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H. M. CHANCE

SAFETY RAZOR

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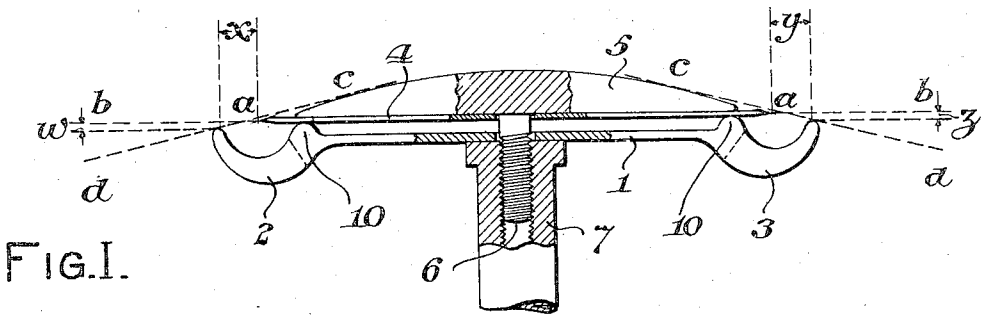


FIG. I.

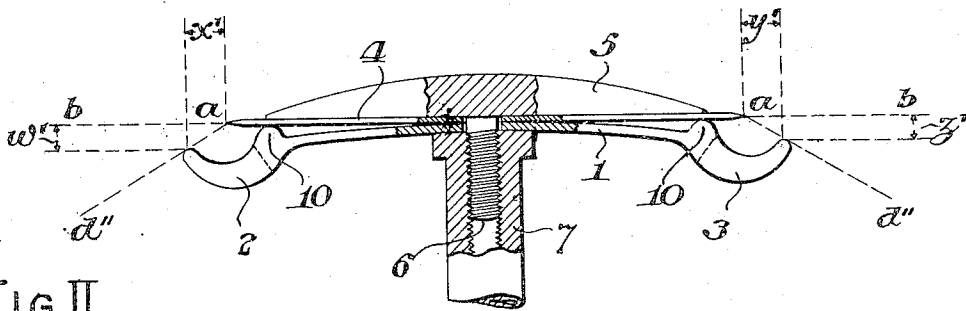


FIG. II.

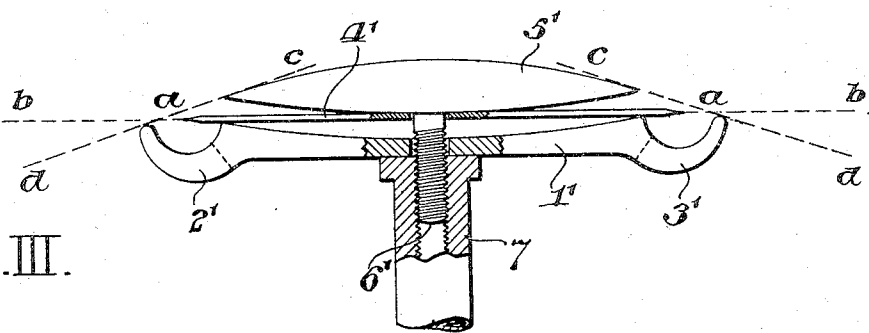


FIG. III.

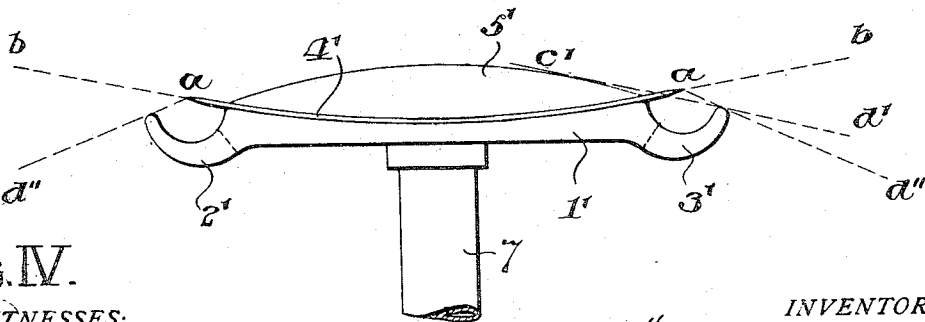


FIG. IV.

WITNESSES:

Carl K. Schuler
Frank M. Chance

INVENTOR.

Henry M. Chance

UNITED STATES PATENT OFFICE.

HENRY M. CHANCE, OF PHILADELPHIA, PENNSYLVANIA.

SAFETY RAZOR.

Application filed July 20, 1921. Serial No. 486,146.

To all whom it may concern:

Be it known that I, HENRY M. CHANCE, a citizen of the United States, residing at Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Safety Razors, whereof the following is a specification.

