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

The blade of my invention has many advantages in itself and many advantages arising from its novel combination with elements of a safety razor. The blade has a normally flat resilient body and a supplemental member of flexible resilient sheet material secured or connected to the blade body and serving three or more distinct functions. In the first place it is a reinforcing element in that it stiffens and adds rigidity to that portion of the blade with which it is in immediate contact. Being disposed adjacent to the longitudinal axis of the blade the reinforcing member tends directly to stiffen or add rigidity to that area of the blade and the stiffening tendency thus imparted to the central portion of the blade is transmitted to its cutting edge with the result that the cutting edge or cutting edges of the blade are maintained in a straighter condition than in blades heretofore used.

The reinforcing function of the supplemental member is important not only in accurately maintaining the shape of the blade but also because it reduces blade breakage, as for example, when the blade is transversely flexed between the cap and guard members of a safety razor. This tendency to prevent blade breakage is extremely important from a practical standpoint and permits the manufacturer to provide blades having harder and better edge-holding temper than heretofore.

It has been the practice heretofore to anneal the end portions of safety razor blades, particularly those blades having a long central slot, in order to reduce blade breakage when the blades are flexed in their end portions. By employing the reinforcing construction of my invention the necessity for end annealing is relaxed. The ends of the blade may be left with a harder temper and the danger of unduly drawing the temper of the cutting edges in the end annealing operation is obviated or reduced.

While the supplemental or reinforcing member may be constructed of any suitable hard resilient sheet material a desirable feature of my invention consists in a sheet steel reinforcing member which is flexible and resilient and less hard than the steel of the blade itself, that is, the temper of the reinforcing member may be selected with a view to maximum toughness and flexibility without the limiting conditions of hardnness of the cutting edge portions of the blade itself.

In the second place, the blade of my invention has the advantage of a self-contained fulcrum about which the blade may be transversely flexed when positioned between the cap and guard members of a safety razor. Therefore, the blade of my invention may be flexed independently of the guard and without touching the guard at its shaving edge. The function of the guard may, therefore, be reduced to that of holding the skin at a definite distance from the blade edge. The guard is thus relieved of direct blade-shaping function and thus an opportunity for absolute control of the blade-edge exposure is achieved.

In the third place, the blade of my invention has the advantage of increased flexing resistance under clamping pressure, its pressure against the cap of the safety razor permitting the cap and guard members to be slightly separated and the edge exposure of the blade thus increased without substantially reducing the pressure upon the blade or upon the razor parts. The latter are thus maintained under a substantial degree of pressure throughout an appreciable range of adjustment without danger of displacement which would render the razor dangerous.

An important feature of my invention consists in a self-contained shiftable or adjustable fulcrum for a safety razor blade. This is provided as herein shown by shaping the supplemental member so that its side portions diverge away from the body of the blade. Pressure upon the blade as a whole causes the fulcrum line to shift outwardly as the material of the fulcrum becomes flattened under the blade, progressively shifting the fulcrum lines toward both edges of the blade, widening the effective fulcrum and distributing the load on the blade over greater and wider area as the load is increased. This characteristic action of the flexible fulcrum thus provides means to reduce blade breakage by distributing the load to which the blade is subjected.

Still another feature of my invention consists in a supplemental member designed to serve in cooperation with the safety razor as blade positioning means for accurately locating the blade in shaving position. In one embodiment of the invention the outer edges of the reinforcing and fulcrum-providing member may be shaped to provide straight outer edges shaped to slide into corresponding grooves or angles provided in the safety razor and so locate the blade by engage-
ment over a substantial length of edges adjacent to the cutting edges of the blade.

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

Fig. 1 is a view in perspective on an enlarged scale of the blade as seen from below, with a section broken out to show the sectional shape of the blade.

