March 2, 1943. N. TESTI 2,312,503

SAFETY RAZOR

Filed July 27, 1942

Fig. 1

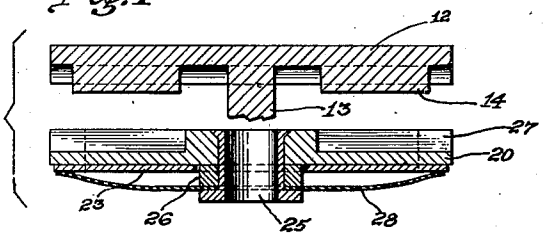


Fig. 2

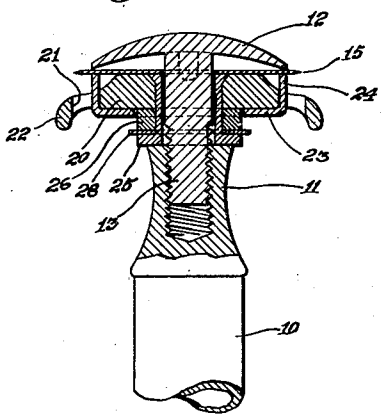


Fig. 3

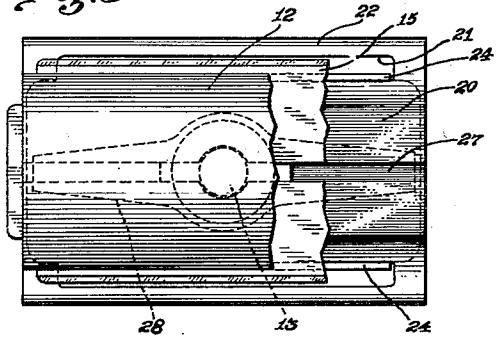


Fig. 4

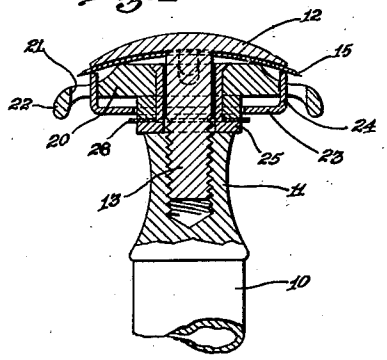


Fig. 5

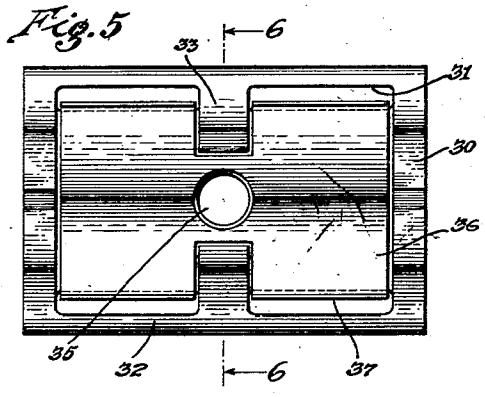
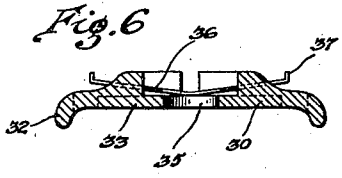


Fig. 6



INVENTOR.

Nicholas Testi

BY

H. H. Kenway.
Atty.

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SAFETY RAZOR

Nicholas Testi, Boston, Mass., assignor to Gillette Safety Razor Company, Boston, Mass., a corporation of Delaware

Application July 27, 1942, Serial No. 452,400

10 Claims. (Cl. 30—72)

This invention relates to safety razors of the type in which a blade of thin flexible steel is supported in flexed position for shaving by co-operating blade-clamping members. Such blades are too thin to be used in unsupported condition and it is, therefore, necessary to support them on both sides adjacent to the cutting edge in order to prevent vibration or distortion of the edge in shaving. It is extremely desirable that the cutting edge of the blade should be adequately supported for shaving even when the blade-clamping members are slightly separated because many users make a practice of releasing the pressure of the blade-clamping members in order to increase the exposure of the shaving edge. Such relaxation permits the blade to straighten slightly from its condition of convex curvature so that its effective width and consequently its edge exposure in the razor is increased. There is, of course, always danger that releasing the pressure of engagement of the blade-clamping members will loosen the threaded connection between the handle and the razor head to such an extent as to permit unexpected turning of the whole head on the handle with resulting danger of cutting to the user. This dangerous condition has been aggravated by employment of blades thinner and more flexible than heretofore. For example, while a blade .006'' or more in thickness has inherently appreciable stiffness and so maintains substantial pressure on the blade-clamping members even when they are slightly separated, a blade .004'' in thickness is so extremely flexible that it exerts no such pressure of engagement.

With these considerations in view an object of the present invention is to provide a safety razor with yielding means for opposing the flexing of a blade therein thus maintaining a substantial pressure at all times between the blade-clamping members so that, even though slightly separated, there will be no danger of the razor head turning accidentally on the handle.

