Jan. 28, 1941. G. DALKOWITZ 2,229,958

SHAVING DEVICE

Filed Jan. 18, 1937

Fig. 1

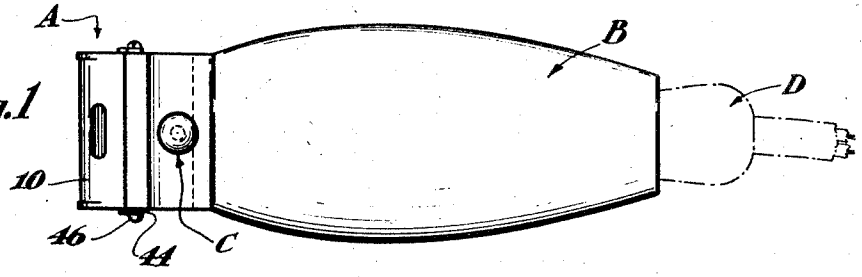


Fig. 2

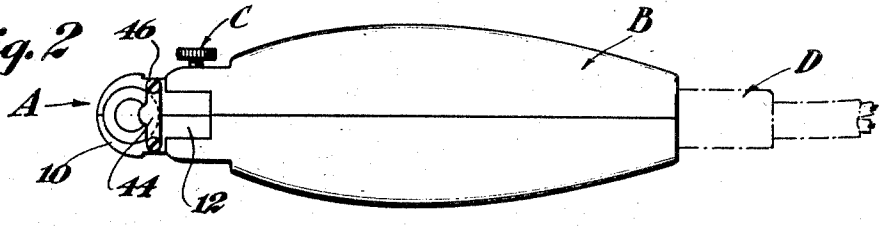


Fig. 3

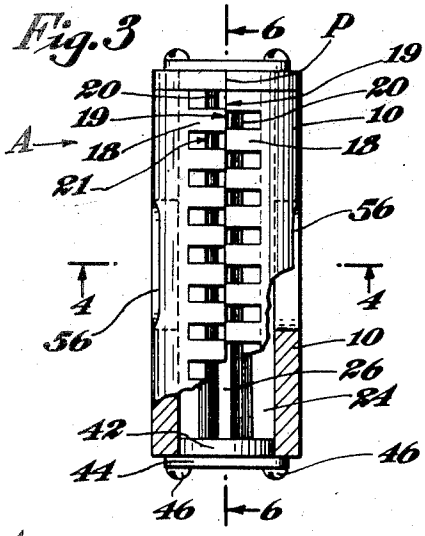


Fig. 4

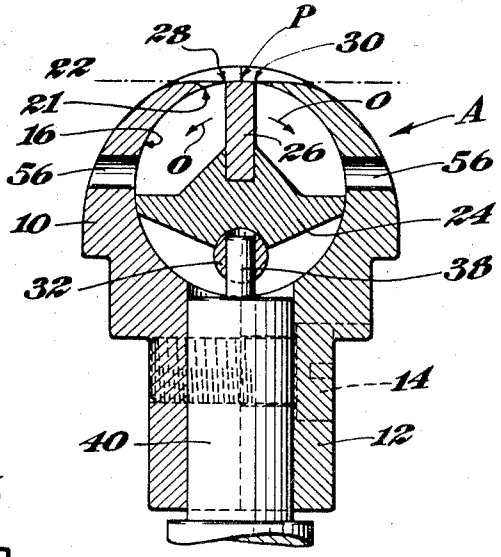


Fig. 6

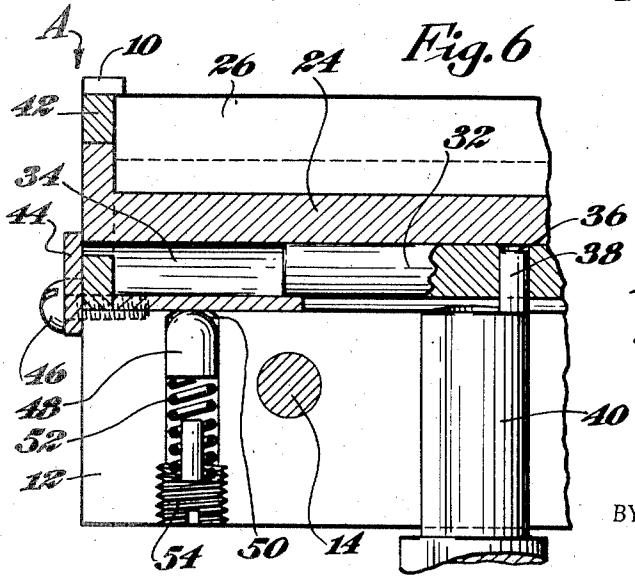
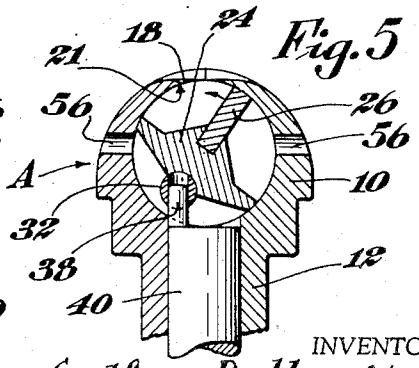


