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(54) **Adjustable safety utility knife**

(57) An adjustable safety utility knife includes an elongated ergonomically shaped handle formed of two elongate shell members each having a peripheral edge and an outer generally convex surface and an inner generally concave surface. The shell members are fastened at the peripheral edges along a vertical parting plane to form an elongated internal cavity. The handle defines a front end, a back end and an intermediate portion suitable for being gripped by a user and also defining top and bottom surfaces extending along opposite sides of the shell members along said peripheral edges. The handle has a slot-like aperture at the front end substantially aligned with the parting plane and dimensioned for passage of a flat cutting blade therethrough. A guide element within the elongated cavity guides the cutting blade between a first position for safely storing the blade fully inside said cavity and a second position for selectively extending the blade beyond the aperture to expose at least a portion thereof. A manually operated button arranged on the top surface is coupled to the guide element for selectively moving the blade between the first and second positions. The handle has a rear opening at the back end for providing access to the elongated internal cavity. A carrier frame has a blade cartridge receiving compartment and dimensioned to be removably receivable within the cavity through the rear opening between a retracted position in which the carrier frame is at least partially moved exteriorly of the back end to provide access of the cartridge receiving compartment. A blade cartridge for storing a plurality of flat cutting blades is receivable within the blade cartridge receiving compartment. A carriage

includes a locking element for normally locking a cutting blade mounted thereon to substantially fix the cutting blade against relative longitudinal movements between the cutting blade and carriage. The locking element includes an unlocking element the actuation of which releases the cutting blade to permit relative longitudinal movements between the cutting blade and the carriage. A blade release element on one of the shell members actuates the unlocking element when manual force is applied thereto, whereby application of a force on the release element releases the cutting blade and enables it to be withdrawn through the front end aperture. Slip resistant elements are secured to the shell members along the top and bottom surface between a rearward-most operative position of the manually operated button and the back end of the handle. The slip resistant elements generally conform to the outer convex surface of the handle and enhance gripping of the handle and minimize slippage thereof during use of the utility knife when gripped by a user.

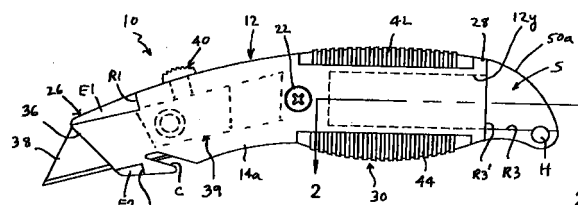


FIG. 1

Description

BACKGROUND OF THE INVENTION

Field of the Invention.

[0001] The present invention generally relates to hand tools and, more specifically, to an adjustable safety utility knife.

Description of the Prior Art.

[0002] Utility knives are widely used in construction, business and hobby applications for cutting such materials as paperboard, wallboard, string and other objects. Commonly, such utility knives are in the form of an elongate hollow housing that can be gripped by the user along an intermediate portion thereof and into which there are placed trapezoidal flat cutting blades. The blades typically have a single cutting edge. The blade is typically slidably mounted between a retracted position within the housing and an extended position in which the cutting edge is at least partially exposed through a front end aperture or slot, the slot being coupled to a manually operated element, such as a button positioned in a manner convenient to be actuated by the user's hand.

[0003] Many utility knives include a region within the housing for storing one or two additional blades that can be used to replace the operative blade when it becomes dull. In most cases a screw or similar means is used for attaching the two clam shell members together during normal use. When blades are to be replaced, the screw is removed, allowing to two shell members to be separated, and access is provide to the replacement blades.

[0004] The flat cutting blades used in utility knives are most useful and are easiest to use when the blades are extremely sharp. These blades, therefore, are frequently replaced once they become dull. For this purpose, known utility knives provide storage within the handle for additional blades so that these will be readily available when needed. In order to facilitate this replacement procedure, some utility knives provide a blade holder which stores the plurality of blades and which can be quickly and conveniently removed from the utility knife handle.

[0005] Also, a number of utility knife designs have been proposed which facilitate the removal, reversal or replacement blades without separating the mating handle parts or shell members.

[0006] Further, while the flat cutting blades used in utility knives are relatively thin, substantially frictional forces are frequently applied to or exerted on these blades, such as when the blades are used to cut heavy or thick cardboard, wallboard or the like. As typically used, the utility knives are placed on the material to be cut and, with the blade penetrated through the material,

and with the user's hand extended, the utility knife is pulled toward the user to effect the cutting. The frictional forces resulting on the blade are such as to pull on the utility knife in the opposite direction, tending to pull the utility knife out of the hand of the user. It is desirable that the user continue to maintain a good grip on the utility knife for safety reasons as well as to prevent damage to the workpiece being cut. Known utility knives, however, are typically made of metallic housings which provide a limited amount of friction between the exterior surface of the housing and the user's hand. Attempts have been made to increase the amount of friction available for this purpose by texturing the surface by providing ribs, knurling, etc. While such textured surfaces have somewhat increased the ability of the user to grip the utility knife housing, the greater the surface irregularities to enhance the gripping action, the more uncomfortable the knife is to use as any such surface irregularities tend to penetrate the skin of the user when the knife is tightly gripped to overcome the pulling frictional forces on the blade.

