SAFETY-RAZOR HANDLE HAVING QUICK OPENING AND CLOSING MEANS WITH CLEANING POSITIONING MEANS

FIG. 1.

FIG. 2.

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FIG. 6.
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This invention relates generally to safety razors, and is especially concerned with safety razors of the general type disclosed in my co-pending patent application Serial No. 472,637, filed December 2, 1954 which has matured into Patent No. 2,835,030 granted May 20, 1958. The instant application is a continuation-in-part of said co-pending patent application.

It is one object of the present invention to provide a highly improved safety razor of the type hereinbelow wherein the razor head may be more quickly and easily operated, being movable to the desired conditions of open, closed, by a single hand of the operator, and employing only a modicum of force. Moreover, the razor of the instant invention may have its head operated, as mentioned above, without employing the thumb or relatively stronger fingers of the hand, but by the use of a single, lighter operator's hand, so that the position of the operator's hand on the handle need not be changed from that normal in actual shaving in order to open or close the razor head.

It is another object of the present invention to provide a safety razor construction having the advantageous characteristics mentioned in the preceding paragraph, wherein the above mentioned extremely simple operation is sure and positive, so that the device is entirely foolproof and reliable in use.

It is another object to provide a razor which is advantageous over prior quick-opening razors in that it can be fully opened and closed with one hand and in a single motion with very little force. In addition, the instant razor automatically locks positively and safely for maximum safety and reliability in the shaving operation.

It is still another object of the present invention to provide a razor of the type described affording a choice of types of operation, for example, automatically closing, automatically staying open, etc.

It is a further object of the invention to provide a razor construction adapted to accommodate blades of different thickness and selectively vary the exposure thereof all without the necessity of precision manufacture and close tolerances between the blade clamping components and locking construction. Further, the structure for accommodating different blade thicknesses operates without affecting the operation of the locking structure.

A further object of the invention resides in the provision of structure enabling the blade to be more easily inserted and ejected as by a single hand opening action. For added safety, blade insertion and removal may be accomplished without touching the blade by the use of conventional dispensers, and a further feature of the invention, wherein blade ejection is easily accomplished when the razor is held inverted while snapping open the head section.

It is another object of the present invention to provide novel means in a safety razor affording adjustment for the closeness of shave desired by the individual user, and also including unique construction for varying the head operating characteristics to satisfy the individual user's preference.

It is another object of the present invention to provide a safety razor wherein the head may be instantly opened to a predetermined intermediate or rinse condition wherein the razor blade is loosely clamped for rinsing and drying.

Still another object of the present invention resides in the provision of a safety razor construction of the type described which is rugged and durable, being trouble-free in use over a long useful life, and is so designed that it readily can be disassembled for any purpose, and which can be manufactured and sold at a reasonable price.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, which will be exemplified in the construction hereinafter described, and of which the scope will be indicated by the appended claims.

In the drawings:

FIGURE 1 is a longitudinal sectional view showing a safety razor constructed in accordance with the present invention in its closed, operative condition of use;

FIGURE 2 is a longitudinal sectional view similar to FIG. 1, but showing the safety razor in an open condition;

FIGURE 3 is a partial longitudinal sectional view similar to FIG. 2, but showing a slightly modified embodiment thereof;

FIGURE 4 is a perspective view showing a user's hand in position to operate a razor of the present invention;

FIGURE 5 is a view similar to FIG. 1, but showing a slightly different embodiment of the instant invention, illustrating the razor in its closed condition in solid lines, and showing certain parts in phantom in their open condition; and

FIGURE 6 is a partial longitudinal sectional view showing still further modification of the present invention.

Referring now more particularly to the drawings, and specifically to FIGS. 1 and 2 thereof, the razor illustrated therein includes a handle, generally designated 20, a head, generally designated 21 located at one end of the handle, and an actuating member or knob, generally designated 22 located at the opposite handle end. As will appear hereinafter in greater detail, the knob or push button 22 is manually actuable to effect movement of the head 21 between its closed condition of FIG. 1 to firmly retain a razor blade, and the open condition of FIG. 2, affording access for the removal and replacement of the blade. In passing between the open and closed conditions the head passes through an intermediate or rinse position, in which the blade is loosely retained within the head permitting the rinsing or washing away of soap and the like from the blade without its removal from the head.

