Oct. 5, 1965 O. W. GNAGE 3,209,455

HAIR CLIPPER

Filed Sept. 20, 1962 4 Sheets-Sheet 1

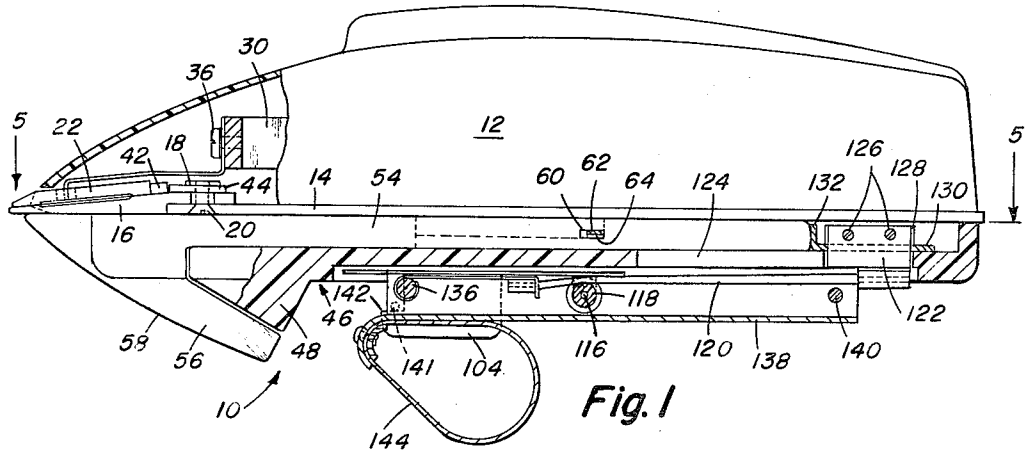


Fig. 1

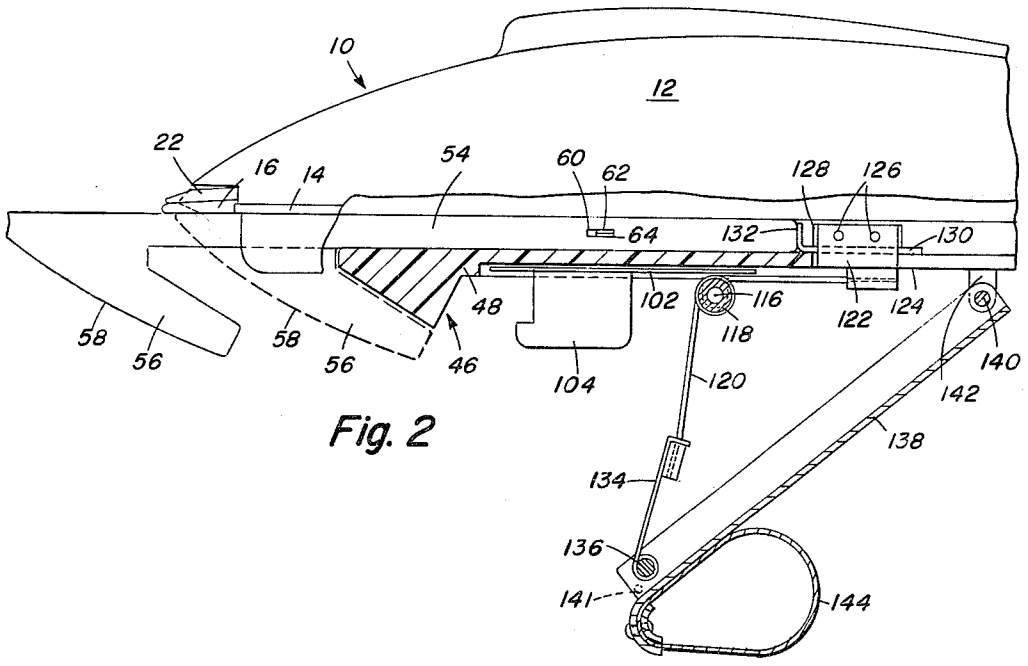


Fig. 2

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HAIR CLIPPER

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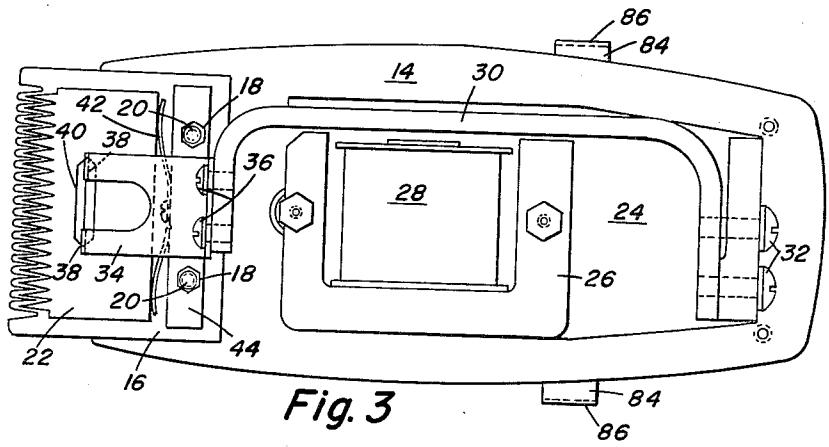


