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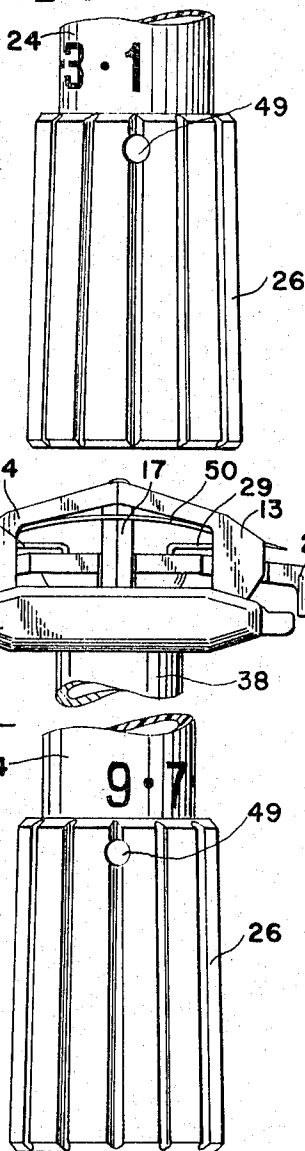
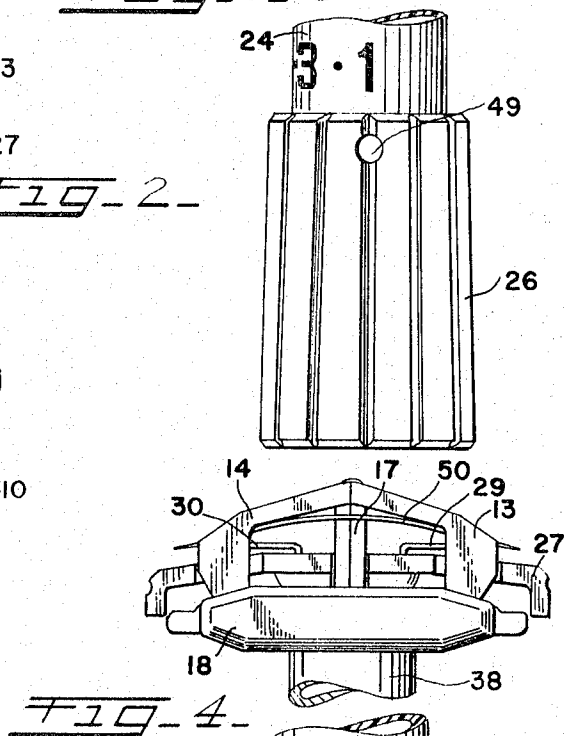
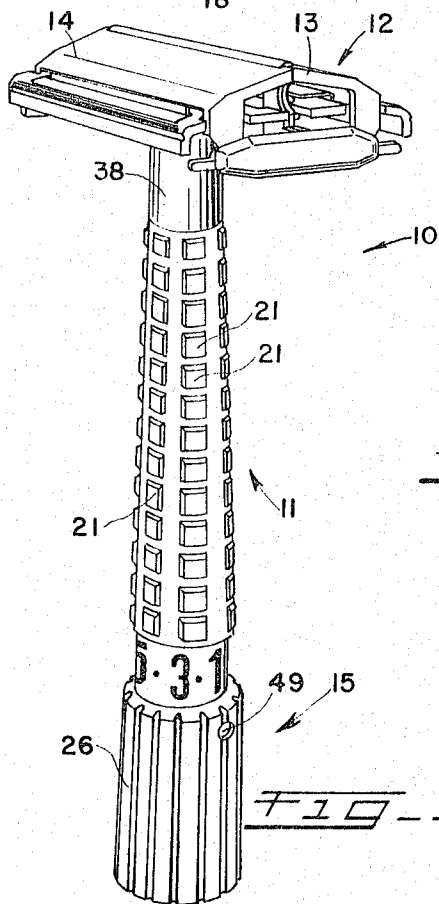
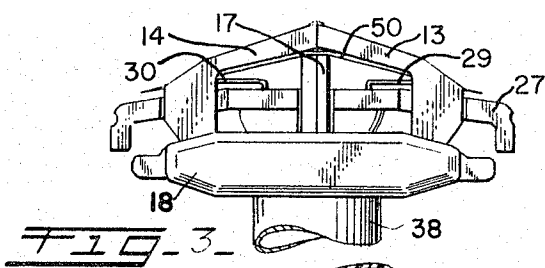
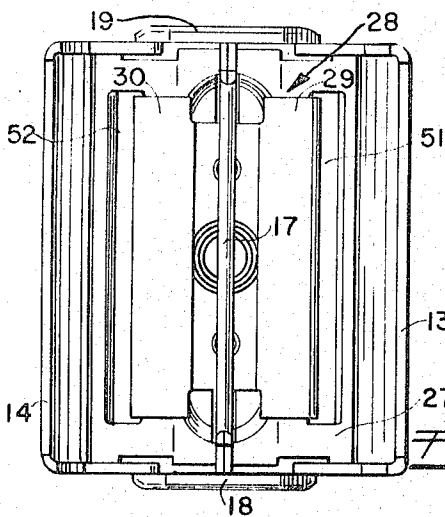
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SPRING SEAT FOR SECTIONAL CAP RAZORS

