Dec. 7, 1943. J. MUROS 2,335,875

SAFETY RAZOR AND BLADE

Filed Sept. 27, 1941

Fig. 1

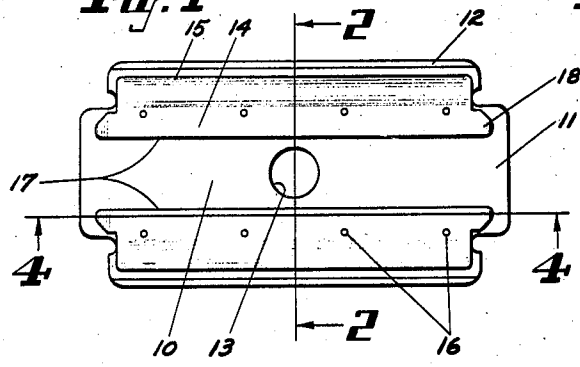


Fig. 2

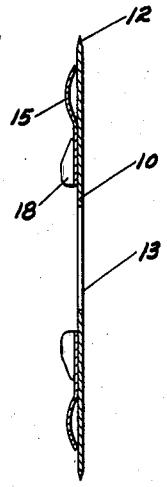


Fig. 3

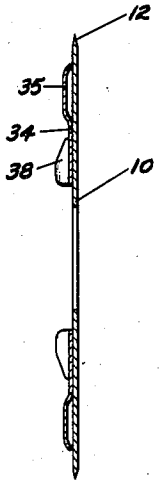


Fig. 4

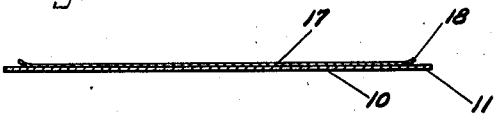


Fig. 5

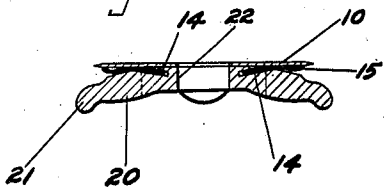


Fig. 6

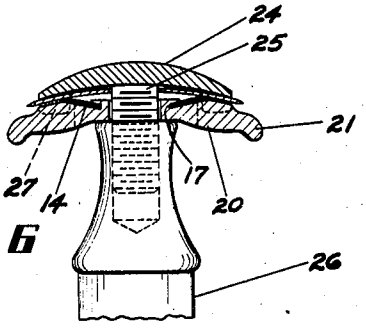
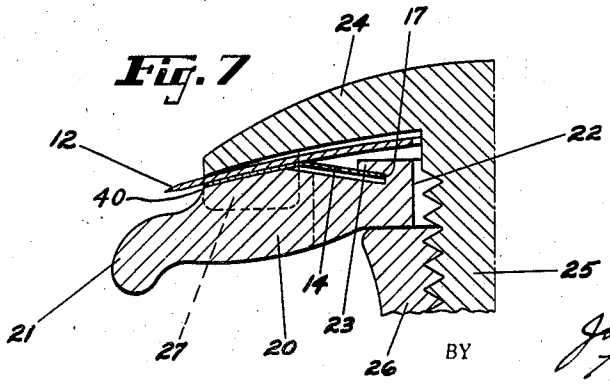


Fig. 7



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SAFETY RAZOR AND BLADE

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Application September 27, 1941, Serial No. 412,586

22 Claims. (Cl. 30—72)

This invention consists in a novel safety razor blade of the type adapted to be supported in use by the blade-clamping members of a safety razor, and in the novel combination of such blade with blade-clamping members.

In one aspect my invention consists in a blade of thin flexible sheet steel reenforced and stiffened by a supplemental member of thin resilient sheet material having a longitudinal bead which is continuous and which serves to impart longitudinal stiffness to the blade and to provide a fulcrum over which it may be flexed transversely, all without appreciably stiffening the blade against transverse flexing. The supplemental member, or the sections thereof, are characterized by a smooth continuous flexible bead presenting throughout its length no irregularities or obstruction that would catch or otherwise interfere with assembling the blades in a stack or inserting them in a razor between yieldingly separated clamping members. In this respect the blade of my invention distinguishes from prior blades having supplemental members with independently yielding sections not maintained at all times in alignment with each other. From the standpoint of manufacturing economy and convenience in handling both by the manufacturer and the user the improved blade herein shown presents obvious advantages over those heretofore known.

