April 14, 1936. H. R. SEGAL 2,037,180

SAFETY RAZOR

Filed Jan. 28, 1933

Fig. 4.

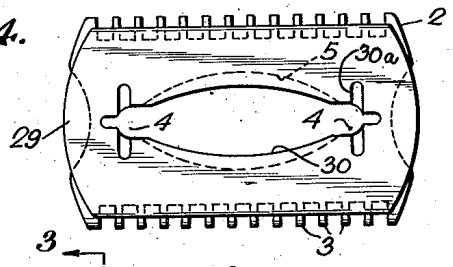


Fig. 2.

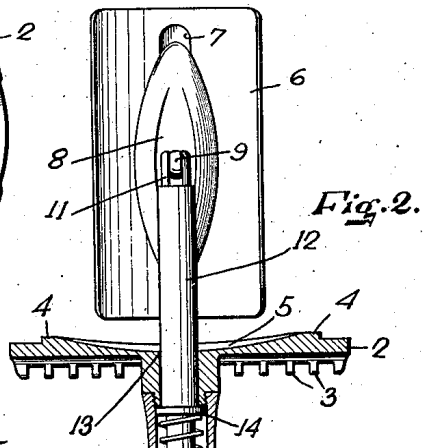


Fig. 1.

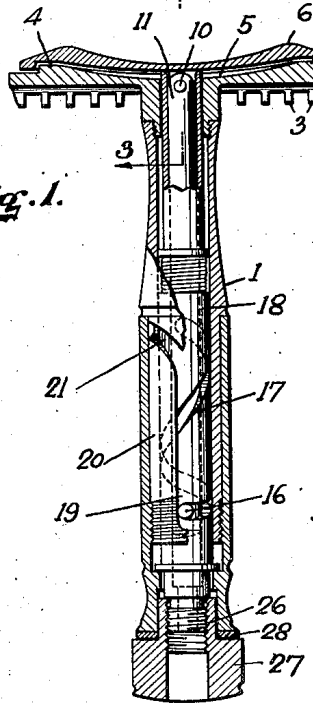
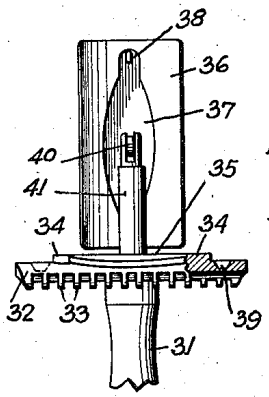


Fig. 5.



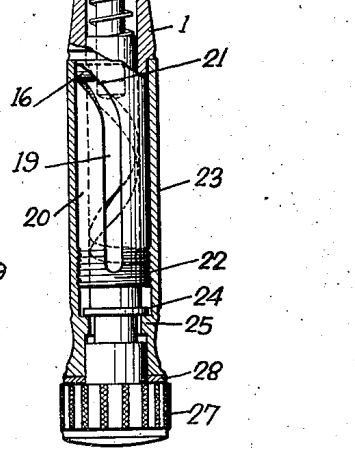


Fig. 3.

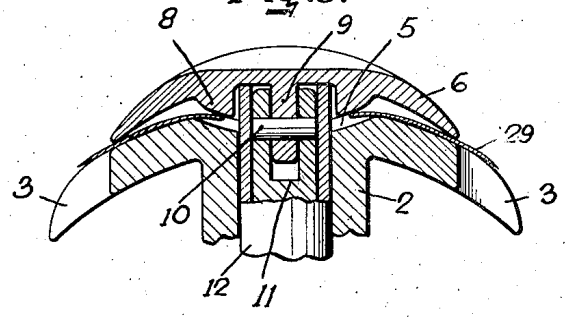
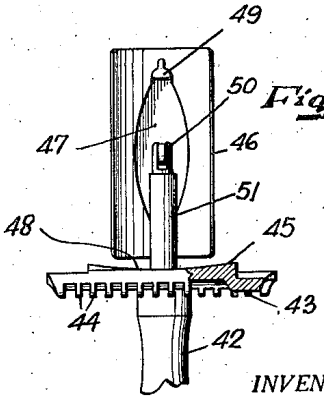


Fig. 6.