Filed April 14, 1965

2 Sheets-Sheet 1



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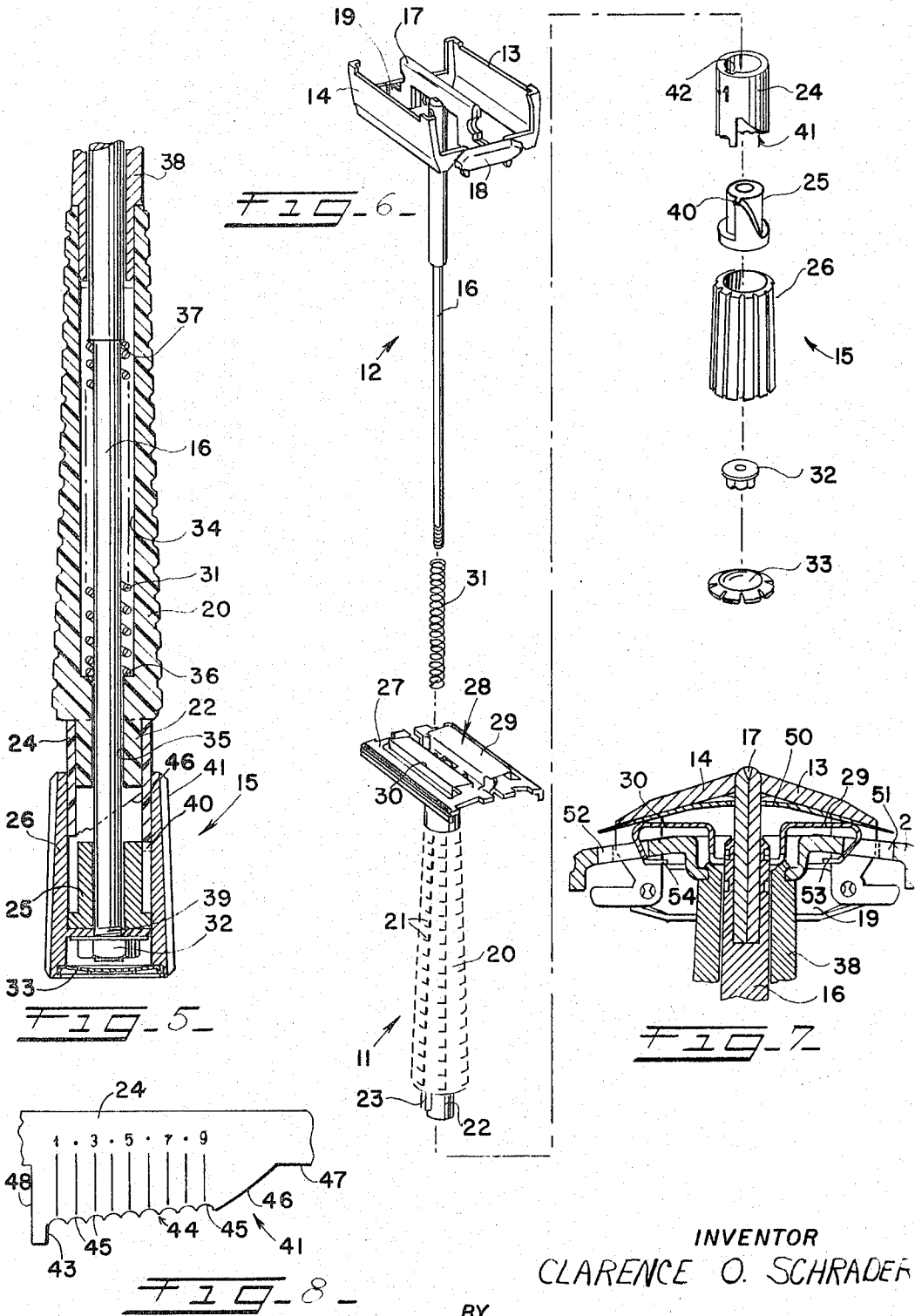
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## SPRING SEAT FOR SECTIONAL CAP RAZORS