My invention relates primarily to safety razors that use a two-edged blade, that is a blade with two cutting edges, such, for example, as the Gillette razor blade, but its application is not limited to that particular kind of two-edged blade, nor to the use of holders commonly used with such blades, as it is applicable also to holders that do not curve or flex the blade, to two-edged blades that are not of the flexible type and to single-edged blades.

In flexible blade razors, flexing of the blade is used as a means for adjusting the position of the cutting edges of the blade and their angular direction, thus enabling the user, within certain limits, to adjust the cutting edges to shave closely or not as may be desired. Owing to slight differences in such blades, all blades do not flex or bend uniformly or symmetrically, and change in flexure of the blade may cause the cutting edge to warp or curve in a simple or compound curve, instead of bending to form the straight (or uniformly curved) line required for safe and efficient use. In addition to this difficulty inherent to adjustment by flexing, ignorance, lack of skill or inattention on the part of the user in adjusting the blade for use, frequently are the cause of scraping of the epidermis or actual cutting of the skin. For these reasons adjustments that do not depend for safety upon the exercise of intelligence, skill or care on the part of the user are preferable to those that require skill in setting every time the razor is used.

My invention is intended to overcome, or to minimize the element of uncertainty and danger of damage in the use of safety razors of the so-called adjustable type and which depend upon flexing the blade in varying degree to change the position of the cutting edge with reference to the guard. To justify the name, a safety razor should be a practically safe instrument when assembled for use in any possible position of the cutting edge and the guard. To effect this, it be-

comes necessary to confine the range of the adjustment available to the user, within precise and definite limits.

I attain this object by flexing the blade or by flexing a portion of the holder, or the guard, in such manner as to change the relative position of the guard with reference to the cutting edge adjacent thereto, the degree of flexing, whether of the holder or of the blade, being positively limited by the construction of the parts that co-act to produce the flexing.

Fig. I is an end and partly cross-sectional view, showing my invention applied to the construction of a razor in which the holder is flexible and showing the cutting edge of the blade and guard in a position insuring the greatest safety, and Fig. II is another view of the same device showing the holder flexed and the cutting edge of the blade and guard in a position adapted for close shaving. These two positions being the extreme positions possible, any intermediate adjustment causes the cutting edge of the blade and guard to occupy intermediate positions. The construction thus insures the required degree of safety throughout the range of these adjustments.

Fig. III is an end and partly cross-sectional view which shows my invention applied to a flexible double edged razor blade, which is stiff enough to assure firm clamping of the blade with the holder and clamp in approximately the position shown, which gives little, if any, exposure of the cutting edge of the blade, and Fig. IV shows the same device with the relative positions of cutting edge and guard changed to permit of use for close shaving, by flexing the blade to the greatest degree of flexing possible, thus providing for practically the same range in relative positions of the cutting edges and guard as that obtained by the device illustrated by Figs. I and II.

In Figs. I and II, 1 is a flexible holder, 2, 3 are guards, shown diagrammatically as of the comb or toothed type, 4 is a double-edged razor blade, 5 a clamp, 6 a screw attached to clamp 5 for clamping the parts together, and 7 is a handle with an internal thread fitting the screw 6.

In Figs. III and IV, 1' is a holder, 2', 3' are guards, 4' is a double-edge flexible razor

blade, 5' is a clamp, 6' is a screw attached thereto and 7 is a handle threaded to engage with the screw 6'.

The drawings are made on a large scale and show the exposure of the cutting edge, the clearances between the cutting edge and the guard, and the differences in angular direction of the cutting edge more or less exaggerated in order to show clearly the principle of construction. In most cases the adjustment to be made between ordinary and close shaving conditions is very small, amounting to but a few hundredths or thousandths of an inch. If the dimension x or y be relatively large, then w or z may be so small that the cutting edge "a" does not reach or intersect the line $c-d$, and yet may provide conditions that permit of satisfactory and even relatively close shaving if the razor be firmly pressed against the skin, because, owing to the distance x being large, the skin will curve inwards between the guard and the cutting edge "a", thus bringing the latter in contact with the skin. Under these conditions the angles $b-a-d$, and $b-a-d''$ will be much smaller than those shown diagrammatically by the drawings. It will of course be understood that in this, as in all safety razors, the safety of the razor is less when the razor is designed or adjusted for close shaving than when the adjustment is for less close shaving.

In Fig. IV the cutting edge of the blade at "a" is shown projecting quite an appreciable distance beyond the line $c'-d'$, a condition that involves some element of danger unless care be exercised by the user, and this exaggerated condition shown may be avoided in practice, either by flattening the curve of the holder, lengthening the guards or decreasing the distance that the cutting edge projects beyond the holder 1'.

