

Nov. 12, 1940.

G. E. COLMAN

2,221,394

MECHANICAL SHAVING DEVICE

Filed Sept. 27, 1937

2 Sheets-Sheet 1

Fig. 1.

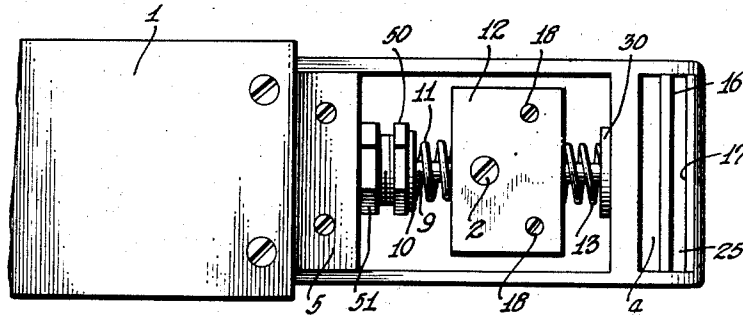


Fig. 2.

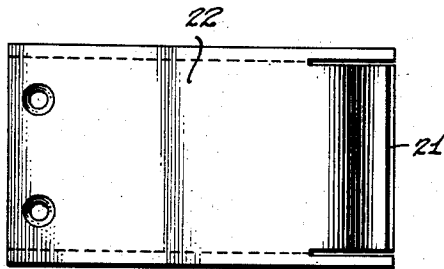


Fig. 3.

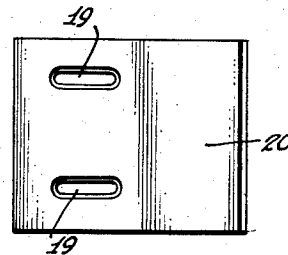
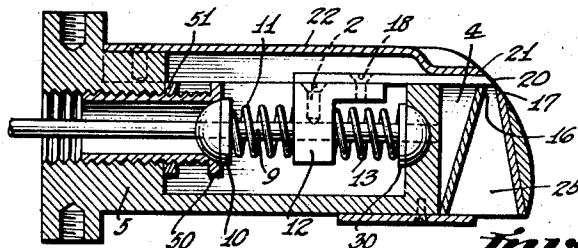


Fig. 4.



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Fig. 5.

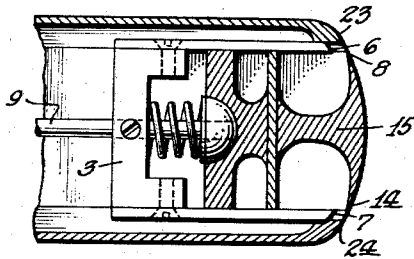


Fig. 6.

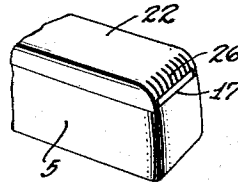


Fig. 9.

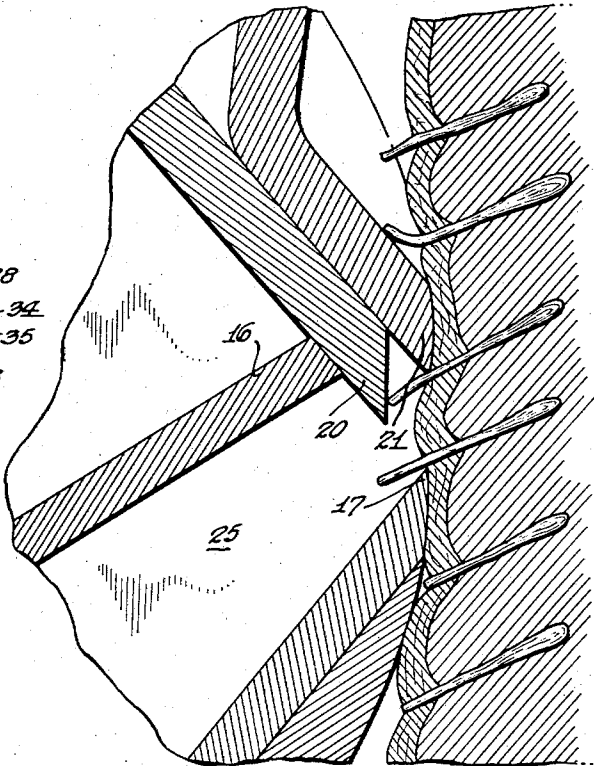


Fig. 7.

