SAFETY RAZOR AND BLADE LOADING DEVICE THEREFOR

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The present invention relates generally to safety razors providing manual blade changing, and more particularly to the type utilizing a manually demountable blade loading device for effecting blade loading of an expendable blade having a single cutting edge opposite a butt edge, with insertion of the blade taking place either transversely or parallelly with respect to the razor-cutting components.

Broadly, as a primary object, my invention seeks to provide a novel and improved razor construction for use with blades of the character set forth, which provides for blade insertion into a blade channel by means of the aforesaid loading device, or individually by hand while accommodating instant and efficient cleaning of the blade at will without removing the blade from the razor head.

In the art of safety razors, the problems of blade loading and cleaning the blade cutting components and keeping the latter unengaged, as by water flow during a shaving operation and also provide for drying the cutting edge for subsequent use, without removing the blade from the razor until a blade-change is required, have received considerable attention. For example, various types of razors have been proposed for use with separate blade magazines difficult to attach and operate with no means for cleaning the blade while shaving nor for inserting an individual blade by hand when a loaded blade dispenser is not available, some have blade holders moveable relatively to the cutting edge guard to facilitate loading and cleaning the blade, others necessitating the cost of a new blade for each shave, while most of them incorporate a cutting edge guard rigid with the blade platform and having intricate openings adjacent thereto which attempt to keep the cutting edge free of the beard laden lather, but none which would enable loading of the blade automatically or manually, and at the same time accommodate cleaning the cutting edge and razor head as the shaving operation progresses without removal of the blade from the razor with the added advantage of preserving the cutting edge for subsequent use as by thoroughly drying it upon completion of a shave.

The present invention, therefore, seeks to advance the art by providing a razor of the last-mentioned type. More specifically, the present invention provides a razor having a pivoting mounted blade platform having spring action with respect to a pivoted clamping member through the intermediary of novel interconnecting cam means, for releasably retaining a blade in the blade channel disposed therebetween.

Another important object related to the object next above is the provision of a razor having its blade cutting edge stops in spaced longitudinal disposition on the member forming the blade support or platform, said stops having the additional novel function of co-operating with the extremities of the cutting edge of the replaceable blade contained in an operably associated demountable loading device or dispenser whereby the blades are individually removed automatically from the dispenser onto the platform responsive to relative movement of the dispenser with respect to the platform and vice versa as will appear.

A further salient feature of my invention is provided by incorporating novel interconnecting cam means between the blade platform and clamping member whereby a manual operating force applied to the clamping member to open the razor head is transmitted to the platform to effect a predetermined separation thereof in opposition to said spring action and thus widen the blade channel normally the same width as the blade, said separation accommodates positioning of the blade loading device on said platform with the cutting edge stops aforesaid disposed forwardly of the edge extremities. With the magazine positioned as aforesaid, relative movement between the razor and dispenser is effective to deposit a blade on the platform; whereupon, closure of the razor head influenced by the spring action on the platform member normalizes the blade channel and impinges the cutting and butt edges between the stops aforesaid and a stop element carried by the clamping member thus conditioning the razor for a shaving operation.

An object importantly related to the immediately foregoing object is the provision of a movable element, preferably yieldable in character, carried on the underside of the clamping member and adapted to project through a suitable registering opening in the blade upon the latter being deposited on the platform for loosely retaining the blade within the razor head while partially open for cleaning purposes, responsive to manual operating effort applied to the clamping member, said partial opening of the razor head advances the cutting edge guard carried by the platform, forwardly of the blade cutting edge to enable cleaning the latter while said element loosely retains the blade for thorough cleaning of the razor head; whereupon, manual release of the clamping member effectively clamps the blade between the stops in shaving position for resumption of the shaving operation, said movable element having the additional novel function of retaining the blade in fully retracted normal shaving position so that the platform can advance relatively thereto when the razor head is partially opened while the resilient characteristic of the element enables the latter to retract into a suitable recess formed in the undersize of the clamping member, to prevent interference with the blade loading magazine when positioned to deposit a blade in the razor head when the latter is fully opened for that purpose.