The faces of the blade-engaging elements of safety razors or their lines of contact do not always lie in a flat plane, or if originally so formed are likely to become distorted by bending or bowing between the points of applied pressure. For example, safety razors having a cap and guard connected by a central stud are likely to separate slightly at their outer ends thus permitting an objectionable flutter or vibration of a cutting edge otherwise unsupported between them. In the blade of my invention this defect is obviated since appropriate contact areas of the bead yield selectively and the bead as a whole accommodates itself to the contour of the blade-clamping members whatever may be their shape under clamping pressure.

An important feature of the blade of my invention is that the bead or rib, although flexible and yielding under local pressure of the blade-clamping members, is of such contour that it has an inherent longitudinal stiffness which it imparts to the flexible blade along a line adjacent to its cutting edge. This is the initial or normal effect of the bead or rib upon an otherwise unsupported blade edge. However, when the blade and its supplemental member are subjected to clamping pressure in a razor the bead or rib is caused temporarily to collapse or flatten into conformity with the face of the blade. The more fully this flattening takes place the more is the inherent stiffness of the bead or rib reduced. Accordingly, when the blade is fully and accurately supported by the engagement of clamping surfaces the now unnecessary stiffness of the rib or bead is reduced to a minimum. While this change of character in respect to longitudinal stiffness is taking place the resistance of the blade to transverse flexing remains practically uniform. If the user desires to increase the edge exposure of the blade by slightly or substantially releasing the pressure of the clamping members the bead or rib of the supplemental member begins to assume its normal cross-section, thus again rendering effective its stiffening effect upon the blade.

The cross-sectional shape of the bead is of secondary importance so long as it tends normally to assume a uniform transverse concavity. Preferably and as herein shown the concave side of the bead is directed toward the surface of the blade and its free edge rests at all times yieldingly on the face of the blade along a line adjacent to the cutting edge. As the flexible bead is flattened its free edge tends to creep outwardly toward the cutting edge. In order to adapt it for use in a variety of different safety razors it is contemplated that the bead may be of substantial width so as to include the fulcrum shoulder of the blade-supporting members throughout a wide range of different designs.

These and other features of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawing, in which:

Fig. 1 is a plan view of the blade, on an enlarged scale, as seen from the side lowermost in the razor;

Fig. 2 is a view in cross-section on the line 2—2 of Fig. 1 but on a still larger scale;

Fig. 3 is a similar view in cross-section showing a modified construction;

Fig. 4 is a view in longitudinal section on the line 4—4 of Fig. 1;

Fig. 5 is a cross-sectional view of the blade in position upon the guard of a razor;

Fig. 6 is a view in cross-section showing the blade clamped for shaving between the cap and guard of the safety razor; and

Fig. 7 is an enlarged fragmentary sectional view corresponding to a portion of Fig. 6.

This invention may be embodied in a blade of any commercial or desired contour and for purposes of illustration is herein shown as embodied in a double-edged safety razor blade of well-known commercial outline. The body 10 of the blade is formed of thin flexible sheet steel in the order of .004" to .007" in thickness and as a whole is therefore flexible and may be clamped in either flat or curved condition for shaving. The particular blade herein shown is provided with corner recesses or notches defining elongated unsharpened end portions 11 and these are symmetrically disposed in the major axis of the blade. It has oppositely disposed longitudinal cutting edges 12 and is provided with a circular central aperture 13 through which may pass the threaded stem of the cap of the safety razor. The illustrated blade may be employed in any safety razor adapted for this shape of blade; for example, in a razor in which the cap and guard are connected by a threaded stem, or a razor in which the cap is formed in sections pivoted to the guard member of the razor.

