

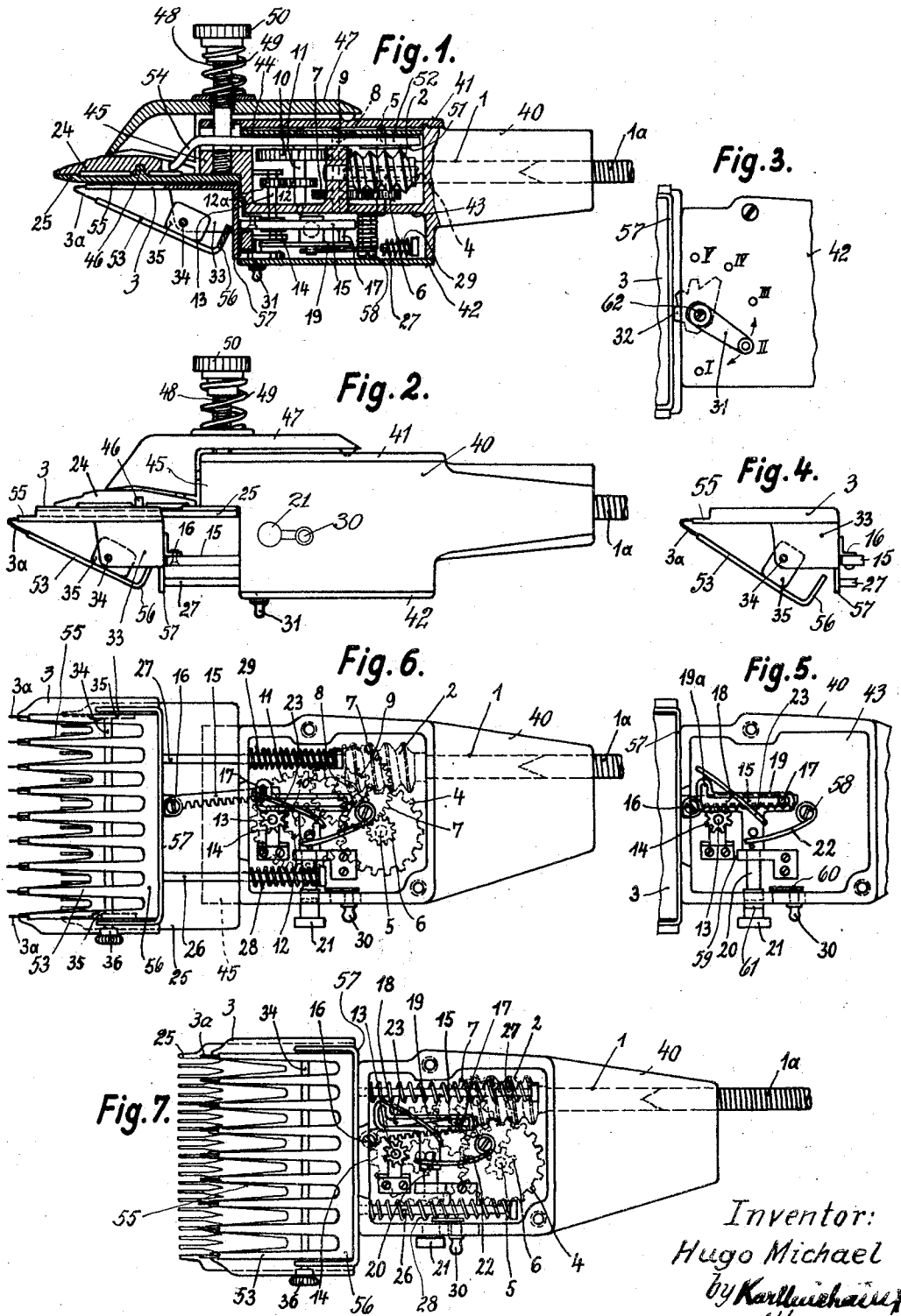
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H. MICHAEL

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HAIR CLIPPER

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Inventor:
Hugo Michael
by *Karl Weichmann*
Atty.

UNITED STATES PATENT OFFICE

HUGO MICHAEL, OF GOTTINGEN, GERMANY

HAIR CLIPPER

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My invention relates to hair clippers of the type in which the cutter blade is mounted to reciprocate on a casing and a comb or gauge bar is mounted to reciprocate on the casing for varying the position of the cutter blade with respect to the scalp or skin with the object of regulating the length of the hair being cut. Normally the clipper first cuts the hair very short and then gradually longer.