SUMMARY OF THE INVENTION

[0007] An adjustable safety utility knife in accordance with one embodiment of the present invention comprises an elongated ergonomically shaped handle formed of two elongate shell members, each having a peripheral edge and an outer convex surface and an inner generally concave surface. Fastening means is provided for fastening such shell members at said peripheral edges along a vertical parting plane to form an elongated internal cavity. Said handle defines a front end, a back end and an intermediate portion suitable for being gripped by a user and also defining top and bottom surfaces extending along opposite sides of said front end substantially aligned with said parting plane and dimensioned for passage of a flat cutting blade therethrough. Guide means is provided within said elongated cavity for guiding the cutting blade between a first position for safely storing the blade fully inside said cavity and a second position for selectively extending the blade beyond said aperture to expose at least a portion thereof. A manually operated button is arranged on said top surface and coupled to said guide means for selectively moving the blade between said first and second positions.

[0008] Said handle has a rear opening at said back end for providing access to said elongated internal cavity. A carrier frame is provided that has a blade cartridge receiving compartment and is dimensioned to be removably receivable within said cavity through said rear opening between a retracted position in which said carrier frame is fully stored within said internal cavity of said handle and an extended position in which said carrier frame is at least partially moved exteriorly of said back end to provide access to said cartridge receiving compartment. A blade cartridge is provided for storing a

plurality of flat cutting blades receivable within said blade cartridge receiving compartment and being individually fully removable through a rear slot-like aperture in said carrier frame.

[0009] The adjustable safety utility knife in accordance with another feature of the present invention comprises an elongated ergonomically shaped handle formed of two elongate shell members, each having a peripheral edge and an outer convex surface and an inner generally concave surface. Fastening means is provided for fastening such shell members at said peripheral edges along a vertical parting plane to form an elongated internal cavity. Said handle defines a front end, a back end and an intermediate portion suitable for being gripped by a user and also defining top and bottom surfaces extending along opposite sides of said front end substantially aligned with said parting plane and dimensioned for passage of a flat cutting blade therethrough. Guide means is provided within said elongated cavity for guiding the cutting blade between a first position for safely storing the blade fully inside said cavity and a second position for selectively extending the blade beyond said aperture to expose at least a portion thereof. A manually operated button is arranged on said top surface and coupled to said guide means for selectively moving the blade between the first and second positions.

[0010] Said guide means includes a carriage within said elongated internal cavity for supporting a flat cutting blade and guide elements are provided on at least one of said inner generally concave surfaces for guiding said carriage or cutting blade carrier between said first and second positions. Said carriage includes locking means for normally locking a cutting blade mounted thereon to substantially fix the cutting blade against relatively longitudinal movements between said cutting blade and said carriage. Said locking means also includes an unlocking element, the actuation of which releases a cutting blade to permit relative longitudinal movements between said cutting blade and said carriage. Blade release means is provided on one of said shell members for actuating said unlocking element when manual force is applied thereto. Therefore, application of a force on the blade release means releases said cutting blade and enables it to be withdrawn through said end aperture.

[0011] The adjustable safety utility knife in accordance with still feature embodiment of the present invention comprises an elongated ergonomically shaped handle formed of two elongate shell members, each having a peripheral edge and an outer convex surface and an inner generally concave surface. Fastening means is provided for fastening such shell members at said peripheral edges along a vertical parting plane to form an elongated internal cavity. Said handle defines a front end, a back end and an intermediate portion suitable for being gripped by a user and also defining top and bottom surfaces extending along opposite sides of said

front end substantially aligned with said parting plane and dimensioned for passage of a flat cutting blade therethrough. Guide means is provided within said elongated cavity for guiding the cutting blade between a first position for safely storing the blade fully inside said cavity and a second position for selectively extending the blade beyond said aperture to expose at least a portion thereof. A manually operated button is arranged on said top surface and coupled to said guide means for selectively moving the blade between said first and second positions. Slip resistant means is provided secured to said shell along said top and bottom surfaces between a rearmost operative position of said manually operated button and said back end. Such slip resistant means generally conforms to said outer convex surface and enhances gripping of said handle and minimizes slippage of said handle during use of the utility knife when gripped by a user.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Other aspects, objects and advantages of the present invention will become apparent upon reading of the following detailed description of a preferred embodiment of the present invention when taken in conjunction with the drawings, as follows:

