United States Patent [19]

Carroll

[11] **3,815,233**

[45] **June 11, 1974**

[54] **SHAVING CARTRIDGES**

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[73] Assignee: **Woodmont Industries, Inc.,** Milford, Conn.

[22] Filed: **Sept. 5, 1972**

[21] Appl. No.: **286,610**

[52] **U.S. Cl.** ..... **30/346.58,** 16/114 R, 30/40, 30/47, 30/85, 403/381

[51] **Int. Cl.** **B26b 21/54,** B26b 21/24

[58] **Field of Search** ..... 16/114 R; 30/32, 40, 47, 30/85, 332, 333, 335, 336, 346.58; 306/22, 23, 25, 42, 43; 403/381, 331

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Primary Examiner—Al Lawrence Smith
Assistant Examiner—Gary L. Smith
Attorney, Agent, or Firm—DeLio and Montgomery

[57] **ABSTRACT**

In a shaving cartridge for detachable mounting on a holding member which includes a handle, the combination of a rigid plastic base member securable to the holding member, a rigid plastic bridge member, and a razor blade permanently sandwiched between the base and bridge members. A plurality of projections on the bridge member are received through superposed apertures of the base member and blade, the heads of the projections being secured to the underside of the base member. The bridge member has a portion at each end which extends transversely of and over the cutting edge of the blade, thereby providing a pair of abutments for locating the blade. During assembly of the cartridge the cutting edge of the blade is aligned against the pair of abutments by application of a magnetic field, the assembly being consolidated while the blade is thus magnetically aligned.

10 Claims, 20 Drawing Figures

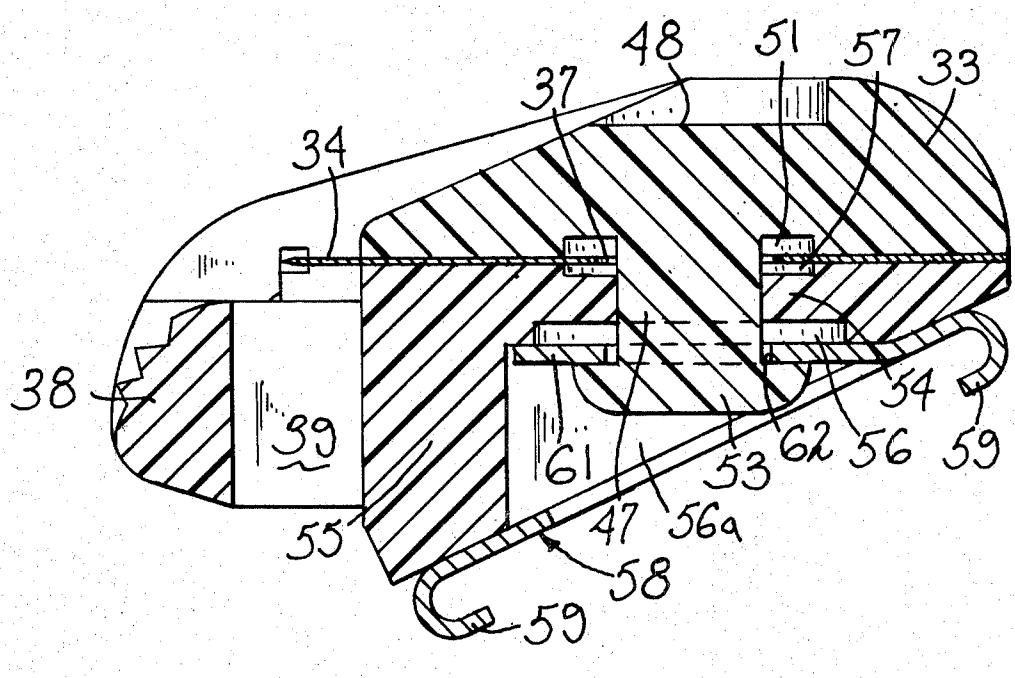


Fig. 1.

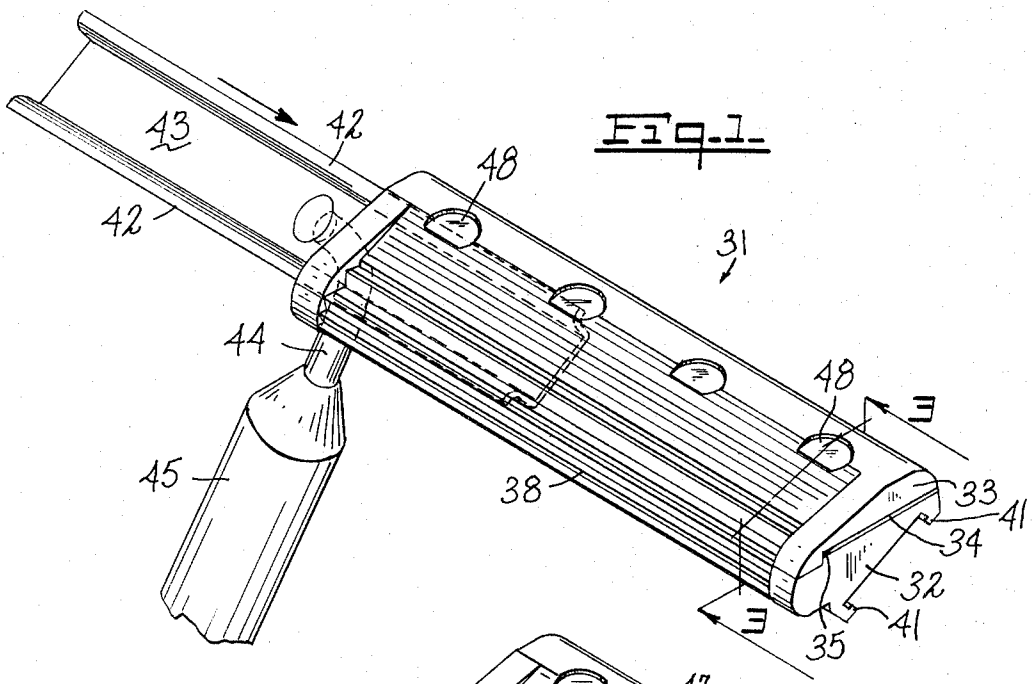


Fig. 2.

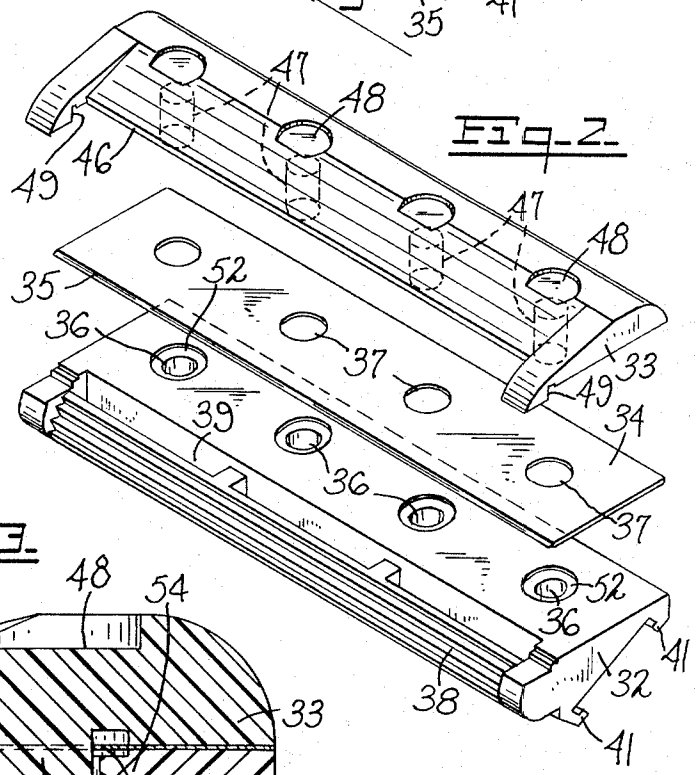


Fig. 3.