Fig. 3

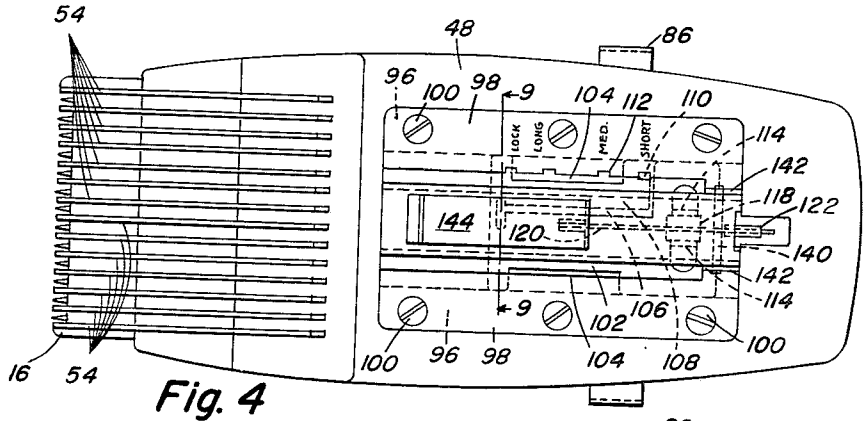


Fig. 4

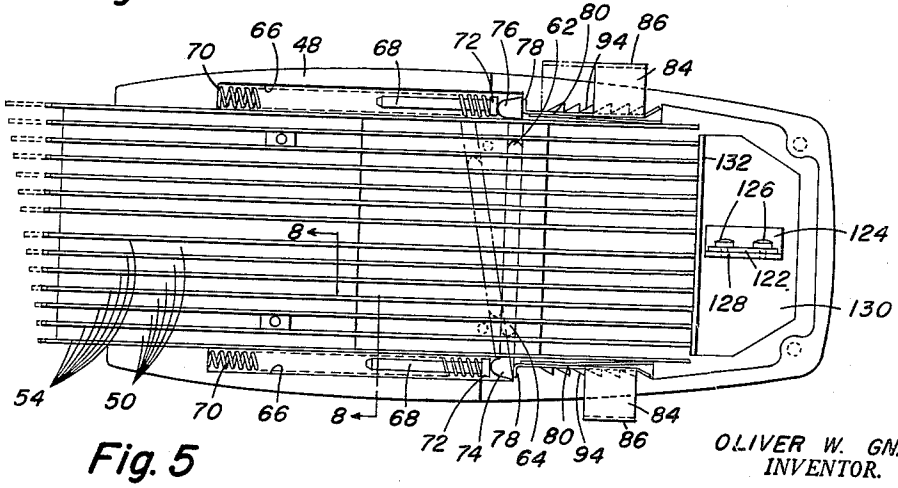


Fig. 5

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HAIR CLIPPER

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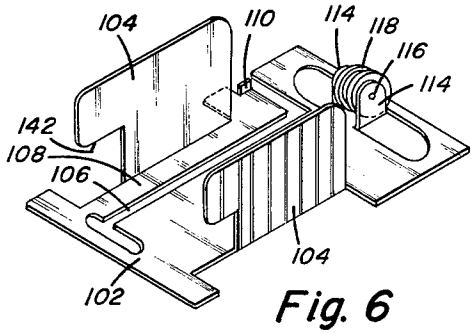