A further and more specific object of the present invention is to provide a separate razor and a separate blade magazine or loading device which, however, having co-acting parts for not only positioning the device for the loading operation after the razor head has been manually opened to enlarge the blade channel but also functioning to enable a blade to be easily and smoothly fed into the razor channel aforesaid from the magazine and at the same time insuring that the effective cutting edge portion of the blade never comes into contact with the blade retaining stops carried by the platform. Thus, eliminating any chance of the shaving portion of the cutting edge coming in contact with anything until it is impinged between the clamping stops in shaving position.

The razor to carry out the object next above of the invention co-operates with the positioning of the blade magazine while spread for the reception of the blade therefrom, and also functions when the magazine is withdrawn, by moving the blade automatically from its deposited position from the magazine into a firm position for shaving.

Another object of importance is the provision of a new and novel safety razor of the type under consideration which enables insertion and removal of blades suc-
cessively either automatically with a magazine or individually by hand, whereby conventional single edge blades of all types sold either in dispensers or packages, or loading magazines may be used by conforming the width of the blade channel to accommodate the narrow or wide blade as the case may be, the latter type having a securing strip of metal on the butt edge to facilitate manual handling thereof.

A further object of the present invention is to produce a novel razor of the type under consideration, in which, the spring action on one of a pair of interfitting blade clamping members is effected via novel interconnecting cam means, on the other clamping member to bias said members toward each other, while manual operating pressure applied to the other member is effective through the cam means to separate said members in opposition to said spring action, the other member being manually movable from a neutral “safety” position wherein the blade is clamped in shaving position, to two successive separated positions enabling razor cleansing without removing the blade, and blade changing operations by the magazine or directly by hand, respectively.

In an optional form of the present invention, a pair of longitudinally spaced upstanding injecting elements are carried medially of the ends of the blade platform and adapted to co-operate with a blade replaceable from a modified magazine with the clamping member moved to fully open the razor head, whereby relative movement of each other in either direction is effective to feed a blade from the magazine onto the blade platform for subsequent clamping in shaving position as aforesaid.

The present invention, therefore, facilitates blade insertion, removal, and cleaning while minimizing the risk of personal injury attendant thereto.

Other important objects and advantages of the present invention will be apparent to one skilled in the art from the following detailed description considered in conjunction with the accompanying drawings, in which:

Figure 1 is a plan view of a razor embodying the present invention with the blade magazine removed in readiness for a shaving operation;

Figure 2 is an elevational side view with the handle broken away looking in the direction of the arrows from the line 2—2 of Figure 1;

Figure 3 is a fragmentary elevational rear view looking in the direction of the arrows from the line 3—3 of Figure 2;

Figure 4 is a fragmentary elevational front view looking in the direction of the arrows from the line 4—4 of Figure 2;

Figure 5 is a plan view with the razor head open and the blade loading magazine in position to deposit a blade therein;

Figure 6 is an elevational side view partly in section taken on the line 6—6 of Figure 5 and showing details of the forward blade stops in the position engaging the cutting edge extremities of the blade during relative movement of the magazine to deposit a blade in the razor channel;

Figure 7 is a front elevational view of the blade loading magazine showing the cutting edge extremities of the blade in position to be removed;

Figure 8 is a transverse sectional view taken on the line 8—8 of Figure 7 showing the blades in the magazine and the opening through which the blades individually pass when being loaded in the razor;

Figure 9 is a bottom view of the magazine taken along the line 9—9 of Figure 7 and showing details of the end transverse channels in which the forward stops move when engaging the cutting edge extremities to feed a blade from the magazine;

Figure 10 illustrates the bottom side of a modified magazine having a medially disposed longitudinal slot through to enable the ends of the replaceable blade to be engaged by the injecting elements carried by the blade platform when the razor is opened for a blade-changing operation; and

Figure 11 is an end view of the modified magazine of Figure 10 taken from the line 11—11 looking in the direction of the arrows and showing one of the end openings through which the blades are fed from the magazine responsive to longitudinal relative movement of the magazine and razor.

