Oct. 17, 1961 W. O. SCHWEIZER 3,004,337

RAZOR HAVING A BIFURCATED BLADE-SUPPORTING MEANS

Filed June 15, 1959 2 Sheets-Sheet 1

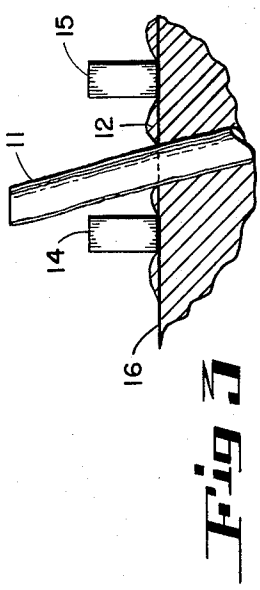


Fig 3

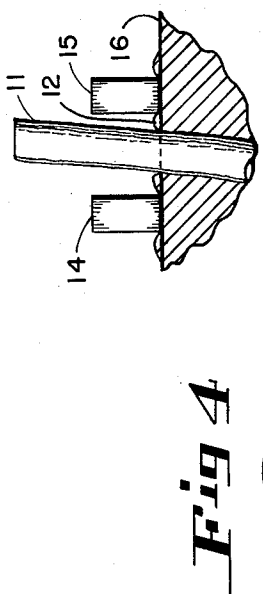


Fig 4

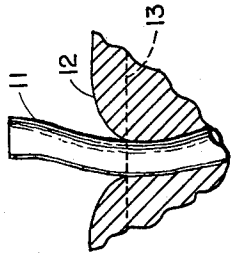


Fig 1

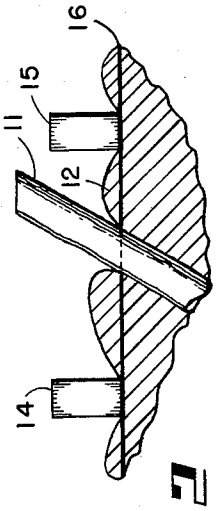


Fig 2

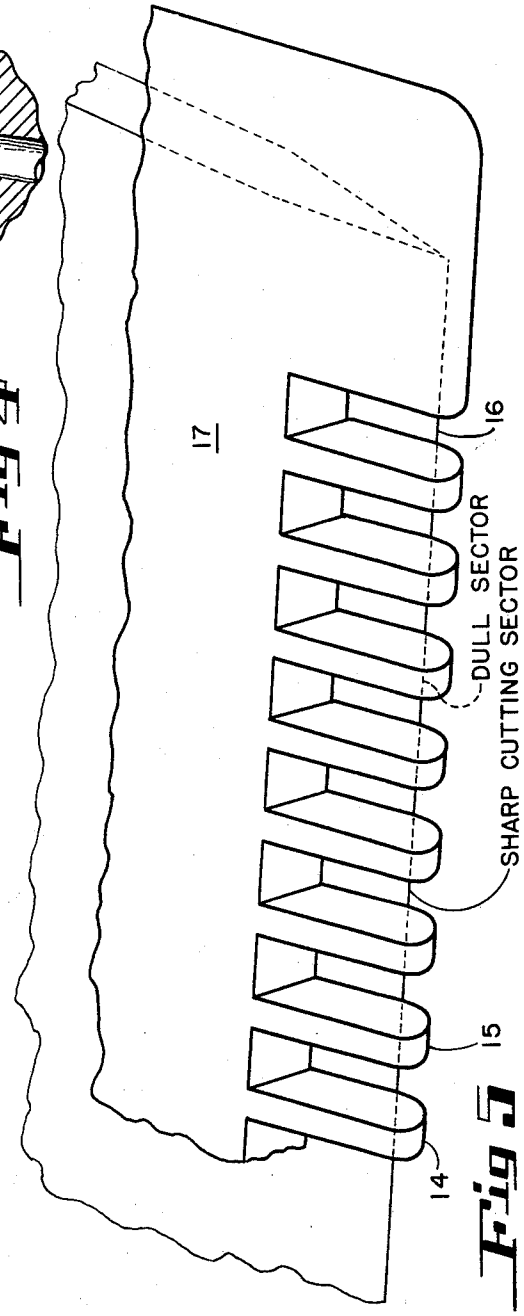


Fig 5

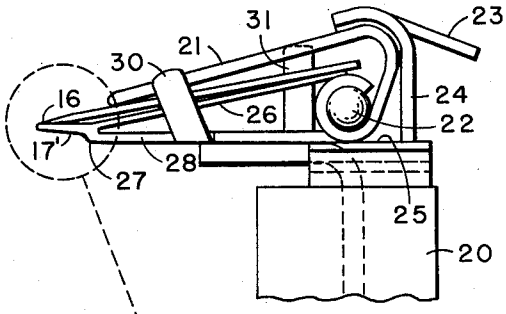
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Fig 7