INVENTOR.
HYMAN R. SEGAL
BY Duell, Mann & Anderson.
ATTORNEYS.

Patented Apr. 14, 1936

2,037,180

UNITED STATES PATENT OFFICE

2,037,180

SAFETY RAZOR

Hyman R. Segal, New York, N. Y., assignor to Segal Founders Corporation, New York, N. Y., a corporation of New York

Application January 28, 1933, Serial No. 653,961

17 Claims. (Cl. 30—61)

This invention relates to a new and improved type of safety razor and particularly to such a device of the so-called "one piece variety", and additionally embodies a new and improved blade clamping means for universal adaptation with respect to double edged safety razors.

It is an object of the invention to provide an article of this character in which a double edged blade is held under the stress of a triple flex.

It is a further object to provide a razor of this type in which the tendency of the parts to jam is overcome and in which the ejection of the cap and stem members is semi-automatic.

Still another object is that of providing a razor capable of extremely fine adjustment so that a correct shaving edge is always obtainable.

With these and other objects in mind, reference is had to the attached sheet of drawings in which:

Fig. 1 is a side elevation in cross-section of one form of the razor in closed position;

Fig. 2 is a side elevation in cross-section of the same razor in open position;

Fig. 3 is an enlarged cross-section of the head of the razor shown in Fig. 1 and taken along the lines 3—3 of said figure;

Fig. 4 is a plan view showing the guard of the razor illustrated in the foregoing figures with an improved type of blade in position thereon;

Fig. 5 is a side elevation of the head portion of a slightly different embodiment of the invention; and

Fig. 6 is a similar view of a still further embodiment thereof.

With particular reference to Figs. 1 through 4, a safety razor having a handle portion 1 is provided with a guard member 2 having the usual teeth 3 on the side edges thereof. The upper surface of this guard is formed with a blade positioning abutment 4 which has a central recess 5 extending in substantially oval shape over a large portion of said abutment. Cooperating with the guard is a clamping plate or cap member 6 having an abutment accommodating recess 7 located at each end thereof. Cooperating with the recess in the guard is a projection 8 which is carried by the undersurface of the cap and which carries at its central point a pivot 9. Coupled to this pivot by means of a pin 10 is a stem member 11, while encircling the latter is a sleeve 12. The stem and sleeve members extend through a hole 13 through the guard to the interior of the handle where the lower end of the sleeve carries a shoulder portion 14 against which a spring 15 presses. The stem 11 has the usual pin 16 at its lower end which cooperates with the spiral groove 17 of an actuating sleeve 18 as well as the longitudinally extending groove 19 of the second actuating sleeve 20. This latter groove has a tangentially extending upper portion 21 while the sleeve also is screw threaded at its lower portion as at 22. Cooperating with the screw threads is a cover sleeve 23 which simply gives the handle a finished appearance and maintains the pin in its position in the slot. The lower end of the actuating sleeve 18 has a flange 24 which rests against the shoulder 25 of the cover sleeve and below the flange is a screw threaded, extended portion 26 to which is secured the actuating knob 27. Between the latter and the cover sleeve is placed a spring washer 28 which maintains the parts in position through friction.

In operation, a turning of the knob 27 causes the sleeve 18 to rotate, bringing into effect a camming action against the pin 16. Inasmuch as the path of travel of the latter is limited by the slot 19 to longitudinal movement, the pin travels along this latter slot, carrying with it the stem 11 and the cap or clamping plate 6. As this stem and cap rise, the spring 15, pressing against the shoulder 14 of the sleeve, causes the latter to also rise until it is projected to its full length. When the pin 16 reaches the tangentially extending portion of the slot 19 at 21, this new path of travel of the pin imparts to the stem and cap members a twisting, as well as rising, movement, so that when the stem is at its fully projected position it has turned through a 90° angle, carrying the clamping plate with it. The sleeve has held the clamping plate in a horizontal position during the projection of the stem due to the fact that it encircles the point of pivot of the latter with respect to the former, but inasmuch as the stem is of greater length than the sleeve and projects to a greater extent than the same, the clamping plate is allowed to pivot when the stem is fully projected. It will thus assume a tilted position such as shown in Fig. 2, at right angles to its normal closed position. In order to close the razor, the operation just described is reversed, causing the pin to travel downwardly along the groove until the parts are clamped together.

