Sept. 9, 1969 F. P. MUSSO 3,465,436

CIRCULAR SAFETY RAZOR

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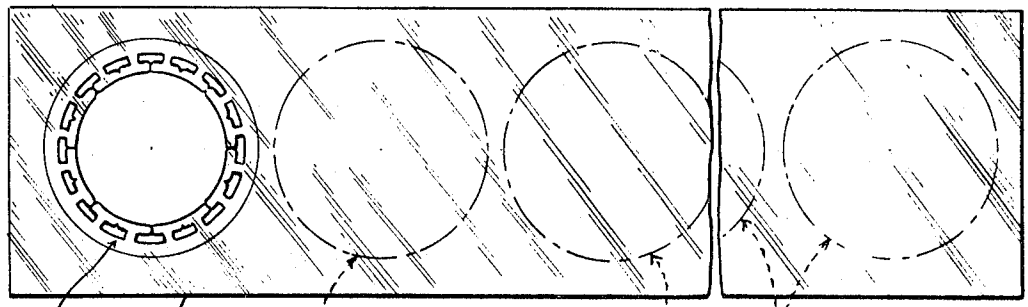


Fig. 6.

Fig. 7.

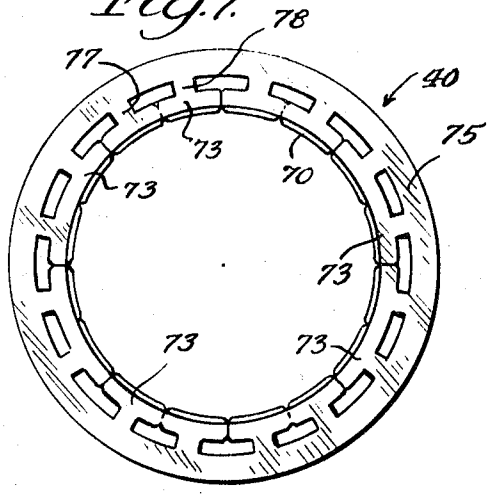
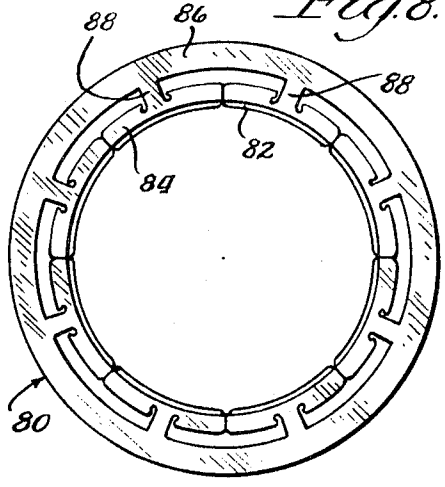


Fig. 8.



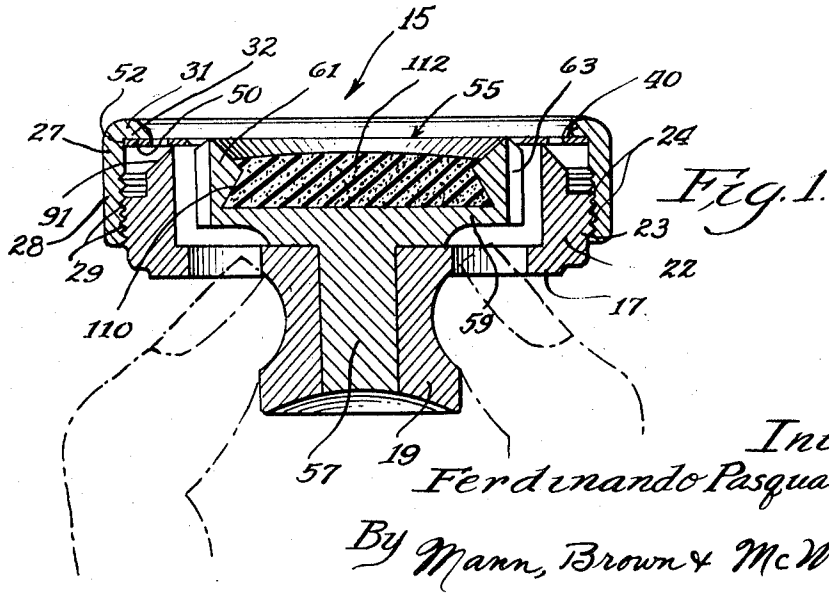


Fig. 1.