Fig. 5



INVENTOR,
Godfrey Dalkowitz,
BY
ATTORNEY.

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UNITED STATES PATENT OFFICE

2,229,958

SHAVING DEVICE

Godfrey Dalkowitz, Brooklyn, N. Y., assignor to American Safety Razor Corporation, Brooklyn, N. Y., a corporation of Virginia

Application January 18, 1937, Serial No. 121,111

14 Claims. (Cl. 30—43)

This invention relates to shaving devices of the type commonly known as "dry shavers" in which the shaving operation is carried on without the use of detergents or unguents, and is usually accomplished by the shearing or nipping action of relatively movable cutting edges, and in particular, it relates to a dry shaver provided with cutting members that are reciprocable or oscillatable relatively to each other.

While my invention has been disclosed as applied to a dry shaver of the reciprocating or oscillating type it will be understood that it is not restricted to dry shavers of that type, and that, as to certain phases thereof, it may have other applications than to dry shavers.

In the construction of dry shavers it is necessary in order to attain an effective cutting action that the cutting edge be positioned as closely as possible to the surface to be shaved so that a "close shave" may be attained, while at the same time precautions must be taken against a portion of the fleshy surface to be shaved entering between the cutting portions.

Among the more important objects of my invention are: the provision of a dry shaver which is simple in construction, and which will operate effectively to give a close shave in a short time without injurious consequences; the provision in a dry shaver of cutting portions in the form of spaced cutting segments, the provision in a dry shaver of a member carrying a plurality of short cutting edges spaced from each other; the provision in a dry shaver of a member presenting a plurality of sets of teeth in opposition to each other with spaces between the teeth; the teeth of one set registering with the spaces between the other set; the provision in a dry shaver of a member presenting a plurality of sets of teeth in opposition to each other, with spaces between the teeth, the free ends of the teeth of each set being in substantial alignment and with the teeth on one set in registry with the spaces between the teeth on the other set and more particularly the provision in such arrangement of the free ends of the teeth of both sets in substantially a common line; the provision in a dry shaver of a continuous cutting edge made up of linear sections, alternate sections forming the ends of two sets of teeth with one set in opposition to the other; the provision generally with each of the aforesaid arrangements of a member and means for providing a relative movement between the parts whereby a cutting action will be effected across the cutting edges.

Among further objects of my invention are the provision of other teeth not aligned with the aforementioned teeth and auxiliary thereto, the provision of openings in the guard member of a dry shaver through which waste matter, such as hair clippings, may escape from the guard member, and, further, the provision of improved means for oscillating the cutting blade of the razor.

For the attainment of these objects and such other objects as will hereinafter appear or be pointed out I have illustrated one embodiment of my invention in the drawing, in which:

Figure 1 is a plan view of a razor of the dry shaver type;

Figure 2 is a side elevation of the same;

Figure 3 is a front elevation of the shaver head as it would appear when viewed from the left of Figures 1 and 2; and on a greatly enlarged scale, portions of the guard being broken away to expose the oscillating cutter;

Figure 4 is a sectional view on a greatly enlarged scale, taken on the line 4—4 of Figure 3, looking in the direction of the arrows;

Figure 5 is a view similar to Figure 4 but on a smaller scale, showing the parts in different relative position; and

Figure 6 is a sectional view of a portion of the cutting mechanism taken substantially on the line 6—6 of Figure 3, looking in the direction of the arrows, and on a greatly enlarged scale.

