United States Patent [19]

Ferraro

[11] **3,890,704**

[45] **June 24, 1975**

[54] **RAZOR BLADE CARTRIDGE**

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

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[52] **U.S. Cl.** **30/47;** 30/50; 30/75

[51] **Int. Cl.**[2] **B26B 21/06;** B26B 21/22

[58] **Field of Search** 30/32, 47, 50, 75, 346.58

[56] **References Cited**

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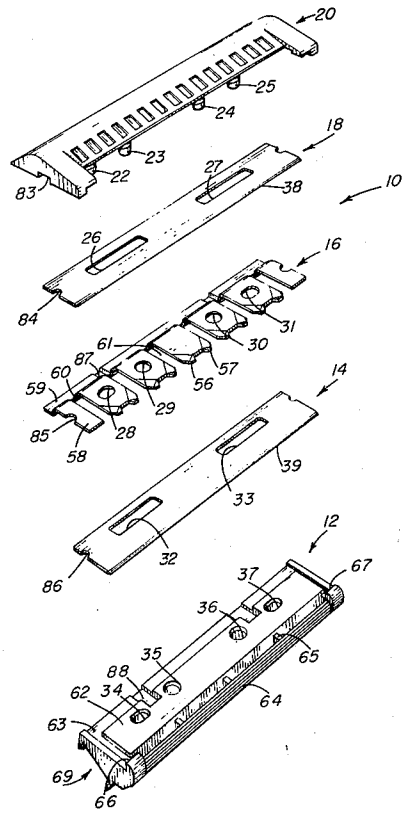
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3,703,764	11/1972	Perry	30/47 X
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Primary Examiner—Al Lawrence Smith
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Attorney, Agent, or Firm—James F. Powers, Jr.; Albert H. Graddis

[57] **ABSTRACT**

The specific disclosure provides a razor blade cartridge comprising a plastic blade seat member, a blade and a cap member. The seat and the blade have transversely spaced and transversely elongated apertures. The cap has at least two posts extending downwardly through the apertures. The posts initially have an outer longitudinal dimension equal to or greater than the longitudinal dimensions of the apertures, and an outer transverse dimension less than the transverse dimensions of the apertures to provide a longitudinal interference fit of the posts in the apertures. The longitudinal interference fit aligns the blade cutting edge with respect to a transversely elongated guard surface on the seat.

