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C. O. SCHRADER
SINGLE CAP OPENING AND BLADE ADJUSTING MEANS
FOR RAZORS HAVING SECTIONAL CAPS

3,293,745

Filed July 21, 1965

3 Sheets-Sheet 1

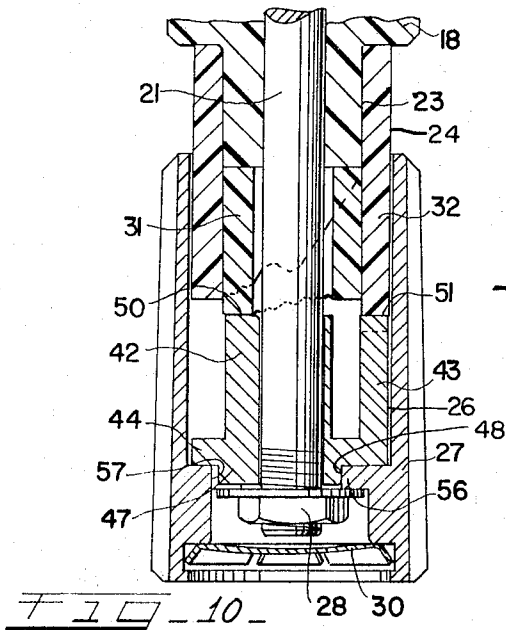


FIG. 2

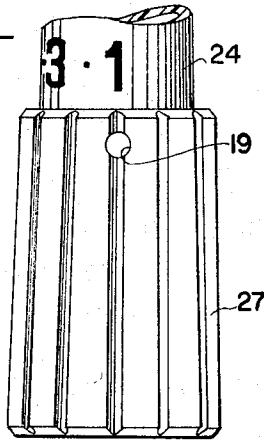
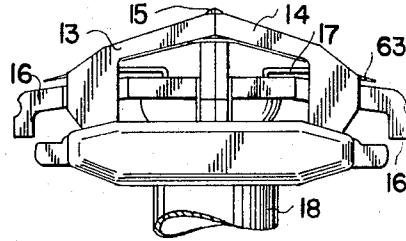


FIG. 3

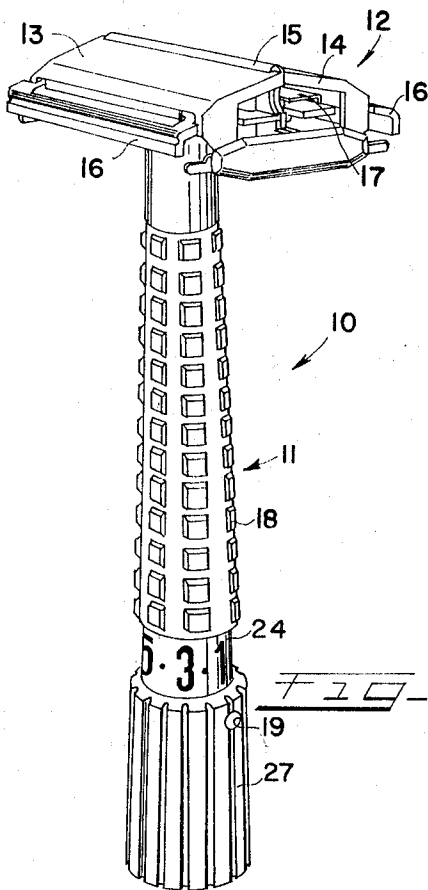
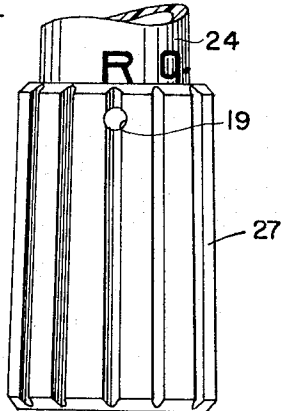
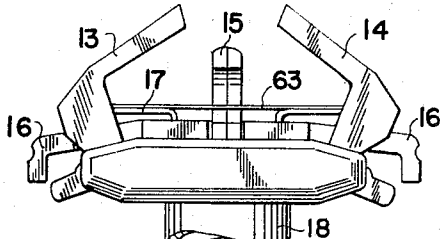


