April 17, 1956 E. J. BROPHY 2,741,840

RAZOR CONSTRUCTION

Filed April 18, 1952

Fig. 2

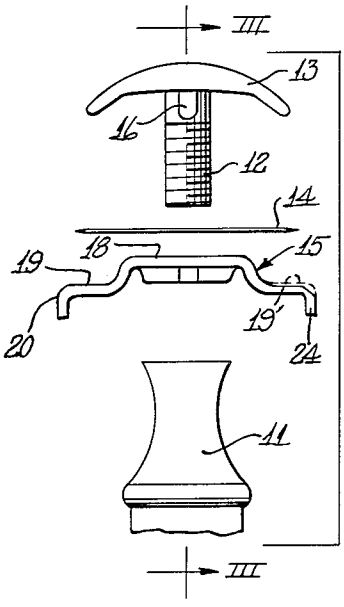


Fig. 1

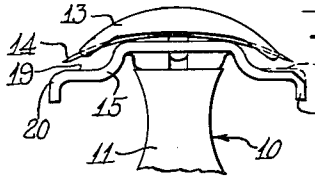


Fig. 3

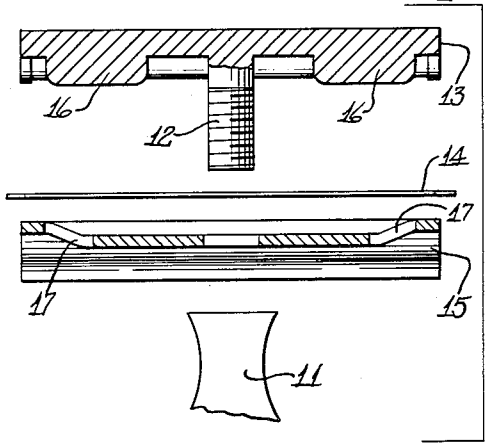


Fig. 4

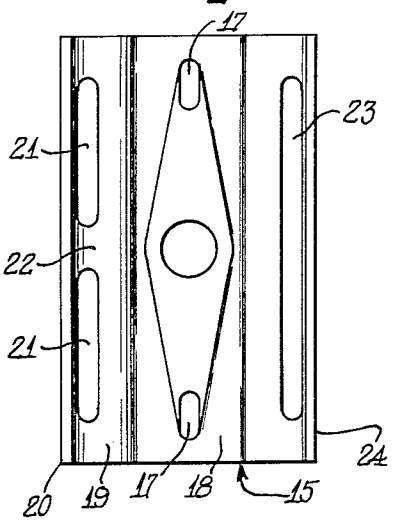


Fig. 5

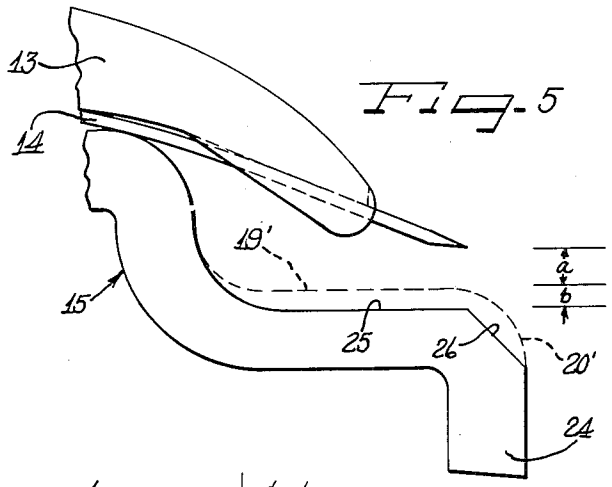
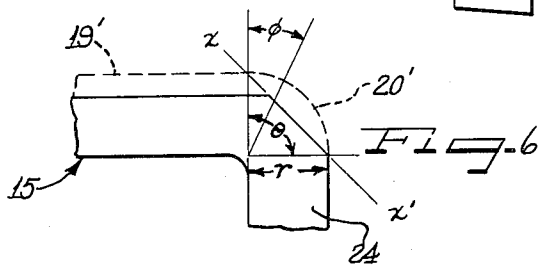


Fig. 6



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RAZOR CONSTRUCTION

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Application April 18, 1952, Serial No. 282,945

2 Claims. (Cl. 30—73)

My invention relates to an improvement in razor construction, and more particularly, to an improvement in the construction of guards for double-edged safety razors.

