SAFETY RAZOR WITH ADJUSTABLE GUARDS
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11 Claims. (Cl. 30—73)

ABSTRACT OF THE DISCLOSURE

A safety razor having a handle supporting a head assembly including a guide plate, a pair of movable guards supported on said guide plate, and a cover for holding a blade on said guards. The end of the handle is tapered and received in tapered recesses in said guards whereby rotational movement of said handle with respect to said head assembly will cause said guards to move with respect to said cover and guide plate for adjusting the spacing between the blade and the edges of said guards.

This invention relates to a safety razor, and more particularly to an adjustable safety razor for use with double edged blades.

This is a continuation-in-part of my copending application Ser. No. 469,941, filed July 6, 1965, now abandoned.

It is an object of the invention to provide a safety razor which can be easily adjusted for adjusting the spacing between the blade and guard edges, which can effect such adjustment without changing the blade angle, which can be releasably locked in the desired position of adjustment, and which can be easily and quickly disassembled for cleaning and blade changing.

In accordance with one form of the invention, there is provided an elongated handle having a tapered end threadably connected to a stud mounted on a top cover. A pair of opposed guards are carried on the tapered handle and are adapted to support a double edged blade against the lower face of the top cover.

The guards are provided with aligned tapered recesses receivable against the tapered handle end for supporting the guards thereon and whereby rotation of the handle in one direction will cause said guards to move outwardly with respect to each other. Blazing means are provided on said guards to urge them to move inwardly toward each other as the handle is rotated in an opposite direction. Conveniently, said guards are slidably carried in a guide plate and are provided with interfitting ribs for guiding their adjusting movements toward and away from each other.

Other objects and features of the invention will become apparent from the more detailed description which follows and from the accompanying drawings, in which:

FIG. 1 is a side elevation of a safety razor embodying the invention;
FIG. 2 is a vertical section taken on the line 2—2 of FIG. 1;
FIG. 3 is a vertical section taken on the line 3—3 of FIG. 2;
FIG. 4 is a bottom plan view of the guards shown in FIG. 2;
FIG. 5 is a side elevation of a safety razor embodying a modified form of my invention;
FIG. 6 is an enlarged vertical section taken on the line 6—6 of FIG. 5;
FIG. 7 is an enlarged vertical section taken on the line 7—7 of FIG. 6;
FIG. 8 is a horizontal section taken on the line 8—8 of FIG. 7;
FIG. 9 is a side elevation of a safety razor embodying another modified form of my invention;
FIG. 10 is an enlarged fragmentary vertical section taken on the line 10—10 of FIG. 9;
FIG. 11 is an enlarged vertical section taken on the line 11—11 of FIG. 10; and
FIG. 12 is a horizontal section taken on the line 12—12 of FIG. 11 but with portions thereof being broken away.

As shown, the razor comprises an elongated handle 10 having an axially extending tapped opening 12 at its upper end received on a threaded stud 14 centrally mounted on an arcuate top cover 15 and projecting downwardly therefrom. The upper end of said handle has a tapered portion, as at 16, and is provided with a plurality of vertically extending, circumferentially spaced splines 17.

The handle end 16 projects upwardly through a guard assembly for connection to the cover stud 14. As shown in FIG. 2, said guard assembly comprises an arcuate guide plate 20 having a web 21 provided with an opening 22 for reception of the handle end 16. Inwardly open channels 24 are formed at the opposed ends of the guide web 21 to provide a pair of guides for guiding the sliding movements of a pair of opposed arcuate guards 26 slidably supported on the guide web 21.

As shown in FIG. 4, the guards 26 are identical in construction. Each of said guards has a top wall 28 terminating at its opposed lateral edges in downwardly offset flanges 29 slidably received in the guide channels 24. The longitudinal edge of the top wall 28 terminates in a downwardly projecting flange 30 disposed below the adjacent cutting edge of a conventional double edged blade 31 supported against the top cover 15 by the guard top walls with a rib 33 on the guard cover 15 received in the centrally disposed slot in the blade. A plurality of inwardly projecting ribs 32 are formed on the bottom of the wall 28 and are slidably supported on the guide web 21. The ribs 32 on the two guards are slidably interfit and thus act in combination with the guide channels 24 and flanges 29 to retain said guards in alignment with each other.