A further object of the invention is to improve the clamping contact upon the blade in the razor head, so that the blade is supported firmly upon both sides in lines of contact closely adjacent to the cutting edge, the location of these lines being maintained in all positions of adjustment in the razor.

It has been discovered that these desirable results and others to be pointed out hereinafter may be accomplished by providing one of the blade-clamping members of the razor head with yielding means tending at all times to oppose flexing of the blade. The yielding means herein shown presents an opposed straight line edge for engaging the blade opposite to or in substantial alignment with the edge of the concave blade-clamping member. The straight line edge or edges are arranged for substantial rectilinear movement in the razor head. For example, if the blade is engaged by the longitudinal edges of a convex cap member the engaging edges of the yielding means are arranged to move in planes vertically beneath or aligned with such edges. It is a characteristic of this construction, therefore, that the opposed lines of engagement do not shift transversely but are maintained always in the same transverse relation for all adjusted conditions of the razor head.

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

Fig. 1 is a view in longitudinal section of the cap and guard members;

Fig. 2 is a view of the razor head in cross-section showing the blade in unflexed condition;

Fig. 3 is a plan view of the razor head with parts broken away;

Fig. 4 is a view in cross-section corresponding to Fig. 2 but showing the blade flexed;

Fig. 5 is a plan view of a guard member of modified construction; and

Fig. 6 is a sectional view on the line 6—6 of Fig. 5.

The invention is herein illustrated in a safety razor having a handle and a cap member of commercial construction, such, for example, as that employed in the "Gillette" safety razor. The handle 10 is tubular and provided with a solid threaded end portion 11. The cap 12 is rectangular in outline and has a concave blade-engaging face. It is provided with a centrally disposed stem 13 which is threaded to receive the threaded end 11 of the handle and has also a projecting blade-locating rib 14 interrupted adjacent to the stud, all of which construction is old and well-known to the industry.

The guard or blade-supporting member is itself of novel construction and is combined with the other elements of the razor to form a new combination. It is rectangular in outline like the cap and comprises a solid body portion 20 having parallel longitudinal shoulders in its upper surface over which the blade is flexed by the concave face of the cap 12, or the guard member may be otherwise shaped to present a generally convex blade-shaping surface for co-operation

with the concave blade-shaping surface of the cap. The guard member has elongated slots 21 in both sides which define guard bars 22 formed with outwardly and downwardly curved surfaces for engaging the face of the user and determining with the edges of the cap the blade exposure. The slots 21 are also shaped to receive the upstanding parallel flanges 24 of a flanged plate 23 which underlies the lower or outer face of the body of the guard member, the flanges 24 being of such length as to stand normally or initially flush with the upper blade-supporting face of the guard member. The flanges 24 are spaced so that they lie substantially opposite to the outer edges of the cap member 12 or in position to engage an interposed blade along lines substantially parallel to and beneath the edges of the cap.

The flanges 24 are mounted for yielding movement in the assembly of the guard member to oppose flexing of the blade. To this end the body 20 of the guard member is provided with a hollow flanged stud 25 which is of sufficient diameter to receive easily and with clearance the stem 13 of the cap and to extend a short distance below the lower face of the body 20 of the guard member in rigid relation thereto. The flanged plate 23 is perforated so that it fits with clearance upon the hollow stud 25 and is free to move up and down thereon, or rather upon a collar or sleeve 26 which surrounds the lower end of the stud 25 where it projects below the body of the guard member. An elongated leaf spring 28 surrounds the stud 25 and is anchored at its center between the flange of the stud 25 and the collar 26. The spring tapers toward both ends and bears upon the opposite end of the flanged plate holding the latter normally in its uppermost position as shown in Fig. 2. This upper position is determined by engagement of the flanged plate with the lower face of the body 20 of the guard member and, as already noted, when the flange plate is so located the flanges 24 are flush with the upper face of the guard. It will be apparent that the function of the spring 28 is to tend at all times to hold the flange plate in this initial position, to resist downward displacement of the flange plate and thus to oppose or resist transverse flexing of the blade over the fulcrum shoulders of the guard member.

The blade herein shown is adapted for use with commercial razors now available, one of such blades is designed by the reference character 15 in Figs. 2–4. The blade is in the order of thickness of .003" to .007", sharpened at both edges and perforated to receive the locating rib 14 of the cap and the stem 13. When the cap has been removed the blade may be presented to the guard member and is supported in flat condition as suggested in Fig. 2. The cap is then placed in position with its stem 13 threaded into the upper end of the handle and when the handle is rotated the stem is drawn down with the cap 12 flexing the blade transversely over the shoulders of the guard member and in opposition to the pressure of the flanges 24 which engage the lower face of the blade along the parallel lines rigidly fixed with a pre-determined spacing equal substantially to the space of the outer edges of the cap 12. It will be noted that there is no shifting of these lines of engagement when the cap is depressed, but that the blade is engaged on both sides adjacent to its cutting edge with firm and substantial pressure as soon as it is flexed at all from its flat position of presentation.

