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SAFETY RAZOR WITH ADJUSTABLE BLADE SETTING

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2 Sheets-Sheet 1

Fig. 1

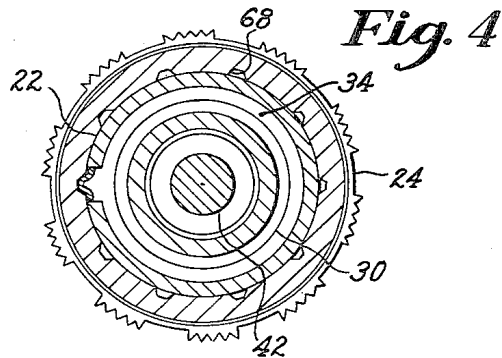
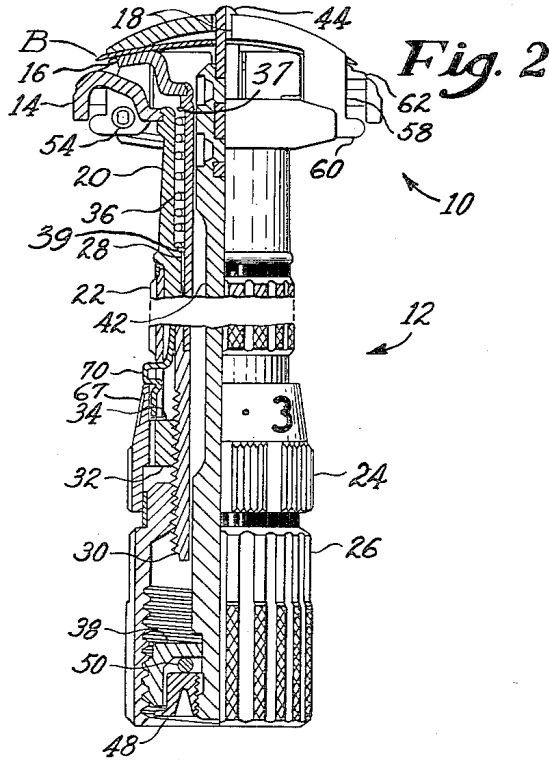
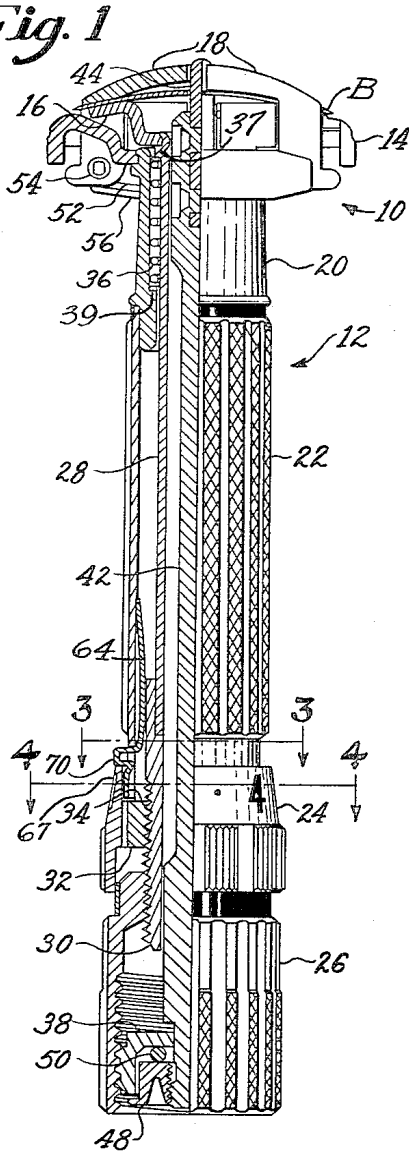
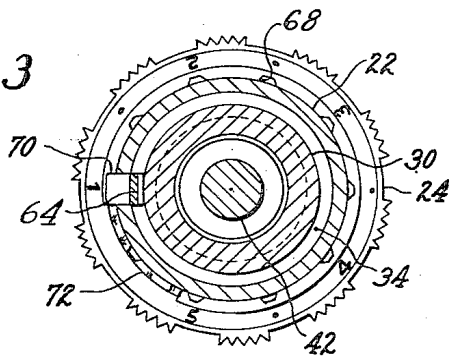


