Nov. 3, 1964 E. B. WESTLAKE, JR 3,154,852

ONE-PIECE SAFETY RAZOR

Filed Nov. 29, 1961 2 Sheets-Sheet 1

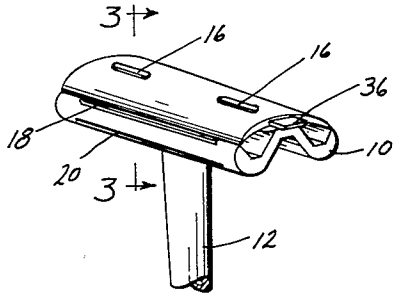


Fig. 1

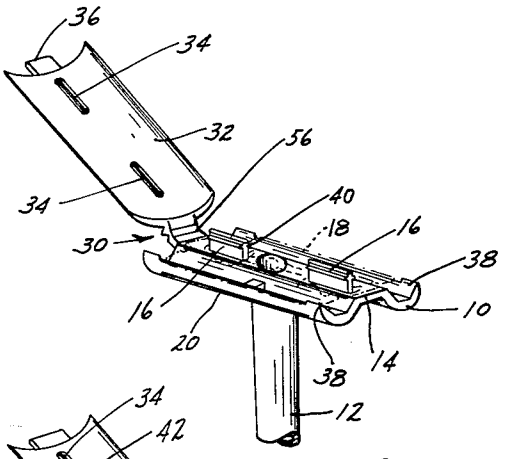


Fig. 2

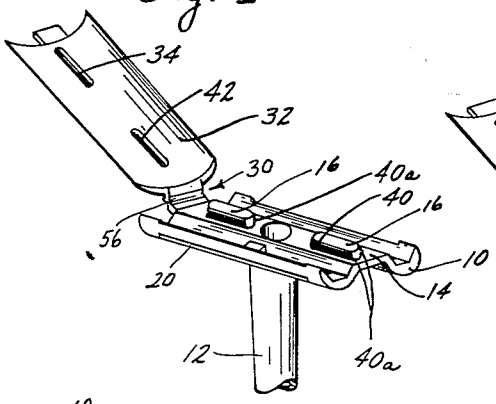


Fig. 8

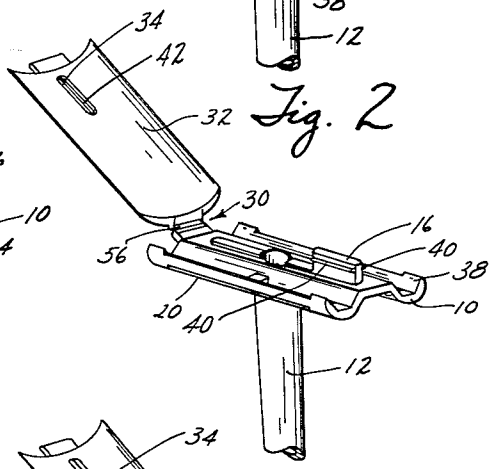


Fig. 7

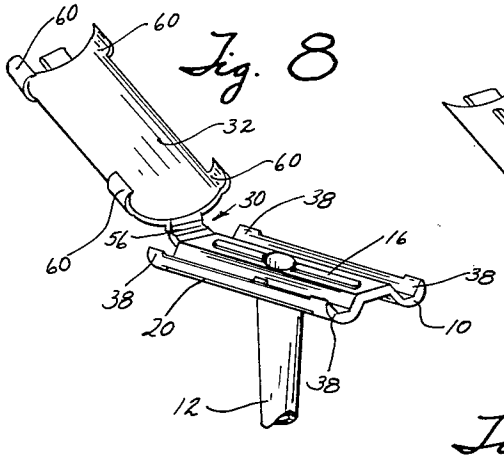


Fig. 10

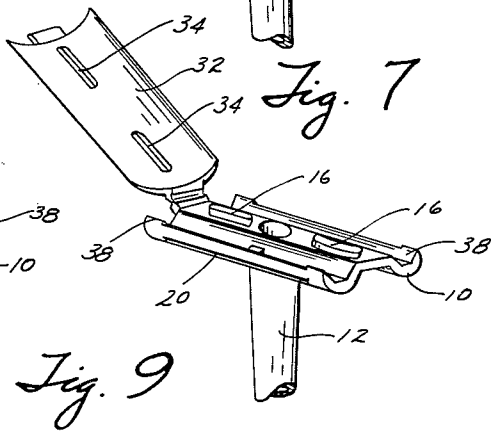


Fig. 9

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ONE-PIECE SAFETY RAZOR

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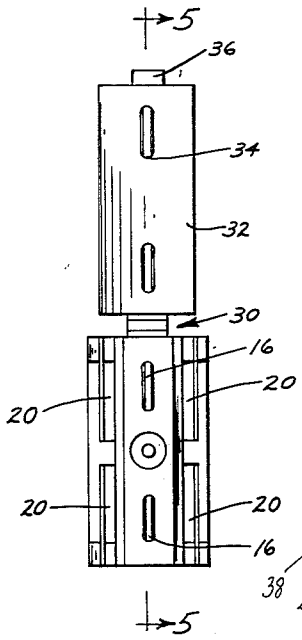


Fig. 4

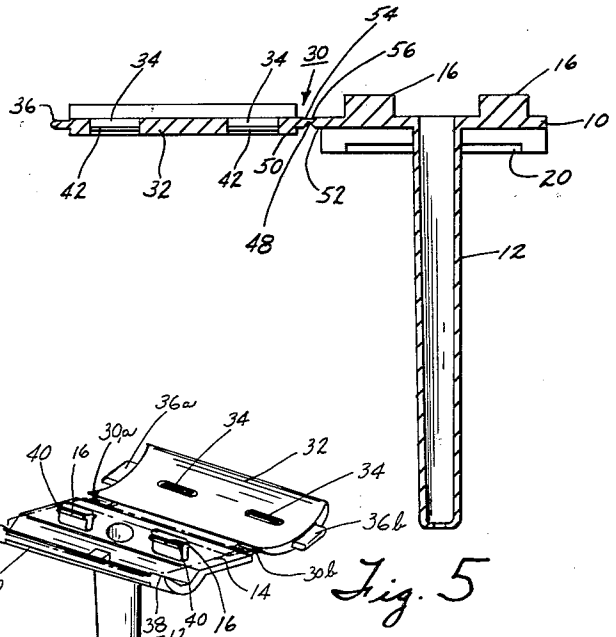


Fig. 5

Fig. 11

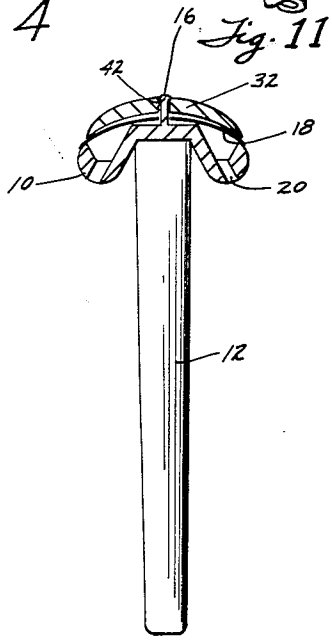


Fig. 3

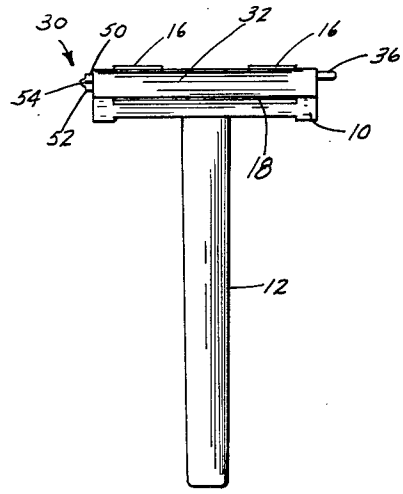


Fig. 6

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United States Patent Office 3,154,852 Patented Nov. 3, 1964

3,154,852

ONE-PIECE SAFETY RAZOR

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Filed Nov. 29, 1961, Ser. No. 155,740
5 Claims. (Cl. 30—51)

This invention relates to safety razors and has as an object the provision of an inexpensive safety razor.

Another object of this invention is the provision of a safety razor of such simple construction that it may be discarded after a single use without great expense to the user. This feature is especially important in hospitals where safety razors are normally sterilized after each use. Razors constructed in accordance with this invention need only be sterilized when purchased since it is cheaper to discard the entire razor than bother with sterilization of used razors.

A more specific object of this invention is to provide a one-piece safety razor for use with double-edged blades which is of simple and inexpensive construction, yet one in which used blades may easily be discarded and replaced by new blades.