The guards 26 are movable outwardly with respect to each other upon tightening of the handle 10 upon the cover stud 14 to move the handle toward the top cover. To this end, aligned arcuate recesses 34 are formed at the inner edges of the guard top walls 28. The walls of the arcuate recesses 34 are tapered so that with the two recesses disposed in alignment with each other they define a tapered opening matingly engageable with the handle end 16. A plurality of vertically extending, circumferentially spaced splines 35 are formed in the recess walls and are adapted to mate with the splines 17 on the handle end 16 for releasably locking the guards 26 in the desired position of separation. The guards are urged inwardly toward each other and thus bindingly retained in contact with the handle end 16 by a spring 40 extending around the arcuate recesses 34 and mounted on pins 42 on the bottom face of the guard walls 28. The separation of the guards, and thus the adjustment of the razor, is measured by aligning indicia 43 on the handle at the base of the tapered end 16 with a fixed reference point 44 formed on the bottom face of the guide web 21.

In operation of the razor, the handle 10 is removed from the top cover 15, and the blade 31 is placed on the guard walls 28. The cover stud 14 is then inserted through the conventional opening in the blade and the handle 10 is tightened on said stud to thus retain the cover 15 and the guard walls 28. As the handle is rotated to tighten it on the stud 14 and move it toward the cover 15, its tapered end 16 bears against the mating arcuate recesses 34 to force the guards outwardly against the action of the spring 40 until the guard flanges 29 are located in the desired position of adjustment with respect to the blade edges. The splines 17 and 35 on the handle
end 16 and arcuate recesses 34 will releasably lock said guards in the desired position of adjustment, the indicia 43 and reference point 44 being employed for measuring the desired position of adjustment. Upon rotation of the handle in an opposite direction to move it away from the top cover, the guards 26 will be moved inwardly by the action of the spring 40 to thus move the flanges 39 inwardly with respect to the blade edges. The guards are guided during their inward and outward adjusting movements by the interfitting ribs 32 and the flanges 29 riding in the guides 24.

In the embodiment shown in FIGS. 5–7, the razor is provided with a handle 48 having an externally threaded, reduced diameter portion 49 at its upper end. An axially extended tapping opening 50 is formed in the upper end of the handle for the reception of a threaded stud 52 on an arcuate top cover 54, said cover having a rib 55 receivable in the centrally disposed slot in the blade. An arcuate top plate 56 having a centrally disposed opening 57 through which the stud 52 extends is seated on the upper end of the handle portion 49 around the opening 50. The guards project longitudinally beyond plates 56 and 60 as shown in FIG. 7 and have their longitudinal edges rounded and their outer faces shouldered as at 66. The upper and lower faces of the guards 64 are disposed in sliding engagement with the lower and upper faces of plates 56 and 60, respectively. Conveniently, a plurality of keys 67 are formed on the lower faces of the guards and are received in slightly longer transverse keyways 68 formed in the edges of plates 60 for guiding and limiting the inward and outward sliding movement of the guards with respect to plates 56 and 60. The sliding movements of the guards are further guided by pluralities of interfitting, laterally spaced ribs 70 formed on said guards and by the ends of said guards slidably engaging the end walls 58.

As shown in FIGS. 6 and 7, the guards 64 are moved outwardly with respect to plates 56 and 60 by a collar 74 threadably mounted on the lower edge of the guard recesses 78 of the collar portion 76 projecting through an opening 77 in plate 60 and disposed in bearing engagement with aligned arcuate recesses 78 formed in the opposed inner edges of the guard plate 64. The recesses 78 are tapered and the adjusting faces of said recesses and the collar portion 76 are provided with cooperating, vertically extending, circumferentially spaced spines 80 for releasably locking the guards in the desired position of adjustment. Conveniently, an annular rib 82 extends around the lower end of the collar below plate 60 to facilitate rotation of said collar about the handle 48. As shown in FIG. 8, the guards are urged inwardly toward each other, and thus bindingly retained in contact with the collar portion 76, by springs 83 interconnecting said guards at their inner edges.