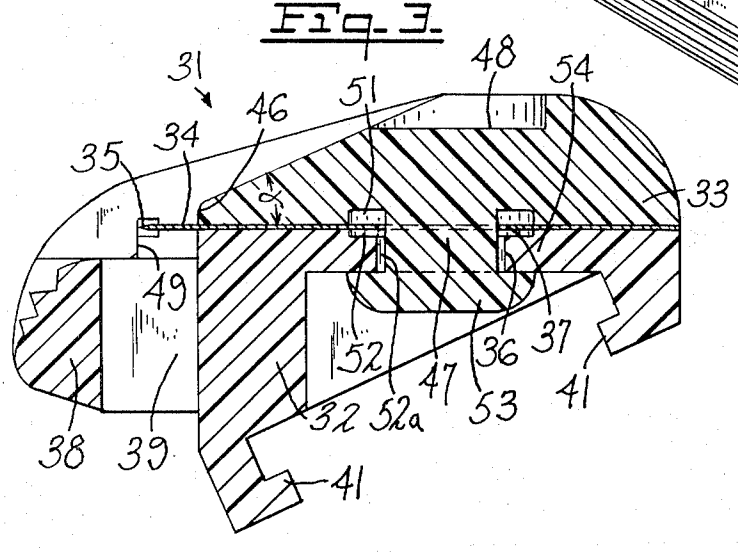
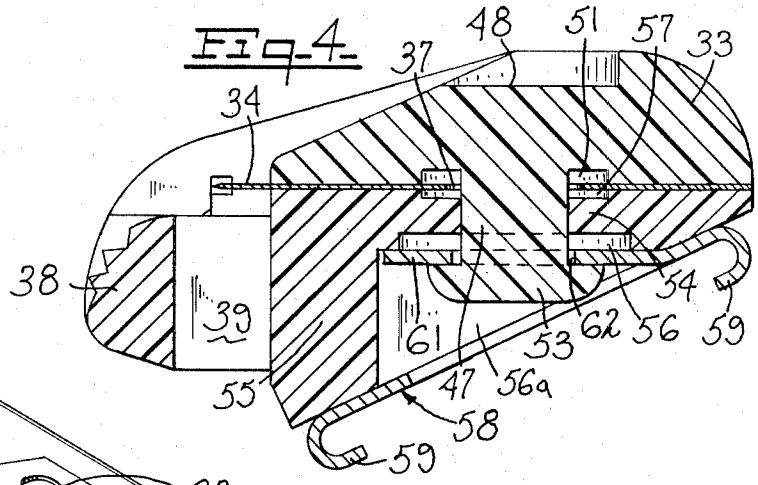


Fig. 4.



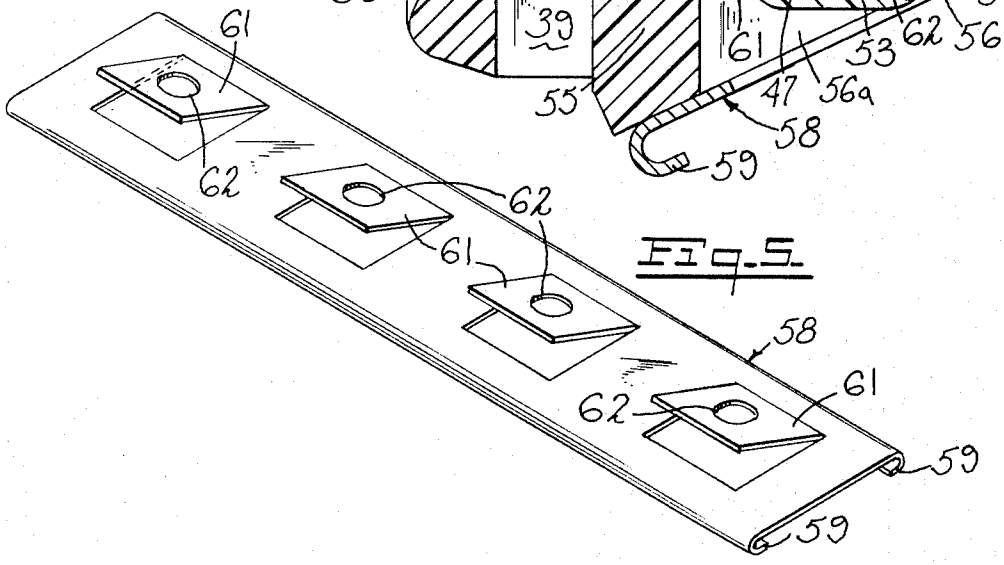
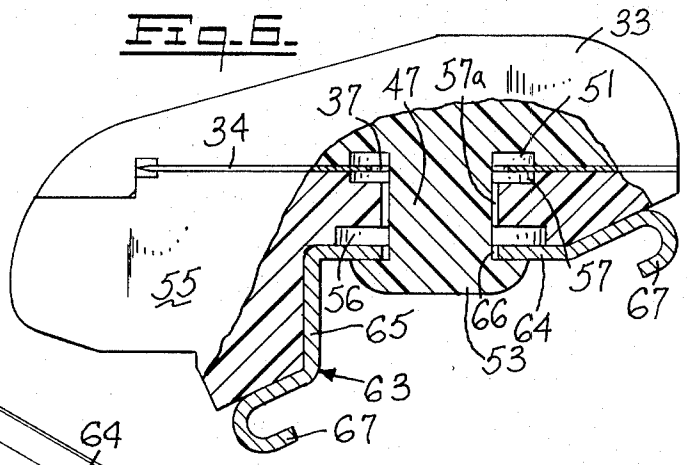


Fig. 5.

Fig. 6.



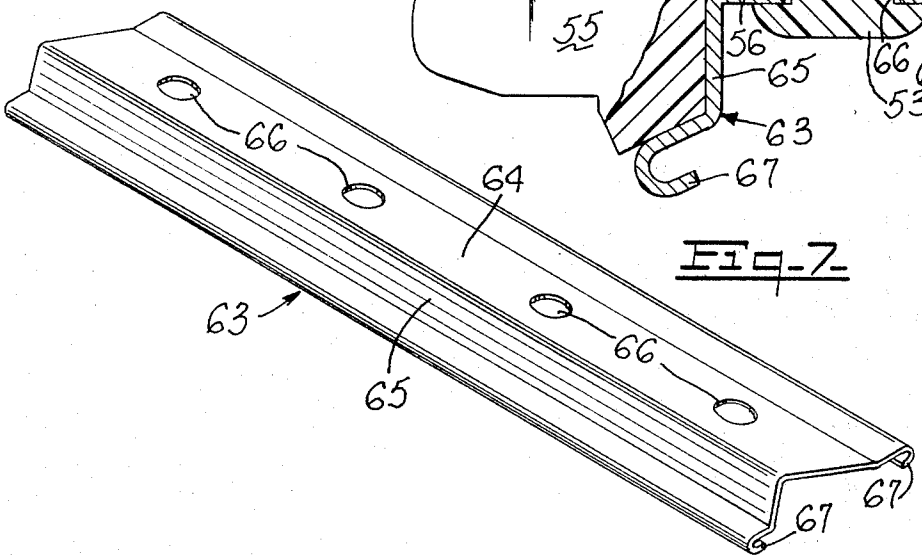


Fig. 7.