Other objects and advantages reside in the construction of parts, the combination thereof, the method of manufacture and the mode of operation, as will become more apparent from the following description.

Referring to the drawings:

FIGURE 1 is a partial perspective view of a new and useful safety razor made in accordance with this invention.

FIGURE 2 is a partial perspective view of the razor of FIGURE 1, wherein the cover plate of the razor has been lifted off its guard plate.

FIGURE 3 is an enlarged, transverse sectional view of the improved razor taken along lines 3—3 of FIGURE 1.

FIGURE 4 is a plan view of the razor of FIGURE 1, the cover plate being lifted from the guard plate and the razor blade removed.

FIGURE 5 is a longitudinal sectional view of the razor taken along lines 5—5 of FIGURE 4.

FIGURE 6 is a side elevational view of the razor of FIGURE 1.

FIGURES 7, 8, 9, 10 and 11 are each partial perspective views, similar to FIGURE 2, each disclosing a different embodiment of the invention.

The embodiment of the invention illustrated in FIGURES 1 through 6 comprises a guard plate 10 attached to the top of a tapered handle 12 which is integral therewith. The guard plate 10, which is generally rectangular in shape, includes a central longitudinal planar support surface 14 to which vertically upwardly projecting locating pins 16 are attached. The locating pins 16 may be shaped as thin rectangular plates having their longitudinal lower edges extending along the longitudinal center line of the surface 14. The locating pins 16 are adapted to interfit within a locating slot centrally of the razor blade, generally designated 18, to maintain the blade in a predetermined, centered position on the guard plate 10. The locating pins 16 perform another very important function, as will be described below. The guard plate 10 is sufficiently wide that its longitudinal edges underlie the edges of the razor blade 18. A plurality of apertures 20 are cut in the guard plate 10 adjacent to and near the longitudinal edges thereof for the passage of shaving soap and so forth beneath the blade.

As apparent from the drawing, the blade 18 is a double-edge blade of the type sold under the trademark "Gillette." As described below, the safety razors provided by this invention may be of one-piece construction, yet so

constructed as to enable replacement of the double-edged blades.

Attached to one end of the guard plate 10 by means of a hinge 30 is a cover plate 32 provided with generally rectangular apertures 34 having mutually parallel longitudinal sidewalls, the apertures 34 being adapted to interfit with the locating pins 16. As shown best in FIGURE 3, the cover plate 32 is crescent shaped in transverse cross-section so as to confine the blade 18 between itself and the guard plate 10 with the proper curvature. Fixed to the end of the cover plate 32 opposite from the hinge 30 is a lifting tab or handle 36 enabling the user of the razor to remove or replace the cover plate 32 in covering relation with respect to the guard plate 10 by pivoting the plates 10, 32 one with respect to the other about the hinge 30.

As usual, the longitudinal edges of the cover plate 32, when positioned on the guard plate 10, are parallel to the edges thereof and to the edges of the razor blade 18. Each of the corners of the guard plate 10 are raised as indicated at 38 to provide corner supports for the blade. When the cover plate 32 is in its normal position of use, shown in FIGURES 1, 3, and 6, the corners of the blade 18 are firmly sandwiched between the corner supports 38 and the corners of the cover plate 32. With this construction, there is little danger that the corners of the razor blade will accidentally cut or nick the user.

The cover plate 32 is releasably locked or clamped in covering relation to the guard plate 10 by the following means. As shown best in FIGURE 2, the locating pins 16 are provided with small, longitudinally extending beads 40 near the top edges thereof, there being one bead 40 on each side of each pin 16. In addition, as shown best in FIGURES 3 and 5, each of the mutually parallel, longitudinally extending sidewalls of each aperture 34 in the cover plate 32 is provided with a small, generally centrally located longitudinally extending bead 42. Most desirably, the locating pins 16 fit snugly within the apertures 34 to restrain the cover plate 32 from sliding or slipping with respect to the guard plate 10. As the cover plate 32 is being placed in covering relation to the guard plate 10, the beads 42 must snap over the beads 40. Thus, the locating pins 16 are snap fitted within the apertures 34 to provide a snap fastener for the cover plate 32. Of course, to remove the cover plate 32 from the guard plate 10, one need only to push upwardly on the lifting tab 36 to snap the beads 42 over the beads 40. From the foregoing description, it is apparent that the locating pins 16, in addition to determining the position of the blade 18 upon the guard plate 10, also serve releasably to lock or clamp the cover plate 32 in position for use, that is, in covering relation to the guard plate 10.

