

July 21, 1931.

R. E. THOMPSON

1,815,745

SAFETY RAZOR

Original Filed April 25, 1929

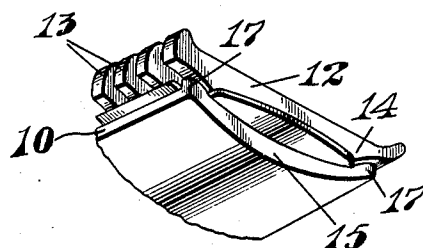
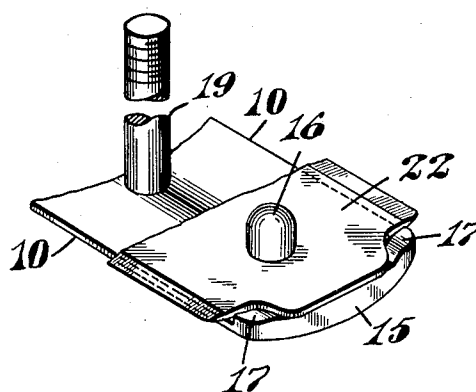
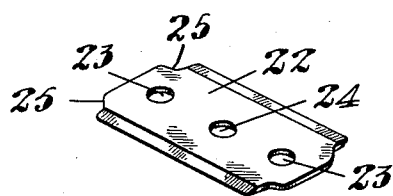
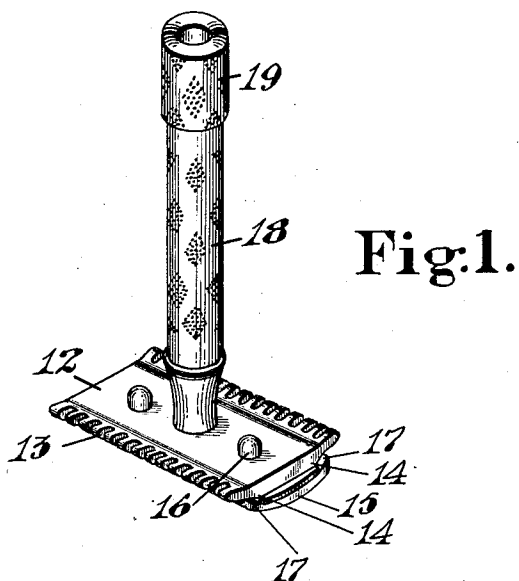


Fig. 3.

Fig. 4.

INVENTOR.  
Ralph E. Thompson.  
by *W. W. Fenway* atty

## UNITED STATES PATENT OFFICE

RALPH E. THOMPSON, OF BROOKLINE, MASSACHUSETTS, ASSIGNOR TO GILLETTE SAFETY RAZOR COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF DELAWARE

## SAFETY RAZOR

Original application filed April 25, 1929, Serial No. 358,114. Divided and this application filed December 3, 1930. Serial No. 499,744.

My invention relates to safety razors in which a thin, flexible and elastic blade, of oblong contour with unsharpened ends and internally apertured to receive positioning and clamping means, is removably secured in a holder comprising a guard member adapted to support the blade adjacent to its longitudinal cutting edges and a cap member provided on opposite sides with parallel straight edges which engage the blade adjacent to the longitudinal edges of the latter and flex it transversely on the guard member as a fulcrum during the process of clamping the blade in the holder, so that, when the razor is ready for use, the blade is maintained in a transversely curved condition and subjected to a pronounced stress, particularly at its longitudinal edge portions.

The Gillette razor exemplifies the type of razor which is described above. For convenience that type of razor will be referred to in this specification and in the appended claims as the "Gillette type", which term will imply the entire description contained in the preceding paragraph.

In the use of such a razor, satisfactory operation requires very accurate positioning of the blade edge with respect to the guard, and consequently it is extremely desirable that the parts which engage and flex the blade should retain, permanently, the precise shapes and dimensions imparted to them when manufactured. This is particularly true of the longitudinal straight edges of the blade-clamping cap, on which the alignment and amount of exposure of the blade edges depend, but inasmuch as these cap edges are necessarily made thin, in order to enable the cutting edge of the blade to reach the skin when the razor is held at the proper shaving angle, they are very easily deformed, particularly at the cap corners, to such an extent as seriously to impair the efficiency of the razor.

