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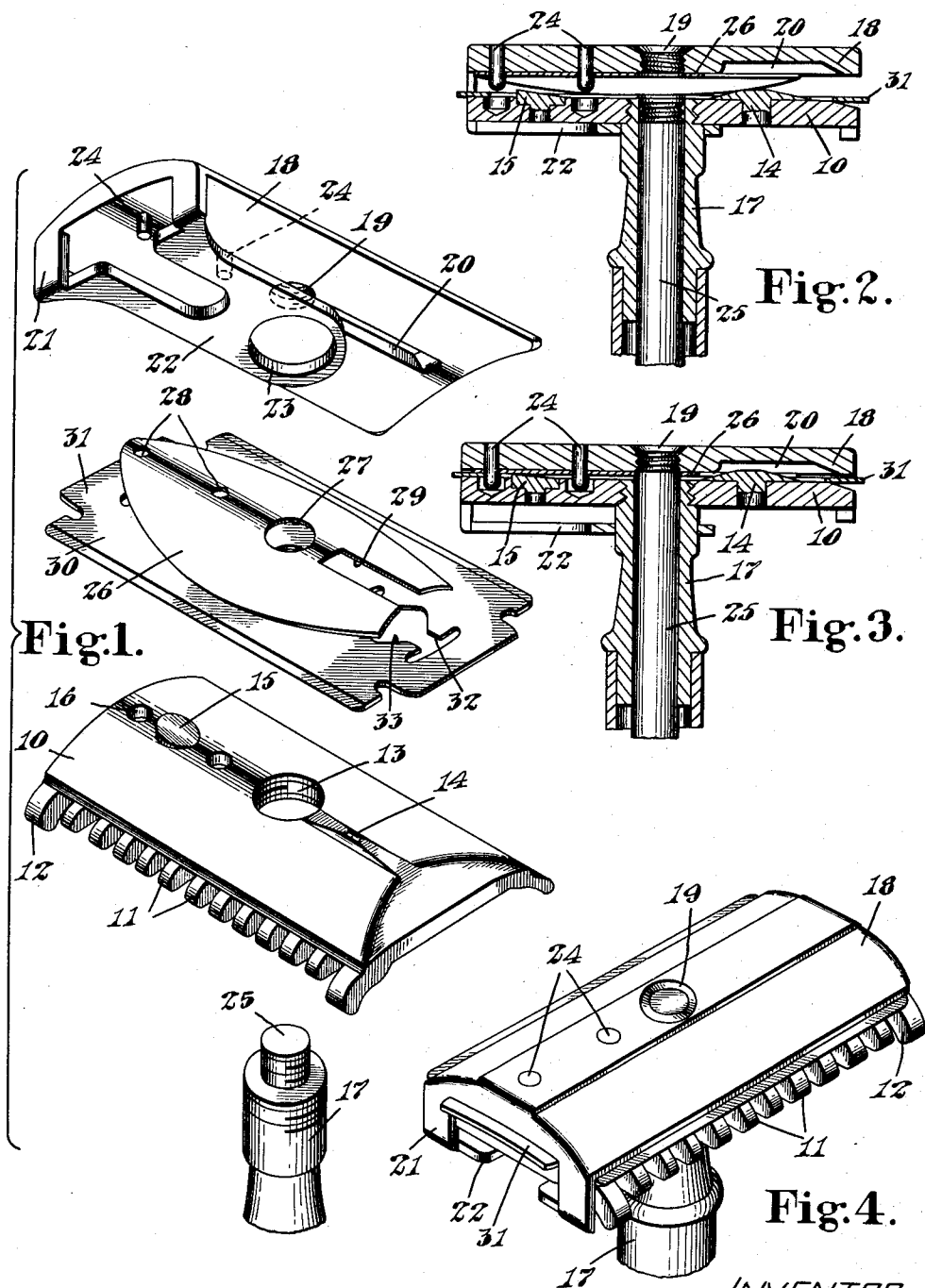
N. TESTI