As shown best in FIGURES 4, 5, and 6, the hinge 30 comprises a plastic strip interconnecting adjacent ends of the plates 10, 32. A generally U-shaped, transverse notch 48 is formed centrally in the lower portion of the hinge strip, dividing it into two substantially identical tabs 50 and 52 connected to the cover plate 32 and the guard plate 10, respectively. The tabs 50, 52 are connected by strip or web 54 formed between the top of the hinge strip and the bight of the notch 48. The web 54 is so thin that it is sufficiently flexible to provide a hinge pivot for the plates 10, 32. Since the web 54 is the only flexible part of the hinge, the tab 50 overlies and is coextensive with the tab 52 when the cover plate 32 is in covering relation to the guard plate. Accordingly, the operation of the hinge 30 is essentially identical to an ordinary mechanical hinge, there being only one horizontal pivot axis, and therefore, no tendency for the cover plate 32 to shift in position relative to the guard plate 10 as it is being clamped or fastened thereto. Note

that if the entire hinge were flexible, the user of the razor would have to adjustably position the cover plate **32** over the guard plate **10** as the two plates are pivoted one toward the other after replacement of a blade **18**. To the end that the tabs **50**, **52** can fold or pivot back against one another, as shown in FIGURE 6, the top of the hinge strip is slightly recessed, as indicated at **56**.

Referring again to FIGURE 5, the razor described above may be molded in the form shown therein by ordinary injection molding techniques using only a pair of mold members. To avoid delay in the molding cycle, the handle **12** is made hollow. This has the further advantages of rendering the razor more lightweight and, of course, of saving material. While several suitable thermoplastic materials are commercially available from which razors of the type described above may be molded, polypropylene has been found highly satisfactory, principally due to the nature of the hinge **30**. Strips of polypropylene on the order of ten-thousandth of an inch thick are sufficiently flexible to permit the cover and guard plates to be easily pivoted one with respect to the other and have been flexed a million or more times without failure due to fatigue. Of course, the particular plastic used must be capable of many flexures without fatigue at the hinge.

Each of FIGURES 7 through 11 discloses a distinct embodiment of this invention. For convenience, like numbers refer to like parts. In FIGURE 7, the locating pin **16** nearest the hinge **30** is much lower and serves only to retain the blade in proper position. Accordingly, the aperture **34** nearest the hinge **30** has been removed. In the embodiment of FIGURE 7, only the outer locating pin **16**, that is, the pin nearest the end of the guard plate **10** opposite the end to which the hinge **30** is attached, is used to lock or clamp the plates **10**, **32** together. This construction is satisfactory since, as described above, only a very small portion of the hinge **30** is flexible. The entire cover plate **32** accordingly is clamped to the guard plate **10** when the beads **42** in the aperture **34** are snapped over the beads **40** on the single locating pin **16**. For this reason, only the single snap fastener is required. At present, the embodiment disclosed in FIGURES 1 through 6 is preferred principally because of the balanced appearance of the locating pins **16** and the apertures **34**.

In FIGURE 8, there are two parallel, vertically spaced beads, designated **40** and **40***a*, extending longitudinally along each side of each locating pin **16**. In this embodiment, there is still only a single bead **42** along each side of each aperture **34**. With this construction, the beads **42** may be snapped between each pair of beads **40**, **40***a*, or the beads **42** may be snapped between the beads **40***a* and the support surface portion **14**. Therefore, the curvature of the blade to be clamped between the cover plate **32** and the guard plate **10** may be varied to in turn vary the cutting angle of the blade.

In FIGURE 9, one of the locating pins **16** is formed with curved or arcuate sidewalls while the mutually parallel, longitudinal sidewalls of the apertures are continuously planar. The cover plate **32** may therefore be clamped in covering relation to the guard plate due to the resultant wedge or press fit between the curved pin **16** and its mating aperture **34**. Of course, both pins **16** could be formed with arcuate sidewalls to be press fit within the apertures **34**.

In FIGURE 10, only relatively low locating pins **16** need be used and the cover plate **32** may present a continuous, not apertured, surface. In this case, arcuate flanges **60** depend from both ends of both the longitudinal side edges of the cover plate **32**. The opposing faces of the flanges **60** are adapted to frictionally interengage with the contiguous edge portions of the guard plate **10**, illustrated herein as the corner supports **38**, so as to firmly clamp the blade between the guard plate **10** and cover plate **32**. This construction has the advantage of

permitting a wide range of adjustment of the curvature of the blade **18**. And further, the corners of the blade **18** are completely covered.

