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SAFETY RAZOR

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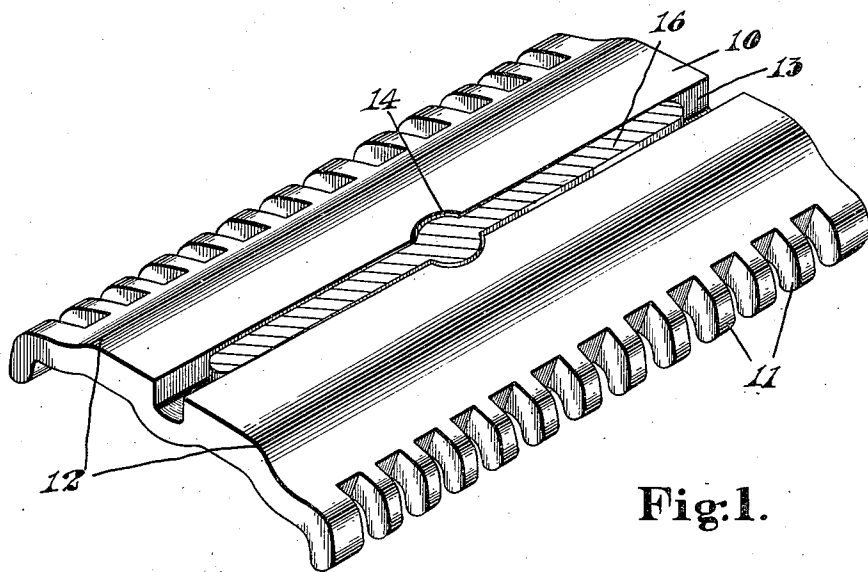


Fig. 1.

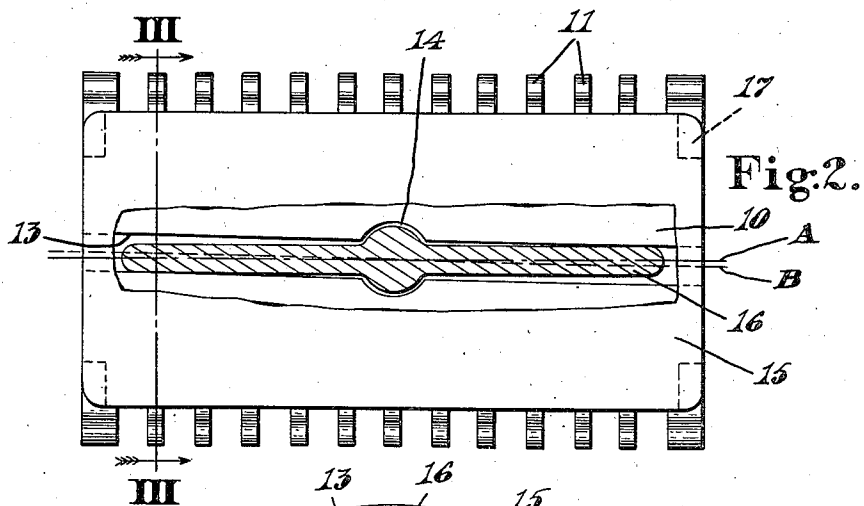


Fig. 2.

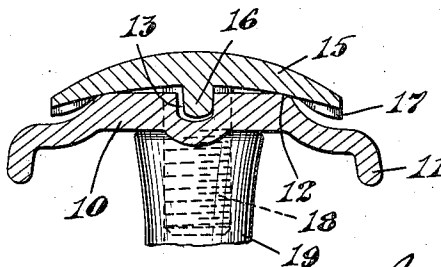


Fig. 3.

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UNITED STATES PATENT OFFICE

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SAFETY RAZOR

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4 Claims. (Cl. 30—70)

This invention relates to safety razors of the type in which a thin steel blade is flexed for shaving between cooperating blade-clamping members, as in the well-known "Gillette" type of safety razor.