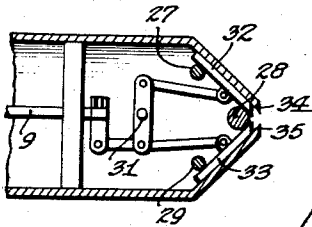
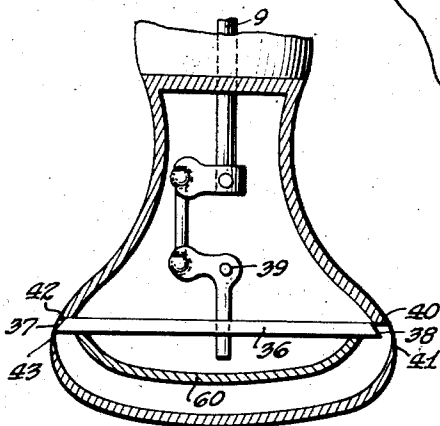


Fig. 8.



Inventor:

George Edward Colman

UNITED STATES PATENT OFFICE

2,221,394

MECHANICAL SHAVING DEVICE

George Edward Colman, Miami, Fla.

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14 Claims. (Cl. 30—43)

The invention relates to improvements in hair shaving or clipping machines, having a reciprocating blade or blades activated by an electric motor; said blade cutting the hair by shearing it off against a fixed blade; the object of the invention is first, to secure a much closer shaving action by placing the moving blade between the fixed blade and the skin, second, to lessen the time needed to shave a given surface by using a hair gathering slot the broad side of which is drawn towards the short hairs, gathering more over which it passes than the standard practice of using many fine slits moved endwise towards the hair, third, to lessen noise, friction and wear by reducing the number of moving parts and bearing surfaces and fourth, to provide for the removal of the cut hairs, and the cleaning of the cutting surfaces without the necessity of taking the shaver apart.

The invention has additional utility, in that it may be used, changed in size but not in principle, to shave hardened skin from healthy surfaces, to trim the lint or fuzz from cloth, to even the surface of furs or brushes or to trim or shave any stiff fibrous material that will enter into its slot. The drawings and description for the sake of clearness will deal with the shaving of the short hair of a man's beard, from the skin of his face.

Figure 1 is a top plan of the cutting head, with the cover plate and movable blade removed. Fig. 2 is a top plan of this cover plate, and Fig. 3 is a top plan of the movable blade. Fig. 4 is a side section of the cutting head shown in Fig. 1. Fig. 5 is a twin form of the species shown in Figs. 1 and 4, also in side section. Fig. 6 is a perspective of the front of the cutting head to show a variation of the slot, in that; the leading edge of the slot is slitted to allow easy entry of hairs. Fig. 7 is a side section of a species adapted for heavier duty and using two moving blades which alternately enter a single slot. Fig. 8 is a side section of a species having a two edged movable blade together with two co-operating slots. Fig. 9 is an enlarged view of the form shown in Fig. 4, in actual use; showing how this type head manipulates the skin and hairs in shaving.

The drawings illustrating the invention are adapted to use with a solenoid motor of the reciprocating type, therefore it may be understood that armature shaft 9 in all the drawings is reciprocable, and is connected to the movable armature of the motor which is not shown. For the sake of brevity this reciprocating motion is used in all the species, but it should be understood that rotary or impulse motors of various

types can be used just as readily by adapting the various species to these types of primary motion.

Figs. 1 to 4 show a simple form of the invention suitable for use with a solenoid motor. The handle 1 (Fig. 1) encloses the motor, the armature shaft 9 sliding in bearings 10 and 30, enters into the motor compartment and is activated by the movable armature of the motor. The blade holder 12 is fixed to this shaft with set screw 2 and this movable assembly is held yieldingly at rest by springs 11 and 13. The adjustable nipple 50 holding bearing 10 affords means of adjusting the tension on the springs, it is held firmly to housing 5 by lock nut 51, when suitably adjusted.

The top of the blade holder 12 is ground flush with the top of the blade bearing 16 and the fixed cutting blade 17. The moving blade 20 is held to the blade holder 12 by the screws 18, 18 (Fig. 1) which pass through the slots 19, 19 (Fig. 3) affording means of adjusting the cutting edge. The front of the blade 20 is kept on its bearing 16 by pressure from the bent lip 21 of the cover plate 22 (Fig. 2). The cover plate lip is of springy material and bent enough to secure tension on the moving blade when cover is screwed down tight. The blades 16, 17, 20, and 21 are of hardened cutting steel. The chamber 4 beneath the moving blade 20 reduces friction and affords room for an oil pad if desired.

The moving blade 20 being rigidly affixed to the shaft 9 through holder 12 partakes of its motions and is set to just pass the fixed blade 17 at its forward limit of motion, effectively shearing any hair introduced between their edges. The cut hairs fall directly through the clipper. The smooth surfaces of the blades and chamber 25 affording no lodgement where the hairs could pack.