Fig. 1 is a side elevational view of an adjustable safety utility knife with an easily removable blade holder in accordance with the present invention;

Fig. 2A is a cross-sectional view of the utility knife shown in Fig. 1, taken along line 2-2, shown with the blade holder and carriage therein in the fully retracted position;

Fig. 2B is similar to Fig. 2A except that the blade holder is shown in its fully extended position in condition for removal of a blade from the cartridge;

Fig. 3 is an enlarged side elevational view of the blade holder shown in Figs. 2A and 2B, showing a cartridge positioned within the blade holder when there are no blades within the cartridge;

Fig. 4 is a side elevational view of the front-loading adjustable safety utility knife in accordance with the present invention with the front portion of the housing broken away to show the safety quick-release lock mechanism in accordance with the invention;

Fig. 5A is a cross sectional view of the front portion of the utility knife shown in Fig. 4 taken along line 5A-5A;

Fig. 5B is similar to Fig. 5A, but illustrating the condition of the elements or components of the quick-release lock mechanism when an external force is

applied to the quick-release button, such as by a finger of the user;

Fig. 6 is an enlarged side elevational view of the blade supporting carriage illustrated in Figs. 4, 5A and 5B, shown in the normal condition when no force is applied to the upper button which unlocks the carriage from moving inwardly or outwardly along the handle within the cavity;

Fig. 7 is a side elevational view of an adjustable safety utility knife with slip resistant elements in accordance with the invention; and

Fig. 8 is a cross sectional view of the utility knife shown in Fig. 7, taken along line 8-8.

DESCRIPTION OF A PREFERRED EMBODIMENT

[0013] Referring now to the figures, in which identical or similar parts are designated by the same reference numerals throughout, and first referring to Fig. 1, an adjustable safety utility knife in accordance with the present invention is generally designated by the reference numeral 10.

[0014] The utility knife 10 includes an elongated ergonomically shaped handle 12 formed of two elongate shell members 14a, 14b, each having a peripheral edge 16a, 16b, respectively, and outer generally convex surfaces 18a, 18b, and inner generally concave surfaces 20a, 20b, respectively. A suitable fastener, such as a transverse screw 22 (Fig. 1) is provided for fastening the shell members 14a, 14b to each other at the peripheral edges 16a, 16b along a vertical parting plane P- (Fig. 2) to form an elongated internal cavity or compartment 24. The handle 12 defines a front end 26, a back end 28 and an intermediate portion 30 suitable to be gripped by the user, and also defines top and bottom surfaces 32, 34, respectively. Top and bottom surfaces extend along the top and bottom surfaces of the shell members 14a, 14b along the peripheral edges. The handle 12 has a conventional slot-like aperture 36 (Fig. 1) and a front end 26 substantially aligned with the parting plane P and dimensioned for passage of a flat cutting blade 38 therethrough. A guide member, in the form of a cartridge 39, is provided within the cavity 24, in the front end 26 for guiding the cutting blade 38 between a first portion for safely storing the blade 40 inside of the cavity and a second position for selectively extending the blade beyond the aperture 36 for exposing a portion thereof, as shown in Fig. 1.

[0015] A manually operated button 40, of the type frequently used in utility knives, is arranged on the top surface 32 and coupled to the guide element for selectively moving the blade 38 between the first and second positions.

[0016] Slip resistant elements 42, 44 are provided and arranged on the top and bottom surfaces 32, 34,

respectively. The elements generally conform to the outer convex surfaces 18a, 18b and enhance the gripping action of the handle 12 and minimize slippage of the handle during use.

[0017] As the shell members are fastened together by means of a single fastener in the nature of a screw 22, the shell members are preferably provided with one or more cutouts or recesses in one of the shell members and extensions in the other shell member that mates therewith. In the embodiment illustrated in Fig. 1, the shell member 14a is provided at the front end 26 thereof with upper and lower recesses or cutouts R1, R2 that receive transverse extensions E1, E2 that are integrally formed on the opposing shell member 14b. It will be appreciated that when the recesses and extensions mate and interlock as shown, it will be clear that the shell members will not have a tendency to pivot or shift in relation to each other.

[0018] The blade guide or carriage 39 is mounted on suitable guide surfaces (not shown) for guiding the cutting blade between a first retracted position for storing the blade fully inside the cavity and a second position for selectively extending the blade beyond the aperture 36 to expose at least a portion thereof, as shown in Fig. 1.

[0019] The manually operated button 40 is arranged on the top surface 32 and coupled to the guide element 39 for selectively moving the blade between the first and second positions.