Fig. 8.

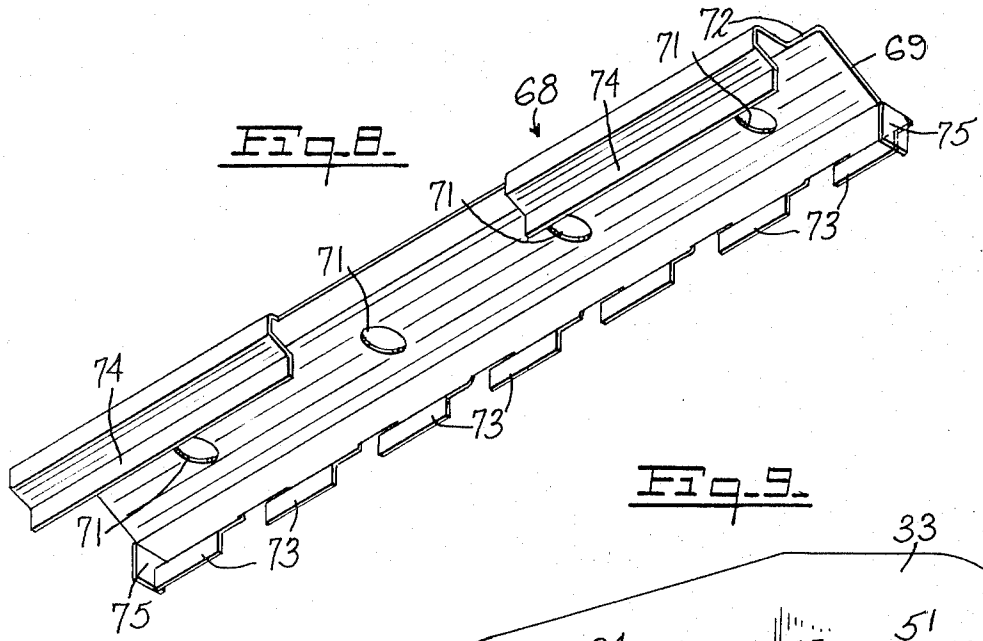


Fig. 9.

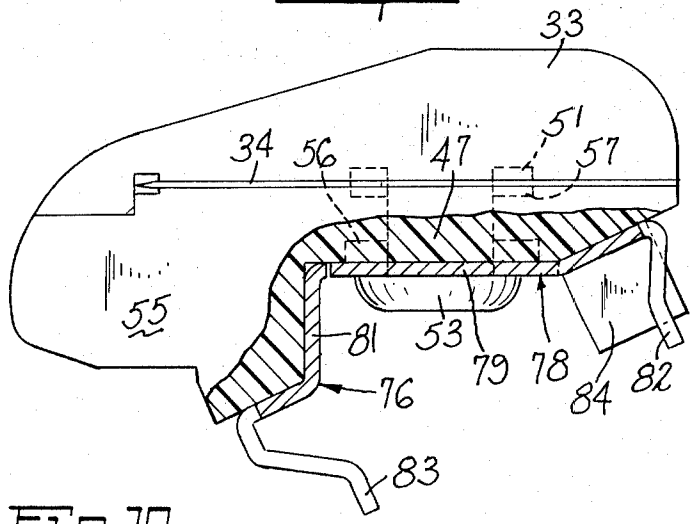


Fig. 10.

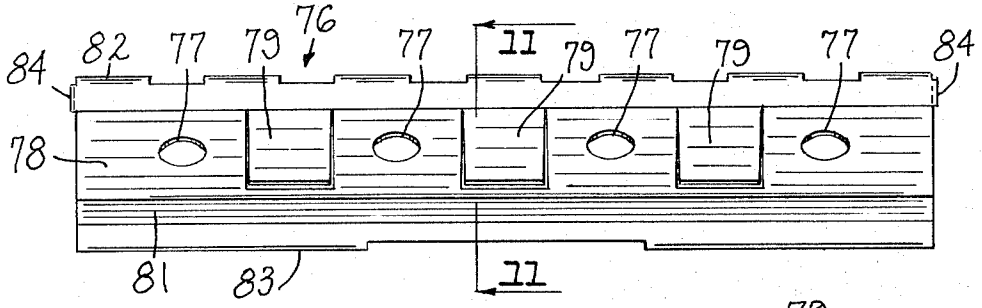


Fig. 11.

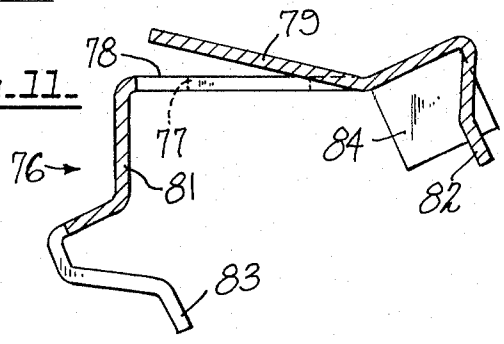
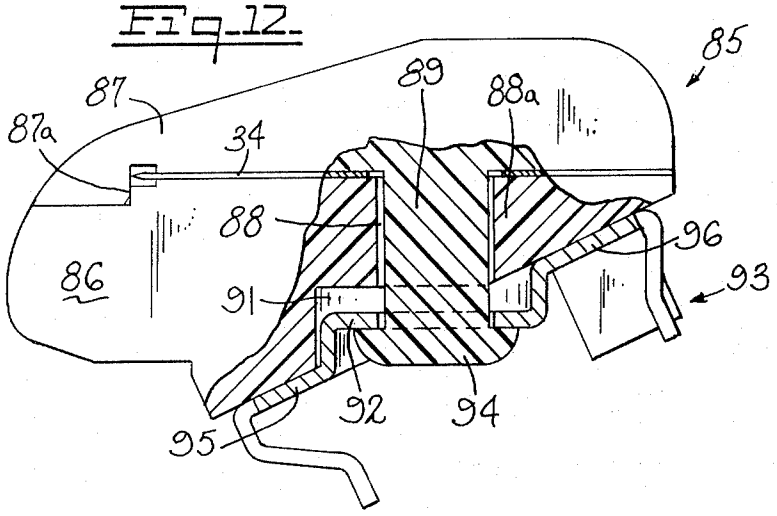


Fig. 12.