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Fig. 2.

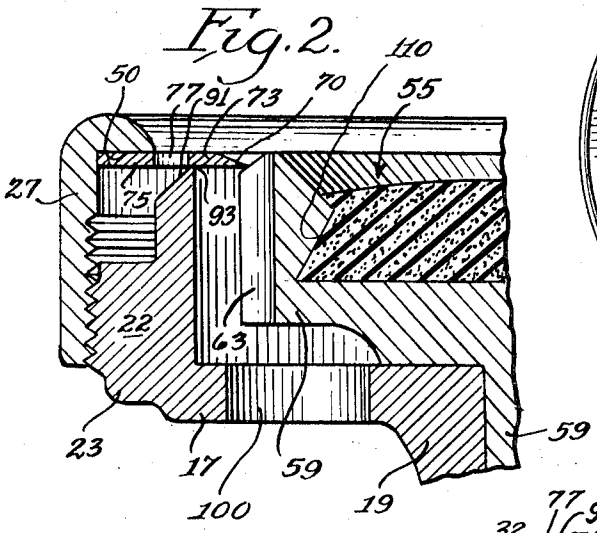


Fig. 5.

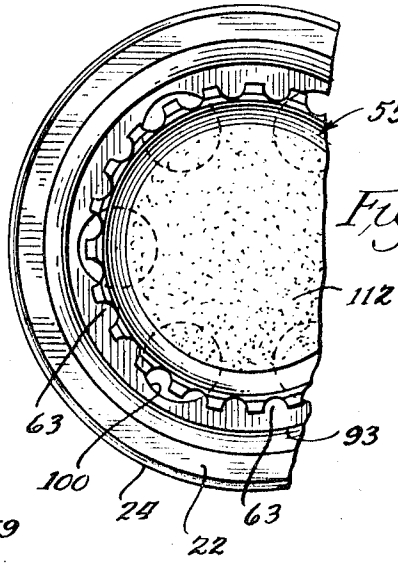


Fig. 3.

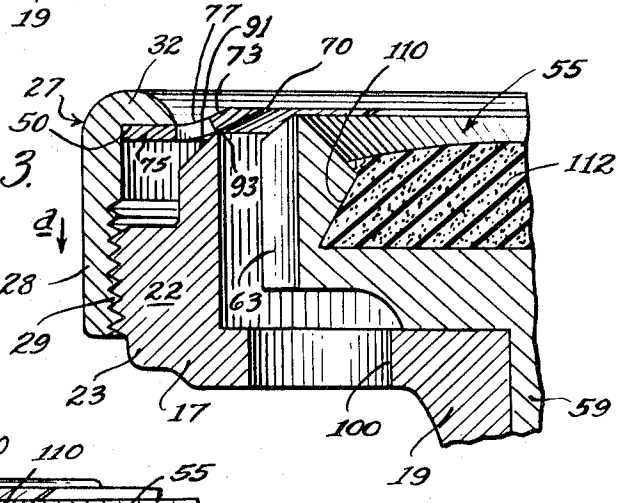
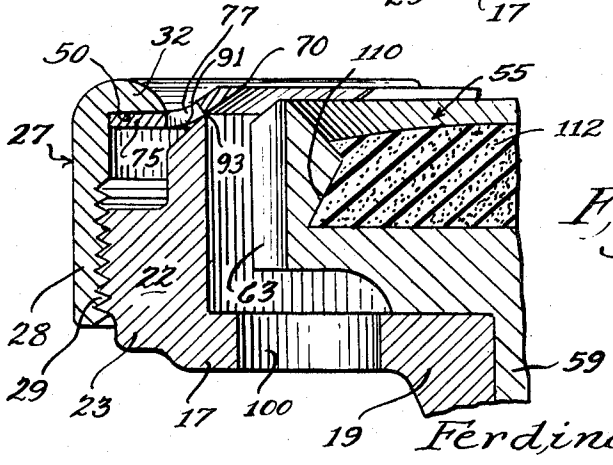


Fig. 4



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Fig. 11.