Fig. 2 is a similar view showing a blade of modified construction;

Fig. 3 is a view in perspective, on the same enlarged scale, of the safety razor having a section broken out to show a blade clamped in shaving position; and

Fig. 4 is a similar view showing the blade in the process of presentation to the guard or blade-supporting member of the razor, a portion being broken away to show the sectional shape of the parts.

The blade illustrated in Fig. 1 is shown as having the contour of a well-known commercial blade and comprising a generally rectangular body 10 of thin resilient sheet steel from 0.007" to 0.004" in thickness. The blade is herein shown as having corner notches defining elongated unsharpened end portions 11 of less width than the body of the blade and as being sharpened in its longitudinal edges 12. As already explained, the body of the blade is hardened and tempered to a degree providing the best possible edge-holding qualities in the cutting edges of the blade and it is somewhat annealed in its end portions to facilitate bending without breakage. As herein shown it is provided with a centrally disposed longitudinal slot 13 which has the effect of localizing the bending stresses of the blade in its softer end portions 11.

The supplemental member is herein shown as comprising a thin sheet metal attachment, corresponding in length to the blade, and preferably but not necessarily having end portions 14 extended flush with the end portions 15 of the blade. The member has connected side portions 15 and a longitudinal opening or slot which corresponds substantially in outline to the slot 13 in the body of the blade. In the embodiment herein shown, though not necessarily, the supplemental member is provided with attaching flanges 16 which extend through the slot 13 in the body of the blade and are folded or crimped on the opposite face of the blade about the margins of the slot. The flanges of the supplemental member thus make close and intimate contact throughout their entire area with one face of the blade 10, while the side portions 15 diverge from each other and from the other surface of the blade at acute angles and thus provide oblique or inclined strips or narrow plates, disposed in parallel longitudinal relation, terminating in free outer edges spaced from the body of the blade and free to yield and flatten out when the blade as a whole is subjected to clamping pressure between the parts of the safety razor.

The blade of each embodiment may be formed of any suitable resilient sheet material, for example, from the synthetic plastics now available or it may be formed of nonferrous metal, such as bronze, or of sheet steel. In any case the supplemental member is preferred so that the flexible body 10 of the blade in a central zone along the margins of its longitudinal slot both against longitudinal and against transverse flexing. As the blade as a whole is subjected to clamping pressure the diverging side portions 15 of the supplemental member are forced into more and more extended contact with the under face of the blade and the reinforcing effect of the supplemental member is thereby increased and extended more effectively toward the cutting edges of the blade.

In addition to its reinforcing function the supplemental member serves to locate the blade in the safety razor through the medium of its side portions 15 which are herein shown as shaped to make interlocking engagement with shoulders of the guard of the safety razor and which thus afford locating, or gauging edges disposed in proximity to the cutting edges of the blade. These and other functions of the supplemental member will be discussed and further explained in connection with the safety razor head shown in Figs. 3 and 4.

In Fig. 2 is shown a double-edge blade embodying my invention in somewhat modified construction. This blade has a body portion 20 of thin flexible steel and longitudinal cutting edges 22. The blade has unsharpened elongated end portions 21 similar to those of the blade shown in Fig. 1. Instead of a longitudinal slot, however, this blade is provided with a row of three longitudinal slots 23 arranged in alignment with the major axis of the blade, although the number and arrangement of the slots is of secondary importance. The supplemental member herein shown is of thin flexible metal corresponding in length to the body 20 of the blade. It is provided with slots coinciding in length and location with the slots 23 of the blade. The supplemental member has connected side portions 25 diverging symmetrically away from the under face of the blade in acute angles. Upon one side of each slot 23 in the blade the supplemental member is provided with an attaching flange 26 which extends through the slot and is folded or crimped over the upper surface of the blade. The attaching flanges 26 of the supplemental member are arranged alternately upon opposite sides of the respective slots 23, that is, the flanges 26 extend over the left-hand edge of the two end slots 23 while the corresponding attaching flange extends over the right-hand edge of the center slot.

The side portions 25 present straight edges by which the blade may be conveniently located in the razor.