In operation of the razor shown in FIG. 5–8, the plates 56 and 60 with the guards 64 retained therebetween are placed on the handle 48 with the plate 56 resting on the upper end of the reduced diameter handle portion 49. The blade 26 is placed on plate 56 and said handle is tightened on the studs 52 thus bindingly retaining the plate 56 on said handle with the blade 65 interposed between the said plate and the cover 54. Rotation of the collar 74 upwardly as viewed in FIG. 7 will cause its tapered portion 76 which bears against the guard recesses 78 to force the guards laterally outwardly with respect to plates 56 and 60 to decrease the amount of exposure of the blade edges. Upon rotation of the collar to move it downwardly as viewed in FIG. 7, the guards 64 will be moved inwardly by springs 83 to thus move the guard edges 66 inwardly with respect to the blade edge and thus increase the blade edge exposure. The spines 80 on the collar and guard recesses 78 will releasably lock the guards in the desired position of adjustment.

In the embodiment shown in FIGS. 9–12, the razor is provided with a handle 88 having a reduced diameter externally threaded handle portion 89 at its upper end. An arcuate top plate 90 is fixedly mounted on the upper end of the threaded handle portion 89 and is connected at its opposed ends by a pair of vertically extending end walls 93 to an arcuate bottom plate 94. A pair of elongated guards 96 identical in their construction are slidably carried between the plates 90 and 94 and project laterally outwardly from between said plates to support the cutting edges of a conventional razor blade 97 carried on plate 90 with its longitudinal cutting edges projecting beyond the longitudinal edges of said plates. The guards 96 are provided with longitudinally spaced slotted guides 98 disposed in parallelism with plate 96 and spaced downwardly therefrom.

A pair of elongated guards 64 identical in their construction are slidably carried between the plates 56 and 60 and project laterally outwardly from between said plates to support the cutting edges of a conventional razor blade 65. As shown, the blade 65 is retained against the upper face of plate 56 by the cover 54 with its cutting edges projecting beyond the longitudinal edges of said plate. The guards project longitudinally beyond plates 56 and 60 as shown in FIG. 7 and have their longitudinal edges rounded and their outer faces shouldered as at 66. The upper and lower faces of the guards 64 are disposed in sliding engagement with the lower and upper faces of plates 56 and 60, respectively. Conveniently, a plurality of keys 100 are formed in the lower faces of the guards and are received in slightly longer transverse keyways 101 formed in the edges of plate 94 for guiding and limiting the inward sliding movement of the guards with respect to the plates 90 and 94. The sliding movements of the guards are also guided by interfitting ribs 102 on said guards and by the ends of said guards slidably engaging the end walls 93.

In order to move the guards laterally outwardly, a collar 106 is threadably mounted on the threaded handle portion 89. As shown, said collar has a tapered upper portion 107 which projects through an opening 108 in plate 94 and bears against opposed arcuate recesses 110 formed in the inner edges of the guards 96. The tapered collar portion 107 and recesses 110 are provided with cooperating, vertically extending, circumferentially spaced spines 111 for releasably locking the guards 96 in the desired position of adjustment. The guards are urged inwardly toward each other, and thus are bindingly retained in contact with the tapered collar portion 107 by springs 112 laterally spaced ribs 113 of the collar 106. The collar 106 is provided with an annular rib 113 disposed below plate 94 to facilitate rotation of the collar about handle 88.

Thus, the guards 96 are movable outwardly as viewed in FIG. 11 by rotating the collar 106 to move it upwardly with respect to handle 88. As said collar is moved upwardly, its tapered portion 107 bears against the guard recesses 110 to slide said guards laterally outwardly to decrease the amount of exposure of the cutting edges of blade 97. Conversely, upon rotation of collar 106 to move it downwardly on handle 88, the springs 112 will pull the guards 96 laterally inward as viewed in FIG. 11 to increase the blade edge exposure. The spines 111 on the tapered collar portion 107 and recesses 110 will releasably lock the guards 96 in the desired position of adjustment.