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1 Claim. (Cl. 30—60.5)

This invention relates to safety razors in general and more specifically is directed to improved safety razor designs having a novel platform spring forming a blade seat which co-operates with movable cap sections to grip the razor blade adjacent the cutting edges. The unique spring seat design permits unobstructed flow of the shaving product through elongated openings provided in a guard member disposed below the same.

In its broadest sense, the adjustable razor of the present invention includes a tubular handle assembly having a platform-like guard member supported at the upper end. A spider assembly mounting the usual pivoting cap sections has the associated spider stem slidably received in the tubular handle. Suitable means of any known type may be provided to shift the spider stem to open and close the cap sections in a well known manner. This means or if desired, an additional means, can be provided to shift the stem to effect razor adjustment in a manner to become apparent.

The novel spring seat of the present invention is supported above the guard member and coacts with the cap sections to tension and grip the razor blade adjacent its marginal edges throughout all positions of adjustment. In this manner, the blade is resiliently supported as close as possible to the cutting edges and yet is supported in such a manner that the flow of the shaving product through the guard is unrestricted.

Through the novel spring seat design, each edge of the razor blade is gripped independently of the other and any irregularities in the razor blade or cap sections can be readily compensated for. A greater appreciation of the salient features of this invention can be had by consideration of the objects and a detailed description of a representative embodiment of the invention.

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

It is a more specific object of this invention to provide a new and improved safety razor design having a novel platform spring means forming a blade seat and being adapted for co-operation with a cap means to hold a razor blade adjacent the cutting edge.

It is a still further object of this invention to provide a new and improved blade supporting resilient spring seat which co-operates with movable cap sections to support a double edge razor blade adjacent the cutting edges.

Further and fuller objects will become readily apparent when reference is made to 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 enlarged top plan view of the razor of FIG. 1 with the cap sections open and the razor blade omitted to illustrate the platform spring in plan;

FIG. 3 is a side elevational view of the razor of FIG. 1 with portions of the handle broken away and having the razor blade inserted and the adjustment set on the reference "1";

FIG. 4 is a view similar to FIG. 3 with the adjustment set on the reference "9";

FIG. 5 is a longitudinal cross section taken through the handle assembly;

FIG. 6 is an exploded perspective of the razor of FIG. 1;

FIG. 7 is a cross sectional view taken through the razor head and illustrating the handle and spider stem fragmentarily; and

FIG. 8 is an illustration of the developed cam sleeve.

