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MAGAZINE FOR SAFETY RAZOR BLADES

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2 Sheets-Sheet 1
This invention relates to safety razors of the type having a thin flexible blade removabley supported and clamped in shaving position therein by co-operating blade-clamping members. In one aspect the invention comprises improved mechanism for feeding a thin flexible sharp edged blade through its edges without damage to its edges from a stack for any purpose where it is desired to deal with one blade at a time, as for example, in delivering blades one by one from a magazine to a safety razor. In another aspect my invention comprises a novel combination of safety razor and magazine so organized that new sharp blades may be presented successively to the razor and used blades removed therefrom mechanically and accurately without danger of dulling to the sharp edge of the blade or of cutting the fingers of the user. In still another aspect the invention consists in an improved magazine for sharp and used safety razor blades.

The problem of separating positively and accurately one thin blade after another from a stack and delivering it in predetermined position to a safety razor or other destination has engaged the skill and resources of blade manufacturers and distributors for many years without successful solution. This is on account of the fact that safety razor blades are often not over .007" in thickness and sometimes may be as thin as .004". It is extremely difficult to separate a single blade of such thinness from a stack of blades with any assurance of accuracy and without serious danger of jamming by inadvertently moving two blades at a time into the discharge opening of a magazine or other receptacle. The small thickness of the individual blade does not afford an adequate abutment at the end of the blade for a pushing or pulling feed member and it is difficult to separate blades lying in face-to-face contact which often cohere by reason of atmospheric pressure. I have discovered, however, that it is entirely practicable to separate such blades in a stack by moving sharp edged members into the wedge-shaped space formed by the diverging bevelled faces between two adjacent blades, but in order to separate blades in this manner it is imperative that their cutting edges escape all contact of the feeding members. Accordingly, I propose to contact the blades by first engaging them at corners formed by the bevelled edges and the end edge of the blade or a shoulder in the end of the blade. In a stack of blades .006" thick the opening of the longitudinal V-shaped channels between adjacent cutting edges is .006" in width and I utilize this space to bring the feeding member and the uppermost blade of the stack into preliminary registration. Having once registered the feeding means with the blade in this manner the feeding means is positively guided into interlocking engagement with the blade.

More specifically, therefore, an important feature of my invention consists in a thin sheet metal blade-feeding member having spaced inwardly diverging offset edges arranged to be moved across two end corners of a blade and so shaped as to present an inclined separating edge at one side which will pass under the edge of the blade while the body of the feeding member is supported in sliding contact with the upper face of the blade. The result is that the corners of the blade are registered and parts of the feeder pass on opposite sides of the blade. This movement of the feeder with respect to blades continues until the blade corners are fully engaged by the material on both sides. When this happens the slide is advanced with the interlocked blade to the desired point and then upon retracting movement of the feeding slide the blade is disengaged and left in the desired position.

The offset edges may be formed in the feed slide by cutting oblique slots therein and then depressing one edge of the slot with respect to the other, or by folding side portions of the slide over its body and properly shaping the inturnd edges, or in any other satisfactory manner.

These and other features of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawings, in which:

Figs. 1, 2 and 3 are end views of the magazine in position on the razor;

Figs. 4, 5 and 6 are plan views showing the magazine upon the razor in three different positions;

Fig. 7 is a view of the razor and magazine in attached relation showing the razor in longitudinal section and the magazine in elevation;

Fig. 8 is a plan view of the razor and magazine with the parts in the position they occupy at the end of the blade-delivering step;

Fig. 9 is an end view of the magazine containing a stack of new blades;

Fig. 10 is a corresponding view of the magazine containing a stack of used blades;

Fig. 11 is a view in perspective of the main shell of the magazine;

Fig. 12 is a corresponding view of the intermediate partition member of the magazine;
Fig. 13 is a view in perspective of the magazine spring.

Fig. 14 is a fragmentary plan view on an enlarged scale of the blade-feeding member engaged with a blade.

Fig. 15 is an end view of the blade-feeding member.

Fig. 16 is a sectional view on the line 16—16 of Fig. 14.

Fig. 17 is a cross-sectional view on the line 17—17 of Fig. 14.

Fig. 18 is a fragmentary plan view of a portion of a blade shown with an alternative form of feed slide.

The feature of my invention is herein shown as in an embodiment designed particularly for use in connection with the safety razor of my prior Patent No. 1,953,885, April 3, 1934, although as already stated my invention may be embodied in magazines adapted for use with other types of safety razors. In the present drawings only so much of the razor construction is shown as is needed for a full understanding of the invention and for other details of construction reference may be had to my said patent.

As herein shown the razor comprises a handle 11 carrying at its upper end a blade-supporting or guard member 10 which supplies a seat for the blade and is provided with marginal guard teeth. The guard member 10 is longitudinally shouldered so that the blade may be flexed upon it and co-operates with a cap member 14 having a concave blade-engaging face. The handle 11 carries a spindle 17 in which is pivotally mounted a retainer or connector having two spaced and flanged sectors 12 and 13 shaped to engage in an undercut recess or guideway which is provided in the concave face of the cap. The connector has an eccentric portion in its periphery between the sectors 12 and 13 and co-operates with a spring detent 16 in the spindle 11, being held yieldingly in position with one sector or the other interlocked with the recess of the cap 14.

In Fig. 7 the sector 12 is shown as in its interlocking position, there being no blade in the razor.

When a slotted blade is presented endwise and moved toward the left into the razor the end edge of the blade encounters the sector 12 and rocks the connector in a counterclockwise direction. The sector 12 is thus disengaged from the cap 14 and the sector 13 is swung upwardly, passing through the slot in the blade and guiding interlocking with the cap as the sector 12 disengages it and clears the space between the blade-clamping members of the razor for the passage of the new blade. When the blade has been fully presented the sector 13 occupies the position in which the sector 12 is now shown and the higher point of the eccentric portion of the connector has been forced past the spring detent 16. With the blade so positioned the spindle 17 is drawn down by turning a knurled head not shown in these drawings and the blade is clamped in shaving position. At the conclusion of the shaving operation the spindle 17 is released and the blade-clamping members 10 and 14 are separated. The blade may then be withdrawn by moving it toward the right out of the razor and in this withdrawing movement the connector is rocked and the blade in its interlocking relation with the cap. The magazine which will now be described is designed to interlock with the blade the presenting and withdrawing movements which have just been described.

The razor and magazine in their illustrated embodiments! are shown as designed to take blades of the well-known Gillette type. These blades 40 are of thin flexible steel .004" to .006" in thickness, sharpened along both longitudinal edges and having shoulders 41 defining elongated, unsharpened end portions 42. The blades are engaged by their shoulders 41 in the withdrawing and presenting movements which are imparted to them as will presently appear. The blades are provided with a central longitudinal slot 43 by which they are located both in the magazine and in the razor.

The magazine has a main shell of sheet metal, as best shown in Fig. 11, rectangular in outline and comprising upper and lower compartments. The upper compartment is formed by the top wall 29 of the shell, its side walls and an inserted partition 22 having its ends flanged and turned up to provide a rear wall 24 and a front wall 26. The side walls of the main shell are shoulderd and offset inwardly and the offset side walls 21 are provided with interturned flanges 25. The offset side walls 21, the partition 22 and the flanges 23 form the lower compartment of the magazine and in this compartment the used blades are accumulated while the stack of new, sharp blades is contained in the upper compartment of the magazine.

The sheet metal partition 22 is of such dimensions as to fit snugly within the main shell of the magazine, resting upon the shoulders formed by the inwardly offset walls 21 and with the rear wall 24 completely closes the rear end of this compartment of the magazine. The front wall 26 has a central opening through which projects an arm 25 of such shape as to fit securely into the socket 16 in the guard 10 of the razor. The arm 25 serves to register the magazine in the proper relation to the razor for presenting a blade thereto and detachably to maintain the razor and magazine in attached relation while a blade is being supplied to the razor. The sections of the front wall 26 are cut away at their upper edge to provide a discharge opening or slot adjacent to the inner surface of the top 20 of the magazine. The body of the partition 22 is slotted and its material is turned up to form a central longitudinal rib 27 shaped to fit the slot 43 of the blades and thus to hold them positively in alignment in the magazine with their sharp edges out of contact with the walls of the magazine as shown in Figs. 1—3 and 9. It will be noted that the rib 27 occupies the forward end of the magazine and that a space is thus left between the rear end of the blade stack and the rear wall 24 of the magazine. This space is utilized in part for the blade-feeding slide 31 which will now be described.

The blade-feeding slide 31 consists of a rectangular piece of thin sheet metal, preferably of about the same thickness as the blades which are to be handled. It is of such dimensions as to fit within the upper compartment of the magazine and is maintained in contact with the front wall 20 of the upper wall 20 of the magazine by connection with a knob 32. The shank of the knob passes through a longitudinal slot 10 in the top wall of the magazine and by manipulating the knob the feed slide may be moved freely from one end of the magazine to the other. Along its advancing edge the feed slide is provided with a pair of inwardly convergent slots...
spaced apart so that when the feed slide is passed over the uppermost blade in the stack, located by the rib 27, the slots 33 intersect or pass across the sharpened edges and shoulder corners of the blade. The material of the slide forming the rear edge of the slots 33 has a concavily 34 imparted to it so that in the advancing feeding movement of the slide the following edges of the divergent slots are displaced downwardly or offset as compared to the leading edges of the slots. The result is that the leading end of the slide 31 and the leading edge of the slot passes over the preceding blade in the stack while the following edge of the slot passes under the edge of the blade, beginning at the sharpened rear corner and bringing up when the rear depressed edge of the slot catches the shoulder 41 of the blade. In Fig. 14 the feed slide 31 is shown as fully engaged and interlocked with the shoulders of the blade preparatory to advancing it out through the delivery slot of the magazine and into the space between the blade-clamping members of the razor.

The feed slide 31 is so proportioned that it never moves to the right beyond the end of the uppermost blade in the blade stack and conversely the rib 27 locates the stack of blades so that the uppermost blade is always overlapped by the feed slide 31. The latter, of course, moves always in contact with the inner face of the top wall 20 of the magazine. The magazine contains a bowed spring 29, best shown in Fig. 13, the center section of this being provided with a longitudinal slot 30 fitting with clearance over the rib 27.

The two outer sections of the spring 29 bear upon the under side of the blade stack as shown in Fig. 7 which yields upwards against the feed slide 31 and the top of the magazine.

The initial position of the feed slide with respect to the upper blade 43 is shown in Fig. 15 from which it will be apparent that the feed slide overlaps the unsharpened end portion 42 of the blade. Accordingly when the feed slide is moved toward the left in its predetermined path the slots 33 pass over the bevelled corners of the blade. In this movement, the front edge of both slots passes above the blade whereas the depressed following edge of each slot passes beneath the bevelled corner of the blade and into the V-shaped space between that blade and the next. As the slide advances to the position shown in Fig. 14 the points of contact of each slot move inwardly and the effect is that of moving thin separating edges simultaneously inwardly from the blade corners and the interlocking relationship of Fig. 14 is reached the blade is symmetrically engaged in a balanced manner and is advanced without tendency to lateral deflection.

The blade is presented to the razor by moving the feed slide through the medium of the knob 32, to the left-hand limit of its path as determined by the slot 19. In this movement the connector 12—13 of the razor is rocked as already described and the blade is located in the razor by suitable ribs provided for that purpose on the guide member 10. The spring 17 is then drawn down to clamp the blade and the magazine is detached by a movement toward the right in which the arm 25 is pulled out of the socket 16 in the guard member.

At the conclusion of the shaving operation, or when the razor is removed from the razor, the magazine is brought into the position shown in Figs. 1 and 4 and the used blade is delivered to the lower compartment, that is to say, the compartment formed by the inwardly offset walls 21 below the partition 22. The inwardly turned flanges 23 in which the walls 21 terminate are spaced apart by the width of the cap member 14 of the razor. A short distance within the forward end of the walls 21 is provided a pair of inwardly turned vertical ears 37. A pair of corresponding ears 37 is formed at an intermediate point in the walls 21 such as to confine between the ears 37 and 38 a stack of used blades. The vertical ears 37 and 38 engage the shoulders 41 of the blades holding the blades in an aligned stack but permitting vertical movement thereof. The center section of the spring 29 is bowed downwardly and engages the stack of blades located by the ears 37 and 38, pressing them always downwardly but permitting them to be forced inwardly from time to time.

When it is desired to remove a used blade from the razor the magazine is positioned as shown in Figs. 1 and 4 being registered transversely on the cap 14 by the flanges 23 and longitudinally by the ears 37—38. The whole magazine is then forced bodily downwardly deflecting the blade 40 over the shoulders of the guard member 10 and so narrowing the blade that finally it snaps past the flanges 23 and flattens out again within the magazine. One blade is shown in this position in Fig. 3. The cap 14 has, of course, been released from blade-clamping pressure and the magazine may now bodily be moved toward the right whereupon the blade is forcibly ejected by the ears 37 which engages the two rear corners as suggested in Fig. 5. In this figure the magazine is shown as moved part way toward the right and the blade is represented as having been moved not quite far enough out of the razor. As successive blades are withdrawn in the manner thus outlined the stack of used blades 40 builds up in the lower compartment of the magazine as suggested in Fig. 10, at each operation the spring 29 permitting the collected blades to be displaced inwardly while the current blade is flexed and drawn between the flanges 23.

In Figs. 14—17 the feed slide is shown as a flat piece of thin sheet metal with oblique offset edges supplied by divergent slots therein. The same result is secured by a different construction as suggested in Fig. 18. In this instance the edge portions 51 of the sheet metal slide are turned in and inwardly over the body of the material and are bevelled so that their advancing edges diverge in the same sense as the slots 33. The oblique edges of the turned portions 51 are, therefore, offset from the plane of the feed slide just as are the following edges of the slots 33. The turned portions 51 are united to the body of the slide by spot welds 52 which supply positive abutments for engaging the shoulders of the blade. In Fig. 18 is included a cross-sectional view of the feed slide and it will be apparent that in this figure the slide is shown reversed in position as compared to the position of the slide shown in Figs. 14—16, that is, inverted from its normal operating position.

It will be apparent that while a feeding member having spaced convergent slots 33 will symmetrically Interlock with a blade and withdraw it, it is not necessary because a stationary guide flange may be provided for engaging the unsharpened edge
of the blade and holding it in a straight line path. Such a structure is contemplated and included in the scope of the accompanying claims, in which I claim as new and desire to secure by Letters Patent:

1. A magazine having a flat slotted top, a thin sheet metal feed slide having operating means extending through the slot whereby it may be reciprocated in contact with the top of the magazine, the feed slide having slots providing spaced divergent edges offset below its body, and means for pressing a stack of blades at all times toward the slide in a position always overlapping its path of reciprocation and placing corners of the blade in line with the divergent edges of said slide.

2. In a blade magazine, a feed slide of thin sheet metal having side portions intertum over its body and bevelled to present spaced divergent edges offset inwardly from the plane of the slide.

3. Mechanism for feeding thin safety razor blades, including an elongated enclosure, a feed slide movable bodily in a fixed path therein and having in a location substantially behind its advancing end a blade-engaging edge which is disposed obliquely with respect to the path of movement of the slide and offset from the body of the slide not less than half the thickness of the blade to be handled nor substantially more than the full blade thickness.

