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SAFETY RAZOR AND BLADE

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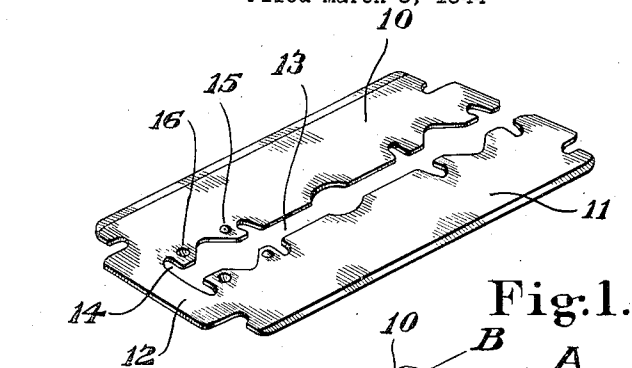


Fig. 1.

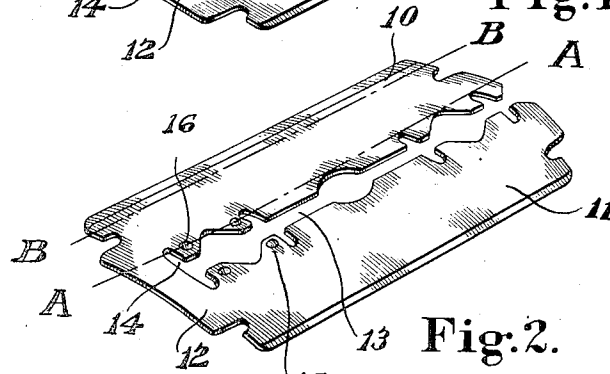


Fig. 2.

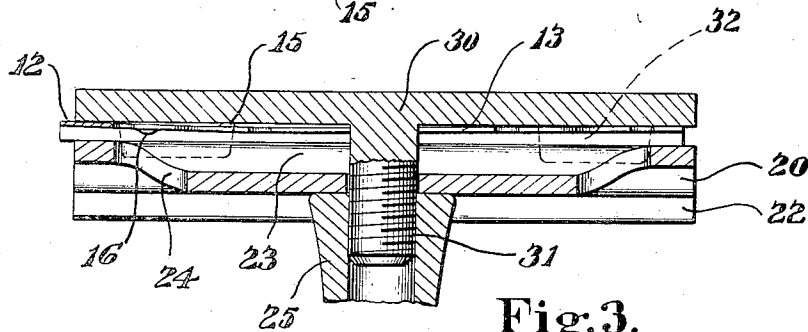


Fig. 3.

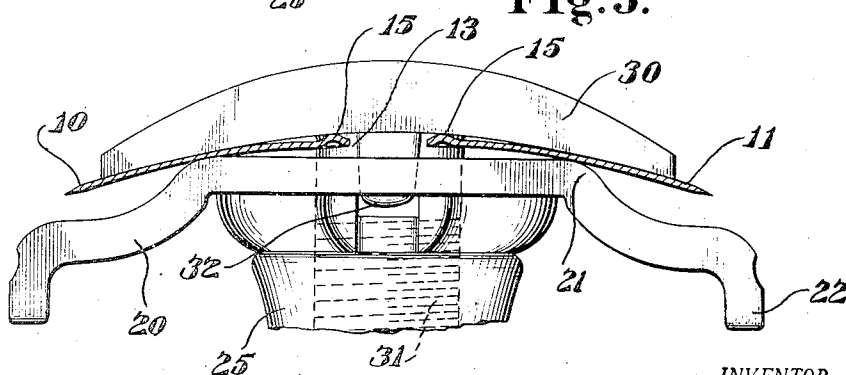


Fig. 4.

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SAFETY RAZOR AND BLADE

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4 Claims. (Cl. 30—70)

This invention relates to safety razors and consists in an improved blade of the thin, flexible open-end type and in a novel combination of such blade with the blade-clamping members of a safety razor.

Open-end razor blades, that is to say, blades having a longitudinal slot opening out through one of the transverse end edges of the blade, may be employed in safety razors in which the cap and guard members are detachably connected, and such blades have the additional advantage that they may also be presented by endwise movement in any safety razor wherein the cap and guard members are connected to permit only a limited separation. Such razors are preferred by many users because by obviating the necessity of detaching and separating the parts of the razor the danger of misplacing or losing them is eliminated.