For example, the mere dropping of the razor, or of the cap alone has frequently resulted in bending over a corner of the cap to an extent sufficient, when the clamping pressure is applied to the blade, to produce an uneven edge exposure or even to crack or

break off a portion of the blade itself. Such a result may occur even though the bending of the cap corner is so slight that it is not likely to be noticed by the user, this being due to the fact that the pressure thereby applied to the blade tends to flex it locally in a different direction from that in which it has already been flexed by the cap as a whole, and according to a familiar geometrical principle the blade cannot be so flexed even slightly, without subjecting it to a greatly increased stress. In such a case the user invariably considers the unsatisfactory operation of his razor to be due to a defective blade, and either continues to use the defective holder and to find fault with the blades, or else discards the razor in favor of one of another make.

To meet the difficulty above explained I have devised an improvement which is applicable to any razor of the construction hereinbefore described, and which consists in reinforcing the cap corners and giving the blade such a contour as to accommodate the reinforced corners.

The blade is described and claimed per se and also in combination with a safety razor of well known construction in my copending application Serial No. 358,114 filed April 25, 1929 of which the present application is a division.

Generally speaking, the present invention consist in a safety razor having a cap with reinforced corners, a construction which is made possible by the novel contour of my blade and serves to minimize the liability of deformation of the cap, thus insuring the preservation of the straightness of its longitudinal edge where it acts upon the blade to flex and position it. The novel safety razor thus characterized and the novel combination of such a razor with the blade of my invention is claimed herein.

My invention may be embodied to good advantage, if desired, in a safety razor having a guard member provided with a channel underlying the cutting edge of the blade as the channel provides a space for the reception of lugs which may be employed for reinforcing the cap corners, thus insuring that

the lugs shall not contact with the guard for in such a case the blade flexing or clamping action of the cap might be objectionably limited.

5 These and other features of my 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  
10 drawings, in which,—

Fig. 1 is a view in perspective of one form of my improved razor.

Fig. 2 is a view in perspective of the blade.

Fig. 3 is a view in perspective on an enlarged scale showing a portion of the cap with the blade positioned thereon;

Fig. 4 is a view in perspective of one end of the assembled razor seen from beneath.

The blade-holding parts of the razor  
20 shown in the drawing are in general of standard construction. The guard member 12 is provided with guard teeth 13 on each of its longitudinal edges and with parallel shoulders 14 formed in part by channels in the  
25 guard and constituting fulcrums upon which the flexible blade is flexed transversely when clamped in the holder. The blade-shaping face of the guard is therefore convex in its general shape, the longitudinal channels  
30 being disposed opposite to the cutting edges of the blade. A cap member 15 having a transversely curved blade-shaping face cooperates with the guard 12 and is provided with a threaded center stem 19 projecting  
35 from its inner face and adapted to pass through a corresponding perforation in the guard member 12. The cap is also provided with a pair of blade-locating pins 16 herein shown as being circular in cross section, but  
40 which may be of any desired contour. The threaded center stem 19 extends into a hollow handle 18 which is secured at one end to the guard in the center of the latter and a nut  
45 19 adapted to turn freely in the handle 18 and having its inner end internally threaded to engage the stem 19, whereby the parts are clamped together.

The longitudinal edges 10 of the cap 15 overhang and are parallel to the fulcrum  
50 shoulders 14 of the guard and are located above the channels in position to overlie the cutting edges of the blade, so that when the blade is clamped in the holder the cutting edges are adjustably positioned and held  
55 over the channels as described in U. S. Letters Patent No. 1,328,024, dated January 13, 1920.

