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M. B. BEHRMAN

1,798,447

RAZOR

Filed June 9, 1926

Fig. 1.

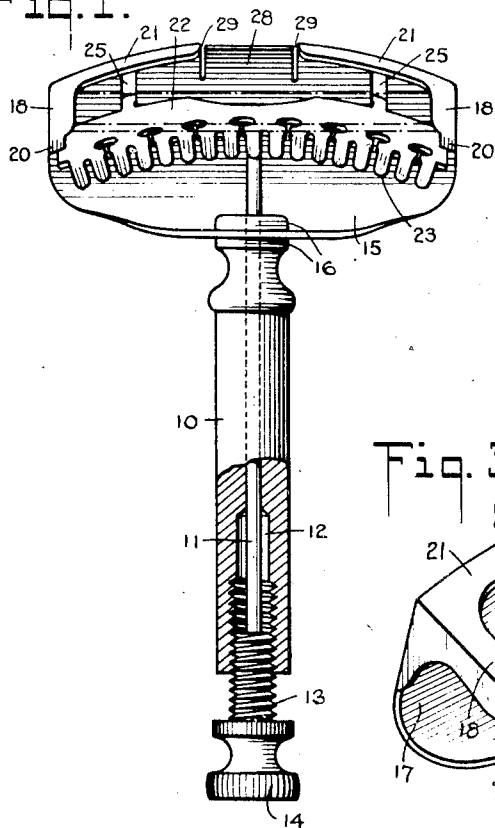


Fig. 2.

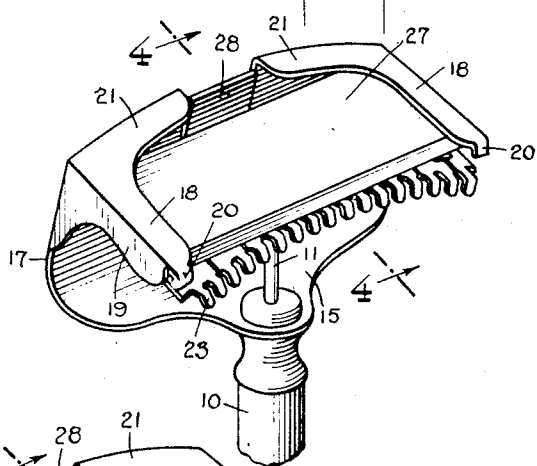


Fig. 3.

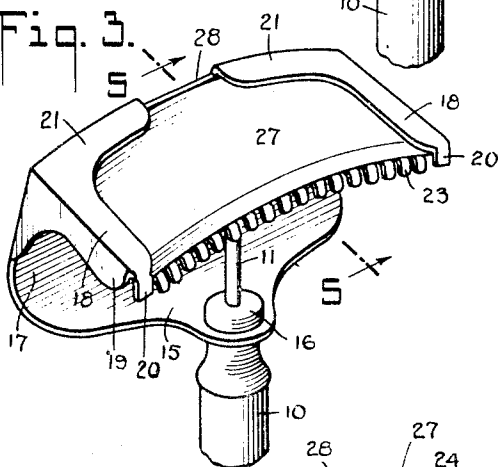


Fig. 4.

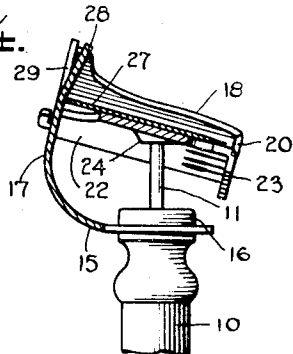


Fig. 5.

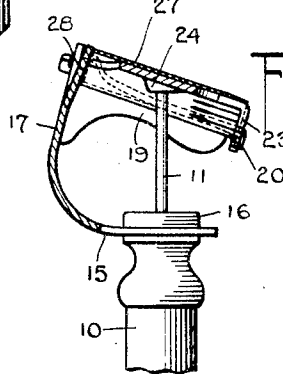


Fig. 6.

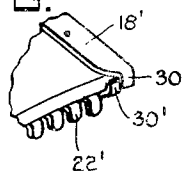
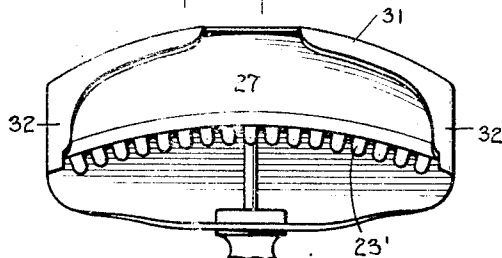


Fig. 7.