2,392,432

SAFETY RAZOR AND BLADE MAGAZINE

Filed Nov. 11, 1944

2 Sheets-Sheet 1



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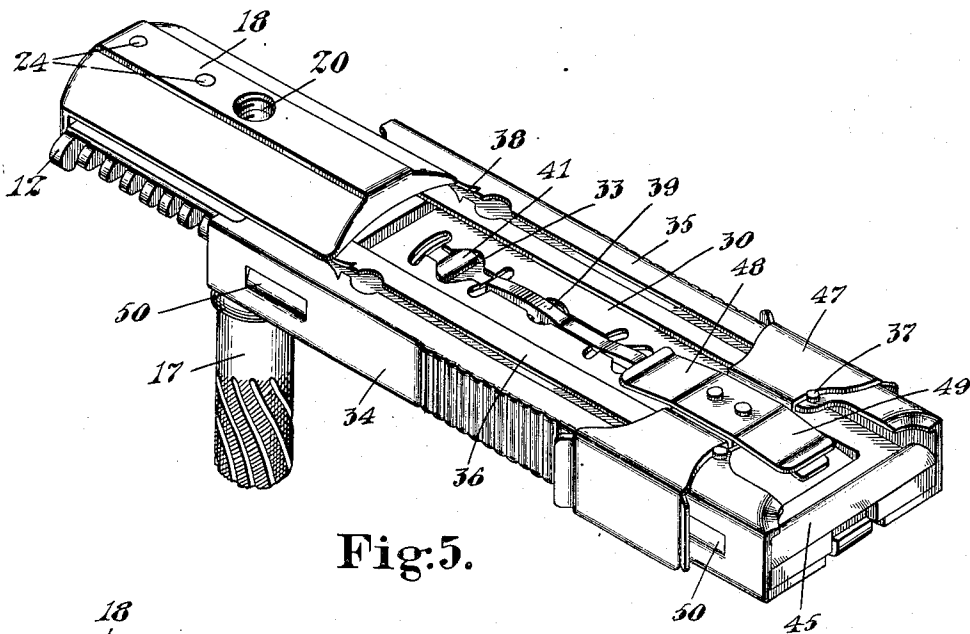


Fig. 5.

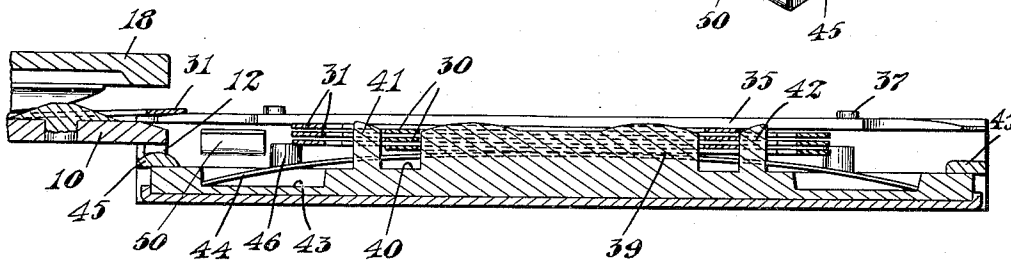


Fig. 6.

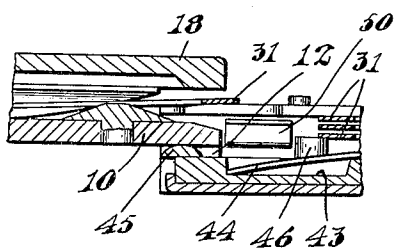


Fig. 7.

