A safety razor magazine that houses a stainless steel razor blade band, 0.1895 inch in width, has a flat shaving platform that terminates at each end in a cylindrical surface of 0.062 inch radius over which the blade is bent through an angle of 165°. Two blade guide surfaces are provided at the rear of the shaving platform. The magazine cover has a wing wall surface at each end of the shaving platform that defines the outer wall of the blade guide channel. That wing wall surface includes a conical surface 75° in length which tapers at an angle of 4°48'. This conical surface has a vertical extension at its upper end and a planar fillet extension at its lower end. This lower fillet extension extends below the shaving platform and has a width of 0.185 inch so that it may support all but the rear edge of the blade. When the magazine is inserted in its holder, the blade is forced against the fillet surface as it is clamped on the shaving platform and the taper of that fillet surface tends to maintain the rear edge of the blade in contact with the blade guide surfaces at the rear of the shaving platform so that the "insert" geometry is the same as the "tracked" geometry.

SUMMARY OF INVENTION

This invention relates to a magazine for a ribbonlike shaving blade in which successive lengths of the blade may be rendered available for shaving, the magazine being of the type adapted to be removably carried in a holder to provide a safety razor.

In such razor blade magazines it is essential to maintain the blade in predetermined engagement with a reference surface which reference surface determines the exposure of the sharpened edge of the blade for shaving purposes and to prevent movement of the blade forward from that surface, so as such movement would change the exposure of the sharpened edge and the shaving geometry of the razor. Lateral movement of the blade across the blade support platform may occur when the magazine was first inserted into its holder, "Insert" exposure, as contrasted with the "tracked" exposure, produced by the advance of the blade in the magazine could vary as much as two thousandths of an inch. This variation in blade exposure produces undesirable and unpredictable shaving results when the magazine is first inserted into the holder. It is an object of this invention to provide an improved magazine for a ribbonlike blade in which the "insert" geometry of the razor is the same as the "tracked" geometry.

Another object of the invention is to prevent variation in shaving geometry as a result of inserting a blade magazine into a holder.

Still another object of the invention is to provide an improved band blade magazine that has minimal variation in shaving geometry in use.

The invention is incorporated in a magazine for a ribbonlike blade for use in a holder to provide a safety razor. The magazine includes structure defining a supply position, a take up position and a shaving platform which receives a shaving length of the blade. The magazine includes a channel for the blade that extends from the supply position to the shaving platform. A second similar channel extends from the shaving platform to the take up position. The inner wall of each channel includes a concave surface of small radius that defines the end of the shaving zone and the outer wall of the channel includes a cooperating concave surface of larger radius. In accordance with the invention, a raised surface disposed in this channel is located so that greater stress is imparted to the blade adjacent its sharpened forward edge than at its rear edge as the magazine is inserted into the holder.

This raised surface stresses the blade as the blade is clamped by the holder on the shaving platform in a preferential manner across its width so that it remains in its predetermined engagement with a reference surface which controls the position of the blade in the shaving zone. While this preferential stressing of the blade could be provided by a variety of structures, for example, a ridge extending along the forward portion of the outer wall of the blade guide channel, it is preferred that this preferential stressing be provided by a smooth inclined surface that terminates prior to the rear edge of the blade so that rear edge is unsupported at that point thus avoiding possible additional friction caused by burrs for example. It is preferred that the inclination of this surface be less than 10°, the preferred range being 3°-7°. In a particular embodiment the taper is 4°48'. The blade in the channel at the end of the shaving zone is bent about an angle greater than 90° and the raised surface extends beneath the shaving platform. In a particular embodiment, the blade is clamped against the positioning reference surfaces prior to insertion of the magazine in the holder by a surface on the inner front wall of the magazine. The raised surface extends past this clamping surface and preferential stress is applied as the clamping pressure is released as the magazine is inserted in the holder. Variations in "insert" shaving geometry are significantly reduced in magazines constructed in accordance with the invention, thus providing increased shaving effectiveness and comfort.