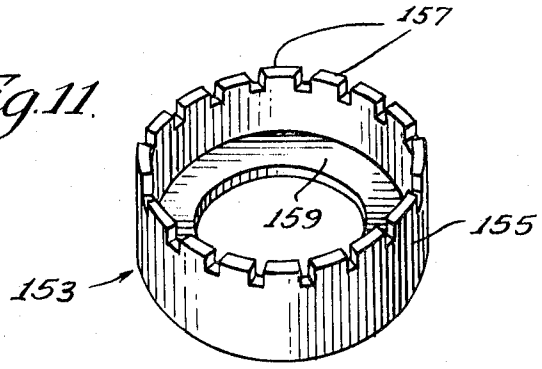
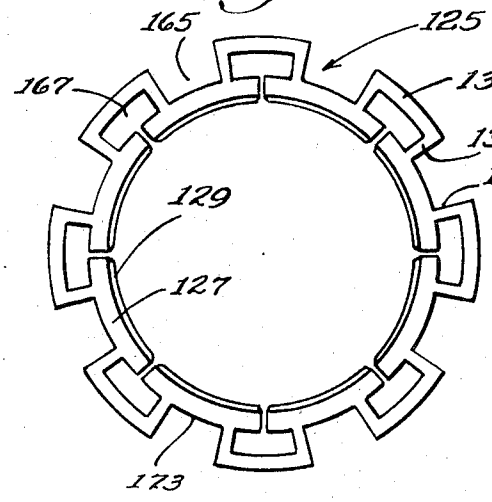


Fig. 9.



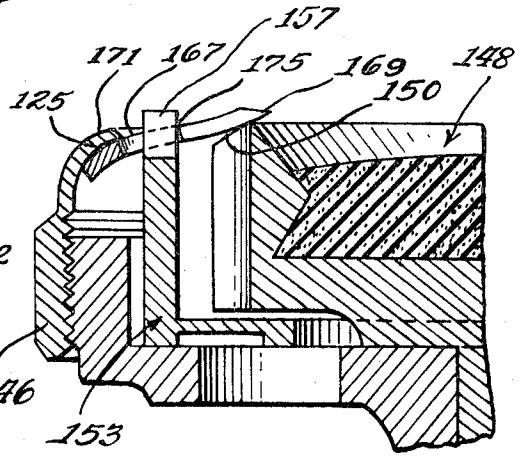


Fig. 12.

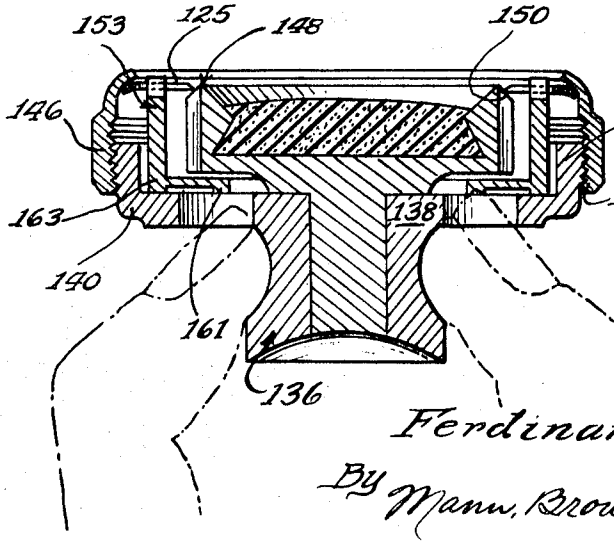


Fig. 10.

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CIRCULAR SAFETY RAZOR

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Continuation-in-part of application Ser. No. 417,988, Dec. 14, 1964. This application Aug. 8, 1967, Ser. No. 659,158

Int. Cl. B26b *21/20, 21/52*

U.S. Cl. 30—49

5 Claims

ABSTRACT OF THE DISCLOSURE

The present invention relates to improvements in the circular razor art. The specification provides a detailed description of a novel concept in circular razors including a blade which is extremely thin, yet completely safe to package and handle in and out of the razor. Also disclosed are certain razor constructions which complement the blades herein described and permit of their efficient use and storage.

More specifically, the blades of the present invention comprise a series of arcuate segments, the inner radial edge of which is sharpened to provide the shaving edge, thereby permitting safe handling of the blade by its outer edge without concern for cuts or nicks. The segments are extremely thin and flexible, and are supported by very thin, integrally formed, spans and bridges which hold the segments in proper alignment and maintain them as a coordinated shaving unit. The razors are especially useful with the blades of the present invention in that they permit complete and unencumbered control of the shaving edges to a proper shaving angle for use in the most delicate of areas, and at the same time permit easy storage of the blade by moving the sharpened surface to a safe position during nonuse. Thus, there is no chance of becoming nicked or cut by the razor either in use or when in storage.