Referring first to Figures 1 and 2 of the drawing it will be observed that I have shown therein a shaving device of the dry shaver type provided with a shaving head denoted in general by A and with a handle denoted by B, the former containing the cutting mechanism and the latter the motor for actuating the cutting mechanism. A set screw C is provided for clamping the head in place on the handle, and electrical connections for supplying power to the motor are indicated in dotted lines at D. As my invention relates solely to improvements in the cutting head of the razor, it will be unnecessary to describe the other parts thereof in detail, and it will suffice to say that I contemplate using therein a motor of any preferred or desired character and mechanism operated thereby for actuating the shaving mechanism thereof.

Referring now to the details of my shaving head as illustrated in Figures 3, 4, 5 and 6, it will be observed that I have shown it as comprising a guard or casing 10 having an extension 12 thereon, that is adapted for accommodation

within a slot of the handle portion, as may be seen from Figure 2, and this guard or casing may be made in two sections, for manufacturing convenience, as will appear from what follows. When the guard is thus made in two parts, it may be held together by screws 14, so that the parts in effect form a single unit, when assembled. Running longitudinally through the outer end portion of the guard is a cylindrical bore 16 designed to accommodate the movable cutter, as will be subsequently described.

The portion of the guard that accommodates the cutter is shown externally also generally of cylindrical shape, however slightly flattened out at its end, this constituting the guard portion proper, which engages the surface to be shaved, and at this point the walls are thinned down so as to taper off into cutting edges 19 which meet at the line denoted by P in Figures 3 and 4. As clearly shown in Figure 3 the walls of the guard adjacent the cutting edges are slotted so as to form a series of teeth 18 separated by the slots 20 and it will be observed that each tooth 18 of each half of the guard or casing is in opposition to a slot 20 of the other half of the guard. In other words the relation is a staggered one, with the result that running across the casing in a longitudinal direction there is what may be termed to be a single cutting edge constituted by segments, and the cutting edge of each pair of adjacent segments face in opposite directions. These cutting edges may be conveniently formed by grinding away the top of the guard along a plane indicated at 22—22 in Figure 4, whereby a very sharp and attenuated cutting edge is formed at the point or rather line, P at which the plane 22—22 becomes tangent to the inner surface of the bore 16.

Revolubly mounted within the bore 16 is a carrier member 24 that has mounted within the cutting element 26, and this cutting element bears in close engagement against the walls of the bore 16 and together with the contacting walls of the carrier element 24 constitutes the bearing surfaces by which the carrier is constrained to oscillate within the bore 16. At its contacting surface portion the cutting element 26 has on the respective opposite sides thereof, two cutting edges 28 and 30, and as the cutting element moves back and forth across the cutting teeth 18, these edges function alternately, the advancing edge in each case coacting with the teeth 18 on that side of the guard toward which the advancing edge is moving.

It will be observed that the inner edges 21 of the slots 18 are also shown as tapered off into cutting teeth, as may be clearly seen from Figures 2 and 5, and these cutting edges, while they are not ordinarily positioned as close to the surface to be shaved as are the cutting edges 19, may nevertheless serve as auxiliary cutting edges to assist the edges 19. They may serve, for example, to operate on the longer hairs, which the cutting edges 19 will thereafter trim more closely.

It will further be observed that the teeth 18 have been shown in Figure 3 as wider than the slots 20. This construction has the advantage that the free corner portions of each cutting edge 19 are protected against damage by the overlapping corner portions of the opposite cutting edges 19, this being desirable where the cutting edges are very thin. However, it will be understood that for certain purposes the relative width of teeth and slots may be other than as shown. For example the slots might be of the same width as the teeth, or even of greater width.

To effect oscillation of the carrier 24 and the cutter 26 within the bore 16, as indicated by the arrows O, so that the edges 28 and 30 are alternately brought into action each against its respective set of cutting teeth, I have provided mechanism comprising a pin 32 revolubly and slidably mounted within the bore 34 provided in the carrier 24, and the pin 32 has a bore 36 running transversely therethrough and adapted to receive the crank pin 38 that is provided on the end of a driving element such as the shaft 40 of the motor contained in the handle B.

The operation of the parts just described will be understood from an inspection of Figures 4, 5 and 6. In Figure 6 the crank pin 38 and pin 32 are shown in their extreme right hand positions and this represents a position of these parts in which the cutting element 26 is in its middle position as indicated in Figures 3, 4 and 6. If the motor shaft 40 is rotated through one-quarter turn the parts will assume the position indicated in Figure 5 in which the cutter 26 has reached a limiting position of oscillation, and in which the crank pin 38 has also assumed a limiting position in a plane transversely positioned in relation to the guard. It will be observed that in order to pass from the position of Figure 4 to that of Figure 5, it is necessary for the pin 32 to turn within the bore 34.