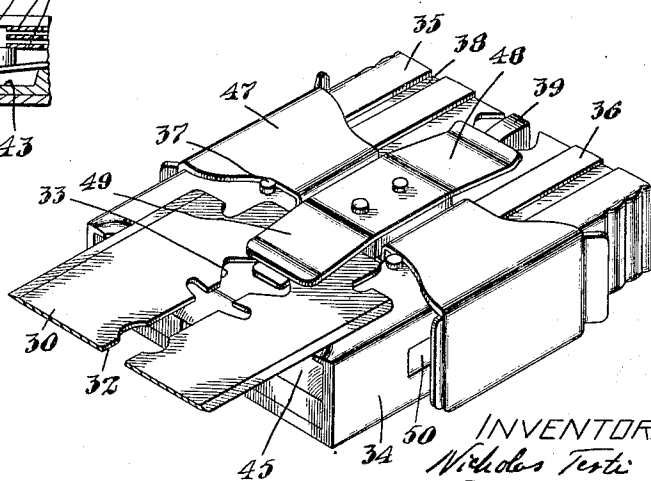


Fig. 8.

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UNITED STATES PATENT OFFICE

2,392,432

SAFETY RAZOR AND BLADE MAGAZINE

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Application November 11, 1944, Serial No. 562,966

12 Claims. (Cl. 30—40)

This invention relates to safety razors of the type in which a thin, flexible replaceable blade is supported on both sides between cooperating blade-clamping members for the shaving operation.

In one aspect, the invention comprises a safety razor so constructed and arranged that a fresh blade may be presented and the used blade withdrawn in a single operation, this operation being effected without the necessity of the user touching the blade and thereby avoiding all danger of cutting himself or of impairing the keenness of the fine shaving edge or edges of the blade.

In handling safety razor blades under commercial conditions of transportation and distribution and in the more or less casual treatment of such blades by the user, the extremely fine keen edge of the blade is likely to become dulled by being brought into contact with its wrapping or with other objects before it can be actually clamped in shaving position in the razor. On this account the best and most skillful efforts of the manufacturer in sharpening blades are often brought to naught because of the damage done to the very fragile and delicate structure of the blade edge after it has been brought to the keenest possible shaving condition and before the shaving operation is actually undertaken.

With these conditions in view, an important object of the present invention is to provide a safety razor to which a fresh sharp blade may be introduced mechanically and accurately into final shaving position in such a manner that its edges are safeguarded from contact with any part of the razor head, while the used blade is, at the same time, displaced to make room for the fresh blade. These steps are carried out in cooperation with a magazine for the blades wherein the latter may be maintained with their edges protected from contact and from which fresh blades may be delivered successively to the safety razor after a preparatory displacement of the used blade to provide passage for the fresh blade.

My invention consists in improvements in the safety razor head itself, improvements in blade magazines, and improvements in safety razor and magazine combinations, whereby the combined steps of the blade delivering and withdrawing operation may be carried out rapidly and conveniently.

With the foregoing ends in view, an important feature of the invention consists in a safety razor head having a blade hold-down device, preferably comprising an elongated spring plate mov-

ably retained therein between the cooperating blade-clamping members and shaped to engage and hold a blade inserted beneath it while leaving the blade free to be moved against yielding pressure to a released position when desired.

Another feature of the invention consists in a blade magazine constructed and arranged to be interlocked or otherwise associated with the razor head for blade delivery, and provided with an inclined or wedging surface effective to lift the used blade in the razor, or cause it to be lifted, and so make way for the fresh blade.

Another feature of the invention consists in a blade magazine equipped with a blade feeding device having engaging or gripping means arranged to seize the used blade in its displaced position and then to withdraw it from the razor simultaneously with the separating movement of the razor and the magazine.

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:

Fig. 1 is an exploded view in perspective showing the several parts of the safety razor head and a blade of the type adapted to be used in the razor;

Figs. 2 and 3 are views of the razor head in longitudinal section respectively showing the blade-clamping members in released and clamping positions;

Fig. 4 is a view in perspective of the razor head corresponding to Fig. 3;

Fig. 5 is a view in perspective showing the razor head and a blade magazine in operative relation;

Fig. 6 is a view in longitudinal section of one end of the razor and the magazine;

Fig. 7 is a fragmentary view of the same; and

Fig. 8 is a view in perspective of one end of the magazine.