The present invention relates to a new circular razor blade having an inner angular cutting edge adapted especially, although not exclusively, for use by women in shaving delicate areas such as legs and underarms.

This is a continuation-in-part of my copending application Ser. No. 417,988 filed Dec. 14, 1964, now abandoned, for Circular Safety Razor. Circular razors of the type to which the present invention relates are illustrated generally by my previous Patents 2,556,208, 2,598,711 and 2,632,242. Since making the inventions disclosed in these patents, I have discovered a superior blade and circular shaving apparatus. The present invention has as one of its objects the provision of a circular type safety razor having both a blade and a holder portion which is simplified in its manufacture, storage and handling.

It is another object of the present invention to provide an improved circular blade which is completely safe to handle for packaging purposes, as well as from the standpoint of removal from the package and placement in the razor, and subsequent removal from the razor and disposal.

Still another object is to provide a circular blade which may be readily manufactured in a variety of sizes including very small diameters for shaving delicate areas.

It is another, and still further object of the present invention to provide a razor for use in conjunction with the circular blade of the present invention which is adapted to hold the blade securely and to permit its efficient use, ready cleaning and replacement.

These and other objects and advantages will become apparent from the reading of the following detailed description taken in connection with the appended drawings wherein:

FIGURE 1 is a side elevation, shown in section, of a new circular razor embodying the present invention;

FIGURES 2, 3 and 4 are enlarged partial sections of FIGURE 1, showing the blade adjusted between a safety position, and a position of optimum blade angle for heavy duty shaving;

FIGURE 5 is a partial plan view of FIGURE 1 showing the construction of the razor of FIGURE 1;

FIGURE 6 illustrates a ribbon of blade material particularly formed during the manufacture of the improved blade of the present invention;

FIGURE 7 illustrates one form of the blade adapted for use in the razor of FIGURE 1;

FIGURE 8 is a modified blade construction embodying the present invention;

FIGURE 9 is a view similar to FIGURES 7 and 8 illustrating still another form of the blade embodying the present invention;

FIGURE 10 is a side elevation similar to that of FIGURE 1, and adapted for use with the blade of FIGURE 9, the blade being illustrated in its storage position;

FIGURE 11 is an enlarged perspective of the blade mounting ring which forms a part of the razor illustrated in FIGURE 10; and

FIGURE 12 is an enlarged and fragmented view of a portion of the sectioned razor of FIGURE 10, illustrating the relationship of blade and razor in the shaving position.

With particular reference now to FIGURE 1, there is illustrated a circular razor indicated generally by the identifying character **15**. It will be apparent that the razor is of the type generally used with a wet lather. However, it is an additional feature of the invention that it may be safely used for dry shaving when convenient. It will be understood that at least the blade of the present invention has utility with an electric or power driven shaver of the general type set forth in my Patent 2,556,208.

The razor, in the exemplary form illustrated, comprises a holder member **17** having a centrally disposed outwardly projecting handle **19**, either formed integrally therewith, or fitted thereto in some suitable fashion. The holder **17** is provided with an upstanding support blade flange **22**, the outer peripheral wall **23** of which is provided with threads **24**.

A complementary collar member **27** is provided, and is adapted to be screwed onto the flange **22** by means of the threads **29** formed internally on the side wall **28** of the collar. The collar may be formed of plastic, metal, or any other suitable material which lends itself to the use for which it is intended here. The crown of the collar wall is rounded as at **31**, and forms a projection **32** extending inwardly from the wall of the collar. The rounded portion **31** is highly finished and smooth so that it will glide smoothly over the surface being shaved.

In keeping with the invention, a generally planar, highly flexible circular blade is provided for use with the razor **15**. Such a blade is illustrated in FIGURE 7 where it is

identified generally by the character **40**. As will be seen, the blade **40** is susceptible of manufacture in mass from a ribbon of material, preferably thin, flexible stainless steel, and such a ribbon is shown in FIGURE 6 indicated generally at **45**.