Fig. 3



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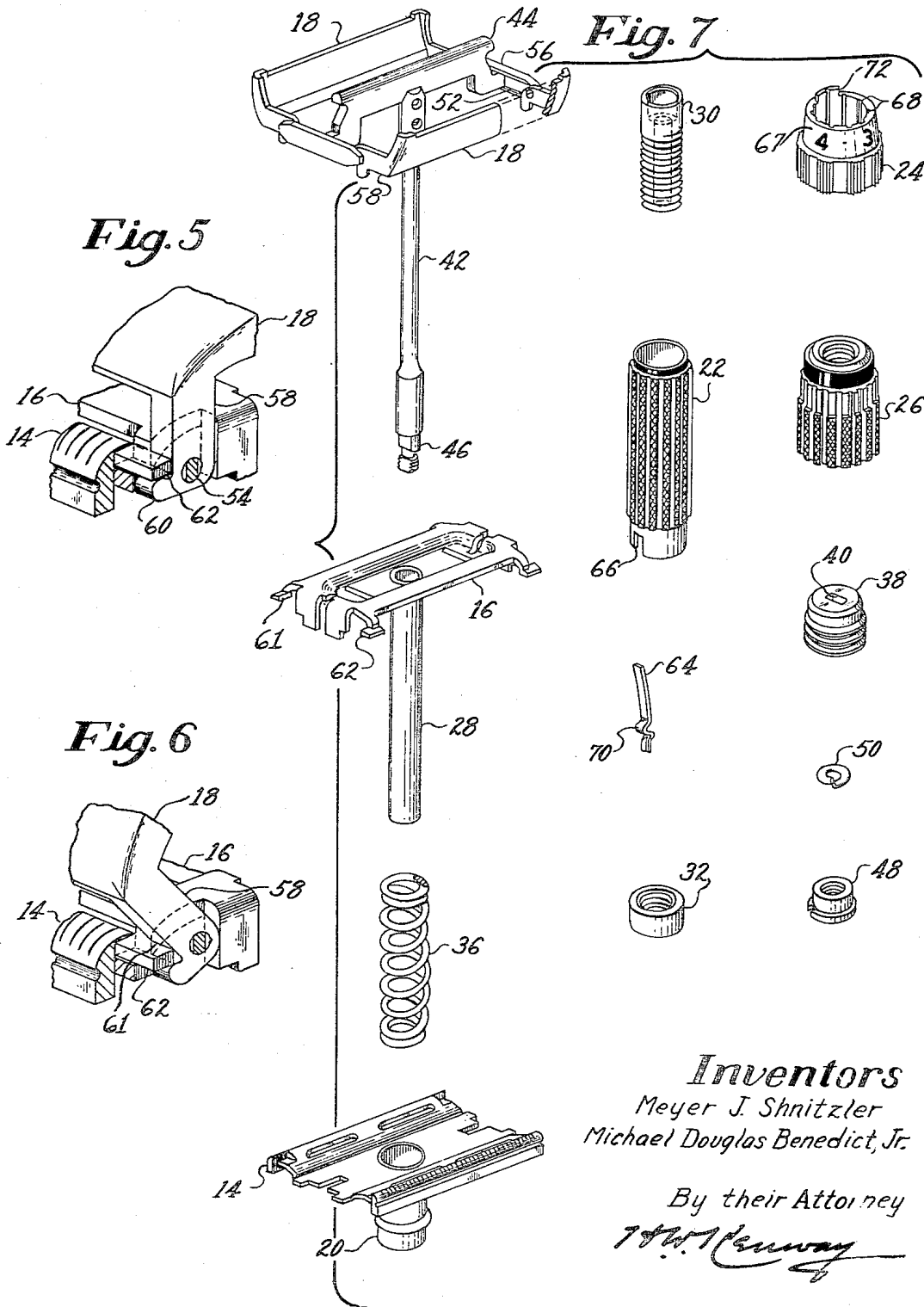
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## SAFETY RAZOR WITH ADJUSTABLE BLADE SETTING