For purposes of illustration, a safety razor and magazine have been selected which are designed especially for use with commercial blades of the well-known "Gillette" type. The invention is not by any means limited in its application to that or to any specific type of blade but is capable of many changes in details of construction and may be thereby adapted to safety razors and blades of other types than those herein shown.

The illustrated safety razor includes in its structure a blade-supporting or guard member 10 which is rectangular in outline and provided with a blade-supporting face convex in transverse contour. This member is provided along

each edge with guard elements, specifically a row of guard teeth 11, and in each corner with a projection comprising an end tooth 12 which extends somewhat beyond and below all the intermediate teeth for a purpose which will be presently described. The guard member is provided centrally with a threaded hole 13 for connection with the razor handle. Between this hole and the blade-receiving end of the guard is provided a blade-locating rib 14 having an upper edge surface which slopes downwardly in both directions from a central point in order to facilitate the passage over the rib of the solid end of a blade. Near the other end of the guard member is provided a blade-retaining spur 15. The spur is circular in cross section and slopes upwardly from its forward edge which is flush with the surface of the guard, so that its rear edge provides an abrupt blade-retaining shoulder. Spaced from each side of the spur 15 and located in the longitudinal axis of the guard member are clearance holes 16. The threaded end of the tubular handle 17 is screwed into the threaded hole 13 of the guard member. This connection is ordinarily not disturbed throughout the life of the razor.

Cooperating with the guard member 10 is a cap member 18, similar in outline but of somewhat less width and having a transversely concave blade-engaging face. It is provided centrally with a threaded hole 19 for connection with the clamping spindle of the razor and with a longitudinal slot or groove 20 affording clearance for the rib 14 of the guard member when the cap is brought into blade-clamping position. At its rear end the cap is provided with spaced downwardly-extending arms 21, formed integral with an inwardly extending connecting plate or flange 22 which is spaced from the body of the cap and provided at its inner end with a circular clearance aperture 23 disposed concentrically with respect to the threaded hole 19. A pair of retaining pins 24 project downwardly from the inner face of the cap in position to be received with clearance in the holes 16 of the guard member. A clamping spindle 25 is mounted to slide freely within the tubular handle 17 and is threaded at its upper end for connection with the threaded hole 19 of the cap.

When the cap and guard are assembled, the hole 19 in the cap, the hole 13 in the guard, and the aperture 23 of the connecting plate are brought into concentric alignment, and the end of the tubular handle 17 is passed through the aperture 23 and threaded into the guard 10, thus permanently retaining the cap in position in the razor head while permitting it to move freely toward and from the guard member to clamp or release a blade interposed beneath it.

Located between the inner faces of the cap and guard members is a yielding hold-down or blade-positioning device, herein shown as a dished spring plate 26 having a central aperture 27 through which the clamping spindle 25 may be passed with clearance and two holes 28 disposed in its medial longitudinal axis arranged to receive the pins 24 with clearance and to be permanently located thereby symmetrically within the razor head with provision for free vertical movement. The forward end of the spring plate 26 is forked and provided with a reentrant slot 29 arranged to afford clearance for the rib 14 of the guard member. The spring plate 26 is substantially oval in outline, except that it is cut off on a transverse line at its forward end. It will be

noted that by reason of its oval shape the forward side edges of the spring plate 26 slope upwardly from the blade-supporting face of the guard member 10 and thus facilitate the insertion of a blade beneath the spring plate. The transverse curvature of the spring plate 26 brings its side edges into bearing upon a blade interposed beneath it so that the blade is held yieldingly by the spring plate upon its seat but may be displaced upwardly against the pressure of the plate.

