Nov. 22, 1938. V. A. BERTRY 2,137,327

SAFETY RAZOR

Filed Sept. 29, 1936

Fig.1

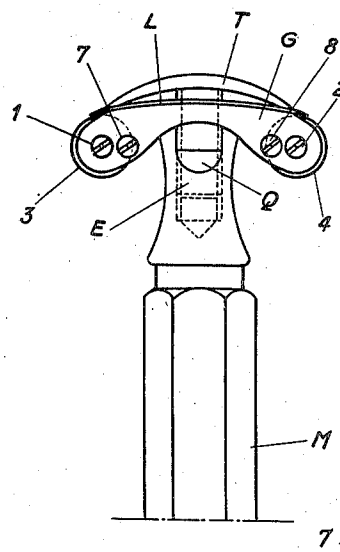


Fig.2

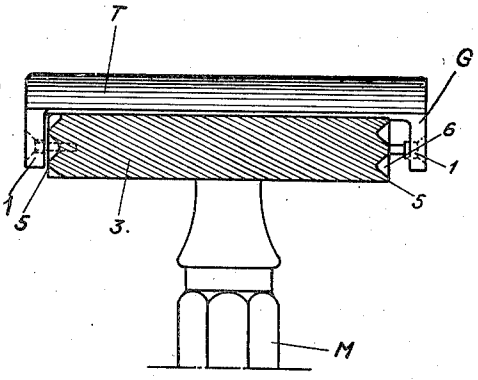


Fig.3

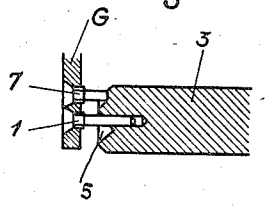


Fig.3a

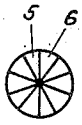


Fig.4

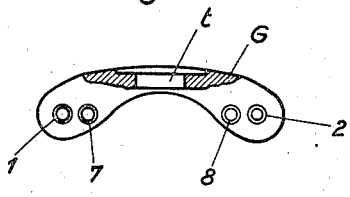


Fig 5

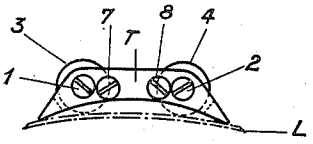


Fig.6

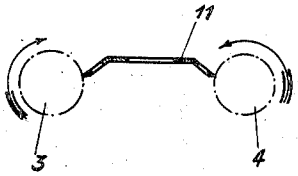
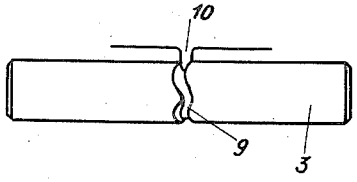


Fig.7



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SAFETY RAZOR

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In France October 7, 1935

7 Claims. (Cl. 30—46)

This invention relates to razors and has more particular reference to safety razors comprising a head, a handle removably fastened to the head, and a blade-holding plate or guard capable of clamping the blade between it and the head.

The primary object of the invention is to provide an improved razor wherein the cutting qualities of the blade are considerably enhanced owing to a vibratory or zigzag motion which is imparted thereto transversely of the direction in which the razor is moved along the skin for shaving purposes and owing also to a perfect and permanent clamping of the blade during such vibratory motion.

Another object of the invention is to provide a razor wherein the vibratory motion imparted to the blade does not necessitate an extraneous source of power such as a small electric motor as in certain kinds of razors devised heretofore but is derived from the impulse given by the user to his razor when displacing it along his skin.

Still another object of the invention is to provide a razor wherein the vibratory motion is imparted not to the blade alone but to the entire blade-holding unit whereby no relative displacement takes place between the blade and said unit and the blade remains held firmly and does not become shaky even after a prolonged shaving operation.

Another object still of the invention is to provide an attachment readily adaptable to safety and other razors and permitting to so convert their operating conditions as to impart a vibratory or zigzag motion to their blade whether of the one-edge or of the double-edge type without requiring an additional source of power.