In carrying out my invention, I do not limit myself to the comb or toothed type of guards shown by the drawings. It is obvious that any suitable type of guard may be used, with or without teeth. If a bar be used as a guard, it may be separated from the cutting edge and from the adjacent part of the holder by an open slot. Such bar guards may be made with a smooth surface or may be provided with corrugations, projections or teeth. The advantage of the bar type of guard is that it does not clog, is easily cleaned and it facilitates the use of an angular sliding movement of the razor by which the cutting edge is drawn diagonally across the hairs instead of squarely across them. In using a two-edged blade, it may often be desirable to use different types of guards for the two cutting edges. It will be understood that the resiliency of the holder, when a flexible holder is used, or of the blade, when a flexible blade is used, keeps a stress upon the screw 6 which tends to hold or lock it in

place, thus keeping the razor firmly clamped in the position in which it is set.

In the type of construction shown by Figs. I and II, the end, 10, of the holder adjacent to the guard, is in contact with the blade close to its cutting edge, firmly pressing the blade against the clamp 5, thus keeping the cutting edge from warping longitudinally and holding it rigidly in place.

My invention as described and shown provides for a combination of elements whereby the construction of a safety razor is attained which has the following characteristics:

1. When the razor holder, razor blade, clamp and handle are assembled and the clamp tightened sufficiently to hold the blade firmly in place ready for use, the cutting edge and guard are in a position with relation to each other such that the cutting edge has its minimum degree of exposure and its maximum degree of protection by the guard, and is not therefore in the position best adapted for close shaving;

2. If the clamp be further tightened, the position of the cutting edge and guard with relation to each other is changed in such manner as to increase the exposure of the cutting edge, and decrease the degree of protection of the guard, thus bringing the cutting edge into a position better adapted for close shaving;

3. If the tightening of the clamp be carried to the limit imposed by the relations and dimensions of the clamp and holder, the position of the cutting edge and guard with relation to each other is changed in such manner as to further increase the exposure of the cutting edge, and further decrease the protection of the guard, thus bringing the cutting edge into a position adapted for close shaving, without, however, causing sufficient exposure of the cutting edge to destroy the element of safety in use;

4. As further movement of the parts is impossible, it is evident that the desired adjustments are effected between two definitely fixed limits, and that the razor is safe irrespective of the way in which it may be adjusted by the user.

5. After tightening the clamp to the limit, that is, to the close shaving position, any change made by slackening the stress upon the clamp, decreases the exposure of the cutting edge, increases the protection of the guard and increases the factor of safety in use.

My invention thus provides a new method for adjusting safety razors in which increase in the clamping pressure decreases the factor of safety up to the permissible exposure of the cutting edge and decrease in the clamping pressure increases the factor of safety so that, as shown by the drawings, Figs. I and III, the parts may be so proportioned

as to give no exposure of the cutting edge when the razor blade is in its initial position as clamped for use, and maximum exposure consistent with safety, when the clamp is tightened to the limit fixed by the construction and proportions of the parts.

I do not limit myself to the particular applications of my improvement which I have described in detail, nor to the use of the two types of appliances illustrated by the drawings, as my invention, as already indicated, may be carried out by other means and may be applied to other types of holders and clamps than those shown and described. While I prefer the types in which progressive tightening of the clamp changes the adjustment from the least to the greatest exposure of the cutting edges consistent with safety in use, my improvement may be applied to types of holders and clamps producing a razor in which progressive tightening of the clamp changes the adjustment of the cutting edge from the greatest exposure consistent with safety to the least exposure; the entire range in adjustment in this, or in other applications of my improvement, produced by flexing the holder or by flexing the blade, being, by the construction of the parts, definitely limited between these two extreme positions of the cutting edges in relation to their respective guards. The term "exposure" in this specification and in the claims hereof, is used to designate the distance by which the cutting edge of the blade projects beyond a line drawn tangent to the outer surface of the clamp and also tangent to the outer surface of

the guard, as indicated by the broken line $c-d$ of Fig. I and $c'-d'$ of Fig. IV.

Having described my invention, I claim,

1. A safety razor including a holder having a guard, a handle therefor, a clamp engaging said holder, a blade between clamp and holder, one of said elements being flexible, means to flex said element, said blade, at the initial position of flexure of the flexible element, having surface contact with said clamp, and a line contact with said holder.

2. A safety razor including a holder having a guard, a handle therefor, a clamp engaging said holder, a blade between clamp and holder, one of said elements being flexible, means to flex said element, said blade, at the initial position of flexure of the flexible element, having surface contact with said clamp, and two line contact with said holder.

3. A safety razor including a holder having a guard, a handle therefor, a clamp engaging said holder, a blade between clamp and holder, one of said elements being flexible, means to flex said element, said blade, at the initial position of flexure of the flexible element, having surface contact with said clamp, and a line contact with said holder, said line contact being between the longitudinal center of said holder and the guard edge, said surface contact including a portion of the blade's upper surface.

In witness whereof I have hereunto placed my hand this 16th day of July, 1921.

HENRY M. CHANCE.

Witnesses:

CHAS. BUSH,

CARL K. SCHULZE.