In the several views identical parts or elements are designated by like reference characters, with modified corresponding parts or elements being designated, however, by the addition of the letter a to each.

Referring now to the drawings, the presently preferred embodiment of the invention is the razor illustrated in Figures 1 through 9 and generally designated 20, and lower end of the modified magazine 26, said magazine being fitted with aligned circular holes 27 in parallel subjacent relationship to the ends of said butt stops, the top plate being formed with an upwardly extruded embossment to form a recess 28 forwardly of the finger tab, for novel purposes to appear.

Interfitting clamping member 15 comprises a top blade platform 22 having a rearwardly extending finger tab or projection 23 medially disposed with respect to a pair of depending blade butt edge stops 24 formed as a continuation of the rear edge of said member, a pair of depending longitudinally spaced end flanges 25 with their forward edges formed as eccentric cam portions 26, said flanges being fitted with aligned circular holes 27 in parallel subjacent relationship to the ends of said butt stops, the top plate being formed with an upwardly extruded embossment to form a recess 28 forwardly of the finger tab, for novel purposes to appear.

Interfitting clamping member 16 comprises a blade platform or support 30 provided with an angular (depending) extension 31 having its lower edge formed with a pair of longitudinally spaced angular projections 32, a forward marginal portion formed as a downturned flange provides the aforesaid cutting edge guard 17 with the ends of the flange being formed with upstanding longitudinally spaced blade stop and ejecting elements 34, and an elongated opening 35 is provided centrally of the guard flange and subjacent to the blade cutting edge for expelling the beard-laden lather therefrom as the shaving operation progresses in a well known manner. A lateral projection 36 is formed on each end of the extension 31 which are acted on by the cam portions 26.

The support member 18 is rigidly attached to the upper end 12 of the razor handle, and comprises a pair of oppositely disposed pistons 37 projecting from the lateral edges subjacent to the upper end thereof, said pistons being journaled in the holes 27, and in spaced longitudinal relation adjacent the lower edge of the support are a pair of openings 38 adapted to receive the angular projections 32, whereby the clamping member has pivotal action with respect to the support member 18 and platform 30, while the platform is provided with pivotal movement relatively to the support member 18 and clamping member 15, by the aforesaid pivotal connections 27, 37, and 38, respectively. The upper end of the support member 18 is formed with an inturmed angular flange 39 disposed above the pistons 37 and normally co-planar with the platform 30, and is adapted to support the marginal surface portion of the blade butt edge when the razor.
2,945,297

5 head is closed, said flange being formed substantially at right angles to the support member proper. The pivotal action between the member 16 and support member 18 provides a variable blade channel 40 between the pairs of blade stops 24, 34, said channel being expandable to enable the blade when manual pressure is applied to the finger tab 23 causing the interaction between the cam portions 26 and projections 36 to widen the channel to be more fully explained.

A normally preloaded leaf spring generally designated S is arranged to act on the member 16 and comprises a forward loop portion 41 terminating in lower and upper legs 43, 44, respectively, the lower leg is attached in the upper end section 12 of the razor handle, forwardly adjacent to the lower edge of the platform extension 31, while the upper leg is adapted to engage the upper medial side of the extension 31 best demonstrated in Figure 2 to bias the latter toward the fixed support 18, and through interaction with the clamping member provided by the cam mechanism 26, 36 to bias said member into clamping relation with the upper marginal surface portion of the blade immediately rearward of the cutting edge 20 whereby the head is closed in shading condition clearly portrayed in Figures 1 and 2.