INVENTOR
Marcus B. Behrman
BY
William S. Bluck
ATTORNEY

UNITED STATES PATENT OFFICE

MARCUS B. BEHRMAN, OF BROOKLYN, NEW YORK, ASSIGNOR TO AMERICAN SAFETY RAZOR CORPORATION, OF BROOKLYN, NEW YORK, A CORPORATION OF VIRGINIA

RAZOR

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My present invention relates to razors, and has particular reference to safety razors of the curved blade type.

In the manufacture of safety razors generally it has been customary to provide a holder having a guard portion and adapted to receive a blade in a manner which predeterminedly positions the blade edge with respect to the guard. Where I have attempted to provide safety razors wherein the blade is given a flexure so as to curve its cutting edge, I have found it satisfactory to construct the holder with co-operating portions which act upon the blade after its insertion in a manner which will impart the necessary curvature thereto. I have found, however, that the blades which are suitable for such a purpose are not always of equal widths. Accordingly, constructions of the general character referred to, have been found by me to be beset with the disadvantage that proper positioning of the blade with respect to the guard has not always been positively assurable.

It is an object of the present invention to provide a safety razor wherein this disadvantage has been obviated; and more particularly, it is an object of the invention to provide a razor wherein positive means are provided for predeterminedly positioning the blade with respect to the guard.

I have found the problem to be unique in connection with razors of the type wherein the cutting edge is curved, because of the existing necessity to conform the curved edge of the blade to the curved guard provided therefor. In other words, in the case of straight safety razors of this general type, the conformity of the straight cutting edge with a straight guard is a relatively simple matter in that such conformity will exist regardless of the angle which the blade assumes. As long as such conformity exists, the guard is effective in fulfilling its safety function. However, in the case of curved razors, absolute conformity between a curved cutting edge and a curved guard will occur only at a predetermined angular position of the blade, and only after a predetermined curvature has been imparted to the blade. Inas-

much as absolute conformity is essential from the standpoint of safety, and rendering the device utilizable at all, the problem has been rendered unusually difficult by the importance, as factors to be considered, of the curvature and the angularity of the blade.

It is an object of the present invention to provide a safety razor wherein these factors have been properly co-related with respect to the factor of variable widths of blades, and more specifically, it is an object of the invention to provide a razor wherein a blade may be positioned with respect to a curved guard in such a manner that absolute conformity of the cutting edge with the guard is always assured, the proper positioning of the blade with respect to the guard being at the same time rendered automatically certain, regardless of the width of the blade.

A still further difficulty which I have encountered lies in the fact that a normally flat yet flexible blade of the wafer type is, from a practical standpoint, the best type of blade to be used; and consequently, the element of friction has presented itself as an additional factor to be taken into account. That is to say, the relative movement of the blade with the guard in order to assure proper relative positioning of the two, must be capable of accomplishment during the flexure of the blade. The instrumentality employed for flexing the blade will of necessity create stresses which will be resisted by the blade. This resistance will produce friction between the blade and the instrumentality, and relative movement of the blade with respect to the instrumentality is thereby rendered particularly difficult.

It is another object of the present invention to provide a device wherein this additional factor of friction has been taken into consideration and properly appreciated from the standpoint of devising means for overcoming the obstacle which it presents.

A feature of my invention lies in providing means for moving the blade bodily, or at least urging the blade so to move, during its conformation with the curved guard. More particularly, it is a feature of the invention to

provide means for shifting the blade edge-wise during the flexure thereof.

In a preferred embodiment, the means for so shifting the blade are associated with the instrumentality employed for flexing the blade.

Another feature of the invention lies in providing means for predeterminedly limiting the bodily movement of the blade so as to produce a predetermined positional relation between the blade and the guard after the operation of insertion and flexing has been completed. Another feature lies in providing this limiting means in such a way as to operate upon the blade and limit its movement during the entire manipulation thereof as contrasted with a functioning which might be made to take place only after the blade has been sufficiently flexed. In this manner, the method of assembly between the blade and the holder is rendered peculiarly efficient, and the likelihood of mishap, either to the blade or the holder or the user, has been minimized.

A preferred type of holder comprises relatively adjustable saddle and grip portions, one of which is provided with the curved guard edge. I have found it most suitable to provide the guard edge upon the saddle and to position the saddle and grip portions in such a manner that the blade is engageable between them and over the saddle. A preferred construction provides the saddle with a curved surface into conformity with which the blade may be made to position itself. In a construction of this character, the means for shifting the blade is associated with one of the co-operating saddle or grip portions, and is operable upon the blade during the mutual adjustment of said portions.