The supplemental member herein shown is made up of two elongated sections 14 which are shown as consisting of thin resilient sheet steel about .002" or .003" in thickness and properly shaped for their intended purpose, but which may be formed of any resilient sheet material, such as Celluloid or other plastic product. As herein shown the outer edge of each section 14 is formed to present a longitudinal bead 15 inwardly concave in cross-section and normally lying with its outer edge substantially in contact with the surface of the blade body just inside the line of the cutting edge 12. The sections 14 may be associated with the body of the blade in any desired manner. As herein shown they are attached thereto by series of spot welds 16 in positions parallel to the major axis of the blade, with the outer edge of the bead parallel to and slightly within the cutting edge 12. Their inner edges are parallel, opposed and spaced apart the proper distance to clear the aperture 13 and to engage a blade-locating rib or projection in the safety razor. The flat inner edges 17 of the sections of the supplementary member normally lie in yielding engagement with the surface of the blade body. They are slightly flared or turned up at each end 18 to facilitate insertion beneath the flange of the undercut rib in the safety razor as shown in Figs. 2 and 4.

In Figs. 5 to 7 the blade above described is illustrated as assembled with the blade-clamping members of a safety razor. The safety razor selected herein for illustration is a three-piece razor comprising a handle 26, having a threaded bore in its upper end, a blade-supporting or guard member 20 and a co-operating cap member 24. The guard member has parallel fulcrum shoulders 40, a generally convex blade-supporting face and marginal guards 21 in the form of teeth or a bar at each edge. It has a wide flat rib 23 extending longitudinally along its middle section and this rib is provided in both edges with an undercut shoulder by which are formed channels shaped to receive the blade-locating edges 17 of the supplementary member when the blade is presented edgewise and the blade locating edges 17 have been introduced into these channels with the assistance of their turned-up or flaring ends 18. The guard member is also provided with a central circular aperture 22 adapted to be registered with the threaded bore of the handle.

The cap member 24 has an inner concave blade-clamping face, in general complementary to the contour of the face of the guard, and a central threaded stem or stud 25 which may pass freely through the aperture 13 of the blade and the aperture 22 of the guard and be drawn into the end of the handle 26 by rotation thereof. The blade-clamping faces of the cap and guard are thus drawn together and into intimate clamping engagement with the interposed blade and its supplemental member. The cap may be located accurately by any convenient means in the razor assembly. As herein shown the cap 24 is provided at each corner with a downwardly projecting lug 27 shaped to fit the corner recesses of the blade and so register the cap in position and hold it against angular displacement. In Fig. 5 the blade is shown as it is initially presented to the guard with the two inner edge portions 17 of the supplemental member 14 entering the undercut channels in the rib 23. In order to enter the channels the edges 17 of the members 24 are sprung somewhat out of their initial flat position and as a result the blade as a whole is held firmly but yieldingly upon the blade seat thus provided.

In Figs. 6 and 7 the blade is shown as transversely curved by the clamping action of the cap member 24. As the blade is flexed from its flat position it will be seen that the inner edges 17 of the supplementary sections 14 tend to crowd together and make positive engagement with the rib in the bottom of the channels therein. The location of the blade and particularly of its cutting edges is thus determined with great accuracy for shaving. Meanwhile any irregularity in the contour of the cap or guard, due to faulty manufacture or distortion in use, is compensated for by appropriate yielding of automatically selected portions of the flexible or elastic bead 15, that is, the bead is compressed and flattened in exact conformity to the contour of the clamping surfaces with the result that a firm and substantial uniform pressure is exerted on the blade throughout a substantial area co-extensive with and adjacent to its cutting edges. It will be noted that the concave cross-section of the bead 15 not only provides a yielding fulcrum for the blade but imparts substantial stiffness to the section of the supplemental member in which it is formed and, therefore, to the portion of the blade upon which it bears. In the concave condition of the bead shown in Fig. 2, for example a pronounced longitudinal stiffness is imparted to the blade, and, while it is transversely stiffened to some extent, the cross-section of the bead is not favorable to stiffness in that direction. As the clamping pressure upon the blade and its associated supplementary member is increased, the bead is collapsed or flattened more and more toward the surface of the blade and in this deformation its longitudinal stiffening effect is correspondingly decreased. In those locations where the blade is solidly clamped between parallel surfaces the concave cross-section of the bead may entirely disappear and longitudinal stiffness on account of the concave cross-section is, therefore, reduced to a minimum. This is a desirable condition in that the concave cross-section tends to impart longitudinal stiffness to the blade edge in areas where it is imperfectly clamped and to relax its stiffening effect on the blade in areas where the clamping action of the razor parts is adequate.