It has already been suggested to provide a comb or gauge bar which cooperates with the blade in this manner, and it is an object of my invention to provide improved means for feeding the comb or gauge bar, with a view to varying the length of the hair being cut during the operation of the clipper.

To this end I provide means for feeding the comb or gauge bar during the operation of the cutter blade, clutching means for connecting it to the feeding means, and means for throwing in and out the clutching means.

It is another object of my invention to vary the initial or starting position of the comb or gauge bar. To this end I provide an adjustable check on the casing by which the comb or gauge bar is arrested at a variable distance from its final inner position on the casing.

It is still another object of my invention to provide means for varying the angular position of the comb or gauge bar with respect to the direction in which it is fed. To this end I connect it to the casing by a hinge at its front end, and provide a cam for turning it about the hinge.

In a preferred embodiment of my invention I operatively connect the means for feeding the comb or gauge bar to the means for reciprocating the cutter blade which may be an electric or other drive, preferably a flexible shaft connected to the driving shaft on the casing at one end and to a motor at the other end or a motor on the casing. The means for feeding the comb or gauge bar may be designed as a pinion which is rotated from the drive of the cutter blade, and a rack which is hinged to the comb or gauge

bar at one end and adapted to mesh with the pinion.

The clutching means referred to include a loop at the inner end of a slide the outer end of which projects from the casing and for pushing the slide into the casing, a pin on the rack which engages in the loop so that the rack and the pinion may be connected and disconnected in any position of the rack with respect to the pinion, and also during the operation of the cutter blade. Depression of the slide throws out the rack and arrests the feed of the comb or gauge bar. At the outer end of the loop on the slide a catch for the pin is provided in combination with a spring on the slide which tends to move the pin into the loop so that the comb or gauge bar is automatically arrested in its outer final position if it has not been arrested in an intermediate position by depression of the slide. By depressing the slide again the comb or gauge bar is released and permitted to return to its final inner or initial position under the action of pull-back springs in the casing.

By means of the cam referred to which in the preferred embodiment explained above is mounted on a shaft in the casing and equipped with a handle for adjusting it to various positions, the initial or inner final position from which the comb or gauge bar is started for its feeding movement, may be varied as desired.

The means for varying the angular position of the comb or gauge bar with respect to the direction in which it is fed are designed as a shaft in the casing with a cam, or a pair of cams, having, in the present instance, two faces for engaging the comb or gauge bar. The hinges at the front end of the comb or gauge bar are preferably designed as very flexible springs.

In the drawing affixed to this specification and forming part thereof a clipper embodying my invention is illustrated diagrammatically by way of example.

In the drawing:

Fig. 1 is an elevation of the clipper, having the major part in section on the axis of the driving shaft,

Fig. 2 is a complete elevation of the clipper,

Fig. 3 is a plan view showing a portion of the clipper viewed from below, with the lever for adjusting the cam by which the initial or inner final position of the comb or gauge bar is varied,

Fig. 4 is an elevation of the comb or gauge bar set for a larger angle with respect to its feeding direction than in Fig. 1 by the cam, or pair of cams, referred to,

Fig. 5 is a plan view showing a portion of the clipper viewed from below, with the cover at the bottom removed for showing the rack-and-pinion mechanism and clutching means,

Fig. 6 is an elevation of the complete clipper, also viewed from below with the bottom cover removed, showing the clipper in its outer final position, and

Fig. 7 is a plan view like Fig. 6 but shows the comb or gauge bar in its initial or inner final position.

Referring now to the drawing, 40 is the casing of the clipper with a top cover plate 41 and a bottom cover plate 42. 43 is a partition extending along the casing in parallel to its top and bottom plates 41 and 42 and subdividing the casing into an upper and a lower compartment for the reception of its driving and comb-feeding mechanisms, as will be described. 44 is a bearing plate for the upper ends of several vertical shafts of the mechanism, which bearing plate is arranged just below the top cover plate 41, 45 is a transverse rib forming a horizontal face at the outer end of casing 40, and 25 is the fixed cutter blade which is secured to the lower face of projection 45 by any suitable means, preferably a pair of screws (not shown), 46 is a transverse rib projecting from the upper face of the fixed cutter blade 25, and 24 is the reciprocating cutter blade which is mounted to slide on the rib 46 and is held down on the fixed blade 25 by a hood or bracket 47. This hood or bracket bears on the top plate 41 with its rear, and on the reciprocating cutter blade 24 with its front end. 48 is a threaded pin the lower end of which is inserted in the projection 45 while its upper end is equipped with a spring 49 bearing on the hood 47 and a nut 50 for regulating the pressure of the spring. The pressure which the front end of the hood 47 exerts on the reciprocating blade 24 is varied by adjusting the nut 50.

