Oct. 14, 1924. 1,511,736

P. S. LIETZ

SAFETY RAZOR

Filed Sept. 26, 1923 2 Sheets-Sheet 1

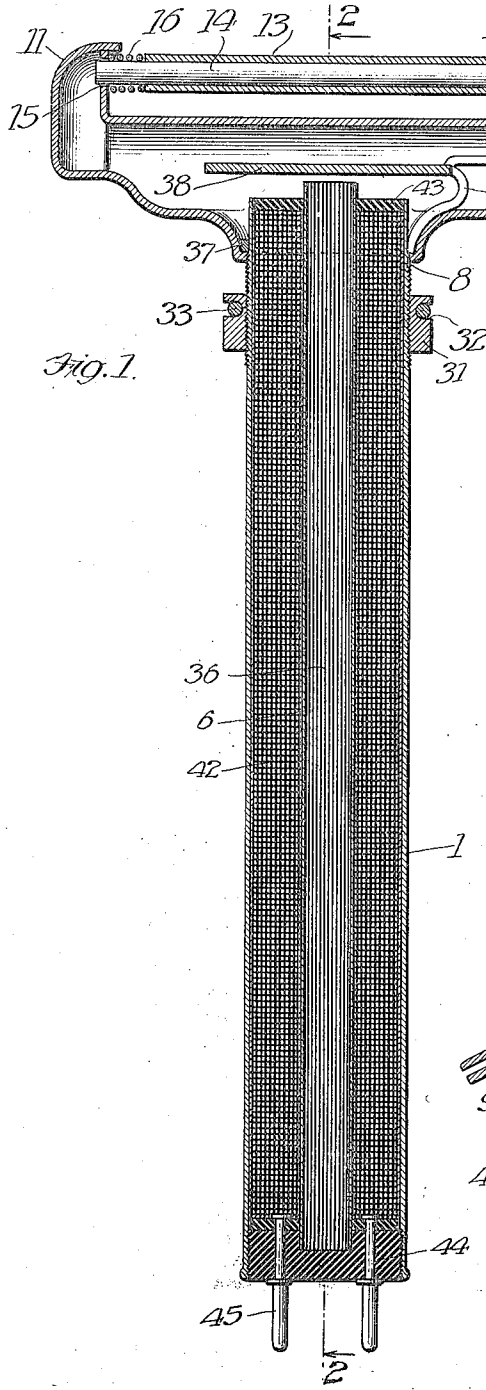


Fig. 1.

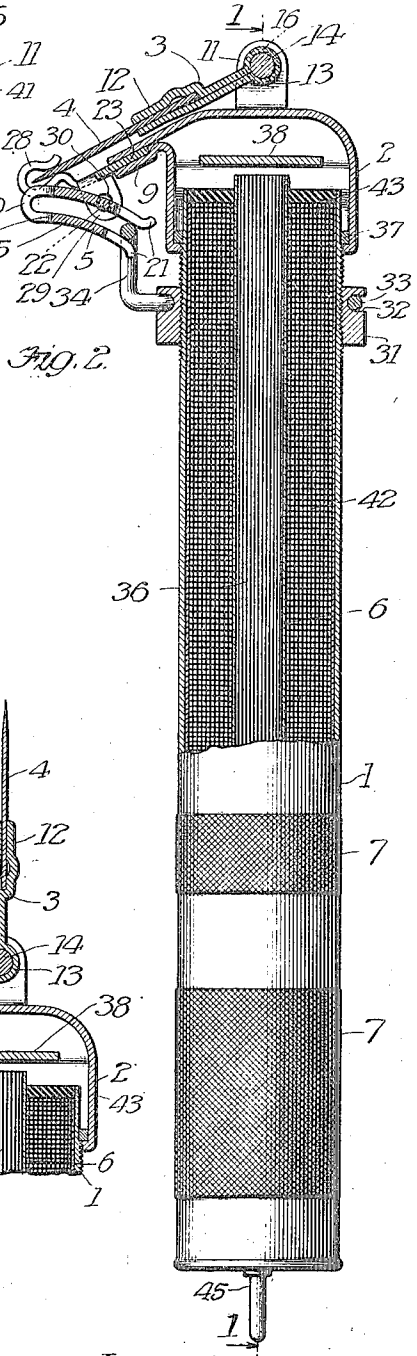


Fig. 2.