Fig. 6

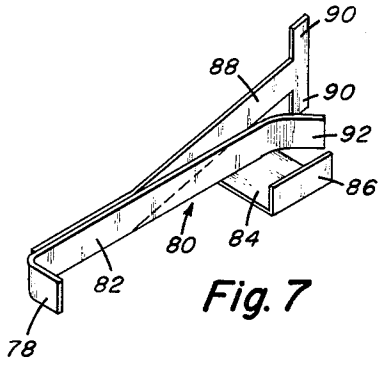


Fig. 7

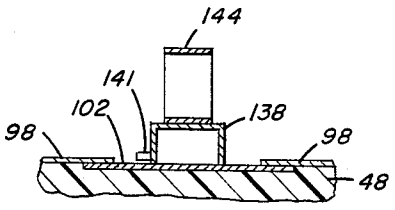


Fig. 9

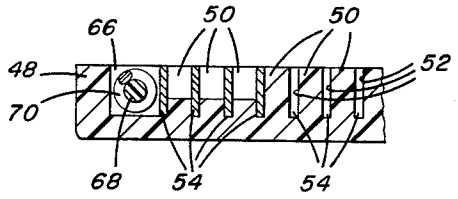


Fig. 8

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HAIR CLIPPER

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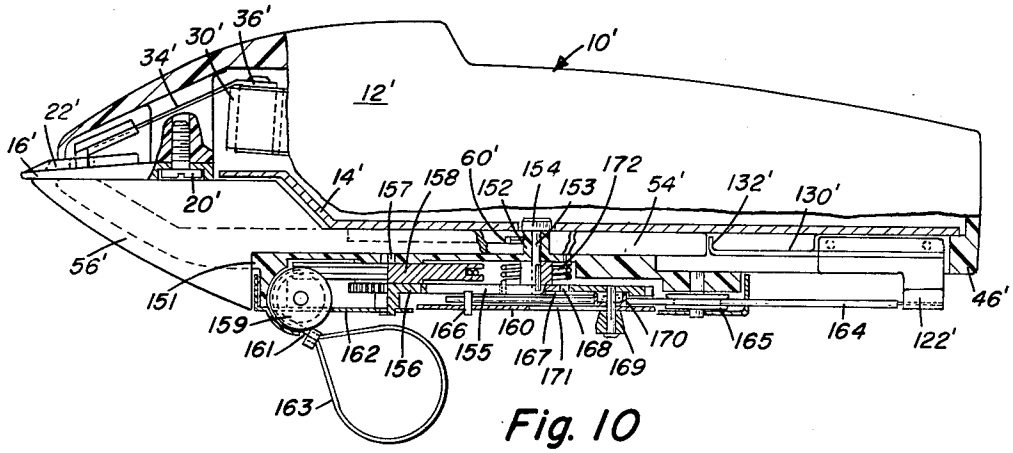


Fig. 10

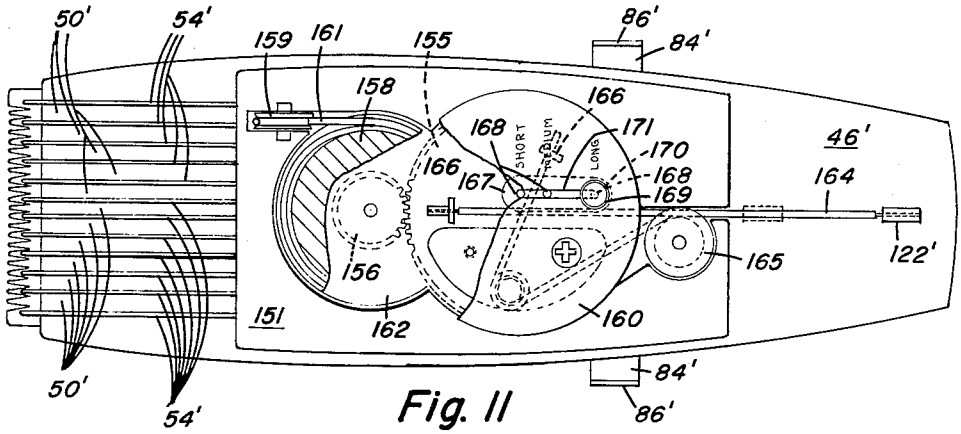


Fig. 11

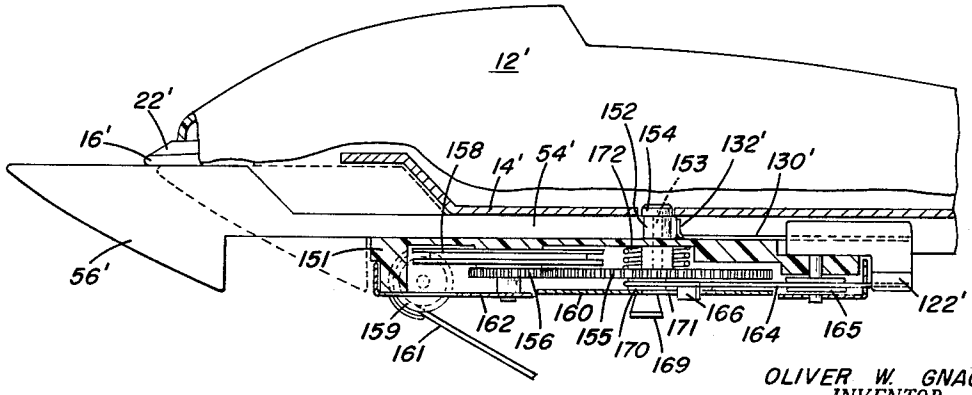


Fig. 12

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United States Patent Office

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3,209,455

HAIR CLIPPER

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Filed Sept. 20, 1962, Ser. No. 225,105
22 Claims. (Cl. 30—200)

This invention relates generally to clippers, and more specifically to an improved motor driven hair clipper.