Other objects, features and advantages of the invention will be seen as the following description of a particular embodiment progresses, in conjunction with the drawings, in which:

FIG. 1 is a front view of a magazine for a ribbon type blade constructed in accordance with the invention, removably carried by a holder to form a safety razor;

FIG. 2 is a front view of the magazine of FIG. 1 with the front wall of the cover removed, and other parts broken away or removed for clarity;

FIG. 3 is a top view of the magazine with a portion of the razor blade broken away;

FIG. 4 is a sectional side view taken along the line 4--4 of FIG. 2 of the magazine;

FIG. 5 is a partial sectional view similar to FIG. 4 showing the magazine secured in the holder;

FIG. 6 is a sectional view of a portion of the magazine taken along line 6--6 of FIG. 3;

FIGS. 7 and 8 are sectional views taken along the lines 7--7 and 8--8, respectively, of FIG. 6;

FIG. 9 is a plan view of a portion of the cover component of the magazine;

FIG. 10 is a rear elevational view of the structure shown in FIG. 9; and

FIG. 11 is a sectional view taken along the line 11--11 of FIG. 10.

DESCRIPTION OF PARTICULAR EMBODIMENT

With reference to FIG. 1 the safety razor structure there illustrated includes a holder member 30 in which a magazine member 12 is releasably secured. This razor
structure is generally of the type shown in U.S. Patent No. 3,262,198. The magazine member 12 includes a base component 14 and a cover component 16 which is secured to the base component 14 by snap type connectors. It is preferred that the components of the magazine structure be manufactured of a suitable organic plastic that is capable of being subjected to repeated deformation stresses and which will withstand the temperature and corrosion environment to which the razor may be exposed in use. A suitable plastic material for the base and cover components is an acetal plastic sold under the name "Delrin."

With reference to FIGS. 2-4, the base component 14 includes a generally planar back wall 18 that has an up-standing cylindrical wall member 20 located intermediate the ends of the base. This cylindrical wall member defines a cylindrical supply chamber which receives a col of shaving blade 22. Adjacent the upper end of back wall 18 is formed an upstanding planar blade support platform 24 that extends perpendicularly to the plane of the base 18. Adjacent the other end of the back wall 18 is a circular aperture 26 in which is rotatably disposed an arbor 28 that has a slot 30 therein that receives one end of blade 22. A portion 32 of reduced width in slot 30 serves to secure to the end of the blade 22 so that the blade is firmly secured to the arbor 28. The blade 22 in this embodiment is the strip of stainless steel 0.0015 inch in thickness and 0.1895 inch in width having a sharpened forward edge 36 and an unsharpened rear edge 38 parallel to forward edge 36 (as best indicated in FIG. 3). Disposed on arbor 28 is an indicator dial 40, a portion of which is visible through aperture 42 in cover 16 (FIG. 1).

Blade 22 extends from the supply chamber defined by cylindrical wall 28 past a first guide pad 44 formed in the magazine cover 16 (of 0.180 inch radius and 70° in arcuate length), a second guide surface 46 formed in the back plate (of 0.052 inch radius and 165° in arcuate length) at the end of the blade support platform 24, along the blade support platform and around a third guide surface 48 identical with guide surface 46 formed at the other end of platform 24, past a fourth guide surface 50 identical with guide surface 44 formed in cover 16, and finally to take up arbor 28.

Formed at the rear end of the blade support platform 24 at each end thereof is an upstanding reference and guide surface 60, 0.020 inch in height which provides a guide for the rear edge 38 of the ribbon blade 22. Shoulder 62 extends between surfaces 60 and is recessed 0.010 inch. Disposed above the blade support platform 24 and extending forwardly over that platform from shoulder 62 are a series of four spaced tabs 64 which act as guides contributing to the definition of the path of the blade 22 through the shaving zone defined by the blade support platform 24. Disposed forwardly of and below the blade support platform 24 is a guard bar structure 66. This guard bar structure 66 is secured to the platform 24 by webs 68 which define slots 70 between the guard 66 and the front edge of the blade support platform 24 to permit movement away from the shaving zone of hair elements or other debris that might accumulate during the shaving operation.