The cutting slot through which the hairs pass is a novel feature of this invention. In the form described, and illustrated in Sheet 1 of the drawings it is formed by the edges of the two blades 17 and 21. Various other ways of forming and using the slot are illustrated in Sheet two of the drawings which will be described later. In any of its forms it must be placed across the head, or part of the mechanism designed to rest on the surface of the material to be shaved; so that the broad side of the slot moves towards the ends of the hairs, when the clipper is drawn over the surface.

The novel way in which this mechanism shaves is shown clearly in the sketch Fig. 9 in which only the parts involved in the cutting action are

shown. The blade bearing 16 takes no part in the actual cutting except to keep the moving blade properly aligned with the fixed blade 17. The shearing is done at the inner edge of blade 17 when the leading edge of blade 20 passes over it. In order to bring this edge close to the skin and secure the finest shaving action all excess metal is ground away from the faces of blades 21, 20 and 17 as clearly shown. These external faces of the blades may be honed or polished without disassembling the clipper. The other surfaces of the blades will be polished by the action of the mechanism.

The angle at which the external faces of the blades 21, 20 and 17 are ground may be varied, as long as the sharp edges bear the same relationship to the dull edges, as in the drawings.

In use, the cutting slot 17-21 is pressed to the skin with the handle of the clipper horizontal or slanting upward, and drawn upward with the full length of the blade 17 dragging or scraping against the hairs. The short stiff hairs are forced between the two edges of the slot 17-21 during the part of the cycle when blade 20 is withdrawn. Pressure of the two edges of the slot 17-21 on the skin force a fold or pucker of skin to enter slightly into the slot causing the hair to protrude from its follicle. The scraping action of blade 17 also lifts the hair further out at the same time pressing the fold of skin back out of the slot. The moving blade 20 cuts sections from the hairs as they enter the slot, by shearing them against blade 17. The final cut will be at a point on the hair ordinarily below the surface of the skin. When the hair is cut it falls within the chamber 25 in the form of coarse powder. The angle at which the clipper is drawn over the skin may be varied. Fig. 9 is an average. It will cut efficiently as long as it is so held as to allow blade 17 to catch against the hairs when it is drawn towards them.

The width of the cutting slot; or distance between the inner edges of 17-21 may vary in different forms of the invention; it is determined mainly by the type of surface to be shaved and may be as wide as desired, providing that it does not allow the skin fold that forms within it to lap over the inner edge of blade 17 to such an extent that it would be cut or pinched by blade 20.

The blades 16, 17, and 21 are shown and described as inserts to accentuate the fact that these parts should be of hardened cutting steel. When the head of the clipper is made of steel they may be formed in the metal instead of inserted, and tempered and hardened.

In Sheet 2 of the drawings are shown other species and variations of the invention. These drawings are simplified to the parts claimed, but a study of the principles of the device shown in Sheet one will readily make apparent their practical application.

Fig. 5 shows in side section a twin variation of the species shown in Figs. 1 to 4. The blade holder 3 holds two movable blades 6 and 7 which respectively shear against edges 8 and 14 of the partition 15. Two cover plates 23 and 24 with their leading edges closely juxtaposed to the shearing corners 8 and 14 each form the leading edge of a slot. Thus the head has two slots oppositely situated, one shears in one direction and the other in the opposite direction. This form empties the cut hairs from the sides.

Fig. 6 shows in perspective a variation of the leading edge of the slot, which is applicable to

most of the species. This variation consists of a row of narrow slits in the leading edge, opening into the slot, this row of slits is shown at 26. The purpose of this row of slits is to allow easy entry into the slot of longer hair, and to allow hair to enter in its natural position without being flattened down by the passage of the leading edge over it. Fig. 7 is a side section of a species drawn to show a heavier duty construction. Foller bearings to hold the blades on their seats are suggested at 27-28-29; a lever system pivoted at 31 activates the blades 32 and 33. The slot 34-35 differs from that previously described in that both edges are used as shearing corners, therefore this slot cuts in either of two directions; when moved upward corner 35 shears and when moved downward corner 34 shears. This single slot is used with two moving blades; moving blade 32 passing in front of blade 33 and into the slot to shear against corner 35 and blade 33 moving in front of blade 32 to shear against corner 34. Fig. 8 shows in side section a shearing device having two slots and a two edged moving blade. It has a single moving blade 36 with two shearing corners 37 and 38, one for each slot. The ball and socket lever system pivoted at 39 moves the blade first into slot 40-41 and then oppositely into slot 42-43. The inner wall 60 serves as a blade bearing to keep the shearing corners in correct register. Fig. 9 is an enlarged sketch of the shearing head, showing the portion that rests on the skin in shaving. It will be seen that the light pressure of the slot edges makes a depression in the skin surface, causing a skin fold to rise slightly into the slot, and that the moving blade 20 approaching at an angle from a position above the slot shears the hair protruding from the skin, without in any way abrading or harming the skin. In this sketch the device is supposed to be moving in an upward direction against the grain or nap of the hair.