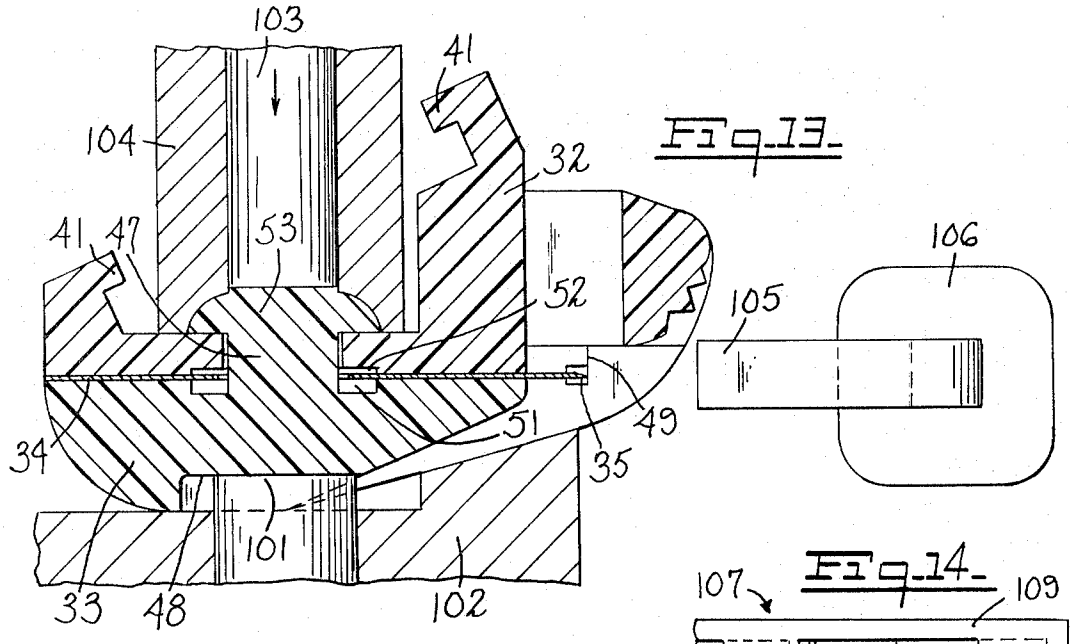


Fig. 13.

Fig. 14.

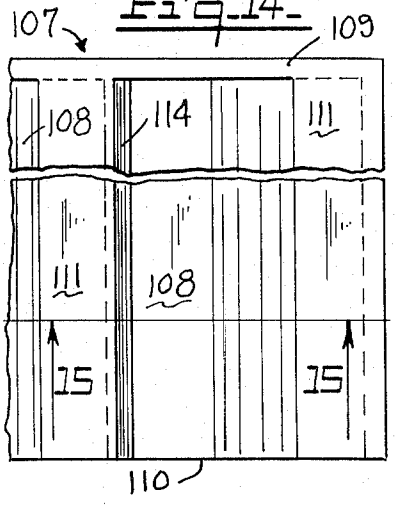


Fig. 15.

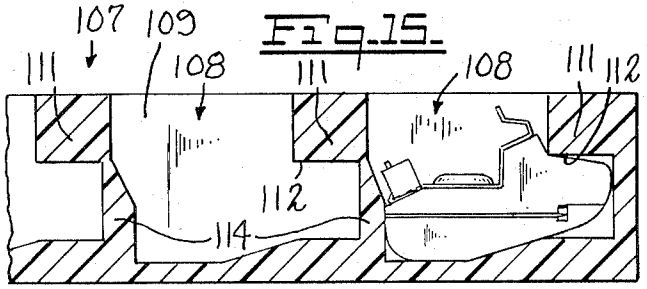


Fig-16.

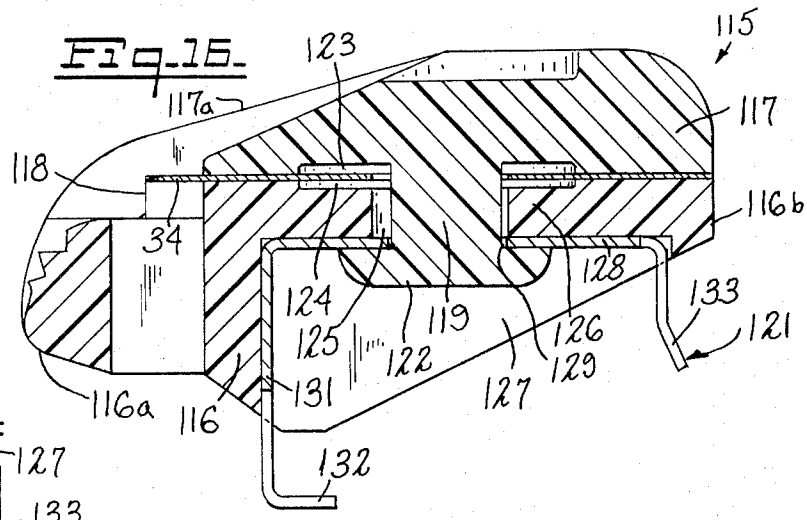


Fig-17.

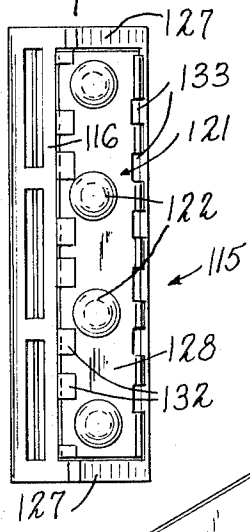


Fig-18.

Fig-19.

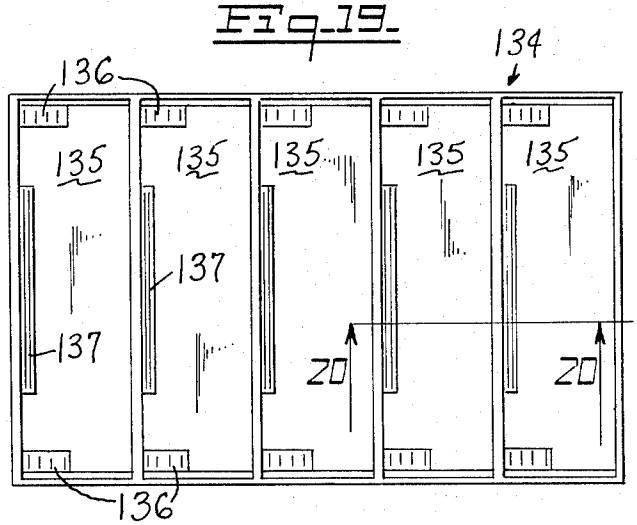
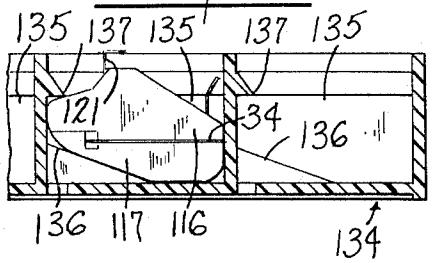


Fig-20.



SHAVING CARTRIDGES

BACKGROUND OF THE INVENTION

This invention relates to new and improved shaving cartridges, and more particularly to shaving cartridges in which a single cutting edge razor blade is permanently sandwiched between two rigid plastic bodies, the resulting composite being adapted for removable attachment to a holding member which includes a handle. The invention also relates to a new and improved method of assembling the shaving cartridges.

Recently, it has been recognized that the amount of blade exposure and the shaving angle (the contact angle between the cutting edge of the blade and the skin) can be more ideally controlled by encasing or consolidating the blade in a plastic body to form a shaving cartridge which is adapted for temporary attachment to a holding member. The holding member usually has a pair of parallel plastic or metal rails (so that the holding member is T-shaped in vertical section), the holding member being attached to a handle. Usually also, the cartridge is adapted for sliding mating engagement with the rails of the holding member and a plurality of the cartridges are packageable in a storage and dispensing container or magazine so that the holding member may be engaged with a cartridge without the fingers having to come in contact with the cartridge or its encased blade. Furthermore, it is known to shape the body of the cartridge to provide an interference fit with the walls of the wells in the container or magazine, so that by a hooking and pivoting motion of the handle portion of the holding member to which is attached a used cartridge, the used cartridge may be reinserted into an empty well of the cartridge container, again without the fingers having to touch the cartridge or its blade.

By thus consolidating the blade in a plastic head to form a cartridge, with resultant fixing of blade exposure and shaving angle, the knicks and cuts to which the skin is subject by movements in shaving angle and blade exposure of prior shaving devices, are avoided. In addition, the use of plastic in such shaving cartridges permits economical manufacture of the cartridges so that the shaving cartridge system can be competitive with prior shaving devices, such as double-edged blades, single-edged injector blades, ribbon blades, and the like.

