March 25, 1952 A. K. PETERSON 2,590,452

MECHANICAL RAZOR

Filed July 26, 1947

Fig. 1.

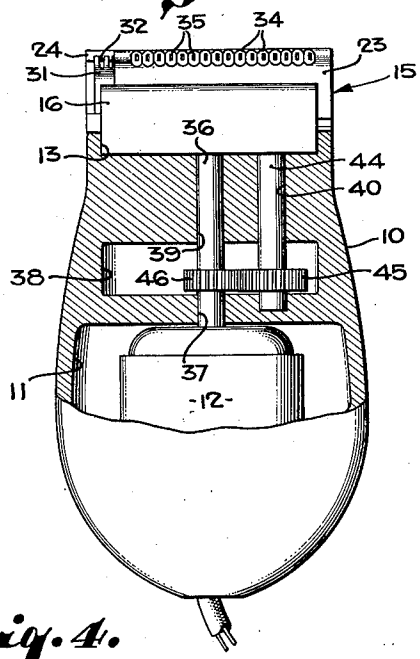


Fig. 2.

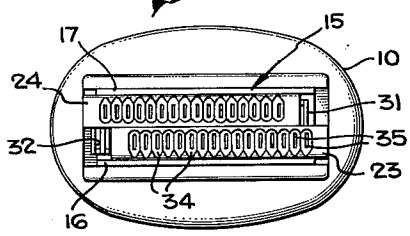


Fig. 3.

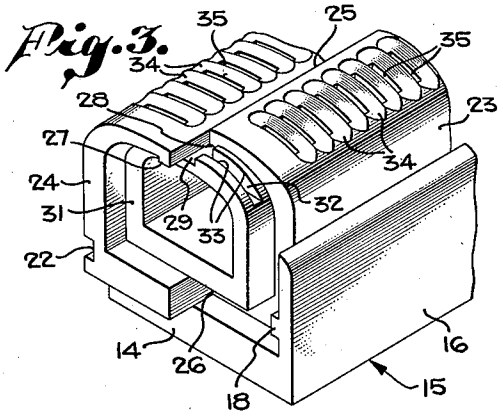


Fig. 4.

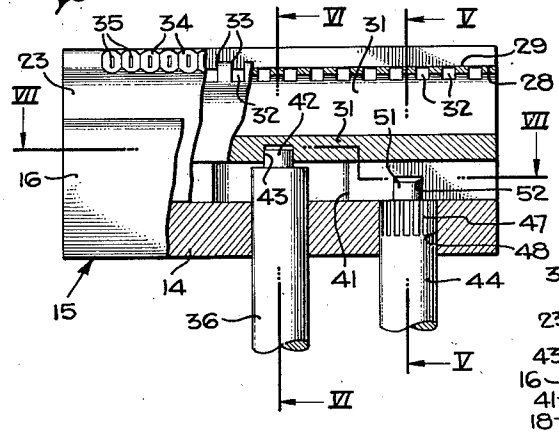


Fig. 5.

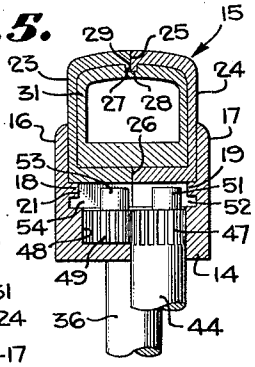


Fig. 6.

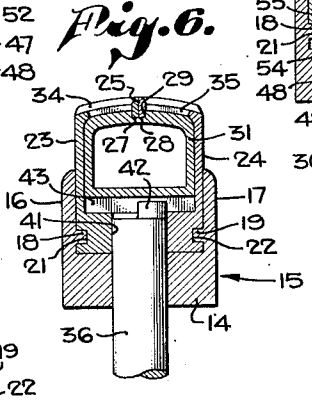
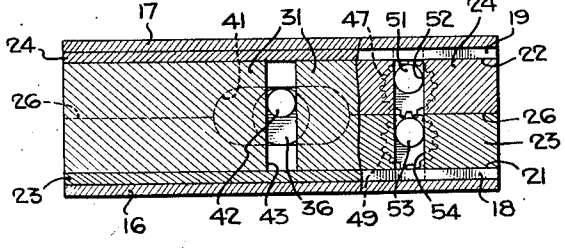


Fig. 7.