The carrier 24 is shown as provided with a pair of heads 42, applied thereto in any suitable or preferred manner, and these heads serve to more or less close the ends of the bore 34 thereby preventing the entrance of dirt thereinto, as well as to retain the cutter 26 against longitudinal displacement and to afford extra bearing surface between the bore 16 and the oscillating parts. In order to retain the oscillating parts, that is the carrier 24 and its adjuncts, in place within the guard, the latter is shown as provided with end plates 44 held in place in any suitable or preferred manner as by screws 46, and these plates engage the heads 42 in bearing contact therewith.

In order to secure proper contact between the cutting element 26 and the cutting edges of the teeth 18 I provide a pair of plungers 48, one of which is shown in Figure 5, that are each slidable within a bore 50 in the extension 12 of the guard or casing, and this bore is shown as restricted at its upper end so as to prevent the passage of the plunger 48 therethrough while at the same time permitting its end to protrude into the bore 16. The plunger 48 is shown in Figure 6 as being urged against the carrier 24 by a coil spring 52 mounted within the bore 50 and adapted to have its pressure against the plunger 48 regulated by a set screw 54, which bears against one end of the spring.

In order to provide for the escape from the guard member of the hair clippings that enter its interior, I have shown a pair of openings 56, one provided on each side of the guard member, and it will be observed by viewing Figures 4 and 5, that as the cutter 26 and its carrier 24 oscillate, the clippings will be forced to move toward and over the openings 56 and will escape therethrough. At the same time a ventilating action is secured which serves to cool the device.

The advantages of my construction will now be clearly apparent. While the guard member is sufficiently strong to perform the function required of it, it will be observed that the portions

thereof adjacent the cutting edges 19 are extremely thin, and the angle of the cutting edges is highly acute whereby they are very effective for their intended purpose. It will also be observed that the cutting takes place substantially at the surface to be shaved, and in a direction substantially perpendicular to the hair to be cut, whereby the maximum effectiveness of action is secured. At the same time due to the fact that the slots 20 are restricted in size it is impossible for portions of a fleshy surface to be shaved to protrude into the guard to an extent so great that there is danger of their being caught between the cutting edges. Where auxiliary cutting edges 21 are used, these will assist the cutting edges 19, as has already been explained.

The advantages of my improved construction for oscillating the cutter 26 and its carrier will also be apparent. Due to the pivotal and slidable mounting of pin 32, freedom from binding is at all times secured.

While I have herein disclosed one embodiment of my invention, it is to be understood that the same may be embodied in many forms, as will be obvious to those skilled in the art, and that the disclosure herein is not intended to be restrictive, but by way of illustration merely, and that I do not limit myself in any way other than as called for by the prior art.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is:

1. In a razor of the dry shaver type, a stationary guard member having a substantially continuous cutting edge constituted by a series of narrow cutting blades alternately facing in opposite directions and having their edges in alignment and a cutting element having cutting edges adapted to assume positions at all times parallel to said cutting edge of the guard and to move transversely across said cutting edge of the guard and in close contact therewith so as to exert a shearing action on matter interposed between said respective cutting edges on the guard and on the cutting element.

2. A razor of the dry shaver type having a stationary guard member provided with a substantially continuous cutting edge constituted by a series of narrow cutting blades alternately facing in opposite directions, said cutting edge being formed at the points of tangency of a plane surface constituting a portion of the outer surface of said guard member, and by the walls of a cylindrical bore within the guard member, and said blades having their cutting edges in alignment and a cutting element adapted to assume positions parallel to said cutting edge of the guard and to oscillate transversely across said cutting edge of the guard and in such close contact therewith as to exert a shearing action, mounted for oscillation within said cylindrical bore.

3. In a razor of the dry shaver type, a stationary guard member having a substantially continuous cutting edge constituted by a series of narrow cutting blades alternately facing in opposite directions and having their edges in alignment, and the outer surfaces of said blades adjacent said cutting edges lying substantially in a plane, and an oscillating cutting blade adapted to assume positions parallel to said cutting edge of the guard and to oscillate transversely across said cutting edge of the guard and in such close contact therewith as to exert a shearing action.

4. In a dry shaver a guard member, a pair of parallel rows of spaced openings therein, the openings of each row being staggered in relation to the openings of the other row and each of the openings of both rows having one of their edges in alignment and having cutting edges formed on said aligned edges, and a cutting element having longitudinally disposed cutting edges thereon adapted to cooperate with said cutting edges to effect a shearing action and means for causing said cutting blade to move back and forth transversely across said cutting edges of said guard.