As herein shown and described, the safety razor is adapted for use with a slotted double-edged blade 30, best shown in Figs. 1 and 5. This blade is sharpened at both longitudinal edges and provided in its corners with reentrant notches which define elongated unsharpened portions 31 at each end of the blade. The blade is also provided with a longitudinal medial slot 32 having a central enlargement for the passage of the clamping spindle 25 and intermediate enlargements 33 shaped to fit the blade-locating projections of the different razors with which the blades are adapted for use. The slot 32 may be closed at both ends, as herein shown, or it may be open at one end. The blades may be of sheet steel .004 to .007 inch in thickness and therefore readily given transverse curvature when clamped in position between the cap and guard members of the razor head.

When the clamping spindle 25 is disengaged from the cap 18, it drops down into the inoperative position shown in Fig. 2, leaving the blade-supporting face of the guard 10 partially unobstructed. The spring plate 26 is thereupon immediately effective to separate the cap and guard members, lifting the cap upwardly to the extent permitted by the connecting plate or flange 22. The razor is shown in this condition in Fig. 2 and it will be noted that a blade 30 may now be inserted endwise from the right or blade-receiving end of the razor. In this movement of delivery, the solid end 31 of the blade will ride up and over the rib 14 and then over the spur 15, after which the blade will progress until arrested by contact of the arms 21 of the cap with the shoulders in the advancing end of the blade. When the blade is thus arrested, it will settle itself flatly upon the face of the guard member with the spur 15 fitting in one of the intermediate enlargements 33 of the blade slot and with its central enlargement disposed in alignment with the clamping spindle so that the latter may be pushed upwardly and make threaded engagement with the threaded hole 19 of the cap. The blade-clamping operation is then effected by rotating the clamping spindle 25 and drawing the cap down into clamping engagement with the blade through the medium of the spring plate 26 which is conformed to the concave curvature of the inner face of the cap in this process. This is the condition of the razor as illustrated in Fig. 3.

A preferred magazine will now be described whereby fresh blades may be supplied to a safety razor of the construction above outlined and the used blade removed from the razor as part of the same operation. For purposes of illustration, I have selected a blade magazine of the general type disclosed in my prior patent, No. 2,330,252, in which a stack of blades is maintained in longitudinal staggered relation. The magazine of that patent is herein shown as reconstructed for use as an element of the novel razor and magazine combination of the present invention.

In the illustrated embodiment, the magazine

is shown as having an elongated tubular body 34 rectangular in cross-section and open at both ends. Its top wall is formed by two wide intumed flanges 35 and 36, separated from each other by a central opening in the form of a medial slot. The magazine may be formed from sheet metal or molded of any suitable resinous product. The flanges 35 and 36 are provided on both ends with short upstanding stop pins 37 which act to limit the path of the feed slide as will presently appear. The ends of the flanges project in spaced relation at both ends of the magazine above the razor-receiving openings therein. In each of the flanges 35 and 36 is provided a double headed arrow 38, one end of which is arranged to be obscured by the feed slide so that the other end of the arrow will indicate from which end of the magazine the next blade should be ejected.

An elongated blade-locating bar or rib 39 is secured to the bottom of the magazine in symmetrical position between the flanges 35 and 36. The upper edge of this bar extends slightly into the space between the opposed edges of the flanges. The bar is substantially shorter than the magazine and its ends are spaced equally within the ends of the magazine. At its upper edge it is provided with two deep notches 40 having parallel walls and beveled corners. These notches set off solid end portions or blade stops 41 and 42 in the bar. The length of these stops 41 and 42 between their vertical edges is predetermined to establish the length of the overlap of adjacent blades.