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2,590,452

MECHANICAL RAZOR

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9 Claims. (Cl. 30—34)

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This invention relates to an electric razor or dry shaver and, more particularly, to an improved cutting head therefor.

Numerous types of electric razors or dry shavers have heretofore been provided. All of these prior types known to me employ some form of a cutting head which employs an outer cutting element and an inner cooperating, cutting element. Some of these types consist of a stationary, outer, cutting element and a reciprocating, inner, cutting element. Other types employ a stationary, inner, cutting element and a reciprocating, outer, cutting element, and still other types employ a structure wherein both the inner and outer cutting elements reciprocate. In all of these various prior constructions, an operator is required to pass the cutting surface of the razor over the same area of the face being shaved a great number of times in order to cut all the hairs and obtain a smooth shave. Of course, the space between the cutting slots comprises a considerable skin-contacting portion of the outer cutting element, and it is practically impossible to cut all the hairs during a single movement of the cutting surface across the face. However, I have found that if the outer, skin-contacting, cutting element of the razor is centrally divided and arranged to oscillate in opposite directions, a certain twisting, massaging and agitation of the skin is effected, which results in directing the hair to be cut into the cutting slots. Also, I have found that if the outer surface of the cutting head is grooved about the slots to form substantially concave, elongated indentures, these concave sides of the groove will operate to effectively direct the hair into the cutting slot.

The provision of the oppositely oscillating parts of the outer cutting head, together with the grooves, operate to greatly reduce the number of times which the cutting surface of the razor is required to be drawn across a given area of the face in order to effect a smooth shave. The pressure of the cutting head against the face causes the skin to project into the grooves and operate to somewhat straighten the hair for entrance into the cutting slot. The present structure, in addition to reducing the number of operations of the razor to effect a smooth shave, produces a desired massage of the skin and makes for a healthy complexion.

It is a primary object of this invention to produce an electric razor that will operate to cut the hair on the face of an operator with fewer strokes of a razor than those required by the razor heretofore provided.

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It is a further object to provide an electric razor having outer skin-contacting elements arranged to move relatively and impart a twisting and massaging to skin in contact therewith.

A further object is to provide an electric razor having the above characteristics and including hair-receiving slots and grooves associated therewith for directing hair into the slots.

A still further object is to provide a razor having the above characteristics composed of relatively few parts, compact, durable, efficient in operation and comparatively cheap to manufacture.

The above and other objects will be made apparent throughout the further description of the invention when taken in connection with the accompanying drawings, wherein like reference characters refer to like parts. It is to be distinctly understood that the drawings are not the definition of the invention but merely illustrate an exemplary form of a preferred embodiment of the invention. The invention will be defined by the appended claims.

In the drawings:

Fig. 1 is an elevational view partly in section of an electric razor embodying the invention.

Fig. 2 is a top plan view of Fig. 1.

Fig. 3 is an enlarged, three-quarters, perspective view of a portion of a cutting head embodying the invention.

Fig. 4 is an enlarged view of the upper section of Fig. 1, partly in section, in order to illustrate the detailed construction of the device.

Fig. 5 is a sectional view taken along the line V—V of Fig. 4.

Fig. 6 is a sectional view taken along the line VI—VI of Fig. 4, and

Fig. 7 is a sectional view taken along the line VII—VII of Fig. 4.