5. A dry shaver having a guard member, openings in said guard member arranged in staggered relation, a cutting edge formed on an edge of said openings, and the cutting edges on alternate openings being oppositely directed and in alignment, and a cutting edge formed on the edge of each opening that is opposed to said first-mentioned edge.

6. In a dry shaver of the oscillating type, a guard member having stationary cutting edges thereon, a cylindrical bore within said guard member having a surface element thereof tangent to the outer surface of the guard member, whereby a pair of said cutting edges are formed at the points of tangency, and each of said cutting edges being broken up into a plurality of spaced segments, a cutting member mounted for oscillation within said cylindrical bore, said cutting member carrying a longitudinally extending cutting blade adapted to cooperate with said stationary cutting edges on the guard member to effect a shearing action, and an opening in the guard member positioned on each side of the cutting edges and adapted for the discharge of clippings, and means for causing an oscillatory motion of said cutting blade across said cutting edges.

7. In a dry shaver of the oscillating type, a guard member having stationary cutting edges thereon, a cylindrical bore within said guard member having a surface element thereof tangent to the outer surface of the guard member, whereby a pair of said cutting edges are formed at the points of tangency, and each of said cutting edges being broken up into a plurality of spaced segments, a cutting member mounted for oscillation within said cylindrical bore, and said cutting member carrying a longitudinally extending cutting blade adapted to cooperate with said stationary cutting edges on the guard member to effect a shearing action.

8. A dry shaver of the oscillating type comprising a guard member having stationary cutting edges thereon, a cylindrical bore within said guard member having a surface element thereof tangent to the outer surface of the guard member, whereby a pair of oppositely directed aligned cutting edges are formed at the points of tangency, a cutting member mounted for oscillation within said cylindrical bore, said cutting member carrying a longitudinally extending cutting blade adapted to cooperate with said stationary cutting edges on the guard member to effect a shearing action, and an opening in the guard member adapted for the discharge of clippings, and means for causing an oscillatory motion of said cutting blade across said cutting edges.

9. In a dry shaver of the oscillating type, a guard member having stationary cutting edges thereon, a cylindrical bore within said guard member having a surface element thereof tangent to the outer surface of the guard member,

whereby a pair of said cutting edges are formed at the points of tangency, and each of said cutting edges being broken up into a plurality of spaced segments and the segments of one cutting edge being staggered in relation to the other cutting edge, a cutting member mounted for oscillation within said cylindrical bore, said cutting member carrying a longitudinally extending cutting blade adapted to cooperate with said stationary cutting edges on the guard member to effect a shearing action, and an opening in the guard member positioned on each side of the cutting edges and adapted for the discharge of clippings, and means for causing an oscillatory motion of said cutting blade across said cutting edges.

10. In a dry shaver of the oscillating type, a guard member having stationary cutting edges thereon, a cylindrical bore within said guard member having a surface element thereof tangent to the outer surface of the guard member, whereby a pair of said cutting edges are formed at the points of tangency, and each of said cutting edges being broken up into a plurality of spaced segments, and the segments of one cutting edge being staggered in relation to the other cutting edge, a cutting member mounted for oscillation within said cylindrical bore, and said cutting member carrying a longitudinally extending cutting blade adapted to cooperate with said stationary cutting edges on the guard member to effect a shearing action.

11. In a dry shaver, a guard constituted by a pair of comb-like members having their teeth lying substantially in the same plane and pointing toward each other and having cutting edges formed on the ends of their teeth and the teeth of said respective members being arranged in staggered relation to each other.

12. In a dry shaver, a guard constituted by a pair of comb-like members having their teeth pointing toward each other and having cutting edges formed on the ends of their teeth and the teeth of said respective members being arranged in staggered relation to each other, and said cutting edges being arranged in alignment.

13. A dry shaver comprising a shear plate provided with two rows of openings, the openings in one row being staggered with reference to those in the other row, and the adjacent inner edges of the openings of one of the two rows of openings being in longitudinal alignment with the inner edges of the openings of the other row and a cutter movable transversely of said shear plate.

14. A dry shaver comprising a shear plate provided with two rows of openings, the openings in one row being staggered with relation to those in the other row, the inner edges of the openings of each row of openings being in longitudinal alignment with the inner edges of the openings of the other row and a cutter movable in opposite directions transversely of the shear plate.

GODFREY DALKOWITZ.