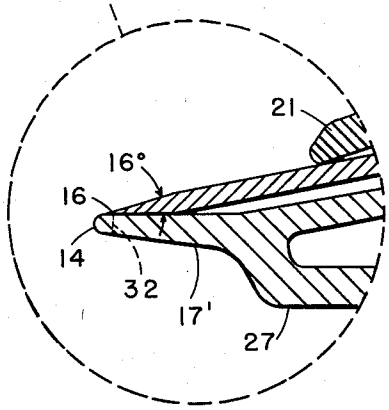


Fig 9

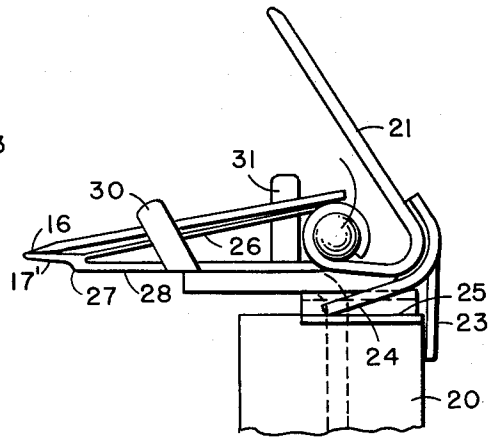


Fig 6

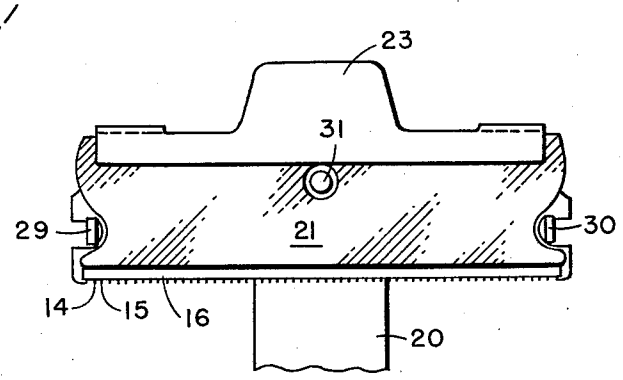


Fig 8

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United States Patent Office

3,004,337

Patented Oct. 17, 1961

3,004,337

RAZOR HAVING A BIFURCATED BLADE-SUPPORTING MEANS

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Filed June 15, 1959, Ser. No. 820,327

3 Claims. (Cl. 30—58)

This application is a continuation-in-part of United States patent application of Walter O. Schweizer, Serial No. 634,640, filed January 17, 1957, entitled Razor Construction, now abandoned.

The present invention relates to safety in shaving. The invention is directed to the general objective of providing a razor construction characterized in performance by a maximum of safety while requiring a minimum of manipulative skill.

The invention provides novel means and method for rendering the cutting edge of a razor selective to cut hair but not to cut skin.

Although skin is more easily cut than hair, shaving or cutting the hair and not the skin is made possible by the fact that a large part of the hair protruding from the follicles extends into the area above the skin surface. Prior art razor constructions and shaving methods are directed to cutting the hair at the skin surface.

A barber uses one hand to smooth and stretch the skin and the other hand to pass a cutting edge over the skin surface, an operation requiring great skill and care. Prior art "safety razors" having a toothed, serrated or smooth bar called a "guard" or "skin stretcher" ahead of the cutting edge have eliminated the need for two hands and reduced the skill and care required to cut the hair at the skin surface.

