May 31, 1955 L. FALCIONE 2,709,296

ELECTRIC SHAVER

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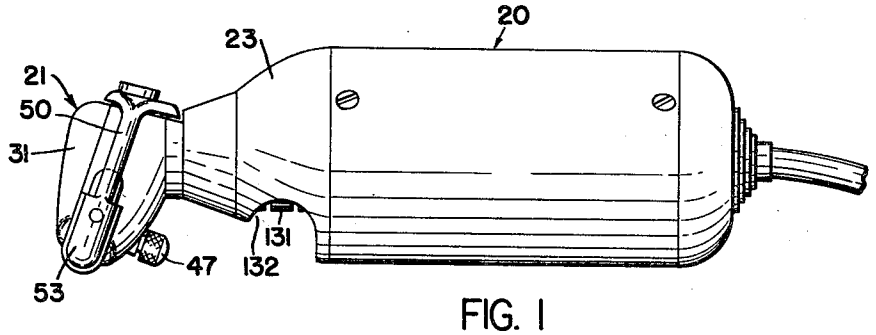

FIG. 1

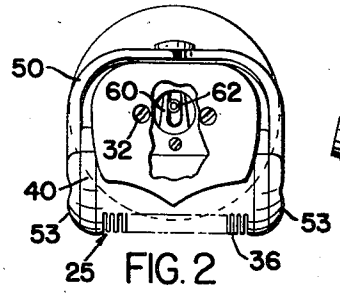

FIG. 2

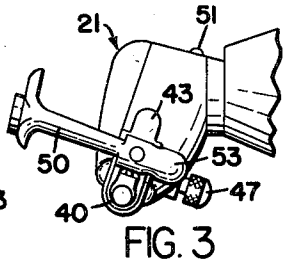

FIG. 3

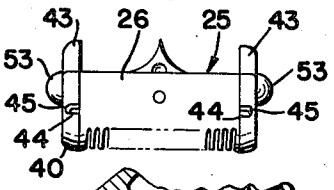

FIG. 4

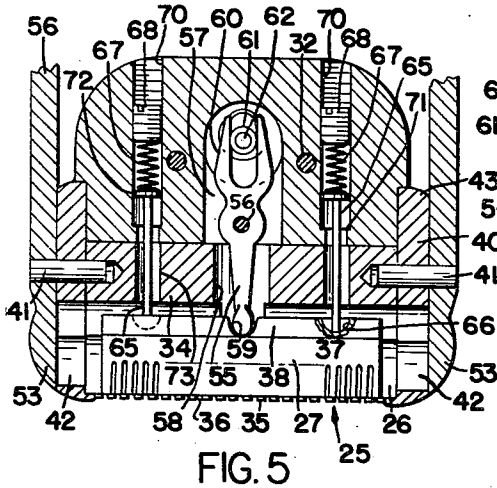

FIG. 5

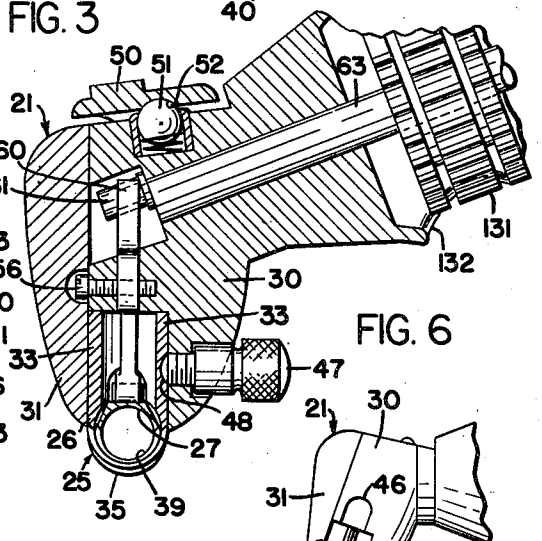

FIG. 6

FIG. 8

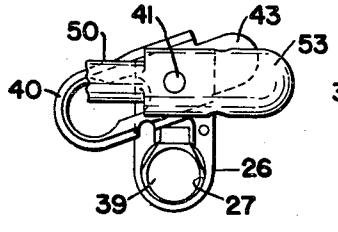

FIG. 7

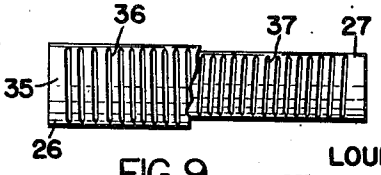

FIG. 9

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ELECTRIC SHAVER

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Application June 9, 1953, Serial No. 360,457

9 Claims. (Cl. 30—41)

This invention relates to an improvement in a shaving machine, and more particularly to a machine of the type usually designated as a dry shaver by which hair is removed from the skin without danger of cutting the skin and without any preliminary lathering. This application corresponds to my application Serial No. 301,122, filed October 25, 1939, allowed April 17, 1942, and abandoned for failure to pay the final Government fee.