As shown in FIGS. 10 and 11, the handle 88 is provided with an axially extending opening 114 in which elongated rod 115 is rotatably carried. Said rod is threadably connected, as at 116, to an adjustment knob 117 rotatably mounted on the lower end of handle 88, whereby rotation of said knob will cause the rod 115 to move vertically with respect to the handle. The upper end of rod 115 is provided with an annular groove 118 in which inwardly directed flanges on a pair of opposed mating clamps 119 are received. Said clamps project upwardly
from the rod 115 on opposite sides of a blade guide 120 and are fixedly connected to said guide by a pin 122. As shown in FIG. 11, the guide 120 projects upwardly from the plate 90 and extends longitudinally thereof for reception in the central slot of blade 97 for locating said blade on the plate. A pair of downwardly projecting arms 124 at the ends of the guide are slidable carried in slots 125 in plates 90 and 94 and end walls 93 and are connected to a pair of pivot bars 126 disposed outwardly from the walls 93. Each of said bars is connected by pins 127 to the adjacent ends of a pair of cover plates 128. As shown, the cover plates are provided at their opposed ends with downwardly projecting cranks, each of said cranks comprising a vertical arm 129 through which one of the pins 127 extends and an outwardly projecting horizontal crank arm 130 receivable under an adjacent guard 96. Thus, rotation of knob 117 to move rod 114 downwardly as viewed in FIG. 10 causes guide 120 and pivot bars 126 to move downwardly pulling the cover plates 128 downwardly into operative position against blade 97 for retaining said blade in a fixed position against plate 90. In this operative position, the adjacent ends of the cover plate will be disposed around guide 120 projecting upwardly through the central blade opening. Rotation of knob 117 to move the guide 120 and pivot bars 126 upwardly as viewed in FIG. 10, raises the pivot pins 127 in a like direction to cause the horizontal crank arms 130 to engage the guards 96. With the horizontal crank arms 130 engaging the guards 96, further upward movement of the pivot bars will cause the cover plates 128 to swing upwardly and outwardly into their retracted positions to permit removal of blade 97 and/or cleaning of the razor.

1 claim:

1. A safety razor, comprising a handle, a top cover adjustable joined to one end of said handle for retaining a blade on a guard adjustment assembly including plate means operatively supported on one end of said handle, a pair of opposed guards carried by said plate means for supporting the cutting edges of said blade and movable laterally and outwardly with respect to said handle, tapered means on said one end of said handle, moveable toward and away from said top cover, means on said guards engageable with said tapered means for moving said guards laterally and outwardly upon movement of said tapered means toward said top cover, spring means on said guards for moving them laterally inwardly upon movement of said tapered means away from said top cover, and means for guiding the movements of said guards.

2. The invention as set forth in claim 1 in which said means on said guards comprises a pair of opposed tapered arcuate recesses formed in the adjacent edges of said guards.

3. The invention as set forth in claim 2 with the addition that said recesses and tapered means are provided with cooperating circumferentially spaced splines for re-leasably locking said guards in the desired position of inward and outward adjustment.

4. The invention as set forth in claim 1 in which said means for guiding the movements of said guards comprises interfitting ribs and slots formed on said guards.

5. The invention as set forth in claim 1 in which said means for guiding the movements of said guards comprises a pair of vertical wall surfaces on said plate means engaging the ends of said guards.

6. The invention as set forth in claim 1 in which said tapered means comprises a tapered portion of the outer face of said handle.

7. The invention as set forth in claim 1 in which said plate means comprises an upper plate interconnected to a bottom plate and said guards are slidably carried between said plates.

8. The invention as set forth in claim 1 in which said plate means comprising an upper plate interconnected to a bottom plate and said guards are slidably carried between said plates, and said tapered means comprises a collar rotatably mounted on said handle and projecting through an opening in said bottom plate.

9. The invention as set forth in claim 8 with the addition that said collar has a frustoconical upper portion engageable with said guards and an annular outwardly projecting rib disposed below said collar.

10. The invention as set forth in claim 7 in which said upper and lower plates are interconnected by a pair of end walls engageable with the ends of said guards.

11. The invention as set forth in claim 7 in which said upper plate is receivable on said one end of said handle and bindingly retained between said said end of said handle and the top cover.

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