United States Patent

[11] 3,583,262

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[21] Appl. No. **776,439**
[22] Filed **Nov. 18, 1968**
[45] Patented **June 8, 1971**
Continuation-in-part of application Ser. No. 550,575, May 16, 1966, now Patent No. 3,413,720.

[54] **METHOD OF MAKING DISPOSABLE SAFETY RAZOR**
4 Claims, 10 Drawing Figs.

[52] **U.S. Cl.** **76/104, 29/525**
[51] **Int. Cl.** **B21k 11/00**
[50] **Field of Search** 30/62, 32, 85; 29/450, 525; 76/104

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Attorney—Cumpston, Shaw and Stephens

ABSTRACT: A plastic safety razor has a body formed of a head and a handle molded in one piece of resilient plastic material. The head is molded with a thin slot open at the front of the head and at opposite ends of the head, and the face walls of the slot are spaced apart by the thickness of a blade adapted to be held within the slot. The slot is closed by a back wall which forms a rear abutment for a single edge blade held in the head. The blade has blunt edges at the extremities of its sharpened edge and is pushed endwise into the slot and by engagement with the blunt edges is seated rearwardly against the back abutment wall of the slot.

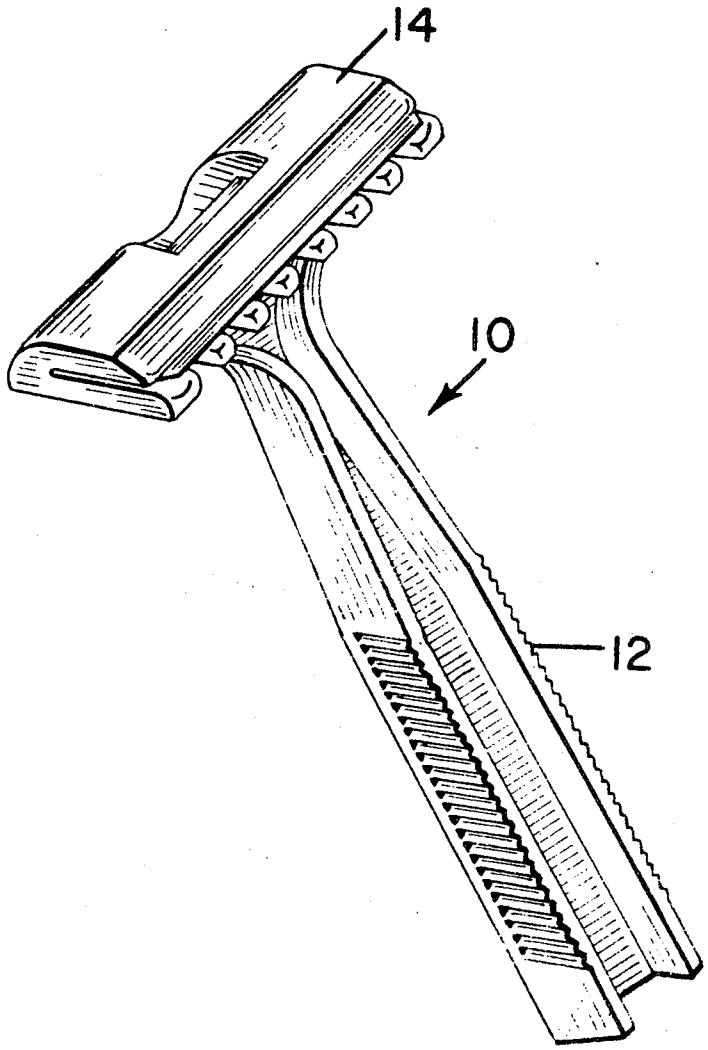


FIG. 1

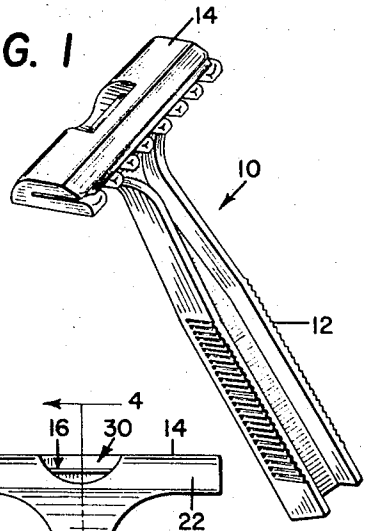


FIG. 3

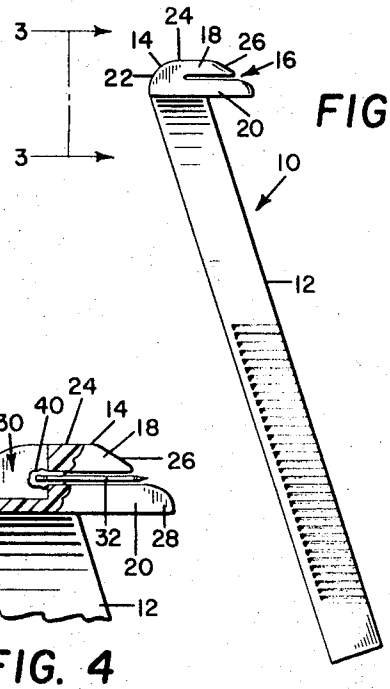


FIG. 2

FIG. 4

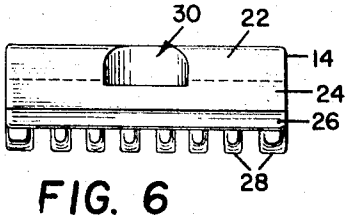


FIG. 6

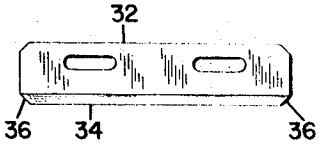


FIG. 5