Shavers of this type comprise a cutter head in which is supported a cutter bar consisting of an outer shearing member and an inner shearing member, the outer member being fixed and the inner member being reciprocable relative to the outer member, and a motor, spring or other means by which the inner member of the cutter head is actuated.

The object of this invention is to provide a shaver of the above type having the structure and function set forth below including one or more of the following features: The cutter bar is so constructed that the hair removed thereby is held within the cutter bar until the operator, usually after the shaving has been completed, desires that it be removed; the travel of the reciprocable inner member of the cutter bar is held within certain limits defined by movable means which are held in functioning position until released; the inner and outer members are each provided with a plurality of transversely extending parallel slots into which the hairs to be cut project, the slots in one member being in a direction slightly at an angle to the direction of the slots in the other member; the inner member of the cutter bar is held yieldably in contact with the outer member thereof by means acting independently against the inner member adjacent its ends whatever be the position taken by the inner member as it is reciprocated; a motor by which the inner member of the cutter bar is actuated, which motor is simple in construction and enclosed within the handle of the shaver.

These and other features will appear from a consideration of the following description and of the drawing which forms a part thereof and in which:

Fig. 1 is a view in side elevation of a shaver embodying this invention;

Fig. 2 is an end view thereof taken from the left in Fig. 1;

Fig. 3 is a side view of the head showing the cutter bar partially released therefrom to permit the removal of the cut hair;

Fig. 4 is a rear view of the cutter bar with its loop in the position shown in Fig. 3;

Figs. 5 and 6 are enlarged sectional views taken at right angles to each other of the cutter head and the cutter bar mounted thereon;

Fig. 7 is an enlarged side view of the cutter bar with certain elements thereof out of normal positions;

Fig. 8 is a side view of the cutter head, the cutter bar having been removed; and

Fig. 9 is a view of the cutter bar with a portion of the outer member broken away.

The shaver 20 comprises a cutter head 21 and a handle

22 joined by a neck 23. The cutter head supports a cutter bar 25 comprising an outer member 26 and an inner member 27. The cutter bar 25 is removable as a unit from the head 21 and when assembled with the head is seated in a recess 28 formed between a flange 29 projecting from the base 30 of the head, and an end plate 31 removably attached by screws 32 to the base 30 (see Figs. 5 and 8).

The outer member 26 of the cutter bar comprises parallel side walls 33, a bottom or inner wall 34 and an arcuate outer wall 35. In the wall 35 are formed a plurality of parallel, equally spaced slots 36 which extend transversely of the cutter bar. The inner member 27 is tubular in form having a plurality of parallel, equally spaced slots 37 which extend transversely thereof and provided with a base bar 38 and a central cavity 39.

The inner member 27 is shorter than and mounted within the outer member 26 and is intended to be reciprocated relative thereto. Each end of both members 26 and 27 is open. The curvature of the slotted portion of the member 27 is such that it is concentric with the outer wall 35 of the member 26 (see Fig. 6). Reciprocation is imparted to the member 27 by means to be described later, between limits defined by arms 40 pivoted upon pins 41 carried by the bottom wall 34 of the outer member 26. Each arm 40 has an opening 42 therethrough adjacent one end and terminates at the other end in a tongue 43. When in the position determined by studs 44 on the outer member 26 and notches 45 in the arms 40, the openings 42 align with the opening defined by the walls of the outer member (see Fig. 5). The walls enclosing the openings 42 project into the path of the inner member and thus limit its travel.

When the cutter bar 25 is assembled in the recess 28 of the base 30, the tongues 43 enter pockets 46 formed in the sides of the base 30 (see Figs. 3 and 8) so that rotary movement of the arms 40 upon the pins 41 is prevented. The cutter bar is clamped in position in the recess 28 by a set screw 47 which extends through the flange 29 of the base 30 and enters a depression 48 in the cutter bar (see Fig. 6). A loop 50 carried by the pins 41 surrounds the base 30 of the cutter head thus further securing the bar in place. Suitable means for holding the loop 50 in this position are provided, as for example a spring-pressed ball 51 on the base 30 which enters a pocket 52 in the loop (see Fig. 6). The ends of the loop 50 terminate in tabs 53 which, when the bar 25 is in position, cap and close the openings 42.