In Fig. 3 is shown the cross-section of an alternative form of supplemental member 34 having an inwardly concave flexible longitudinal bead 35 of wider and flatter contour than the bead 15 shown in Fig. 2. A bead of the wider dimensions shown in this figure is desirable in some cases in that it adapts the blade for use in safety razors having fulcrum shoulders of different spacing, that is, some wider than others. The wider bead 35 insures contact with the fulcrum shoulders located throughout an appreciable range of widths. In Fig. 5 it will be noted that the beads 15 of the supplemental member coincide in location substantially with the fulcrum shoulders of the blade-supporting member 20 when the blade is assembled with the razor. The same is true of the beads 35 of the blade shown in Fig. 3 except that the greater width of the beads 35 gives the blade a wider range of use in safety razors of different designs.

Having thus disclosed my invention and described an illustrative embodiment thereof I claim as new and desire to secure by Letters Patent:

1. A safety razor blade having a body portion of thin sheet steel with an edge sharpened for cutting, and a supplemental member attached to the blade body and presenting a continuous hollow flexible bead extending adjacent to and within the cutting edge of the blade and being in contact throughout its length with the blade.

2. A safety razor blade of thin flexible steel sharpened at its edge for cutting, and an attached supplemental member of resilient sheet material having a continuous longitudinal flexible bead normally of curved cross-section adapted to impart stiffness to the blade but collapsible under clamping pressure to substantially flattened condition.

3. A safety razor blade of thin flexible steel sharpened for cutting, and an attached supplemental member of resilient sheet material associated therewith and having a continuous longitudinal elastic bead curved transversely and arranged to be flattened when the blade and supplementary member are subjected to clamping pressure in a safety razor.

4. A safety razor blade having a body portion of thin flexible steel with an edge sharpened for cutting and an attached supplemental member attached to the body of the blade, extending outwardly from its attached portion in a longitudinal bead concave in its inner face and having its free edge maintained yieldingly in engagement with the surface of the blade along a line adjacent to said cutting edge.

5. A safety razor blade having a body portion of thin flexible steel with an edge sharpened for cutting and a centrally located internal aperture, and a supplemental member of resilient sheet material attached to the body of the blade in a longitudinal intermediate zone at one side of the blade aperture and merging into a continuous longitudinal bead concave in its inner face and a free edge bearing against the face of the blade along a line between the said zone of attachment and sharpened edge of the blade.

6. A double-edged safety razor blade of thin flexible steel having a centrally disposed internal aperture, and a pair of supplemental sections of resilient sheet material attached to the blade on opposite sides of said aperture along an intermediate longitudinal zone, the inner portions of said sections being flat and normally lying in yielding engagement with the face of the blade and the outer portion of each being shaped to provide a continuous longitudinal resilient bead with a free edge resting on the face of the blade along a line adjacent to a cutting edge of the blade.

7. In a safety razor, the combination with blade-clamping members shaped to impart a transverse curvature to an interposed blade and a blade having an attached supplemental member including a smooth, continuous, longitudinal, resilient bead of thin resilient metal arranged to provide a fulcrum over which the blade is flexed when subject to clamping pressure.

8. In a safety razor, the combination with blade-clamping members having complementary faces shaped to impart a transverse curvature to an interposed blade, of a flexible blade sharpened at its edge for cutting and having a supplemental member of resilient sheet material attached thereto in a longitudinal intermediate zone and presenting an outwardly convex longitudinal bead flexible in compression and of substantial width adapted to engage one of the blade-clamping members over a substantial width and to provide a fulcrum for the blade as it is flexed by the other member.

9. In a safety razor, the combination of complementary blade-shaping members, one having a longitudinal fulcrum shoulder, with a flexible blade having a supplemental member of resilient sheet material attached thereto and shaped to provide a convex longitudinal bead located in position to coincide with the fulcrum shoulder of said blade-shaping member when assembled in the razor.