Hair clippers for providing a well shaped hair taper without requiring a great deal of manual skill by the operator are generally well known in the art, but all devices of this type that applicant is aware of have serious defects which make them commerically impractical. One drawback of such prior-art hair clippers has been their highly complicated construction, necessitating a large number of parts, some machined to extremely close tolerances. As a consequence, the devices have been too expensive to manufacture, and hence commercially unacceptable. Other devices of this general type have had serious operational difficulties that have interfered with their giving repeated satisfactory service. Furthermore, none of these devices that applicant is aware of incorporated means for cutting a person's hair at a fixed length, such as for brush cuts, or for providing a taper on portions of the head that are not readily accessible such as around the ears. Applicant's improved haid clipper is believed to obviate these and other disadvantages of prior-known hair clippers.

One of the primary objects of the present invention is to provide an improved hair clipper that is of simple design and construction, thoroughly reliable and efficient in operation, and economical to manufacture.

Another object of the invention is to provide an improved hair clipper that essentially eliminates the need for any manual skill by an operator so that an inexperienced person may give other persons a professional-appearing haircut without any previous training, and without the use of attachments.

Still another object of the invention is the provision of an improved hair clipper by which the operator may give haircuts having tapers of varying length such as short, medium and long, as well as brush or crew cuts.

One more object of the invention is to provide an improved hair clipper enabling an operator to eliminate stairs, steps and digs in the hair of the person receiving the haircut.

A more specific object of the invention is to provide an improved motor driven hair clipper having a comb movable with respect to the cutting device by means of a pivotal lever, cable and pulley system.

Another specific object of this invention is to provide a hair clipper in which the distance the comb moves away from the cutting device upon a predetermined movement of the clipper is controlled by adjustably moving a pulley with respect to a cable.

Another specific object of the invention is to provide a hair clipper in which the distance the comb moves away from the cutting device upon a predetermined movement of the clipper is controlled by a rotatable member having one end of a cable secured thereto and an adjustable pulley mounted thereon adapted to engage and move the cable.

Still another object of the invention is to provide an improved hair clipper having control means for positioning the movable comb blades in a selected normal position with respect to the cutting blades to enable an operator to provide brush cuts and a proper taper-cut around the ears of the person receiving the haircut.

Objects and advantages other than those set forth above will be apparent from the following description when read in connection with the accompanying drawings, in which:

FIG. 1 is a side elevation view of a hair clipper constructed in accordance with the invention and having a portion broken away and another portion sectioned;

FIG. 2 is a side elevation view similar to FIG. 1 showing in full lines the position of the comb blades after they are shifted with respect to the cutting blades upon relative movement of a movable hair tapering mechanism with respect to the body of the hair clipper;

FIG. 3 is a top plan view of the hair clipper of FIG. 1 on a partially reduced scale and with the cover removed;

FIG. 4 is a bottom view of the hair clipper of FIG. 3;

FIG. 5 is a top plan view on the same scale as FIG. 4 of the lower housing taken along the line 5—5 of FIG. 1;

FIG. 6 is a perspective view of the pulley setting mechanism disclosed in FIG. 4;

FIG. 7 is a perspective view of the lower detent shown in FIG. 5.

FIG. 8 is an enlarged fragmentary view in section taken along line 8—8 of FIG. 5;

FIG. 9 is a fragmentary section view taken along line 9—9 of FIG. 4;

FIG. 10 is a view similar to FIG. 1 showing a modification of the invention;

FIG. 11 is a bottom view of the hair clipper of FIG. 10 with a portion thereof broken away; and

FIG. 12 is a side elevational view similar to FIG. 10 showing in full lines the position of the comb blades after they are shifted with respect to the cutting blades upon movement of the movable hair tapering mechanism.