A further object of the invention is to provide a razor having the improved means as aforesaid for imparting a vibratory motion to the blade and blade-clamping parts with additional means whereby any excess of soap or other impurities are automatically stripped off to prevent choking the razor.

A further object still of the invention is to provide a razor or razor attachment wherein the vibratory motion imparted to the blade has no tendency to chafe or otherwise injure the user's skin due to the blade being prevented from jogging off its proper cutting stroke with respect to the beard to be cut.

A still further object of the invention is to provide a razor or razor attachment fulfilling the aforesaid requirements and having a simple, durable and rugged structure lending itself to easy and cheap manufacture in large quantities.

With these and such other objects in view as will incidentally appear hereinafter, the invention comprises the novel construction, arrangement and combination of parts that will now be described with reference to the accompanying diagrammatic drawing exemplifying the same in several embodiments and forming a part of this disclosure.

In the drawing:—

Figure 1 is a partial edge view of a razor constituting a first embodiment of the invention, two actuating rollers being journalled in the guard.

Figure 2 is a partial front view of the razor shown in Figure 1, this view showing in section one of the actuating rollers the end surfaces of which are toothed.

Figure 3 is a fragmentary sectional view showing the way of mounting the actuating roller with respect to the guard of the razor.

Figure 3^a is an end view of the said roller.

Figure 4 is a front view, partly broken away, of the razor guard.

Figure 5 is a front view of a razor head equipped with actuating rollers, assuming the guard to be omitted.

Figure 6 is a simplified or diagrammatic view showing the arrangement between the two actuating rollers of a scraper rubbing them and capable of stripping off the soap or other impurities carried by the said rollers as they are rotated during the shaving operation.

Figure 7 is a front view of a roller formed substantially midway of its length with a zigzag-shaped cam-groove co-operating with a pin-shaped follower carried by a suitable part of the razor mounting.

In the embodiments illustrated, the razor belongs to the type adapted to use double-edged blades L, but no limitation is involved in this.

According to current practice, the blade L is held and clamped according to the required curvature between a head T and a guard G. The head T has the usual screw-threaded shank Q which, after passing through a central hole in the blade L and a central hole *t* (Fig. 4) in the guard G, is screwed into a correspondingly tapped recess E in the handle M. Guiding pins (not shown) may be formed as usual on the head T for engaging through the usual side holes formed in the blade L and guard G for positioning the blade clamped between the head and the guard. Consequently the four elements: head, blade, guard and handle form (in shaving position) a non-shaky assembly and cannot move relative to one another.

In the embodiment of the invention which is illustrated by Figs. 1 to 4, the guard G is provided with a movable device receiving its impulse from the movement of the razor itself along the skin of the user while the latter shaves and thus imparting to the mounting T—G—M and to the blade L clamped therein a vibratory motion of small amplitude in the direction of the blade edges, which vibratory motion is sufficiently large to be perceptible by the user's hand holding the handle M and ensures a clean cut of the beard.

To that effect, there is provided in the guard G in this embodiment two pairs of longitudinal axes 1, 2 fixed respectively in its end flanges. On such pins may respectively rotate (freely or with a gentle friction) and are slidably supported two rollers or castors 3, 4 having a cylindrical, round or similar shape. The cross sectional size of these rollers 3, 4 is so calculated that, when the user moves the razor along his skin for shaving, the roller adjacent to the cutting edge of the blade L which cuts the beard bears against the skin and therefore rotates about its axis. If desired, the rollers 3, 4 may be made rough, knurled, or otherwise formed on the whole or on a portion of their rolling surfaces to be better driven by their contact with the user's skin without chafing or injuring it.

At its respective ends, each roller 3 or 4 has a series of cam bosses or projections 5 separated by recesses 6, one boss 5 at an end corresponding, so far as its location is concerned, to a recess 6 at the opposite end. Two pairs of pins or followers 7, 8 carried by, or formed on, the inner faces of the end plates of the guard G and oppositely disposed pairwise are so located and sized that the pins in each pair are struck successively by the bosses 5 on the roller which is rotated by its contact with the skin.

The maximum length (calculated from boss tip to boss tip) of each roller 3 or 4 is so reckoned that each time a boss at one end strikes the adjacent pin, the roller can slide along its axis 1 or 2 whereupon it strikes, by the next boss, the pin located at the other end. The sliding motion in either directions of the roller or castor 3 or 4 is possible, on the one hand, owing to its loose mounting on the axis 1 or 2 and, on the other hand, owing to the staggered arrangement of the bosses 5 and intermediate recesses 6 at each end of the roller. The roller, viewed endwise, has the radiated structure shown diagrammatically by Fig. 3a.

Practically, inasmuch as the roller 3 or 4 bears throughout its length intimately against the skin while rotating, the mutual engagement of the cam bosses 5 and follower pins 7 or 8 produces a reciprocating or vibratory motion or, in other words, a zigzag motion of the blade L in the direction of its cutting edges. Assembly T—G—M in which the blade L is clamped partakes of this vibratory motion.

The speed and amplitude of this reciprocating motion depend upon the number of bosses 5 and upon their dimensions to which must be conveniently adapted, of course, the stroke of each roller 3 or 4 with respect to the assembly in which the blade is clamped.

It will therefore be seen that, owing to the rolling movement of the roller 3 or 4 against the user's skin, the whole of the razor mounting is imparted a reciprocating motion (the frequency of which is proportional to the speed of the said rolling movement) in the direction of the cutting edges of the blade L without any possibility for the latter to become shaky, as was the case in previous razors comprising a blade capable of vibrating inside a stationary mounting.

The vibratory or reciprocating motion is imparted, as above stated, to the whole of the razor mounting and is easy to distinguish visually and is perceptible by the hand which holds the handle M. However, such vibratory motion is small enough to leave the user undisturbed while shaving. This vibratory motion considerably enhances the cutting efficiency.

Obviously, the guard G may comprise (see Fig. 1) only one actuating roller 3 or 4 located on one side. In such event, the blade can be used only at its edge adjacent to such roller. Each roller may be made in a plurality of ways provided it co-operates with suitable portions of the razor mounting so that the latter moves to and fro in the direction of the cutting edge of the blade when the roller rotates against the skin.

More generally, the reciprocating motion imparted to the razor mounting may be obtained in any suitable manner from the rotational movement of a roller or cylinder such as 3 or 4 or an equivalent member bearing against the skin of the razor user. Any transmission or gear capable of converting a continuous circular or angular movement into a rectilinear reciprocating movement may be used. Thus (as shown by Fig. 7) the roller may comprise substantially midway of its length a cam-groove 9 of zigzag or wavy shape co-operating with a follower pin 10 engaged into it and carried by, or formed on, the head or the guard (not shown) of the razor. The shape of this cam-groove may vary depending on the periodicity and extent of the required vibratory motion.

Instead of being mounted on the guard G, the roller or rollers 3, 4 and the co-operating pins 7, 8 may be mounted on the head T. This constructional form is illustrated by Fig. 5. The operation is the same.

A head or a guard thus equipped constitutes, with its roller or rollers adapted to function as above stated, a unitary structure adaptable to existing razors and forming a novel attachment utilizable for obtaining in any suitable razor the reciprocating or vibratory motion as described. Such attachment may therefore be sold in the trade independently of the other elements of which the razor is made up.

With a view to avoiding the accumulation of soap or other impurities on the actuting rollers 3, 4, a scraping or stripping device may be provided. This device may comprise for example (as shown by Fig. 6) a separate flexible plate 11 spanning the gap between the rollers 3, 4 and rubbing their surfaces. This plate may be apertured and suitably secured to the guard or head. The same result may be obtained by providing the guard or the head with a scraping strip capable of stripping the impurities off the peripheral surface of the roller or rollers.

Apart from the aforesaid advantages, each actuating roller bearing against the skin as hereinbefore described, offers the advantage of holding the cutting edge of the blade to the proper angle that ensures safe cutting. Besides, the guard, in case it supports the roller or rollers, no longer needs to have a toothed longitudinal edge and can be made at cheaper cost.