5 Claims, 10 Drawing Figures



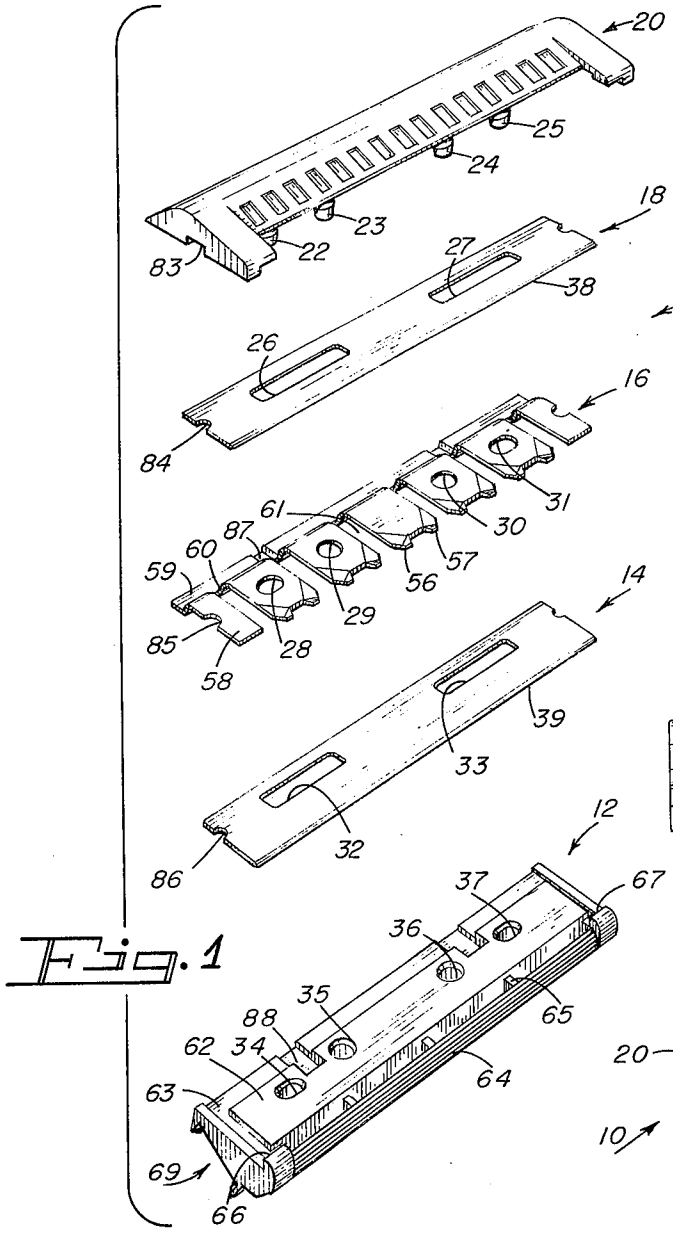


Fig. 1

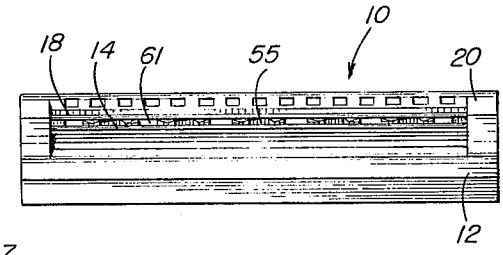


Fig. 2

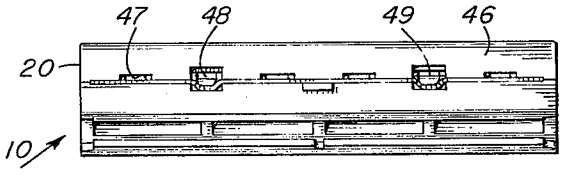


Fig. 3

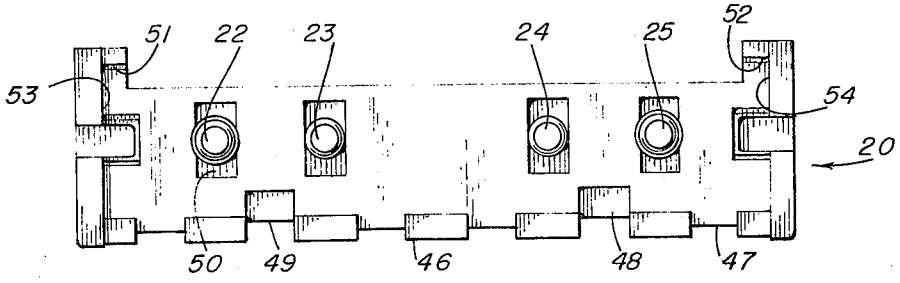


Fig. 4

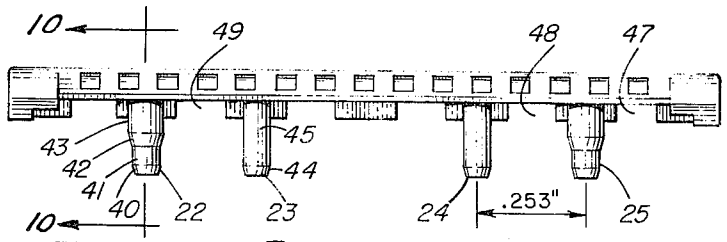


Fig. 5

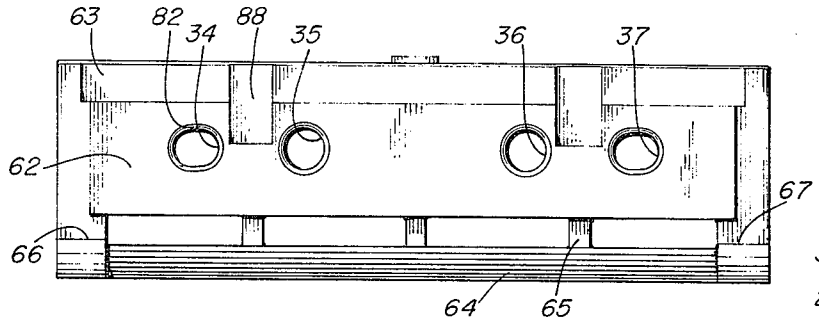


Fig. 6

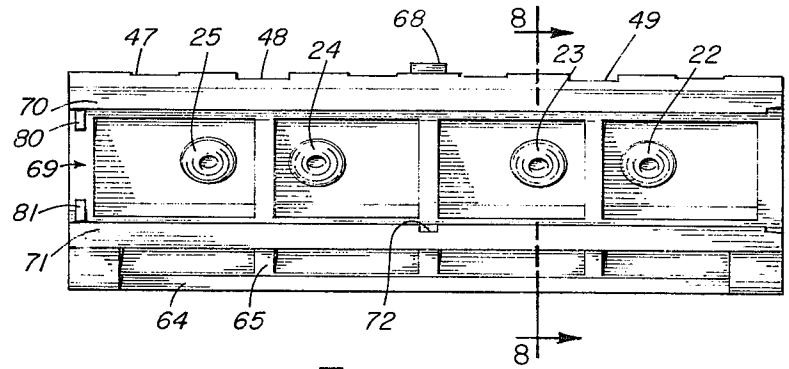


Fig. 7

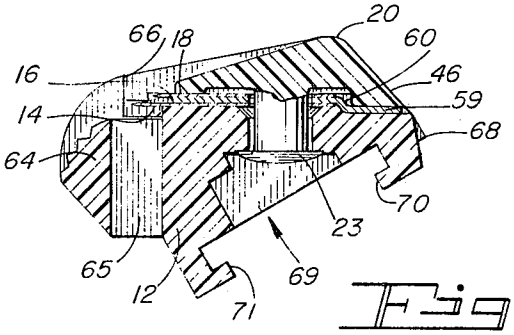


Fig. 8

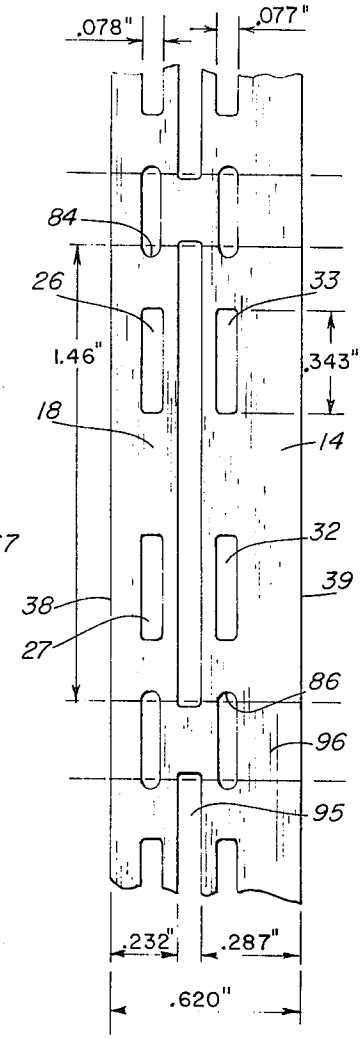


Fig. 9

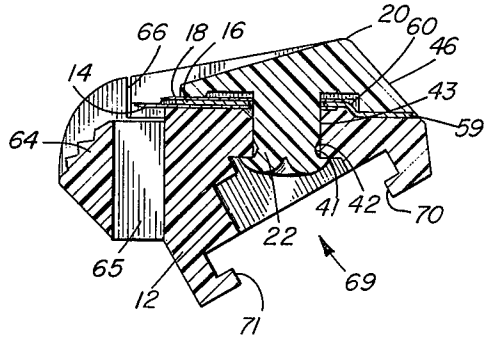


Fig. 10

RAZOR 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 replaceable cartridge. More particularly, the present invention relates to means for aligning the cartridge components.

A critical step in assembling razor blade cartridges is to properly align the blade cutting edges with respect to guard surfaces. U.S. Pat. No. **3,724,070** provides for loosely fitting blades on posts extending from a cap member through a blade seat member. The blades are then moved forwardly to abut notches in the cap member, and the cartridge is thereafter bonded together by deforming the lower ends of the posts. Such movement of the blades during assembly raises a degree of risk in not properly aligning the blades. Further, there is a danger that the deformed posts will not maintain the blade in a desired location during shipment and use.

SUMMARY OF THE INVENTION

In accordance with the present invention, there is provided a razor blade cartridge comprising a plastic seat member, a blade and a cap member. The seat and the blade have transversely spaced and transversely elongated apertures. The cap has at least two posts extending downwardly through the apertures. The posts initially have an outer longitudinal dimension equal to or greater than the longitudinal dimensions of the apertures, and an outer transverse dimension less than the transverse dimensions of the apertures to provide a longitudinal interference fit of the posts in the apertures. The longitudinal interference fit aligns the blade cutting edge with respect to a transversely elongated guard surface on the seat.

The invention is also suitable for aligning more than one blade and spacing means between the cap member and the blade seat member.

Thus, it is clear that the present invention avoids the need for longitudinal movement of the blade(s) after they are located between the cap member and the blade seat member. Further, the blade(s) cannot longitudinally move after the components are bonded together.

BRIEF DESCRIPTION OF THE DRAWINGS

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

FIG. **2** is a front elevational view of the cartridge;

FIG. **3** is a rear elevational view of the cartridge;

FIG. **4** is a bottom plan view of a cap component of the cartridge;

FIG. **5** is a front elevational view of the cap member;

FIG. **6** is a top plan view of a blade seat member of the cartridge;

FIG. **7** is a bottom plan view of the blade seat;

FIG. **8** is a cross-sectional view of the cartridge;

FIG. **9** is a top plan view of perforated blade material suitable to form blades for the cartridge,

FIG. **10** is a cross-sectional view taken along line **10—10** of FIG. **5.**

DESCRIPTION OF SPECIFIC EMBODIMENTS

A razor blade cartridge **10** has a pair of tandemly mounted blades **14, 18** bonded permanently between a cap member **20** and a blade seat member **12.** The

blades **14, 18** each have a single cutting edge **38, 39,** and are maintained in a vertically separated state by a spacer member **16.**

The cartridge **10** has a T-shaped channel **69** (FIG. **8**) formed by inwardly directed flange members **70, 71** for releasably securing the cartridge on a holder (not shown).

The spacer member **16** has a rearwardly extending flange **59,** and seven spacer elements **55, 58** joined to the flange **59** by vertically extending members **60.** The inner spacer elements **55** have beveled forward surfaces **56, 57** which may extend outwardly a slight distance from the top blade cutting edge **38.** The spacer elements **55, 58** form shaving residue channels **61** (FIG. **2**) which extend rearwardly from between the cutting edges **38, 39** to exit ports **47 – 49** (FIG. **3**) formed at the rear **46** of the cartridge **10.** The spacer member **16** also has transversely elongated outer holes **28, 31,** and circular inner holes **29, 30.**

With reference to FIGS. **4** and **5,** the cap member **20** has four posts **22 – 25** extending downwardly from recesses **50** in the underside of the cap member **20.** The cap member **20** also has opposing downwardly extending side walls **53, 54,** and a pair of spaced downwardly extending front walls **51, 52.**

With reference to FIG. **5,** the outer posts **22, 25** have a beveled lower portion **40,** an intermediate cylindrical portion **41,** an upper cylindrical portion **43,** and an upwardly and outwardly beveled intermediate portion **42** interconnecting the intermediate and upper cylindrical portions **41, 43.** The inner posts **23, 24** are cylindrical at **45** and have a beveled lower end **44.**

With reference to FIG. **1,** the blades **14; 18** have a pair of spaced and transversely elongated slots or apertures **26, 27; 32, 33.** As clearly shown in FIG. **8,** the top blade **18** has a shorter longitudinal length than the bottom blade **14.**

Referring now to FIGS. **6** and **7,** the blade seat member **12** has a pair of transversely elongated outer holes or perforations **34, 37,** and a pair of circular inner perforations **35, 36.** Each one of the perforations **34 – 37** has a beveled upper portion **82** for guiding the lower beveled portions **40, 44** of the posts **22 – 25** therein.

The blade seat member **12** also has a plateau **62** for seating the bottom blade **14,** and a rear step **63** for receiving the flange **59** of the spacer member **16.** A guard bar **64** is supported forwardly of the blade seat member **12** by spaced support elements **65.** Surfaces **66, 67** extend upwardly from the outer ends of the guard bar **64** to cover the outer corners of the bottom blade cutting edge **39.** A boss **68** extends rearwardly from the blade seat member **12,** and functions to maintain the cartridge **10** in a dispenser (not shown). The T-shaped channel **69** has a notch **72** formed in the flange member **71** for receiving a holder spring (not shown). Stop members **80, 81** are provided at one end of the T-shaped channel **69** for preventing a holder (not shown) from passing therethrough. U.S. Pat. No. **3,783,510** discloses a holder and a dispenser suitable for use with the specific embodiment described hereinabove.

The cartridge **10** can be assembled by inverting the cap member **20,** and sequentially placing the top blade **18,** the spacer member **16,** the bottom blade **14** and the blade seat member **12** on the cap member **20** with the posts **22, 23** passing through the aperture or slot **26,** the holes **28, 29,** the aperture or slot **32** and the perforations **34, 35,** and with the posts **24, 25** correspondingly

passing through the aperture or slot **27**, the holes **30**, 31, the aperture or slot **33** and the perforations **36, 37.** The lower ends of the posts **22 – 25** are stacked or otherwise deformed at the lower ends thereof as shown in FIGS. **7** and **8** to permanently bond the components together. The cap member **20,** the blades **14, 18** and the spacer member **16** have cut-out portions for receiving alignment members (not shown) during assembly. After the cartridge **10** is stacked, the alignment members are removed.

The intermediate cylindrical portions **41** of the outer posts **22, 25** are dimensioned to have a close longitudinal fit in the blade apertures **26, 27, 32, 33,** the spacer outer holes **28, 31** and the blade seat outer perforations **34, 37.** The intermediate cylindrical portions **41** may have a longitudinal dimension equal to the longitudinal dimension of the bottom blade apertures **32, 33** to provide an interference fit.

The intermediate beveled portions **42** of the outer posts **22, 25** serve to gradually increase the longitudinal dimensions of the posts **22, 25** such that the upper cylindrical portions **43** have a longitudinal interference fit in the blade apertures **26, 27, 32, 33** and the blade seat perforations **34, 37,** and a very close fit in the outer spacer holes **28, 31.** The inner posts **23, 24** have a close fit through the blade apertures **26, 27, 32, 33,** the inner spacer holes **29, 30** and the inner blade seat perforations **35, 36.**

The following table provides suitable dimensions for the posts **22 – 25,** the apertures **26, 27, 32, 33,** the holes **28 – 31** and the perforations **34 – 37.**

TABLE

Component	Inches
Intermediate post portion 41 (diameter)	0.074 – 0.076
Upper post portion 43 (diameter)	0.077 – 0.079
Post portion 45 (diameter)	0.072 – 0.075
Apertures 26, 27 (longitudinal)	0.077 – 0.078
Apertures 32, 33 (longitudinal)	0.076 – 0.077
Apertures 26, 27, 32, 33 (transverse)	0.343
Holes 28, 31 (longitudinal)	0.080 – 0.083
Holes 28, 31 (transverse)	0.088 – 0.091
Holes 29, 30 (diameter)	0.088 – 0.091
Perforations, 34, 37 (longitudinal)	0.074 – 0.076
Perforations 34, 37 (transverse)	0.088 – 0.091
Perforations 35, 36 (diameter)	0.088 – 0.091

The transverse dimensions of the blade apertures or slots **26, 27, 32, 33,** the outer spacer holes **28, 31** and the outer seat perforations **34, 37** are greater than the diameters of the outer posts **22, 25** to provide deformation of the outer posts **22, 25** in a transverse direction as interference fitting occurs in a longitudinal direction, and thereby provide alignment of the cutting edges **38, 39** with respect to the guard bar **64.**

FIG. **9** shows a perforated strip of blade material having cutting edges **38, 39** formed on the outer sides. The strip is cut along the dashed lines to provide the top and bottom blades **14, 18,** and the portions **96** are discarded or recycled.

What is claimed is:

1. A razor blade cartridge comprising:

a. a plastic blade seat member including a transversely elongated guard surface defining a front surface of said blade seat member, and at least two transversely spaced perforations therethrough, each one of said perforations being transversely elongated and having a first longitudinal dimension;

b. a first blade located on said blade seat member including a forward cutting edge spaced upwardly and rearwardly of said guard surface, and at least two transversely spaced apertures, each one of said first blade apertures being transversely elongated and having a second longitudinal dimension greater than said first dimension;

c. a spacer member located on said first blade including at least two transversely spaced holes;

d. a second blade located on said spacer member including a forward cutting edge spaced upwardly and rearwardly of the forward cutting edge of said first blade, and at least two transversely spaced apertures, each one of said second blade apertures being transversely elongated and having a third longitudinal dimension greater than said second dimension; and

e. a cap member located above said second blade and including at least two plastic posts extending downwardly through said apertures, said holes and said perforations, said posts initially having a longitudinal outer dimension equal to or greater than the longitudinal dimensions of said apertures and said perforations to provide a longitudinal interference fit of said posts in said apertures and said perforations.

2. The cartridge of claim **1** wherein said spacer member holes are transversely elongated.

3. The cartridge of claim **1** wherein each one of said posts has a lower cylindrical portion and an upper cylindrical portion, the diameter of said upper cylindrical portion being greater than the diameter of said lower cylindrical portion.

4. The cartridge of claim **3** wherein each one of said posts has an upwardly and outwardly beveled portion interconnecting said upper and lower cylindrical portions.

5. The cartridge of claim **1** wherein said posts are deformed at the lower ends thereof to prevent removal of said posts from said perforations.

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