1 is the driving shaft of the clipper to which rotation is imparted by any suitable means, such as a flexible shaft 1a the other end of which may be connected to an electric motor (not shown) but obviously the motor might also be mounted on the casing 40. 2 is a worm at the inner end of the shaft 1 which is journaled in a suitable bearing block in the upper compartment of the cas-

ing, 4 is a worm wheel which meshes with the worm 2, and 5 is the shaft of the worm wheel which is mounted to rotate in the bearing plate 44 with its upper, and in the partition 43 with its lower end. 51 is a cam or eccentric on the upper portion of the shaft 5, and 52 is a slotted lever in which the cam or eccentric 51 engages near its rear end. The slotted lever 52 is mounted to rock about the pin 48 near its front end, and 54 is a forward extension of the lever which engages in a slot of the reciprocating cutter blade 42. It will be understood that as the shaft 5 rotates under the action of the worm 2 and the worm wheel 4 the slotted lever 52 is rocked about the pin 48 and reciprocates the cutter blade 24.

3 is the comb or gauge bar which is mounted to slide on the sides of the lower blade 25 with its upturned edges, and has upper prongs 55 which project from the body 3 in forward direction and in parallel to the cutter blades, as shown in Figs. 6 and 7. 3a are V-shaped springs which are secured to the outer ends of the prongs 55 at one end and to inclined lower prongs 53 on a bar 56 at the other end. 57 is a vertical plate which projects downwardly from the comb body 3, 26 and 27 are rods which are secured to the plate 57 at their front ends and project rearwardly into the lower compartment, and 28, 29 are pull-back springs on the rods 26, 27 which bear on the front wall of the lower compartment with one end, and on heads at the rear ends of the rods 26, 27 with the other end.

Instead of springs 3a, hinges (not shown) might be provided, or the prongs 53 themselves might be resilient.

Pivoted to the plate 57 at 16 is a rack 15 which meshes with a pinion 14 on a shaft 13. The shaft 13 extends through the partition 43 with the pinion 14 at its lower end in the lower compartment, and a pinion 12a at its upper end in the upper compartment. 12 is a spur gear on a shaft 10 in the upper compartment, 11 is a larger spur gear, also on the shaft 10, 9 is a pinion on an intermediate shaft 8, also in the upper compartment, which meshes with the spur gear 11, 7 is a spur gear, also on the intermediate shaft 8, and 6 is a pinion on the shaft 5 of the worm wheel 4 which meshes with the spur gear 7 on the shaft 8. In this manner the rotation imparted to the shaft 5 by the worm 2 is transmitted to the shaft 8 through the pinion 6 and the spur gear 7, to the shaft 11 through the pinion 9 and the spur gear 10, and to the shaft 13 of the pinion 14 through the spur gear 12 and the pinion 12a.

17 is a pin near the free end of the rack 15, as best seen in Fig. 5 which engages in a slot 18 of a tee-shaped slide 19, 20. The slotted bar 19 of the slide extends in paral-

lel to the direction in which the comb 3 is
 fed. 21 is a button at the end of the bar
 20 of the slide which projects from the cas-
 ing, and 22 is a spring which is wound about
 5 a pin 58 extending downwardly from the
 partition 52, with its free end engaging be-
 tween two pins on the bar 20 of the slide
 so as to move the slide out of the lower com-
 partment as far as permitted by a check 59
 10 which is engaged by the outer pin under the
 pressure of spring 22. 30 is a handle which
 is mounted to slide in a slot of the casing
 40, 60 is a forked bolt at the inner end of the
 handle, and 61 are notches in the shank of
 15 the button 21 which are engaged by the bolt
 60 when the button is pushed inwardly, and
 the handle 30 is advanced, as shown in Fig.
 7. 23 is a plate or wire spring which is se-
 20 cured to the bar 20 of the slide at one end,
 with its free end projecting across the bar
 19 so as to engage the pin 17 of the rack 15,
 and 19a is a catch at the front end of the
 slotted bar 19 for the pin 17 to engage un-
 25 der the pressure of spring 23 in the outer
 final position of the comb 3, as shown in
 Fig. 6.