For convenience, the description of the device will be made in accordance with the direction in which the razor is adapted to be drawn across the face of the operator, such direction being referred to as longitudinally. The device includes a handle or housing 10 made of any desired material and suitable contour. Within the housing and adjacent the bottom thereof, as viewed in Fig. 1, there is provided a chamber 11 in which is mounted a suitable electric motor 12. The upper end of the housing 10 is recessed at 13 to provide a space for receiving the base 14 of a supporting block or holder 15. Recess 13 is substantially the depth of the thickness of the base 14 of the holder 15, and the holder 15 may be retained in fixed relation with

the base 13 by any suitable means not shown, such as a screw through the side wall of the opposing portion of the handle 10 and into contact with the block 15.

In Figs. 1 to 3 the cutting edges are shown in intermediate positions, while in Figs. 4 to 7, inclusive, the device is shown with the cutting edges in aligned position. The block 15 is provided with upstanding sides 16 and 17. These side walls 16 and 17 are provided with horizontal projections or keys 18 and 19, respectively, extending inwardly of the sides 16 and 17. These projections 18 and 19 are adapted to fit into horizontal recesses or grooves 21 and 22 provided in the outer side walls of an outer, substantially hollow, cutting head formed of two parts 23 and 24. The outer cutting head may be formed with a uniform, continuous, slightly convex face contacting surface, and is divided vertically along the transversely central lines 25 and 26. The opposing upper edges of the outer cutting block terminate in downwardly extending flanges 27 and 28. These flanges are adaped to project into a transverse recess 29 provided centrally and transversely of an inner cutting element 31 which slidably fits within the parts 23 and 24 of the outer cutting element. The inner cutting element 31 is provided with a series of longitudinal slots 32, thereby forming a large number of cutting edges 33 in sliding contact with the lower surfaces of face-contacting portions of 23 and 24 of the outer cutting element which are each provided with a series of longitudinal depressions or grooves 34 having inwardly and downwardly inclined walls leading to hair-receiving, longitudinally extending slots 35.

As above stated, the block 15 is held stationary with the handle 10 in the recess 13. For the purpose of oscillating the inner cutting head 31, a drive shaft 36 is provided. The shaft 36 extends from the motor 12 upwardly through opening 37, chamber 38 and opening 39 provided in the handle 10 and through an elongated, transverse recess 41 provided in the bottom of the members 23 and 24 of the outer cutting head. The upper end of the shaft 36 is provided with an eccentric pin 42 extending into a longitudinally disposed slot 43 provided in the bottom of the inner cutting member 31. It can now be understood that as the shaft 36 rotates, the eccentric pin 42 engaging the slot 43 in the bottom of the inner cutting member 31 will cause the inner cutting member 31 to oscillate, it being understood that the width of the slot 43 is substantially the diameter of the eccentric pin 42, and that the eccentric pin 42 is adapted to slide within a slot 43 during the rotation of the shaft 36.

For the purpose of oscillating the members 23 and 24 of the outer cutting head simultaneously and in opposite directions, there is provided a counter shaft 44. The counter shaft 44 is disposed in vertical opening 40 within the handle 10. The counter shaft 44 is provided with a gear 45 at its lower end, and the gear 45 is adapted to mesh with and be driven by a gear 46 carried by the drive shaft 36, the gears 45 and 46 being located within the chamber 38. The upper end of the counter shaft 44 is provided with a gear 47 being disposed within a recess 48 provided in the bottom 14 of the block 15. Also provided within the opening 48 is a gear 49 suitably journalled within the opening 48 and adapted to mesh with the gear 47

carried by the counter shaft 44. The upper surface of the gear 47 is provided with an eccentric pin 51, the latter extending into a longitudinal groove 52 in the bottom of the block 24 of the outer cutting head. The upper surface of the gear 49 is provided with an eccentric pin 53, the latter extending into a longitudinal groove 54 provided in the bottom of the part 23 of the external cutting element. The gear 45 carried by the counter shaft 44 is larger in diameter than the gear 46 carried by the driving shaft 36 and provides a differential between the rotation of the drive shaft 36 and the counter shaft 44, whereby the parts 23 and 24 of the outer cutting head are oscillated slower than the inner cutting head 31.

