

[54] RAZOR WITH ADJUSTABLE BLADE
CARTRIDGE

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[21] Appl. No.: 294,759

3,775,845 12/1973 Kuhl 30/63 X

FOREIGN PATENTS OR APPLICATIONS

595,799 12/1947 Great Britain 30/63

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[52] U.S. Cl. 30/47, 30/32, 30/63, 30/77

[51] Int. Cl. B26b 21/16, B26b 21/06

[58] Field of Search 30/47, 60-63,
30/71-73, 77, 81, 83, 32

[56] References Cited

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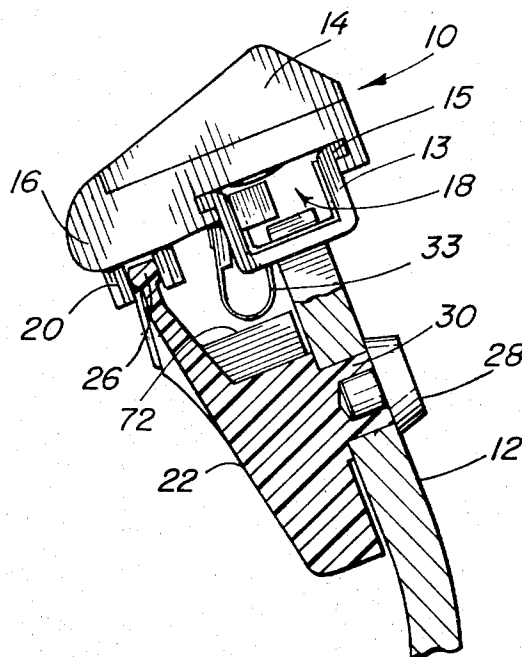
895,997	8/1908	Flagg	30/61 X
2,799,926	7/1957	Shaylor	30/63
3,111,756	11/1963	Kruger	30/63
3,128,551	4/1964	Crown	30/63
3,388,831	6/1968	Hansom	30/63 X
3,724,070	4/1973	Dorion	30/50 X

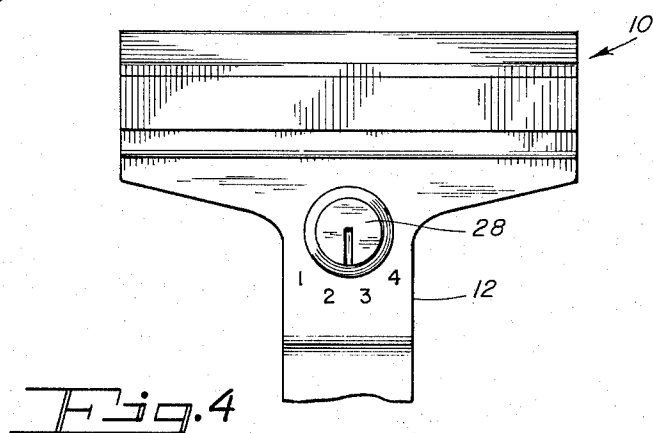
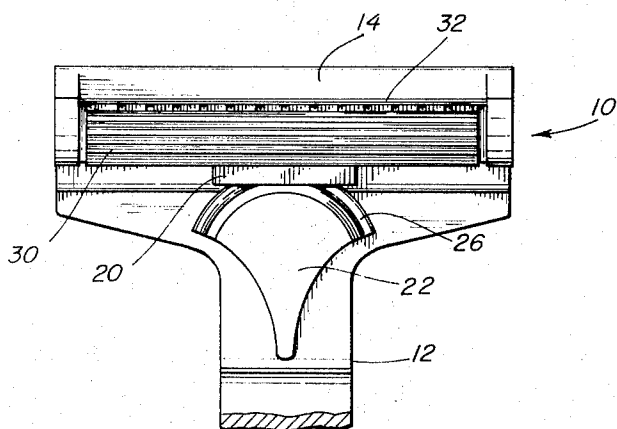
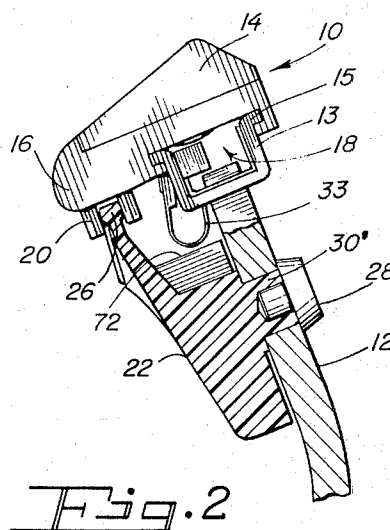
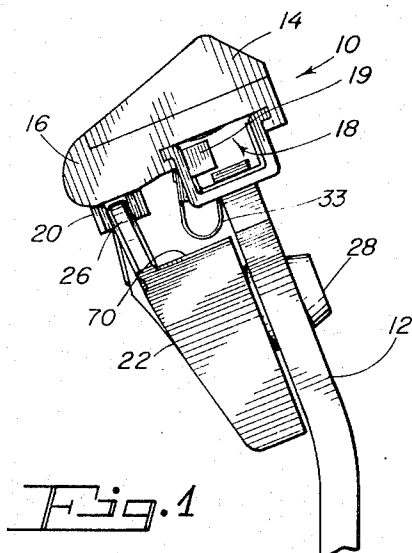
[57]