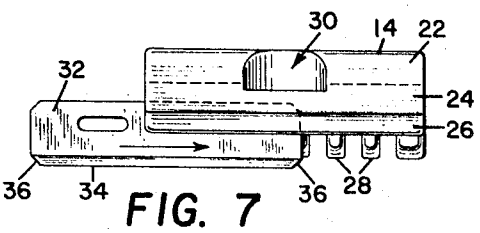


FIG. 7

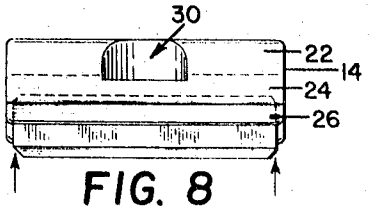


FIG. 8

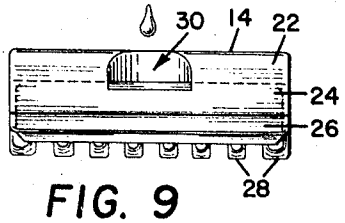


FIG. 9

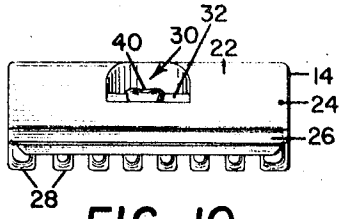


FIG. 10

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METHOD OF MAKING DISPOSABLE SAFETY RAZOR

GROSS REFERENCES

This application is a continuation-in-part of my copending parent application, Ser. No. 550,575, filed May 16, 1966 now U.S. Pat. No. 3,413,720, issued Dec. 3, 1968.

This invention relates to the construction of razors and to methods making razors. More particularly, the invention relates to expendable or disposable razors, and to methods of making them.

There are many occasions when an individual would find the use of a good razor to be a comfort and convenience, under circumstances where the services of a barber are not readily available and where it is either undesirable or uneconomical to purchase an ordinary razor. For example, travellers frequently find themselves in need of razors together with shaving soap, blades and other needs for shaving comfort, while away from home unexpectedly or caught in circumstances that do not permit a visit to the home or to a barber shop.

Various types of disposable razors have been proposed in the past, but none has been adopted on a widespread scale, perhaps because of high manufacturing costs. One object of the present invention is to provide a practical, disposable razor, that can be manufactured at a reasonable cost.