[0020] Referring to Figs. 1, 2A and 2B, the handle 12 has a rear opening at the back end 28 for providing access to the elongated internal cavity 24. The opening is formed by a recess R3 which removes the rear part of the shell 18a up to the vertical edge R3' (Fig. 2B), retaining an arcuate or curved surface 12n which forms part of the back end of the shell member 18b, as best shown in Figs. 2A and 2B. A carrier frame is generally designated by the reference numeral 50, which has a blade receiving compartment 50' and is dimensioned to be removably receivable from within the cavity 24 through the rear opening between a retracted position as shown in Fig. 2A, in which the carrier frame 50 is fully stored within the internal cavity 24 of the handle and an extended position shown in Fig. 2B in which the carrier frame 50 is at least partially moved exteriorly of the back end to provide access to the cartridge receiving compartment. A blade cartridge 52 is provided which is slidably receivable within the carrier frame for storing a plurality of flat cutting blades 38 receivable within the blade cartridge receiving compartment 50', each of the blades being fully removable through a rear slot formed by a carrier frame slot 50b and cartridge slot 52 that are aligned with each other as best shown in Figs. 2A and 2B.

[0021] The carrier frame 50 includes an arcuate portion having a curved surface 50a that generally conforms with the arcuate curved surface 12n (Fig. 2A) of the handle so that when the carrier frame is within the

cavity 24 the exterior surfaces 50a, 12n of the carrier frame and the back of the handle blend to provide a unitary shape or appearance. A generally vertical slot 50b is provided in the arcuate surface or wall 50a.

[0022] The carrier frame has a lateral wall 50c, most proximate to the shell member 18b, and an opposing wall 50d which is substantially in line or co-planar with the wall of the shell member 18a, an outwardly directed tapered hook being formed at the end of a rearwardly projecting tab 50g. At the end of the carrier frame 50 remote from the curved surface 50a there is provided a rear wall 50h which includes a vertical tab 50i on the exterior surface of which there is provided a tapered projection 50j. The projection 50j becomes operative when the carrier is moved from its retracted to its extended positions shown in Fig. 2B, the projection 50j serving as a limit stop by engaging a positioning rib 12d formed on the shell member 18a. A similar vertical projection 12e is provided on the inside surface 20b of the shell member 18a to serve as a positioning member for maintaining the lateral position of the carrier frame within the cavity 24. Thus, in its extended position the projection 50j engages the vertical rib 12d, while movement of the carrier frame interiorly to its fully retracted position causes the tapered hook 50f to engage a tapered projection 12h formed on the inner surface 20a of the shell member 18a, as best illustrated in Fig. 2A.

[0023] Slits 50e provided above and below the wall extension 50g render the wall 50d more flexible in the intermediate region thereof, facilitating the depression or deflection of the wall extension 50g when the carrier frame needs to be removed. By pressing on the wall 50d, substantially at the center thereof, the tapered hook 50f clears the tapered projection 12h to allow the carrier frame to slide out from within the housing of the handle, as shown in Fig. 2B.

[0024] A cartridge 52 that contains the cutting blades is generally designated by the reference numeral 52. In order to substantially fix the position of the cartridge 52 within the carrier frame 50 during normal operation, a number of features are provided that secure the cartridge against movements relative to the carrier frame. Thus, inclined edges 52a on the cartridge are received within corresponding inclined indentations or recesses 50k within the inside surface 20b of the shell member 18b. Additionally, an upwardly extending limit tab 52b is provided on the cartridge which abuts against the inner surface of the upper end of the inclined surface 50a of the carrier frame, as shown in Fig. 3. Also, formed on the bottom wall 52c of the cartridge there is advantageously provided a lateral limit tab 52d which abuts against the inner surface of the wall 50d, to prevent undesired lateral movements and to ensure alignment of the slot 52s in the rear wall 52w with the slot 50b in the carrier frame. In order to further ensure the positional stability of the unit during normal use, the cartridge is preferably with a rear wall 52q that generally conforms to the interior surface or shape of the rear wall

50h of the carrier frame member, which permits the two aforementioned components to be separated only by a relative sliding downward movement of the cartridge in relation to the carrier frame, as best shown and suggested by the arrow M in Fig. 3. An additional positioning wall 50y is advantageously provided that extends downwardly as shown in Fig. 3 to capture the wall 52q of the cartridge. With this construction, therefore, the cartridge is fully captured within the carrier frame and shares all linear, sliding movements therewith as the carrier frame is extended and retracted into the handle.