FIG. 1

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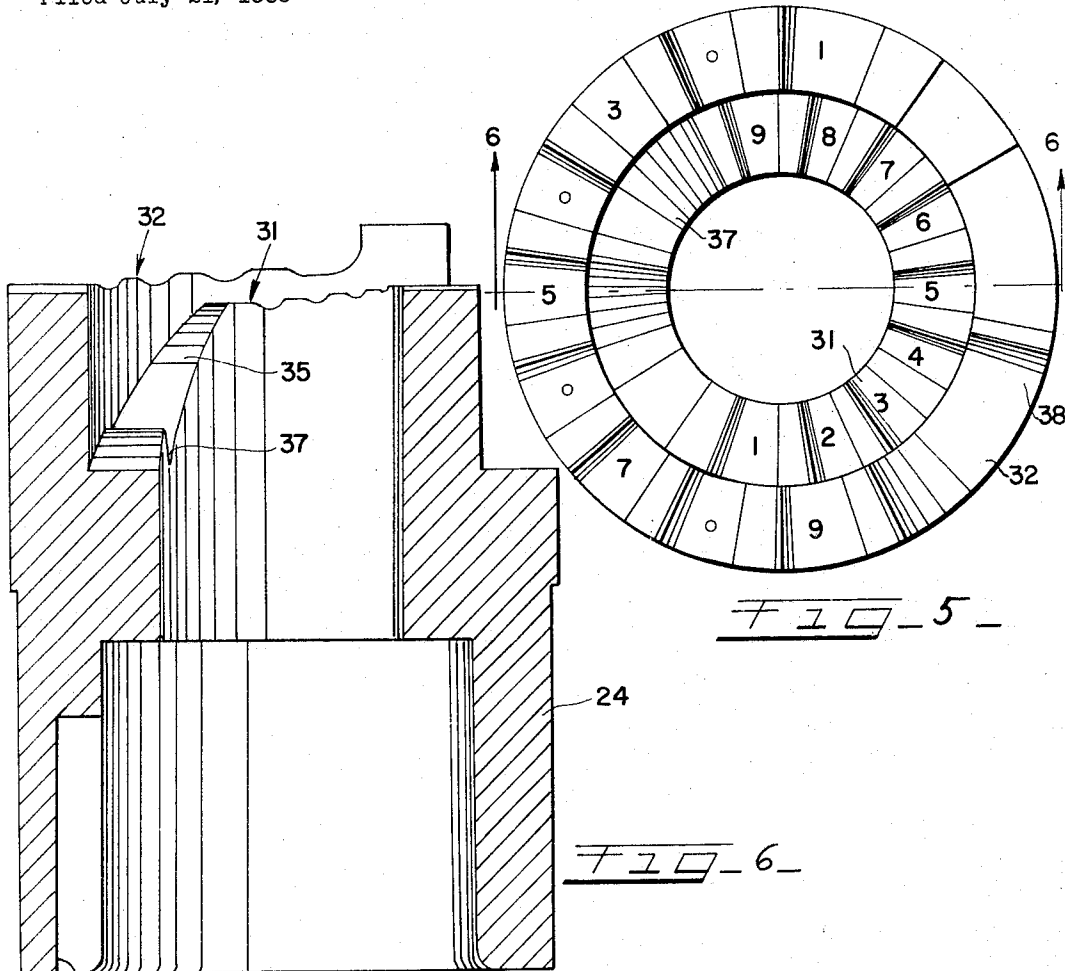