Nevertheless, shaving cartridges presently available suffer from several significant defects. Perhaps the foremost of these are the problems of aligning the blade during assembly of the cartridge and then maintaining the blade in a predetermined position relative to the other components of the cartridge. Because the plastic of the cartridge is susceptible to incision by the cutting edge of the blade, extreme care must be taken to seat the blade so that it will not move during assembly and the predetermined shaving angle and blade exposure will be obtained and maintained during use of the cartridge. In efforts to solve these problems the older cartridge types, in which the plastic material is molded integrally around the blade, have been replaced with multiple component cartridges. In the latter type, two or more plastic components are consolidated around a blade to form a sandwiched construction. The plastic components generally are identified as a base member and a bridge member, and the blade is clamped between them. Despite this approach the structure of the

components even with considerable clamping force has not prevented movement of the blade during assembly or during use. For example, external wedging or clamping means have been utilized, such as a clamping member associated with the holding member and handle of the shaving device as in U.S. Pat. No. 3,388,831. Even though such external clamping means reduces the tendency of the blade to move out of alignment, the manufacture of the device is complicated by the additional structure, thus adding to its expense. Moreover, the foregoing and other shaving cartridges are not interchangeable with different holding members, for example holding members which engage the cartridge with a hooking and pivoting action, rather than by a lateral sliding motion.

OBJECTS AND SUMMARY

Accordingly, an object of the invention is to provide new and improved shaving cartridges in which the total clamping means is incorporated into the shaving cartridge, thereby avoiding the complexity and expense of external clamping means.

Another object is to provide new and improved shaving cartridges of the multi-component type wherein the blade is permanently sandwiched between the components without movement of the blade either during assembly or during use of the cartridge, thereby preserving a predetermined blade exposure and shaving angle.

Still another object of the invention is to provide a new and improved method of assembling a multi-component shaving cartridge so as to substantially simplify and reduce the costs of the shaving cartridge while also improving the control over pre-setting of the blade exposure and shaving angle.

A further object is to provide new and improved shaving cartridges requiring only one, single-cutting edge razor blade for each cartridge, and which can be engaged by holding members of different designs.

These and other objects, features and advantages of the invention will become apparent from the specification which follows.

In summary outline, the foregoing and other objects are achieved by shaving cartridges assembled from essentially three components: a bridge member, a base member removably attachable to a holding member, and a razor blade permanently sandwiched between the base and bridge members. In some embodiments a fourth component, a clip-like member, is included. The base member and blade have a plurality of apertures spaced so as to be concentric when superposed. The bridge member has a plurality of projections positioned to be received through the apertures of the base member and blade, the heads of the projections being secured to the underside of the base member so as to hold the blade in preset position between the base and bridge members. In addition, the bridge member has a portion at each end which extends transversely of and over the cutting edge of the blade to thereby form a pair of abutments for locating the blade during assembly of the cartridge.

In the assembly method of the invention, the bridge member is fixedly held with the projections in a generally upright position. The blade is then seated on the bridge member such that the projections of the bridge member are received through the apertures of the blade and the cutting edge of the blade aligned against

the pair of abutments of the bridge member. This step is followed by seating of the base member on the blade such that the projections of the bridge member are received through the apertures of the base member. Finally, the heads of the projections are engaged with the underside of the base member while the blade is magnetically held in alignment against the pair of abutments. Preferably, the magnetic field for magnetically holding the blade in alignment is applied during or simultaneously with seating of the base member on the blade, and the magnetic field is maintained until assembly is completed.

The invention accordingly comprises the several steps of the method of assembly and the relation of one or more of such steps with respect to each of the others, as well as the shaving cartridges possessing the features, properties and relation of elements, which are exemplified in the following detailed disclosure, and the scope of the invention will be indicated in the claims.

DETAILED DESCRIPTION

For a fuller understanding of the nature and objects of the invention, reference is had to the following description taken in conjunction with the accompanying drawings, in which:

FIG. **1** is a perspective, partially diagrammatic, oversized view of a cartridge shaving system embodying one form of shaving cartridge of the invention;

FIG. **2** is a partially diagrammatic exploded view of the shaving cartridge of FIG. **1**;

FIG. **3** is an enlarged vertical section along the lines **3—3** of FIG. **1**;

FIG. **4** is an enlarged vertical section similar to FIG. **3** of another embodiment of shaving cartridge of the invention incorporating a clip-like member;

FIG. **5** is a partially diagrammatic perspective view of the embodiment of the clip-like member portion of FIG. **4**, somewhat reduced in size;

FIG. **6** is an enlarged end view of another embodiment of shaving cartridge with portions broken away to show underlying structure, incorporating another embodiment of clip-like member;

FIG. **7** is a perspective view of the embodiment of clip-like member portion of FIG. **6**, somewhat reduced in size;

FIG. **8** is a partially diagrammatic, enlarged perspective view of another embodiment of clip-like member forming an element of one embodiment of shaving cartridge of the invention;

FIG. **9** is an end view of a shaving cartridge similar to FIG. **5** incorporating another embodiment of clip-like member, with portions broken away to show underlying structure;

FIG. **10** is an enlarged bottom plan view of the embodiment of clip-like member shown in FIG. **9**, somewhat reduced in size;

FIG. **11** is an enlarged vertical section along the line **11—11** of FIG. **10**;

FIG. **12** is an end view similar to FIGS. **5** and **9** of another embodiment of cartridge of the invention incorporating still another embodiment of clip-like member, with portions broken away to show underlying structure;

FIG. **13** is a partially diagrammatic, vertical section of an embodiment of shaving cartridge of the invention and apparatus illustrating a method of assembly of the invention;

FIG. **14** is an enlarged partially diagrammatic top plan view of a container or magazine for storage and dispensing of cartridges of the invention;

FIG. **15** is an enlarged vertical section along the line **15—15** of FIG. **14**, showing an end view placement of a cartridge of the invention in the cartridge container;

FIG. **16** is an enlarged vertical section of still another embodiment of shaving cartridge of the invention incorporating another embodiment of clip-like member;

FIG. **17** is a bottom plan view, somewhat reduced in size, of the cartridge of FIG. **16**;

FIG. **18** is an enlarged, partially diagrammatic, perspective view of the clip-like member shown in FIGS. **16** and **17**;

FIG. **19** is an enlarged top plan view of another embodiment of container for receiving and dispensing cartridges of the invention; and

FIG. **20** is a vertical section along the line **20—20** of FIG. **19**.

With reference to FIGS. **1–3**, one embodiment of shaving cartridge **31** of the invention includes three components integrally associated and consolidated. These components are a base member **32**, a bridge member **33** and a blade **34** which is sandwiched between the bridge and base members so as to expose the proper amount of cutting edge **35** above the base member. The base and bridge members are generally rectangular elongated rigid bodies formed of a suitable thermoplastic such as polystyrene, ABS, or the like. ABS is preferred because it can be cold drawn under lower pressures without loss of dimensional stability. The base member has a plurality of bores or apertures **36** therethrough, the dimensions and spacing of which are such that the apertures **36** are concentric with a plurality of apertures **37** in the blade **34** when the base member and blade are superposed. Preferably formed unitary with the base member **32** and along one longitudinal edge thereof is a guard **38**. The guard is spaced a slight distance from the main body of the base member so as to provide drainage channels **39** adjacent the underside of the cutting edge **35** of the blade. These channels promote cleaning around the cutting edge of the blade after use. The guide **38** minimizes accidental contact of the fingers with the cutting edge of the blade and also facilitates preparation of the skin and beard for shaving.