The blade 22 is or may be like the blade  
60 commonly used in razors of the type above described in that it is of substantially uniform thickness, transversely flexible, sharpened on its parallel longitudinal edges to provide two cutting edges and provided with  
65 perforations 23 and 24, to receive the studs

16 and the center stem 19 respectively. The blade is long enough at its central zone to overhang the ends of the cap 15, the latter feature being desirable not only to facilitate the removal of the blade from the cap but  
70 also to provide enough material between the end perforation 23 and the ends of the blade to prevent cracking of the latter along its center line. In contrast to the standard blade  
75 heretofore employed in this type of razor, however, my blade 22 is cut away at each of its four corners in such fashion as to provide a reentrant recess which bounds the corresponding end of the adjacent cutting edge  
80 and is so proportioned that when the blade is clamped in the holder these recesses span the respective corners of the cap and provide clearance spaces of sufficient size to receive the corners and their reinforcing lugs which  
85 will be presently described. Consequently while my blade is being flexed transversely by the cap 15 and is engaged only by those portions of the straight edges 10 of the cap which lie between the corresponding recesses  
90 25 of the blade, it cannot be broken or cracked by engagement with a cap corner either by being flexed or when clamped in final position in the holder.

It is noted that the reentrant recesses 25  
95 are each bounded internally by a fillet or inwardly curved portion, the effect of which is to prevent excesses of concentration of stress at these points when the blade is stressed, and thereby avoid breakage on account of  
100 such stresses.

The cap, which is of a distinctive construction made possible by the novel contour of the blade, is provided at each corner with a projection or reinforcing lug 17. These as  
105 herein shown are located on the inner or concaved face of the cap and constitute reinforcements which supply additional strength to the cap at the points where it is most likely to be bent or distorted. The lugs 17 are integral with the cap and so shaped that they  
110 taper inwardly from a maximum thickness at substantially the outer edge of the cap and are flush with its ends. The lugs therefore protect and safeguard the straight blade deflecting edges 10 of the cap, thus affording  
115 additional assurance that the portion of the cap which is critical in its action upon the blade shall be undistorted and accurate in shape. The lugs are preferably so disposed and proportioned that when the parts of the  
120 razor are clamped together they pass into or through the recesses 25 in the corners of the blades and into the channels of the guard member 12 but without engaging the latter and without interfering with the cooperative blade-clamping action of the cap and  
125 guard. The reinforcing lugs 17 may thus be made thicker and stronger than would otherwise be practical, but if these projections are not thicker than the blade itself or

are differently disposed, the preference or absence of the channels is unimportant so far as the lugs are concerned.

In Fig. 3 the blade 22 is shown as resting upon the cap 15 in which condition the relative transverse position of the cap and blade is determined by the action of the blade-locating studs 16 in the apertures of the blade. The reentrant recesses in the corners of the blade receive the upwardly projecting lugs 17 affording clearance spaces for them, the blade thereby being entirely out of contact with the lugs and uninfluenced in any way by them. In assembling the guard member 12 upon the blade and cap it will be noted that the fulcrum shoulders 14 are located within the blade flexing edges 10 of the cap so that the latter act to bend the edge of the blade over the fulcrum shoulders and into the channels of the guard to an extent determined by the relative position of the cap and guard. As herein shown, particularly in Fig. 4, the cap and guard members are of such relative size and shape that the lugs 17 of the cap lie in opposed relation to the body of the guard, projecting toward it from the cap within the area or general outline of the guard. While as a general thing no distortion of the reinforced cap corners is to be anticipated it will be apparent that, even should these become bent, the clearance spaces afforded by the reentrant recesses 25 of the blade will save the blade from being distorted or objectionably affected in respect to its edge exposure.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. A safety razor comprising a flexible and elastic blade of substantially oblong contour and internally apertured to receive positioning and clamping means, a guard member adapted to support the blade adjacent to the cutting edges of the latter, a blade clamping cap provided with parallel longitudinal edges and with reinforced corners, means for positioning the blade between the cap and the guard member, and means for clamping said parts together and simultaneously causing the longitudinal edges of the cap to flex the blade transversely on the guard member as a fulcrum the blade being provided with unsharpened ends and being cut away at each of its corners to such an extent as to span the corresponding reinforced cap corner and provide a clearance space of sufficient area to receive said cap corner if bent toward the guard member, each cap corner being located within the area of a cut away clearance space in the blade and also within the area of the guard and opposite the corners thereof, whereby a cap corner is prevented from exerting pressure on the blade while the latter is being flexed or when clamped and thereby

breaking the blade or distorting its cutting edges.