In accordance with another aspect of the invention, the blade **40**, being flat, is adapted to be fitted snugly into the collar **27** which is provided with a short inwardly turned surface **50** defined by the projection **32**. The surface **50** terminates in a sharp corner at **52** where the surface **50** engages the internal face of the wall **28** of the collar. It is contemplated that the blade will be secured on the surface **50** by the manufacture, and the collar and blade sold as a unit. It will be appreciated that the blade is susceptible of manufacture and sale exclusive of the collar which may, itself, be a permanent part of the razor per se.

In order that there may be optimum safety in handling the razor with a blade in it, when not intended for immediate shaving use, a guard pillar, indicated generally by the numeral **55** is provided, centrally disposed within the holder **17** and concentric with the blade. Referring to FIGURES 1 and 5 in particular, the guard pillar is provided with a central locating pin **57** which may be fastened within the handle **19** of the holder in any convenient manner. The pin is suitably formed with supports and a generally transverse flat web or disc **59** which terminates in an upstanding flange portion **61**. The external peripheral face of the flange portion is serrated as at **63** for the purposes of providing a plurality of flow holes.

The height of the guard pillar is such that with the blade inserted in the collar, and the collar and holder screwed together, the guard pillar initially projects slightly above the cutting edge of the blade. To this end, also, the serrated portion **63** of the outer periphery of the upstanding flange **61** is chamfered, so that the sharpened edge of the blade will reside below, and spaced slightly from the top of the guard so as not to damage the edge.

Referring now more specifically to the blade, in order to permit its manufacture and handling in a relatively flat form, while at the same time being able to provide a blade with an adjustable angle for varying shaving conditions, the blade **40** is provided with an internal highly sharpened edge **70** which is divided into a plurality of arcuate segments **73**. Each segment is supported on an external, flat ring portion **75** by means of, in the instance of the blade of FIGURE 7, two suitably spaced spanner portions **77** and **78**. In the case of the blade **80** of FIGURE 8, there is provided an internal sharpened edge **82**, and the blade is divided into arcuate segments **84**, each of which is supported on an external ring **86** by means of a single span **88**. The number of segments, of course, may be varied, but it has been found that 8 or 16 segments works quite well. Also, the width of the span, as well as the thickness of the arcuate segment may be varied depending upon the size of the razor and its intended use. It has been found that by employing the blade construction of the present invention, any convenient blade size may be readily manufactured. It will be remembered that because the blade is manufactured from resilient stainless steel, the spanners are highly resilient, and act as biasing members for the arcuate segments as will be described.

Referring now specifically to FIGURES 2, 3 and 4, the cooperation between the blade of the invention and the razor is illustrated. In order to provide a suitable guide for fine adjustment of the blade angle, the flange portion **22** of the holder is provided with a chamfered portion forming a guide surface **91** which serves as a guide and support for the blade in use. Referring specifically to FIGURE 2, the safety position of the razor is indicated, and there it will be seen that the sharpened edge of the blade, which will be presumed to be that of the configuration of FIGURE 7, is at rest on the chamfered portion of the serrated edge **63** of the guard pillar **55**. The blade is supported on its underside by the apex **93** of the chamfered support surface **91**. It will be noted that the apex **93** bears against the underside of one of the segmented sections **73**, and will remain in contact with the segmented section. The outer ring **75** of the blade is supported, as previously noted, in the pocket provided between the surface **50** of the collar and the inner section of the internal wall of the collar **27**.

In keeping with the invention, adjustment of the blade angle is accomplished as the collar **27** is rotated relative to the holder **17**. Referring to FIGURE 3, and presuming the normal right-hand thread, clockwise rotation of the collar **27** and the blade attached to it relative to the holder will result in the advancement of the collar onto the holder in the direction indicated by the arrow A (FIG. 3). As a result, the apex **93** of the flange **22** will be brought to bear heavily against the underside of the segment **73** of the blade **40**. Because the spans **77** and **78** are relatively narrow, and because the material is resilient, the segment will be biased in a curved fashion indicated in FIGURE 3, upwardly and away from the serration **63** of the guard, thereby exposing the sharpened portion **70** of the blade to the surface to be shaved. Further advancement of the collar **27** will result in increasing the blade angle to a position indicated generally in FIGURE 4 which represents a blade angle of approximately 30 degrees. Because of the action of the biasing spanners which urge the segments against the guide at all times, a uniform blade angle is achieved all the way around even though the blade segments are otherwise independent of one another. Thus, the blade angle may be adjusted to taste, and with an absolute minimum of effort and handling of the razor or the blade. The segments **73** are so close, and the blade raised so little that a substantially continuous cutting edge is provided. A slight chamfer at the edges of the segments may eliminate nicking, however.