FIG. 5

FIG. 6

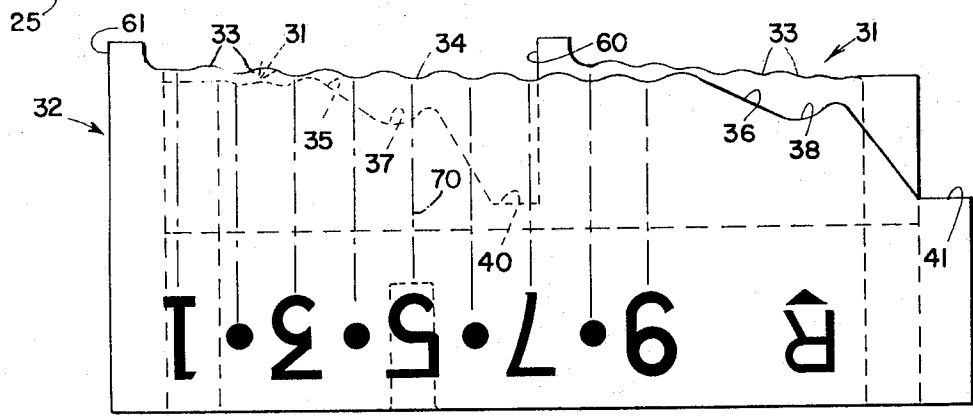


FIG. 7

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FIG. 8

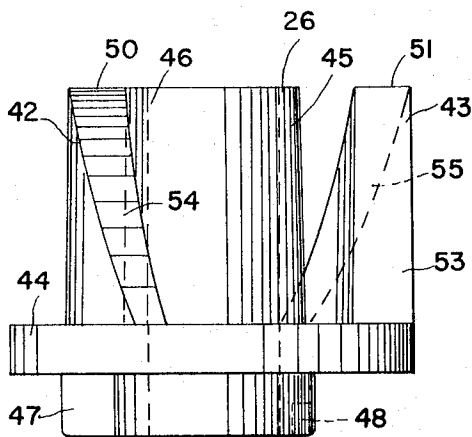
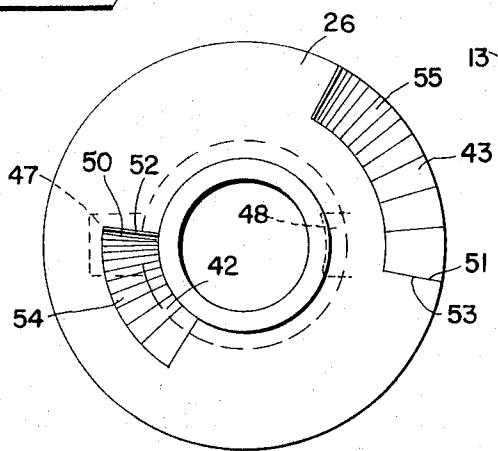


FIG. 9

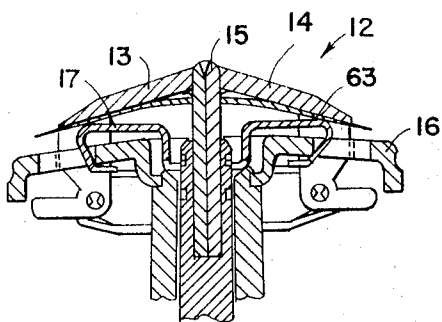


FIG. 11

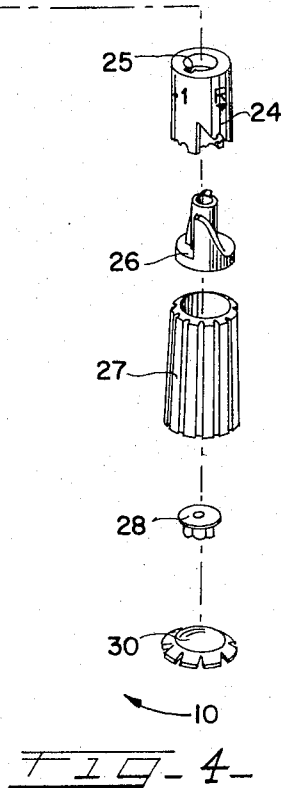
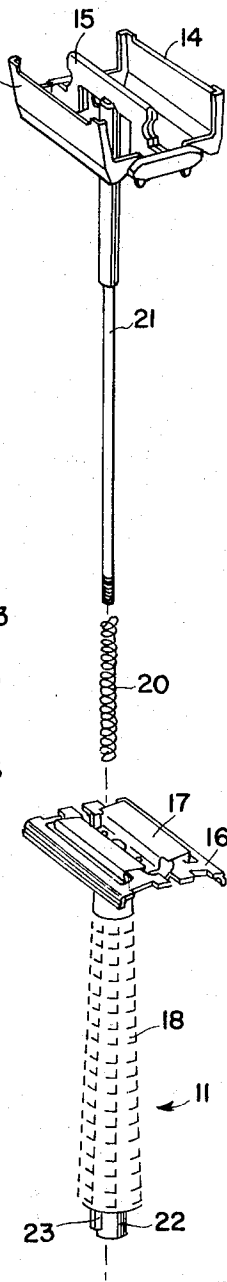


FIG. 4

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SINGLE CAP OPENING AND BLADE ADJUSTING MEANS FOR RAZORS HAVING SECTIONAL CAPS

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2 Claims. (Cl. 30—60.5)

This invention relates to safety razors in general and more particularly to adjustable type razors. More specifically, the present invention is directed to improvements in safety razors of the double edge type wherein a single operating or adjusting knob is provided to open and close the cap sections of the razor, adjust the blade angle relative to the guard, and also permit the caps to be released for flushing or rinsing while remaining closed a sufficient amount to preclude the loss or removal of the razor blade.

