# United States Patent [19]

**Bowman et al.**

[11] **3,909,941**

[45] **Oct. 7, 1975**


[54] **ADJUSTABLE SAFETY RAZOR**


[75] Inventors: **Peter Bowman**, Sandy Hook; **Ernest F. Kiraly**, Fairfield, both of Conn.

[73] Assignee: **Warner-Lambert Company**, Morris Plains, N.J.



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[52] **U.S. Cl.** ..... **30/47;** 30/57; 30/77

[51] **Int. Cl.**[2] ..... **B26B 21/06;** B26B 21/14

[58] **Field of Search** ..... 30/50, 54, 60, 60.5, 61, 30/63, 71, 77, 57, 47; 403/33, 81, 93



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 1,918,227 | 7/1933 | Muros | 30/60.5 |
| 3,080,651 | 3/1963 | LaCas | 30/61 |
| 3,783,507 | 1/1974 | Perry | 30/77 X |
| 3,816,916 | 6/1974 | Kuhnl | 30/63 X |



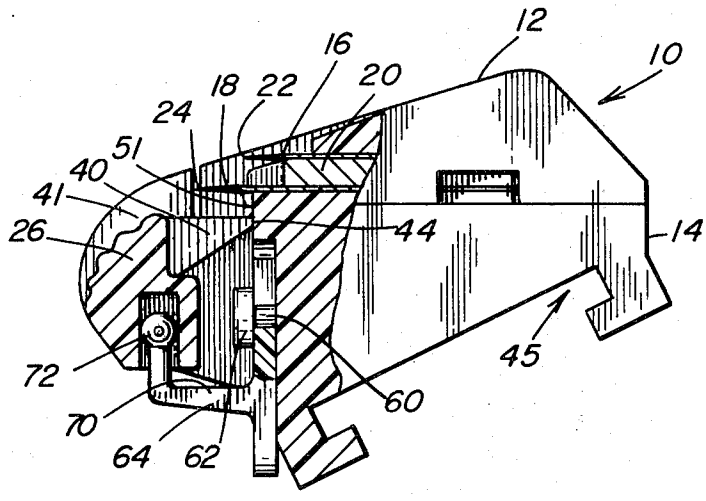
*Primary Examiner*—Al Lawrence Smith
*Assistant Examiner*—Gary L. Smith
*Attorney, Agent, or Firm*—James F. Powers, Jr.; Albert H. Graddis



[57] **ABSTRACT**

The specific disclosure provides an adjustable safety razor having a guard structure hinged to a blade seat member, and a manually operable cam pivotally mounted on the blade seat member and extending into a channel in the guard structure for moving the guard structure about an axis defined by the hinging means.


**2 Claims, 3 Drawing Figures**



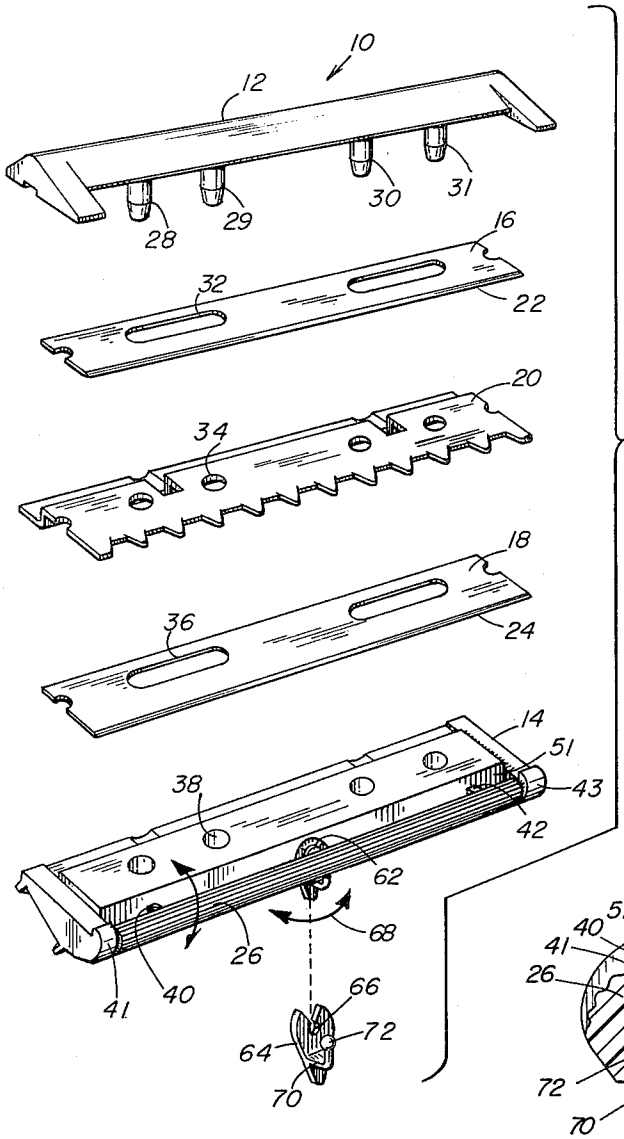



Fig. 1

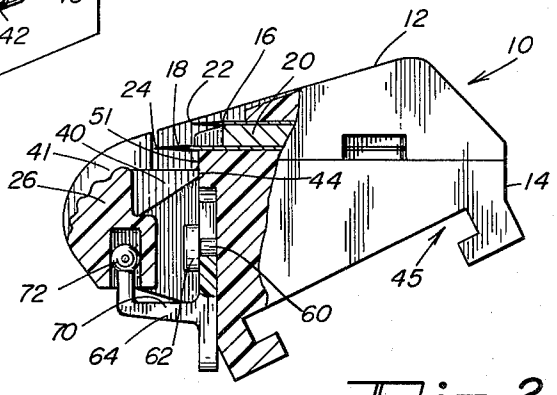



Fig. 2

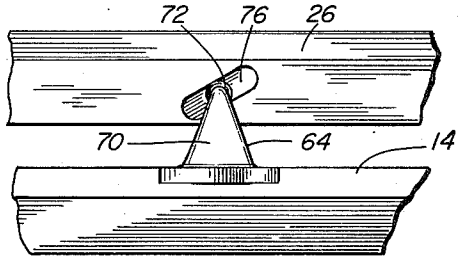



Fig. 3

# ADJUSTABLE SAFETY RAZOR

## BACKGROUND OF THE INVENTION

The present invention relates to safety razors of the type in which a guard structure is manually adjustable to vary the shaving parameters of the razor. The invention is particularly suitable for safety razors of the type having at least one blade permanently bonded in a replaceable plastic cartridge, or of the disposable type formed at least in-part of plastic.

Safety razors having means for adjusting guard structure with respect to blade cutting edge(s) are well known in the art. For example, U.S. Pat. No. **3,375,578** discloses an adjustable band razor cartridge, U.S. Pat. No. **3,358,368** provides an adjustable double edge razor and U.S. Pat. No. **3,203,093** shows an adjustable single edge razor. Movement of the guard structure acts to vary shaving parameters such as shave or tangent angle, exposure and span. Shave angle is measured between the median plane of a blade and a plane extending from the cutting edge of the blade tangent to the skin-engaging surfaces in front of the blade. Exposure is the distance from the cutting edge to a plane tangent to the skin-engaging surfaces disposed in front of and behind the cutting edge. Span is the distance between the cutting edge and the skin-engaging surface in front of the cutting edge.

## SUMMARY OF THE INVENTION

An object of the present invention is to provide a relatively uncomplex means for adjusting a guard structure with respect to blade cutting edge(s), such that manufacturing and assembly costs are minimized.

In accordance with the present invention there is provided an adjustable safety razor comprising a blade seat member, at least one blade positioned on the blade seat member, and a guard structure. Means are provided for hinging the guard structure to the blade seat member, and the hinging means defines an axis parallel to the guard structure. A linear channel is formed in the guard structure, and manually operable means is pivotally mounted on the blade seat member and extends into the channel for moving the guard structure about the hinging means axis.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an exploded perspective view of a twin blade cartridge embodiment of the present invention;

FIG. **2** is a cross-sectional view of the cartridge; and

FIG. **3** is a bottom plan view of means for adjusting a guard structure of the cartridge.

## DESCRIPTION OF SPECIFIC EMBODIMENTS

The specific embodiment shown in the Figures is a replaceable twin blade cartridge **10** of the type disclosed in U.S. Pat. Nos. **3,783,510** and **3,785,051,** and in pending U.S. Pat. application Ser. No. **433,030,** filed Jan. **14, 1974,** by F. A. Ferraro for Razor Blade Cartridge and assigned to the assignee of the present application. U.S. Pat. Nos. **3,783,510** and **3,785,051,** and patent Application Ser. No. **433,030,** filed Jan. **14, 1974** are incorporated herein by reference.

With reference to the Figures, the cartridge **10** includes a plastic cap member **12** and a plastic blade seat member **14.** A pair of single cutting edge blades **16, 18** vertically separated by a spacer member **20** are permenantly bonded between the cap member **12** and the blade seat member **14.** As shown in FIG. **2,** the cutting edges **22, 24** are tandemly arranged with respect to a guard structure **26.**



The cap member **12** has two pairs of downwardly extending posts **28, 29; 30, 31.** The posts **28–31** extend through a pair of slots **32** in the top blade **16,** respective holes **34** in the spacer member **20,** a pair of slots **36** in the bottom blade **18,** and respective holes **38** in the blade seat member **14.** The lower ends of the posts **28–31** are deformed (not shown) to prevent removal of the posts through the blade seat holes **38** and thereby bond the components of the cartridge **10** together. The posts **28–31,** the slots **32; 36** and the holes **34; 38** can be dimensioned and/or shaped to provide an interference fit and the cartridge components can be assembled as taught by patent application Ser. No. **433,030,** filed Jan. **14, 1974.**

As shown in FIG. **2,** the cartridge **10** has a T-shaped channel **45** formed on a lower side of the blade seat member **14** for sliding engagement with transverse supporting surfaces on a holder (not shown). A suitable holder for the cartridge **10,** is shown in U.S. Pat. No. **3,783,510.** U.S. Pat. Nos. **3,783,510** and **3,785,051** disclose systems suitable for dispensing a plurality of the cartridges **10.**

The guard structure **26** is spaced a slight distance from forward outer blade seat corners **41, 43,** and is hinged to a forward wall **51** of the blade seat member **14** by spaced webs **40, 42.** The guard structure **26** and the webs **40, 42** are molded integrally with the blade seat member **14,** and the webs **40, 42** have reduced cross-section protions **44** at the forward blade seat wall **51.** The reduced cross-section protions **44** define a transverse hinging axis parallel to the guard structure **26,** and the guard structure **26** is movable about the hinging axis.

A cylindrical post **60** having a cap portion **62** of increased diameter is integrally molded with the blade seat member **14** between the forward blade seat wall **51** and the guard structure **26.** A plastic cam member **64** is pivotally mounted on the wall **51** by forcing the cam member **64** upwardly between the guard structure **26** and the blade seat wall **51** to snap-lock an apertured portion **66** of the cam member **64** on the post **60.** When thus mounted, the cam member **64** is pivoted about the post **60** as shown by arrows **68** in FIG. **1.**

The cam member **64** has a forwardly extending portion **70** beneath the apertured portion **66,** and an upwardly extending ball-shaped element **72** at the forward end of the forwardly extending portion **70.** The ball-shaped element **72** is positioned in a channel **76** formed in the underside of the guard structure **26.** As shown in FIG. **3,** the channel **76** is angularly disposed with respect to the guard structure **26,** the webs **40, 42** and the cutting edges **22, 24.** Thus, movement of the cam member **64** in a clockwise direction as viewed in FIG. **1** will cause the guard structure **26** to pivot upwardly about the transverse hinging axis defined by the reduced cross-section portions **44** of the webs **40, 42.** Conversely, movement of the cam member **64** in a counter-clockwise direction as view in FIG. **1** will move the guard structure downwardly about the transverse hinging axis defined by the reduced cross-section portions of the webs **40, 42.**

It is apparent that the present invention is suitable for use on disposable razors such as that disclosed in U.S. Pat. No. **3,703,765.** The present invention also contem-

plates adjustment of single and double edge razors such as shown in U.S. Pat. Nos. **3,203,093** and **3,358,368,** respectively.

What is claimed is:

**1.** An adjustable safety razor blade cartridge including means for releasably engaging a holder, said cartridge comprising:

a. a plastic blade seat member,

b. at least one blade positioned on said blade seat member, said at least one blade including a forwardly extending cutting edge,

c. a cap member above said at least one blade, said cap member being permanently connected to said blade seat member to bond said at least one blade between said cap and blade seat members,

d. a transversely elongated plastic guard structure having a skin-engaging surface parallelly spaced forwardly of the cutting edge,

e. a plurality of flexible plastic webs integrally formed with and interconnecting said blade seat member and said guard structure, said webs defining a transverse hinging axis parallel to said skin-engaging surface,

f. a linear channel formed in an underside of said guard structure, said channel being nonparallelly disposed with respect to said hinging axis, and

g. a manually operable cam mounted on said blade seat and movable about a forwardly directed axis, said cam including a portion extending forwardly to beneath said channel and another portion extending upwardly from said forwardly extending portion into and permanently seated in said channel, movement of said cam about said forwardly directed axis adjusts the shaving position of said skin-engaging surface with respect to the cutting edge.

**2.** The cartridge of claim **1** wherein said webs have a reduced cross-sectional portion.

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