April 22, 1941. H. I. MICKLE 2,239,333

MOTOR ACTUATED ROTARY SHAVING HEAD

Filed Feb. 7, 1938

FIG. 1

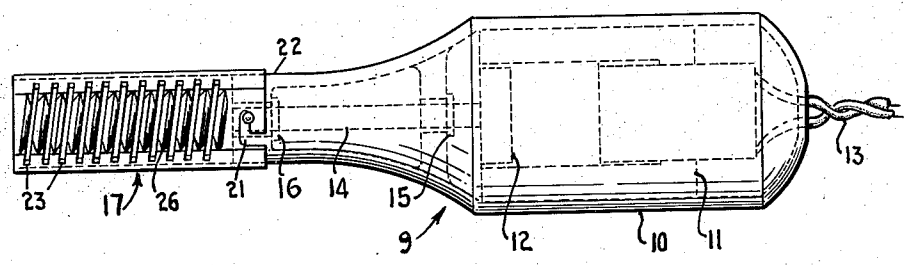


FIG. 2

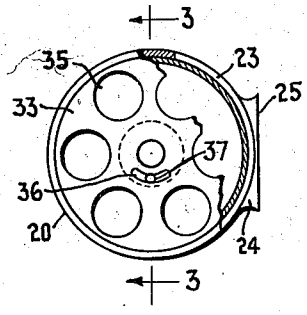


FIG. 3

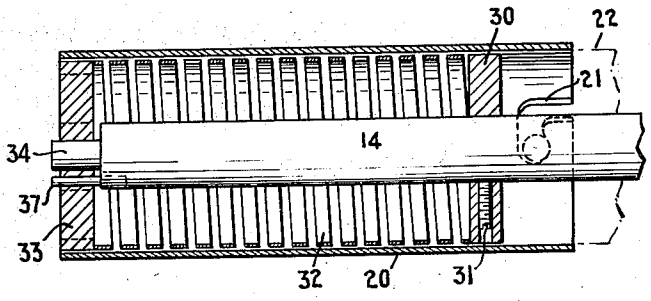


FIG. 5

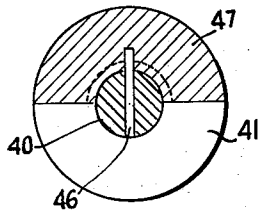


FIG. 4

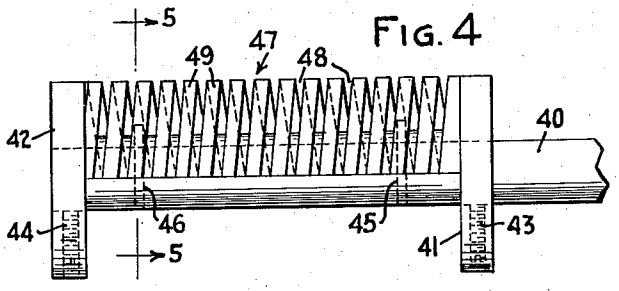
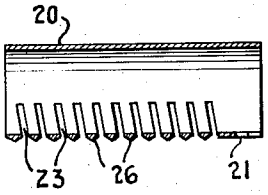


FIG. 6



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MOTOR ACTUATED ROTARY SHAVING HEAD

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3 Claims. (Cl. 30—43)

This invention relates generally to improvements in devices for clipping or cutting hair and, more especially, to motor actuated devices of this character adapted to cut growing hair in close proximity with the skin, as in shaving.

It is among the more important objects of the present invention to provide a device for shaving wherein razor blades and the like need not be used and which permits of shaving without the use of water, soap, cream or other similar toilet preparations, thereby substantially diminishing the cost of shaving to the user.

It is also an object of the present invention to provide means for shaving wherein the danger of cutting is at least largely minimized even though very close shaving is done.

It is also intended that the device according to the present invention shall permit shaving without removal of or deleterious effect upon the outer layers of the skin.

Although certain types of motor actuated shaving mechanisms are now known, each of these types possesses certain disadvantages. In at least most of the types now known the cutting or shaving head of the instrument comprises a pair of slotted comb-like members, one being held stationary while the other, adjacent thereto, is reciprocated or oscillated whereby hair and the like, positioned between and projecting through the teeth of the relatively stationary member, can be cut or sheared by the teeth of the oscillating member. This type of shaving head is characterized by at least two important disadvantages, namely, first, the oscillation movement of the head member, especially at the relatively high speeds required, produces considerable shock to the other parts of the mechanism often causing loosening, dislocation and wear thereof and, second, there is at least a noticeable tendency toward wear of the reciprocating or oscillating member at the places of abutment against the relatively stationary member whereby the efficiency of the instrument as a means for shearing hair and the like is appreciably diminished.

It is among the major objects of the present invention to provide a new and improved motor actuated shaving mechanism wherein there are no reciprocating parts and wherein means are provided for substantially automatic adjustment of the cooperating shearing elements during usual wear, thereby avoiding the disadvantages hereinabove referred to of the types of motor actuated shaving mechanisms heretofore known.