A particular feature of my invention lies in rendering this means entirely self-operative during said mutual adjustment. One embodiment includes a resilient and yieldable portion which bears against an edge of the blade. Another embodiment eliminates the necessity for yieldable or resilient portions of any character, and contemplates the production of blade movement by virtue of the strains set up in the blade itself. More particularly, the last mentioned embodiment provides means for flexing the blade into a non-cylindrical surface such as a conical surface, thereby producing strains within the blade which co-operate with the flexing instrumentality to shift the blade bodily with respect thereto. Where a curved saddle portion is provided, the saddle may be provided with a curved surface of this character, and the conformation of the blade with such a surface will automatically impart the same curvature to the blade.

For the attainment of the foregoing objects, and such other objects as may hereinafter appear or be pointed out, I have illus-

trated my invention in the accompanying drawings in which

Fig. 1 is a front elevational view of a suitable type of holder embodying the features of my invention;

Fig. 2 is a perspective view of a holder of this character, showing a normally flat flexible blade initially positioned therein;

Fig. 3 is a view similar to Fig. 2, showing the blade in final position with respect to the holder;

Fig. 4 is a cross-sectional end view taken along the line 4—4 of Fig. 2;

Fig. 5 is a similar view taken along the line 5—5 of Fig. 3;

Fig. 6 is an enlarged perspective view of a structural modification; and

Fig. 7 is a view similar to Fig. 1, showing a modification;

Referring to the drawings, and particularly to Figs. 1 and 2, it will be observed that the holder which I have illustrated comprises a handle member 10 provided with a longitudinal bore within which a rod 11 is movably positioned. In the construction illustrated, the gripping portion is fixedly associated with the handle 10, and the rod 11 serves to operate upon the saddle portion; but it will be understood that any suitable means may be employed for causing the relative adjustment of the gripping and saddle portions. Thus, I have shown the longitudinal bore as being provided with an enlarged lower portion 12 internally threaded, and I have shown the lower end of the rod 11 provided with an enlarged portion 13 externally threaded to engage with the internal threads in the bore. At the extreme lower end of the rod I provide a handle or knob 14, and it will be obvious that manipulation of the knob 14 will move the rod 11 upwards or downwards with respect to the handle 10.

The gripping portion comprises a base 15 held in position with respect to the handle 10 by flanges 16 on the latter. The base 15 extends rearwardly and then upwardly to provide a back 17. Carried by the back are forwardly projecting arms 18 suitably spaced with respect to each other so as to engage the opposite ends of a blade subsequently to be inserted thereunder. These arms 18 are preferably provided with depending flanges 19 which limit the endwise movement of the blade, and at the forward end of the arms 18 I provide depending tabs 20, whose function will be more obvious hereinafter. The top surfaces of the arms 18 continue along the top edge of the back 17, as shown at 21, and are preferably made to terminate on opposite sides of the center of the back. This center portion, between the surfaces 21, is suitably constructed in the illustrated embodiment to provide the blade shifting means hereinbefore referred to.

I have shown a saddle portion 22 having a

forward curved guard edge 23 comprising the conventional depending teeth. In the illustrated form, the entire saddle is curved symmetrically with respect to the guard edge, thereby providing a substantially cylindrical surface with its convex side upwards. The rod 11 bears against a lug 24 carried on the under-side of the saddle, and thereby movement of the rod 11 will urge the saddle upwards with respect to the gripping portion constituted of the elements 15, 17, 18, etc. To permit of such relative movement, the saddle is associated with the gripping portion in a manner which retains it in attachment thereto, and which at the same time permits such movement to take place. I have illustratively shown a pair of vertical slits 25 provided in the back 17, and the rear edge of the saddle portion 22 may be provided with T-shaped projections extending through these slits.

Reference to Fig. 2 will show how a normally flat flexible blade 27 will position itself when initially inserted into the holder. It will be obvious that this insertion will be made to take place while the rod 11 is in a relatively low position, so that the saddle 22 will rest within the lowermost portions of the slits 25. When the holder portions are in such a position, the blade will rest upon the middle portion of the saddle 22, and its opposite ends will be disposed underneath the arms 18. The slits 25 are preferably made of such a length that retractive movement of the saddle 22 to a position lower than that shown in Fig. 2 will be prevented. As the knob 14 is now manipulated, the rod will bear upwardly against the saddle 22, forcing the middle portion of the blade upwardly; the ends of the blade, however, will be prevented from moving upwardly by the arms 18, and consequently a curvature will be imparted to the blade, tending to position it in conformity with the curved surface of the saddle. When the saddle 22 has been moved upwardly to its fullest extent, the blade will be flexed in a position as shown in Fig. 3, and it will now be observed that the upper edge of the back 17, together with the surfaces 21, must be upwardly curved at least to the extent of the saddle curvature, otherwise the cutting edge of the blade will not be in conformity with the guard portion 23 after the saddle has been moved to its fullest extent.