ABSTRACT

The specific disclosure provides a safety razor system comprising a cartridge having at least one single cutting edge blade and a guard member having a transverse blade guard surface, and a holder including means for releasably engaging the cartridge. The system also includes means for movably supporting the guard member of the cartridge, and means mounted on the holder and releasably interlocked with the guard member for selectively adjusting the guard surface with respect to the cutting edge of the blade.

8 Claims, 15 Drawing Figures





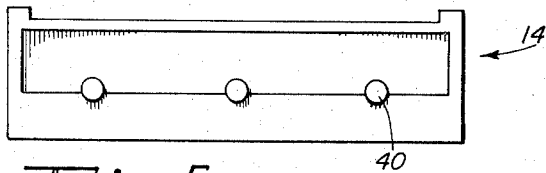


Fig. 5

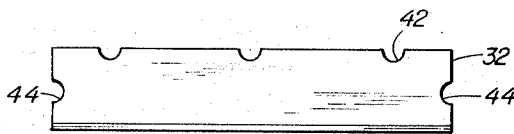


Fig. 6

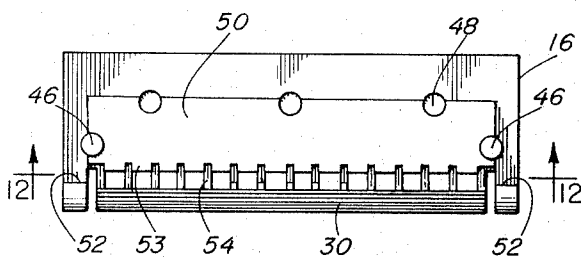


Fig. 7

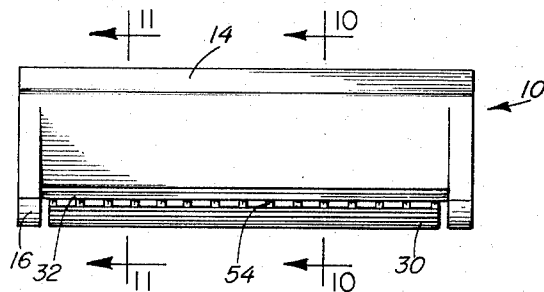


Fig. 8

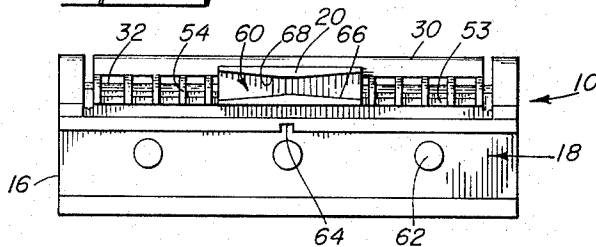


Fig. 9

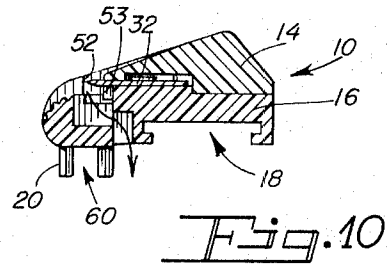


Fig. 10

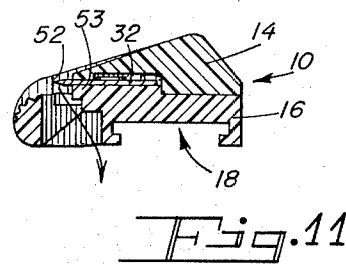


Fig. 11

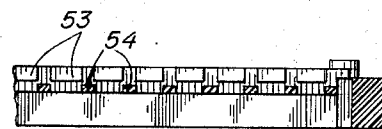


Fig. 12

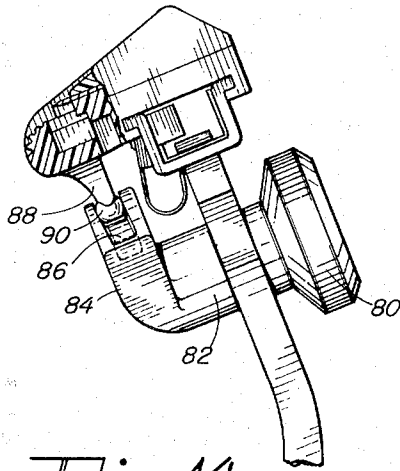


Fig. 14

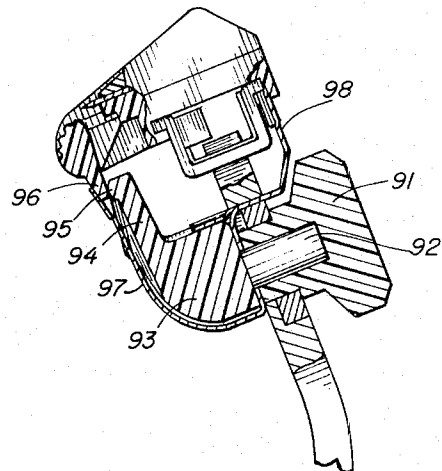


Fig. 15

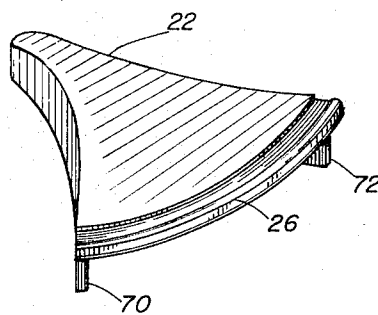


Fig. 13

RAZOR WITH ADJUSTABLE BLADE CARTRIDGE

BACKGROUND OF THE INVENTION

The present invention relates to safety razors of the type having at least one blade permanently bonded in a disposable and replaceable cartridge.

It is known to permanently bond a blade in a disposable and replaceable cartridge. For example, U.S. Pat. Nos. 1,864,995 and 3,388,831 each disclose a razor system having a blade permanently bonded in a disposable and replaceable cartridge. The former patent discloses a double cutting edge blade bonded in a plastic cartridge, and the latter patent provides a single cutting edge blade bonded in a plastic cartridge. Typically, a