The invention is applicable to several kinds of razors whether of the type using a two-edged blade or of the type having a one-edged blade.

The constructional details may vary of course

without departing from the spirit of the subjoined claims.

What is claimed is:

1. In a razor, a mounting made of a head element and a guard element between which a blade is removably clamped in cutting position, a handle rigidly attachable to the mounting, actuating rollers slidably and revolubly carried on axes on an element of the mounting and adapted to contact the user's skin during the shaving operation and to be rotated by the impulse given to the razor by the user, and co-operating transmission means on the rollers and on said mounting element whereby a reciprocating motion is imparted to the entire mounting, handle and blade transversely of the direction of said impulse responsive to the rotation of the rollers.

2. In a razor, a mounting made of a head and a guard between which a two-edged blade is removably bent and clamped in cutting position, a handle rigidly attachable to the mounting, actuating rollers slidably and revolubly carried on axes on the guard adjacent the cutting edges of the blade, said rollers being adapted to contact the user's skin during the shaving operation and to be rotated by the impulse given to the razor by the user, and co-operating transmission means on the rollers and guard whereby the rotation of the rollers is converted into a reciprocating motion of the mounting, handle and blade in substantial parallelism to the blade edges.

3. In a razor, a mounting made of several interfitting elements between which a blade is bent and clamped in cutting position, a handle rigidly attachable to the mounting, at least one actuating roller slidably and revolubly carried by one element of the mounting and adapted to contact the user's skin during the shaving operation and to be rotated by the impulse given to the razor by the user, bosses and intermediate recesses on the end faces of the roller, the bosses and recesses being staggered from one end face to the other, and followers on said element at positions adjacent said bosses whereby due to the alternate action of the bosses on said followers a reciprocating motion is imparted to the whole mounting, handle and blade transversely of the direction of said impulse responsive to the rotation of the roller.

4. In a razor comprising a rigid mounting made of a shanked head and a flanged guard between which a blade may be firmly clamped in curved cutting position, a handle firmly attachable to the head shank for holding the head, blade and guard rigidly assembled, a pair of actuating rollers slidably and revolubly carried on axes on the end flanges of the guard adjacent the cutting edges of the blade, said rollers being so sized as to project outside the guard and being adapted to contact with the user's skin during the shaving operation and to be rotated by the impulse given to the razor by the user, cam means on the end faces of the rollers, and followers on the guard end flanges whereby the rotation of the rollers is converted into a reciprocating motion of the entire mounting, handle and blade in substantial parallelism to the blade edges.

5. In a razor, a mounting firmly holding a blade in cutting position, a handle rigidly attachable to the mounting, actuating means movably carried by the mounting and adapted to contact the user's skin during the shaving operation and to be driven by the impulse given to the razor by the user, transmission means for converting the drive of the actuating means into reciprocating motion of the whole mounting, handle and blade transversely of the direction of said impulse, and scraping means co-operating with the actuating means for stripping off soap and other impurities.

6. A razor attachment comprising a carrier element, a companion element, means for fixedly interconnecting said elements juxtaposed and for clamping a blade in cutting position therebetween, said interconnecting means permitting the rigid adaptation of a handle to said elements, actuating means movably supported by said carrier element and projecting out of it and adapted to contact the user's skin during the shaving operation and to be driven by the impulse given to the razor by the user, and transmission means on the carrier element for converting the drive of the actuating means into a reciprocating motion of said elements and blade as a unit transversely of the direction of said impulse.

7. A razor attachment comprising a carrier element, a guard element, means for fixedly interconnecting said elements juxtaposed while clamping a blade in bowed cutting position therebetween, said interconnecting means permitting the rigid adaptation of a handle to said elements, actuating rollers slidably and revolubly supported by said carrier element and projecting out of its outline for being adapted to contact the user's skin during the shaving operation and to be driven by the impulse given to the razor by the user, cam means on the rollers, and follower means co-operating with said cam means on the carrier element whereby a reciprocating motion is imparted to said elements and clamped blade as a unit transversely of the direction of said impulse responsive to the drive of the rollers.

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