A centrally disposed depending extension or leg 45 projects from the medial lower edge of the support member 18 into the slotted upper end 12 of the handle 10 to rigidly attach the support member to the handle, and the previously mentioned sleeve 13 is placed in position encircling legs 43, 45 and prestressed onto this section of the handle to anchor the lower leg of the leaf spring S and lower end portion of the support member 18 as a unitary assembly to the handle best shown in Figure 2.

A blade retaining spring designated 46 is disposed for reception by recess 28 when abnormally deformed toward the clamping member from a normally relaxed position. This spring comprises a free end terminating in a flange 47 projecting toward the platform 30 with the other end anchored to the end wall of the recess as by a rivet 49. The free flanged end 47 is adapted to enter an aperture 50 formed in the blade centrally disposed forwardly of the butt edge thereof and into engagement with the upper side of the platform 30 responsive to closure of the clamping member 15 onto the blade. It is thus seen that the function of the spring 46 is to maintain the blade in a retracted position notwithstanding the clamping member 15 may subsequently be partially opened to relax the spring substantially to its normal status free of tension and simultaneously advance the guard flange 17 ahead of the blade cutting edge thereby releasing the blade to enable cleaning the razor as by the water flow with the blade loosely retained in the razor head by the flange and aperture connection 47, 50, so that the water may freely circulate around the blade and through the head for thorough cleansing thereof.

Each lateral edge of the platform 30 is formed medially thereof with an upstanding blade ejecting element 52 for co-operating with the ends of a blade displaceable from a modified loading magazine, said blade being fed from the magazine endwise from either end thereof responsive to relative endwise movement in either direction of the razor head and magazine. This novel blade-charging operation will be more fully explained in connection with a more detailed description of the modified dispensing.

A demountable blade magazine generally designated M of novel design is shown in Figures 7, 8, and 9. This magazine as is understood, is adaptable to hold a summation or stack of blades individually designated 19. The magazine casing 55 is preferably formed of thin sheet aluminum in square cross section. The upper wall 57 has a medial arcuate recess 58 merging with the inner surface of this wall on a transverse line equidistant from each end. Plates 59 close the ends of the casing 55 and are each provided with a pair of ears 60 formed medially on opposite edges. These ears are adapted to be pressed into suitable aligned openings 61 adjacent the ends of the casing to thus confine the blades within the casing as is understood. A normally preloaded leaf spring 62 of substantially bracket-shaped configuration is formed with a medial hump 63 which engages the recess 58 while the free ends terminate in legs 64, 65, the latter being adapted to engage the last blade within the magazine and constantly urge the pack of blades toward the bottom of the magazine in registry with a slot 66 forming a blade outlet through the rear wall 67 in line with the bottom blade. A transverse channel 68 intersecting the terminal of slot 66, is provided at each end of the casing through the bottom wall 69 and front wall 70 immediately adjacent the inner side of the end plates. These cross channels receive the coating ejecting elements 34 to enable the confronting face of said elements to engage the extremities of the blade cutting edge 20 with the bottom wall of the magazine in intimate contact with the upper side of the blade platform 30. The connection between the elements and channels also serves to guide the sliding relative movement of the platform and magazine when feeding a blade from the magazine through the outlet 66 onto the platform. It is thus seen that the elements 34 coast with the extremities of the blade cutting edge to eject a blade from the magazine responsive to relative sliding movement of the razor head and magazine. The present razor may, therefore, be termed the "injector-type."

A modified blade magazine generally designated M' of novel design is shown in Figures 10 and 11. This magazine is substantially the same construction as magazine M with the exception that the cross channels 68 and longitudinal blade outlet 66 are eliminated. The bottom wall 75 of this modified casing 76 is formed with a centrally disposed channel 77 through the wall running lengthwise thereof and merging at each end with transversely disposed blade slots or outlets 78 formed in end plates 79 and 80, the latter slots registering with medial end portions of the bottom blade within the magazine. With the clamping member 15 fully open and the magazine M' positioned on the platform in readiness to deposit a blade thereon, the ejecting elements 52 are aligned with the channel 77 in registry with the bottom blade, and the stops 34 are spaced slightly forward of the casing 76.