In a typical double-edged safety razor, the generally rectangular two-edged blade is held against a generally rectangular head piece so that the cutting edges of the blade extend outwardly a short distance beyond the opposite edges of the head piece. The blade is clamped against the head piece by a generally rectangular guard which has opposite edges spaced from and aligned with the opposite head piece and blade cutting edges so as to present an allochiral pair of guarded cutting edges. The opposite edges of the guard extend forwardly of as well as outwardly from the blade cutting edges so as to afford greater safety in the handling of the razor.

During shaving, the operator holds the razor angularly with respect to the surface of the skin, so that the particular blade cutting edge used and the corresponding guard edge are aligned in a plane generally parallel to the plane of the skin surface. The guard thus acts as a guide (contacting the skin at a line) spaced from the line of contact between the razor blade and the skin. This particular alignment of the guard and blade edges is essentially a matter of feel or touch in the control of the operator. The operator uses the guard to ride along on the surface of the skin comfortably, so as to prevent the blade from making sharp, biting contact with the skin, while permitting the blade to cut off upstanding hairs as nearly as possible to the skin level.

In this respect, it is important to note that the operator carries out the shaving process mainly by the use of the sense of touch. Whether or not a blade is dull, and whether or not the angle at which the razor is held should be changed a few degrees are questions answered solely by the operator's sense of touch. The individual hair sizes, blade thicknesses and razor position all involve extremely small dimensional tolerances. The detailed mechanics of the operation are neither observed nor appreciated, ordinarily.

Although the thickness as well as the length of the individual hairs in a beard may vary appreciably, as a general average the hair thickness is about 0.0004 inch. The guard, in passing over the skin first attempts to remove some of the lather and to momentarily bend the individual hairs forward. The small space of about 0.0015 inch between the guard and the blade edge permits the hairs to rise slightly before contacting the blade and being cut thereby.

The instant invention is based upon an unobvious discovery which can now be explained only after a detailed study of the mechanics of the shaving operation. It has been found that, by new and apparently insignificant variations in razor arrangement and construction, unusually important and appreciably noticeable improvements in the performance of a single razor can be obtained.

Because of the inherent beard density variations, for example, on the face of each user, the performance of a given razor is almost invariably unsatisfactory for shaving either the light cheek beard or the dense beard of mustaches or sideburns. For example, it is true that, as the operator stumbles through his morning shave, he may be barely conscious of little more than the fact that some parts of his face appear to cut easily and shaving of other parts of his face requires repeated passes by the razor. Usually, the operator assumes that it is his own clumsy operation of the razor that causes the trouble. The instant invention is based upon the discovery that this defective feature actually resides in the particular razor construction.

It is, therefore, an important object of the instant invention to provide a razor construction to accommodate shaving of different types and densities of beards by the use of a single razor. As used herein, the term "beard" is not intended, however, to mean only the growth of hair upon the face. Shaving of growths of hair on other parts of the body, such as the arms and legs, is also contemplated.

Another important object of the instant invention is to provide an improved razor construction comprising means for guiding the two blade edges of a double-edged blade at different spacings from a line of contact between the razor and the skin surface to be shaved, thereby to accommodate the shaving of different types and densities of beards.

It is a further object of the instant invention to provide a razor construction for accommodating the shaving of different types and densities of beards that comprises a safety razor guard presenting guarding faces contiguous to each of the blade edges for contacting the skin along a line spaced forwardly of the corresponding blade edge, wherein one of the blade edges is spaced closely to the respective guarding face, for use with a light beard, and the other of the blade edges is spaced a substantially greater distance from its respective guarding face.

Other objects, features and advantages of the present invention will become apparent to one skilled in the art from the following description of the embodiment illustrated in the accompanying drawings, in which:

Figure 1 is a fragmentary side elevational view of a razor construction embodying the invention;

Figure 2 is an exploded side elevational view of the razor construction of Figure 1;

Figure 3 is an exploded sectional elevational view taken substantially along the line III—III of Figure 2;

Figure 4 is a top plan view of a razor guard used in the instant razor construction;

Figure 5 is an enlarged fragmentary view in elevation showing in detail the cooperation between the razor guard and the razor blade in a preferred embodiment of the instant razor construction on the quick-cutting side thereof;

Figure 6 is an enlarged fragmentary detailed elevational view of an edge portion of the guard employed in the instant razor construction, corresponding to Figure 5.

As shown on the drawings:

The reference numeral 10, in Figure 1, indicates generally a double-edged safety razor, the head portion of which is shown. The razor 10 comprises a handle 11 adapted to threadedly engage the screw-like member 12 of a head piece 13, for actuation of the head piece 13 toward and away from the handle 11.