32, Fig. 3, is a cam which is mounted on
 a vertical shaft 62 in the lower compart-
 ment, with its lower end projecting from the
 20 bottom cover plate 42, and 31 is a handle on
 the lower end of the shaft. The cam 62
 projects through a slot in the front wall of
 the lower compartment and has five steps
 one of which arrests the plate 57 for each
 25 position of the handle 31. The handle is
 equipped with a catch at its outer end which
 is adapted to engage depressions I to V in
 the bottom plate 42. In Fig. 7, the handle
 31 is set for the second step and the catch
 40 at its free end engages in the depression II
 in the bottom plate 42.

The means for varying the angular posi-
 tion of the lower prongs 53 with respect to
 the direction in which the comb 3 is fed,
 45 include a shaft 34 which is mounted to ro-
 tate in lugs 33 at the sides of the comb, with
 a pair of cams 35 at opposite ends of the
 shaft, each cam bearing on one of the lower
 prongs 53, and 36 is a knurled handle at the
 50 outer end of shaft 34 for rotating the cams
 35. In the present instance the cams 35 are
 rectangular bodies with two prong-engag-
 ing faces at right angles to each other but
 obviously any other type of cams with any
 55 number of faces might be provided.

In normal operation the rack 15 is moved
 by the pinion 14 through the train of gears
 described until the comb 3 has arrived at its
 outer final position, Fig. 6. The pin 17 on
 60 the rack 15 gradually bends the spring 23
 out of its path until the pin is opposite the
 catch 19a, in which it engages under the re-
 action of the spring 23 as shown in Fig. 6
 when the comb 3 is in its outer final posi-
 65 tion in which it is held until the button 21

is depressed so that the slot 18 in the bar
 19 of the tee slide is presented to the pin
 17, permitting the comb 3 to be returned to
 its initial position by the springs 28 and 29
 70 on which tension had been put during the
 feeding of the comb. The initial position
 of the comb 3 is shown in Fig. 7. The dis-
 tance to which the comb is permitted to re-
 turn under the action of springs 28, 29 is
 75 determined by the cam 32 in Fig. 3.

If it is desired to return the comb to its
 initial position at an intermediate point of
 its feeding stroke the button 21 is depressed
 so that the rack 15, through the medium of
 80 bar 19 and pin 17, is thrown out of mesh
 with the pinion 14, and the comb returns to
 its initial position under the action of
 springs 28 and 29. If it is desired to throw
 out permanently the feed of the comb the
 button 21 is arrested in its depressed posi-
 85 tion by pushing forward the handle 30 as
 shown in Fig. 7, so that the bolt 60 engages
 in the notches of button 21 and the bar 19
 holds the rack 15 out of mesh with the
 pinion 14.

The length of the hair to be cut first is de-
 termined by the initial position of the comb
 which in turn is fixed by adjusting the cam
 32. The hair cut first is the longer the fur-
 90 ther the handle 31 is moved from I toward
 V. In addition to, or in combination with,
 this regulation of the initial length of the
 hair, the angular position of the prongs 53
 may be varied by turning the handle 36 on
 the shaft 34. Fig. 4 shows the cam 35 set for
 100 the largest, and Fig. 1 shows it set for the
 smallest angle. The reaction of the springs
 3a which serve as hinges for the prongs 53,
 holds the prongs 53 engaged with the
 105 cams 35.

I wish it to be understood that I do not
 desire to be limited to the exact details of
 construction shown and described for ob-
 vious modifications will occur to a person
 110 skilled in the art.

In the claims affixed to this specification
 no selection of any particular modification
 of the invention is intended to the exclusion
 of other modifications thereof and the right
 115 to subsequently make claim to any modifica-
 tion not covered by these claims is expressly
 reserved.

I claim:—

1. A hair clipper comprising a casing, a
 reciprocating cutter blade on said casing,
 120 means for reciprocating said blade, a comb
 or gauge bar mounted to be displaced on said
 casing for varying the position of said blade
 with respect to the scalp or skin, a pinion
 125 operatively connected to said blade-recipro-
 cating means, a rack connected to said comb
 or gauge bar and adapted to mesh with said
 pinion, and means for making and breaking
 the meshing relation of said rack and said
 130 pinion.