In order to more aptly describe the salient features of the novel spring seat of the present invention, the description will be given in conjunction with a novel adjusting means which per se does not form a part of this invention. It is not intended that this description be limiting inasmuch as the design features and advantages of the present invention are equally applicable for use with other types of adjusting means.

Referring now to FIG. 1, the adjustable razor of the present invention is indicated generally by the reference numeral 10 and includes the basic elements as follows: a handle assembly 11; spider assembly 12, including the cap sections 13 and 14; and, an operating mechanism 15. A better appreciation and understanding of the components making up the basic elements of the adjustable razor may be had by consideration of the exploded perspective view of FIG. 6.

The spider assembly 12 includes the spider stem 16 attached to the spider 17 with spider arms 18 and 19 disposed at opposite ends. The spider arms 18 and 19 pivotally support the cap sections 13 and 14 for opening and closing movement as the ends engage the guard in a well known manner.

As seen in FIGS. 5 and 6, the handle assembly 11 includes a handle 20 of generally frustoconical exterior contour having a series of ribs 21 uniformly spaced to provide an attractive design and enhance the ease with which the razor may be gripped. The handle 20 may be formed of any suitable material with plastic being preferred. At the lower end of the handle 20 is provided a cylindrical section of reduced diameter 22 having an axially extended key 23 formed integrally thereon for purposes to become apparent.

The handle assembly 11 further includes a guard 27 and the platform-type spring seat of the present invention indicated generally at 28 mounted on the upper end of the handle 20. The spring seat 28 includes blade engaging sections 29 and 30 disposed in substantial parallelism with the marginal edges of the cap sections 13 and 14 and the guard 27.

As is best seen in FIG. 6, the adjustment assembly 15 is composed of three main elements including a cam sleeve 24, cam follower sleeve 25 and adjusting knob 26. A spider biasing spring 31, washer nut 32 and trim cap 33 complete the basic razor assembly. The manner in which the basic parts are assembled and coact will be described in greater detail below.

As best seen in FIG. 5, the spider stem 16 is positioned within the cylindrical bore 34 formed in the handle 20. A bore of reduced diameter 35 is formed in the lower section of the handle and forms at the junction with the enlarged cylindrical bore 34 a radially extending shoulder 36. The spider stem 16 is also provided with a radially extended shoulder 37 which axially faces the shoulder 36 in the bore. When the stem is slidably received in the handle, the spring 31 is bottomed on each of the shoulders 36 and 37 thereby continuously to urge the spider stem 16 axially of the handle 20 in a direction to open the cap sections 13 and 14.

A metal collar 38 is provided at the junction of the handle 20 and guard 27 and is provided with an internal bore having a bearing area for the spider stem 16. The metal collar 38 facilitates rigid attachment of the guard 27. The spring seat 28 is attached to the guard 27 by riveting or the equivalent.

The lower end of the spider stem 16 is threaded as at 39 to receive the washer nut 32 which holds the adjusting knob 26 on the stem 16 and also provides con-

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trol of movement of the spider stem 16 by operation of the knob 26. The cam follower sleeve 25 is press fitted or secured in any suitable fashion within the knob 26. Spring 31 serves to urge the cam follower surface 40 (also shown in FIG. 6) in engagement with the cam surface indicated generally at 41 on the cam sleeve 24. Upon assembly of the razor the cam sleeve 24 is received about the handle section 22. Relative rotation between the cam sleeve 24 and handle 20 is prevented by the integral key 23 on the handle section 22 being received in a suitable key way 42 in the cam sleeve 24.