It has been found that in safety razors of the type wherein the blade is transversely flexed when it is clamped in shaving position, as in the "Gillette" type safety razors, the cutting edges of an open-end blade are frequently deflected out of their normal parallel relation. Whereas, the two sharpened longitudinal edges may be disposed accurately in parallel relation when the outline of the blade is initially determined, the two edges are often found to diverge toward the open-end of the blade when the blade is flexed and clamped in the razor. This is due partly to the fact that the hinge portion at the closed or solid end of the blade has a restraining effect on the two side portions which is entirely absent at the open end of the blade. Going more into detail, the side portions are tied together at the closed end of the blade by a flexible connection which, when curved by the cooperating clamping elements of the razor, causes the cutting edges of the blade to draw together. However, inasmuch as the side portions of the blade adjacent to its open end are free and unconnected the free ends are not subjected to this drawing-in action. These differences in structure and behavior, and possibly other causes, often result in a departure from parallelism of the two sharpened cutting edges in an open-end blade when finally clamped in shaving position. Such variation detracts from the precision of the assembled razor and produces irregularities in the edge exposure of the blade that may even become so excessive as to be dangerous in some cases.

I have improved the structure and behavior of open-end razor blades and eliminated uneven

edge exposure by causing the two side portions of the blade to draw together in the clamping operation until arrested by properly spaced stops or gauging surfaces. In effect, I impress a drawing-together movement on the free ends of the blade that compensates for the drawing-in of the other ends of the sharpened edges caused by the hinge connection between them. This I am able to do by providing means in, or acting upon, the side portions of the blade for bowing and thus shortening in the blade an intermediate longitudinal zone located adjacent to the medial slot or at least substantially within the outer sharpened edge of the side portion. This bowing of an intermediate zone while the outer edge of the blade remains flat tends strongly to draw together the free ends of the two side portions. An abutment or blade stop may be located in the razor so as to lie between the free ends of the blade and accordingly to present opposite outwardly directed gauge faces to the blade. Under these circumstances the ends of the blade will continue to draw together until their inner edges bring up against the outwardly directed gauge faces of the abutment. The converging movement of the side portions is thus arrested when it has progressed to a point where the sharpened cutting edges of the blade lie exactly parallel.

The treatment of the open-end blade contemplated by my invention is effective only when the blade itself is supported or partially clamped as by engagement between the cap and guard members of a safety razor. This is particularly true when the blade is clamped in a position of transverse curvature because then it is necessary to engage only one face of the blade in the longitudinal zone where it is desired to effect a bowing of the blade.

The secondary or longitudinal flexing of the side portions of the blade may be effected in any desired manner but as herein shown and in accordance with another feature of my invention, it is effected by providing in the material of the blade one or more projections so located as to be engaged and depressed by the concave clamping member of the razor. For example, one or more conical bosses may be struck from the material of the blade in selected areas and may be projected into position to be engaged by the inner face of the cap member of the razor when the cap and guard members are clamped together. The longitudinal zone containing the projections is thus flexed longitudinally in the razor and the desired compen-

sating movement is imparted to the side portions of the blade. Preferably and as herein shown the projecting bosses may extend in opposite directions from the plane of the blade so that the same bowing of the side portions will occur no matter which side up the blade is presented. It will be understood, of course, that the cooperating blade-clamping members are shaped to afford proper clearance for the bowing deformation which is impressed upon the blade.

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 view in perspective of the blade on an enlarged scale;

Fig. 2 is a similar view showing the blade in transversely flexed condition;

Fig. 3 is a central longitudinal section, showing the head of a safety razor with a blade in position; and

Fig. 4 is a view of the razor head in end elevation on a still larger scale, the blade being shown in cross-section.

The invention as herein shown is embodied in a blade of the well-known "Gillette" type, although it is not limited to that or to any specific type of blade but with proper modifications may be embodied in any flexible open-end blade. The blade herein shown is substantially rectangular in outline and provided with reentrant recesses in each of its corners which define elongated, unsharpened end portions. It has two side portions 10 and 11 connected at one end by a transverse hinge portion 12 and separated by a medial slot 13 which opens through the outer end of the blade. The slot 13 is provided with intermediate enlargements to fit the blade-locating projections of the various safety razors in which it may be used. It is also provided with a central circular enlargement or aperture for the passage of the stem or spindle connecting the blade-clamping members of the razor. At the solid end of the blade the slot 13 terminates in a narrow transverse enlargement which has the effect of distributing bending stress in the blade and defining the inner boundary of the slot 13 and of the hinge portion 12. The hinge portion is usually annealed to a slight degree but in general the whole blade is hardened and tempered for its shaving function. The outer longitudinal edges of the side portions 10 and 11 are ground, honed and stropped to present in the flat blade parallel, keen shaving edges.