2. A safety razor comprising a flexible and elastic blade of substantially oblong contour and internally apertured to receive positioning and clamping means, a guard member adapted to support the blade adjacent to the cutting edges of the latter, a blade clamping cap provided with parallel longitudinal edges and reinforcing lugs at its corners, blade positioning projections, and means for clamping the cap and guard member together and for causing the longitudinal edges of the cap to flex the blade transversely on the guard member as a fulcrum, the blade being provided with unsharpened ends and with reentrant recesses located at its corner portions respectively and each extending both longitudinally and transversely of the blade and cap to such an extent as to span the corresponding reinforced cap corner and provide a clearance space freely to receive said cap corner each reinforcing corner lug being located within the area of one of said reentrant recesses and also within the area of the guard member and opposite to one corner thereof whereby the cap corner is prevented from exerting pressure on the blade while the latter is being flexed or when clamped and thereby breaking the blade or distorting its cutting edge.

3. A safety razor according to claim 2, in which the guard member is provided with a channel underlying the cutting edge of the blade and the corresponding cap corners and thereby providing space for the reception of the reinforcing lugs on the cap corners without limiting the blade flexing and clamping action of the cap.

4. A safety razor comprising a transversely flexible blade having a longitudinal cutting edge terminating at each end in a recess, which recesses constitute clearance spaces to eliminate clamping pressure at such recessed ends, a blade supporting member extending lengthwise beyond the cutting edge of the blade, and a blade-clamping cap having a straight edge engaging that portion of the blade between said recesses to bend substantially the whole blade transversely upon said supporting member and having its corners provided with reinforcing lugs extending in opposed relation to and toward the blade supporting member in the clearance spaces provided by said pressure preventing recesses and terminating in close proximity to said member.

5. A safety razor comprising a flexible blade with longitudinal cutting edges, cap and guard members shaped to maintain the blade in a transversely curved condition between them, and means for clamping the parts together, said blade having reentrant open areas at the ends of its cutting edge, which open end areas constitute clearance spaces to

prevent clamping pressure at the ends of the cutting edges, and the cap member having reinforcing lugs that project above its blade-shaping surface and which pass into the open

- 5 areas of the blade toward the guard member within the area or outline of said guard member and terminate in close proximity thereto.
6. A safety razor comprising a flexible blade, with longitudinal cutting edges, cap and guard members shaped to maintain the blade in a transversely curved condition between them, and means for clamping the parts together, said blade being provided with unsharpened ends and being cut away at each of its corners to such an extent as to span the corresponding cap corner and afford a clearance space therefor to prevent clamping pressure at the ends of the cutting edge, and the cap member having reinforcing lugs that project above its blade-shaping surface in opposed relation to the corners of the guard and which pass into the open clearance spaces of the blade toward the guard member and terminate in close proximity thereto.
7. A safety razor comprising a flexible and elastic blade modified to receive positioning and clamping means, a guard member adapted to support the blade adjacent to a cutting edge of the latter, a blade clamping cap provided with an outer clamping edge and with reinforcing lugs at its corners, means for positioning the blade between the cap and guard members, and means to clamp said members together and simultaneously causing an outer edge of the cap to flex the blade transversely on the guard member as a fulcrum, the blade being cut away at each of its corners at a cutting edge thereof to such an extent as to span the corresponding reinforcing lug and provide a clearance space of sufficient area to receive said reinforcing cap lug, each lug being located within the area of the cut away clearance space in the blade and also within the area of the guard and opposite the corners thereof whereby a cap corner is prevented from exerting pressure on the blade while the latter is being flexed or when clamped and thereby breaking the blade or distorting its cutting edge.
8. A safety razor comprising a cap member, a guard member and a flexible blade, said blade having a shaving edge, said members and blade having positioning means for said blade and cooperating surface portions on said members to flex said blade transversely and maintain said blade and the edge thereof in shaving position, in combination with means to draw said members together and maintain said blade in transversely flexed position, said members being longer than said cutting edge portion, reinforcing means on said cap member and extending toward the other member in opposed relation thereto and at least partly within the outline of the body of said members, said reinforcing means extending transversely of said blade at the ends of its cutting edge portion.
- Signed at Boston, Massachusetts, this twenty-ninth day of November, 1930.
- RALPH E. THOMPSON.

70

75

80

85

90

95

100

105

110

115

120

125

130