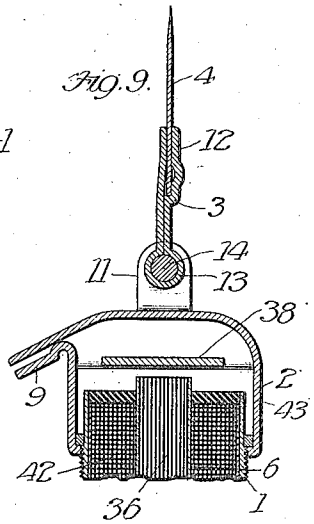


Fig. 9.

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Fig. 3.

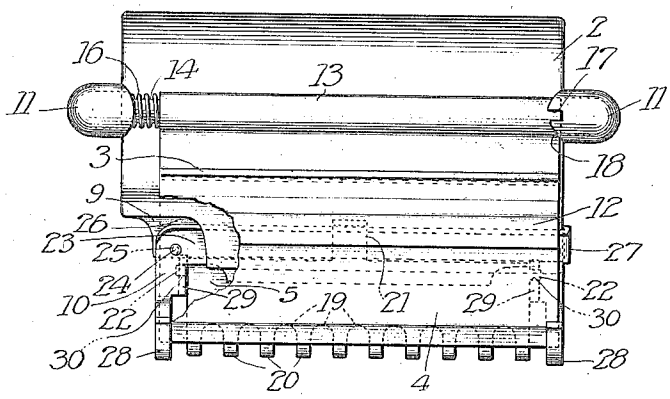


Fig. 4.

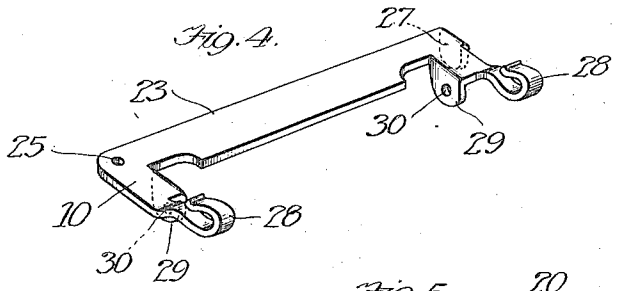


Fig. 6.

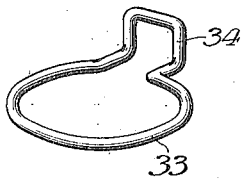


Fig. 5.

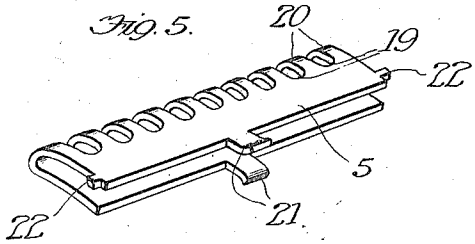


Fig. 7

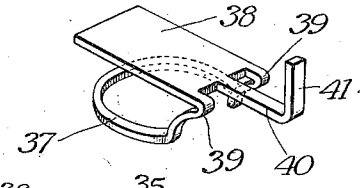
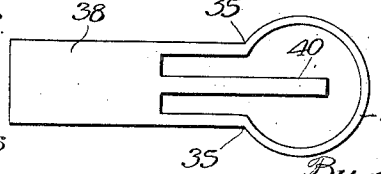


Fig. 8.



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UNITED STATES PATENT OFFICE.

PAUL S. LIETZ, OF CHICAGO, ILLINOIS.

SAFETY RAZOR.

Application filed September 26, 1923. Serial No. 664,903.

To all whom it may concern:

Be it known that I, PAUL S. LIETZ, a citizen of the United States of America, and a resident of Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Safety Razors, of which the following is a specification.

The main objects of this invention are to provide an improved form of safety razor; to provide a safety razor having an improved form and arrangement of a blade-guard; to provide improved means for angularly adjusting the guard relative to the cutting edge of the blade for the purpose of varying the effectiveness of the blade in shaving; to provide an improved construction and arrangement of blade holder; to provide an improved construction and arrangement of an electro-magnetic armature for reciprocating the blade holder on the razor head; and to provide an improved razor of this type particularly designed to simplify the operations of cleaning, honing, attaching and removing the blade.

An illustrative embodiment of this invention is shown in the accompanying drawings, wherein:—

Figure 1 is a longitudinal section taken through the center of a razor to which this invention is applied.

Fig. 2 is a section taken on the line 2—2 of Figure 1.

Fig. 3 is a top plan of the same, partly broken away for the sake of clearness, and certain of the parts being shown in dotted outline.

Figs. 4, 5, 6, and 7 are details in perspective of the guard-holder, guard, guard adjusting yoke, and armature, respectively.

Fig. 8 is a detail showing the armature stamping as it appears before it is bent into the form shown in Fig. 7.