In Figs. 5 and 6 is shown a guard member of modified construction somewhat less expensive in construction but retaining most of the advantages above discussed. In this modification the guard member includes a rectangular body portion 30 having slots 31 adjacent to both edges which set off guard bars 32 formed with outwardly and downwardly sloping faces. The openings 31 also define a depressed solid central portion connected to the body of the guard at its ends, and at its side by oppositely arranged bridge members 33. The solid center portion is provided with a central hole 35 for the passage of the threaded stem 13 of the cap. Fulcrum shoulders are provided in the ends and bridge portions of the guard and upon these the blade is initially supported and over which it is flexed by the cap.

The yielding means in this modification comprises a slightly dished and flanged plate 36 having upturned longitudinal flanges 37 and side notches that locate the flange plate in the razor head by fitting the bridge members of the guard member. The flexible blade is engaged by the longitudinal edges of the cap on its upper surface, as above explained, and on its lower surface by the flanges 37 which are initially located directly under the edges of the cap and which may be yieldingly depressed in opposing flexing of the blade when the cap and guard members are forced together with a blade between them.

In the illustrated construction the effective stiffness of the blade is maintained constant regardless of its own flexibility because the spring 28 always exerts constant pressure on the blade tending to prevent it from being flexed out of its initial flat condition. Therefore, in addition to the spring of the blade, the cap is under a substantial and practically uniform pressure of the spring 28. Under these conditions the user may safely back off the blade-clamping members, increasing the edge exposure of the blade, and still be assured of the necessary blade edge stiffness.

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

1. A safety razor having co-operating blade-clamping members with opposed faces shaped to flex a double-edged blade between them, means for forcibly moving said members together, and yielding means carried by one member tending at all times to oppose flexing of the blade by exerting pressure thereon along parallel lines disposed adjacent to its respective cutting edges, the lines of contact between said yielding means and said blade remaining the same irrespective of the relative positions of said blade-clamping members.

2. A safety razor having co-operating blade-clamping members with opposed faces shaped to flex a blade between them, a flexible blade engaged on one face by one member in a straight line near its cutting edge, means for forcibly moving the said members together, and yielding means presenting an opposed straight line edge for engaging the blade on its other face and resisting flexing of the blade when the two members are so moved.

3. A safety razor having co-operating cap and guard members, the cap having parallel blade-flexing edges, the guard member having longitudinal slots within its side edges, and a spring actuated plate having upstanding flanges ex-

tending through the slots of the guard member in opposed relation to the edges of the cap.

4. A safety razor having co-operating cap and guard members having opposed faces shaped to flex a blade between them, a plate having spaced flanges normally held substantially flush with the face of the guard member and in position to support a flat blade thereon, and a spring tending at all times to resist displacement of said plate.

5. A safety razor having co-operating cap and slotted guard members shaped to flex a blade between them, a stud projecting from the outer side of the guard member, a plate guided by said stud and having upstanding blade-engaging walls arranged to pass freely through the slots of the guard member, and a spring retained by said stud in a position of pressure upon the said plate.

6. A safety razor having a cap with a concave inner face, a guard larger in outline than the cap and slotted in line with the longitudinal edges of the cap, a channel shaped plate disposed below the guard with its side walls projecting through the slots of the guard, a spring for maintaining the upper edges of said walls substantially flush with the upper surface of the guard, and means for clamping the cap and guard on an interposed blade.

7. In a safety razor, a novel guard member of rectangular outline having a central portion bounded by longitudinal fulcrum shoulders and provided with longitudinal slots parallel to and outside said shoulders, and a flanged plate yieldingly held adjacent to the outer face of said guard with its flanges disposed substantially flush with said fulcrum shoulders.

8. In a safety razor, a novel rigid guard member having a central blade supporting surface and a pair of narrow parallel flanges, spaced one on each side of said surface and movable yieldingly from a position of flush relationship to a position below the plane of said surface.

9. A safety razor having co-operating blade-clamping members, one having a concave face and the other having a rigid surface and spring-pressed separate yielding elements with their free ends disposed initially flush with said rigid surface for supporting a blade in flat condition, and means for moving the said members toward each other whereby a blade between them may be flexed and the yielding elements correspondingly displaced.

10. A safety razor having co-operating blade-clamping members, one having a concave face and the other a rigid center portion of substantially oblong outline, yielding flanges spaced one along each longitudinal side of said surface and being normally maintained flush with said surface for supporting in co-operation with the latter a blade in flat condition, and clamping means for moving said blade-clamping members toward each other whereby a blade between the two members may be flexed and the yielding flanges correspondingly displaced.

NICHOLAS TESTI.