[0025] Mounted on the inside surface of the wall 52e of the cartridge 52, substantially centrally of the longitudinal length of the cartridge, there is provided a retaining standoff 52h to each lateral side of which there are provided vertical ribs 52f, 52g as shown in Figs. 2A and 2B. A leaf spring 54 has a central portion thereof captured between the retaining standoff 52h and the wall 52e and is prevented from shifting laterally by the vertical ribs 52f, 52g. The leaf spring 54 has two lateral spring members or wings which are bent forwardly towards an opening 52i in the wall 52j of the cartridge. It will be clear that insertion of cutting blades 38 within the cartridge, as shown, will be urged or biased towards the opening 52i by means of the leaf spring, so that if there are any blades within the cartridge, one of these blades will be in abutment against the wall 52j and accessible for finger contact through the opening 52i.

[0026] While the longitudinal length of the inner cartridge is substantially equal to the maximum dimension of the blades, the blades are prevented from shifting within the cartridge by means of a movable tab 50k provided at the top of the cartridge which is hinged, such as by a plastic hinge 50m at one end and having a downwardly directed right angle finger 50n dimensioned to be received within a conventional open notch at the upper edge of the cutting blade. When the assembly of the carrier frame and the cartridge are inserted into the handle, the tab 50k is automatically forced downwardly by the inside surface 12y (Fig. 1) of the shell members, causing the finger 50n to be moved into one of the notches of the blade(s) thereby maintaining all of the blades in alignment within the cartridge. When a blade is removed from the cartridge and the carrier frame is withdrawn or brought to its extended position shown in Fig. B, the movable tab 50k clears the surface 12y and the tab is resiliently lifted to the position shown in Fig. 3, clearing the notches and allowing a blade to be removed from the cartridge. If the cartridge is not made from a plastic material to allow use of a plastic hinge, the tab 50k may also be mounted using a standard hinge and a suitable spring may be used to urge the tab to go to the position shown in Fig. 3.

[0027] In use, when a blade needs to be extracted or removed from the cartridge, the wall 50d is initially manually pressed inwardly, allowing the tapered hook 50f to clear the tapered projection 12h. This permits the carrier frame to be moved outwardly until the tapered

projection 50j comes into abutment with the positioning rib 12d. In this position, the opening or window 52i, concealed when in the retracted position shown in Fig. 2A, becomes exposed and a user may, using his or her finger, contact the outermost blade that abuts the wall 52j of the cartridge and slide the blade rearwardly through the aligned slots 52s and 50b to extract the blade. When removal is completed, the carrier frame may be slid back into the housing of the handle 12 to the position shown in Fig. 2A, at which point the carrier frame becomes locked within the handle by means of the tapered hook 50f and the tapered projection 12h.

[0028] It will be noted from the foregoing that the removable blade holder in accordance with the invention ensures that the blades are always securely stored within the holder and within the cartridge, the possibility of blades inadvertently falling out of the unit being extremely remote because of the dual encasement construction. Also, the removal of the blades is easy and convenient. Because there is a separate blade cartridge 52, individual blades need not be handled when the blades are inserted into the unit for future use. The cartridge 52 is, preferably, supplied to the user as a pre-packaged unit so that the cartridge can simply be inserted and snapped into place without ever touching the blades. Inadvertent opening of the blade compartment is, therefore, virtually impossible. The resulting design is, therefore, extremely safe to use and virtually child-proof. As indicated, even if the carrier frame is withdrawn, this would not expose the dangerous cutting edges of the blades. The additional step of manually sliding a blade, through the opening or window 52i, would need to be taken to remove the blade from the cartridge.

[0029] The utility knife 10 includes an elongated ergonomically shaped handle 112 formed of two elongate shell members 114a, 114b, each having a peripheral edge 116a, 116b, respectively (Fig. 5), and outer, generally convex surface 118a, 118b and an inner generally concave surface 120a, 120b, respectively. A suitable fastener, such as a transverse screw 122 (Fig. 4) is provided for fastening the shell members 114a, 114b to each other at the peripheral edges 116a, 116b (Figs. 5A, 5B) along a vertical parting plane P (Fig. 5) to form an elongated internal cavity or compartment 124. The handle 112 defines a front end 126, a back end 128 and an intermediate portion 130 suitable to be gripped by the user, also defining top and bottom surfaces 132, 134, respectively, extending along the tops and bottom sides of the shell members 114a, 114b along the peripheral edges. The handle 112 has a conventional slot-like aperture 136 (Fig. 4) and a front end 126 substantially aligned with the parting plane P and dimensioned for passage of a flat cutting blade 138 therethrough. A guide member, in the form of a carriage 139, is provided within the cavity 124, in the front end 126, for guiding the cutting blade 138 between a first position for safely storing the blade 140 inside of the

cavity and an extended second position for selectively extending the blade beyond the aperture 136 for exposing a portion thereof, as shown in Fig. 4. A manually operated button 140, of the type frequently used in utility knives of this kind, is arranged on the top surface 132 and coupled to the guide element or carriage 139 for selectively moving the blade 138 between the first and second positions.