The cap and guard members of such safety razors are provided respectively with corresponding projections and apertures designed usually to locate the blade accurately in shaving position between them and also to maintain the two members themselves in parallel relation. It is important to maintain this relation since the edge exposure of the blade in the razor is determined by a plane tangent to the outer edges of the cap and guard members. Therefore, if these edges are not maintained parallel throughout their length the edge exposure of the blade will vary from one point to another along the edge of the razor. For example, if the cap is twisted to any degree with respect to the guard the edge exposure at diagonal corners of the blade will be excessive in one case and scant in the other.

An object of the present invention is to provide a safety razor so constructed and arranged that accurate parallelism of the edges of the cap and guard members will be established and maintained when these members are clamped together upon a blade.

In manufacturing safety razors as heretofore constructed on a quantity basis it has been the practice to provide, in addition to the tolerances allowed in making the individual elements, a tolerance clearance of .002" to .003" between the projection or projections on one blade-clamping member and the groove or apertures provided for its or their reception in the other blade-clamping member. This is in accordance with well understood principles of production manufacture. It happens, however, that the user almost invariably holds such a razor by the edges or teeth of the guard member in clamping the cap and guard together so that the clearance allowed for manufacturing reasons is always taken up in the clamping operation by a slight twisting of the cap with respect to the guard member; that is to say, the cap is turned with the handle at the conclusion of the clamping operation until the walls of its rib, if that is the shape of its projection, abut at opposite ends of the cap against opposite walls of the groove in the guard member. The same condition persists in razors wherein the cap is provided with pins or other projections and the guard with corresponding apertures; the cap will twist slightly until the projections at opposite sides of the handle abut

against walls of their apertures and the difference in edge exposure between opposite ends of the blade on the same side of the razor may amount to several one-thousandths of an inch. This displacement may be sufficient to render the razor dangerous to the user or it may merely make its shaving efficiency variable, but in any case it impairs the desired precision of the razor as a shaving instrument. It is not practical to reduce the manufacturing tolerances in the cap and guard members sufficiently to overcome this defect without unreasonably increasing the production cost of the razor parts and it is accordingly desirable to allow the same manufacturing tolerances which have been found practical and desirable from a production standpoint.

I have discovered that the problem created by these circumstances may be solved by manufacturing the cap and guard members so that the rib or projection of one and the corresponding slot or aperture of the other are permanently disposed at an angle which will compensate for the relative twisting movement to which the two parts are subjected in the clamping operation. This may be accomplished for example by inclining the slot of the guard several degrees from the geometrical longitudinal axis of the guard which, of course, is parallel to the line of the teeth or side edges of the guard. The effect of this displacement is to locate the walls of the slot so that they will act as gauging surfaces to establish and maintain parallelism of the cap and guard edges when the cap is twisted to the limit of movement permitted by the tolerances of and the tolerance clearance between the projecting portions of one member and the apertured portions of the other. It will be apparent that the same advantageous results may be secured by inclining either the axis of the apertures or slot of one member or the axis of the rib or projections of the other member, so long as there is an initial deflection between these two axes which will accurately compensate for the twisting of the two razor members permitted by manufacturing tolerance of their dimensions.

These and other features of the invention will be best understood and appreciated from the following description of one of the many possible embodiments thereof selected for purposes of illustration and shown in the accompanying drawing, in which:

Fig. 1 is a view in perspective on an enlarged scale of the guard member of a safety razor showing a portion of the blade-locating rib of the cap positioned in its slot;

Fig. 2 is a plan view of the razor on the same scale as seen from the top, portions of the cap being shown as broken away; and

Fig. 3 is a view in cross-section on the line III—III of Fig. 2, the blade being omitted in both views.