The handle 20 is of an elongate, hollow or tubular construction, preferably fabricated of a pair of tubular sections 24 and 25 arranged in end to end aligned relation. The handle section 24 is formed with an axial through passageway 26 having an enlarged upper end portion 27 adjacent to the head 21 and defining an internal annular handle shoulder 28 facing outward toward the head. The other or lower end region of the passageway
26 of handle section 24 is enlarged, as at 29, which enlarged portion is formed at its inner region with internal screw threads 30. Handle section 25 remote from the head 21 may have an external diameter slightly larger than that of the handle section 24, and is provided at its upper or inner end with a reduced extension 33 extending upward into the end portion 29 of passageway 26. The reduced extension portion 33 of the handle section 25 is provided with external screw threads 34 for threaded engagement with the internal screw threads 30, and may be diametrically slotted, as at 35, if desired. The reduced extending portion 33 defines externally on the handle section 25 an annular shoulder 36 engageable with the adjacent end edge 37 of handle section 24 to limit movement of the extending portion 33 into the handle section 24. By this construction, the handle sections 24 and 25 are connected together in longitudinal alignment with each other and adjustable for relative longitudinal positioning by relative rotation thereof.

The handle section 25 is formed internally with an axial through passageway or bore 38 opening into and in alignment with the passageway 26 of handle section 24. Interiorly of the passageway 38, the handle section 25 is formed with a plurality of longitudinally spaced internal recesses or annular grooves 40, 41 and 42, the groove 40 being closest to the outer end 43 of the handle section 25, the groove 42 being located furthest from the handle section end 43, and the groove 41 being located in the region intermediate the grooves 40 and 42. It will now be understood that longitudinal adjustment of the handle sections 24 and 25 relative to each other effects selective positioning of the grooves 40, 41 and 42 toward and away from the head 21. The passageway 38 of handle section 25 may be of substantially cylindrical internal contour, except for the grooves 40, 41 and 42; and, each of the grooves is preferably configured in its cross-section, as seen in FIGURES 1 and 2, with the side walls disposed oblique to each other or convergent in the laterally outward direction. Thus, the side walls 44 and 45 of groove 40, being spaced vertically in the illustrated position, converge toward each other in the radially or laterally outward direction, terminating at the groove bottom wall. Viewed otherwise, the side walls 44 and 45 of groove 40 may be considered as internal shoulders on the handle section 25 facing generally toward each other and slanted outward with respect to the groove, diverging from each other in the radially inward direction with respect to the handle section 25. Similarly, the intermediate groove 41 has its side walls 46 and 47 configured to taper or converge in the radially or laterally outward direction and thus defines internal shoulders generally facing toward each other and obliquely radially inward of the handle. The side walls 49 and 48 of the innermost groove 42 are also disposed at an angle with respect to each other to define internal shoulders facing generally toward each other and obliquely radially inward of the handle.

The head 21 includes a generally rectangular guard member 50 disposed substantially normal to the axis of handle 20 and having its longitudinal side edges turned or bent downward, as at 51. The guard 50 is provided centrally thereof with an extension or portion 52 disposed generally normal to the plane of the guard and force-fit into the upper portion 27 of the handle passageway 26. The guard extension 53 may be of an open ended cylindrical shape or may be press-fit its full length into the upwardly opening passageway portions 27, with the guard properly abutting against the upper, outer end 53 of the handle section 24. The lower or inner end 54 of the guard portion 52 is spaced from the internal shoulder 28 of the passageway 26. A generally rectangular blade support 56 is nested between the groove 50, being of width less than the guard, so as to terminate at its side edges 57 laterally inward of the guard. An extension 58 is formed on the blade support 56, disposed generally normal to the latter, and extending downward into the handle 20 slidably through and inward beyond the inner end 54 of the guard extension 53. The blade support extension 58 may be of an open ended tubular, or hollow cylindrical configuration, and is provided on its lower or inner end with an outwardly flange or shoulder 59 disposed beneath or inward of the edge 54 and spaced from the handle shoulder 28. It is to be noted that the flange 59 is adjacent to but spaced from the fixed extended portion 53, so as to terminate at its side edges 57 laterally inward of the handle. At opposite ends of the bar 61 are provided cross pieces or arms 62; and, a pair of cap sections 63 are arranged on opposite sides of the bar 61 each having its opposite ends pivotally connected to the outer ends of the cross bars 62, as at 64. The cross arms 62 and cap sections 63 are the connected to the arm 61 for movement therewith longitudinally of the handle 20, and the cap sections are provided adjacent to their pivotal connections with tongues or cams 65 engageable with the guard 50 to effect the desired rotation of the cap sections about the pivot upon movement of the arms 61. As clearly illustrated, in FIGS. 1 and 2, the cap sections 63 are swingable between their position overlying the blade support 56, for clamping a blade between the cap sections and blade support, and their open position of FIG. 2 spaced outward beyond the blade support and exposing the latter to conveyence of the handle section 25.