The screw member 12 is adapted to pass through the central portion of a suitably apertured double-edged safety razor blade 14, and through the central portion of a suitably apertured safety razor guard 15, so that the screw member 12 may make contact with a threaded socket of the handle 11. As is well known, the blade 14 is clampingly engaged between the head piece 13 and the

guard **15**, supported by the handle **11**, merely by rotation of the handle **11** to tighten up on the screw **12**.

The general manner in which the head piece **13** cooperates with the guard **15** to maintain clamping engagement upon the blade **14** and to maintain the blade **14** in a fixed position with respect to the head piece **13** and the guard **15** is well known in the art. As an example, in Figure 3, it can be seen that the head piece **13** has two depending lugs **16, 16** spaced longitudinally on opposite sides of the screw member **12**. The lugs **16, 16** pass through suitably formed apertures in the blade **14**, so as to prevent rotary movement of the blade **14** while it is clampingly engaged by the head piece **13**.

As shown in Figure 3, the central portion of the guard **15** is dished and the longitudinal extremities of the dished portion are apertured as at **17, 17** so as to suitably receive and cooperate with the lugs **16, 16** in holding the blade **14** in position. Other structures may, of course, be used in such a razor for preventing rotary motion of the blade **14**.

Referring again to Figure 2, it will be seen that the head piece **13** is generally bow-shaped in cross-section so that it may clampingly engage the blade **14** against the contact surface or table **18** of the guard **15** in such a manner that the blade **14** will also be bent or bowed thereby deflecting each of the cutting edges of the blade forward slightly, as shown in Figure 1.

The table portion **18** of the guard **15** is actually more in the nature of a frame surrounding the dished portion of the guard **15** and presenting a surface upon which the central portion of a blade **14** may bear. Extending outwardly from either side of the table portion **18** are wing-like integral guard edges which curve back sharply at the table's edge on each side and then curve outwardly in a generally concave arc to present generally parallel plane surfaces **19, 19'** with respect to the blade **14** before it is bent forwardly in clamping position. Then, as shown in Figure 2, extending outwardly from the left-hand plane surface **19** the guard edge curves sharply forward to define a generally rounded outward extremity, the curved portion **20** thereof having substantially the cross-section of a quadrant.

As can be seen by reference to the left-hand side of Figure 1, in the normal razor construction, the blade **14** is deflected downward by and extends outward from the outer edge of the head piece **13**. The guard **15** presents a generally flat surface **19** directly forward of the outer extremity of the blade **14** and the guard **15** extends outwardly beyond the extremity of the blade **14** and then curves sharply forward to define the rounded extreme edge **20**.

As will be explained in detail hereinafter, the instant invention resides in the use of a construction wherein one edge of the guard **15** has substantially the normal construction shown on the left-hand side of Figure 1. The other edge of the guard, as shown on the right-hand side of Figure 1, is, however, spaced forward a greater distance from the cutting edge or extremity of the blade **14** and/or is flattened or beveled (instead of rounded as at the outer edge **20** of the guard **15**).

Another feature which the instant applicant has found to be particularly significant in the razor construction of his invention is that shown in Figure 4. As can be seen from Figure 4, the normal guard construction, as shown on the left-hand side of Figure 4, calls for a plurality of slots **21**, each extending generally parallel to the rounded edge **20** and inwardly therefrom, and being separated by spacers or bridges **22** (only one of which is shown herein).

In the razor construction of the instant invention, as shown on the right-hand side of Figure 4, the guard **15** has a continuous slot **23** extending generally parallel to the outer extremity of the particular guard edge that is modified according to the invention and is here designated as **24**, so as to permit unobstructed flow of shaved beard and lather therethrough. It will be appreciated that the continuous slot **23** extends substantially the full length of the cutting edge of the blade **14** corresponding thereto, so as to present an uninterrupted passageway the full length of the blade edge for the flow of shaved beard and lather therethrough. It has been found that a most unexpected improvement in connection with the prevention of clogging of the razor during use is obtained by the use of this "what-appears-to-be" insignificant alteration in the structure of the guard **15**. The effectiveness of the slot as a passageway for shaved beard and lather is, of course, substantially more noticeable when used in cooperation with the increased space between the blade cutting edge and the guard edge **24**, in accordance with the principles of the present invention.