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3 Claims. (Cl. 30—60.5)

The present invention relates to safety razors, and principally to safety razors of the so-called "one-piece" construction, wherein the component elements of the razor remain inter-connected at all times to facilitate blade replacement without the necessity of handling separated razor parts. In greater particularity the present invention concerns the provision of improved and relatively inexpensive means for adjusting the shaving relation between a clamped blade and an associated guard member to suit the needs of the user.

The various objects and features of the invention will be apparent in the following detailed description of a preferred embodiment thereof, and their particular novelty distinctly pointed out in the appended claims.

In the drawings:

Fig. 1 is a view in side elevation, partially in longitudinal section, showing our razor with the shaving relation thereof adjusted to provide a minimum blade edge exposure;

Fig. 2 is a view similar to Fig. 1, with certain portions broken away, but with the shaving relation adjusted to provide a greater exposure of the blade edge;

Fig. 3 is a section taken on the line 3—3 in Fig. 1 and on an enlarged scale;

Fig. 4 is a section taken on the line 4—4 in Fig. 1 and also on an enlarged scale;

Fig. 5 is a perspective view on an enlarged scale of the elements employed in clamping a blade in the present razor;

Fig. 6 is a view similar to Fig. 5 showing these elements in a different relative position; and

Fig. 7 is an exploded view of the various component elements of the illustrated razor.

A preferred embodiment of our novel razor, as it would be used in shaving, is best illustrated in Figs. 1 and 2, wherein it will be seen that the razor comprises a head portion 10 in which a double-edged blade B may be clamped for use in shaving. A handle 12, of composite construction, is connected to the head portion 10 which may include a guard 14, a platform 16 and a pair of swingable cap sections 18 for clamping the blade B against the platform 16 with its cutting edges in shaving relation with respect to the guard 14.

The exterior portions of the handle 12 may include a guard extension 20 fast upon the guard 14 to which a tube 22 may be press-fitted to form a composite outer tube. Immediately beneath the tube 22 (hereinafter referred to as outer tube 22) will be found an adjusting knob 24 which may be employed to vary the shaving relation between the clamped blade B and the guard 14 in a manner more fully described below. The terminus of the lower end of the handle 12 may include an opening and closing knob 26 which for greatest convenience is placed in end-to-end relation to the adjusting knob 24.

In furtherance of certain aspects of the invention, it has been found preferable to provide an inner tube 28,

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of. For convenience of manufacture, this inner tube 28 may be of composite construction and include a threaded element 30 pressed onto its lower end. With further reference to Fig. 1, it can be seen that the adjusting knob 24 may also, for convenience of manufacture, be of composite construction and have a press-fitted insert 32 which is threaded onto the threaded element 30. This insert further provides a seat 34 for receiving the lower end of the outer tube 22. A spring 36 acting between a flange 37 formed on the inner tube 28, and an internal shoulder 39 formed on the guard extension 20 maintains the lower end of the outer tube 22 in positive engagement with the seat 34, which in effect is an integral part of the adjusting knob 24.