The blade **80** of FIGURE 8 functions in substantially the same manner, and either blade would function as described whether having 8 segments, 16 segments or any other suitable number.

With particular reference now to the FIGURES 9 through 12, still another novel form of a razor and blade embodying the present invention is illustrated in detail. It has been found that metals technology has advanced to a state whereby extremely thin blades may be manufactured which, if properly supported in a holder, are capable of functioning as extremely fine shaving instruments.

Accordingly, and in keeping with the objective of making an extremely flexible, yet strong blade, capable of a high degree of control in terms of the position of the shaving edge, a blade is provided which is illustrated in FIGURE 9 wherein the sharpened surface has a minimum of support and a high degree of flexibility.

More specifically, a blade **125** is provided having a series of closely spaced sharpened arcuate segments **127**. The inner peripheral surface **129** of each second segment is sharpened to a fine cutting edge and the series of surfaces together define the inner diameter of the blade as seen in FIGURE 9. It will be appreciated that while 8 segments are shown, any number of appropriate segments might be used without departure from the invention.

Each segment is maintained in proper alignment by means of spans **132**, preferably formed integrally with and extending outwardly from each segment near the terminal end thereof. Spans **132** extend radially outwardly, and adjacent spans on adjacent segments are joined by an integrally formed bridge **134**. In the illustrated case, two spans extend from each sharpened segment and are joined by a bridge thereby holding all of the segments in proper alignment while at the same time providing strength and rigidity as well as uniformity of control between the segments.

Referring now to the razor construction, the circular holder illustrated in FIGURE 1 is similar in construction to that of FIGURE 10. Thus, a handle **136** is provided with a finger gripping area **138** which terminates in a support flange having sidewalls which define an upwardly extending cup-shaped portion **140**. The outer peripheral edge of the upstanding sidewalls **142** of the cup portion are threaded at **144** and a ring or collar member **146**, having complementary threads is mounted thereon. Within the cup portion a guard pillar is indicated generally at **148**. The upper peripheral edge of the guard pillar is chamfered at **150** in order to provide support for the cutting surface of the sharpened segments **127** of the blade, as well as to nest the sharpened edge when not in use.

It will be noted that each of the spans, and associated bridge portions are of extremely thin wall construction, being preferably thinner than the width of the sharpened segment itself. In order, therefore, to insure proper support for, and control of the blade, there is provided in FIGURE 10, in keeping with this aspect of the invention, a novel circular blade holder which is specifically constructed to provide the necessary support for proper control of the very thin blade of FIGURE 9.

As will be seen in FIGURE 10, the blade **125** is mounted in a storage position in the holder. In order to properly mount and position the blade within the holder, a circular blade support or ring, indicated generally at **153** (FIGURE 11) is provided within the cup defined by the holder between the upstanding sidewall **142** and the guard pillar **148**. As will be seen, the ring is provided with an upstanding sidewall portion **155**, the upper peripheral edge of which is notched to provide, in the instant case, 16 rectangular teeth **157** of uniform size. In order to provide proper positioning and alignment of the blade holder within the cup, a wall portion **159** extends radially inward from the lower edge of the wall **155** as seen in FIGURE 11, and a supporting foot (see FIG. 10) is illustrated at **161**. A second foot of equal height to the foot **161** is shown at **163**, and comprises, in the present case, an extension of the sidewall **155**.

References to FIGURES 9 and 11 will illustrate the correlation between the blade holder element and the blade of FIGURE 9. The blade is provided with a series of spans and bridges which together define slots **165** between each series of connected spans and bridges, and slots **167** defined within the confines of a series of joined spans and bridges and their associated arcuate sharpened segments. The slots **165** and **167** are equal in width, and of sufficient depth so that the teeth **157** on the support **153** will reside freely within each of the slots with sufficient clearance to permit movement of the blade to and from the proper shaving angle while mounted in the razor. Reference to FIGURE 12 will illustrate the general relationship between a typical slot **167** and a tooth **157** on the holder **153**. In that figure, the blade **125** is shown in the position which it assumes during use as a razor. Elevation to that position is accomplished by relative movement between the ring or collar **146** and the chamfered surface **150** of the guard pillar **148**. This is accomplished, in accordance with the invention, by rotation of the collar **146** to screw the same downwardly, or upwardly, relative to the upstanding sidewalls **142** of the holder.