safety razor has a guard surface situated downwardly and outwardly from the cutting edge of a blade and parallel to the cutting edge. The guard surface may be of the comb variety such as shown in U.S. Pat. No. 1,864,995, or may be formed by an outer surface of an elongated guard bar such as shown in U.S. Pat. No. 3,388,831. The cartridges disclosed in the foregoing patents have factory-set shave angles which are defined by the relationship between a blade cutting edge and a guard surface.

SUMMARY OF THE INVENTION

The present invention is directed to a safety razor system wherein the shave angle is adjustable to meet a need or a preference of a user.

In accordance with the present invention, there is provided a safety razor system comprising a cartridge having at least one single cutting edge blade and a guard member having a transverse blade guard surface. A builder is provided for releasably engaging a cartridge. The system also includes means for movably supporting the guard member on the cartridge, and means mounted on the holder and releasably interlocked with the guard member for selectively adjusting the guard surface with respect to the cutting edge of the blade.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation view of an embodiment of the present invention showing a holder releasably engaging a blade cartridge;

FIG. 2 is a side elevation view of the embodiment of FIG. 1 with a portion of the cartridge and holder shown in cross-section;

FIG. 3 is a front elevation view of the embodiment of FIG. 1;

FIG. 4 is a rear elevation view of the embodiment of FIG. 1;

FIG. 5 is a bottom plan view of a cap portion of the cartridge shown in FIG. 1;

FIG. 6 is a top plan view of a single cutting edge blade used in the cartridge of FIG. 1;