In Figs. 3 and 4 there is illustrated one form of safety razor adapted particularly to receive the blade shown in Figs. 1 and 2, or with suitable modification other blades of this general type. The razor comprises a handle 30, a cap 32 and a blade-supporting or guard member 31, to which the handle may be rotatably or detachably connected as preferred. The guard 31 is provided at its opposite edges with guard bars 33 and in its upper face with parallel undercut longitudinal shoulders or ribs 34 which act to confine the free edges of the supplemental member and which provide between them open channels for the reception of the side portions 15 of the supplemental blade. The cap has a concave inner face with projecting corner lugs shaped to pass freely into the corner notches of the blade.

Fig. 4 suggests the manner in which the blade may be presented to locate the guard member, the guard 31. In this operation the free edges of the side portions 15 of the supplemental member are entered in the angular channels formed by the
rib 34 and the blade as a whole is pushed endwise inwardly until it registers symmetrically with the guard. In this operation the outer edges of the side portions 15 of the supplemental member travel in the channels thus provided in the guard of the safety razor, locating the blade transversely with great accuracy and holding it rigidly in the position shown in Fig. 4, that is to say, with the body of the blade suspended above the level of the ribs 34, of the guard. The cap 32 is now presented and its stem passed through a central aperture of the guard and threaded into the upper end of the handle 30. By rotating the handle 30 the cap 32 is drawn down to clamping relation with the guard. In this operation the blade is transversely flexed by the concave face of the cap and the flexible side portions 15 of the supplemental member are flexed and roll outwardly into engagement with an increased area of the underface of the blade. The outer edges of these flexible portions 15 are, of course held rigidly, thus maintaining the blade at all times accurately and in shaving position. When the cap 32 is released the side portions 15 immediately spring back into their initial position and again support the blade in flat condition above the ribs 34 where it may be conveniently flushed in cleaning the razor with both surfaces freely exposed.

It will be noted that the cap of the razor bears in addition the cap 32, serving a guiding function. Its sole purpose is that of blade flexing. Therefore, the cap may be located in the razor in relation to the guard and the blade in any suitable manner known to the art, for example, by corner lugs cooperating with corner recesses or notches in the blade; or by being pivoted to the guard, or other part of the head.

This application is a division of my application Serial Number 403,401, filed July 21, 1941.

Having thus disclosed my invention and described in detail several preferred embodiments thereof for the purpose of illustration but not in any limiting sense, I claim as new and desire to secure by Letters Patent:

1. A safety razor blade having a normally flat resilient body, and a supplemental member of resilient sheet material secured to the body of the blade adjacent to its major axis, having side portions diverging from the body of the blade and providing straight unobstructed outer edges for locating the blade in a safety razor having corresponding channels.

2. A double-edged safety razor blade having a normally flat resilient body, and a reenforcing member of resilient sheet material secured to the body of the blade, for the purpose of illustrating but not in any limiting sense, I claim as new and desire to secure by Letters Patent:

3. A double-edged safety razor blade having a thin sheet steel body, and a supplemental member of resilient sheet material centrally secured in double thickness to the body of the blade and thereby reenforcing the blade and having side portions obliquely disposed to the face of the blade and serving to support it in spaced relation to an underlying part of the safety razor.

4. A double-edged safety razor blade having a resilient body of thin sheet steel and a resilient sheet metal reenforcing attachment projecting from one face of the blade with side portions located opposite to portions of the blade body, diverging obliquely from the blade, terminating in free edges and being adapted to be pressed into increasingly extensive supporting areas of contact as the blade is subjected to increasing clamping pressure.

5. A double-edged safety razor blade having a longitudinally slotted resilient body, and a reenforcing fulcrum member folded over the longitudinal edges of the slot in the resilient body and having side portions flaring away from each other and terminating in free edges spaced from the surface of the resilient blade body.