The operator may now grasp the razor handle, for example, in his right hand and the ends of the magazine between the thumb and forefinger of his left hand and separate the magazine and razor head by relatively sliding the magazine and platform in either direction while in contact with each other to forcibly feed a blade from the magazine onto the platform through either outlet.

Operational summary

Although the manner in which my invention achieves its objectives should be manifest from the foregoing description augmented by an inspection of the drawings, a brief restatement is deemed apropos, and will be given as follows:

What will be considered a shading cycle, will now be described with reference to the razor of the instant invention, and particularly the embodiment illustrated in Figures 1 through 9. Assuming the razor head empty, such a cycle comprises the steps of first opening the razor head by applying manual operating pressure on the thumb tab 23 while grasping the handle 10, for example, in the right hand, to move the clamping plate 22 to the position shown in Figures 5 and 6 and then mounting the magazine M on the razor platform 30. With the magazine held between the thumb and forefinger of the left hand and the magazine may be moved relatively to the platform and vice versa. This relative movement brings about separation of the magazine and platform and due to engagement of the stops 34 with the blade cutting edge extremities forcibly causes the bottom blade within the magazine to be ejected through the outlet 66 onto the platform; whereupon, release of the manual pressure on the projection 33 enables the spring S to urge the platform 30 toward the support member 18, and simultaneously—
ly act through the camming followers 36 and the camming surfaces 26 to move the clamping plate 22 toward its normal clamping first stage position A against the upper surface of the deposited blade best demonstrated in Figures 1 and 2. As the clamping plate reaches a position substantially parallel with the platform, the flanging 47 engages the upper surface of the blade rearwardly of the aperture 50 and as the clamping member continues toward its clamping position, the retarding spring 46 deflects to an abnormally deformed configuration toward recess 28 to accommodate completion of the clamping movement of said member 15. During this latter movement of the clamping member, the blade slides rearwardly by action of the stop elements 34 acting on the cutting edge corners thereof to bring the aperture into registry with the end of the flange 47 so that the flange can engage said aperture closely adjacent the rear edge of said aperture, and the butt edge 21 of said blade is brought into contact with the depending stops 24 forming the rear marginal portion of the plate 22, to thus impinge the edges of the blade between the stops 24, 34 with the end of the flange 47 in closely confronting relationship with respect to the rear edge of the aperture 50. The razor is now conditioned for a shaving operation.

While shaving, the clamping member 15 may be moved to second stage position B substantially parallel with the platform 30 as shown in Figure 2 by the first dash line position of the finger tab 23, for effectively cleaning the blade and razor frame. This second stage operation of the member 15 releases the blade by advancing the stops 34 ahead of the cutting edge, and removal of clamping pressure along the top surface of the blade rearwardly of the cutting edge, the razor head thus loosely retains the blade by means of the connection effective between the flanged end 47 of the retarding spring 46 and aperture 50. After circulating water from a convenient faucet through the razor head, the clamping member is manually released to return to its blade clamping position A under influence of the spring S so that the shave may be resumed in usual fashion.

Thus, it should be manifest that my invention discloses a new and novel razor construction that is extremely simple in design, easy to manipulate, and free of risk as to personal injury during blade-changing as with a magazine. the hands never in contact with the blades, and in the case of direct manual blade-changing, only the end portion is grasped. Moreover, the present novel razor enables removal of a used blade as by gravity when the razor head has been opened to third stage position C shown in Figure 2 by a second dashed line position of the finger tab 23 and also by a solid line in Figure 6 in which the magazine may be positioned on the platform for depositing a new blade onto the latter in the manner above described.

Use of the modified magazine M for loading the blades on the razor platform when the head is open, differs only in the direction of relative movement of the magazine with respect to the platform. An endwise relative movement between the magazine and platform is effective to forcibly eject a blade from the end outlets on the platform, and this movement may be made in either direction since an outlet slot 77 is provided at each end of the magazine. Otherwise, the clamping and cleansing operations are similar to those described in connection with the first embodiment shown in Figures 1 to 9.