FIG. 7 is a top plan view of a blade seat portion of the cartridge of FIG. 1;

FIG. 8 is a top plan view of the cartridge of FIG. 1;

FIG. 9 is a bottom plan view of the cartridge of FIG. 1;

FIG. 10 is a cross-sectional view of the cartridge taken along Lines 10 — 10 of FIG. 8;

FIG. 11 is another cross-sectional view of the cartridge taken along Lines 11 — 11 of FIG. 8;

FIG. 12 is a cross-sectional view of the blade seat portion taken along Lines 12 — 12 of FIG. 7;

FIG. 13 is a perspective view of a cam element;

FIG. 14 is a side elevation view of another embodiment of the present invention; and

FIG. 15 is a side elevation view with portions broken away of still another embodiment of the present invention.

DESCRIPTION OF SPECIFIC EMBODIMENTS

With reference to FIGS. 1 through 4, a holder 12 has a transverse U-shaped member 13 at the upper end thereof. The U-shaped member 13 has forwardly and rearwardly directed flange portions 15 for sliding engagement in a T-shaped channel 18 formed in the underside of a disposable and replaceable cartridge 10. A spring member 33 is also provided at the upper end of the holder 12 to bias a detent into a notch 64 (FIG. 9) formed in the T-shaped channel 18.

A finger piece 22 has an internally threaded boss 30' positioned in the holder 12. An indicator member 28 is rigidly secured to the boss 30' to maintain the finger piece mounted on the holder 12. An arcuate cam 26 is formed at the upper end of the finger piece 22 and is positioned in a channeled cam follower 20 formed on the underside of a movable guard bar 30 of the cartridge 10. Rotary movement of the finger piece 22 about the axis of the boss 30' causes the guard bar 30 to move with respect to the cutting edge of a blade 32 to thereby adjust the shave angle of the cartridge 10.

The cartridge 10 comprises a cap member 14 and a blade seat member 16 having the blade 32 permanently bonded therebetween. As shown in FIG. 5, the cap member 14 has a plurality of downwardly extending elongated posts 40. The blade 32 has a semi-circular recess 44 at each end thereof, and three semi-circular recesses 42 at the rear end thereof. With reference to FIG. 7, the blade seat 16 has three apertures 48 extending vertically therethrough, and a pair of spaced upwardly extending posts 46. The blade 32 is positioned on a plateau 50 of the blade seat member 16 with the upwardly extending posts 46 positioned in the blade recesses 44. The cap member 14 is then positioned over the blade 32 with the posts 40 extending downwardly through the rear blade recesses 42 and through the apertures 48 in the blade seat member 16. The lower ends of the cap posts 40 are then deformed to permanently bond the cap and blade seat members 14, 16 and the blade 32. The blade seat member 16 has a pair of vertical surfaces 52 which act to prevent nicks and cuts from the outer corners of the cutting edge of the blade 32.

As shown in at least FIGS. 7 and 12, the guard bar is spaced from the main body of the blade seat member 16 by a plurality of ribs 54. In the embodiment shown, the blade seat member 16 is preferably formed of molded plastic. The ribs 54 are relatively small in cross-section, and permit movement of the guard bar 30 with respect to the cutting edge of the blade 32. FIGS. 7 and 12 also show relatively small ledges 53 positioned upwardly and between the ribs 54. The ledges 53 provide additional support for the blade 32. The arrows pointing downwardly and to the right of the cutting edge of the blade 32 shown in FIGS. 10 and 11 indicate the flow of shaving residue below the cutting edge of the blade 32.

With reference to FIG. 9, the channeled cam follower 20 is formed of downwardly extending walls 66, 68 which form the channel 60. Each end of the downwardly extending walls 66, 68 are beveled or funneled to guide the cam 26 (FIG. 13) of the finger piece 22 into the channel 60. The thickness of the cam 26 is constant throughout the arcuate length thereof, and is chosen to provide a relatively tight fit at the narrowest center portion of the channel 60. It should also be noted that the cam 26 helically extends from a high point adjacent to rearwardly extending surface 72 to a low point adjacent to another rearwardly extending finger piece surface 70. The surfaces 70, 72 act as cam stops to prevent the cam 26 from being rotated out of the channel 60.