Another object of the invention is to provide a practical type of safety razor in which the razor blade is built into the head of the razor.

Another object of the invention is to provide an inexpensive, disposable safety razor that will provide satisfactory shaving service for several shaves.

A further object of the invention is to provide an inexpensive disposable razor, that can be manufactured at a moderate cost, and that can be used for at least one, and usually more than one, satisfactory shave.

Another object of the invention is to provide a practical, inexpensive disposable razor that can be manufactured at sufficiently low cost to permit its sale as part of an inexpensive emergency kit containing all shaving necessities for at least a single satisfactory shave.

Another object of the invention is to provide an inexpensive, practical disposable razor in which the blade is permanently secured in place in the head of the razor, in proper position for optimum shaving efficiency and comfort.

A related object of the invention is to provide a simple and inexpensive manufacturing process for the production of razors of the character described.

Other objects of the invention will be apparent hereinafter from the specification and from the recital of the appended claims; and to these and other ends, the invention will be hereinafter described, the novel features being pointed out in the claims at the end of this specification.

FIG. 1 is a perspective view of a safety razor that is constructed in accordance with one embodiment of the invention, showing a finished razor with the blade seated in the razor head;

FIG. 2 is a side elevation, on a enlarged scale, of this safety razor, with the blade removed;

FIG. 3 is a fragmentary rear elevation of the razor head, taken on the line 3–3 of FIG. 2, looking in the direction of the arrows;

FIG. 4 is a fragmentary sectional view on an enlarged scale, taken on the line 4–4 of FIG. 3, looking in the direction of the arrows, and showing the razor blade seated in the razor head and permanently bonded in its seated position by an adhesive bond;

FIG. 5 is a top plan view, on an enlarged scale, of a blade of a conventional type, that can be used in a razor that is constructed in accordance with this invention;

FIG. 6 is a top plan view of the razor head, with the blade removed;

FIG. 7 is a top plan view of the razor head, showing the blade partly inserted in a slot in the head, the direction of movement of the blade for further insertion being indicated by the arrow;

FIG. 8 is a top plan view of the razor head and blade, showing the blade inserted in the slot along its full length, the arrow indicating the locations at which and the directions in which force may be applied to complete seating of the blade in the slot in the razor head;

FIG. 9 is a top plan view of the razor head showing the blade seated in the head, and showing the application of a drop of a liquid bonding material, and

FIG. 10 is a top plan view thereof after hardening of the bonding material.

Referring now in detail to the drawings by numerals of referenced, the numeral 10 denotes a unitary safety razor that is molded from a synthetic plastic material such as, for example, polystyrene, polyvinyl chloride or the like. The razor 10 is formed with a handle 12 that is in the form of a generally U-shaped channel and that is integrally united with the heat 14 of the razor.

The razor head 14 is formed with an elongate, generally rectangular slot 16 (FIG. 2) that is open at its ends and that extends lengthwise of the razor head and that opens along the front side of the razor head. The razor head 14 is also formed with an upper portion 18 over the slot 16 and with a lower portion 20 below the slot. The back of the razor head 14 is rounded, as showing FIGS. 2 and 4, to provide a curved, smooth, contour between a flat surface portion 24 on the upper portion 18 of the razor head and the back surface of the razor handle 12. The upper portion 18 of the razor head is tapered outwardly toward the front of the razor head and is formed with a flat, frontwardly- and lengthwise-extending surface 26 (FIGS. 2 and 4) of substantial area, that is disposed immediately above the front opening of the slot 16.

The lower portion 20 of the razor head is formed with a plurality of projecting fingers 28 that project to the front of the razor head and that are formed with substantially uniformally rounded upper surfaces. These fingers are spaced from each other along the length of the razor head.

The razor head is also formed in its back side with a notch 30 that communicates with the slot 16.

