade, a rotary power device, means for converting power from said rotary power device into oscillatory power movement, and a resilient connection between said power device and said reciprocating blade and yieldable in a direction parallel to said movable blade.

3. The structure in claim 2 and said resilient connection comprising a relatively rigid element and an interconnected yielding element, said elements being connected between said movable blade and said power converting means and yieldable in a direction parallel to said movable blade.

4. In a hair cutting device, an open ended tubular housing providing a handle, relatively movable cutting blades mounted at one end of said housing, a rotary air motor mounted axially within said housing, a suction device connected to an end of said housing, and a resilient drive connection between said air motor and one of said cutting blades.

5. In a hair cutting device, an open ended tubular housing constituting a handle, relatively movable cutting blades mounted at one end of said housing, drive mechanism mounted within and extending longitudinally of said housing, and a resilient drive connection between said drive mechanism and at least one of said cutting blades.

6. In a hair cutting device, a generally straight tubular housing open at its ends, relatively movable cutting blades mounted at one end of said housing, a rotary air motor having an elongated shaft lying substantially axially of and within said housing, power transmission means connected to said air motor and to at least one of said cutting blades to transmit power from said air motor to said blade, said blades and transmission mechanism being substantially in alignment with the axially disposed air motor shaft in said housing.

7. In a hair cutting device, an open ended substantially straight tubular housing, an air motor supported within said housing and including a shaft disposed substantially axially of said housing, power transmission mechanism disposed within said housing and connected to said air motor shaft and supporting the same, a cutting blade assembly connected to said transmission mechanism, and said air motor, transmission mechanism and cutting blade assembly being removable as a unit from said housing.

8. In a hair cutting device, a housing, drive mechanism mounted within said housing, a blade assembly including at least one movable cutting blade mounted at an end of said housing, and a resilient drive connection between said drive mechanism and said movable cutting blade, said drive connection being yieldable in a direction parallel to said movable blade.

9. In a hair cutting device, a housing, drive mechanism positioned within said housing, a cutting blade assembly including a movable blade, a spring element connected to said movable blade and extending upwardly therefrom, and said drive mechanism including a member mounted for oscillatory motion and having a drive connection with the upwardly extending portion of said spring member, said drive connection being yieldable in a direction parallel to said movable blade.

10. The structure in claim 9 and said spring member comprising a substantially frusto-conical spring coil having its base connected to said movable blade and having its smaller end detachably secured to said drive mechanism member.

11. In a hair cutting device, a housing, drive mechanism mounted within said housing, a pair of cutting blades including a movable blade, a block of rubber connected to said movable blade and extending upwardly therefrom, said block having a socket in its upper end, and said drive mechanism including an oscillatory element having a portion thereof seated in the socket of said rubber block.

12. In a hair cutting device, drive mechanism, a pair of blades one of which is movable relative to the other and said blades having portions in sliding contact and being mounted adjacent said drive mechanism, a resilient element extending outwardly from said relatively movable blade at the opposite side thereof from the other of said blades, and said drive mechanism including an oscillatory drive element connected to said resilient element and movable toward and away from said resilient element to vary the pressure on the latter and also to vary the degree of pressure of said movable blade against the other of said blades.

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