6. A safety razor blade having a body of thin tempered steel, and a sheet steel reenforcing member of softer temper than the blade body with diverging side portions projecting obliquely with respect to the blade body and in yielding relation thereto and disposed entirely within the outline of the blade body.

7. A safety razor blade having a body of thin flexible steel, and a sheet metal member attached to the blade, stiffening it in an intermediate zone throughout its entire length and having obliquely disposed side portions normally spaced from the surface of the blade body and adapted to bend into contact with the flexible blade body in zones of increasing area as the blade body is subjected to increasing pressure.

8. A safety razor blade having a longitudinally slotted body of thin resilient steel, hardened cutting edges and less hard end portions, and a clip member engaging the blade and the edges of its slot and across the end portions thereof and having edge portions yielding spaced from the lower face of the blade.

9. A safety razor blade having a body of thin flexible steel, and a supplemental member attached thereto and projecting parallel yieldable strips sloping in opposite directions with respect to the adjacent face of the blade body and movable toward said face under pressure.

10. A safety razor blade having a body of thin flexible steel and longitudinal cutting edges, and a supplemental blade, holding and fulcrum member presenting substantially parallel elongated strips of resilient material disposed at acute angles to the adjacent face of the blade and having free outer edges adapted to engage a blade-locating part of a safety razor, and located to the blade, having side portions presenting parallel free edges spaced to fit in the channels of the supporting member to locate the blade in shoving position in the razor, the said side portions supporting the blade with its lower face spaced above the said blade-supporting member when presented thereto.

11. In a safety razor, the combination with a blade-supporting member having parallel longitudinal channels in its face, of a flexible blade, and a flexible supplemental member attached to the blade, having side portions presenting parallel free edges spaced to fit in the channels of the supporting member to locate the blade in shoving position in the razor, the said side portions supporting the blade with its lower face spaced above the said blade-supporting member when presented thereto.
14. In a safety razor, the combination with a guard having spaced ribs on its face, of a thin flexible blade provided with a flexible supplemental member having diverging side portions held at their outer edges between said ribs and supporting the body of the blade at a level above said ribs when presented to the guard.

15. In a safety razor, the combination with a blade-supporting member having spaced longitudinal ribs on its face, of a flexible blade having a flexible supplemental member attached thereto with side portions diverging outwardly from their lines of contact with the blade into engagement with the ribs of the supporting member.

16. In a safety razor, the combination with a guard having spaced ribs on its face, of a flexible blade having transversely sloping, flexible strips held against spreading by contact with said ribs and connected to the blade in lines more closely spaced than the said ribs.

17. A safety razor blade having a normally flat resilient body, and a supplemental member of resilient sheet material connected with the body of the blade, having divergent side portions extending away from the surface of the resilient blade body and providing razor-engaging means at their outer edges for locating the blade in a safety razor.

18. A safety razor blade having a resilient body of thin sheet steel and a flexible fulcrum member connected with the body of the blade and having side portions which are located opposite to portions of the blade body, which diverge obliquely from the blade, which terminate in free edges and which are arranged to become arched into increasingly extensive supporting areas of contact as the blade is subjected to increasing clamping pressure.

19. A safety razor blade having a body of thin flexible steel, and a supplemental sheet metal member connected with the blade, stiffening it in intermediate zones throughout its entire length and having obliquely disposed side portions diverging away from the face of the blade and arranged to fold into contact with the blade in zones of increasing area as the blade is subjected to increasing pressure.

20. A safety razor blade having a body of thin flexible steel sharpened at its longitudinal edges and provided with a medial longitudinal slot, and longitudinal spring members extending obliquely with respect to the blade body in symmetrical relation to the slot being disposed entirely within the outline of the blade body.

21. A safety razor blade having a body of thin flexible steel with a central aperture formed therein, and spring members presenting longitudinal yieldable strips sloping in opposite directions with respect to the adjacent face of the blade in symmetrical relation to the aperture of the blade and movable toward the face of the blade under pressure.

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