The several parts of the razor head are proportioned snugly to receive and to cooperate with a razor blade 32 of a common type that is ordinarily referred to as an injector blade. This blade 32 is provided with a sharpened, lengthwise-extending edge 34 that is formed with blunt portions 36 at each of its extremities. The slot 16 may be formed with a depth that provides little or no clearance for the blade. Since the razor blade, when seated in the slot in the head of the razor, has broad surfaces that are in engagement with an in frictional contact with the confronting broad surfaces that bound the slot, the blade tends to be held in place by frictional resistance to its movement. Alternatively, when the razor is formed from a resilient plastic material, the slot may be formed in the head of the razor in such a manner that the blade is resiliently gripped between the upper portion 18 and the lower portion 20 of the razor head and thus is resiliently held in the slot.

The flat surface portion 26 of the upper portion of the razor head is disposed to lie in an imaginary plane, that, if extended, would project slightly beyond the sharpened edge of the blade when the blade is properly seated as shown, for example, in FIG. 4. Moreover, the rounded surfaces of the fingers 18 are disposed to approach, but to fall short of, tangency with that imaginary extended plane.

To make a disposable razor, complete with a blade, in accordance with one preferred embodiment of this invention, the razor is molded from a resilient, synthetic plastic material with a handle that is integral with the head of the razor. This unitary razor is molded in the form and with the structure shown in the drawing, and the slot 16 for the blade is formed preferably by the use of a blank in the mold. Alternatively, the slot may be cut in the head of the razor after molding.

To insert the blade in the razor, one end of the razor blade is inserted into one end of the slot. The blade is then moved along a path that extends lengthwise of the blade and of the razor head, as shown, for example, in FIG. 7. After the blade is inserted in the slot along its entire length, force is then applied to the two blunt portions 36 at the ends of the sharpened edge of the blade, as shown in FIG. 8, until the blade has been moved back into the slot to engage against the back wall bounding the slot, to seat the blade shown in FIG. 9.

While for many applications either frictional retention of the blade in the razor head, or resilient clamping of the blade in the razor head, is sufficient to maintain the blade in its seated position for some critical applications where the razor must be in proper adjustment at all times such as, for example, medical applications where the razor is used in preparation for surgery, a further means for retention of the razor blade may be employed. To this end, as is illustrated schematically in FIG. 9, a drop of a liquid bonding material is applied in to the notch 30 to the portion of the blade that projects into the notch. This liquid bonding material then enters or penetrates the spaces between the confronting surfaces of the blade and the walls of the slot to a degree that depends upon the viscosity of the bonding material that is employed. The preferred kinds of bonding materials are those that are compatible with the material from which the razor is formed. For example, when the razor is molded from a polystyrene resin, the bonding material may be polystyrene cement. Many other kinds of liquid adhesives and bonding materials are well known for forming satisfactory bonds between metal surfaces and plastic surfaces, and can be used in connection with the present invention. After the liquid adhesive hardens, it forms a hardened bond 40 that is disposed primarily at and adjacent the notch 30. The hardened adhesive provides a bond that secures the blade permanently in place in the razor.

While the manufacturing steps in accordance with a preferred embodiment of the invention described above can be preformed by hand, they are also exceptionally well adapted to be performed by automatic machinery.

In molding a razor in accordance with the present invention, ordinary molding apparatus can be employed in which resinous granules are introduced into a heated cylinder in which the granules are subjected to sufficient heat to permit them to flow. The molten resinous mass is then forced by a hydraulic ram through a small orifice into a mold cavity. As soon as the plastic material hardens in the mold, the razor is ejected from the mold, and any flashing is automatically removed when the razor is ejected.

The mold is preferably made into two parts with a male portion extending into the channel in handle 12, extending into and forming the slot 16, and forming the fingers 28 under slot 16, and a female portion forming the upper, rearward, and bottom surfaces of the head 14 and the rearward surface of handle 12. Such mold parts open and close generally in the direction of slot 16 so that the razor can be molded in one piece in a relatively simple mold. The female portion of the mold also forms the recess 30 in the back of head 14 if such is desired.