Inasmuch as the gears 47 and 49 are in meshed relation, they will rotate in opposite directions, and the pins 51 and 53 will operate to oscillate outer parts 23 and 24, respectively, in opposite directions. The parts 23 and 24 are held in position within the block 15 by means of the projections 18 and 19 of the blocks 15 extending into the recesses 21 and 22 within the opposing surfaces of the blocks 23 and 24, respectively. Also, the abutting projections 27 and 28 of the upper ends of the parts 23 and 24 extend into the transverse groove 29 in the upper central portion of the inner cutting element. All of the reciprocating parts are actuated in response to the single drive shaft 36, and the differential effected by the gears 45 and 46 operates to oscillate the parts 23 and 24 at a predetermined slower speed than the oscillating speed of the inner cutting element 31, thereby effecting relative movement between the parts 23, 24 and the inner cutting element 31 at all times during the operation of the device.

Accordingly, there is provided an electric dry shaver having an outer cutting element formed in two parts and means for oscillating the parts in opposite direction during the oscillation of an inner cutting element, the latter arranged to oscillate or reciprocate at a greater speed than the parts 23 and 24. The oscillation of the two parts or halves of the outer cutting element augments the positioning of hairs within the cutting slots and also the grooves associated with the hair-receiving slots operate effectively to direct hair into the cutting slots. The cooperation of the opposite reciprocation of the two parts 23 and 24 together with the grooves 34 operates to effectively cause the hair to enter the cutting slots more readily and greatly reduces the number of operations required to obtain a smooth shave. The device is simple, rugged, efficient in operation and comparatively cheap to manufacture.

It is to be understood that the invention is not limited to a razor in which a single head is used nor to one in which a single head is made in two outer parts such as 23 and 24. The invention contemplates two separate but adjacent heads, each including a movable outer, skin-contacting portion, the two portions then reciprocating in opposite or opposing or out-of-place relation to impart a massaging and twisting action to the skin. The cutting heads reciprocating within these outer portions may reciprocate in unison or in opposition, as desired.

The characteristics of the exemplary form of device described hereinabove may also be embodied and utilized in other forms. For example, the massaging action can be incorporated in the so-called multiple head razors by permit-

ting one or more of the skin-contacting perforated or slotted outer members to reciprocate while the skin-contacting members of adjoining or adjacent heads are stationary. A multiple head razor is shown in Patent No. 2,371,535, for instance, and the three heads 14, 15 and 16 in this patent may be arranged in accordance with the present invention so that any one of the heads may remain stationary while the others oscillate or any one of the heads may oscillate while the other heads remain stationary and produce the skin twisting and massaging effect herein disclosed.

In these various modifications, as in the specific example given, a single motor or power source preferably drives the face-contacting outer portions and the cutters.

While a preferred form of the present invention has been illustrated, it will now be apparent to those skilled in the art that certain changes may be made in the exemplary form shown, such as the hair-receiving slots and cutting edges of both the inner and outer cutting elements may extend transversely of the cutting head instead of longitudinally. Other modifications, additions, substitutions and omissions may be made in the exemplary form shown without departing from the spirit and scope of the appended claims.

I claim:

1. A mechanically actuated shaving implement including: a relatively stationary holder; a pair of adjoining, parallel members carried by the stationary holder, each of said members including a thin, apertured, skin-contacting convex portion, said skin-contacting portions forming an upper smoothly contoured continuously convex skin-contacting surface, said portions being oppositely oscillatable and edges of said portions being in slidable contact along the summit of said convex surface; a single inner cutter element in sliding contact with the inner surface of both skin-contacting portions; and means for reciprocating said parallel members longitudinally and in opposing directions to impart a twisting motion to skin in contact with the skin-contacting portions.

2. In a shaving implement of the character stated in claim 1, the provision of a longitudinally extending groove in the cutter element and a depending marginal lip carried by each of the skin-contacting portions and extending into said groove, whereby opposing edges of the skin-contacting portions are maintained in slidable contact.