In the embodiment of cartridge of FIGS. **1–3**, a pair of rails **41** are constructed unitary with the underside of the base member **32** and longitudinal thereof. The rails **41** are adapted for longitudinal sliding engagement with mating rails **42** of a holding member **43** in a known manner. The holding member **43** is connected through a suitably angled neck portion **44** to a handle **45**. It will thus be seen that by moving the holding member **43** in the direction of the arrow in FIG. **1**, the cartridge **31** may be secured to the holding member **43**. Tabs or other suitable detent means (not shown) may be provided on either or both of the holding member **43** and the base member **32** in a known manner so as to hold the cartridge **31** and holding member **43** in pre-selected relative position. Of course, the lateral mid-section dimension of the bridge member **33** is somewhat less than that of the base member **32** so that the forward edge **46** of the bridge member permits a predetermined amount of exposure of the blade.

Aspects of the cartridge structure which are significant in achieving the benefits of the invention will now be described. With reference particularly to FIGS. 2 and 3, before assembly of the three components (FIG. 2) a plurality of posts or similar projections 47 depend from the underside of the bridge member. The projections 47 are spaced so that upon superposition of the three components of the cartridge, the projections 47 are received through the apetures 36 and 37, the height of the projections 47 being such that the ends of the projections project slightly beyond the underside of base member 32. It will be noted that the portions of the top surface of the bridge member which are adjacent the bases of the projections 47 are somewhat flattened. The purpose of these flattened areas 48 will be explained below.

It will be noted that the bridge member 33 has a portion at each end thereof which extends transversely of and over the cutting edge of the blade so as to form a pair of abutments 49 in contact with the cutting edge 35 of the blade. The abutments 49 preferably are shaped to mate with end portions of the guard 38 so that the entire forward lengthwise edge of the cartridge permits smooth contact with the skin.

The pair of abutments 49 preferably are formed unitary with the bridge member 33 and are not portions of the base member 32 for reasons which will become apparent during description of the method of assembling the cartridge. However, at this point it can be stated that, in cooperation with the clamping means by which the blade is sandwiched between the bridge member and base member, the pair of abutments 49 serve during assembly and thereafter to align the cutting edge 35 of the blade and thus to assist in providing a predetermined amount of blade exposure and shaving angle. The shaving angle, of course, is governed by the angle of inclination of the upper surface of the bridge member relative to the cutting edge of the blade, as indicated by alpha (α) in FIG. 3.

With reference also to FIG. 3, an annular cutout 51 is provided in the bridge member surrounding each projection 47 and adjacent the top of blade 34. Complementing cutout 51 is a similar annular cutout 52 in base member 32. In effect cutout 52 is an enlargement of the diameter of the aperture 36 in the base member adjacent the underside of the blade 34. During assembly of the components of the cartridge as explained further below, a force is applied to the exposed end of each of the projections 47 so as to cold draw or otherwise form rivet-like head 53 on the projection. The head 53 thus expands laterally so as to provide a clamping action on each of the annular portions 54 of the base member which are adjacent and between the projections 47. The annular portion 54 is rendered somewhat resilient by reason of the annular cutouts 51 and 52, and is therefore resiliently biased by the clamping force of head 53 toward the underside of the blade 34. Although the force applied to form the rivet-like head 53 may so expand the diameter of the projection 47 that an interference fit of the projection with the walls of the aperture 36 will result, in the embodiment of FIG. 3 less than this amount of force has been applied so as to leave a small annular space 52*a*, thereby promoting the resilient biasing of the annular portion 54 towards the blade 34.

In another embodiment of shaving cartridge of the invention, with reference to FIGS. 4 and 5, an additional clamping force is provided by a clip-like member associated with the base member. It will be noted that the bridge member 33 is the same as in FIGS. 1–3 but the base member 32 is replaced with a base member 55 having a second annular cutout 56 in addition to the annular cutout 57 comparable to the annular cutout 52 of FIGS. 1–3. The cutout 56 is open to the underside of the base member 55 wherein a cavity 56*a* is formed to receive the clip-like member 58.

As best shown in FIG. 5, member 58 is an elongated body formed preferably of plastic or spring steel and has a pair of parallel rails 59 similar in dimension and function to the rails 41 of base member 32 of FIGS. 1–3. The member 58 has a plurality of tabs 61 which are bent at a slight angle to the surface of the member 58 so as to fit into the cavity 56*a* of base member 55. Apertures 62 are provided in each of tabs 61 to receive the projections 47 of the bridge member 33. The peripheries of the apertures 62 are resiliently biasable. During assembly of the cartridge, as seen with respect to FIGS. 1–3, the projection 47 is received through the apertures 36 and 37 of the base member and blade, and sufficient force will be applied to the exposed end of the projections so as to form rivet-like heads 53. Accordingly, the peripheries of apertures 62 are spring-biased by heads 53 and impose spring bias on annular portions 54, whereby blade 34 is clamped and held between the bridge and base members. As shown, in the embodiment of cartridge of FIG. 4 it is preferred to form an interference fit between projections 47 and the adjacent portions of the base member.

In yet another embodiment as shown in FIGS. 6 and 7, a clip-like member 63, similar to a Belleville washer, is provided for use with the above-described bridge member 33 and base member 55. Clip-like member 63 has a first longitudinal wall 64 meeting at a generally right angle with a second longitudinal wall 65 of lesser width. A plurality of apertures 66 are provided in wall 64 to receive projections 47. The peripheries of the apertures are resiliently biasable by the rivet-like heads 53 of projections 47 during assembly of the components. In this embodiment it is preferred that the force of consolidation of the components will leave an annular space 57*a* surrounding each of projections 47, thereby permitting resilient biasing of the annular portions 54 of the base member 55 towards the blade 34. A pair of rails 67 on the clip-like member 63 permits sliding attachment of the cartridge to a holding member 43 as in the previous embodiments.

FIG. 8 shows a form of clip-like member 68 which may be substituted for clip-like member 63 for use with the remaining components of the cartridge illustrated in FIG. 6. The clip-like member 68 is especially useful where the shaving cartridge is to be affixed to a holding member either by a hooking and pivoting motion, or by sliding the holding member onto the cartridge as previously described. The clip-like member 68 has a first longitudinal wall 69 having a plurality of apertures 71 therein, the peripheries of which are resiliently biasable similarly as are the peripheries of aperture 66 of the clip-like member 63 of FIG. 7. Adjoining wall 69 is a second longitudinal wall 72 of slightly less width, similar to wall 65 of FIG. 7. Depending from the edges of walls 69 and 72 are resiliently biasable detent tabs 73 and 74, respectively. Tabs 73 and 74 are shaped for sliding mating engagement with the rails 42 of the holding member 43 illustrated in FIG. 1 but they are also

angled outwardly of each other so that the member **68** (and other cartridge structure) may be pushed or clipped onto a holding member.

If desired, one or more end stop tabs **74** may be provided at either or both ends of the clip-like member **68** to assist fixing of the position of the cartridge on the holding member **43**, but other positioning means such as detent points and the like also may be used for this purpose.