Prior art devices generally feature a bar or skin stretcher which is placed in advance of the blade in such a manner that the blade as a whole (except the ends) is made available as a cutting edge. The cutting edge of the blade has been disposed in various spaced positions relative to the guard and many devices for preserving the selected relation have been devised. Examples are shown in the following United States patents:

Dalkowitz, 1,773,614
Masip et al., 2,078,150
Glazier, 2,085,423
Schroder, 2,666,982

These various structures differ among themselves in design but not in fundamental principle in that all of them incorporate bars or guards which are not in contact with the cutting edge. All of these prior art structures are for the purpose of shaving at or above the skin surface. In other structures such as Lewis 2,234,440, not designed for shaving, a guard is provided for the purpose of assuring that the hair is cut at a level above the surface of the skin and this guard is positioned between the blade and the skin. In still other structures, intended for shaving, the guard comprised flexible teeth or springs placed in contact with the cutting edge of the blade, but in the operation of the last-mentioned types of devices such as those shown in United States patents to Seko 2,710,446 or Kampfe 228,904, the flexible teeth or springs are moved either by the pressure of the skin on them or by forces transmitted in the cutting of hair. The shearing of hair requires tremendous forces in terms of pounds per square inch. Those razors mentioned above which are operable involve substantial skill in manipulation and the construction is such that cuts occasionally result. This is a matter of common and general observation among users of prior art safety razors.

The present invention is directed to the shaving of hair, not at or above the skin surface, but on a plane

below the skin surface and close to the plane of emergence of the hair.

Hair emerges from the follicle below the surface of the skin and a perfect shave is accomplished when it is cleanly cut at the plane of emergence. This plane below the surface, within the epidermis, can not be reached by the cutting edge in prior art methods without cutting the skin.

It is an object of the present invention to provide means and method for shaving hair below the skin surface and near the plane of emergence of hair without cutting the skin.

An important object of the invention is to provide, in a safety razor, the combination of a blade having a beveled cutting edge, a plurality of rigid spaced obstructions, in positive abutment with and extending transverse to said edge, said edge presenting sharp cutting sections in the spaces between said obstructions, said obstructions and edge supplementing each other to present dull sectors between said cutting sectors, and means for securing said obstructions in contact with said edge, said obstructions being spaced to prevent entry of skin but to permit entry of hair between them.

After arriving at the realization that hair should be shaved near the plane of emergence, and after arriving at the concept that rigid spaced obstructions, extending transverse to but in positive contact with the blade edge provide the answer. I determined a priori and experimentally confirmed the fact that the optimum width of the obstructions is in the range from 0.002 to 0.006 inch and that the optimum width of the hair cutting blade sections between the obstructions is from 0.008 to 0.03 inch. Accordingly, another object of the invention is to provide a razor construction characterized by obstructions so spaced and dimensioned.

Another object of the invention is to provide a combination of blade and obstructions so formed and spaced that while the substantially tangential continuity of the obstructions and blade edge presents a substantially smooth and blunt surface to the skin during shaving, the spaces between the obstructions permit the hair but not the skin to enter such spaces, whereby the combination effectively functions as a safe selective cutter.

Another major object of the invention is to provide, in a razor, a combination of blade and obstructions of the character described, which renders the razor suitable for shaving preparatory to surgical operations, a usage in which both complete protection of the skin surface and close cutting are absolutely mandatory, and a usage to which the prior art devices mentioned above are neither specifically directed nor generally suitable.

Still another object of the present invention is to provide a combination of blade and obstructions which is suitable for incorporation in any of the standard razor constructions generally available on the market, these being exemplified by the well-known Gillette, Schick and Gem types. Any of these types can be readily modified to incorporate a blade and obstructions in accordance with the invention.

For a better understanding of the present invention, together with a realization of further objects, advantages and capabilities thereof, reference is made to the following description of the accompanying drawings.

In the drawings:

FIG. 1 is a sectional view of the skin surface showing a hair emerging therefrom;

FIGS. 2, 3 and 4 show the relationship, in section, between the FIG. 1 anatomy and a bevel-edged razor blade provided with spaced obstructions, the obstructions being spaced closer together in the progression through FIGS. 2, 3 and 4, and being in accordance with the invention in FIG. 4;

FIG. 5 is a perspective view, generally in top plan, of a combination in accordance with the invention comprising a beveled edged blade, spaced obstructions, and a blade positioning member integrally carrying the obstructions and positioning them in positive abutment with the blade edge;

FIG. 6 is a side elevational view of a suitable complete razor construction incorporating the invention, with the retainer open;

FIG. 7 is a side elevational view of the same complete razor, with the retainer closed;

FIG. 8 is a perspective view of such complete razor, generally in top plan; and

FIG. 9 is a greatly enlarged fragmentary sectional view taken in the area indicated by the dashed circle of FIG. 7.

Referring now to FIG. 1, it shows a whisker **11** drawn about forty times actual size, emerging from the skin **12** at the plane **13**. The plane of emergence **13** is the plane in which it is desired that the whisker be cut, without cutting the skin.