3. A mechanically actuated shaving implement including: a relatively stationary holder; a pair of adjoining, parallel members carried by the stationary holder, each of said members including a thin, apertured, skin-contacting convex portion, said skin-contacting portions forming an upper smoothly contoured continuously convex skin-contacting surface, said portions being oppositely oscillatable and in slidable contact along the top of said convex surface; a single inner cutter element in sliding contact with the inner surface of both skin-contacting portions; means for reciprocating said parallel members longitudinally and in opposing directions to impart a twisting motion to skin in contact with the skin-contacting portions, the center of said twisting motion being along a line coinciding with the uppermost longitudinal line of said convex surface; and means for reciprocating the inner cutter element at a different rate than the rate of reciprocation of the outer members.

4. In a mechanically actuated shaving implement, the provision of: two contiguous outer complementary skin-contacting portions; a single inner cutting element cooperating with each of said outer portions; a single power means, and means operably connecting said power means with the cutting element and with one of the outer portions to move the latter relatively to the other outer portion whereby skin in contact with said outer portions is twisted and massaged in contiguous areas.

5. In a mechanically actuated shaving implement the provision of not less than two contiguous outer, skin-contacting, apertured portions, a single inner cutting element in cooperative relation to both of the skin-contacting portions and means for rapidly reciprocating one of said outer portions with respect to the other to impart a twisting to contiguous skin areas in contact with such outer portions.

6. In a mechanically actuated razor, the provision of: a holder; a pair of complementary oppositely oscillating elongated U-section outer members disposed with their open sides in opposed face-to-face relation to form a hollow, enclosed section, said members being slidably mounted in said holder; opposed edges of said U-section members being in slidable contact; said members each having an outer top wall and presenting a convex outer face, said faces together presenting a smoothly contoured continuous convex skin-contacting surface; a single inner cutting element reciprocally slidable within said hollow section and having a wall extending beneath said outer wall and co-operable therewith in shearing relation; a longitudinally extending groove in the wall of the inner element beneath the opposed edges of the top walls of said members; depending lips provided along opposed edges of said top walls and slidable within said groove for holding said opposed edges in close slidable contact; and means for oppositely oscillating the U-shaped members at one rate of speed and the inner cutting element at another rate of speed.

7. A mechanically actuated razor as defined in claim 6, wherein each skin-contacting face of each outer member is provided with transverse slots, each slot having upwardly and outwardly flaring walls, the walls between adjacent slots terminating in an outer common thin edge.

8. In a mechanically actuated razor, the provision of: a holder; a pair of complementary oppositely oscillating elongated U-section outer members disposed with their open sides in opposed face-to-face relation to form a hollow, enclosed section, said members being slidably mounted in said holder; opposed edges of said U-section members being in slidable contact; said members each having an outer top wall and presenting a convex outer face, said faces together presenting a smoothly contoured continuous convex skin-contacting surface; a single inner cutting element reciprocally slidable within said hollow section and having a wall extending beneath said outer wall and cooperable therewith in shearing relation; and means for oppositely oscillating the U-shaped members at one rate of speed and the inner cutting element at another rate of speed.

9. In a mechanically actuated razor, the provision of: a holder; a pair of complementary, oppositely oscillating, contiguous, elongated,

U-section, outer cutting heads disposed with their open sides in opposed face-to-face relation to form a hollow enclosed portion, said cutting heads being slidably mounted in said holder; outer longitudinal edges of said U-section cutting heads being in slidable contact; said cutting heads each having an outer top wall presenting a convex outer face, said faces together presenting a smoothly contoured continuous convex skin-contacting surface sloping downwardly and outwardly from the line of contact of said outer edges; a single inner cutting element reciprocally movable within said hollow section and having a wall extending beneath said outer wall and cooperable therewith in shearing relation; and a plurality of transverse slots in each outer face.

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