With particular reference to FIGS. 1–9 of the drawings, a hair clipper **10** is disclosed comprising an upper assembly **12** as seen best in FIGS. 1–3 having a base plate **14** to which a fixed cutting blade **16** is secured by means of nuts **18** and bolts **20**. A movable cutting blade **22** is mounted on fixed blade **16** for reciprocal movement relative thereto. An insulating block **24** as seen in FIG. 3 is secured to base plate **14**, and supports a yoke **26** and coil assembly **28** of an electric motor. A vibrating armature arm **30** has one end secured to a portion of the insulating block **24** by screws **32**, and its opposite end supporting one end of a spring **34** by means of studs **36**. The opposite end of spring **34** has a pair of spaced depending fingers **38** extending into an elongated slot **40** in movable blade **22**. The fingers **38** not only serve to connect the spring **34** to blade **22**, but additionally have shoulders pressing against the upper surface of blade **22** to urge it into engagement with blade **16**. A leaf spring **42** (see FIG. 3) has a midportion secured to a block **44** mounted on blade **16**, and free end portions engaging an edge of movable blade **22** for urging it into engagement with the depending fingers **28**, and for guiding the reciprocal movement of blade **22**. The motor described is essentially a well-known type of vibrator motor which is adapted when connected to a power supply to cause the armature arm **30** to vibrate, this in turn causing the movable cutting blade **22** to vibrate or reciprocate rapidly with respect to the fixed cutting blade **16** to accomplish a cutting action.

The lower assembly **46** as seen best in FIGS. 1, 4 and 5 comprises a plastic housing **48** for supporting a setting means and a movable hair tapering mechanism to be described hereinafter. The lower assembly **46** is secured to base plate **14** of upper assembly **12** by any suitable means. The upper end of plastic housing **48** has a plurality of ribs **50** and slots **52** (see FIGS. 5 and 8) into which individual thin, elongated plate-like comb blades **54** are slidably mounted. One end of each comb blade **54** has an integrally formed arm **56** and an arcuate lower surface **58**. The comb blades **54** have aligned openings **60** (see FIGS. 1 and 2) extending therethrough through

which a pair of levers **62**, **64** extend, one from each end, for interrelating the blades **54**. The plastic housing **48** further has a pair of cavities **66** (see FIGS. 5 and 8) for housing the comb blade setting means for releasably holding the blades **54** in a selected initial or normal fixed position relative to cutting blades **16**, **22**. The setting means comprises a plunger **68** in each cavity **66** and a helical spring **70** encircling each plunger **68**. One end of spring **70** engages the housing **48**, and its opposite end engages an enlarged end **72** of the plunger **68** for urging same against respective ends **74**, **76** of the levers **62**, **64**. The springs **70** and plungers **68** bias the respective ends **74**, **76** of the levers **62**, **64** against the lugs **78** of a pair of identical stop members shown as detents **80**, seen best in FIGS. 5 and 7. Each detent **80** comprises a plate **82** having an integrally formed arm **84** extending through an opening between the plastic housing **48** and base plate **14** and having a bent finger tab **86**. The detent **80** further has a leaf spring **88**, one end of which is secured to plate **82** and the opposite end having lips **90** bearing against an edge of a slot, not shown, in the plastic housing **48** and an edge of a slot, not shown, in plate **14**. The detent **80** further has a bent pawl **92** adapted to cooperate with a ratchet **94** molded into the plastic housing **48**. In the assembled position, the detent spring **88** is tensioned, urging pawl **92** into engagement with ratchet **94**. By varying the initial or normal position of comb blades **54** relative to cutting blades **16**, **22**, the described setting means provides an effective means for properly positioning the blades as seen in FIG. 5 to allow the operator to taper cut a person's hair around each ear, one detent thereof providing the proper taper around one ear and the other detent providing the proper taper for the opposite ear. It can readily be seen that if one detent **80** is positioned in its innermost position, and the other detent is moved forward to a desired taper, its lug **78** urges the levers **62**, **64** pivoting them about end **74**. The levers **62**, **64** in turn move the comb blades **54** relative to fixed blades **16**, **22** to provide a fixed taper as seen dotted in FIG. 5. In order to cut the hair on the top, top sides or the back of a person's head to a predetermined desired length such as for brush cuts, the operator moves both detents **80** in a forward direction equally, moving the comb blades **54** to a selected normal position in which the ends of the comb blades **54** are extended from the cutting blades **16**, **22** a predetermined distance equal to the length of haircut desired.