FIG. 2 shows obstructions **14** and **15** extending from the cutting edge **16** of a blade and depressing the surface of the skin to the plane of emergence **13**, and the obstructions so widely spaced that the skin bulges above the cutting edge so that the skin would be cut.

FIG. 3 shows the obstructions **14** and **15** spaced about 0.02 inch and the skin mounds bulging beyond the plane of the cutting edge so little that enough epidermis may be removed by cutting to cause razor burn but not enough to cause bleeding.

FIG. 4 shows obstructions **14** and **15** spaced about 0.012 inch and the skin **12** is generally below the cutting edge **16** except for mounds so small as not to be cut at all, the edge sliding over the mounds. The skin can not be cut, the whisker **11** is held firmly, pressure is not critical, shaving is quite comfortable, there is no razor burn, and ingrown hair from shaving is not experienced.

The principle of my invention will be understood from the foregoing.

It should be emphasized that the obstructions are in positive abutment with the cutting edge, so that, while the edge presents sharp cutting sectors in the spaces between the obstructions, the obstructions and cutting edge supplement each other to present dull sectors between the cutting sectors.

The combination of blade and obstructions can be used for shaving with complete safety, the blade side pressed to the skin with great latitude in pressure. Very little pressure is required to depress the surface of the skin and unreasonably great pressure lowers it no more than to the plane of hair emergence, where the hair is cleanly cut without cutting the follicle and surrounding epidermis. Neither skill nor care is required to make it so function.

The stiffened cutting edge and firmly held hair allow a clean cut which, with the uncut follicle and epidermis, eliminates the chief causes of razor burn and ingrown hair.

This construction in no wise resembles a comb in which a combing function is performed by teeth extending forwardly of the blade edge. In my construction an edge-blunting function is performed by rigid obstructions extending transversely of the blade edge. The obstructions must be rigid and in positive abutment with the blade edge and the obstructions can be electro-deposited or cast, or otherwise bonded onto the cutting edge. A preferred method of placement of the obstructions upon the cutting edge is to provide a blade-positioning member **17** (FIG. 5) which integrally carries spaced obstructions such as **14**, **15**, etc., this member **17** being shaped for positioning the obstructions in abutment with the blade edge. Again, it is reiterated that the significant factor here is the obstructions extending transverse to

the blade edge. The obstructions **14** and **15** are, of course, provided with rounded frontal surfaces extending forwardly of the blade edge and the blade edge is related to such surfaces in tangential continuity so that the combination of blade and obstructions is comfortable when pressed to the body or face.

The shape of the obstructions is not critical but should be sufficiently rounded to be comfortable when pressed to the face. The thickness is also not critical except that the obstructions must be sufficiently rigid to hold them immutably of the cutting edge when cutting the hair. Any shifting of the obstructions on the edge at the clamping pressure required for rigid abutment while cutting the hair would break or at least dull the adjacent edge. The width of each obstruction may be from 0.002 inch to 0.006 inch, large enough to reject the skin and not large enough to matt down a hair. Spaces between obstructions over about 0.03 inch permit the skin to enter enough to cut some of the follicle and epidermis, resulting in razor burn. Whiskers are from 0.004 inch to 0.01 inch in diameter, generally about 0.006 inch and rarely over 0.008 inch, so spaces as small as 0.008 inch are practical for youths and women. I prefer obstructions 0.003 inch to 0.005 inch wide with spaces 0.01 inch to 0.012 between them.

As stated above, my preferred method of placing the obstructions upon the cutting edge is to machine a member **17** with the ends of the obstructions shaped, sized and spaced to form an assembly of obstructions which can be attached to safety razors of present design or made a part of razors of new design.

Thus it will be seen that the invention provides in a safety razor the combination of a blade having a beveled cutting edge **16**, a plurality of rigid spaced obstructions **14**, **15**, etc., in positive abutment with and extending transversely to said edge, said edge presenting sharp cutting sectors in spaces between said obstructions, said obstructions and edge supplementing each other to present dull spaced sectors between said cutting sectors, and a body member **17** for securing said obstructions in contact with said edge **16**, each of said obstructions **14**, **15**, etc. having a width of from 0.002 to 0.006 inch and each of the spaces between the obstructions having a width of from 0.008 to 0.03 inch. The obstructions are formed with curved forward surfaces extending 0.001 to 0.015 inch forwardly of said edge **16**.