The cartridge 10 is positioned on the holder 12 by sliding the U-shaped member 13 into the T-shaped channel 18 formed in the underside of the cartridge 10. As the U-shaped member 13 is moved transversely in the T-shaped channel 18, the cam 26 enters one of the funneled ends of the channel 60 in the cam follower 20 and is thus guided therein. A stop element 19 (FIG. 1) is provided in the U-shaped member 13 to ensure proper orientation of the holder 12 with respect to the cartridge 10 when dispensing cartridges from a dispenser such as that provided with the commercially available Schick Super II Cartridge Shaving System manufactured by Schick Safety Razor Company, Milford, Connecticut. After the cartridge 10 is positioned on the holder 12, the user rotates the finger piece 22 to adjust the guard bar 30 with respect to the cutting edge of the blade 32 and thus obtain a desired shave angle. As shown in FIG. 4, suitable indications of guard bar settings can be provided on the rear surface of the holder 12.

FIG. 14 shows an alternative embodiment of the present invention wherein the cartridge may be constructed as described hereinabove, but wherein a downwardly extending element 88 having a cam follower 90 at the lower end thereof is substituted for the channeled cam follower 20 of the foregoing embodiment. The cam follower 90 is positioned in a helical channel 86 formed in an upwardly extending portion of a trunion 82 which is rotatable by a knob 80 to obtain a desired shave angle.

FIG. 15 shows another alternative embodiment wherein a cam follower 96 extends downwardly from the guard bar and is interlocked between a cam surface 95 and a spring member 97. The cam surface 95 is formed at the upper end of an extension 94 of a cam element 93. The cam element 93 is rigidly secured to a knob 91 by a pin 92. Rotation of the knob 91 acts to move the cam surface 95 with respect to the cam follower 96 to thus adjust the shave angle of the cartridge. The spring 97 ensures that the cam follower 96 is biased into abutting engagement with the cam surface 95. The spring 97 is shown as a portion of a spring 98 which biases a detent into a notch formed in the channel on the underside of the cartridge.

As used herein, the front or forward end of the cartridge and/or the holder is that end having the guard bar. Thus, transverse is used herein to identify a side-to-side direction that is at least substantially parallel to the guard bar.

I claim:

1. In a safety razor system comprising a cartridge in-

cluding at least one single cutting edge blade bonded thereto and a guard member having a transverse blade guard surface, and a holder adapted to releasably engage said cartridge, the combination comprising:

means for movably supporting said guard member on said cartridge,

said guard member including a transverse downwardly opened channel formed on an underside thereof, and

cam means mounted on said holder and removably positioned in said channel when said cartridge is engaged by said holder for selectively adjusting said guard surface with respect to the cutting edge of said at least one blade, said cam means being removed from said channel when said cartridge is disengaged from said holder.

2. The system of claim 1 wherein said cam means comprises an upwardly extending cam surface positioned in said channel.

3. The system of claim 1 wherein said cam means comprises a cam pivotally mounted on said holder, and wherein said cam comprises an upwardly extending arcuate cam surface positioned in said channel.

4. The system of claim 1 wherein said cam surface is helically formed.

5. The system of claim 1 wherein said cam means comprises stop means formed adjacent to a low point and to a high point of said cam for limiting movement of said cam in said channel.

6. The system of claim 1 wherein said channel is outwardly flared at least at one end thereof for guiding said cam means into position in said channel.

7. In a safety razor system comprising a cartridge including at least one single cutting edge blade bonded thereto and a guard member having a transverse blade guard surface, and a holder adapted to releasably engage said cartridge, the combination comprising:

means for movably supporting said guard member on said cartridge;

a cam follower connected to and extending downwardly from said guard member, and

means mounted on said holder and including an upwardly opened helically formed channel for removably seating said cam follower,

whereby movement of said seating means selectively adjusts said guard surface with respect to the cutting edge of said at least one blade.

8. In a safety razor system comprising a cartridge including at least one single cutting edge blade bonded thereto and a guard member having a transverse blade guard surface, and a holder adapted to releasably engage said cartridge, the combination comprising:

means for movably supporting said guard member on said cartridge,

a cam follower connected to and extending downwardly from said guard member,

a cam pivotally mounted on said holder and including a cam surface, and

means connected to said holder and in abutting engagement with said cam follower for biasing said cam follower into abutting engagement with said cam surface when said cartridge is engaged by said holder, said cam follower being disengaged from said biasing means and said cam surface when said cartridge is disengaged from said holder.

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