In the bottom of the magazine is provided a well 43 in which is received the end of a bowed and forked leaf spring 44 tending at all times to lift the stack of blades in the magazine, holding the uppermost blade 30 in contact with the top flanges 35 and 36 of the magazine. The stops 41 and 42 are substantially wider than the rib 39, filling the intermediate enlargements 33 of the blade slot and so preventing longitudinal displacement of the blades in the stack. At both ends the magazine is provided with transverse crossbars 45, each having a rounded upper face and serving temporarily to guide and lift the end of the safety razor, or the guard member thereof, when the magazine and razor are brought into operative relation. Stop pins 46 project from the bottom of the magazine in position to gauge the end of the guard 10 when the latter is inserted in the magazine. A feed slide 47 is arranged to slide freely in the magazine between the two sets of stop pins 37. For this purpose, it is provided with side flanges shaped to embrace the outer side walls of the magazine. From an inspection of Fig. 8, it will be noted that the feed slide 47 extends appreciably below the inner faces of the flanges 35 and 36 and is shaped to clear the blade-locating rib 39. It therefore engages the uppermost blade in the stack and will feed it in one direction or the other, depending upon the longitudinal position of the blade in the stack, and at the same time depress the second blade and those beneath it in the stack. Projecting forwardly and rearwardly from the bridge of the feed slide are resilient spring grippers 48 and 49. The open end of these grippers is disposed slightly above the upper face of that blade 30 which is uppermost in the blade stack and at a level above the blade-engaging portion of the feed slide 47. The result is that when the feed slide is moved in either direction the gripping device moves with the feed slide

above the blade being ejected from the magazine.

In bringing the magazine and razor into operative relation, the clamping spindle 25 of the razor is first released permitting the spring 26 to lift the cap member into the position shown in Fig. 2, meanwhile yieldingly holding the used blade in position upon its seat in the razor. The magazine is so designed as to receive telescopically one end of the guard member 10, this telescopic inserting movement being limited by the stop pins 46. As the elongated end teeth 12 of the razor pass inwardly over the crossbar 45 of the magazine, the magazine is depressed or the razor is lifted and guided so that the solid end 31 of the used blade in the razor is caught above the projecting ends of the flanges 35 and 36 of the magazine which are somewhat beveled to facilitate this operation. The blade is thus lifted or pried off its seat as suggested in Fig. 6. When the teeth 12 have passed beyond the crossbar 45, the magazine is lifted, or the guard member of the razor is lowered in the magazine, to the position shown in Fig. 7 and the used blade is lifted still further from its seat.

The magazine is provided at both ends in its side walls with inwardly deflected spring lips 50 which overlie the teeth 12 of the guard members after these have passed inwardly over the cross bar 45 and hold the guard member down against the bottom of the magazine.

The feed slide 47 is now advanced and the uppermost blade in the stack is fed forwardly beneath the flanges 35 and 36 of the magazine and so inserted in the razor beneath the used blade which has already been lifted from its seat by the flanges of the magazine. As the feed slide is further advanced, the fresh blade passes forwardly under the used blade lifting it against the pressure of the spring hold-down plate 26 and finally freeing it from the spur 15. By the time the feed slide has completed its forward movement the fresh blade is fully located in shaving position, registering with the rib 14 in the razor, and the used blade occupies a superposed position above it. As the feed slide 46 approaches the end of its movement, the forked gripping device 48 engages the end of the used blade which is now held in place only yieldingly by the spring plate 26. Now when the magazine and razor are separated the used blade is drawn out of the razor as suggested in Fig. 8 and held by the gripping device of the feed slide in a position where it may be conveniently grasped and disposed of by the user.

When it again becomes necessary to replace the blade in the razor the magazine must be reversed, end for end, this being indicated by the exposed end of the arrow 38. The telescopic relation of the razor guard with the opposite end of the magazine is, accordingly, established and the operation may proceed as already described.

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

1. A safety razor, having in combination, a blade-supporting member provided with an upstanding blade-locating rib and a blade-retaining spur, a cooperating blade-clamping cap, and an interposed spring member apertured to clear the said rib and shaped to engage an apertured blade adjacent to its longitudinal edges, thereby permitting the blade to be yieldingly lifted and released from the said retaining spur.

2. A safety razor, having in combination, blade-clamping members having cooperating blade-flexing faces, an interposed apertured spring plate curved transversely and tapered so that its side edges slope away from one of said blade-flexing faces and thus facilitate the introduction of a blade endwise beneath the said plate, and a threaded spindle passing through said plate and engaged with one of said blade-clamping members.