In adjusting the position of the cutting edge **169** by rotation of the ring **146**, it has been found that the friction between the inner surface of the inturned flange **171** and the bridges **134** are such that the blade tends to adhere to that surface. Accordingly, the holder element **153** is constructed to permit the same to rotate relative to the cup in which it resides so that adjustment of the blade is accomplished with the ring, blade and holder element **153** all rotating at the same time.

In order to bring about the proper flexure of the blade **125**, and thereby position the cutting edge **169** of the blade at the proper cutting angle, the ring or collar **146** is

formed with an inturned flange portion **171** which overlays the bridges **134** of the blade **125**, and a portion of the spans **132**. As will be seen in FIGURE 12, downward movement of the ring **146** causes pressure to be applied against the bridges **134**, distorting the supporting portion of the blade, and causing an upward tipping movement of the arcuate segments **127**. The outer diametral edge **173** of the arcuate segments, when the same are in a proper shaving position abuts the inner surface of the wall **155** at a point **175** illustrated in FIGURE 12. In this manner, the blade is securely clamped between the inturned flange **171** and the teeth **157** on the holder element of FIGURE 11. The sidewall **155**, and the depths of the notches defined between the teeth **157** on the element **153** are such that the shaving edge **169** will reside at the proper shaving angle with respect to the pillar guard **148** as illustrated in FIGURE 12. In this illustrated position, the razor is ready for use. The upper surfaces of the teeth are polished so as to ride smoothly over the skin surface.

On completion of the shaving, the razor is simply reversed under a faucet where water, for cleaning purposes, may be forced through suitable openings **100** provided in the base of the holder **17**, the water flowing between the guard pillar and the flange **22** and through the serrations **63** and against the exposed blade **70** for cleaning.

The razor **15** of the present invention (FIG. 1) provides another unique and useful shaving advantage by the provision of means for spreading the lather or the like used during the course of shaving over the area to be shaved. Thus, the guard pillar is recessed as at **110**, and a cellular material such as a sponge **112** is received in the recess **110** in a position to engage the lather being used during shaving at that time. A similar feature is shown also in FIGURE 10.

I claim as my invention:

1. A safety razor comprising, in combination, a generally circular holder member having a handle protruding therefrom, an upstanding support flange on said holder member, said flange being formed with external threads, a collar adapted to screw onto said flange, a centrally disposed guard pillar having a chamfered surface located radially inwardly from said collar, a generally planar blade member comprising a series of spaced arcuate segments, adapted to be positioned between said collar and said flange, the inner peripheral edge of each said segment being sharpened, and such sharpened edges defining a substantially continuous circle, means outwardly of said segments for innterconnecting said segments thereby to hold such segments together relative to one another and define a unitary circular blade formed from a unitary blank, a series of spaced slots, surrounding said segments, formed by said segments and interconnecting means, a circular means mounted in said holder for supporting and holding said blade in position between said collar and said guard pillar, said last-mentioned means having teeth adapted to engage in said slots, said collar means adapted to bear against said segment interconnecting means so that when said collar is screwed on said flange, each segment is urged upwardly to a predetermined shaving angle.

2. For use with a razor, a circular blade comprising a series of serially spaced arcuate segments, the inner radial peripheral edges of said segments being sharpened, and such sharpened surfaces defining a substantially continuous circle, means outwardly of said segments for interconnecting the same to thereby hold such segments relative to one another, said interconnecting means and said segments being co-planar and integrally formed from a unitary blank.

3. A blade as set forth in claim **2** wherein said interconnecting means comprises an outer support ring, and a plurality of spans extending between said segments and said support ring for holding the former with respect to the latter.

4. The blade as set forth in claim 2 wherein said interconnecting means comprises a series of spans extending radially outwardly from said segments, spans of adjacent segments being interconnected by a bridge integrally formed therewith.

5. The blade as set forth in claim 2 wherein said spans and bridges together define a series of slots.

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MYRON C. KRUSE, Primary Examiner

U.S. Cl. X.R.

30—41, 346.56, 346.57

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,465,436 September 9, 19

Ferdinando Pasquale Musso

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, between lines 36 and 37, insert

While the invention is susceptible of various modifications and alternative constructions, certain illustrative embodiments are shown in the drawings and will be described below in considerable detail.

Signed and sealed this 26th day of May 1970.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents