

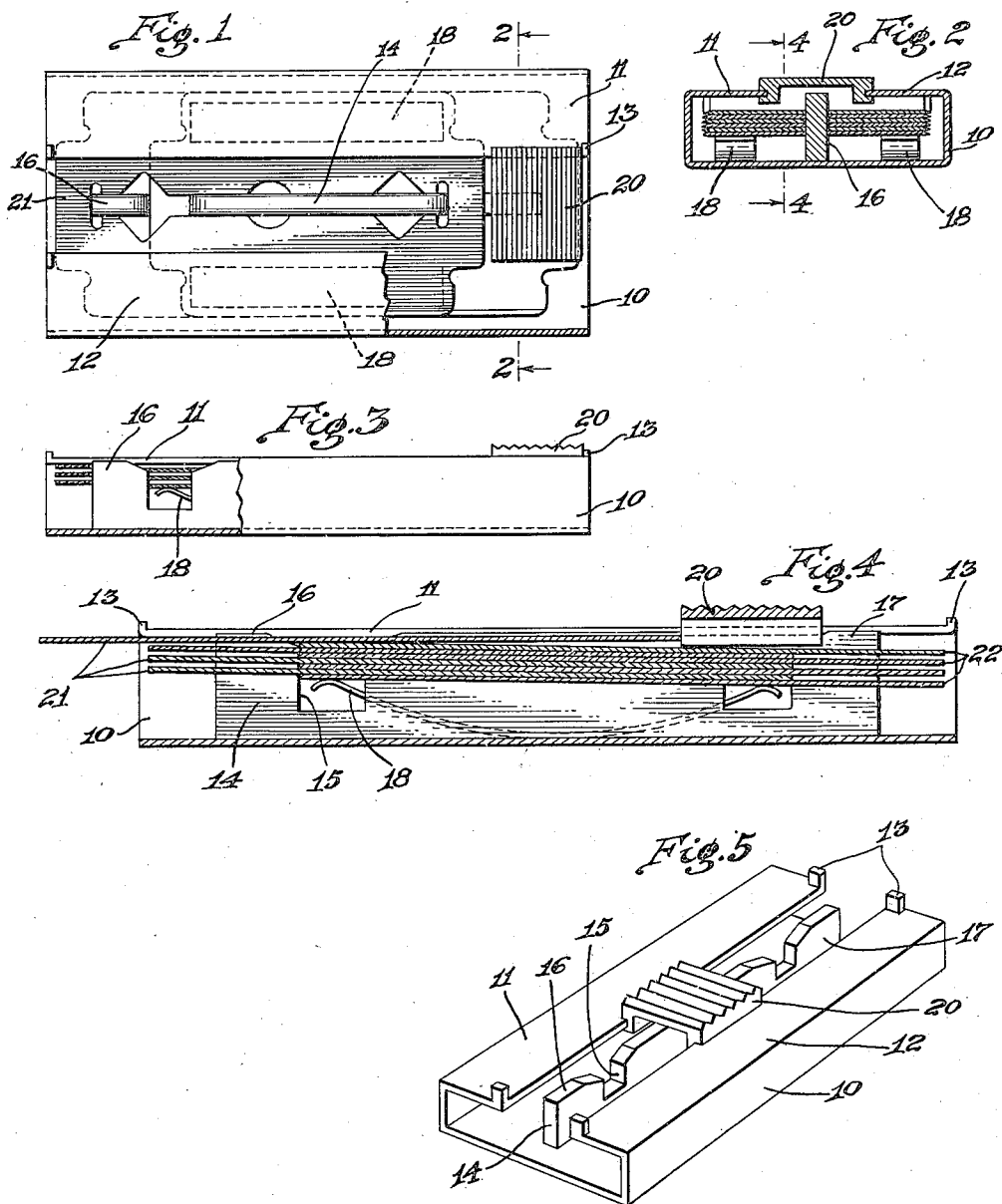
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BLADE MAGAZINE

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BLADE MAGAZINE

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This invention consists in an improved magazine for containing thin flexible blades in a novel stacked formation without damage to their cutting edges and also in feeding mechanism for separating the individual blades and feeding them successively from a stack for any purpose where it is desired to deal with one blade at a time, for example, in delivering blades one by one to a safety razor. In another aspect my invention comprises a novel blade magazine so organized that new sharp blades may be delivered successively for presentation to a safety razor without danger of dulling the sharp edge of the blade or of cutting the fingers of the user.

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 superposed in a stack does not afford an adequate abutment 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 and feed such blades from a stack by assembling them in longitudinally staggered relation, and by this I mean that in the stack alternate blades are located in different longitudinal positions such that the ends of alternate blades are separated by a space equal to the thickness of an interposed blade. For example, the left-hand ends of the first, third, fifth and seventh blades in a stack may be separated at the left-hand end of the stack by the width of the second, fourth and sixth blades in the stack, whereas, at the right-hand end of the stack the ends of the second, fourth and sixth blades are separated by the third and fifth blades. The blades may be staggered so that they all occupy one of two positions or they may be progressively staggered. The former arrangement is the more desirable and since slotted blades having a solid end portion of predetermined length may be reg-

istered in respect to a fixed stop in either of the two desired predetermined positions by engaging one edge or the other of the end portion with the stop. By providing two such stops, properly spaced, the two series of blades in the stack may be thus registered and positively held in position so that they can move only in a vertical direction. In another aspect accordingly my invention comprises a magazine having spaced stops therein, in combination with slotted blades having solid or imperforate end portions which may be registered alternately with opposite walls of the stop. In handling blades thus arranged the feed slide is not limited to operate in a vertical space equal only to the thickness of the blade it is advancing but may operate in a space equal to the thickness of the blade plus its spacing from the next blade, that is .012 inch instead of .006 inch in the case of blades gauging .006 inch.

As herein shown a feed slide is provided for ejecting the uppermost blade of the stack and as another important feature of the invention this slide may be designed to perform the additional function of maintaining any desired or convenient degree of separation between the uppermost blade being fed and the second or next lower blade of the stack.

Still another feature of the invention consists in a magazine having means for registering a stack of staggered blades, in combination with the feed slide and means for yieldingly holding certain blades of the stack in contact with the feed slide so that the latter may control their position in the stack, specifically the vertical height thereof, while it performs its feeding function in respect to that blade which has already been separated from the stack.

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 drawing, in which:

Fig. 1 is a plan view on an enlarged scale of the magazine;

Fig. 2 is a view in cross-section on the line 2—2 of Fig. 1;

Fig. 3 is a view of the magazine in side elevation with a portion of the outer wall broken away;

Fig. 4 is a view in longitudinal section on the line 4—4 of Fig. 2 on a still larger scale; and

Fig. 5 is a view in perspective of the magazine.

In the illustrated embodiment the magazine is shown as having an elongated tubular body 10 of rectangular contour open at both ends and hav-

ing its top wall formed by wide intumed flanges 11 and 12 separated from each other by a continuous central opening in the form of a wide slot. The magazine may be bent up out of sheet metal or moulded of any suitable thermo-plastic compound. The flanges 11 and 12 are provided at both inner corners with upstanding ears 13 which act as stops to limit the path of the feed slide as will presently appear. An elongated blade-locating bar or rib 14 is secured to the bottom of the magazine in symmetrical position between the flanges 11 and 12. The upper edge of this bar extends slightly into the space between the opposed edges of the flanges 11 and 12. The bar is substantially shorter than the magazine and its ends are spaced equally within the ends of the magazine. In its upper edge it is provided with two deep notches 15 having parallel vertical walls and bevelled corners and these notches set off solid end portions or blade stops 16 and 17 in the bar. The length of these stops 16 and 17 between their vertical walls is predetermined to determine the length of the overlap of adjacent blades.

A feed slide 20 is arranged to slide freely in the magazine between the two sets of stops 13. For this purpose are provided side flanges grooved in their outer walls to fit the opposed edges of the flanges 11 and 12 which thus act as a guide-way for the feed slide. From an inspection of Fig. 2 it will be noted that the side flanges of the feed slide 20 extend appreciably below the inner faces of the flanges 11 and 12 and that the feed slide as a whole is bridged to clear the blade-locating rib 14. The upper surface of the feed slide is transversely corrugated or knurled to facilitate operating it.

As already intimated the magazine is designed to hold a stack of slotted blades overlapped in staggered relation. The blades herein shown are thin flexible double-edged blades of a type used commercially in "Gillette" safety razors. They have shoulders at each end defining elongated imperforate end portions and each blade has an elongated centrally disposed slot of such width and length as to receive with clearance the blade-locating bar or rib 14 of the magazine. Each slot, moreover, opens into three spaced transversely enlarged portions. Of these, the central opening is herein shown as circular and the outer openings are diamond-shaped in outline. It is the length of the imperforate end portions of the blades plus the length of the blade stops 16 and 17 that determine the overlap of the blades at the ends of the stack.

The notches 15 in the blade-locating bar 14 are so arranged that the end portion of each blade may be disposed either outside the end stop 16, as is the uppermost blade 21 shown in Fig. 1, or inside the end portion 16 as are the blades 22 shown in Fig. 4. In loading the magazine the individual blades of the stack are presented alternatively in these two positions, that is to say, half the blades in the stack extend from the left-hand end of the magazine to the inner edge of the right-hand end portion 17 of the rib, and the blades 22 constitute the other half of the stack extending from the right-hand end of the magazine to the inner wall of the left-hand end portion or stop 16 of the blade-locating rib. The outer wall of the stop 16 initially prevents the blades 21 from shifting toward the right, and the outer wall of the stop 17 prevents the blades 22 from shifting to the left out of their desired position in the stack. The magazine is provided

with two leaf springs 18, one disposed on each side of the rib 14 and these springs act to press the stack of staggered blades yieldingly upwardly into contact with the flanges 11 and 12 of the magazine or with the feed slide 20 as the case may be.

The path of the feed slide 20 coincides substantially with the solid portion of the stack, that is, with that portion in which the blades overlap in continuous contact with each other. The length of this path is equal to the length of the overlapped portions of the blades in the stack plus the distance that the blade-moving walls of the feed slide are spaced apart. The blades 22 at right-hand end of the magazine are spaced from each other by the thickness of the intermediate blades 21, and at the left-hand end of the magazine the blades 21 are spaced from each other by the intermediate blades 22. The flanges of the feed slide 20 hold the second blade in the stack away from the under face of the flanges 11 and 12 in the locality that the feed slide happens to occupy. As shown in Fig. 4 the feed slide depresses all the blades in the stack below the blade 21, whereas, the uppermost blade 21 has been released by the feed slide when the slide reached its extreme right-hand position and now lies in continuous contact with the under side of the flanges 11 and 12. This relationship insures a definite space below the blade which is being operated on by the feed slide and thus the operation of separating the blades and feeding them one by one from the stack is simplified. As herein shown the feed slide maintains between the blade 21 which is being fed and the second blade 22 a space of about .020 inch.

It will be understood that in its extreme right-hand position the feed slide 20 passes slightly beyond the end of the uppermost blades 21 in the stack, although the path of the slide is limited at that end of the magazine so that it cannot possibly move beyond the end of the second blade 22. The result is that when the feed slide is moved to its right-hand position it frees the uppermost blade 21 and allows the latter to snap up and lie flat against the flanges 11 and 12. Meanwhile the feed slide itself maintains the second blade 22 of the stack spaced below it, deflected downwardly from a line adjacent to the outer wall of the left-hand notch 15. As the feed slide advances toward the left the uppermost blade 21 is positively pushed out of the magazine and in each position of the feed slide the second blade 22 and the stack below it is depressed until the feed slide reaches a position at the extreme left-hand end of the magazine and is arrested by the stops 13. In this position the uppermost blade 21 is fully ejected and the feed slide is carried beyond the end of the second blade 22. That blade 22 is thereupon immediately lifted into engagement with the inner faces of the flanges 11 and 12 by the action of the springs 18 while the second blade 21 and the stack beneath it are now depressed by the feed slide in an oppositely inclined manner to that shown in Fig. 4. Consequently, when the feed slide 20 is moved to the right, the uppermost blade 22 is advanced by it and ejected from the right-hand end of the magazine. It will be seen, therefore, that in each reciprocation of the feed slide a blade is ejected from one end or the other of the magazine as the case may be and in all positions of the feed slide the uppermost blade which is being operated upon is spaced a substantial distance from the next lower blade and full opportunity thus afforded for active and

selective engagement by the feed slide. Fig. 4 indicates how definitely the uppermost blade 21 is separated by the flanges of the feed slide from the second blade 22 and what good opportunity is afforded for the selective engagement of the end of that blade for advancing it toward the left. The bevelled corners of the notches 15 facilitate the release of the uppermost blade in the feeding step.

It will be appreciated that the mechanism of my invention is adapted without adjustment to separate and feed blades regardless of their thickness and that blades of various thickness may be handled in the stack as well as blades all of the same thickness.

It will be understood that while I have described the blade-locating means as constituted by a rib and elongated blade stops, studs of various shape could be substituted and correspondingly perforated blades successfully handled in the same general manner as that described, all within the scope of the invention.

Having thus disclosed my invention and described an illustrative embodiment thereof, I claim as new and desire to secure by Letters Patent:

1. A blade magazine having spaced co-operating stops for holding a stack of blades which are slotted to receive said stops with lengthwise clearance and disposed thereon in parallel superposed relation, all overlapping centrally between the stops and with their ends projecting in staggered spacing beyond the stops, a feed slide movable in the magazine in a path embracing in its length the overlapping portion of the blades to eject the uppermost blade and terminating at a point above and within the outer end of the second blade in the stack, and means for pressing the stack toward the feed slide.

2. A blade magazine holding a stack of slotted blades as defined in claim 1, and having a feed slide shaped to engage selectively the uppermost blade in the stack and to space the next lower blade from the engaged blade.

3. A blade magazine holding a stack of slotted blades as defined in claim 1, and having a feed slide provided with an end edge for selectively engaging the uppermost blade in the stack and an inner face for engaging and spacing the next lower blade from the uppermost blade.

4. A blade magazine holding a stack of slotted blades as defined in claim 1 having a feed slide with angularly disposed faces, one for vertically separating the uppermost blade from those beneath it and the other for engaging the separated blade and feeding it out of the magazine when the slide is advanced.

5. A blade magazine having a blade-locating rib of predetermined length and a stop spaced from one end of the rib in combination with a stack of blades, each having a longitudinal slot of width to receive the rib and stop and an imperforate end portion, the blades being arranged alternately in staggered relation with the inner edge of the end portion of one blade and the outer end edge of a contiguous blade engaging opposite walls of the stop and the rib occupying different positions in the length of their respective slots, and a feed slide guided for movement in a path in line with the outermost blade of the stack.

6. A blade magazine having a blade-locating rib of predetermined length and an elongated stop of the same width as the rib and spaced from the end of the rib, in combination with a stack of

blades, each having an imperforate end portion and a slot shaped to receive the rib and stop without endwise clearance, the blades being arranged in the magazine with the rib projecting into their slots and with their end portions alternately on opposite sides of the stop, and a feed slide guided for movement in a path in line with the outermost blade of the stack.

7. A blade magazine having a blade-locating rib with spaced notches forming blade stops of equal height at both ends of the rib, in combination with a stack of blades of less height than the blade stops having rib-receiving slots not longer than the combined length of the rib and one stop and having also imperforate end portions, the blades being arranged with only one stop projecting into the slot of each blade and with their end portions located alternately on opposite sides of one stop and alternately engaging opposite ends of the rib, and a feed slide guided for movement in a path in line with the outermost blade of the stack.