Arranged longitudinally within the handle 20, longitudinally slideable therein, is an elongate operating member, rod or spindle 66. The rod 66 has one end extending slidably through the blade support extension 58, and outward therefrom, there being fixedly secured to the bar 61, as by screws or other suitable means. Intermediate its ends, the operating rod 65 is provided with an annular enlargement shoulder or collar 69 loosely received in the passageway 38 of handle section 25. The lower portion 70 of rod 66, in the lower handle section 25, is formed with a bore or hole 71 extending upward from the lower rod end and terminating adjacent to the collar 69. Extending transversely through the lower rod portion 70, intermediate the ends of and intersecting with the rod passageway 71, is a through passageway, or opening 72. Adjacent to and spaced below the opening 72, the rod is provided with the passageway 71 with an internal, downwardly facing shoulder 73, and adjacent to and spaced below the latter shoulder, there is provided in the passageway 71 an internal, upwardly facing shoulder 74. The lower end edge 75 of the rod 68 terminates short of the lower handle end 43, interiorly of the handle section 25. Loosely circumcised about the rod 68 interiorly of the passageway portion 27 and seated on the shoulder 28 is an annular member or collar 77. A relatively stiff coil spring 78 is circumcised about the rod 68 in the passageway portion 27, interposed between and having its opposite ends in bearing engagement with the collar 77 and inner end of the flange 59.

It will be noted that the hollow portion 70 of rod 68 as defined by the bore 71 and its cross passageway 72 is located in the region adjacent to the internal grooves 40, 41 and 42 of the handle section 25. In the transverse passageway 72, as seen in FIG. 1, are arranged a series of detent elements, which may be three in number and have the configuration of spheres or balls, as at 80 and 82, fixedly disposed as detent elements, as will appear more fully hereinafter, the balls 80 and 82 being located in laterally spaced relation and projecting outward radially beyond the operating mem-
member 68 into the groove 40, while the ball 81 is located generally axially of the operating member and directly interposed between the outwardly projecting balls. In the bore 71 of rod 68, inward of the passageway 72, there is provided a biasing member 84, slidable longitudinally of the bore, and a spring or other suitable resilient means 85 interposed between the cup and the end wall of the bore to resiliently urge the cup against the intermediate ball 81 toward the transverse passageway 72. The spring 85 may be relatively flexible, having a relatively low spring constant. Another spring is interposed around the operating rod 68 at 86, being in compression and having its opposite ends bearing against the collar 77 and shoulder 69 to resiliently urge the rod downward or away from the head 21. The spring 86 is preferably of lighter weight or lower spring constant than the spring 78.

The actuating member 22 includes a shaft or rod 88 slidably received in the lower, outer end portion of the handle section 25, and in the adjacent end portion of the bore 71 of rod 68. The rod 88 is thus in axial alignment with the handle 20 and rod 68, and is provided on its inner end with a tapering blunted portion or point 89. An annular shoulder or collar 90 is integrally provided on the rod 88 in the space between shoulders 73 and 74 of bore 71, and is abuttingly engageable with said shoulder 74 to limit sliding movement of the actuating member rod relative to the operating rod 68. In the outermost position of sliding movement of the actuating member rod relative to the operating rod, the pointed end enters into the transverse passageway, see FIG. 2. A knurled knob, or button 91 is provided with a threaded shank 92 extending in threaded engagement into the outer end of rod 88. The latter rod may be provided with wrench receiving recesses 93 to facilitate rotation of the rod relative to the knob 91 and its shank 92 for adjusting the relative longitudinal positions thereof.