When in open position, the blade member 29, formed with an opening 30, is passed over the clamping plate and assumes a position on the guard such as is shown in Fig. 4. It will be noted that the guard recess underlying the opening of the blade is of greater extent than the latter so that the edges of the blade opening are not supported by the guard. When the razor is closed,

the complementary projection of the cap member 6 comes into contact with the edges of the blade opening and causes them to flex slightly downwardly as shown in Fig. 3. This, of course, places the blade under extreme tension and causes it to approximate the ideal condition for shaving purposes. As shown in Fig. 4, the central blade opening 30 conforms generally to the shape of the guard recess 5 although it is slightly smaller than the latter and overlies the edges thereof. At the ends of the blade opening 30 are transversely extending slotted portions 30a which allow the longitudinally extending edges of the blade opening 30 to be flexed downwardly into the guard recess when the projection 8 is brought into contact with them. The blade thus assumes a shaving position in which the ends of the blade are curved from cutting edge to cutting edge, but the entire central portion of the blade through an area co-extensive with the length of the opening 30 is subjected to curvature from cutting edge to central opening at each side of the latter, thus producing additional stress on this portion of the blade. Without the provision of the transversely extending end portions, the edges of the central blade opening could not be subjected to a downward pressure without resulting in a buckling and cracking of the blade. The longitudinally extending edges of the blade opening 30 are not parallel with the cutting edges of the blade so that as a result the distance between the cutting edges and the edges of the central opening is shorter in the central portion and gradually becomes greater toward the ends of the blade opening. When the blade is subjected to clamping pressure the greatest amount of tension and stress will be set up in the center of the blade, and will gradually decrease toward the ends of the same. It is, of course, apparent that any shape of guard recess and blade opening might be used as long as the distance between the cutting edges and the edges of the central opening is shortest in the center of the blade, gradually increasing toward both ends of the central opening. Transversely extending slots at the end portions of the central opening might also be disposed obliquely to the cutting edges rather than at right angles thereto, as illustrated, without in the least modifying the result obtained.

It will be noted that the blade is subjected to three distinct flexes, the first being from cutting edge to cutting edge, as determined by the convex and concave complementary surfaces of the guard and clamping plate, and the other two being from cutting edge to center and being caused by the cap projection and guard recess as just described.

Turning now to Fig. 5, we have a razor having a handle portion 31, carrying a guard 32, and having tooth members 33 on each edge thereof. This guard has a blade positioning abutment 34 formed with a central recess 35. Cooperating with the guard is a clamping plate 36 having a projection 37 which cooperates with the guard recess. At each end of this projection are lug members 38 which, in turn, fit into complementary recesses 39 in the guard. These projections serve to more readily center and position the blade when the razor is in a semi-opened condition such as is desirable during a cleaning or washing of the same. As in the case of the former embodiment, the clamping plate is pivoted at 40 to a stem which is encircled by a sleeve member 41, and in other respects, operates in the same manner as has heretofore been pointed out.

In Fig. 6, a handle 42, carrying a guard 43 with tooth members 44, is formed with a blade positioning projection 45. A cap 46 cooperates therewith and is formed with a projection 47 which cooperates with the abutment recess 48 of the guard. Blade positioning projections 49 are carried by the clamping plate and, as described in connection with Fig. 5, these projections serve to more securely position the blade when the razor is in semi-closed position. The clamping plate is pivoted at 50 in the conventional manner to a stem which cooperates with actuating mechanism located in the handle and a sleeve 51 encircles the stem so as to maintain the cap in a horizontal position until the stem has been fully projected.