FIGS. 6, 7, 8 and 9 show the combination of blade and obstructions in accordance with the invention as incorporated in standard safety razor organization. This razor comprises a handle **20**, and a retainer **21**. The retainer is pivotally mounted at **22** and has secured to it a member on which there is formed a manual operating lug **23** and another lug **24** which presses against a bias spring **25** in such a manner as to bias the retainer normally in the position shown in FIG. 7. The construction so far described is purely conventional and need not be detailed further. There is placed in the razor organization a double beveled edge blade having a cutting edge **16** and it is held by an underlying bifurcation **26** in such a fashion that the edge is in positive abutment with the obstructions such as **14**, formed on a blade-positioning member **17'**. Member **17'** is identical to that shown in FIG. 5, but is provided with an integral bend **27** and a principal bifurcation or body portion **28** to fit it into the general organization. The blade is secured in position at both ends by tangs **29** and **30**, and centrally by tang **31**, all formed integrally with body portion **28** of member **17**, the blade being suitably formed with openings accommodating the tangs.

Attention is invited to FIG. 9 which shows a cross-section through a blunted sector. It will be observed that the included angle of the blade is roughly 16 degrees so that it would normally press a sharp cutting edge to the skin. Assume now that the obstructions did not have rounded edges but projected transversely from the blade edge as illustrated by the imaginary line **32** of FIG. 9. In

that case, the obstruction 14 and blade 16, taken together, would press a dull angle of 106 degrees to the skin, which manifestly would not cut it. This result is accomplished and at the same time the structure is rendered adapted to a comfortable shave by rounding the frontal surfaces of the obstructions 14.

While there has been shown and described what is at present believed to be the preferred embodiment of the invention, it will be understood by those skilled in the art that various changes and modifications may be made herein without departing from the scope of the invention as defined in the appended claims.

I claim:

1. In a safety razor the combination of a flat-bodied blade having a beveled cutting edge, a plurality of rigid spaced end and intermediate obstructions in positive abutment with and extending transverse to the bevel of said edge, the apex of said edge presenting sharp cutting sectors in the spaces between said obstructions, said obstructions and edge supplementing each other to present dull sectors between said cutting sectors, and means for securing said obstructions and the bevel of said edge in contact with each other so that adjacent surfaces of the bevel and the obstructions firmly contact each other from base to apex of said edge, each of said obstructions having a width of from 0.002 to 0.006 inch, and each of the spaces between the obstructions having a width of from 0.008 to 0.03 inch to permit entry of hair between the obstructions but to prevent entry of skin between them.

2. In a safety razor for shaving, the combination of a standard blade formed with a beveled cutting edge, a blade-positioning member comprising a body portion disposed in an acute angular relationship to said blade and on the opposite side of the blade to the whiskers being shaved, said blade-positioning member also being formed with a bifurcation underlying said blade and supporting it in said angular relationship, said blade-positioning member being further formed with a plurality of rigid, integral, spaced, skin depressing obstructions extending transversely of said edge, said edge presenting sharp cutting sectors in the spaces between adjacent obstructions, each of said spaces having a width of from 0.008 to 0.03 inch to prevent entry of skin but to permit entry of hair between obstructions, said obstructions being formed with curved surfaces extending from 0.001 to 0.015 inch in advance of said edge but positioned in continuity with said edge so that adjacent surfaces of said obstructions and edge are parallel and firmly contact each other from base to apex of the edge to present dull sectors between said cutting sectors, each of said obstructions having a width of from 0.002 to 0.006 inch, and means for securing the blade in said acute angular relationship comprising a biased retainer on the opposite side of the blade and a pair of integral tangs formed on the ends of the body of the blade-positioning member.

3. In a safety razor, the combination of a blade having a beveled cutting edge, a plurality of rigid spaced obstructions in positive abutment with and extending transverse to said edge, said edge presenting sharp cutting sectors in the spaces between said obstructions, said obstructions and edge supplementing each other to present dull sectors between said cutting sectors, and means for securing said obstructions in contact with said edge, said obstructions being spaced to prevent entry of skin but to permit entry of hair between them, said obstructions being formed with curved forward surfaces extending forwardly of the edge and in tangential continuity therewith, and said means for securing said obstructions in contact with said edge comprising: a body member integrally formed with the obstructions, means comprising a bifurcation on the body member for supporting the blade body at an angle to said member, and a retainer, said retainer being placed on the side of the blade body opposite said body member and supporting means to clamp the blade in place.

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