The cam surface 41 on the cam sleeve 24 contains diverse rises or angles as may be best appreciated by referring to FIG. 8. In viewing from left to right, cam 41 includes a stop shoulder 43 which serves to limit the rotation of the cam follower sleeve 25 in one direction by engagement with the follower 40. Adjacent the shoulder 43 the cam surface 41 contains a gentle rise 44 defined by a series of step-like formations or notches 45 each of which is increasing in elevation relative to the adjacent notch as it progresses up the rise 44. After passing the last notch disposed in alignment with the reference numeral "9," the cam surface 41 contains a sharp rise as indicated at 46 which terminates in a flat bottom 47, limited on the opposite side by an axially extending shoulder 48. The cam follower 40 conforms substantially to the shape of the flat bottom 47 and the sharp rise 46 of the cam surface 41 so that when the follower 40 on the cam follower sleeve 25 engages the flat bottom 47 the spring 31 extends the spider stem 16 to move the cap sections to the open position as illustrated in FIG. 2.

When the cam follower 40 on the cam follower sleeve 25 is rotated for sliding up the rise 46 and reception in one of the notches 45, as for example that positioned directly below the reference "9" in the cam sleeve 24, the cap sections 14 and 15 assume the closed or blade clamping position shown in FIG. 4. The knob 26 slides axially outwardly along the cam sleeve 24, the stem 16 moves downwardly in the handle and the spring 31 is compressed, and the spring seat 28 is tensioned a slight amount. The blade engaging sections 29 and 30 engage the razor blade and resiliently hold the same against the cap sections 13 and 14. In this position maximum blade exposure or clearance with the guard 27 is available.

Rotation of the knob 26 to align the cam follower 40 with the notch in axial alignment with the reference numeral "1" on the cam sleeve 24 causes the cap sections 13 and 14 to assume the minimum blade exposure position shown in FIG. 3. When the knob is rotated to this position, the independently movable blade engaging sections 29 and 30 of the platform spring seat 28 are moved downwardly relative to the guard. The outer edge of each of the blade engaging sections 29 and 30 engages the razor blade adjacent the marginal edge of the associated cap section thereby resiliently holding the blade adjacent the cutting edges.

In each of FIGS. 3 and 4, a marker index or indicating means 49 is provided on the adjustment knob 26 to permit axial alignment with the associated reference numeral on the cam sleeve 24. Incremental adjustment intermediate either of the positions shown in FIGS. 3 and 4 may be easily selected by rotating the adjusting knob 26 to bring the indicator 49 in axial alignment with the desired reference mark.

A better appreciation of the relationship of the platform spring seat 28, guard 27 and blade may be had by reference to the cross sectional view of FIG. 7. A razor blade 50 of conventional double edge design is positioned over the spider 17 and the cap sections 13 and 14 brought to the closed position by rotation of the knob 26 so that the indicating means 49 is aligned at any position on or between references "1" or "9." The cap sections 13 and 14 remain in the closed position through the downwardly projecting arms at opposite ends being engaged with the usual vertical slots at the ends of the guard 27.

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The cap sections 13 and 14 are pulled downwardly relative to the guard by the spider stem 16 acting through the spider assembly 17 against the force of the spring 31. In this manner, the marginal edges of the cap sections 13 and 14 exert clamping force on the marginal edges of the razor blade 50.

The platform spring seat 28 has the opposite longitudinal blade engaging sections 29 and 30 engaging the underside of the blade 50 at opposite marginal edges slightly inwardly of the outer edges of the associated cap sections. As is best seen in FIG. 2, cutout areas 51 and 52 on opposite sides of the guard 27 are unobstructed. During the shaving process, the cutting edge blade 50 is continuously cleared of the shaving product by the same being permitted to flow in an unrestricted manner through the openings 51 and 52 in the guard 27. The platform spring seat 28 co-operates with the cap sections 13 and 14 to provide support to the razor blade 50 resiliently holding it adjacent the cutting edges for maximum shaving comfort and safety. For ease in manufacturing, the platform spring seat 28 may be secured to the guard 27 by riveting, welding or the equivalent.