10. In a safety razor, the combination of complemental blade-clamping members, one having a central blade-locating rib, with a flexible blade having a supplemental member of resilient sheet material presenting parallel inwardly concave beaded edges and opposed flat edges, the said supplemental member being attached to the blade so that the outer edge of the beads may creep outwardly on the blade surface when the beads are flattened by clamping pressure.

11. A safety razor blade having a body of thin sheet steel and longitudinal cutting edges, and supplemental members attached to the blade body and presenting spring projections uniformly distributed throughout areas substantially co-extensive with the cutting edges of the blade and within the outline thereof.

12. A safety razor blade having a thin flexible body, and an elongated reinforcing member welded to the body of the blade in an intermediate zone and having an inner continuous yielding edge lying adjacent to the body of the blade, and an outer beaded edge providing pressure-receiving areas separated in part from the surface of the blade.

13. A safety razor blade having a normally flat body provided with a longitudinal cutting edge, and a thin sheet steel supplementary member welded to the body of the blade in an intermediate zone and having both longitudinal edges free to move yieldingly with respect to the face of the blade, the inner edge being a straight blade-locating edge and the outer edge being beaded to present a uniformly distributed longitudinal pressure-receiving area.

14. A safety razor blade having a flexible steel body with longitudinal cutting edges, and thin sheet steel supplementary members fastened to the blade body and presenting opposed blade-

locating edges lying adjacent to the face of the blade and arranged to move toward each other when the blade as a whole is transversely flexed in use.

15. A double edged safety razor blade having a flexible steel body, generally rectangular in contour and with corner recesses defining elongated unsharpened end portions, and a pair of similar oppositely disposed supplemental members of resilient steel attached to the said blade body with straight parallel inner edges extending partially over the unsharpened end portions of the blade and curved transverse sections extending outwardly into a line adjacent to the cutting edges of the blade.

16. A safety razor having complementary blade-shaping members, and a blade engaged under pressure thereby and having attached supplemental members of sheet steel providing separate uniformly distributed yielding contact areas of uniform stiffness equally firm under pressure of engagement on the blade regardless of variations in the contour of said blade-shaping members.

17. A safety razor having co-operating blade-clamping members, and a flexible blade shaped under pressure thereby and having attached supplemental members on one face with curved resilient sections providing areas for equally distributed pressure of engagement on the clamped blade.

18. A safety razor including in its structure co-operating blade-clamping members, one of which is provided with a blade seat having longitudinal channels disposed on opposite sides and below the level thereof, and a blade having attached supplemental members presenting thin resilient edges shaped to enter said channels endwise, normally lying close to the surface of the blade and adapted to be sprung outwardly as the blade is presented and to hold it firmly on the blade seat.

19. A safety razor including in its structure co-operating blade-clamping members, one having a blade seat with undercut longitudinal channels beneath it and the other having a transversely curved face shaped to flex a blade on the blade seat, in combination with a resilient blade having a supplemental member with a yielding edge normally lying close to the blade, shaped to enter the channel and become deflected away from the body of the blade as the blade is progressively flexed by the cap.

20. A safety razor including in its structure co-operating blade-clamping members, in combination with an elongated double edged blade of thin sheet steel having a central perforation, similar supplemental members of resilient steel secured to the body of the blade in position to overlie and reinforce it in two intermediate longitudinal zones, said members having opposed inner blade-locating edges yieldingly lying adjacent to the face of the blade and outer beaded edges presenting raised pressure areas uniformly distributed adjacent to the cutting edges of the blade and yieldable under pressure of the blade clamping members.

21. A safety razor blade having a body portion of thin sheet steel with an edge sharpened for cutting, and supplemental members attached to the body of the blade and shaped to present pressure-receiving sections adjacent to the said cutting edge, said sections having curved contours and lying only partly in contact with the blade surface.

22. A safty razor blade having a normally flat body of sheet steel with an edge sharpened for cutting, and a supplemental member of resilient sheet material attached to the body of the blade and shaped to present a pressure-receiving section in an area adjacent to said cutting edge, said section being of convex contour whereby different portions of the section are disposed at different distances from the blade surface when subjected to uneven clamping pressure.

JOSEPH MUROS.