[0030] Slip resistant elements 142, 144 are secured between the shell members or the top and bottom surfaces 132, 134, respectively, between a rearwardmost operative position of the manually operative button and the back end 128. The slip resistant elements 142, 144 generally conform to the outer convex surface 118a, 118b and enhance the gripping of the handle 112 and minimize slippage of the handle during use of the utility knife when gripped by the user.

[0031] As the shell members are fastened together by means of a single screw 122, the shell members are preferably provided with one or more cutouts or recesses in one of the shell members and extensions in the other shell member that mate therewith. In the embodiment illustrated in Fig. 4, the shell member 114a is provided at the front end 126 thereof with upper and lower recesses or cutouts R1, R2 that receive transverse extensions E1, E2 which are integrally formed on the opposing shell member 114b. It will be appreciated that when the recesses and extensions mate and interlock as shown, it will be clear that the shell members will not have a tendency to rotate or shift in relation to each other.

[0032] The blade guide element or carriage is mounted on suitable guide surfaces 112a, 112b for guiding the cutting blade between a first position for safely storing the blade fully inside the cavity 124 and a second position for selectively extending the blade beyond the aperture 136 to expose at least a portion thereof, as shown in Fig. 4.

[0033] The manually operated button 140 is arranged on the top surface 132 and coupled to the guide element or carriage for selectively moving the blade between the first and second positions.

[0034] Referring to Fig. 4, the housing is shown broken away to illustrate the general position of the blade guide member or carriage 139 within the elongated internal cavity 124 for supporting the flat cutting blade. Guide surfaces 112a, 112b (Fig. 4) are provided on at least one of the inner generally concave surface 120a, 120b for guiding the carriage 139 and cutting blade between the first and second or extended and retracted positions. A plurality of teeth 112c (Fig. 4) are provided along the longitudinal length direction D1 of the front end of the housing 112, the teeth being shown arranged along a straight or linear path for reasons to be more fully apparent hereafter.

[0035] Referring to Figs. 5A, 5B and 6, the details of the carriage 139 for enabling the safe, quick release of the blade 134 will be described. The carriage includes a

substantially planar body 139a (Fig. 6), preferably formed of a metal, although other materials may be used. Spaced ribs or ledges 139b, 139c are generally aligned with each other as shown, and define a generally rectangular opening or space 139d within the body 139a. A lower ledge or rib 139d is provided which is parallel to the ribs 139b, 139c, and the opposing ribs are spaced from each other to substantially correspond to the height of the blade 138 so that the blade can be received between the opposing ribs with small clearance. While the ribs 139b - 139d project towards the shell 118a (out of the paper, as viewed in Fig. 6), the body 139a is provided with spaced and substantially parallel projections 139g and 139h which extend towards the shell member 118b (into the page, as viewed in Fig. 6). The projection 139g includes an opening 139i and the projection 139h includes an opening 139j to accommodate the stem 140b on which the button 110 is supported to enable the button and the stem to move vertically in relation to the body 139a. A helical compression spring 146, captured between the projections 139g, 139h, normally urges the button and stem to move upwardly in relation to the body 139a, bringing mating teeth 140c on the stem 140b to be generally aligned and interlock with the teeth 112c on the housing of the handle 112. When so engaged or interlocked, the body 139a becomes locked in place and cannot move forwardly or rearwardly in relation to the handle. However, when the button 110 is depressed inwardly, the teeth 140c are moved downwardly in relation to the teeth 112c and the interlocking relationship is disrupted so that the user can slide the carriage 139 forwardly or rearwardly on the guides 112a, 112b.

[0036] A pawl 148 is provided with a vertical cylindrical boss 148a through which a vertical pin 150 extends between the projections 139g and 139h to render the pawl 148 pivotable about the axis A of the pin. The pawl includes a front portion 148b forwardly of the pin 150 and a rear portion 148c, rearwardly of the pin 150. A compression spring 152 is disposed between the body 139a and the rear portion 148c to normally rotate the pawl 148 in a counterclockwise direction when the carriage is viewed from the top. Such normal disposition of the pawl maintains a right angle finger 148d extending through the opening 139d a distance sufficient to engage one of the notches 138a, 138b formed in the upper edge of the blade 138. The finger 148d, therefore, normally locks the blade from moving in relation to the carriage.

[0037] As indicated, therefore, the right angle finger 148d, which is in the nature of a lock or blocking element normally locks the cutting blade mounted thereon to substantially fix the cutting blade against relative longitudinal movements between the cutting blade and the carriage.

[0038] Referring to Figs. 5A and 5B, a quick release mechanism 154 is illustrated on the shell member 118b. The quick release mechanism 154 includes a pin 156

extending through an opening 112c in the shell member 118b, the pin 156 being slidably mounted along a direction generally normal to the axis A of the pin 150. A cap or button 158 is provided which covers the pin 156 and is provided with an exterior shape or configuration suitable for manual depression. The pin 156 may be secured to the wall of the shell member 118b in any suitable or conventional manner, washer 160 being shown, the end of the pin 156 extending inwardly beyond the washer 160 being enlarged in any conventional way, such as by flaring, to permit the pin to move inwardly into the cavity but not to permit the pin from moving outwardly beyond the condition indicated in Figs. 5A, 5B. The axis B of the pin 156 is preferably aligned with the spring 152, the interior end of the pin 156 and spring 152 being arranged on opposite sides of the rear portion 148c of the pawl 148. Thus, when no exterior pressure is applied to the cap 158 and pin 156, the compression spring 152 is selected to be sufficiently strong to rotate the pawl 148 in a counterclockwise direction, as viewed in Fig. 5A, so that the locking finger 148d is received within an upper notch of the blade 138, while the pin 156 and cap 158 are urged outwardly to the maximum extent permitted by the washer 160. However, when it is desired to remove the blade 138 through the front opening or aperture 136, the user presses the quick release cap 158, thereby overcoming the forces exerted by both the springs 152 and 162, thereby rotating the pawl 148 in a clockwise direction, as viewed in Fig. 5A, to the condition shown in Fig. 5B, in which the locking finger 148d is removed or extracted from the upper notch of the blade 138. Under this condition, there is nothing retaining the blade 138 from movement in relation to the carriage 139 and the blade may be easily and conveniently pulled forwardly out of the utility knife housing. The same procedure can be applied for inserting a new blade. As long as the cap 158 is maintained in a depressed position, by applied of force F, the locking finger 148b is displaced from its normal position and provides a clear path for the blade to be either inserted or withdrawn. Once the blade is inserted into the unit, the cap 158 may be released and the blade locked in place as illustrated in Fig. 5A.

[0039] It will be appreciated that the above described quick release mechanism 154 overcomes the difficulty with some prior art designs in which all of the components or elements used to provide some of the functions described above are separable. Therefore, when the shell members 118a, 118b are removed or separated, the numerous components, including the springs, all separate and it becomes very difficult to reassemble the elements in a way that makes them readily functionable. With the present design, the carriage 139 is made as a single unitary unit, all of the components described, with the exception of the release mechanism or button 154, are all mounted on the body 139a of the carriage 139. Therefore, if the shell members 118a, 118b are separated, it becomes a simple

matter to simply reposition the body 139a on the guide ledges 112a, 112b and the unit can be quickly and conveniently reassembled since all of the springs, the pawl, etc., are all permanently mounted on the body 139a.

[0040] The utility knife 10 includes an elongated ergonomically shaped handle 212 formed of two elongate shell members 214a, 214b, each having a peripheral edge 216a, 216b, respectively, and outer, generally convex surface 218a, 218b and an inner generally concave surface 220a, 220b, respectively. A suitable fastener, such as a transverse screw 222 (Fig. 7) is provided for fastening the shell members 214a, 214b to each other at the peripheral edges 216a, 216b along a vertical parting plane P (Fig. 8) to form an elongated internal cavity or compartment 224. The handle 212 defines a front end 226, a back end 228 and an intermediate portion 230 suitable to be gripped by the user, also defining top and bottom surfaces 232, 234, respectively, extending along tops and sides of the shell members 214a, 214b along the peripheral edges. The handle 212 has a conventional slot-like aperture 236 (Fig. 7) and a front end 226 substantially aligned with the parting plane P and dimensioned for passage of a flat cutting blade 238 therethrough. A guide member, in the form of a carriage 238, is provided within the cavity 224, in the front end 226 for guiding the cutting blade 238 between a first portion for safely storing the blade 240 inside of the cavity and a second position for selectively extending the blade beyond the aperture 236 for exposing a portion thereof, as shown in Fig. 7. A manually operated button 240, of the type frequently used in utility knives of this kind, is arranged on the top surface 232 and coupled to the guide element for selectively moving the blade 238 between the first and second positions.

[0041] In accordance with an important feature of the present invention, slip resistant elements 242, 244 are provided and arranged on the top surface 232 and coupled to guide mechanism for selectively moving the blade 238 between the first and second positions.

[0042] A feature of the present invention is the provision of the slip resistant elements 242, 244 secured between the shell members or the top and bottom surfaces 232, 234, respectively, between a rearwardmost operative position of the manually operative button and the back end 228. The slip resistant elements 242, 244 generally conform to the outer convex surface 218a, 218b and enhance the gripping of the handle 212 and minimize slippage of the handle during use of the utility knife when gripped by the user.