In the closed operating condition of FIG. 1, with a razor blade 95 clamped between the blade support member 56 and cap sections 63, the actuating member 22 has its lowest or outermost position of FIG. 1. That is, the actuating member has been shifted outward, and its collar 90 bearing against the internal shoulder 74 of operating rod 68 has served to draw the operating rod downward away from the handle 21, as will be more fully explained hereinafter. This effects firm clamping action of the cap sections 63 against the blade 95, which may cause the blade support 56 to move slightly inward against the spring 78, to separate the flange 59 from the edge 54.

Also, when the actuating member 22 and operating rod 68 have been shifted downwards sufficiently to place the passageway 72 contiguous to the groove 40, the outer balls or detent elements 80 and 82 are free to move laterally outward into the groove, under the resilient biasing action of the cap 84 against the intermediate ball or detent element 81 which moves into the space between the outer balls. The closed condition is retained against the resilient forces of the flexed blade 95 and spring 78 by abutting or locking engagement of the outer balls 80 and 82 against the shoulder 45. That is, the outer balls tend to move inward, due to the inclination of the shoulder 45, but this tendency is resisted by abutting engagement with the intermediate ball 81 maintained in position by spring biased cup 84, so that the razor is effectively locked in its closed condition.

Upon very slight inward pressure on the actuating member 22, only enough to overcome the force of resilient means 84, 85, the point 89 will slightly shift the intermediate ball 81 longitudinally upward beyond its center-to-center alignment with the outer balls 80 and 82, thereby enabling the outer balls to move somewhat, toward each other along the shoulders 45 into the passageway 72. The operating rod 68 may then move upward a slight distance under the resilient forces of the blade 95 and spring 78, and further upward pressure may be easily accomplished upon engagement of rod 88 with adjacent end 75 of the operating rod, at which point the further upward pressure on the rod 68 is somewhat resisted by the partial blocking action of the intermediate ball 81, still only slightly out of its peak locking alignment in relation to the outer balls, as they tend to move inward along inclined shoulder 45. This condition is maintained in the snapping action, effected, as the slightly more pressure applied to rod 68 at shoulder 75, has suddenly overcome the resisting and partial blocking action of the spring biased intermediate ball, allowing the outer balls to move inward, thus fully releasing the rod 68 to quickly move upward, passing or bypassing the intermediate groove 41, and moving into the position shown at FIG. 2, wherein the head is in open position and the passageway 72 is contiguous to the groove 42.

In this condition, the outer balls 80 and 82 may move laterally outward and partially into the groove 42 as seen in FIG. 2, the intermediate ball 81 being held by the resilient means 84 and 85 into its partially holding or blocking condition interposed, somewhat between the outer balls. If the operator's hand is removed from the razor in the condition of FIG. 2, the force of spring 86 will effect downward extension by a downward snapping action of the rod 68, as the outer balls 80 and 82 are not sufficiently projected into the groove 42, nor is the intermediate ball 81 sufficiently received between the outer balls, to fully resist inward movement of the outer balls into the operating rod 68. To further explain the closing and locking operation: In the position of FIG. 2, the intermediate ball effects very little pressure of the outer balls toward the outwardly direction because of the relative position of the balls to each other; therefore relatively very little resistance is offered to the moving spring 86 as it urges the rod and balls quickly downward, passing or by-passing the intermediate groove 41, and moving to the position where the outer balls begin to enter the groove 40. It now becomes obvious, that as the outer balls move further into a groove 40, the intermediate ball is urged by the spring 82 and cup 84 to move between the outer balls, similar to a wedging action, and in turn forcing the outer balls outward and downward along the inclined surfaces 45, included with the groove 41, resolutely causing blade clamping pressure at the head many times multiplying the longitudinally axial pressure of spring 85 and also causing deflection of spring 78. It may be noted that because of the strong locking action, the spring 86 need be only strong enough to carry the locking devise to the locking position, as no clamping aid is required from the spring 86 and further, indicating why so little resistance is offered to the razor opening procedure.

Although it is not shown in the drawings, the operating rod 68 may be placed, when desired, in an intermediate position with the passageway 72 adjacent the groove 41, and the balls fully seated in the latter groove to retain the operating rod in this intermediate position. This condition is easily understood as being one wherein the blade 95 is not tightly clamped, but loosely retained beneath the closed cap sections 63, so that the head may be held under a stream of water to rinse or wash the head and blade, and also to facilitate rapid evaporation of any retained water.