In accordance with the preferred embodiment of my invention, the side portions 10 and 11 are provided with bosses 15 and 16 which are struck from the material of the blade and project from the plane of the blade surface .003" to .015". The projections or bosses 16 project downwardly and are located adjacent to the inner edges of the respective side portions 10 and 11 and are also adjacent to the transverse enlargement 14 and to the hinge portion 12. The projections 15, which project upwardly, are located in the same longitudinal zone as the projection 16 but somewhat nearer the centre of the blade.

The blade is represented in Fig. 2 as transversely flexed as it is flexed over the convex blade-supporting member of the safety razor. The line A—A represents the general position of the longitudinal zone in which the projections 15 and 16 are located, while the line B—B represents the position of any other longitudinal zone located

in the side portion 10 outside the zone A—A. It will be understood that when clamped in the safety razor, the longitudinal bowing of the blade occurs in the zone A—A, the blade being slightly shortened thereby in this zone, while the zone B—B remains undisturbed in its length.

In Figs. 3 and 4 is shown the safety razor head comprising a guard or blade-supporting member 20, shaped to present longitudinal fulcrum shoulders 21 and marginal guard bars 22. The upper face of the guard member 20 is provided with an elongated central depression 23 which is generally diamond-shaped and has at either end a central slot 24.

The cooperating cap member 30 has an inner concave blade-engaging face, as best shown in Fig. 4, which is effective to flex the blade transversely over the fulcrum shoulders 21 of the guard member when the blade-clamping members are brought together. The cap member 30 is provided with a central threaded stem 31 which is arranged to pass freely through an aperture provided for that purpose in the bottom of the guard member 20 and to enter the upper end of the handle 25 which is bored and threaded to receive the stem. The cap member has also a pair of aligned blade-locating ribs 32, one of which supplies the abutment and gauge surfaces already mentioned. The ribs 32 of the cap member enter the slots 24 of the guard member and thus at all times preserve the alignment of these two members.

By references to Figs. 3 and 4 it will be seen that when the blade is presented with the bosses 15 directed upwardly and is clamped by screwing the handle 25 upon the stem of the cap, the blade is not only flexed transversely but is bowed longitudinally in the zone A—A by the engagement of the inner face of the cap 30 with the upwardly projecting boss 15 in each side portion of the blade. This action is shown particularly well in Fig. 4 where the blade is sectioned through the two bosses 15. From this view it is apparent that each side portion is deflected in the zone of the boss away from the concave surface of the cap 30 by the engagement of the cap with the bosses 15. It will also be apparent that the flat, upper surface of the guard member between its fulcrum shoulders 21 affords ample clearance for this longitudinal bowing of the blade in this narrow longitudinal zone. The blade, however, remains longitudinally flat in the zone B—B. Accordingly, each side portion is shortened in an inner or intermediate zone while it remains unaffected in the zone of its outer edge. The effect of this distortion is to cause the free ends of the blade to draw together. As already explained, this drawing-in action continues until it is arrested by the engagement of the inner edges of the two side portions 10 and 11 with the outwardly directed gauge faces of the blade-locating rib 32 at the free end of the blade. The width of the rib 32 is such that when it arrests the drawing-in movement of the free ends of the blade, the two cutting edges are disposed accurately in parallel relation. Thus I have compensated for any tendency toward separation or divergence which might otherwise occur in transversely bowing the open-end blade.

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

1. A double-edged, open-end blade for safety razors, having a flexible body divided into side

portions by a central longitudinal slot, and having a solid hinge portion connecting the side portions at one end of the blade, and projections formed in the side portions between the outer edges thereof and said slot, whereby the side portions are longitudinally bowed in an inner longitudinal zone.

2. A double-edged, open-end blade for safety razors, having a transverse end portion and two sharpened side portions extending therefrom in spaced relation, and a projection in each side portion located in a longitudinal zone adjacent to its inner edge, whereby that zone may be bowed longitudinally when the blade is engaged by part of a razor.

3. A double-edged, open-end blade for safety razors, having sharpened side portions, a flexible hinge portion connecting one end of said side portions, and projections from both faces of the side portions located within their outer edges and adjacent to said hinge portion.

4. A safety razor comprising a blade-supporting member having spaced fulcrum shoulders, a cooperating cap having a concave blade-engaging face, a flexible open-end blade flexed by said cap over the fulcrum shoulders of the blade-supporting member, and means for longitudinally bowing the blade in an inner longitudinal zone thereof.

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