Realizing that the range of variation of shaving relation between the clamped blade B and the guard member 14 is to be determined by the needs of the shaving public, the present disclosure illustrates an average minimum exposure of the blade edge in Fig. 1 and an arbitrarily selected, representative maximum exposure of the blade edge in Fig. 2. These extremes and any intermediate exposure positions may be obtained by revolving the adjusting knob 24 to vary the position thereof with respect to the inner tube 28 and threaded element 30. This result flows from the fact that the relative position of the guard member 14 is controlled by the adjusting knob 24 and the spring 36. With respect to the presently-discussed aspect of the invention, it should be observed that the clamped blade B, the platform 16, and the composite inner-tube 28 with threaded element 30 form a rigid metallic system for carrying the adjusting knob 24. The shaving relation adjusting system is free from any interdependent functional elements interconnecting it with the system carrying the blade B. Thus, the guard 14, the guard extension 20 and outer tube 22 all are carried by the adjusting knob seat 34 to carry or withstand the forces to which the various component elements will be subjected when the razor is used in shaving. These two independent systems give a solid support for the blade and guard, while at the same time, the shaving relation of the blade B with respect to the guard 14 may at any time be varied by adjustment of the knob 24.

Replacement of the blade B is effected by a further system of mechanical elements which, according to other aspects of the invention, may include the knob 26 located immediately below the adjusting knob 24 and in end-to-end relation thereto. The knob 26 is illustrated as having two concentric, interiorly threaded portions, the upper of which provides for its attachment to the lower end of the threaded element 30. The lower threaded portion of the knob 26 is, preferably, a multiple thread of relatively steep pitch, and carries thereby a threaded element 38 which has a central aperture 40 of non-circular cross-section (Fig. 7). Looking toward the interior of the inner-tube 28 (Fig. 1), it will be seen that a stem 42 extends therethrough, being secured at its upper end to a spider 44 and having at its lower end a reduced portion 46. The cross-section of this reduced portion 46 corresponds to the configuration of the aperture 40 to permit passage of the reduced portion 46 therethrough but prevent relative rotation therebetween. A lock-nut 48 is threaded onto the extreme lower portion of the reduced portion 46 to maintain the threaded element 38 and the stem 42 in assembled relation. Referring further to Figs. 1 and 7, it will be seen that a spring lock-washer 50 is interposed between the nut 48 and the threaded element 38. In Fig. 1, the lock-washer 50 is shown as it performs a function described below in which it is wholly compressed to a flat condition, though normally, in non-compressed condition, this lock washer would maintain the threaded element 38 at the upper end of the reduced portion 46 of the stem 42.

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The spider 44 includes cross-arms 52, the inturned ends of which serve as pintles 54 for the pivotal or swingable mounting of the cap sections 18 as is best illustrated in Figs. 5 and 7. For appearance's sake, it is common practice to superpose shell-like members 56 over the ends of the crossarms 52.

The cap sections 18 are provided with legs 58 at the lower end of which provision is made for the pivotal mounting thereof on the pintles 54. Also adjacent these pivotal mountings are projections 60 extending from the legs 58 and preferably at right angles thereto. Referring particularly to Figs. 2 and 5, it will be seen that the platform 16 is formed with integral tabs 62 adjacent the legs 58 and overlying the projections 60.

With the above description in mind, it will be seen that the blade B may be replaced by opening and closing the swingable cap sections 18 without disturbing the shaving relation established in the razor head 10 by the adjusting knob 24. To this end, knob 26 is rotated to advance it upwardly along the threaded element 30. The threads of the element 38 are preferably of the opposite hand and, therefore, the threaded element 38 will also advance upwardly with respect to the knob 26. As this occurs, the element 38 will move upwardly until it reaches the upper limit of the reduced portion 46 of the stem 42, decompressing the lock-washer 50, and then impart longitudinal movement to the stem 42, carrying it upwardly and with it the spider 44. As has been noted, the cap sections 18 are carried on the pintles 54 at ends of these spider cross arms 52, and, therefore, they will advance upwardly as said longitudinal movement is imparted by rotation of the knob 26. As a result of this longitudinal movement, the projections 60 will engage undersurfaces of the platform 16 as provided by the tabs 62, thus causing the cap sections 18 to swing outwardly to a fully open position which is illustratively shown in Fig. 7. In this position of the cap sections 18, an old blade may be removed and a new blade may be placed on the razor head, resting on the platform 16. The new blade may be clamped on the platform 16 by imparting reverse rotation to the knob 26. In so doing, the knob 26 and the threaded element 38 will move downwardly with respect to the outer tube 22, carrying the stem 42 and the associated spider 44 therewith in a longitudinal direction. As this longitudinal movement is imparted, the legs 58 of the cap sections 18 will engage edges 61 on the platform, as provided by the tab 62 (see Fig. 6), thus causing the cap sections to swing inwardly toward each other in readiness to clamp a blade B on the platform 16, in response to continued longitudinal movement of the stem 42, in a downward direction. After the blade B is clamped against the platform 16 in a positive manner, further continued rotation of the knob 26 compresses the spring 50 as seen in Fig. 1 to provide a friction lock which prevents inadvertent loosening of the knob 26.