The inner member 27 is here shown as reciprocated by a lever 55 pivoted intermediate its ends upon a pin 56 carried by the base 30 of the cutter head 25. The lever 55 passes through a slot 57 in the base 30 and a slot 58 in the bottom wall 34 of the outer member 26. The end of the lever 55 projecting beyond the slot 58 is rounded and enters a pocket 59 formed in the inner face of the base bar 38 of the inner member 27. The lever 55 is suitably oscillated as by the provision at the other end of a yoke 60 which receives a sleeve 61 surrounding a stud 62 eccentrically mounted upon the upper end of the shaft 63 of a suitable electric motor. The inner member 27 is yieldably held in contact with the wall 35 of the outer member 26 by pins 65 which enter pockets 66 in the base bar 38. The pins 65 act independently upon the ends of the member 27 and are yieldably advanced by coil springs 67. The tension of the springs 67 is regulated by screw plugs 68. Each pin 65 with its spring 67 and plug 68 is carried in a passage 70 which extends through the base 30 and terminates in a shoulder 71 which coacts with the head 72 of the pin 65 to prevent inadvertent escape of the pin. Slots 73 through the bottom wall 34 parallel to the slot 58 guide the pins. It will be noted that the heads 72 are domed so that the pins will offer no resistance to the oscillation imparted to the pins as the

inner member is reciprocated. Moreover, the pins are rocked by the inner member as it is reciprocated. Such rocking causes tilting of the heads 72, thereby compressing the springs 67 beyond the amount required by the pins when the inner member is midway of its movement, as shown at Fig. 5. This compression of the springs does of course increase their power of advancing the pins so that the inner member is yieldably held against the outer member with a uniform pressure at all points in its travel.

In use, the outer member 26 of the cutter bar 25 rests against and is moved over the skin to be shaved. The hairs on the skin enter the slots 37 and 38 and are sheared off by the reciprocation of the member 27 past the member 26. Preferably the slots 37 extend in a direction oblique to that in which the slots 38 extend. For example, as shown in Fig. 9, the slots may vary slightly in opposite directions from that at right angles the cutter bar, or, if desired, the slots 36 may be at right angles to the bar while the slots 37 alone are oblique.

The cut hairs fall into the central cavity 39 of the inner member 27 and remain there until the loop 50 is shifted into the position shown in Fig. 3, in which the tabs 53, normally closing the openings 42, are shifted so that the hairs may be removed by shaking, blowing, brushing or other means. Thus while shaving is being performed there is no spilling or dropping of the cut hairs upon the clothing or elsewhere, a feature distinguishing this shaver from numerous others on the market. Moreover, this shifting of the loop does not disturb the mounting of the cutter bar 25 in the cutter head 21, since it is held firmly in position by the set screw 47. It will be further noted that the position of the arms 40 by which the movement of the inner member 27 is limited is not disturbed by this shifting of the loop 50. Thus this removal of the cut hair does not interfere with the assembly of the members 26 and 27 so that, if desired, the shaving may be interrupted at any time and the cut hairs removed.

Moreover, the inner member 27 can only be removed from the outer member 26 by shifting the loop 50 and swinging one of the arms 40 on the pivot pins 41. Obviously this cannot be done while the cutter bar is mounted in the head, because the tongues 43 are at that time seated in the pockets 46. The removal of the cutter bar is not in this shaver, as it is in other shavers of this type, all that is necessary to permit the removal of the inner member 27 Hence the danger that the inner member will fall out inadvertently and be injured is not present.

It is well recognized that the cutter bar of a shaver of this type must be set and firmly held in a definite position in order that it function properly. This shaver provides four independently acting means for this purpose. First, the lever 55 and pins 65 which enter pockets 59 and 66 and roughly position the inner member 27; second, the arms 40 which enter pockets 46 in the cutter head and position the outer member 27; third, the set screw 47 by which the cutter bar is firmly held in position, and fourth, the loop 50 which, encircling the cutter head, firmly holds the cutter bar in place. While a depression 48 is formed in the cutting bar, the primary reliance for the successful functioning of the set screw 47 is upon the frictional contact of the cutter bar with the plate 31. The loop 50, however, acts more positively to supplement the action of the set screw in holding the cutter bar firmly in place in the recess 28 of the cutter head.

The shaft 63, by which the inner member 27 of the cutter bar 25 is oscillated, is rotated by a motor of well-known type (not shown) mounted within the casing of the handle 22. A knurled ring 131 on the shaft 63, accessible through an opening 132 in the neck 23, may be turned to initiate the rotation of the shaft 63 as is usual with this type of motor.