Notable among the features of the device according to the present invention are that it can easily be dismantled for purposes of cleaning and can be conveniently sterilized if desired. It is also to be noted that the device is to a certain extent at least self-sharpening. Among the other features of the device according to the present invention are its relative simplicity of construction and the comparative ease with which the various elements comprising the structure can be fabricated whereby certain economies of manufacture can be effected.

Various other objects, features and advantages of the device according to the present invention will be apparent to those skilled in the art during the course of the following description wherein a specific embodiment of the present invention, herein illustrated, will be described, it being clearly understood, however, that the specific embodiment illustrated and described is given purely to facilitate a fuller and more complete understanding of the matter of the present invention, that it is solely by way of example and is non-limitative.

In the drawing:

Fig. 1 is substantially a top plan view of the preferred embodiment of the present invention, showing it in association with a motor actuated mechanism;

Fig. 2 is substantially an end view of the cutter head according to the present invention;

Fig. 3 is substantially a vertical sectional view of Fig. 2 taken along the line of 3—3, with certain of the parts shown in full view for purposes of clearness;

Fig. 4 is a side view of a modified form of cutter element according to the present invention;

Fig. 5 is substantially a vertical sectional view of Fig. 4 taken along the line 5—5; and

Fig. 6 is substantially a vertical sectional view of the cutter element comprising the cutter head according to the present invention.

Regarded in certain of its broader aspects, the novel shaving mechanism according to the present invention comprises a motor actuated shaver head, said head comprising an outer relatively stationary substantially cylindrical member having slots formed in a segment thereof, said slots being disposed obliquely relative to the axis of the substantially cylindrical casing member, and a relatively movable inner member provided with cutaway portions registrable with said slots, said inner member being adapted to rotate within said casing member and press against the sides thereof whereby hair and the like positioned in and projecting through said slots can

be sheared and cut through rotation of the inner member.

Referring now to the illustrated embodiment of the present invention, the numeral 9 is employed to generally designate the motor actuating means comprising a casing 10 within which are positioned the stator field member 11 and a rotor armature member 12, the former being associated with a source of current supply through the line 13 and the latter being carried on a freely rotatable shaft 14 held in the bearings 15 and 16, substantially as shown, said shaft 14 being adapted to actuate the cutter head generally designated at 17.

Referring now to Figs. 2 and 3, wherein details of the construction of the cutter head generally designated 17 are best illustrated, it will be noted that the outer portion of the cutter head comprises a substantially cylindrical casing member 20 open at both ends and provided near one end with cutaway portions forming a bayonet catch generally designated at 21 adapted to assist in positioning and holding said member 20 upon portions of the casing 22. Slots 23 formed in a segment of the wall of said substantially cylindrical casing 20 and disposed obliquely relative to the axis of said substantially cylindrical member are provided as shown. A portion of the slotted segment is formed to provide a projecting comb-like member 24, the faces 25 of said member being cut or formed to provide a plurality of anticlinal surfaces 26, substantially as shown in Figs. 1 and 6, whereby when the skin is pressed against the surface 25 hair growing in the skin will at least tend to dispose itself within the openings 23. The edges formed by intersection of the walls of the slots and the inner wall of the casing member should be substantially right angles and relatively sharp.

In the embodiment of the present invention illustrated in Figs. 2 and 3, the motor driven shaft 14 is positioned within the casing substantially coaxial therewith and carrying substantially fixedly attached thereto an annular member 30 held in position on said shaft preferably by means including the set screw 31. The annular member 30 carries substantially fixedly attached thereto a helical cutter member 32, the latter being formed so that its outside diameter is slightly less than the inner diameter of the cylindrical member 20, and the coils of the helix being disposed relative to each other whereby the openings between the coils are registrable with the slots 23 in the casing member 20 during a portion of the cycle of rotation of said helical member. The free end of the helical member 32 is substantially fixedly attached to a foraminous annular block 33 freely mounted upon the projection 34 of the shaft 14, substantially as shown, said block 33 having openings 35 formed therein and a segmental arcuately curved opening 36 formed near the center thereof adapted to receive and cooperate with a pin 37 mounted in the shaft 14, whereby free though limited rotative movement of the block 33 relative to and upon the projection 34 is permitted. It will be noted that the block 33 is held upon the projection 34 of the shaft 14 by means including the helical member 32.

In operation, rotative movement imparted to the annular block 31 from the motor-actuated shaft 14 tends to unwind the helical member 32 whereby, due at least in part to radial expansion, it is pressed against the inner wall of the casing member 20, this effect being augmented by the inertia of the block 33 associated with the free end of the helical member 32 and also being augmented by action of centrifugal force upon the helical member. As the member 32 is rotated portions thereof pass across the slots 23 formed in the casing 20 thereby shearing hair or the like projecting through said slots. It will be noted that hair ends or similar waste material sheared off through the use of the cutter head as aforesaid, can be discarded or removed through the openings 35 in the annular block 33.