Having thus described my invention and shown some of its embodiments by way of example and not limitation, what I claim as new and desire to secure by Letters Patent is:

1. A shaving device comprising a cutting head having a slot, a blade movable across one edge of the slot and into it, cooperating with the inner corner of the slot-edge in passing to shear hairs projecting into the slot, and means for reciprocating the blade.

2. A shaving device comprising a cutting head having a slot, a blade movable from a position above the slot, across one edge of the slot and into it, cooperating with the inner corner of this slot-edge in passing to shear hairs projecting into the slot, and means for reciprocating the blade.

3. A shaving device comprising a cutting head having a slot, a blade mounted within the head at an acute angle to the skin contacting surface of the head and movable across one edge of the slot and into the slot, cooperating with the inner corner of this slot-edge in passing to shear hairs projecting into the slot, and means for reciprocating the blade.

4. A shaving device comprising a cutting head having a slot, a blade with its edge fitted to the slot and protrusile thereto, movable into the slot, wiping one edge of it in entering to shear hairs projecting into the slot, and means for actuating the blade.

5. A shaving device comprising a cutting head having a slot, a blade movable across one edge of the slot into the slot, and over an external bearing face adjacent the slot-edge, cooperat-

ing with the inner corner of the slot to shear hairs projecting into the slot, and means for reciprocating the blade.

5 6. A shaving device comprising a cutting head, having a slot extending transversely of the direction in which the cutting head is moved in use, a blade movable across the following edge of the slot and into the slot, cooperating with the inner corner of this slot-edge in passing to shear
0 hairs projecting into the slot, and means for reciprocating the blade.

7. A shaving device comprising a cutting head, having a slot, the external wall of the cutting head adjacent the slot being beveled to facilitate
5 entrance of hairs, a blade within the head movable across one edge of the slot and into the slot, cooperating with the inner corner of this slot-edge to shear hairs projecting into the slot, and means for actuating the blade.

20 8. A shaving device comprising a cutting head, having a slot extending transversely of the direction in which the cutting head is moved in use, and having a plurality of slots extending at right angles to the transverse slot and opening
25 through its leading edge to facilitate the entrance of hairs, a blade movable across the following edge of the slot and into the slot, cooperating with the inner corner of the following edge to shear hairs projecting into the slot, and means
30 for actuating the blade.

9. A shaving device comprising a cutting head having a slot, a blade within the head movable across one edge of the slot and into it, cooperating with the inner corner of this slot-edge in
35 passing to shear hairs projecting into the slot, means for reciprocating the blade, means for guiding the blade during its reciprocation, and means for yieldably urging the blade into shearing engagement with the edge of the slot.

40 10. A shaving device comprising a cutting head having two slots, a double-edged blade movably mounted within the head, one blade-edge for each slot, each blade-edge movable into its re-

spective slot in a shearing manner across one edge of it, cooperating with the inner corner of its slot edge in passing to shear hairs projecting into that slot, and means for actuating the blade.

11. A shaving device comprising a cutting head, 5 having a slot wide enough to receive a skin fold extending above the inner corners of the slot, two blades movable in alternation into the slot in a shearing manner, one across one edge of it and the other across the other, each cooperating 10 with the inner corner of its respective slot-edge to shear hairs projecting from the skin fold, and means for reciprocating the blades in alternation.

12. A shaving device comprising a cutting head, 15 having a slot of sufficient width to receive a fold of skin, a blade movable into the slot, wiping one edge of it in entering to shear hair from the skin-fold, the face of the blade above its shearing corner rounded convexly to press the 20 skin fold from the slot without abrasion, and means to actuate the blade.

13. A shaving device comprising a cutting head, having a slot of sufficient width to allow intruding skin to bulge above its inner limits, a blade 25 movable into the slot, wiping one corner of it in entering to shear hairs from the skin, and means to actuate the blade.

14. A shaving device comprising a cutting head, 30 having a slot extending transversely of the direction in which the cutting head is moved in use, and wide enough to allow a skin fold to intrude above the slots inner limits during that movement, a blade mounted within the head at an acute angle to the skin contacting surface of the 35 head, and movable from a position above the slot, across the following edge of the slot, and into the slot, cooperating with the inner corner of the slot-edge in passing to shear hairs projecting from the skin fold, and means for recip- 40 rocating the blade.

GEORGE EDWARD COLMAN.