In the razor shown in FIGURE 11, the cover plate **32** is attached to the guard plate **10** by a pair of hinges, designated **30***a* and **30***b*, integral with the ends of one side of both the cover plate **32** and the support surface **14**. Each hinge **30***a*, **30***b* is identical to the hinges **30** described above. So constructed, the razor is best suited for single-edged blades. If desired, two lifting tabs **36***a* and **36***b* may be attached, one at each end, to the cover plate **32**.

Each of the above described embodiments of this invention comprises an integral or one-piece, lightweight razor. Each may be injection molded in a single operation. Since the razors can be manufactured so inexpensively, they can be discarded after only a single use without great expense to the user. On the other hand, the razors are easily cleaned due to their simple construction, the blade may be replaced, and accordingly, the razor may be used many thousands of times. Thus, razors constructed in accordance with this invention have the advantages of both the disposable razors and the more conventional safety razor constructions. While razors accommodating double-edged blades have been emphasized with regard to FIGURES 1 through 10, these razors could accommodate suitably designed single-edged blades.

Although the presently preferred embodiment of the device has been described, it will be understood that within the purview of this invention various changes may be made in the form, details, proportion and arrangement of parts, the combination thereof and mode of operation, which generally stated consist in a device capable of carrying out the objects set forth, as disclosed and defined in the appended claims.

Having thus described my invention, I claim:

1. In a safety razor, a guard plate, a cover plate, a razor blade locating pin integral with one of said plates projecting therefrom, the other of said plates being provided with an aperture snugly receiving said pin, at least one bead formed on said pin and at least one bead formed on at least one side wall of said aperture whereby a portion of said pin may be snap fitted within said aperture.

2. A molded one-piece safety razor construction comprising: a handle; a generally rectangular guard plate mounted on said handle; a generally rectangular cover plate adapted to overlie said guard plate in covering relation thereto, said guard plate and said cover plate being constructed to confine a double-edged razor blade therebetween with its longitudinal cutting edges exposed; hinge means interconnecting said guard plate and said cover plate, said hinge means including a pair of substantially identical hinge tabs, one hinge tab being connected to an end edge of said guard plate, the other hinge tab being connected to the adjacent end edge of said cover plate, and a thin web connected to the free ends of said tabs, said web being sufficiently flexible and sufficiently short to permit said hinge tabs to pivot one with respect to the other about a single pivot axis between said hinge tabs; at least one razor blade locating pin attached to one of said plates, the other of said plates being provided with an aperture to receive said locating pin, said pin having at least one bead formed thereon and a sidewall of said aperture having at least one bead formed thereon, whereby a portion of said pin may be snap fitted within said aperture thereby releasably retaining said cover plate in covering relation to said guard plate; and a lifting tab projecting outwardly from the end edge of said cover plate opposite from the end edge to which the said other of said hinge tabs is connected.

3. A molded one-piece plastic safety razor construction comprising: a handle; a generally rectangular guard plate mounted on said handle; a generally rectangular cover plate adapted to overlie said guard plate in covering

relation thereto, said guard plate and said cover plate being constructed to confine a double-edged razor blade therebetween with its longitudinal cutting edges exposed; hinge means interconnecting said guard plate and said cover plate, said hinge means including a pair of substantially identical, generally rectangular hinge tabs having adjacent surface portions which may be pivoted or folded one upon the other, one hinge tab being connected to and projecting beyond an end edge of said guard plate, the other hinge tab being connected to and projecting beyond the adjacent end edge of said cover plate, and a thin web connected to the free ends of said tabs, said web being sufficiently flexible and sufficiently short to permit said hinge tabs to pivot one with respect to the other about a single pivot axis between said hinge tabs; and locking means projecting from one of said plates into engagement with a surface portion of the other of said plates thereby releasably retaining said cover plate in covering relation to said guard plate.

4. The safety razor construction of claim 3 further including a lifting tab projecting outwardly from the end edge of said cover plate opposite from the end edge to which said other of said hinge tabs is connected.

5. The structure of claim 1 wherein there are two vertically spaced beads formed on said locating pin whereby said cover plate may be releasably held upon said guard plate in either of two positions determined by the relationship between the bead formed on a sidewall of said aperture and the two beads on said pin.

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