The guard member 10 of the illustrated razor is rectangular in outline and provided along each longitudinal edge with a series of guard teeth 11. Its blade-engaging face is generally convex in transverse curvature and includes parallel fulcrum shoulders 12 over which the blade is flexed when clamped for shaving. The guard member is provided with a central longitudinal slot 13 and this, as shown in Fig. 2, is not parallel to the longitudinal axis of the guard member 10 or to the line of its guard teeth but is rotated in a clockwise direction, as seen in Fig. 2, where the dot-and-dash line A indicates the geometrical axis of the guard member 10 and the dash line B indicates the geometrical axis of the slot 13. The slot 13 merges centrally into a circular aperture 14 extending completely through the guard.

The cooperating clamping member of the razor comprises the cap 15, this being also rectangular in outline but somewhat narrower than the guard. Its blade-engaging face is transversely curved and its parallel edges are so disposed as to engage an interposed blade behind its parallel cutting edges and flex it over the fulcrum shoulders 12 of the guard. The cap is provided with a blade-locating rib 16 arranged to fit into the slot 13 of the guard member with a clearance tolerance of about .003". A reinforcing lug or projection 17 is provided at each of the cap corners. The cap is also provided with a threaded central stem 18 which passes freely through the aperture 14 of the guard member 10 and is received in the threaded upper end of the handle 19 of the razor. The rib 16 coincides with the longitudinal axis of the cap 15 and is disposed in parallel relation with both of its outer edges.

In the accompanying drawing the blade has been omitted for the sake of clearness but its position between the guard 10 and the cap member 15 of the illustrated safety razor will be readily understood. It is, of course, longitudinally slotted to receive the rib 16, apertured for the passage of the stem 18 and notched at its corners to clear the lugs 17. Assuming, therefore, that the blade has been properly positioned between the two members and that the user holds the guard member at opposite sides by its teeth with one hand and rotates the handle 19 with the other hand in a counter-clockwise direction, as seen in Fig. 2, it will be apparent that in the final clamping turn of the handle 19 the cap 15 will be twisted also in a counter-clockwise direction until its rib 16 at its left end abuts against one wall of the slot 13 and at its right end against the other wall of the slot. However, the angular twist permitted to the cap by the tolerance of the parts is arrested before the cap has passed through the position in which

its edges are symmetrically disposed with respect to the guard 10. The cap, therefore, is caught and held with the edges of the two members positively registered in parallelism by the gauging effect of the walls of the slot 13 on the walls of the rib 16.

While the walls of the slot 13 in the guard act to gauge the rib 16 of the cap so as to establish exact parallelism of the critical edges or surfaces of the two blade-clamping members, they permit the user to release slightly the clamping pressure of the cap on the blade, if this should become desirable in order to increase the edge exposure of the blade for the current shaving operation, all without any disturbance to the correct positions of the clamping members. The spring pressure of the interposed blade tends to retain the cap in the position to which it has been moved in the final clamping rotation of the handle, and it is only when substantially all clamping pressure is removed that the cap is permitted to leave this predetermined position in the razor.

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

1. A safety razor having cooperating blade-clamping members with outer parallel surfaces which determine the edge exposure of a blade interposed between them, and rotatable means for clamping said members together, one member having a projecting configuration parallel to its outer edges, and the other having a corresponding recessed configuration disposed at a slight angle to its outer edges.

2. A safety razor having cooperating blade-clamping members with outer edges shaped to determine the edge exposure of a blade interposed between them, and rotatable means for clamping said members, the said members having corresponding projections and recesses varying in dimensions by a predetermined tolerance clearance and the axis of the projections in one member being angularly displaced with reference to the axis of the recesses of the other member when the two members are disposed with their outer edges in parallel relation.

3. A safety razor having cooperating cap and guard members, one provided with a slot and the other with a rib to be received in said slot with clearance and to locate one member with respect to the other, the axis of the rib being parallel to the axis of one member and the axis of the slot being disposed at a slight angle to the axis of the other member.

4. A safety razor having cooperating cap and guard members, each with means making contact with each other to locate the said members in parallel relation, the means on one member being disposed parallel to the axis of the member whereon it is located and the means on the other member being disposed at a slight angle to its axis.

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