It will be noted that the above arrangement provides at all times a fixed relation for the opening and closing of the cap sections 18; that is, regardless of the adjustment of the knob 24 to provide a wide range of shaving relations, the same relative movement, caused by the rotation of the knob 26, between the inner tube 28 and the stem 42 will effectuate the same degree of opening and closing of the cap sections 18.

Oftentimes, in shaving it is found that certain portions of a person's face may be more tender than other portions, and because of this or for closer shaving or other reasons, it may be desirable to vary the shaving relation of the blade of the razor head during the course of the shave. For this reason, as well as to permit variations of this shaving relation to suit the need of different individual users, it is essential that convenient and readily accessible means be provided for effecting such adjustment. Further to these same ends, it is desirable to provide sensing means for determining the magnitude of adjustment being made. To further these purposes, a stop-

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spring 64 may be provided. This spring lies between and bears against the threaded element 30 and the outer-tube 22 to force its lower end through a slot 66 formed in the lower end of the outer-tube 22. The adjusting knob 24 is provided with a portion 67 which overlaps the lower end of the outer-tube 22 and is concentric therewith. Flutes 68 formed in this overlapping portion provide detent means for receiving the lower end of the stop-spring 64 (Fig. 4) as it is urged outwardly through the slot 66. Thus, as the adjusting knob 24 is rotated, a readily detachable hesitation is felt by the user as the detent means releasably maintains the adjusting knob in various incremental positions. Further, the stop-spring 64 produces an audible noise as it enters one flute or another, assisting the user in determining the magnitude of variation.

As has previously been alluded to, there are desirable maximum and minimum settings for the shaving relation of the blade edge with respect to the guard member 14. In the interests of providing a more convenient and efficient adjusting means for this shaving relation, it is desirable that means be provided for preventing the adjustment of the shaving relation from exceeding either extreme limit. To this end, and with another aspect of the present invention in mind, the stop-spring 64 preferably is formed with a loop 70 which also extends through the slot 66 in the outer-tube 22. Cooperating with this projecting loop is an integral lug 72 extending upwardly from the overlapping portion 67 of the adjusting knob 24. Once in assembled relation, the rotation of the adjusting knob 24 is thereby limited to less than one revolution and the extreme limits of adjustment may be established by the pitch of the thread of the element 30.

Two functions are combined in the stop-spring 64; namely it serves as a click-producing detent means as well as providing a stop for limiting the extent of adjustment of the knob 24 to less than one full revolution. Yet another function is uniquely combined in this element in that the loop 70 is preferably disposed immediately above the upper surface of the overlapping portion 67 of the adjusting knob 24. On the outer surface of this overlapping portion, indicia, such as engraved numbers, may be placed to serve as a visual guide for establishing or registering a desired shaving relation of the blade B with respect to the guard member 14. The loop 70 is externally visible and serves as a ready reference point for the desired indicia on the adjusting knob 24.