Referring now to Figures 5 and 6, wherein the right-hand side **24** of the blade guard **15** of Figures 1, 2, 3 and 4 is shown in detail, the broken line shows the corresponding shape and contour, in cross-section, of the left-hand side (for the purpose of comparing the two sides of the razor) with reference numerals **19'** indicating the plane surface **19**, and **20'** indicating the curved portion of the guard face contiguous to the corresponding blade edge. As can be seen, the guard face on the normal or left-hand side of the razor guard is spaced a distance "*a*" from the blade edge; but on the right-hand side **24** here shown, the guard plane surface **25** is spaced an additional distance "*b*" from the blade edge. Ordinarily, the distance "*a*" is about 0.0015–0.0020 inch, whereas the distance "*b*" is preferably at least about 0.0010–0.0015, or three or four additional hair thicknesses. This apparently minute increase in space produces an amazingly different result best demonstrated by the "touch" response experienced by the user during shaving. It will, of course, be appreciated that the guard side **24** may be spaced much greater distances from the blade edge, or for that matter, be partially or completely removed, so as to obtain certain of the benefits of the invention; but in order to obtain best performance, it is usually preferable to employ a distance "*b*" of from about 0.001 to about 0.005, so that the shaving properties of the two razor sides are not too radically different.

Also, it can be seen from Figure 6 in particular, that the rounded surface **20'** which would correspond to the rounded surface **20** on the left-hand side of the guard **15** has the shape in cross-section of a quadrant of a circle of radius "*r*," the angle θ being 90°. On the guard side **24**, however, the edge **26** is beveled along the chord or line *x*—*x'*, so as to reduce the cross-sectional area to that resulting from the removal of a segment subtended by the chord *x*—*x'*. It has been found that "removal" of material along the edge **24** must be at least as much as that described. The minimum reduction in cross-sectional area (or the minimum differential between the two guard edges) should be approximately equivalent to such segment, although the resulting surface **26** may be defined by any line of radius greater than "*r*" starting within the rearmost 30° of the quadrant, herein designated by the symbol ϕ, and extending forwardly and outwardly so as to define a cross-sectional area reduction of at least the area of the segment of the quadrant.

It will be appreciated that by beveling the edge **26** as described, the guide line of contact between the guard edge and the skin is shifted forward from a line intersecting a point on the (cross-sectional) arc *x*—*x'* of the surface **20'** of Figure 6 to the point, desingated *x'*, at the forwardmost edge of the beveled surface **26**, thereby increasing the space between the guide line and the razor edge contact line with the skin.

The most unusual feature of the instant invention resides in very great differences in shaving "feel" or comfort which are experienced by the use of the instant razor wherein such apparently minute differences in construction occur on opposite sides of the razor. By the use of the instant razor construction, suitably arranged or designed according to the present teachings, the operator

will experience an entirely new shaving comfort. The "normal" or closely spaced construction on one side may be used on those sensitive portions of the skin without pain or annoyance and the more widely spaced construction may be used on the remaining portions of the skin, such as at sideburns, mustaches and heavy chin beards so as to accomplish amazing quick and effective shaving in such regions without the necessity of making repeated passes with the razor. The entire shaving operation is simplified and expedited to an unusual, almost unbelievable extent, solely by taking advantage of the minute but critical structural differences in the guard design.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention, and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the patented claims.

I claim as my invention:

1. In a safety razor including a handle and a head piece actuable toward the handle for clampingly engaging a double-edged blade, means for guiding the two blade edges at the different spacings from a line of contact between the razor and the skin surface to be shaved to accommodate the shaving of different types and densities of beards, comprising a safety razor guard presenting guarding faces contiguous to each of the blade edges, one of said faces being spaced closely forward of the contiguous blade edge corresponding thereto and extending outwardly and curvingly forward therefrom to define a quadrant shaped cross-sectional edge and the other of said faces being spaced at least 0.0010–0.0015 inch more than the first from its corresponding blade edge and having a cross-sectional shape that would result from the removal from said quadrant of at least the segment thereof.

2. In a safety razor including a handle and a head piece actuable toward the handle for clampingly engaging a double-edged blade, means for guiding the two blade edges at the different spacings from a line of contact between the razor and the skin surface to be shaved to accommodate the shaving of different types and densities of beards, comprising a safety razor guard presenting guarding faces contiguous to each of the blade edges, one of said faces being spaced closely forward of the contiguous blade edge corresponding thereto and extending outwardly and curvingly forward therefrom to define a quadrant shaped cross-sectional edge of radius "*r*" and the other of said faces being spaced at least 0.0010–0.0015 inch more than said one face from its corresponding blade edge and having a cross-sectional shape that would result from the removal from said one face of at least the quadrant segment thereof along a line of radius greater than "*r*" starting within the rearmost 30° of the quadrant.

References Cited in the file of this patent

UNITED STATES PATENTS

896,153	Reed	Aug. 18, 1908
1,805,509	Behrman	May 19, 1931
1,934,148	Rogers	Nov. 7, 1933
2,270,388	Stampleman	Jan. 20, 1942
2,362,851	Przybysz	Nov. 14, 1944
2,367,422	Muros	Jan. 16, 1945