The present invention is provided with a double cam track which permits step-wise adjustment of the angle of exposure of the blade. In addition, an intermediate rinse position is provided which facilitates loosening the cap sections to allow the blade, cap sections, guard and blade support to be easily and completely rinsed while retaining the cap sections closed a sufficient degree to preclude complete release of the razor blade.

Cam followers, displaced 180° from each other, cooperate with the concentrically disposed double cam tracks having identical adjustment positions displaced 180°. In this manner, as the cam followers are rotated, they ride on the concentric cam tracks being urged into following engagement by suitable means.

Any desired adjustment is easily selected by rotating the cam followers over the notched eccentric cam surfaces forming an adjustment truck. This causes the spider stem to shift axially to increase or decrease blade clearance depending upon the direction of rotation. A sharp rise is formed in each of the cam surfaces immediately adjacent one end of the adjustment track to facilitate quick opening when the cam followers are moved beyond the same. Intermediate of the track forming the sharp or steep rise is a notch-like formation which is shaped to receive and hold the cam followers against movement toward the fully opened position. When the cam followers are positioned in the notch-like formations, the cap sections are no longer in tight clamping engagement with the razor blade, but closed a sufficient degree to preclude full release of the razor blade. In this manner, the parts are loosely retained to permit flushing or rinsing and may conveniently and quickly be restored to the desired adjustment with a few degrees of rotation of the followers.

A better understanding of the novel features of the safety razor of the present invention may be had by a consideration of the objects achieved and a description of a preferred embodiment.

It is a general object of this invention to provide a new and improved adjustable razor.

It is a further object of this invention to provide a new and improved adjustable razor having a plurality of blade angle adjustment positions, an open position wherein the blade may be removed, and an intermediate rinse position all of which require less than one full rotation of an adjusting knob.

It is a further object of this invention to provide a new and improved safety razor having a rinse position which is intermediate the fully opened and fully closed positions.

Other objects not specifically set forth will become apparent from the following detailed description of the

invention made in conjunction with the accompanying drawings wherein:

FIG. 1 is a perspective view of the razor of the present invention with the cap sections closed and the razor blade omitted;

FIG. 2 is an end elevational view of the razor of FIG. 1 with portions of the handle broken away and a razor blade inserted with the adjustment set on reference No. 1;

FIG. 3 is a view similar to FIG. 2 generally illustrating the position of the cap sections with the adjustment set on the rinse position;

FIG. 4 is an exploded perspective view of the razor of FIGS. 1-3;

FIG. 5 is a bottom plan view of the double cam track shown in FIG. 4;

FIG. 6 is a cross sectional view taken along the lines 6-6 of FIG. 5;

FIG. 7 is a view of the developed double cam track shown in FIGS. 5 and 6 with the outer cam track superimposed on the inner cam track;

FIG. 8 is a top plan view of the cam follower shown in FIG. 4;

FIG. 9 is a side elevational view of the cam follower of FIG. 8;

FIG. 10 is a cross sectional view of the cam and cam track assembly; and

FIG. 11 is a cross sectional view of the razor blade head in the closed position.

The adjustable razor of the present invention is indicated generally by reference character 10 and includes a handle assembly 11, and razor head assembly indicated generally at 12. As seen in FIGS. 1, 2, 4 and 11, the razor head assembly 12 includes cap sections 13 and 14 pivotally mounted on a spider assembly 15. A guard or blade seat 16 having a platform type spring 17 is supported on a tubular handle 18.

The spider assembly 15 includes a spider stem 21 slidably received in a longitudinal bore in the tubular handle 18 and adapted to co-operate with a means to provide incremental adjustment of the razor blade angle in a manner to be described. The lower end of the handle 18 is provided with a cylindrical portion of reduced diameter 22 having a longitudinally extending key 23 formed along one side.