4. Mechanism for feeding one by one from a stack thin double-edged razor blades, comprising means for holding the blades of a stack in vertical alignment, and a thin flat feed slide bodily movable in sliding contact with the outer face of a blade so held in the stack and having a forward portion bounded by forwardly diverging edges which portion passes on one side of the blade when the slide is advanced, followed closely by a rear portion bounded by rearwardly converging edges offset inwardly from the plane of the slide, which rear portion passes on the other side of the blade whereby the blade is engaged on opposite sides in a balanced manner by different portions of the feed slide.

5. In a blade magazine having side, top and end walls, a sheet metal feed slide movable bodily in a predetermined path always in contact with one wall of the magazine, means for locating a stack of blades in the magazine so that the stack is always overlapped by the feed slide, and means for yieldingly pressing the stack against the slide, the slide being provided with divergent slots, each having an edge divergent with respect to the other and offset inwardly from the plane of the slide to overlap the corners of a blade in said stack.

6. In a blade magazine having side, top and end walls, means for locating therein a stack of sharpened blades, a thin sheet metal feeder movable bodily in the magazine in yielding contact with the outermost blade of the stack and having convergent edges located out of the surface planes of the feeder and below the plane of said outermost blade.

7. In a blade magazine having side, top and end walls, means for locating therein a stack of sharpened blades, a sheet metal slide movable bodily in the magazine in yielding contact with the stack and having slots oblique to its path of movement, the slots being movable across the corners of the blade, the leading sides of said slots being elevated with respect to the following sides thereof.

8. In a blade magazine having side, top and end walls, a thin feed slide movable bodily in contact with one wall of the magazine and having an edge therein which is inclined to its path of movement and offset inwardly from the plane of the slide, means for pressing a blade stack toward the said wall in overlapping relation to the path of the slide, whereby the slide travels always in contact with the uppermost blade of the stack and its inclined offset edge engages the corner of the blade between itself and the body of the slide.

9. In a blade magazine having side, top and end walls, means therein for holding a stack of bevelled edge blades with their edges registering one above another and separated by V-shaped channels presented by the bevelled edges of the blades, and a thin feed slide movable bodily in the magazine and having an edge oblique with respect to the bevelled blade edges and shaped to enter said V-shaped channel in separating one blade of the stack from another.

10. In a blade magazine having side, top and end walls, an enclosure having means for locating a blade therein, and a sheet metal blade-feeder movable bodily in the enclosure and having slots oblique to its path of movement and depressed portions located in position to receive the corners of the blade when the feeder is moved with respect to a blade held by said locating means.

11. In a blade magazine, an elongated enclosure having side, top and end walls, means for locating a stack of sharpened blades therein, and a spring blade-feeder having convergent slots with one side wall of each slot depressed, the feeder being movable bodily in a fixed path with respect to the stack of blades held by said locating means.

12. Mechanism for feeding one by one from a stack thin double-edged razor blades, comprising means for holding the blades of a stack in vertical alignment, and a thin flat feed slide cooperating with said holding means and bodily movable in sliding contact with the outer face of a blade so held in the stack and having a forward portion bounded by forwardly diverging edges which portion passes on one side of the blade when the slide is advanced, followed closely by a rear portion bounded by rearwardly converging edges offset inwardly from the plane of the feed slide, which rear portion passes on the other side of the blade whereby the blade is engaged on opposite sides in a balanced manner by different portions of the feed slide.

13. A blade magazine comprising means for enclosing a stack of safety razor blades, means for locating the blades stacked one above another within the enclosing means, a spring for disen-gaging one blade at a time from said blade-locating means, and blade-feeding means including a thin flat slide bodily movable above the blade stack and in contact therewith and having rearwardly converging edges offset inwardly from the plane of the slide, arranged to pass beneath the uppermost blade of the stack and extend from those lower down in the stack as the slide is advanced.

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