The lower end of the plastic housing **48** supports the movable hair tapering mechanism for controlling the relative movement of the comb blades **54** to the cutting blades **16**, **22**. The housing **48** has a pair of spaced-apart ribs **96** to which spaced-apart rails **98** (see FIG. 4) are secured by screws **100** or the like. Rails **98** overhang the ribs **96** to form guideways for a taper selector bracket **102** as seen in FIGS. 4 and 6. The taper selector bracket **102** comprises a plate slidable within the guideways and having a pair of extending finger tabs **104**. The bracket **102** further has an L-shaped elongated slot **106** therethrough so that one finger tab **104** and integral arm **108** acts as a leaf spring urging a lug **110** against the edge on one of the rails **98**. The edge of the rail **98** is provided with a plurality of notches **112** which cooperate with lug **110** to form a detent for releasably holding the taper selector bracket **102** in one of a plurality of selected positions designated "Lock," "Long," "Med.," or "Short." The bracket **102** further has a pair of spaced, struck-out tabs **114** which support a spindle **116** upon which a groved nylon fulcrum or roller **118** is rotatably mounted as seen in FIGS. 1, 2 and 4. A cable **120** rides in the groove of roller **118**, and one end thereof is secured to one end of a plate **122** (also see FIG. 5) that extends through a slot **124** in plastic housing **48**. The opposite end of plate **122** is secured by screws **126** to a struck-out tab **128** of a pusher plate **130** slidably mounted on the upper end of housing **48** and having an upturned lip **132** adapted to engage the ends of guide fingers **54**. The opposite end of cable **120** is releasably secured to a lever **134** (see FIG. 2) pivoted on a stud **136** supported by a pivotal arm **138**. The pivotal arm **138** is U-shaped in cross-section, and is pivotal on a spindle **140** supported by spaced-apart upturned tabs **142** on each rail **98**. A thumb loop **144** is secured to arm **138**, and the arm further carries a pin **141** which is adapted to engage a shoulder **142** of one of the finger tabs **104** when the taper selector bracket **102** is moved into the "Lock" position as seen dotted in FIG. 1 for releasably locking or preventing pivotal movement of arm **138** with respect to the upper and lower assemblies **12**, **46** respectively.

In the operation of the movable hair tapering mechanism disclosed in FIGS. 1–9, the operator initially moves the detents **80** of the fixed tapering mechanism to their innermost positions so that the blades **54** assume a selected normal position in which the ends of blades **54** and **16**, **22** are in substantial register as seen in FIG. 1. The operator then moves the taper selector bracket **102** in a desired notch depending upon the length of taper desired. Although only four notches are designated, it is, of course, possible to incorporate a greater number. The primary function of this taper selector bracket **102** is to position roller **118** relative to the ends of cable **120**. Let us assume that the taper selector bracket **102** and roller **118** are moved to the notch designated "Long" in FIGS. 2 and 4. The operator places the finger loop **144** against the neck of the person receiving the hair cut and holds it there preferably with his left thumb while pivotally moving the upper and lower assemblies **12**, **46** as a unit in the upward direction. As the assemblies **12**, **46** are moved upwardly as a unit, the cable **120** and pusher plate **130** secured thereto are pulled causing lip **132** of pusher plate **130** to gradually urge the comb blades **54** outwardly against the bias of springs **70** from its normal position as seen in FIG. 1 to an extended position with respect to the cutting blades **16**, **22** (see FIG. 2). The distance between the outer surfaces of the comb blades **54** and the cutting blades **16**, **22** increases as the angle between the arm **138** and lower assembly **46** increases. When the hair tapering operation is completed, the operator releases the loop allowing springs **70** to return the comb blades **54** to their normal position. It is obvious that as the taper selector bracket **102** and roller **118** are moved closer to the pusher plate **130**, for instance to one of the positions designated "Med." or "Short," the pusher plate **130** will not be moved as far outwardly for the same angle of separation between the arm **138** and the assemblies **12**, **46**, and hence the comb blades **54** will not move out as far resulting in a taper of reduced length. The movable hair tapering mechanism is used to taper-cut the hair on the back of the neck and head, and to taper-cut the sideburns if desired. To taper-cut around the ears, the taper selector bracket **102** is moved into the "Lock" position locking the pivotal arm **138** to the lower assembly **46**, and the detents **80** of the comb blade setting means are used, one at a time, to select a normal position for blades **54** to provide the taper cut around the proper ear to match the taper-cut for the back of the neck. Then both of the detents **80** may be used to move all of the comb blades **54** to a selected normal position in which the ends thereof are moved a predetermined distance from the cutting blades **16**, **22** to cut the hair on the top, top sides and back of the head of the person receiving the haircut to a specified length.

In the modification of the invention disclosed in FIGS. 10–12, similar or identical parts to the parts described in FIGS. 1–9 will be designated by the same numerals primed. The hair clipper **10'** has an upper assembly **12'** having a base plate **14'** having an offset portion **150** to provide sufficient room for the enlarged ends of comb blades **54'**. The hair clipper **10'** has a fixed cutting blade **16'** secured to assembly **12'** by a screw **20'**. A movable cutting blade **22'** is mounted on blade **16'** and is reciprocally moved

relative thereto by a spring **34'** having one end secured to armature arm **30'** and its opposite end in engagement with blade **22'**.