An alternative or modified form of the present invention is illustrated in Figs. 4 and 5, wherein a power driven shaft 40 is provided with a pair of annular spacer members 41 and 42 substantially fixedly secured thereon preferably by means including set screws 43 and 44, substantially as shown. Between these spaced annular members 41 and 42 and slidable upon pins 45 and 46 fixedly secured in portions of the shaft 40, is the block-like member generally designated at 47. Said block-like member 47 is formed in substantially the shape of a segment of a cylinder cut along the axis thereof and is provided with a plurality of cutout parts 48, substantially as shown, whereby the portion of the block remaining presents, in appearance, substantially half of a helix. It will be noted that during rotation of the block-like member 47 within the substantially cylindrical casing member 20 the parts 49 of said block will pass across the openings 23 formed in said casing thereby exerting substantial shearing action upon hair and the like positioned therein. It is further to be noted that during rotation of the shaft 40, the block-like member 47 will press against the inner face of the casing 20 by reason of tendencies of movement from which centrifugal force is, at least, not excluded thereby facilitating shearing action as aforesaid.

It will, of course, be understood that the outer faces of the helical cutting members, either the resilient spring-like member 32 or the block-like member 47, will be provided with substantially sharp edges, thereby enhancing the shearing effect as parts of the helical member pass over the openings 23 formed in the substantially cylindrical casing. It will be apparent that wear either of the casing or the moving cutter element will serve to substantially sharpen the respective parts thereby assisting in shearing hair and the like therewith. It is also to be noted that the movement of the motor-actuated cutter element is continuous and in the same direction thereby at least largely minimizing or precluding shock effects, notably when oscillatory or reciprocating cutter elements are employed. It is obvious that the cutter heads according to either the preferred or modified form of the present invention can be readily dismantled for cleaning or other purposes of sterilization if desired.

It is to be understood that this improvement is capable of extended application and is not confined to the exact showing of the drawing nor to the precise construction described and, therefore, such changes and modifications may be made therein as do not affect the spirit of the invention nor exceed the scope thereof as expressed in the appended claims.

What is claimed is:

1. A device of the type described comprising a supported, relatively stationary, substantially cylindrical casing member, a segment of said casing having a plurality of slot-like openings formed therein disposed obliquely relative to the axis of said substantially cylindrical casing mem-

ber; a live spindle positioned within and disposed coaxially relative to said casing; a pair of collar-like members substantially fixedly secured in spaced relationship on said spindle and rotatable therewith; a block-like shape in the form of a segment of a cylinder positioned between said collar-like members and provided on the outer surface thereof with helical, square-cut, groove-like formations alignable with said slot-like openings in said casing and means connecting said block-like member and said live spindle whereby said block-like member can be rotated by said spindle so that, through means including centrifugal force, said rotating block-like member is pressed against inner parts of said substantially cylindrical casing, causing hair and the like positioned in said slot-like openings of said casing to be cut and sheared.

2. A device of the type described comprising a supported, relatively stationary, substantially cylindrical casing member, a portion of the surface of said casing being radially extended to provide a substantially planar surface at least nearly tangential to said cylindrical member, a segment of said casing including said extended part having a plurality of slot-like openings formed therein disposed obliquely relative to the axis of said substantially cylindrical casing member, portions of said substantially planar extended surface between said slots being formed to present a plurality of spaced substantially parallel anticlinal surfaces; a live spindle positioned within and disposed coaxially relative to said casing; a pair of collar-like members substantially fixedly secured in spaced relationship on said spindle and rotatable therewith; a block-like shape in the form of a segment of a cylinder positioned between said collar-like members and provided on the outer surface thereof with helical, square-cut, groove-like formations alignable with said slot-like openings in said casing; and means connecting said block-like member and said live spindle whereby said block-like member can be rotated by said spindle, thereby pressing said block-like member against inner parts of said substantially cylindrical casing, causing hair and the like positioned in said slot-like openings of said casing to be cut and sheared.

3. A device of the type described comprising a supported, relatively stationary, substantially cylindrical casing member, a portion of the surface of said casing being radially extended to provide a substantially planar surface at least nearly tangential to said cylindrical member, a segment of said casing including said extended part having a plurality of slot-like openings formed therein disposed obliquely relative to the axis of said substantially cylindrical casing member, portions of said substantially planar extended surface between said slots being formed to present a plurality of spaced substantially parallel anticlinal surfaces, a live spindle positioned within and disposed coaxially relative to said casing, a segmental cylindrical block-like member carried on said spindle by means including pins secured in said spindle and received in openings in said block-like member whereby substantially free radial movement of said block-like member with respect to said spindle is permitted, said block-like member being appreciably though but slightly less in exterior diameter than the interior diameter of said casing member, said block having helical, square-cut grooves formed in the outer surface thereof registerable with said slot-like openings in said casing whereby, through means including centrifugal force, said rotating block-like member is pressed against inner parts of said substantially cylindrical casing, causing hair and the like positioned in the slot-like openings in said casing to be cut and sheared.

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