Fig. 9 is a fragmentary detail, in vertical section, of the razor head, showing the blade and carriage in position for honing the blade.

The razor herein shown comprises a support including a hollow handle 1, having a head 2, on which is recprocatingly mounted a carriage 3, by means of which a blade 4 is secured in place and caused to traverse a guard 5 adjustably supported on the head. Electro-magnetic means 6 housed within the hollow handle 1 actuates the blade carriage 3.

Referring to the drawings, the handle 1 is in the form of a tube having one end projecting into the head 2, to which it is rigidly secured, and having suitable knurled portions 7 forming a finger grip. The head 2 is preferably formed of a metal stamping bent to the shape shown in Figures 1 and 2, so as to provide a hollow casing for housing part of the carriage actuating mechanism. Formed in the bottom of the casing 2, is a central opening 8, through which the handle 1 extends and, at one side thereof, the casing is formed to provide a clip 9, in which is detachably mounted a guard holder 10 for adjustably supporting the guard 5. Formed at opposite ends of the carriage 3, are upstanding ears 11, forming bearings for hingedly and reciprocatingly supporting the carriage 3.

In the particular form shown, the carriage 3 comprises a strip of metal doubled upon itself to form a clip 12 for detachably supporting the blade 4, and a tubular part 13, through which extends a hinge pin 14, rigidly secured to the carriage. The ends of the pin 14 project through apertures 15 in the ears 11 for swingably supporting the carriage 3. The carriage 3 is of less width than the casing 2 so as to permit the carriage to freely reciprocate between the ears 11. Embracing one end of the hinge pin 14 and bearing between the carriage 3 and the adjacent ear 11, is a helical spring 16 which is arranged to normally urge the carriage toward the other ear. The other end of the pin 14 is arranged to coact with part of the electro-magnetic mechanism within the casing 2, whereby said pin and carriage are urged against the action of the spring 16.

The carriage 3 is normally held in an inclined position relative to the axis of the handle 1, as shown in Figure 2, by the coaction of the blade 4 and guard holder 10. To permit honing of the blade, the carriage 3 is swingable to an extended position axially of the handle 1, as shown in Figure 9. The carriage is locked in its extended position by a notch 17 formed in one of the ears 11, as shown in Figures 1 and 3. Formed adjacent the notch 17, is an inclined cam surface 18 arranged to coact with the adjacent edge of the carriage 3 for guiding the latter into the notch. The notch 17 is of sufficient depth to permit the carriage to be reciprocated while in its extended position, so as to facilitate honing of the blade.

In the form shown, the guard 5 comprises

a metal strip bent to channel shape, as shown in Figure 5, and having a series of slots 19 formed along the bend thereof so as to provide projections or teeth 20. Formed on the inner edges of the guard 5, and disposed centrally of the guard, is a pair of lugs 21 arranged to form a bearing to coact with mechanism for angularly adjusting the guard relative to the razor blade, as hereinafter described. Formed on opposite ends of the guard 5, are lugs 22 forming pivoted pins for pivotally supporting the guard in the holder 10.

In the particular construction shown, the guard holder 10 comprises a blade part 23, which fits within the clip 9 to which the holder is detachably secured by means of a hinge pin 24 formed on the clip for engagement with an aperture 25 in the holder. The upper part of the clip 9 is recessed adjacent the pin 24, as shown at 26 in Figure 3, so as to permit the insertion and removal of the holder 10.

A suitable finger grip 27, at the outer end of the blade part 23, facilitates insertion and removal of the holder. Projecting outwardly from the blade part 23 is a pair of spaced hooks 28, arranged to form guideways for the blade 4 for securing said blade and its carriage in position for shaving. Struck down from the holder 10 is a pair of lugs 29, spaced apart to receive the guard 5, and having apertures 30 for receiving the pivot pins 22 of the guard.

The guard 5 is angularly adjustable with respect to the holder 10 for varying the position of the teeth 20 relative to the cutting edge of the blade, so as to suit the requirements of the user. The means for adjusting the guard 5 includes an axially adjustable knurled collar 31, threaded on the upper part of the handle 1, and having a peripheral groove 32, in which is loosely seated a yoke 33, having a U-shaped part 34 arranged to coact with the lugs 21 of the guard, whereby an axial adjustment of the collar 31 will effect an angular adjustment of the guard. The relative arrangement of the yoke 33 and guard 5 permits the guard and its holder 10 to be readily removed as a unit from the razor for cleaning, and again inserted into place without affecting the position of the collar 31 on the handle 1. With this construction, after the guard has once been properly adjusted, the user is assured of the same adjustment after the razor has been cleaned and is again assembled ready for use.

In the form shown, the electro-magnetic means 6 includes an improved form of armature 35, arranged within the casing 2, and an electro-magnet 36 housed within the tubular handle 1. As illustrated, the armature 35 is constructed of a metal stamping, cut to the shape shown in Figure 8 and then bent to the finished form shown in Figure 7. The armature includes a collar part 37 adapted to embrace the projecting end of the handle 1, and an armature plate 38 spaced above the collar 37 and connected thereto by resilient straps 39. Formed on the armature plate 38, is an extension 40 which is bent to form a hammer 41 adapted to coact with one end of the carriage hinge pin 14 for urging the carriage against the action of the spring 16. The armature is arranged on the upper end of the handle 1, so that the vibration of the plate 38 through the action of the electro-magnet 36 will cause the hammer 41 to tap against the end of the pin 14.

The electro-magnet 36 is in the form of a laminated soft iron core preferably a bundle of soft iron wires surrounded by the usual windings 42, and supported in insulation blocks 43 and 44. The upper end of the core 36 projects into the casing 2 in position to attract the armature plate 38. Extending through the block 44, are terminals 45 for the attachment of a terminal plug, not shown.

In operation, the razor is used in the customary manner, with the guard teeth 20 engaging the face. While the blade and guard rest against the face, the collar 31 may be adjusted to obtain an adjustment of the guard relative to the blade which will suit the user. The arrangement of the collar 31 on the handle permits it to be adjusted with one finger while the razor is being drawn across the face. The movement of the blade back and forth along the guard results in a shearing action of the blade. The relative arrangement of the armature 35 and blade carriage 3 is such that, in the event undue pressure is exerted on the razor, the carriage and blade will be held stationary against the action of the spring 16. This avoids injury to the skin which would likely result under such circumstances if the armature were positively connected to the blade carriage so as to cause vibration of the blade at all times, irrespective of the pressure applied to the razor.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. A safety razor comprising a support having a handle, a blade on said support, a guard adjustably mounted on said support adjacent the cutting edge of said blade and being movable toward and away from said cutting edge, a rotatable element embracing said handle and being threaded thereon so as to be adjustable axially with respect

thereto, and apart on said guard coacting with said element whereby an axial adjustment of said element moves said guard relative to said blade.

2. A safety razor comprising a support including a handle, a blade on said support, a guard pivotally mounted on said support adjacent the cutting edge of said blade and angularly adjustable toward and away from said cutting edge, a rotatable element embracing said handle and being threaded thereon so as to be adjustable axially with respect thereto, and a part coacting with said element and guard whereby an axial adjustment of said element effects an angular adjustment of said guard.

3. A safety razor comprising a support including a handle, a blade on said support, a guard holder detachably secured to said support, a substantially channel-shaped guard pivotally mounted on said holder so as to be angularly adjustable toward and away from the cutting edge of said blade, a collar threaded on said handle so as to be adjustable axially with respect thereto, and means coacting with said collar and guard whereby an axial adjustment of said collar effects an angular adjustment of said guard, said guard and holder being removable as a unit from said support irrespective of the relative position of said collar and handle.

4. A safety razor comprising a support including a handle, a carriage hinged on said support and adapted to be reciprocated on its hinge, a blade on said carriage, means for normally holding said carriage in a radial position relative to the axis of said handle whereby said blade will be positioned for shaving, other means for holding said carriage in an axial position relative to said handle to permit honing of the blade, and mechanism for reciprocating said carriage in either of said positions.

5. A safety razor comprising a support, a blade carriage reciprocatingly mounted on said support, a blade on said carriage, a spring coacting with one end of said carriage for normally urging said carriage in one direction, an armature member arranged on said support in position to coact with the other end of said carriage for urging the latter against the action of said spring, and electro-magnetic means for vibrating said armature, said carriage being adapted to be manually held in a retracted position during the vibration of said armature for retaining said blade stationary relative to said support.

6. A safety razor comprising a hollow head forming a casing, a hollow handle having one end projecting into said casing, a carriage reciprocatingly mounted on said casing, a blade on said carriage, a spring normally urging said carriage in one direction, an armature element enclosed within said casing and comprising a metal stamping having a collar part embracing said handle, an armature part spaced from said collar part, a resilient part connecting said collar and armature part, a projection on said armature part and arranged to form a hammer coacting with one end of said carriage for urging the latter against the action of said spring, and electro-magnetic means within said handle for vibrating said armature part to actuate said hammer.

Signed at Chicago this 22nd day of Sept., 1923.

PAUL S. LIETZ.