If desired, the razor may be adjusted to hold itself in open position, prior to shaving, by slightly unscrewing the shank 92 of knob 91 with respect to the rod 88, thereby enabling the operating member 68 to extend further into the handle 20 with the knob 22 in its stopping position.
or abutting engagement with the handle end 43. Stated otherwise, this adjustment of the actuating member will position the passageway 73 in sufficiently contiguous relation with the inner groove 42, in the extreme inward position of the actuating member, to permit outward movement of the balls 80 and 82, and movement of the ball 81 into its partially blocking or holding position between the outer balls to retain the operating member in fully open position. The razor can then be released to its closed position by a mere slight outward pull of the actuating knob 22 sufficient to force the outer balls into the operating member and to permit extension of the operating rod 68 by the spring 86. Of course, the device may be placed in rime or intermediate position in any condition of adjustment.

Additional slight unscrewing of the actuating member 22 will enable the operating member to be projected further inward to shift the outer balls slightly radially inward of the operating member, whereupon sudden release of the actuating member permits automatic snapping to fully closed condition.

In other words, additional slight unscrewing of the actuating member 22 will allow a slighter upward push, whereupon sudden release will cause the outer balls to pass or bypass the upper groove, as well as the intermediate groove, as the operating rod moves quickly downward.

Again this can be accomplished with the weaker finger of one hand.

To explain further, in the condition of FIG. 1, and with the actuating member in the further unscrewed position, the rod 68 may be raised to the point where the razor will remain open after the finger is removed from knob 91. Either a push upward and sudden release, or a slight downward pull will effect a closed condition.

Rotation of the handle section 25, will move the entire locking device rod and cap clamping section upward or downward as desired, in relation to the handle section 24 and the fixed guard member 50. This changes the distance between the clamped blade edge and the turned down portion of guard 51, thereby exposing the blade edge more or less as desired, as the blade support 56 moves with the blade urged by resilient means 78. To explain more fully by observation of FIG. 1, it may be appreciated that the closeness of shave obtained by the razor of the present invention is dependent upon the distance between the blade edges and the adjacent portions of the guard 50. This distance and consequently the blade exposure may be varied, and the closeness of the resultant shave selectively obtained, by relative rotation of the handle sections 24 and 25 at their threaded connections 30, 34. For example, if it is desired to move the blade edges closer to the guard 50, the handle section 25 is rotated relative to the handle section 24 to extend further from the latter handle section, or to withdraw the portion 33 partially from the handle section 24. This draws the bar 61 closer to the guard 50, and, of course, draws the blade 95 closer to the guard, the blade support 56 also being drawn closer to the guard and effecting increased compression of the spring 78. Rotation of the handle section 25 in the opposite direction will, of course, have the opposite effect of moving the blade 95 further away from the guard 50, the limiting position being obtained when the edge or shoulder 36 of handle section 25 abuts against the adjacent end edge of handle section 24, which occurs approximately simultaneously with abutment of flange 59 of the blade support against end edge 54 of the guard.

The moving blade support performs additional functions, namely, to accommodate blades of varying thicknesses, while allowing the balls, in the locking device, to be in peak or most efficient locking alignment, and further, eliminating the necessity for close manufacturing tolerances between the clamped blade and the locking device.

It may be noted that adjustment of handle section 25 and knob 22 in no way counteract or clash, and settings of both will remain constant.

In FIG. 3 is shown a slight modification of the device of FIGS. 1 and 2 wherein an annular washer or spacer 97 is interposed between the inner side of knob 22 and the adjacent end of rod 88. By this construction the above described adjustments may be obtained with the use of spacers of the necessary thickness, for permanency of adjustment.

In FIG. 5 is shown a slightly modified embodiment of razor according to the present invention, wherein the handle 26a is substantially the same as the handle 20 and is provided in the enlarged upper passageway portion 27 with an annular, internal shoulder 100 adjacent to and spaced below or inward of the upper handle end 53. Also, the internal dimension of the medial portion of passageway 26a is reduced to a size less than that of the adjacent portion of passageway 28, thereby defining at the inner end of passageway portion 29 an internal shoulder 101, for a purpose appearing presently.