Although this invention contemplates the manufacture of razors in which the blade is retained in place in the slot in the razor head either by frictional engagement or by resilient clamping, the use of a notch in the back of the razor, together with a bonding agent applied to the blade and the razor head in the notch, represents a preferred embodiment of the invention. Whether the adhesive is used or not, the portion of the blade that projects in the notch permits visual inspection to determine at a glance whether the blade is properly seated.

Razors made in accordance with the present invention can be inexpensively produced by mass production techniques. The cost of manufacture can be sufficiently low to permit the packaging of a razor, that is made in accordance with the invention, in a package together with a small quantity of shaving cream and soap, and a paper towel, in an attractively designed container, that can be sold at a reasonable and attractive price, for disposable use.

While the particular design and shape of the razor handle and razor head may be modified within the scope of this invention, I prefer a particular design, substantially as shown in the drawing, that I have found to provide ultimate shaving comfort. In this design, the angle between the plane in which the lower surface of the lower portion 20 of the razor head lies, is approximately 70°; the flat surface 24, on the upper portion 18 of the razor head 14, is disposed parallelism with the lower face of the portion 20 of the razor head; and the flat surface portion 26 is disposed to lie in a plane that forms an angle of approximately 45° with the plane in which the back surface of the razor handle lies. Moreover, the walls that bound the slot 16 are formed to be substantially in parallelism with the lower surface of the lower portion 20 of the razor head and with the flat surface portion 24 of the upper portion 18 of the razor head.

I have found that this particular razor design permits the razor to be formed with a head whose length and width are small enough to permit easy maneuvering, to permit comfortable shaving under the nose and in other relatively inaccessible places, to permit the overall razor structure to be relatively compact so as to be generally economical of materials and of space. Moreover, the particular arrangement and disposition of the flat surfaces 24 and 26, on the upper portion 18 of the razor head, make it easy to use the razor to adjust its position for most comfortable contact between the sharpened edge of the blade and the skin. Furthermore, the proportions of the upper portion of the razor head and of the lower portion of the razor head are such that the surface 26 on the upper portion of the razor head and the projecting fingers 24 on the lower portion of the razor head together serve as guards for the sharpened edge of the razor blade, to protect against accidental contact with the blade, and to permit cutting action only when the razor head is pressed against the skin.

While the invention has been disclosed herein by reference to the details of preferred embodiments thereof, it is to be understood that such disclosure is intended in an illustrative, rather than in a limiting sense, and it is contemplated that various modifications in the construction and arrangement of the parts will readily occur to those skilled in the art, within the spirit of the invention and the scope of the appended claims.

I claim:

1. A method making a molded, one-piece disposable formed of resilient material to have a handle and a slotted head with a single-edged blade secured in the slot in said head, said method comprising:

a. forming a two-part mold that opens and closes in the direction of said slot;

b. forming a female portion of said mold to shape the back of said head;

c. forming a male portion of said mold to shape the front of said head and said slot;

d. configuring the surfaces of said mold portion to form a guide surface at the upper front of said head, to from said slot extending into said head a predetermined distance from the front of said guide surface to terminate in an abutment surface, and to form a plurality of fingers spaced along the underside of said head with the tops of said fingers in the plane of the bottom of said slot and curving downward in front of said guide surface;

e. dimensioning said male mold portion to form said slot with the correct width and depth relative to said blade and said guide surface and said fingers so that said blade is frictionally held in said slot with its sharpened edge extending forward a proper amount for shaving when its unsharpened edge is seated against said abutment surface;

f. operating said mold to form the body of said razor;

g. inserting one end of said blade into an open, transverse end of said slot;

h. moving said blade substantially it full length into said slot; and

i. contacting said blade at a surface other than said sharp edge, and through said contact moving said blade trans-

versely into seated engagement with said abutment surface.

2. The method of claim 1 wherein said contact with said blade is made adjacent the extremities of said sharpened edge.

3. The method of claim 1 including configuring said male mold portion to form said handle as a generally U-shaped channel opening toward the front of said razor.

4. The method of claim 1 including configuring said female mold portion to form a recess in the back of said head in visible communication with said abutment surface of said slot, and applying bonding material to said blade and said head in said recess for bonding said blade to said head.