The cover 16 is secured to the back 14 by clamping tabs 72 which engage recesses at the rear edges of shoulder 62 and by side wall tabs (not shown) which engage recesses in wall 18 on either side of supply cavity 20. Alignment pins 74 extend rearwardly from the inside surface of the cover 16 and are received in holes 76 in back element 14.

The holder 10 as best seen in FIGS. 1 and 5 has formed at its upper end a head portion 80 having a forwardly projecting elongated lip 82 and a downwardly extending back web 84 which is rigidly connected at its lower end to handle 86. Head 80 is provided with slots which receive in mating relation the magazine blade guide tabs 64. The lip 82 extends across the entire width of the head 80 and has a substantially planar blade engaging surface 90 on its under side. When the magazine 12 is not secured in holder 10, the blade 22 is arched upwardly into engagement with tabs 64.

A latch structure 92 is pivotally mounted on the holder 10 and, when the magazine 12 is mounted in holder 10, as indicated in FIG. 1, the latch structure 92 biases the magazine upwardly towards lip 82 and surface 90 engages and urges the blade 22 downwardly into contact with the blade support platform 24 to firmly clamp the blade against the supporting surface in flat shaving position with the sharpened edge of the blade exposed in shaving position.

A blade advancing lever (not shown) is rotatably mounted on the rear of web 84 and includes a pin which engages a lug on arbor 28 when the magazine 12 is inserted in holder 10 so that when the blade advancing lever is rotated the arbor 28 is turned to advance a fresh portion of blade 22 into shaving position. When the thumb piece of the latch structure 92 is pressed inwardly, a rear cam surface of the latch structure acts against the bottom of the magazine to release and permit it to be removed from the holder 10.

Details of the blade guide channel between guide surfaces 44 and 46 are shown in FIGS. 6-11, the guide channel between surfaces 48 and 50 being similarly formed. Conical pad 44 is of 0.180 inch radius, of 70° arcuate length and is tapered at 5° with the apex of the cone lying to the rear of the magazine. The second guide surface 46 is a convex cylindrical surface of 0.062 inch radius, and 165° in arcuate length. Cooperating with convex cylindrical surface 46 is a concave conical surface 100 formed in the wing portion of cover 16. Surface 100 has a depth of 0.185 inch, a radius of 0.0705 inch about the same center of radius as surface 46, an arcuate length of 75° and a conical taper of 4° 48' to an apex that is located in front of the magazine. This conical surface 100 has a vertical continuation 102 at its upper end and a continuation in the form of tapered fillet surface 104 extending from its lower end to pad 44. In the front wall of the wing above the tapered fillet surface 104 is a vertical surface 106 in which is disposed a recessed 108 which is 0.125 inch from surface 102. A portion 112 of surface 106 between recess 108 and pad 44 functions to force the blade band 22 rearwardly against guides 60 when the cartridge 12 is not inserted in the holder 10.

As is indicated in FIGS. 5, 9, the rear walls 114 of the wings of the magazine are tapered rearwardly at a 4° angle. When the magazine is placed in holder 10, web 84 contacts the clamping tabs 72 and forces the front walls 112 away from the blade edge 36 freeing the blade. Lip 82 contacts the upper surface of blade 22 and forces it down into firm engagement with platform 24 as indicated in FIG. 5. In this operation the blade is forced downwardly through the curved channel defined by surfaces 103 and 46 and against the planar fillet extension 104. The configuration of surfaces 100, 102 and 104, as the blade is forced downwardly in this clamping action, imparts a greater stress to the forward edge 30 of the blade than to the rear edge 38 due to the smaller curvature to which it is subjected, and the blade 22 as it slides over the inclined surfaces 100, 102 and 104 is maintained in its rearward position with its rear edge 38 at each end of the shaving zone in engagement with guides 60 and does not move forward as the wings are flexed together with the holder web 84, relieving the engagement of blade edge 36 with the clamp surfaces 112, or as the blade length is clamped against platform 24.