8. A blade magazine having therein a blade-locating rib notched to present a blade stop at each end, in combination with a stack of blades having rib-receiving slots longer than the unnotched portion of said rib and having imperforate end portions, half the blades of the stack enclosing in their slots one of said end stops and the unnotched body of the rib and the other half of the blades similarly enclosing the same part of the rib and the other of said end stops and being maintained thereby in longitudinally staggered, stacked formation within the magazine, and a feed slide movable in opposite directions in a path in line with the uppermost blade of the stack to engage successive blades so presented in the stack.

9. A blade magazine having means for holding a stack of slotted blades superposed in vertical registration one above another, the said means being shaped to hold alternate blades temporarily and positively against longitudinal movement in either direction and with their ends in spaced staggered relation, means for disengaging one blade at a time from said holding means, and means for engaging and feeding one blade at a time from the stack.

10. A blade magazine having a central rib for holding a stack of slotted blades superposed in vertical registration one above another, said rib being notched to provide spaced blade stops shaped to enter the slots of alternate blades and hold said alternate blades positively in either one of two longitudinal positions in which adjacent blades are staggered, and a feed slide movable in a path parallel to said rib to engage the uppermost blade of the stack.

11. A blade magazine having exit openings at both ends, a feed slide mounted to reciprocate in a fixed path in one wall of the magazine, in combination with a pair of spaced blade stops in the magazine and a stack of perforated blades arranged in staggered relation in the magazine with a perforation in some blades hooked over one stop and a perforation in other blades hooked over the other stop, the ends of all the blades extending beyond the path of the slide at both ends of the magazine, the stops being located out of the path of the feed slide, and means being provided for moving a blade into its path.

12. A blade magazine having a wall with a guideway therein, a feed slide movable in the guideway, means for holding a stack of perforated blades in position beneath the feed slide in longitudinally staggered relation with spaced end

portions at both ends of the stack, and means for arresting the slide at both ends of its path in a position clearing the uppermost blade in the stack and overlapping and depressing the end of the second blade in the stack whereby the said uppermost blade may be individually engaged for feeding from the magazine.

13. A blade magazine having a wall with a guideway therein, a feed slide movable in said guideway, a rib in the magazine interrupted to present spaced blade-receiving recesses and providing central zones and end zones, a stack of slotted blades on said ribs, divided into two series in contact with each other in a central zone between said recesses and spaced alternately from each other in both end zones, and means for arresting the feed slide after it has moved across said central zone and while occupying a blade-engaging position in one of said end zones.

14. A blade magazine having positive means therein for holding certain blades of a stack of perforated blades disposed in overlapping longitudinally staggered relation thereby separating the ends of alternate blades by a space equal to the thickness of an interposed blade, a feed slide movable in the magazine partly in the space thus provided into end engagement with the uppermost blade in the stack and in face-to-face engagement with and depressing the second blade in the stack, and means to limit the travel of the feed slide, so that it can never pass beyond either end of the stack.

15. A blade magazine including in its structure an elongated walled enclosure open at both ends and having a slotted top, a feed slide arranged for movement in the slot of the top, projecting ears

limiting the path of the feed slide, and a solid blade-locating rib projecting inwardly from the bottom of the magazine and having spaced notches setting off blade stops at each end thereof, the outer walls of said notches being disposed within the limits of the path of the feed slide.

16. A blade magazine including in its structure an elongated walled enclosure slotted in one wall, a feed slide guided therein, means for limiting the path of the slide, a blade-locating rib in the magazine beneath the slide having spaced notches setting off blade stops at each end thereof, and a stack of slotted blades arranged upon the rib with alternate blades anchored in the notch at one end of said rib and the other blades held in a different longitudinal position by being anchored in the notch at the other end of the rib, the said notches being at least as deep as the stack of blades in the magazine.

17. A magazine for safety razor blades, having in combination, spaced projections, a stack of slotted blades thereon having ends of alternate blades projecting in opposite directions longitudinally and thus providing overlapping portions in the stack, the said projections being constructed and arranged to engage portions of said blades and restrain movement inwardly toward the overlapping portions while allowing outward movement in the opposite directions, a slide member having spaced moving walls at opposite sides thereof, and means for slidably mounting said member for movement through a distance equal at least to the length of the overlapped portions plus the distance the blade moving walls are spaced apart.

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