While one embodiment of this invention has been shown and described in detail, it will be understood that the invention is not limited thereto and that other embodiments or changes in the disclosed embodiment may be made without departing from the spirit and scope of the invention as set forth in the following claims.

What is claimed is:

1. A shaver including a cutter head, a cutter bar adapted to be mounted thereon, said bar comprising an outer member and a reciprocating inner member, each of said members having a plurality of transverse slots therein and being open at the ends thereof, means for rigidly securing said outer member to said head, and a loop pivoted upon said outer member and removable therewith, said loop being adapted to enclose said cutter head and thereby additionally secure the cutter bar to the cutter head.

2. A shaver including a cutter head, a cutter bar adapted to be mounted thereon, said bar comprising an outer member and a reciprocating inner member, each of said members having a plurality of transverse slots therein and being open at the ends thereof, means for rigidly securing said outer member to said head, and a loop pivoted upon said outer member and adapted to enclose said cutter head and thereby additionally secure the cutter bar to the cutter head, said loop terminating in tabs which, when the bar is so secured, close the open ends thereof and prevent the escape of the severed hair therefrom.

3. A shaver including a cutter head, a cutter bar adapted to be mounted thereon, said bar comprising an outer member and a reciprocating inner member, each of said members having a plurality of transverse slots therein and being open at the ends thereof, means for rigidly securing said outer member to said head, and means pivoted upon the outer member for limiting the reciprocation of the inner member, which pivoted means include tongues engaged by the cutter head to hold the means in operative position when the cutter bar is secured to the cutter head.

4. A shaver including a cutter head, a cutter bar adapted to be mounted thereon, said bar comprising an outer member and a reciprocating inner member, each of said members having a plurality of transverse slots therein and being open at the ends thereof, means for rigidly securing said outer member to said head, such means including a loop pivotally mounted upon said cutter bar, and means for preventing the escape of the hair severed by said inner member from said cutter bar, said preventing means being integrally connected with said pivotally mounted loop so that the movement of the loop on its pivotal mounting permits the escape of the severed hair.

5. A shaver including a cutter head, a cutter bar adapted to be mounted thereon, said bar comprising an outer member and a reciprocating inner member, each of said members having a plurality of transverse slots therein and being open at the ends thereof, means for rigidly securing said outer member to said head, such means including a loop pivotally mounted upon said cutter bar, and locking means carried by the head and independent of said loop, and means for preventing the escape of the hair severed by said inner member from said cutter bar, said preventing means being integrally connected with said pivotally mounted loop so that the movement of the loop on its pivotal mounting permits the escape of the severed hair.

6. A shaver including a cutter head, a cutter bar adapted to be mounted thereon, said bar comprising an outer member and a reciprocating inner member longitudinally movable therein, each of said members having a plurality of transverse slots therein and being open at the ends thereof, means for rigidly securing said outer member to said head, longitudinally extending pivots in the ends of said outer member, means on said pivots

for swinging over the ends of said inner member to limit reciprocation thereof, and means rotatable on said pivots for closing the ends of the cutter bar and preventing the escape therefrom of the hair severed by said inner member.

7. A shaver including a cutter head, a cutter bar adapted to be mounted thereon, said bar comprising an outer member and a reciprocating inner member longitudinally movable therein, each of said members having a plurality of transverse slots therein and being open at the ends thereof, means for rigidly securing said outer member to said head, means pivoted upon the ends of the outer member for swinging over the ends thereof and limiting the reciprocation of the inner member, and means on the cutter head for holding said limiting means in the operative position when the cutter bar is secured thereto.

8. A shaver including a cutter head, a cutter bar adapted to be mounted thereon, said bar comprising an outer member and a reciprocating inner member, each of said members having a plurality of transverse slots therein and being open at the ends thereof, means for rigidly securing said outer member to said head, means pivoted upon the outer member for movement transversely thereof and movable into alignment therewith for limiting the reciprocation of the inner member, and tabs mounted on said pivots for closing the ends of said cutter bar.

9. A shaver including a cutter head, a cutter bar adapted to be mounted thereon, said bar comprising an outer member and a reciprocating inner member, each of said members having a plurality of transverse slots therein and being open at the ends thereof, means for rigidly securing said outer member to said head, means for limiting the reciprocation of the inner member pivoted upon the outer member for movement transversely thereof into and out of alignment therewith, and means on the cutter head for holding said limiting means in the position of alignment when the cutter bar is mounted upon the cutter head.

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