While a particular embodiment of the invention has been shown and described, various modifications thereof will be apparent to those skilled in the art and therefore it is not intended that the invention be limited to the
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disclosed embodiment or to details thereof and departures may be made therefrom within the spirit and scope of the invention as defined in the claims.

What is claimed is:

1. For use in a safety razor, a magazine member adapted to be received in a holder member, said magazine member adapted to store a ribbonlike blade of uniform width having a longitudinally extending rear edge and a parallel sharpened front edge,

said magazine comprising structure defining a blade supply position, a blade take up position, and a blade path extending between said supply position and said take up position, said structure defining said blade path including a blade support platform which defines a shaving zone for receiving a shaving length of blade in supporting position with the sharpened edge of the blade projecting beyond the front edge of said support platform in exposed position for shaving, a reference surface at said blade support platform for engaging and guiding the blade in said shaving zone, a first channel extending from said blade supply position to said blade support platform and a second channel extending from said blade support platform to said blade take up position, characterized by the provision of a raised surface in the outer wall of at least one of said channels for imparting greater stress to the forward portion of said razor blade as said magazine member is being inserted in said holder member to maintain said razor blade against said reference surface in said shaving zone and provide uniform shaving geometry.

2. The magazine member as claimed in claim 1 wherein said raised surface is disposed beneath said blade support platform.

3. The magazine member as claimed in claim 1 further including a cylindrical convex surface of small radius defining the end of said blade support platform adjacent said one channel, said blade being bent through an angle greater than 90° about said convex surface, and wherein said blade path defining structure includes a wall member disposed outside said curved end surface, said raised surface including a conical concave surface in said wall member, the apical point of which lies forward of said blade path.

4. The magazine member as claimed in claim 3 further including a vertical extension of said conical concave surface from said raised surface.

5. The magazine member as claimed in claim 1 wherein said raised surface is an elongated inclined surface that extends along said one channel beneath said blade support platform for engagement with the under surface of said blade, the width of said inclined surface being less than the width of said razor blade so that the rear edge of said razor blade is unsupported by said inclined surface in said channel.

6. The magazine member as claimed in claim 5 wherein the angle of inclination of said inclined surface with respect to the plane of said support platform is less than 10°.

7. The magazine member as claimed in claim 1 and further including structure for maintaining said blade in engagement with said reference surface when said magazine member is not secured in said holder member, said maintaining structure releasing said blade as said magazine member is being secured in said holder member and said holder member forcing said blade down onto said support platform in a clamping operation and simultaneously forcing the blade along said raised surface, thereby maintaining said blade in engagement with said reference surface.

8. The magazine member as claimed in claim 7 wherein said reference surface includes a pad at each end of said shaving zone against which the rear edge of the blade abuts and wherein said raised surface is disposed in each of said channels for maintaining the rear edge against said pads as said magazine member is being inserted in said holder member.

9. The magazine member as claimed in claim 8 and further including a cylindrical convex surface of small radius defining the end of said blade support platform adjacent said one channel, said blade being bent through an angle of about 165° about said convex surface, and wherein said blade path defining structure includes a wall member disposed outside said curved end surface, said raised surface including a conical concave surface in said wall member, the apical point of which lies forward of said blade path, with said concave and convex surfaces having the same centers of radius and defining a portion of each said channel defining said blade path.

10. The magazine member as claimed in claim 9 wherein in each said raised surface further includes an inclined surface formed as an extension of said conical concave surface toward said supply position, the width of said inclined surface being less than the width of said razor blade so that the rear edge of said razor blade is unsupported by said inclined surface in said channel.

11. The magazine member as claimed in claim 10 wherein the angle of inclination of said inclined surface with respect to the plane of said support platform is in the range of 3-7°.

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