Having thus described our invention, what we claim as novel and desire to secure by Letters Patent in the United States is:

1. A safety razor of the type which has its component elements interconnected at all times, said razor comprising a handle and a head portion attached thereto for holding a double-edged blade, said head portion including a platform, swingable cap sections having an open position for blade replacement and a closed position for clamping the blade against the platform, and a guard spaced beneath the cutting edges of the clamped blade and in shaving relation with respect to said cutting edges, said handle comprising a hollow outer tube secured at one end to the guard and having a longitudinally extending slot in its other end, an inner tube secured to said platform and extending interiorly and concentrically of the outer tube, an adjusting knob threaded onto the lower end of the inner tube for varying the shaving relation of the guard with respect to said blade edges to suit the needs of the user, said adjusting knob having a seat for receiving said other end of the outer tube, spring means for maintaining said outer tube in engagement with the adjusting knob seat, said adjusting knob also having flutes formed on an interior surface overlapping the lower end of said outer tube and concentric therewith, and a lug integral with said overlapping portion and extending thereabove, a stop-spring comprising an elongated member extending between said outer tube and said inner tube

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and bearing against each of said tubes to urge its lower end outwardly through the slot in said outer tube causing said lower end to enter said flutes and releasably maintain said adjusting knob in selected positions, an integral projection on said stop-spring extending into the path of travel of said lug and limiting the movement of said adjusting knob to less than one full revolution, said head portion also including a spider on which said cap sections are swingably mounted, a stem connected to said spider and extending interiorly of said inner tube, means for imparting longitudinal movement to said stem and spider comprising a knob also threaded onto the lower end of said inner tube and in end-to-end relationship with said adjusting knob, said cap sections having projections and legs adjacent their pivotal mountings and said platform having undersurfaces which are engaged by said projections to swing said cap sections to their open position in response to movement of the stem in one direction, said platform also having edges which engage the cap section legs to swing said cap sections to their closed position in response to longitudinal movement of the stem and spider in the opposite direction as the blade is clamped against the platform.

2. A safety razor of the type which has its component elements interconnected at all times, said razor comprising a handle and a head portion attached thereto for holding a double-edged blade, said head portion including a guard, a platform, and means for clamping the blade against the platform with the cutting edges of the blade in shaving relation with respect to the guard, said handle comprising a hollow outer tube secured at one end to the guard, an inner tube secured to said platform and extending interiorly and concentrically of the outer tube, an adjusting knob threaded onto the lower end of the inner tube for varying the shaving relation of the guard with respect to said blade edges to suit the needs of the user and having a seat for receiving the other end of the outer tube, spring means for maintaining said outer tube in engagement with the adjusting knob seat, said outer tube having a longitudinally extending slot in its lower end, a stop-spring extending into said slot, said adjusting knob having flutes formed on an interior surface overlapping the lower end of said outer tube and concentric therewith, and a lug integral with said overlapping portion and extending thereabove, said stop-spring comprising an elongated member extending between said outer tube and said inner tube and bearing against each of said tubes to urge its lower end outwardly

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through the slot in said outer tube causing said lower end to enter said flutes and releasably maintain the adjusting knob in selected positions, and an integral projection on said stop-spring extending into the path of travel of said lug and limiting the movement of said adjusting knob to less than one full revolution.

3. A safety razor of the type which has its component elements interconnected at all times, said razor comprising a handle and a head portion attached thereto for holding a double-edged blade, said head portion including a guard, a platform, and means for clamping the blade against the platform with the cutting edges of the blade in shaving relation with respect to the guard, said handle comprising a hollow outer tube, an inner tube extending interiorly and concentrically of the outer tube, the upper end of one said tube secured to said guard and the upper end of the other said tube secured to said platform, an adjusting knob threaded onto one of said tubes for varying the relation of the guard with respect to said platform and having a seat for receiving the other of said tubes, said outer tube having a longitudinally extending slot therein, a stop-spring extending into said slot, said adjusting knob having flutes formed on an interior surface concentric with said tubes, and a lug integral with said adjusting knob, said stop-spring comprising an elongated member extending between said outer tube and said inner tube and bearing against said inner tube to urge a portion of said stop-spring outwardly through the slot in said outer tube into engagement with said flutes and releasably maintain the adjusting knob in selected positions, a portion of said stop-spring extending into the path of travel of said lug and limiting the movement of said adjusting knob to less than one full revolution.

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