Another embodiment of clip-like member **76**, for use with bridge member **36** and base member **55**, is illustrated in FIGS. **9–11**. It will be noted that the structure of the member **76** is essentially the same as that of the clip-member **68** of FIG. **8** except that the apertures **77** for receiving projections **47** are in the longitudinal wall **78**, and resiliently biasable tabs **79** alternate with the apertures **77**. The peripheries of apertures **77** are resiliently biasable by heads **53** of projections **47** as in previous embodiments of clip-like members. It will thus be evident that the tabs **79** themselves will resiliently bear against the underside portions of the base member **55** between each of the apertures in the base member so that clamping tension may be provided to hold the blade in place prior to final assembly of the components of the cartridge. This form of clip-like member therefore additionally guarantees that the blade will be properly positioned prior to the consolidation of the components in a manner to be explained. As with respect to the clip-like member **68** of FIG. **8**, clip-like member **76** has a second longitudinal wall **81** adjacent wall **78**, and may be provided with end stop tabs **84** on either or both ends of the wall **78**. The depending edges **82** and **83** are resiliently biasable outwardly and are shaped both for sliding and hooking engagement with a holding member, thereby operating substantially as described with reference to the depending edges **73** and **74** of clip-like member **68** in FIG. **8**.

Another embodiment of clip-like member and shaving cartridge is illustrated in FIG. **12**. With reference thereto, the shaving cartridge **85** has a base member **86** substantially identical with base member **55** of FIGS. **4**, **6** and **9** except for the absence of the annular cavities **56** and **57**. Similarly, with respect to bridge member **87**, the annular cutout **51** of the bridge member of the previous Figures is absent. However, the diameters of the apertures **88** of the base member **86** are slightly enlarged with respect to the diameters of the projections **89** so that the annular portions **88***a* of the base member adjacent the projections **89** are resiliently biasable for clamping contact with the blade **34**. However, the underside of the base member **86** is shaped to provide semi-circular cutouts **91** adjacent one side of the projections **89**. The semi-circular cutouts **91** permit resilient biasing of the horizontal, annular, step-like portions **92** of the clip-like member **93** under urging by rivet-like heads **94** of the projections **89**. A longitudinal cavity in the underside of member **86** would be the equivalent of the plurality of cutouts **91**. Clip-like member **93** further includes longitudinal walls **95** and **96** adjacent the intermediate horizontal step-like portion **92**. It will be noted that the peripheries of the apertures in the clip-like member **93** therefore have a half-cup form on each side of projections **89**, the right-hand portion being shown as an upright half-cup portion and the left-hand portion being shown as an inverted half-cup portion. The resiliently biasable portions **92**, of the clip-like member **93** therefore are annular depressions between the longitudinal walls **95** and **96**, which are angled slightly so that they are generally parallel to the blade **34** of the cartridge. In this manner, substantially all of the clamping tension necessary for holding the blade sandwiched immovably between the bridge and body members is provided by the clip-like member **93**.

A primary reason for providing the pair of abutments of the bridge member (abutments **49** in FIGS. **1–4**, **6** and **9**, and abutments **87***a* in FIG. **12**) will be evident from a consideration of a method of assembly of the invention. With reference to FIG. **13**, the components of the cartridge of the invention, such as the cartridge of FIGS. **1–3**, are positioned in the manner shown. It will be noted that the bridge member **33** is inverted with the flattened portions **48** seated on a plurality of anvil surfaces **101**, and the bridge member otherwise is immovably held in a suitable frame **102**. The blade **34** is then seated on the base member **33** with projections **47** extending through the apertures of the blade. The base member **32** is then seated on the blade in similar fashion such that the pair of abutments **49** properly align the cutting edge **35** of the blade. The composite of bridge member, blade and base member is then consolidated by the application of a suitable force on the exposed end of the projection **47**, as by a plurality of rams **103**, associated with a heating jacket **104** if the plastic of the projection **47** is of a type requiring heating for deformation. Prior to application of the riveting force by ram **103**, and preferably during or simultaneously with seating of the blade on the bridge member, a magnetic field is applied, as by a core arm **105** associated with field coil windings **106** (desirably energized by a variable DC power supply, not shown), to attract and hold the blade **34** in position against abutments **49**. In the known methods of assembling components of shaving cartridges, alignment of the cutting edge **35** of the blade has been difficult because of the tendency of the edge **35** to cut into an aligning abutment. This problem has been eliminated by the present invention by virtue of constructing the abutments **49** integral with the bridge member **33** rather than with the base member so that the blade is preliminarily aligned before seating of the base member on the blade. If the abutments were part of the base member, the blade could move out of position before seating of the base member. The alignment is thus set initially and then maintained by the magnetic field during the consolidation of the components. The attractive force of the field is selected so as to maintain the alignment of the blade but without causing the blade to cut into abutments **49**.

If desired, auxiliary means for consolidating the components of the cartridge may be employed, including heat sealing, ultrasonic welding, solvent welding, snap pressure fitting, and the like.

FIGS. **14** and **15** illustrate storage and dispensing containers or magazines for cartridges of the invention. With respect thereto, a storage dispenser unit **107** generally comprises an open top, walled plastic unit having a plurality of longitudinal wells **108** shaped to receive a cartridge in each of the wells, as shown in FIG. **15**. In the embodiment of storage dispenser of FIGS. **14** and **15** the unit **107** has a wall across only one side **109** of the wells **108** so that the cartridges may be slid into or out of the wells from the opposing side **110**. Each of the wells **108** has a partial top wall **111** having an underside detent portion **112**, under which may be hooked the

forward end of the base member of the cartridge (when the cartridge is inserted by a hooking and pivoting action). The portion **112** also serves to hold the cartridge in the well whether the insertion is accomplished by hooking and pivoting or by laterally sliding the cartridge into the well. The wall **114** of each well, opposite wall **111**, is shaped to provide an interference fit with the rearward end of the cartridge.

In another embodiment of a cartridge **115** of the invention, shown in FIGS. **16–17**, the blade **34** is clamped between a base member **116** and a bridge member **117** wherein the base and bridge members are shaped essentially as described above with reference to FIGS. **4, 6** and **9**, including a pair of abutments **118** and a plurality of projections **119** integral with the body of bridge member **117**. As in the embodiments of clip-like members of FIGS. **8** and **12**, the clip-like member **121** of FIG. **16** is resiliently biased towards the blade **34** by the clamping force of rivet-like heads **122** of projections **119**. However, in this embodiment, annular cutouts **123** in the bridge member have greater lateral dimensions (diameters) than similar cutouts in the earlier embodiments of the cartridge, and complementary enlarged annular cutouts **124** are provided in the base member adjacent the underside of the blade. In addition, the apertures in the clip-like member **121** for receiving the projection **119** are relatively smaller in diameter than the apertures **125** in the base member. Consequently, it will be seen that the annular portions **126** of the base member between the upper surface of the clip-like member **121** and the annular cutouts **124** are enlarged and therefore more resiliently biasable towards the underside of blade **34** than in the earlier embodiments, thus enhancing the cooperative clamping action of the head **122** on the clip-like member **121**.

Another difference of the cartridge of FIG. **16** relative to the previous embodiments is an end wall **127** integral with the base member **116**, shaped to enclose the mating adjacent end of the clip-like member **121**. The wall **127** thus operates as an end stop tab to prevent the holding member when engaged with the clip-like member **121** from sliding out of engagement. The inclusion of wall **127** as part of the base member **116** thus eliminates the need for an end stop tab on the clip-like member **121**.

If desired, as shown in FIG. **17**, the base member **116** may be provided with a pair of such end walls **127** so as to completely enclose the ends of the clip-like member **121**. However, in this case, it will be evident that the engagement of the clip-like member **121** with the holding member of the shaving device can occur only by a hooking and pivoting action since the pair of walls **127** will prevent sliding engagement of the two members.