3. A safety razor, having in combination, a blade-supporting member having a convex face, a blade-locating rib and a retaining spur projecting therefrom, a cap member having a concave face provided with a clearance slot therein for said rib, and a yieldable hold-down device comprising a transversely curved spring plate having spaced edges arranged to bear on both sides of an interposed blade out of line with said rib.

4. A safety razor, having in combination, a blade-supporting member having a convex face equipped with a retaining spur, a cap member having a complementary concave face, a resilient hold-down yieldingly maintaining a blade engaged with said retaining spur, guard elements disposed along the edges of said blade-supporting member, and projections extending beyond said guard elements at each corner of the blade-supporting member.

5. A magazine and razor combination wherein the razor has a blade seat and a projecting spur, and the magazine has a tubular enclosure with an open razor-receiving end, means for guiding a fresh blade into the razor in a path to lift a used blade from engagement with said spur, and a blade gripping device movable on the magazine to engage the used blade after it has been so lifted.

6. A magazine and razor combination in which the razor has a blade seat with a projecting blade-positioning rib, and the magazine is engageable with the razor and provided with a projection shaped to lift a used blade from the seat of the razor, and a blade-feeding device movable after the razor has been engaged by the magazine to advance a slotted blade from the magazine into registration with the rib of the razor.

7. A magazine and razor combination in which the razor has a blade seat, and the magazine is open-ended to receive the razor, and provided with spaced projections at one end shaped to lift a used blade from the seat of the razor, guiding means in the magazine for registering the blade-seat of the razor with said projections and then permitting the blade seat to recede below the projections, and a feed slide movable in the magazine to advance a blade outwardly beneath said projections.

8. A magazine and razor combination in which the razor has a guard member with a blade seat and corner projections, and the magazine is open-ended to receive said guard member, and provided with a fixed blade lifting projection and a

guide surface cooperating with the corner projections of the guard member, whereby the blade seat of the guard member is caused to move first toward and then from said projection as the guard member is being entered in the magazine.

9. A magazine and razor combination comprising a razor having a blade seat with a projecting rib and a fixed retaining spur; and a magazine having an open end with upper and lower members for determining the level of the blade seat in the magazine when the razor is entered in the open end thereof, and a feed slide movable in the magazine to advance a slotted blade upon the blade seat and into registration with the rib thereon.

10. A magazine and razor combination comprising a razor having a blade-supporting member providing a blade-seat, and a magazine having an open end shaped to receive one end of said member, means for holding a stack of blades within the body of the magazine, a stop in the magazine for arresting the end of the blade-supporting member of the razor in spaced relation from the end of the blade stack, a blade lifting device in the magazine projecting outwardly beyond the said stop and acting to lift a blade from the blade-seat, and a blade feeder movable in the magazine to advance a blade from the stack to the blade seat and beneath the lifted blade.

11. A razor and magazine combination comprising a razor having cap and guard members connected at one end and providing a blade-receiving passage at the other and being relatively movable to clamp a blade between them, and a blade-retaining spur projecting from the lower of said members near one end of the razor, in combination with a magazine having a device for lifting one end of a used blade in the razor, when the magazine and razor are brought into operative relation, and a feed slide for advancing a fresh blade from the magazine in a path beneath the lifted used blade in the razor and for causing the advancing blade to lift the other end of the used blade out of engagement with the said retaining spur.

12. A razor and magazine combination comprising a razor having cap and guard members connected at one end and providing a blade-receiving passage at the other, a blade-retaining spur projecting from the guard member near that end thereof which is connected to the cap, a flexible apertured blade engaged by said spur, and a spring holding said blade in place upon the spur, in combination with a magazine having a projection for lifting the outer end of said blade without disturbing its inner spring-held end when the magazine and razor are brought into operative relation, and a feed slide for advancing a fresh blade from the magazine in a path beneath the lifted end of the blade in the razor and for causing the advancing blade subsequently to lift the inner, spring-held end of the used blade from engagement with said stud.

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