2. A hair clipper comprising a casing, a reciprocating cutter blade on said casing, means for reciprocating said blade, a comb or gauge bar mounted to be displaced on said casing for varying the position of said blade with respect to the scalp or skin, a pinion operatively connected to said blade-reciprocating means, a rack connected to said comb or gauge bar and adapted to mesh with said pinion, and a slide mounted to reciprocate in said casing and operatively connected to said rack for making and breaking its meshing relation to said pinion. 70
3. A hair clipper comprising a casing, a reciprocating cutter blade on said casing, means for reciprocating said blade, a comb or gauge bar mounted to be displaced on said casing for varying the position of said blade with respect to the scalp or skin, a pinion operatively connected to said blade-reciprocating means, a rack connected to mesh with said pinion, a pin on said rack, a slide mounted to reciprocate in said casing, and a loop on said slide for engaging said pin so as to move said rack into and out of meshing relation to said pinion. 75
4. A hair clipper comprising a casing, a reciprocating cutter blade on said casing, means for reciprocating said blade, a comb or gauge bar mounted to be displaced on said casing for varying the position of said blade with respect to the scalp or skin, a pinion operatively connected to said blade-reciprocating means, a rack connected to said comb or gauge bar and adapted to mesh with said pinion, a pin on said rack, a slide mounted to reciprocate in said casing, a loop on said slide for engaging said pin so as to move said rack into and out of meshing relation to said pinion, and a catch at one end of said loop for said pin to engage in. 80
5. A hair clipper comprising a casing, a reciprocating cutter blade on said casing, means for reciprocating said blade, a comb or gauge bar mounted to be displaced on said casing for varying the position of said blade with respect to the scalp or skin, a pinion operatively connected to said blade-reciprocating means, a rack connected to said comb or gauge bar and adapted to mesh with said pinion, a pin on said rack, a slide mounted to reciprocate in said casing, a loop on said slide for engaging said pin so as to move said rack into and out of meshing relation to said pinion, and a cam rotatably mounted on said comb or gauge bar for varying the angular position of said comb or gauge bar to the direction in which it is fed. 85
6. A hair clipper comprising a casing, a reciprocating cutter blade on said casing, means for reciprocating said blade, a comb or gauge bar mounted to be displaced on said casing for varying the position of said blade with respect to the scalp or skin, a pinion operatively connected to said blade-reciprocating means, a rack pivotally connected to said comb or gauge bar and adapted to mesh with said pinion, and means for making and breaking the meshing relation of said rack and said pinion. 90
7. A hair clipper comprising a casing, a reciprocating cutter blade on said casing, a comb or gauge bar mounted to be displaced on said casing for varying the position of said blade with respect to the scalp or skin, means for feeding said comb or gauge bar, clutching means for controlling the connection of said feeding means and said comb or gauge bar, a shaft mounted to rotate in said casing, a stepped cam on said shaft which is adapted to project from said casing so as to engage said comb or gauge bar and to limit its return movement with respect to said casing, and means for rotating said shaft and for holding it in several positions corresponding to the steps of said cam. 95
8. A hair clipper comprising a casing, a reciprocating cutter blade on said casing, a comb or gauge bar of resilient material mounted to be displaced on said casing for varying the position of said blade with respect to the scalp or skin, means for feeding said comb or gauge bar, clutching means for controlling the connection of said feeding means and said comb or gauge bar, and means for varying the angular position of said comb or gauge bar to the direction in which it is fed. 100
9. A hair clipper comprising a casing, a reciprocating cutter blade on said casing, a comb or gauge bar of resilient material mounted to be displaced on said casing for varying the position of said blade with respect to the scalp or skin, means for feeding said comb or gauge bar, clutching means for controlling the connection of said feeding means and said comb or gauge bar, and a cam rotatably mounted on said comb or gauge bar for varying the angular position of said comb or gauge bar to the direction in which it is fed. 105
10. A hair clipper comprising a casing, a reciprocating cutter blade on said casing, a comb or gauge bar of resilient material mounted to be displaced on said casing for varying the position of said blade with respect to the scalp or skin, means for feeding said comb or gauge bar, clutching means for controlling the connection of said feeding means and said comb or gauge bar, prongs arranged at an angle to the body of said comb or gauge bar of resilient material the angular position of said prongs to the direction in which said body is fed. 110
11. A hair clipper comprising a casing, a reciprocating cutter blade on said casing, a comb or gauge bar of resilient material mounted to be displaced on said casing for 115

varying the position of said blade with respect to the scalp or skin, means for feeding said comb or gauge bar, clutching means for controlling the connection of said feeding means and said comb or gauge bar, prongs arranged at an angle to the body of said comb or gauge bar, resilient means connecting each prong to said body, and means for varying the angular position of said prongs to the direction in which said body is fed.

In testimony whereof I affix my signature.

HUGO MICHAEL.

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