The head 21a of the embodiment of FIG. 5 is the same as the head 21 of FIGS. 1 and 2, except that the blade support and guard are formed as a single element having an inner blade-supporting portion 102, and an outer guard portion 103. A single, tubular extension 104, disposed generally normal to and centrally of the blade support-guard 102, 103, extends slidably downward into the upper end portion 27 of the handle passageway 26a. A groove or recess 105 is formed in the extension portion 104 receiving the internal shoulder 100; and, the lower or upward facing side wall or shoulder 106 of the recess 105 is engageable with the shoulder 101 to limit upward, outward shifting movement of the support-guard 102, 103.

As the passageway 26a is smaller than the adjacent portion of passageway 28, thereby defining the internal downwardly facing shoulder 101, the enlargement or collar 69 carried by the operating member or rod 68 has its upper end engageable with the shoulder 101 to limit or stop upward shifting movement of the operating member relative to the handle 26a. As seen in dot-and-dash outline in FIG. 5, in the upward limiting position of operating rod 68, the knob 91 of actuating member 22 is spaced from the lower end 43 of the handle.

In operation, the device of FIG. 5 is much the same as that of FIGS. 1 and 2, the actuating member being shiftable to selectively position the detent elements 80 and 81 in the grooves 40, 41, 42 to place the head 21a respectively in its closed, rime and open conditions. However, in the open condition, the collar or shoulder 69 will be in abutting engagement with the shoulder 101, and the knob 91 spaced from the adjacent end of the handle 26a, which space facilitates gripping of the knob by the user to withdraw the operating rod.

In the closed condition of FIG. 5, it will be observed that the shoulder 106 defined by groove 105 is spaced below the retaining shoulder 100, resulting from the resilient yield of tubular extension 104 through spring 78 for the purposes of accommodation of varying blade thicknesses and for elimination of extreme close manufacturing tolerances between the clamped blade and the locking devices.

The handle section 25, affords longitudinal adjustment relative to handle section 20, in that it changes the position of the grooves 42, 41, and 40 toward and away from the shoulder 101.

In the open condition of FIG. 5, with the shoulder of collar 69 limiting the further upward movement of rod 68, it is readily apparent that the same choices of operation may be afforded by rotating the handle section 25 of FIG. 5, as by the rotation of knob 91 of FIG. 1, namely, automatic closing, staying open, push and sudden release to close. At variance with FIG. 5 however, is the elimination of adjustment for closeness of shave.
In FIG. 6 is shown another modification similar to the embodiments of FIG. 1, but more simplified, wherein the adjustment for closeness of shave again has been eliminated, also the adjustment for choice of operation has been eliminated, the condition of operation intended thus be predetermned at the time manufactured; and in effect dominated by the limiting of upward movement of rod 68b, by the abutment of upper shoulder of knob 110 and the handle end 43b. The handle 22b of FIG. 6 may be a single integral unit having an axial through bore or passageway 26b. The operating member or rod 68b is slidably in the passageway 26b and extends beyond the lower end 43b of the handle, where it is provided with an annular external enlargement or knob 110. The bore or passageway 71b of the actuating rod 68b extends axially inward thereof through the lower end or knob 11b and terminates at a location inward of the grooves 46-42. A pair of diametrically opposed, longitudinally extending through slots 111 are formed in the operating rod 68b opening from the interior of the passageway 71b to the exterior of the operating rod, and located inward of the innermost groove 42.

A plunger or pin 112 is slidable in the bore or passageway 71b of the operating rod 68b in the inner region thereof, between the inner end of the passageway and the cross or transverse passageway 72b. A cross-piece or transverse pin 113 is carried by the slidable plunger 112 and projects from the latter laterally outward in opposite directions through the slots 111. As is obvious from FIG. 6, the plunger 112 is slidable longitudinally within the operating rod 68b to extend its lower end into the transverse passageway 72b to a position limited by movement of an actuating member 22b, the upper end of which is in contact with ball 81b which ball in turn is in contact with plunger 112. The plunger is slidable in the opposite direction to permit reception of the intermediate ball or detent element 81b at least partially into the adjacent portion of bore 71b.