It is apparent that the particular type of clamping action herein described is subject to use without any modification in safety razors of the so-called "three piece variety". It is applicant's intention that it may be so used.

Likewise, many other changes in construction and rearrangement of the parts might be resorted to without in the least departing from the spirit of the invention herein described.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An article of the character described including, in combination, a guard member, a handle secured thereto, a stem slidably disposed within said handle, means for projecting and retracting the same, a clamping plate pivotally secured to the upper end of said stem, and a sleeve normally encircling the latter to render said pivot inoperative.

2. A safety razor including in combination, a guard, a handle secured thereto, a stem slidably disposed within said handle, means for projecting and retracting said stem with respect thereto, a clamping plate pivotally secured to the upper end of said stem, a sleeve encircling said stem and normally rendering said pivot inoperative, and means for limiting the projection of said sleeve to a lesser distance than that of said stem, whereby said pivot is rendered operative.

3. An article of the character described including, in combination, a guard, a handle associated therewith, a stem slidably disposed within said handle, means for projecting and retracting the same with respect thereto, a clamping plate pivotally carried by the upper end of said stem, a sleeve encircling said stem and normally rendering said pivot inoperative, and a spring disposed within said handle and normally urging said sleeve to follow said stem as the latter is projected.

4. A safety razor including, in combination, a guard, a handle associated therewith, a stem slidably disposed within said handle, means for projecting and retracting the same with respect thereto, a clamping plate pivotally carried by the upper end of said stem, a sleeve encircling said stem and normally rendering said pivot inoperative, and a spring for normally urging said sleeve to follow said stem as the latter is projected, said sleeve and handle having complementary shoulder portions which arrest the following motion of the former before the stem has reached its extended limit, whereby said pivot is again rendered operative.

5. As an article of manufacture, a safety razor blade of the double-edged type, said blade being adapted for use in a holder of the type characterized by a blade positioning abutment formed with a central recess of substantially oval outline, the widest diameter of which is located in the

central portion thereof, a projection carried by said holder and complementary to said recess, the end portions of said holder presenting complementary concave and convex surfaces between which the end portions of the blade are to be clamped, said blade when in use adapted to overlie the edges of said abutment recess and being formed with a central aperture of an area less than that of said recess, slots also formed in the blade and extending at angles to the longitudinal axis thereof, said slots being disposed adjacent the longitudinal ends of said aperture whereby the edges of said blade adjacent said central aperture are flexed downwardly by said projection in the direction of said recess and the blade is caused thereby to assume a double flex throughout the central portion of the blade whereas the end portions of the blade assume a single transverse flex.

6. A safety razor comprising in combination, a guard, a blade positioning abutment formed on said guard, a recess located centrally of said abutment, said abutment terminating short of the longitudinal limits of said guard, a clamping plate for cooperation with said guard and carrying a projection complementary to said recess and for association therewith, the longitudinal extremities of said clamping plate and guard presenting concave and convex surfaces, and a blade for use in said razor and having a central aperture, the edges of which are adapted to overlie said guard recess, and transversely extending slot portions at the ends of said aperture whereby the edges of said blade adjacent said aperture are flexed downwardly by said clamping plate projection so as to give a double flex to the central portion of the blade, whereas the end portions of the blade assume a single transverse flex.

7. A normally flat safety razor blade comprising a flexible body having opposite cutting edge portions, said body being formed with a centrally uninterrupted and oval opening terminating short of its ends and of a width such as to accommodate a razor portion which is to bear against the faces of the blade adjacent said opening and to extend into the latter, said blade body being formed with slots extending at an angle to its longitudinal axis and merging into such opening at points adjacent the ends thereof, whereby the blade portions at opposite sides of said opening may each be subjected to independent, transverse flexing stresses to assume positions defining arcs of circles having different centers, the blade portions beyond said slots being adapted to be transversely flexed to assume single arcs.