The comb blades **54'** have a slightly different shaped end **56'** than blades **54**, but are similarly slidably mounted in slots **52'** separated by ribs **50'**. The comb blade setting means is identical to that disclosed and described in FIG. 5 and hence will not be described in further detail in this modification.

The primary differences in the modification in FIGS. 10–12 over the hair clipper described in FIGS. 1–9 resides in the aforementioned shape of the comb ends **56'** which provides increased space between the ends **56'** and housing **48** to allow the uncut hair to pass therebetween, and in the details of the movable hair tapering mechanism. This mechanism comprises a cup-shaped housing **151** secured to the lower surface of lower assembly **46'** by any suitable means. The housing **151** has an annular hub **152** through which a shaft **153** extended. The shaft **153** has a head **154** at one end, and a gear **155** secured to its other end. The gear **155** is rotatable by a drive means comprising a gear **156** in mesh therewith and mounted on a shaft **157** supported by housing **151**. Gear **156** is integral with a pulley **158**. A guide pulley **159** is rotatably supported by housing **151** in a plane at right angles to the plane of pulley **158**. A cord **161** has one end secured to pulley **158**, its intermediate portion wound around pulley **158**, and its other end directed over pulley **159** and extending through an opening in a cover plate **162** where it terminates in a finger loop **163**.

The gear **155** has a cover plate **160** secured thereto, and is further connected to a plate **122'** by a cable **164**, one end of which is secured to plate **122'**, and its opposite end secured to a radially spaced lug **166** secured to both gear **155** and plate **160**. The gear **155** has an elongated recess **167** having spaced apart openings **168** for receiving one end of a spring biased plunger or fulcrum **169**. The plunger extends through a slot **171** in plate **160**, and has a pulley **170** thereon adjacent cable **164**. The plunger **169** is further movable along recess **167** to position plunger **169** in one of the openings **168** which are designated on plate **160** as "Short," "Medium," and "Long." A helical spring **172** biases gear **155** in a counter-clockwise direction winding the cord **161** on pulley **158** until the base of loop **163** engages housing **151**.

Let us assume that the operator desires to secure a "Long" taper and hence moves plunger **169** into the "Long" position as seen in FIG. 11. The spring **172** would bias gear **155** and the remaining parts of the movable hair tapering mechanism into the positions seen in full lines in FIGS. 10 and 11. To achieve the taper, the operator moves the front end of comb blades **54'** into engagement with the lower portion of the neck of the person receiving the hair cut. As the operator moves the hair clipper and comb blades **54'** toward the top of the person's head, he pulls the cord **161** by means of finger loop **163** causing gear **156** to turn gear **155** through an angle of approximately 55 degrees. This causes pulley **170** to engage and move cable **164** as seen dotted in FIG. 11 causing lip **132'** of pusher plate **130'** to gradually urge comb blades **54'** outwardly with respect to the cutting blades **16'**, **22'** (see FIG. 12) to achieve a gradual taper. If a shorter taper is desired, the operator moves plunger **169** in the opening designated "Short" or "Medium," thereby moving pulley **170** toward the center of gear **155**. It is apparent that when pulley **170** is radially spaced a shorter distance from the center of gear **155**, pulley **170** is moved through a shorter arc upon a fixed angular movement of gear **155**, thereby advancing cable **164** a shorter distance resulting in a shorter taper.

The invention has been described in detail with particular reference to preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention as described hereinabove and as defined in the appended claims.

I claim:

1. In a hair clipper, the combination comprising:
(A) hair cutting means;
(B) comb means movable relative to said cutting means between a normal position in which the ends of said hair cutting and comb means are in substantial register, and an extended position in which said ends are spaced apart; and
(C) means for controlling the movement of said comb means between said normal and extended positions;
(D) said controlling means comprising (1) a manually movable member, (2) means for engaging and moving said comb means, said moving means comprising a pusher plate in engagement with said comb means, (3) flexible means interconnecting said movable member and said moving means, and (4) a fulcrum interposed between said movable member and said moving means and cooperating with said flexible means intermediate its ends upon movement of said movable member to cause said moving means to move said comb means between said normal and extended positions, said fulcrum further being adjustably movable to one of a plurality of fixed positions for varying the distance between said normal and extended positions.

2. The invention according to claim **1** wherein said interconnecting means comprises a cable having one end secured to said pusher plate and its other end secured to said movable member.

3. The invention according to claim **2** wherein said cable ends are a predetermined distance apart when said comb means is in one of said normal and extended positions, and a shorter distance apart when said comb means is in the other of said normal and extended positions.

4. The invention according to claim **3** wherein said movable member is pivotal.

5. The invention according to claim **3** wherein said movable member is rotatable.

6. The invention according to claim **5** wherein said fulcrum is carried by said rotatable member.

7. In a hair clipper, the combination comprising:
(A) a body;
(B) hair cutting means supported by said body;
(C) comb means movable relative to said cutting means between a normal position in which the ends of said hair cutting and comb means are in substantial register, and an extended position in which said ends are spaced apart; and
(D) means for controlling the movement of said comb means between said normal and extended positions comprising (1) a lever having one end pivotally connected to said body and its other end free, (2) a pusher plate in engagement with said comb means, (3) a bracket on said body supporting a fulcrum, and (4) a cable trained over said fulcrum and having one end secured directly to said pusher plate and its other end secured to the free end of said pivotal lever whereby said comb means is movable relative to said cutting means between said normal and extended positions upon relative pivotal movement of said lever and body.

8. The invention according to claim **7** wherein said bracket is slidably movable on said body for adjustably varying the position of the fulcrum between the ends of said cable and thereby varying the distance between said normal and extended positions for a fixed relative movement of said lever and body.

9. In a hair clipper, the combination comprising:
(A) a body;
(B) hair cutting means supported by said body;
(C) comb means movable relative to said cutting means between a normal position in which the ends of said hair cutting and comb means are in substantial regis-

ter, and an extended position in which said ends are spaced apart; and

(D) means for controlling the movement of said comb means between said normal and extended positions comprising (1) a member rotatably mounted on said body, (2) drive means for rotatably moving said rotatable member, (3) a pusher plate in engagement with said comb means, (4) a fulcrum carried by said rotatable member, and (5) a first cable having one end connected to said pusher plate, its other end connected to said rotatable member, and its intermediate portion engageable and movable by said fulcrum whereby said comb means is movable relative to said cutting means between said normal and extended positions upon movement of said rotatable member by said drive means.

10. The invention according to claim **9** wherein said fulcrum is slidably movable on said rotatable member for adjustably varying its position between the ends of said first cable and thereby varying the distance between said normal and extended positions for a fixed movement of said rotatable member.

11. The invention according to claim **9** wherein said drive means comprises a first rotatable member in driving engagement with said rotatable member, a pulley secured to said first member, and a second cable having one end secured to said pulley, its intermediate portion wound around said pulley, and its other end free and adapted when pulled by the operator to rotate said pulley and first member for driving said rotatable member.

12. The invention according to claim **1** and further including comb setting means for releasably holding said comb means in its normal position, said setting means comprising a stop means for said comb means, and a resilient means for urging said comb means into engagement with said stop means.

13. The invention according to claim **12** wherein said comb means comprise a plurality of spaced apart slidable blades, and means interrelating said blades, and said resilient means urges said interrelating means against said stop means.

14. The invention according to claim **13** wherein said interrelating means comprises a bar extending through aligned openings in said comb blades.

15. The invention according to claim **12** wherein said stop means is adjustable and comprises a detent means.

16. The invention according to claim **15** wherein said detent means comprises a ratchet and a pawl engageable therewith.

17. The invention according to claim **9** and further including comb setting means for releasably holding said comb means in its normal position, said setting means comprising a stop means for said comb means, and a resilient means for urging said comb means into engagement with said stop means.

18. The invention according to claim **17** wherein said comb means comprise a plurality of spaced apart slidable blades, and means interrelating said blades, and said resilient means urges said interrelating means against said stop means.

19. The invention according to claim **18** wherein said interrelating means comprises a bar extending through aligned openings in said comb blades.

20. The invention according to claim **17** wherein said stop means is adjustable and comprises a detent means.

21. The invention according to claim **20** wherein said detent means comprises a ratchet and a pawl engageable therewith.

22. In a comb blade setting means for a hair clipper having a plurality of spaced apart slidable blades, and means interrelating the blades for releasably holding said comb blades in a selected normal position, the combination comprising:

adjustable stop means for said comb blades comprising a detent means,

said detent means comprising a ratchet and pawl engageable therewith, and

resilient means for urging said interrelating means into engagement with said stop means.

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WILLIAM FELDMAN, *Primary Examiner.*

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,209,455 October 5, 1965

Oliver W. Gnage

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the heading to the printed specification, line 3, for "75 Panorama Trail, Rochester 25, N. Y." read -- 24 Raleigh Rd., Rochester 17, N. Y. --.

Signed and sealed this 20th day of September 1966.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents