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TAPER ADJUSTMENT MECHANISM FOR CLIPPER

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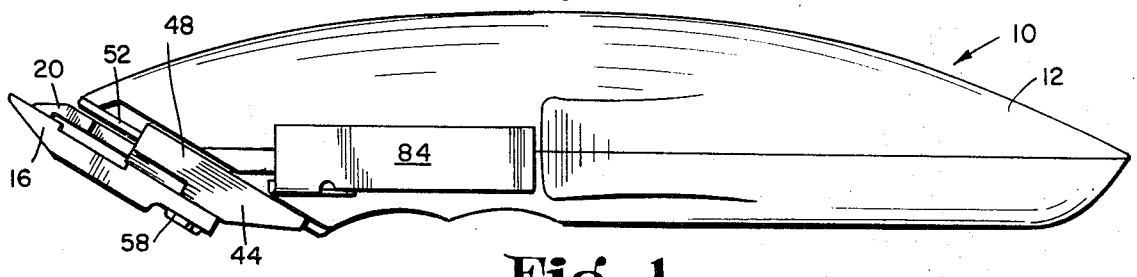


Fig. 1

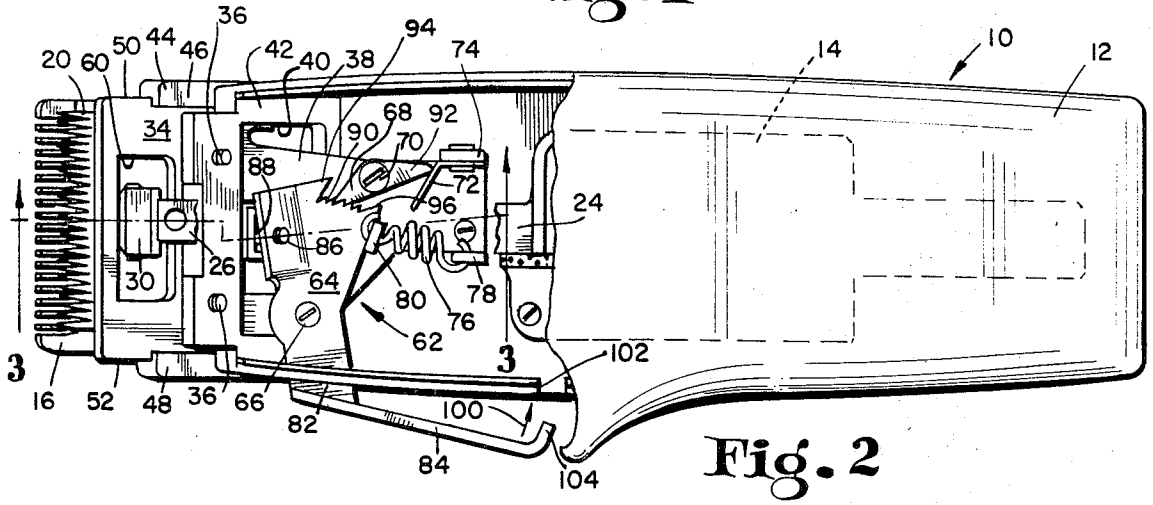


Fig. 2

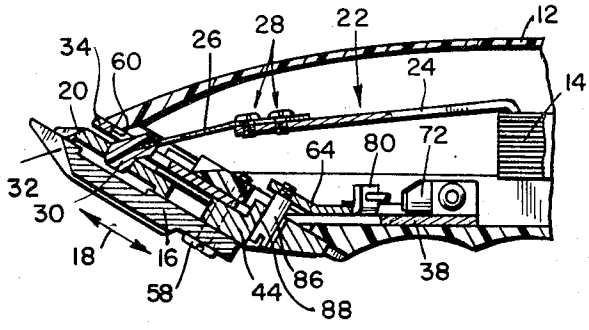


Fig. 3

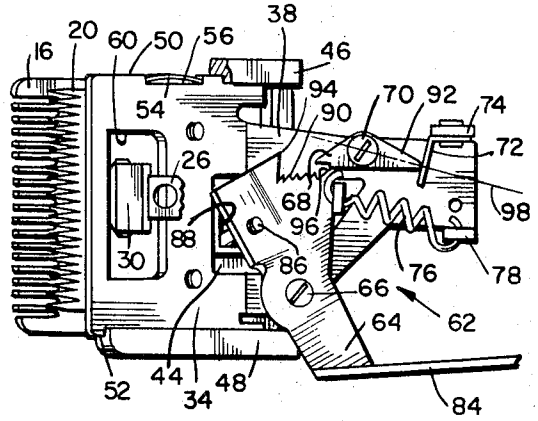


Fig. 4

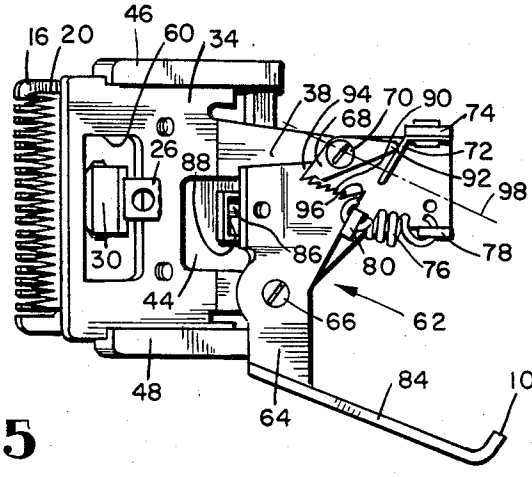


Fig. 5

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TAPER ADJUSTMENT MECHANISM FOR CLIPPER

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U.S. Cl. 30—201 10 Claims

ABSTRACT OF THE DISCLOSURE

A hair clipper comprising a casing, a cutter member mounted for reciprocably adjustable movement on said casing, and ratchet means for selectively positioning the cutter member along its path of movement. The ratchet means comprises means providing a row of teeth defining a plurality of operating positions for the cutter member and a protruding portion at each end of the row, a pawl, and spring means, the pawl being movable between a first position in which it is engaged with the teeth and a second position in which it is disengaged from the teeth, the spring means being effective yieldably to hold the pawl in either of its first and second positions. One of the protruding portions is effective to engage and move the pawl to the second position and the other of the protruding portions is effective to engage the pawl when it is in its second position and move it to its first position. Preferably, spring means is provided for yieldably urging the cutter member toward one end of its path and a lever on which the teeth and protruding portions are formed is provided for moving the member in opposition to the spring means, the lever being fulcrumed on the casing and drivingly connected to the member. Thus, the teeth and protruding portions are, preferably, connected to the cutter member for movement therewith and the pawl is mounted for pivotal movement about an axis on the casing. Also, preferably, the spring means which cooperates with the pawl to hold it in either of its first and second positions is a simple leaf spring or spring arm engaging a radially outwardly extending toe portion on the pawl.

It is a primary object of the present invention to provide a hair clipper comprising a taper adjustment mechanism which is simple and inexpensive to manufacture, which is easy to use, and, yet, which is effective for the purpose intended. Taper adjustment mechanisms, i.e., mechanisms for adjustably moving the lower comb blade of an electric clipper, have been known for many years. See, for instance, the Wahl Pat. 2,795,967 issued June 18, 1957; the Andis Pat. 2,869,234 issued Jan. 20, 1959; and the Wahl Pat. 3,031,758 issued May 1, 1962. These three patents, as well as several others too numerous to mention, disclose lever-operated means for reciprocably adjusting the comb blade of a clipper. The mechanism of the present invention is an improvement over the prior art mechanisms because it comprises ratchet means for selectively positioning the comb blade along its path of movement, which ratchet means is proportioned and arranged so that, when the comb blade is fully extended, its pawl is automatically disengaged from its toothed member so that the blade can be retracted. The mechanism of the present invention can, therefore, be operated solely by manipulating one lever to extend and retract the comb blade. Specifically, this feature is obtained by providing spring means for yieldably urging the comb blade toward its retracted position, a lever for moving the blade in opposition to the spring means and the ratchet means for selectively positioning the blade.

It is another object of the present invention, therefore,

to provide such a ratchet means comprising means providing a row of teeth defining a plurality of operating positions for the comb blade and a protruding portion at each end of the row, a pawl, and spring means, the pawl being movable between a first position in which it is engaged with the teeth and a second position in which it is disengaged from the teeth, the spring means being effective yieldably to hold the pawl in either of its first and second positions, one protruding portion being effective to engage and move the pawl to its second position and the other protruding portion being effective to engage the pawl when it is in its second position and move it to its first position. Preferably, the teeth and protruding portions are formed on the lever and the ratchet means is operated merely by moving the lever in opposition to the urging of the spring means which biases the comb blade toward its retracted position.

Still another object of the present invention is to provide such a mechanism wherein the pawl is mounted for pivotal movement about an axis and wherein the spring means which is effective to hold the pawl in either of its first and second positions comprises a leaf spring or a spring arm which engages a radially outwardly extending toe portion formed on the pawl so that, when the pawl is in its first position, the toe portion is on one side of a line extending through the pivot axis of the pawl and generally perpendicular to the spring arm, and, when the pawl is in its second position, the toe portion substantially overlies such a line. Specifically, when the pawl is in its first position, the spring arm urges the pawl about its axis and, when the pawl is in its second position, the force of the spring arm is directed through the pivot axis of the pawl.

Still further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, the present invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described, so long as the scope of the appended claims is not violated.

In the drawings:

FIG. 1 is a side elevational view of a clipper comprising the mechanism of the present invention;

FIG. 2 is a plan view, partially cut away, of the clipper showing the adjustment mechanism;

FIG. 3 is a fragmentary, sectional view taken from FIG. 2 generally along the line 3—3;

FIG. 4 is a fragmentary view of the adjustment mechanism and showing the mechanism in a condition fully to extend the comb blade; and

FIG. 5 is a fragmentary view showing the mechanism in a condition fully to retract the comb blade.

Referring now to the drawings, it will be seen that there is illustrated a hair clipper **10** comprising a casing **12** which may be formed of any suitable material, such as molded plastic, a motor **14** disposed in the casing **12**, a comb blade **16** mounted for reciprocation in the direction of the arrow **18** (FIG. 3) on the casing **12**, a blade **20** mounted for transverse reciprocation on the comb blade **16** and an arm **22** for drivingly connecting the motor **14** and the blade **20**.

The motor **14** may be a conventional vibrator motor of the type including an oscillating armature which is drivingly connected by the arm **22** to the blade **20**. Such motors are well known and need not be discussed, in detail, in this description. The arm **22** includes a relatively rigid portion **24** which is fastened directly to the armature to extend toward the blade **20** and a resilient or spring-like portion **26** which is connected to the portion **24** as

indicated at 28 in FIG. 3 and arranged to urge the blade 20 against the blade 16. A suitable plastic member 30 serves to connect the portion 26 to the blade 20.

The comb blade 16 is also of conventional form in that it includes a flat surface against which the blade 20 bears and a plurality of comb-like teeth which cooperate with the teeth of the blade 20 to cut hair. The forward portion 32 of the blade 16 is conventionally inclined as illustrated in FIG. 3 so that, by moving the blade 16 in the direction of the arrow 18 relative to the blade 20, the distance between a person's scalp and the cutting edge of the blade 20 can be varied.

In the illustrative embodiment, a mounting plate 34 is rigidly fastened to the casing 12 by means such as the illustrated screws 36, the plate 34 having a rear portion 38 extending inwardly through a generally square opening 40 formed in the forward end wall 42 of the casing 12. A slider member 44 is mounted for reciprocation on the plate 34, the member 44 being formed with side portions 46, 48 slidably engaging, respectively, the side edges 50, 52 of the plate 34. In FIG. 4, it will be seen that there is a leaf spring 54 carried in a notch 56 formed in the side edge 50, the leaf spring being arranged to provide a slight frictional force resisting reciprocation of the member 44 relative to the plate 34. Such a spring 54 may be disposed in a similar notch in the other side edge 52.

The blade 16 is rigidly fastened to the member 44 by means such as a pair of screws 58, only one of which is shown in FIG. 3, for movement with said member.

From the above description, it will be apparent that the blade 16 and the member 44 can be reciprocably adjusted in the direction of the arrow 18 relative to the casing 12 while the blade 20 reciprocates in a direction generally perpendicular to the arrow 18 and relative to the casing 12. The mounting plate 34 is provided with an opening 60 through which the plastic driving member 30 extends.

The adjustment mechanism of the present invention, indicated generally by the reference numeral 62, comprises a lever 64 mounted on the extension portion 38 of the plate 34 for pivotal movement about an axis defined by a screw 66 or the like, a pawl 68 mounted on the portion 38 for pivotal movement about an axis defined by a screw 70 or the like, a leaf spring 72 mounted on a turned-up portion 74 of the portion 38 and a coiled spring 76 connected between a turned-up tab 78 formed on the portion 38 and a similar tab 80 formed on the lever 64. The lever 64 is formed to provide a portion 82 which extends through a slot (not shown) provided in the side of the casing 12 and a thumb-engaging portion 84. The other end of the lever 64, i.e., the end opposite to the portion 82, is drivingly connected to the slider member 44 by means of a pin 86 which, in the illustrative embodiment, is rigidly fastened to the lever and arranged to extend through a transversely elongated slot 88 in the member 44. The spring 76 is a tension spring which yieldably urges the blade 16 toward its fully retracted position illustrated in FIG. 5. The lever 64 is a means for moving the blade 16 in opposition to the urging of the spring 76 toward its fully extended position illustrated in FIG. 4. It will be understood that it is only a matter of convenience to connect the spring 76 between the lever 64 and the plate 34 and that such a spring could be connected directly between the blade 16 and the casing 12. The spring 76 is thus a means for yieldably urging the comb 16 toward one end of its path of movement. The spring 76 and the lever 64 together comprise manually-operated means for reciprocating the blade 16.

The position of the blade 16 is selectively determined by the engagement of the pawl 68 with a row of teeth 90 formed on the lever 64 to be adjacent the pawl. That is, each tooth 90 defines an operating position for the blade 16 in that the pawl will engage a tooth and hold the lever 64, member 44 and blade 16 against movement by the spring 76. The pawl 68 is urged into engagement with the teeth 90 by the spring 72 which engages a radially outwardly extending toe portion 92 of the pawl. As will be discussed hereinafter, the spring 72 will also hold the pawl out of engagement with the teeth 90.

The lever 64 is also formed to provide a protruding portion 94, 96 at each end of the row of teeth 90, the protruding portion 96 being effective, when the lever 64 is moved to its position illustrated in FIG. 4, to engage and move the pawl 68 to a position in which the toe portion 92 overlies a line 98 extending through the pivot axis of the pawl and perpendicular to the spring 72 and the portion 94 being effective, when the lever 64 is moved from its position illustrated in FIG. 4 to its position illustrated in FIG. 5, to engage the pawl 68 and move it to a position in which it is engaged with the teeth 90. In FIG. 5, it will be seen that, when the pawl 68 is engaged with the teeth 90, the toe portion 92 is disposed on one side of the illustrated line 98 which extends through the pivot axis of the pawl and perpendicular to the spring 72. When the pawl 68 is moved to its illustrated position in FIG. 4 by the protruding portion 96, the force of the spring 72 is directed through the pivot axis of the pawl and, consequently, there is no tendency for the pawl to move until the somewhat hook-like portion 94 engages the pawl to move it to its position illustrated in FIG. 5.

Referring to FIG. 5, it will be apparent that, when the toe portion 92 is on one side of the line 98, i.e., above the line as illustrated in the figure, the spring 72 will urge the pawl into engagement with the teeth 90 and, when the toe portion 92 overlies the line 98 or is on the opposite side of the line, the spring 72 will hold the pawl 68 out of engagement with the teeth 90.

From the above description, it will be apparent that a person using the clipper can advance the blade 16 through each of its positions as defined by the teeth 90 merely by pushing the portion 84 of the lever 64 inwardly as indicated by the arrow 100 (FIG. 2). When the portion 84 is moved to its innermost position, the protruding portion 96 will pivot the pawl 68 to its position illustrated in FIG. 4 so that the comb 16 can be retracted by the spring 76. The casing 12 is provided with an opening 102 (FIG. 2) in its side wall for receiving the inturned portion 104 of the portion 84.

What is claimed is:

1. A hair clipper comprising a casing, a cutter member mounted for reciprocation on said casing, ratchet means for selectively positioning said member along its path of movement, said ratchet means comprising means providing a row of teeth defining a plurality of operating positions for said member and a protruding portion at each end of said row, a pawl, and spring means, said pawl being movable between a first position in which it is engaged with said teeth and a second position in which it is disengaged from said teeth, said spring means being effective yieldably to hold said pawl in either of said first and second positions, one of said protruding portions being effective to engage and move said pawl to said second position and the other of said protruding portions being effective to engage said pawl when it is in said second position and move it to said first position.

2. A hair clipper as in claim 1 further comprising a spring for yieldably urging said member toward one end of its path and a lever for moving said member in opposition to said spring, said lever being drivingly connected to said member, said teeth and protruding portion providing means being operatively connected to said member for movement therewith.

3. A hair clipper as in claim 1 wherein said teeth and protruding portion defining means is operatively connected to said member for movement therewith, wherein said pawl is mounted for pivotal movement about an axis on said casing, said pawl being formed with a radially outwardly extending toe portion, and wherein said spring

means comprises a spring arm engaging said toe portion so that, when said pawl is in said first position, said toe portion will be on one side of a line extending through the pivot axis of said pawl and generally perpendicularly to said spring arm, and, when said pawl is in said second position, said toe portion will substantially overlie such a line.

4. A hair clipper as in claim 1 wherein said pawl is mounted for pivotal movement about an axis, said pawl being formed with a radially outwardly extending toe portion, and wherein said spring means comprises a leaf spring engaging said toe portion.

5. A hair clipper as in claim 4 wherein said pawl is proportioned and designed so that, when said pawl is in said first position, said toe portion will be on one side of a line extending through the pivot axis of said pawl and generally perpendicularly to said leaf spring, and, when said pawl is in said second position, said toe portion will substantially overlie such a line.

6. A hair clipper comprising a casing, a cutter member mounted for reciprocation on said casing, means providing a row of teeth defining a plurality of operating positions for said member and a protruding portion at each end of said row, said last-mentioned means being operatively connected to said member for movement therewith, a pawl, and spring means, said pawl and spring means being proportioned and arranged so that said pawl is movable between a first position in which said pawl is engaged with said teeth and a second position in which said pawl is disengaged from said teeth, said spring means being effective yieldably to hold said pawl in ether of said first and second positions, one of said protruding portions being effective to engage and move said pawl to said second position and the other of said protruding portions being effective to engage said pawl when it is in said second position and to move it to said first position, and manually-operated means for reciprocating said member.

7. A clipper as in claim 6 wherein said manually-operated means comprises a spring yieldably urging said member in one direction along its path of movement and a lever for moving said member in opposition to said spring, said teeth and protruding portion providing means comprising an extension portion of said lever, said pawl being mounted for pivotal movement about an axis and formed with a radially outwardly extending toe portion, said spring means comprising a spring arm engaging said toe portion so that, when said pawl is in said first position, said toe portion will be on one side of a line extending through the pivot axis of said pawl and generally perpendicularly to said spring arm, and, when said pawl is in said second position, said toe portion will substantially overlie such a line.

8. A hair clipper comprising a casing, a comb blade mounted for reciprocation on said casing, means yieldably urging said blade toward one end of its travel, a lever fulcrumed on said casing, means for drivingly connecting said blade to one end of said lever, said lever being formed to provide a row of teeth defining a plurality of operating positions for said blade, a pawl, and spring means, said pawl and spring means being proportioned and arranged so that said pawl is movable between a first position in which said pawl is engaged with said teeth and a second position in which said pawl is disengaged from said teeth, said spring means being effective yieldably to hold said pawl in either of said first and second positions, and said lever further being formed with a protruding portion at each end of said row of teeth, one of said portions being effective, when said blade is extended to its outermost position, to engage and move said pawl to said second position and the other of said portions being effective, when said blade is retracted from its said outermost position, to engage said pawl in said second position and move it to said first position.

9. A clipper as in claim 8 wherein said pawl is mounted for pivotal movement about an axis on said casing and formed with a radially outwardly extending toe portion, said spring means comprising a spring arm engaging said toe portion so that, when said pawl is in said first position, said toe portion will be on one side of a line extending through the pivot axis of said pawl and generally perpendicularly to said spring arm, and, when said pawl is in said second position, said toe portion will substantially overlie such a line.

10. A clipper comprising a casing, a cutter member mounted for reciprocation on said casing, and ratchet means for selectively positioning the cutter member along its path of movement, said ratchet means comprising means providing a group of serially arranged teeth defining a plurality of operating positions for the cutter member, a pawl, spring means, said pawl being movable between a first position in which it is cooperatively engaged with said teeth and a second position in which it is disengaged from said teeth, said spring means being effective yieldably to hold said pawl in either of said first and second positions, means effective, when said member is moved to one end of its travel, to engage and move said pawl to said second position, and means effective, when said member is moved to the opposite end of its travel, to engage and move said pawl to said first position.

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