As seen in FIG. 7, each section 29 and 30 of the platform spring seat 28 is curved downwardly along its outer marginal edges and is provided with tabs (only two shown at 53 and 54) extending downwardly through the respective openings 51 and 52. Each of the tabs 53 and 54 is curled inwardly towards the center of the guard 27 thus serving to limit the upward movement of each of the spring sections 29 and 30 when the razor is opened for blade changing as seen in FIG. 2.

The tabs 53 and 54 are dimensioned so as to insure that the proper spring force will be exerted on the razor blade 50 at the angle of greatest exposure as seen in FIG. 4 as well as the angle of minimum exposure as seen in FIG. 3. This can be better understood by describing the necessary steps in initially preparing the razor for shaving.

A razor blade of the usual double edge type is placed on the platform spring seat 28 with the slotted center over the spider 17. The knob 26 is rotated to move the cam follower 40 away from the surface 47 down the cam track or rise 46 to the selected notch-like formation 45 formed in the cam surface 44. Assume, for example, the greatest blade exposure is desired by the individual preparing to shave with the razor, then the adjustment will be set with the indicator 49 on the reference "9" position. The cross sectional view of FIG. 7 illustrates the general relationship of the parts and the razor blade 50 at this setting. Each of the blade engaging sections 29 and 30 has its respective tab 53 and 54 depressed downwardly away from the underside of the guard 27. The upward force available by each of the blade engaging sections 29 and 30 is of sufficient magnitude to provide the necessary support for the razor blade 50. Each blade engaging section 29 and 30 is further depressed toward the guard 27 as the adjusting knob 26 is moved from position "9" to position "1." Throughout the full range of adjustment, the clamping pressure exerted by each of the blade engaging sections 29 and 30 is substantially consistent thereby to provide uniform blade support and promote maximum shaving comfort. It is to be emphasized once again that the support provided by each of the blade engaging sections 29 and 30 is closely adjacent the cutting edge of the blade and yet inwardly of the respective openings 51 and 52 to permit unrestricted flow of the shaving product.

After a consideration of the foregoing description, it becomes evident that the total number of moving parts in the present razor design is minimized. The assembly of the platform spring to the guard may be easily performed due to its simple design. The simplicity of the razor promotes economy in manufacture and assembly of the razor. As a further feature, the coaction of the parts is such that the usual wear experienced in adjustable

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razors substantially unaffected the normal functioning of the present design due to the built-in compensating features. Since the spring seat is of resilient material and disposed within the cap sections, it is protected against damage due to accidental dropping of the razor or the like. Lack of uniformity in either cap section 13 or 14 whether due to manufacture or accidental dropping is readily compensated for by each of the individual sections 29 and 30 being movable independently of the other. Such independent movement also will compensate for any blade irregularities, misalignment of razor parts or the like.

Obviously, certain modifications and variations of the invention as herein before set forth may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated by the appended claim.

I claim:

A safety razor of the adjustable type comprising a handle member, a guard mounted on said handle member, a spider assembly movable relative to said guard and having a spider stem extending into said handle member, said spider assembly including cap sections adapted to open and close in response to full spider stem movement, said cap sections in the closed position being spaced from said guard, spring seat means mounted intermediate said guard and said cap sections, said spring seat adapted to engage opposite edge portions of a razor blade and urge the same against said cap sections thereby resiliently to hold said razor blade, means to vary the spacing between said cap sections and said guard when said razor is in the closed condition, said spring seat being operative to

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maintain said razor blade in engagement with said cap sections through variance of the spacing between said cap and guard sections, and spring means on said stem to urge it axially of said handle member, said spring means having sufficient operative movement to urge said cap sections to the open condition and means formed on said spring seat to co-operate with said guard to limit the upward movement of said spring seat in order that the tension on said spring seat may be provided throughout variance in said spacing between said cap sections and said guard.

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