In order that the guard edge may fulfill its function most efficiently, it is necessary that the cutting edge be positioned with respect thereto in accordance with predetermined design. This predetermined position must exist after the blade has been fully flexed, with its cutting edge in conformity with the guard 23. In the embodiment shown, I have provided a resilient portion carried by the gripping portion of the holder,

and operable upon the blade during its flexure. It will be observed that I have shown this resilient portion in the form of a tongue 28, this tongue being provided by cutting slits 29 into the back 17 just inside of the terminal ends of the surfaces 21. After these slits 29 have been provided, the intermediate portion is bent inwardly, i. e., toward the forward end of the holder. This is the normal position of the tongue 28, but the tongue is resilient and yieldable, and may be forced in a rearward direction against its tendency to position itself forwardly. Thus it will be observed that as the middle portion of the blade is forced upwardly by the saddle 22, the rear edge of the blade will contact with the tongue 28, and the latter will tend to move the blade forwardly in an edgewise direction. The forward movement of the blade is, however, limited by the depending tabs 20, and it will be obvious that these tabs 20 must be so positioned and constructed as to bear a certain predetermined positional relation to the guard edge 23.

It will be obvious that by positioning the tabs 20 upon the arms 18 instead of on the guard edge 23, the blade will be limited in its forward bodily movement throughout its entire manipulation. It will be obvious, however, that in holders wherein the relative movement of the blade engaging parts is of a different character, these limiting tabs 20 may be otherwise positioned so as to achieve an equivalent function. Furthermore, it may be desirable to provide similar tabs upon the saddle portion even in the construction illustrated. For example, I have shown a construction of this character in Fig. 6 wherein complementary tabs 30 and 30' are provided. The tabs 30 are dependent from the arms 18' of the gripping portion, and correspond to the tabs 20 of Fig. 1; and the tabs 30' are upwardly projecting from the saddle portion 22'. The tabs 30 and 30' must be suitably positioned with respect to each other so as to permit a certain overlapping thereof, as shown in Fig. 6, otherwise the extent of movement of the saddle and grip portions would be limited by the tabs when they encountered each other.

In the embodiment thus far illustrated and described, the resilience and strength of the tongue 28 is sufficient to overcome the friction between the blade and its engaging parts. In this manner, an edgewise forward movement of the blade is urged which will result in proper positioning of the blade after it has been totally flexed. Slight variations in the widths of blades will be compensated for by the yieldability of the tongue 28, and regardless of the width of blade used.

The final result will be substantially like that shown in Fig. 3 wherein the cutting edge not only conforms throughout its entire length with the curved guard 23, but where-

in this cutting edge is suitably positioned at a predetermined point with respect thereto.

In Figs. 4 and 5 I have shown cross-sectional end views which render the operation of the device more clear, and it will be observed that I prefer to incline the saddle portion forwardly with respect to a plane perpendicular to the rod 11. This inclination must be taken into account in designing the arms 18, the tabs 20 or their equivalent, and the guard edge 23 of the saddle portion.

In Fig. 7 I have illustrated a type of holder wherein resilient means such as the tongue 28 are entirely eliminated. In this construction, the surface of the saddle 22 is made non-cylindrical, and the other elements of the holder are designed in suitable accordance therewith. In the illustrated form, I have made the saddle embody a conical surface wherein the forward edge 23' has a curvature substantially like that of the edge 23 of Fig. 1, but wherein the rear edge 31 has a curvature of smaller radius. In other words, the conical surface is a portion of a cone having its apex rearward of the device. Obviously the curvature of the top edge of the back 17 must be altered, and the arms 32 (corresponding to the arms 18) must be suitably inclined so as to conform with the saddle when the two portions are in mutual close relation.

In this embodiment, the relative movement of the saddle and grip portions will flex the blade as before, and the cutting edge of the blade will be the first to conform to the curvature of the saddle. When this conformity has occurred, continued movement of the saddle and grip portions will tend to increase the flexure of the rear portion of the blade. This will create strains within the blade itself, and inasmuch as the blade will naturally tend to move in a direction wherein these strains are minimized, a forward bodily movement of the blade will result. It will thus be obvious that I have provided a device wherein all the essential factors have been considered and wherein the operation of the device properly co-relates these factors so as to achieve the desired result. Not only are the widths of blades rendered immaterial as far as proper positioning of the cutting edge is concerned, but in every case the cutting edge will conform absolutely to the guard edge, and will be made to assume a predetermined position with respect thereto. Furthermore, the device is extremely simple both from the standpoint of manufacture and manipulation, and the insertion and removal of blades is rendered extremely expeditious without any danger of damage either to the device itself, the blade, or the user.