The three-stage operation of the clamping member 15 to position C (See Figures 2 and 6) for clamping, cleaning, and inserting a blade, respectively, provides novel advantages in safety razor operation not heretofore appreciated by workers in the art. This arrangement simplifies the razor for a shaving operation, it augments the purpose of the operator is provided with the special and additional feature of selective movements of the clamping member at will according to the operation desired. For example, after deposing a blade on the platform the tab may be fully released with resultant automatic clamping of the blade in shaving position, or may be moved to either a blade loading or cleaning position.

The various elements of the invention are combined to provide a low cost and simplified razor construction for loading blades successively, either endwise or crosswise of the razor head without dullying the effective cutting edge portion thereof as the mechanism is designed to feed the blade with its effective cutting edge portion clear of any clamping means until it is in position to be clamped in shaving position automatically, and then only the corners of the cutting edge are in engagement with the stops 34. Furthermore, operation of the clamping member 15 acts initially through the cam and follower connections 26, 36 to project the stops 34 forwardly of the cutting edge 20 and also transmits the force of the spring S to the platform and thence to the clamping member to urge the latter toward clamping position A with release of manual pressure thereagainst. In this connection, the present invention contemplates manual insertion of blades without using the magazines M and M' for this purpose. In the case, for example, where conventional single edge blades having a reinforcing strip along the butt edge thereof are used, such blade may be inserted into the blade channel 40 by fully opening the razor head to position C of Figure 6 and then inserting the blade into the channel 40 by grasping the butt portion.

Thus, the present invention enables blade loading automatically from the illustrated novel magazines or optionally directly by hand.

Referring to the terminology used in the foregoing description and in the appended claims, the identifying expressions and/or terms employed are intended to convey meanings which include the range of reasonable equivalents in the patent sense. For example, the expressions "razor head," "razor frame," "interfitting members," "clamping members," "blade channel," are intended to include any structure or chamber for the reception of a razor blade of the single-edge type, whether such assembly provides for sliding or pivotal relative movement of the members to accommodate insertion and removal of a blade, or a different type of movement serving the same purpose. The terms "depending," "upstanding," "sub-jacent," "superjacent," "rear," "front," and other directional words or characters are intended to have only relative connotation for convenience in describing the structure as illustrated, and are not intended to be interpreted as establishing a definite operating position of the razor or requiring any particular orientation with respect to related structure or operating position of the present disclosure.

The preferred embodiments of the invention have been illustrated and described. It is to be understood, however, that the invention contemplates any and all modifications, substitutions, and/or arrangements thereof that may fall within the purview of the claims heretofore appended.

Having thus described my invention, I claim:

1. A safety razor for use with a blade having a cutting edge opposite a dull butt edge, a blade platform member and a blade clamping member adapted to receive such blade thereby, said members being movable relatively to one another and to a fixed handle, resilient means biasing said members toward one another for engagement with such blade, abutment means on said platform member engageable by such blade; the improvement which comprises: manually actuable means including cam mechanism movably mounted on said platform member for effecting relative separation of the latter against the bias of said resilient means to a position wherein said platform member is advanced relatively to said handle, in response to actuating said manual means.

2. A safety razor according to claim 1 in which said
blade clamping member is pivotally mounted on said handle in spaced relation from said cam mechanism for arcuate movement relative to said platform member from a blade clamping position at which said clamping member overlies said platform member to a blade loading position substantially normal to said platform member at which the latter is advanced relatively to said handle to accommodate placement of such blade thereon.

3. A safety razor according to claim 2 in which said manually actutable means comprise: a finger tab carried by said clamping member, an eccentric cam element carried at opposite ends of said clamping member adjacent the pivotal mounting thereof, and a cooperating working surface carried on opposite ends of said platform member and contacitable with said cam element to separate said members under influence of manual force exerted on said finger tab.

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