Actuating member 22b is slidably received in the outer or lower end portion of the operating rod passageway 71b and has its outer end provided with a button 91b projecting slidably through and outward beyond the knob 110. The inner end of the actuating member 22b may be the same as that of the actuating member 22 of FIG. 1 wherein the shoulder of the annular collar abuts with the head or shoulder at passageway 71b, to limit the downward or outer movement. A coil compression spring 86b is circumposed about the operating rod 68b having its opposite ends in respective bearing engagement with the collar 77 and the crosspiece 113. Thus, the resilient member or spring 86b operates through the slide or plunger 112, detent element 81b, and actuating member 22b to yieldingly urge the operating rod longitudinally downward and outward. The spring 78 yields similarly to that of FIG. 5 as explained hereinbefore. In the embodiments of FIGS. 1-5, the spring 86 urges the operating member downward and outward, and the spring 83 serves to urge the intermediate ball 81 downward and outward. However, in the embodiment of FIG. 6, the single spring 86b serves both of these functions. Operation of the device of FIG. 6 is substantially the same as that of FIGS. 1-5.

From the foregoing, it is seen that the present invention provides a safety-razor construction which fully accomplishes its intended objects, and is well adapted to meet practical conditions of manufacture and use.

Although the present invention has been described in somewhat detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and scope of the appended claims.

What is claimed is:

1. In a safety razor, a hollow elongate handle having a plurality of longitudinally spaced internal grooves, an elongate operating rod longitudinally shiftable in said handle, a head connected to one end of said handle and the adjacent end of said rod for movement between open and closed conditions upon shifting movement of said rod, detent means biased laterally outward for engagement in a selected one of said grooves to retain said rod in a selected position of its shifting movement corresponding to the desired operating condition of said head, and an actuating member carried by said rod adjacent to the other end of said handle and operatively connected to said detent means for manually retracting the latter inward against the resilient biasing force thereof to effect said shifting of said rod, said detent means comprising a pair of outer detent elements carried by said rod for movement between a laterally spaced holding position projecting beyond opposite sides of said rod and a relatively contiguous releasing position substantially retracted into said rod, an intermediate detent element carried by said rod for movement between a holding position interposed between said laterally spaced element and a releasing position shifted longitudinally within said rod substantially out of said interposed position, and resilient means of engaging said intermediate detent element toward its interposed position, said actuating member being engageable with said intermediate detent element to shift the latter to its releasing position against the force of said resilient means.

2. A safety razor according to claim 1, said actuating member comprising an elongate element longitudinally shiftable in the other end of said rod and projecting outward therefrom, said elongate element having its inner end engageable with said intermediate detent element to effect longitudinally shifting movement thereof.

3. A safety razor according to claim 1, said resilient means being operatively connected through said intermediate detent element and said actuating member to said rod to resiliently bias the latter away from said one handle end.

4. In a safety razor, a hollow elongate handle having a plurality of longitudinally spaced internal grooves, an elongate operating rod longitudinally shiftable in said handle, a head connected to one end of said handle and the adjacent end of said rod for movement between open and closed conditions upon shifting movement of said rod, detent means biased laterally outward for engagement in a selected one of said grooves to retain said rod in a selected position of its shifting movement corresponding to the desired operating condition of said head, and an actuating member carried by said rod adjacent to the other end of said handle and operatively connected to said detent means for manually retracting the latter inward against the resilient biasing force thereof to effect said shifting of said rod, said detent means comprising at least one outer detent element carried by said rod for movement between an outward position projecting beyond one side of said rod and an inward position substantially retracted into said rod, said outer detent element carried by said rod for movement between a holding position alongside of and abutting said outer detent element when the latter is in its holding position and a releasing position shifted longitudinally within said rod out of said holding position, and resilient means biasing said outer detent element toward its holding position, said actuating member being engageable with said outer detent element to shift the latter to its releasing position against the force of said resilient means.

5. A safety razor according to claim 4, said actuating member comprising an elongate element longitudinally shiftable in said other end of said rod and projecting outward therefrom, said elongate element having its inner end tapered and engageable with said outer detent element to effect longitudinal shifting movement thereof.

6. A safety razor according to claim 4, said resilient means being operatively connected through said inner de-
tent element and said actuating member to said rod to resiliently bias the latter away from said one handle end.

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