As best seen in FIG. 4, a double cam track sleeve 24 is provided with an internal key way 25 adapted to co-operate with the key 23 when the sleeve 24 is received over the reduced cylindrical portion 22. A double cam follower member 26 is biased into engagement with the cam tracks through the action of the coil spring 20 against the spider stem 21 urging it toward the open position. An adjusting knob 27 receives the double cam follower 26, the two being held in engagement through a washer nut 28 threadably joined to the end of the spider stem 21. An end cap 30 trims the lower end of the adjusting knob 27.

The details of the double cam sleeve may be better understood by referring to FIGS. 5-7. The double cam sleeve 24 includes concentrically disposed inner and outer cam tracks 31 and 32. Each of the respective cam tracks may be formed separately and thereafter joined, or may be formed from a single casting as illustrated. The double cam sleeve 24 may be formed from any suitable material such as metal or plastic with the latter being preferred. Each of the cam tracks 31 and 32 is disposed with identical track portions 180° out of phase in order to co-operate with cam follower portions which are equally displaced. With a double cam track arrangement, great stability during adjustment is obtained, which insures that the force applied to the spider stem 21 will be purely axial.

Each of the cam tracks is formed with a series of notch-like formations or undulations 33 disposed at different elevations for receiving a co-operating portion of the cam follower during razor adjustment. Undulations on each of the cam tracks 31 and 32 which are identical in elevation, are 180° displaced on each cam track. This applies for each position of adjustment. As is apparent in FIG. 7, the valley 34 of each undulation 33 is identified by an axially extending marker 70 on the outer cam track and a number of references from one to nine. Adjustment to a particular number or setting may be had by rotating the cam follower to the desired position which permits the user to reselect a particular setting which has been found to be the most satisfactory. To the attainment of this end a marker 19 is provided on the adjusting knob 27 which permits rotation of the cam followers.

As seen in the top plan view of FIG. 5, the settings 1-9 have been marked in corresponding notches or valleys 34 in the undulated portions of each of the cam tracks 31 and 32. Adjacent the No. 9 adjustment on each of the cam tracks 31 and 32 is provided a steeply inclined portion 35 and 36 each of which is interrupted about half way down by a valley or notch-like formation 37 and 38 disposed at an elevation substantially below the valley in the undulation forming the No. 9 adjustment. These valleys 37 and 38 form an intermediate position between open and fully closed positions which is referred to as the rinse position. The fully opened positions on each of the cam tracks 31 and 32 is shown in the developed view of FIG. 7 at 40 and 41 at the bottom of the steep or sharp rises 35 and 36.

The details of the double cam follower member 26 are best seen in FIGS. 8 and 9. Cam follower portions 42 and 43, adapted to co-operate with the inner and outer cam tracks 31 and 32 respectively, are formed on the cam follower member 26. The cam follower portions 42 and 43 project upwardly from an annular disk-like base 44 having a tubular sleeve portion 45 provided with a central bore 46. A key 47 is provided on the lower end of the tubular portion 45 and forms a driving connection between the adjustment knob 27 and the cam 26. A key way 48 may be provided on a diametrically opposite side of the lower end of the tubular portion for co-operation with a key in the knob to assist in forming a driving connection therewith. Each of the cam followers 42 and 43 may be suitably shaped at its cam track contacting portion 50 and 51 to permit it to fit in the undulations 33. When viewed in elevation, the cam followers 42 and 43 are of generally right triangular configuration, each having a straight side 52 and 53 and a sloped side 54 and 55.

The generally right triangular configuration of each of the cam followers generally conforms to the configuration of the steep cam portion so that when the cam surfaces are aligned with the steep slope portion, the spring will urge the cam follower downwardly against the bottom 40 and 41 of each of the steep slope surfaces. When the cam followers are in this position, the caps are fully opened as shown in the exploded perspective view of FIG. 4 to permit a razor blade to be inserted or withdrawn.

A better appreciation of the co-operation between the cam followers and cam tracks may be had by referring to the enlarged cross sectional view of FIG. 10 illustrating the same in assembled relation. The inner cam follower 42 has the cam contacting surface portion 50 engaged with the cam track 31. The outer cam follower 43 has the cam contacting surface 51 in engagement with the outer cam track 32 with both being at equal elevations.