It will be obvious that many changes in the details as herein described and illustrated for the purpose of explaining the invention, may be made by those skilled in the art without

departing from the spirit and scope of the invention as expressed in the appended claims. It is therefore intended that these details be interpreted as illustrative, and not in a limiting sense.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:—

1. In a razor, a holder, a flexible blade, means for adjusting the holder and blade relatively to each other to flex the shaving edge of the blade, means automatically operable upon the blade during the adjustment to shift the blade edgewise, and means associated with the holder for limiting said edgewise movement during the entire adjustment.

2. In a safety razor, a holder having a curved guard edge, a normally flat blade having a cutting edge, means for initially engaging the blade within the holder, means for causing relative adjustment of the blade and holder to flex the cutting edge into conformity with the guard edge, and means automatically operable during the adjustment to move the blade edgewise so as to cause the cutting edge to bear a final predetermined positional relation with respect to the guard edge.

3. In a safety razor, a holder comprising relatively adjustable saddle and grip portions adapted to engage a normally flat blade, means for adjusting said portions so as to flex the shaving edge of the blade, and means automatically operable during the adjustment to move the blade edgewise.

4. In a safety razor, a holder comprising relatively adjustable saddle and grip portions adapted to engage a normally flat blade, means for adjusting said portions so as to flex the shaving edge of the blade, and means automatically operable during the adjustment to move the blade edgewise, said last named means comprising resilient means associated with said portions and engageable by the blade.

5. In a safety razor, a holder comprising relatively adjustable saddle and grip portions adapted to engage a normally flat blade, means for relatively adjusting said portions so as to flex the shaving edge of the blade, and means automatically operable during the adjustment to move the blade edgewise, said last named means comprising a yieldable tongue associated with one of said portions and engageable by a blade edge during the adjustment.

6. In a safety razor, a holder comprising relatively adjustable saddle and grip portions adapted to engage a normally flat blade, said saddle portion presenting a curved surface to the blade, means for adjusting said portions relatively of each other so as to flex the shaving edge of the blade into conformity with the saddle portion, and yieldable means associated with the grip portion and engage-

able by the blade during the adjustment to automatically urge the blade edgewise during the flexure thereof.

7. In a safety razor, a holder comprising
5 relatively adjustable saddle and grip portions adapted to engage a normally flat blade, said saddle portion presenting a curved surface to the blade, means for adjusting said portions relatively of each other so as to flex
10 the shaving edge of the blade into conformity with the saddle portion, and yieldable means associated with the grip portion and engageable by the blade during the adjustment to automatically urge the blade edgewise during
15 the flexure thereof, said yieldable means comprising a resilient tongue positioned to engage an edge of the blade.

8. In a safety razor, a flexible blade, a holder comprising a saddle portion having a
20 curved guard edge, and a relatively movable grip portion co-operating with the saddle portion to engage the blade, means for adjusting the saddle and grip portions to flex the cutting edge of the blade into conformity
25 with the guard edge, and complementary projections carried by the saddle and grip portions to engage the cutting edge during the flexure thereof.

9. In a razor, a flexible blade, a saddle portion having a curved guard edge, a relatively
30 movable grip portion co-operating with the saddle portion to engage the blade, means for adjusting the saddle and grip portions to flex the cutting edge of the blade into conformity
35 with the guard edge, means operable upon the blade during said adjustment to advance the cutting edge, and projections carried by at least one of said co-operating portions to engage the cutting edge and limit its advance.

40 10. In a razor, blade clamping members, comprising a blade seat having a curved guard edge and means for adjusting the members relatively to each other into clamping
45 relation to force a normally flat blade received therewithin to conform in the curvature of its cutting edge to the curvature of the guard edge and means automatically operable during said adjustment to shift the blade forwardly along the guard edge.

50 11. In a razor, blade clamping members, comprising a blade seat having a curved guard edge and means operable upon one of the members for adjusting it relatively to the
55 other to force a normally flat blade received therewithin to conform in the curvature of its cutting edge to the curvature of the guard edge and means automatically operable during said adjustment to shift the blade forwardly along the guard edge.

60 In testimony whereof, I have hereunto signed my name.

MARCUS B. BEHRMAN.