FIG. **18** illustrates further details of the clip-like member **121**. With reference thereto, the clip-like member **121** has a first longitudinal top wall **128** having apertures **129** therein for receiving the projections **119** of the bridge member. A second longitudinal wall **131** of lesser width and set at generally right angles to wall **129** has a plurality of tabs **132** along a longitudinal edge thereof angled to provide hooking or lateral sliding engagement with a rail or similar structure of a holding member. A plurality of detent tabs **133** depend from the top wall **128**. The tabs **133** are angled outwardly and are resiliently biasable outwardly upon contact with the second rail of a holding member, substantially as described above with reference to the embodiments of FIGS. **8–12**. Accordingly, the clip-like member **121** when incorporated with the appropriate base member of the shaving cartridge provides either sliding or hooking-pivoting engagement with a holding member of a shaving unit.

One form of storage-dispensing unit **134** useful with the shaving cartridge of FIG. **16** is illustrated in FIGS. **19** and **20**. It will be noted that the unit **134** is enclosed except for the top and is separated into identical wells **135**. Therefore, insertion and removal of cartridges is only by a hooking and pivoting action. The bottom of each well has an inclined surface **136** against which rests the similarly shaped forward portion **117***a* of the bridge member **117** of the shaving cartridge. The inclined surface **136** may extend along the entire length of the well or it may comprise a plurality of inclined planes, as shown in FIG. **19**. An abutting edge **137** is provided in the top of each well **135**. The abutting edge **137** is hooked by the lower forward portion **116***a* of the base member **116** of the cartridge **115** when it is desired to insert a used cartridge in an empty well. After hooking of the forward edge **116***a* under the abutting edge **137**, the rearward portion **116***b* of the cartridge is pivoted downwardly so as to rest in the well **135**. When it is desired to remove a cartridge from a well, it will be evident that the rear portion **116***b* of the cartridge is first pivoted upwardly so as to clear the well, the forward edge **116***a* is unhooked from abutting edge **137**, and the entire cartridge is then simply lifted out of the well.

It will be evident that the shape of the clip-like members **68, 76, 93** and **121** of FIGS. **8, 10, 12** and **18**, respectively, in the absence of end stop tabs either on the clip-like members or on adjacent base member structure of the cartridge, adapt the shaving cartridges to use with holding members requiring engagement by sliding contact and with holding member which require engagement by a hooking and pivoting action. Accordingly, these shaving cartridges of the invention are readily interchangeable with different holding members, thereby eliminating the inconvenience and expense of limitation to shaving cartridges of either the sliding engagement design of clip-like member or the hooking-pivoting design of hook-like member. The user, therefore, can use the same shaving cartridge with different holding members and handles.

While some embodiments of the shaving cartridge of the invention are illustrated (as in FIG. **12**) as not having cutouts in either or both of the base member and bridge member, surrounding each of the posts or projections and adjacent the face or faces of the razor blade, it will be evident that such cutouts may be present in order to increase the resiliency of those portions of the base members which are between the heads of the posts or projections and the blade. Similar additional resiliency is provided in those portions of the bridge member which are in contact with the blade. The degree of resiliency of such base or bridge member portions is related, of course, to the type of material and dimensions of these members, as well as to the clamping force provided by the heads of the projections, and by clip-like members if used. The added resiliency generally increases the clamping force of these members so as to hold the blade more tightly in position therebetween, as already described.

In its preferred aspects the cartridge of the invention includes only a single blade, and the blade has but one cutting edge. In some known shaving cartridges two such blades (each blade having a single cutting edge) have been employed. No special advantage is believed to result from dual blades, and in fact, the difficulty of properly locating and aligning in a cartridge head two such blades compounds the complexity and expense of manufacturing and assembly.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in carrying out the above method and in the construction set forth without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim:

1. In a shaving cartridge the combination of: a base member adapted for releasable securing to a holding member, a bridge member, and a razor blade permanently sandwiched between said base and bridge members;

wherein said base member comprises a generally rectangular, elongated, rigid plastic body;

wherein said base member and blade have a plurality of apertures spaced so as to be concentric when superposed;

wherein said bridge member comprises a generally rectangular, elongated, rigid plastic body shaped to expose along its forward lengthwise edge the cutting edge of said blade, said bridge member having a portion at each end thereof extending transversely of and over the cutting edge of said blade to thereby form a pair of abutments for locating said blade;

said bridge member having a plurality of projections positioned to be received through the apertures of said base member and said blade, the heads of said projections being secured to the underside of said base member;

the portions of the apertures of said base member which are adjacent the lower face of said blade having enlarged diameters and said bridge member having annular cutouts surrounding the bases of said projections adjacent the upper face of said blade, whereby the remaining portions of said base member between said projections are resiliently biased by said heads toward the lower face of said blade so as to clamp said blade between said base member and said bridge member; and

an elongated clip-like member shaped for seating in the underside of said base member, said clip-like member having depending longitudinal edges for mating with said holding member whereby said base member is securable to said holding member; said clip-like member having a plurality of apertures for receiving said projections, and resilient portions between said longitudinal edges, the peripheries of said apertures being resiliently biased by said heads against said remaining portions of said base member.

2. A shaving cartridge as in claim **1** wherein said base member has a cavity opening to the underside thereof, said clip-like member further including a plurality of upwardly extending tabs, said tabs being received in said cavity.

3. A shaving cartridge as in claim **2** wherein said tabs contain the clip-like member apertures to receive the projections of the bridge member.

4. A shaving cartridge as in claim **1** wherein said base member has a cavity therein opening to the underside thereof, said clip-like member further including a plurality of upwardly extending tabs adapted for resilient bias against the underside of said base member within said cavity.

5. A shaving cartridge as in claim **4** wherein the apertures in said clip-like member alternate in position with said tabs.

6. A shaving cartridge as in claim **1** wherein the depending longitudinal edges of said clip are shaped for sliding engagement with said holding member.

7. A shaving cartridge as in claim **6** wherein said clip has an abutment at one end whereby said clip may be centrally positioned on said holding member.

8. A shaving cartridge as in claim **6** wherein said depending longitudinal edges of said clip are shaped also for hooking and pivoting engagement with said holding member.

9. In a shaving cartridge the combination of: a base member adapted for releasable securing to a holding member, a bridge member, and a razor blade permanently sandwiched between said base and bridge members;

wherein said base member comprises a generally rectangular, elongated, rigid plastic body;

wherein said base member and blade have a plurality of apertures spaced so as to be concentric when superposed;

wherein said bridge member comprises a generally rectangular, elongated, rigid plastic body shaped to expose along its forward lengthwise edge the cutting edge of said blade, said bridge member having a portion at each end thereof extending transversely of and over the cutting edge of said blade to thereby form a pair of abutments for locating said blade;

said bridge member having a plurality of projections positioned to be received through the apertures of said base member and said blade, the heads of said projections being secured to the underside of said base member, and

an elongated clip-like member shaped for seating in the underside of said base member, said clip-like member having depending longitudinal edges for mating with said holding member whereby said base member is securable to said holding member; said clip-like member having a plurality of apertures for receiving said projections, and resilient portions between said longitudinal edges, the peripheries of said apertures being resiliently biased by said heads against said remaining portions of said base member.

10. A shaving cartridge as in claim **9** wherein said base member has a cavity therein opening to the underside thereof, and wherein said clip-like member has a plurality of step-like depressions having the clip-like member apertures therein for receiving the projections of the bridge member, a portion of each of said step-like depressions being received in said cavity.

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