A key 56 on the adjusting knob 27 is received in the key way 48 in the cam follower while the key 47 on the cam follower is received in a suitable key way 57 formed in the knob. The lower end of the spider stem 21 threadably received the washer nut 28 and serves to hold the knob against the disk-like portion 44 of the cam follower.

Obviously, the cam follower and adjusting knob may be secured by a suitable adhesive or other means if desired. The trim cap 30 may be pressed into the lower end of the knob 27 to cover the end of the spider stem and washer nut 28.

In using the safety razor, the adjusting knob 27 is turned until the straight sides of the cam followers engage the straight sides 60 and 61 of the inner and outer cams so the spring pulls the cams against the bottom portions 40 and 41. The cap sections 13 and 14 are thus opened and a conventional double edge razor blade 63 may be inserted. The knob 27 is rotated in a reverse direction so the cam followers move up the steep rise. Through continued rotation the cams pass the rinse notch-like formations and the marker may then be positioned on any of the positions 1-9 and the cap sections assume the generally closed relationship shown in FIGS. 2 and 11. The platform spring 17 urges the margins of the blade upward against the caps to hold the blade during adjustment and shaving. This function is adequately described in the application of Clarence Schrader, Serial No. 448,018 filed April 14, 1965.

After a few shaving strokes or when shaving is complete, the knob 27 may be rotated to bring the marker 19 into alignment with the "R" on the cam sleeve 24 as shown in FIG. 3. In this position, the cam followers 42 and 43 are positioned in the notch-like formations 37 and 38 in the steep rise cam track surfaces 35 and 36. The cap sections generally assume the position shown in FIG. 3, as the spring 20 urges the spider stem 21 to the open position. As is evident, the razor blade 63 is lifted away from the guard 16 by the platform spring 17 although loosely retained by the cap sections 13 and 14. A thorough flushing or rinsing of the entire razor head assembly 12 may be completed by holding it under a stream of water while the parts remain in loosely assembled relation.

The safety razor of the present invention provides advantages in the form of accurate and easy adjustment. The rinse position permits the razor head to be easily and thoroughly flushed without losing the razor blade which is exceedingly difficult and somewhat dangerous to retrieve if accidentally dropped. While the cam tracks have been illustrated as being mounted on the handle, they may be mounted on the spider stem and the co-operating cam followers carried on the lower portion of the handle if desired.

Upon a consideration of the foregoing, it will become obvious to those skilled in the art that various modifications may be made without departing from the invention embodied herein. Therefore, only such limitations should be imposed as are indicated by the spirit and scope of the appended claims.

I claim:

1. An adjustable safety razor comprising a guard, an elongated generally tubular handle member joined to said guard, a spider stem received in said tubular handle member and having one end thereof extending through said guard for joining to a spider, a pair of cap sections pivotally supported on said spider and engageable with said guard for opening and closing movement on shifting of said spider to clamp and release a razor blade, spring means urging said spider stem in a direction to open said cap sections, first and second cam surfaces concentrically disposed on said tubular handle member, an adjustment knob having first and second cam followers disposed in axial opposition for co-operation with said first and second cam surfaces, each of said first and second cam surfaces including a series of undulations on which is received an associated cam follower to permit incremental shifting of said spider stem, and a steep rise portion on each of said first and second cam surfaces for opening said cap sections.

2. An adjustable safety razor comprising a guard, an elongated generally tubular handle member joined to

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said guard, a spider stem received in said tubular handle member and having one end thereof extending through said guard for joining to a spider, a pair of cap sections pivotally supported on said spider and engageable with said guard for opening and closing movement on shifting of said spider to clamp and release a razor blade, spring means urging said spider stem in a direction to open said cap sections, first and second cam surfaces disposed on said tubular handle member, an adjustment knob having first and second cam followers disposed in axial opposition for co-operation with said first and second cam surfaces, each of said first and second cam surfaces including a series of undulations on which is received an associated cam follower to permit incremental shifting of said spider stem, a steep rise portion on each of said

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first and second cam surfaces for opening said cap sections, and a notch-like formation on each of the steep rise portions of said first and second cam surfaces to receive said cam follower to hold said cap sections in a position intermediate the open and closed positions to permit flushing of said razor.

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