8. A razor blade including a transversely flexible body having its longitudinal side edges formed to provide cutting edge portions, said body being additionally formed with an opening terminating short of its end edges and with slots extending angularly with respect to the longitudinal axis of said blade, such slots merging into such blade opening at points adjacent the ends of the latter, the width of the opening increasing from points adjacent such slots to a point substantially intermediate the blade ends, and at that point being at least equal to the width of the blade portion between the opening edge and the cutting edge, whereby such opening may accommodate the end of a razor abutment which is to bear against one of the blade faces solely adjacent such opening, the blade at points between such slots, being of such character that it may assume a double transverse flex, the slots defining end zones for said blade, in which only single transverse flexure may occur.

9. A normally flat safety razor blade comprising a flexible body having opposite cutting edge portions, said body being formed with a centrally uninterrupted and oval opening terminating short of its ends and of a width such as to accommodate a razor portion which is to bear against the faces of the blade adjacent said opening and to extend into the latter, said blade being formed with slots extending at an angle to its longitudinal axis and merging into such opening at points adjacent the ends thereof, the blade portions beyond said slots being adapted to be transversely flexed to assume single arcs.

10. A razor blade including a transversely flexible body having its longitudinal side edges formed to provide cutting edge portions, said body being additionally formed with an opening terminating short of its end edges and with slots extending angularly with respect to the longitudinal axis of said blade, such slots merging into such blade opening at points adjacent the end of the latter, the width of the opening increasing from points adjacent such slots to a point substantially intermediate the blade ends, and at that point being at least equal to the width of the blade portion between the opening edge and the cutting edge, the slots defining end zones for said blade, in which only single transverse flexure may occur.

11. A razor including a clamping plate and a guard plate, both of such plates being transversely curved and being adapted to receive between them a blade to be transversely flexed, means for drawing said plates towards each other, a domed abutment extending from one plate and terminating short of the ends thereof, and the second of said plates being formed with a recess into which such abutment may extend.

12. A razor including a clamping plate and a guard plate, both of such plates being transversely curved and being adapted to receive between them a blade to be transversely flexed, means for drawing said plates towards each other, a domed abutment extending from one plate and terminating short of the ends thereof, and the second of said plates being formed with a recess into which such abutment may extend, such abutment being of greatest width at a point substantially centrally of the plate with which it is associated.

13. A razor including a clamping plate and a guard plate, both of such plates being transversely curved and being adapted to receive between them a blade to be transversely flexed, means for drawing said plates towards each other, a domed abutment extending from one plate and terminating short of the ends thereof, and the second of said plates being formed with a recess into which such abutment may extend, such abutment being of greatest width at a point substantially centrally of the plate with which it is associated and presenting reduced end portions.

14. A razor including a guard plate and a cooperating clamping plate, means for moving such plates towards each other, both of such plates presenting transversely curved surfaces, an abutment extending from one of such plates and terminating short of the end thereof, said abutment presenting reduced end portions and increasing in width towards its central portion, said plates being adapted to receive between them a blade to be flexed, and said abutment having its blade contacting surface convexly curved, said other plate being formed with a recess to receive

said abutment and blade portions depressed thereby.

15. A razor including a guard plate, a clamping plate, means for drawing said plates towards each other, said plates presenting adjacent their end portions surfaces cooperative with an interposed blade to transversely flex the same through a single arc, and means terminating short of the end portions of such plates and extending from one of the same for double flexing the central area of a blade.

16. A safety razor including a guard plate, a clamping plate, means for drawing said plates towards each other, said plates being adapted to receive between them a transversely flexible blade presenting side cutting edges, said plates presenting adjacent their end portions blade contacting surfaces or single arc configuration whereby, as said plates are moved towards each other, said blade will have its end portions transversely flexed through single arcs, its cutting edges being operatively disposed with respect to the adjacent plate edges, and means associated with one of said plates and cooperating with said blade during the movement of said plates toward each other to subject the central area of said blade to relatively great stress.

17. A safety razor including a clamping plate and a guard plate cooperative to transversely flex and subject to a single stress a blade interposed therebetween, and means associated with one of said plates and co-acting with said blade to subject the same to a compound stress adjacent the central area thereof.

HYMAN R. SEGAL.