[0043] As the shell members are fastened together by means of a single screw 222, the shell members are preferably provided with one or more cutouts or recesses in one of the shell members and extensions in the other shell member that mate therewith. In the embodiment illustrated in Fig. 7, the shell member 214a is provided at the front end 226 thereof with upper and lower recesses or cutouts R1, R2 that receive transverse extensions E1, E2 which are integrally formed on

the opposing shell member 214b. It will be appreciated that when the recesses and extensions mate and interlock as shown, it will be clear that the shell members will not have a tendency to rotate or shift in relation to each other.

[0044] The blade guide element or carriage 239 is mounted on suitable guide surfaces (not shown) for guiding the cutting blade between a first position for safely storing the blade fully inside the cavity 224 and a second position for selectively extending the blade beyond the aperture 236 to expose at least a portion thereof, as shown in Fig. 7.

[0045] The manually operated button 240 is arranged on the top surface 232 and coupled to the guide element or carriage for selectively moving the blade between the first and second positions.

[0046] Slip resistant elements 242, 244 are secured to the shell members 214a, 214b along the top and bottom surfaces between a rearwardmost operative position of the manually operated button 240 and the back end, the slip resistant elements 242, 244 generally conforming to the outer convex surface of the handle housing and enhance the gripping by the user of the handle and minimize slippage of the handle during use of the utility knife when gripped by a user.

[0047] Preferably, the slip resistant elements 242, 244 are formed of an elastomeric or rubber-like material.

[0048] The specific manner of attaching the slip resistant elements 242, 244 to the handle 212 is not critical, and any suitable or conventional method of attaching same to the handle may be used. Referring to Fig. 8, however, one presently preferred embodiment is illustrated in which the slip resistant elements 242, 244 are generally in the form of rectilinear strips having first and second predetermined lengths L1, L2 along the top and bottom surfaces, respectively. The peripheral edges along each of the predetermined lengths of the top and bottom surfaces have generally U-shaped offsets to each side of the parting plane P which together form a generally elongate rectangular opening defining opposite edges 246a, 246b that are generally parallel to the parting plane. Each slip resistant element 242, 244 has dimensions substantially corresponding to an associated rectangular opening and has opposite lateral grooves 242a, 242b arranged to receive associated edges 246a, 246b in a tongue-and-groove configuration to secure each strip within an associated opening in the handle housing.

[0049] While it is not critical, the predetermined lengths L1 and L2 need not be equal to each other. However, in the preferred embodiment they are approximately equal to each other to provide the user with a substantial gripping area.

[0050] Each of the slip resistant elements is formed so as to enhance the gripping action. Thus, the elements are preferably provided with external grip enhancing protuberances. In the embodiment shown,

such protuberances are in the form of a plurality of transverse ribs that extend in a direction generally normal or transverse to the parting plane P.

[0051] As best shown in Fig. 7, the handle 212 is formed of forward and rearward handle portions, each of which is substantially straight and defines a longitudinal direction, directions D21 and D22, as indicated in Fig. 7. The longitudinal directions are slightly angularly offset from each other, the slip resistant material being placed on a substantial length of the rear handle portion. Towards that end, each of the slip resistant elements preferably protrudes slightly beyond the top and bottom surfaces to provide a positive grip with the hand of the user. In the embodiment shown, such slip resistant strips form generally outwardly shaped arcuate profiles along the longitudinal directions of the handle. The specific shape and surface texture, however, is not critical. Thus, for example, the slip resistant elements may also be formed of a foam-like material of sufficient density to withstand significant squeezing action or pressures applied thereon.

[0052] The handle 212 is also shown in Fig. 7 to include a channel C proximate to the front end 226 and along the bottom surface 234 which can be used to cut filamentary material such as string or rope, even when the blade 238 is fully retracted, as the edge continues to rotate relative to each other.

Claims

1. An adjustable safety utility knife comprising an elongated ergonomically shaped handle formed of two elongate shell members each having a peripheral edge and an outer generally convex surface and an inner generally concave surface; fastening means for fastening said shell members at said peripheral edges along a vertical parting plane to form an elongated internal cavity, said handle defining a front end, a back end and an intermediate portion suitable for being gripped by a user and also defining top and bottom surfaces extending along opposite sides of said shell members along said peripheral edges, said handle having a slot-like aperture at said front end substantially aligned with said parting plane and dimensioned for passage of a flat cutting blade therethrough; guide means within said elongated cavity for guiding the cutting blade between a first position for safely storing the blade fully inside said cavity and a second position for selectively extending the blade beyond said aperture to expose at least a portion thereof; a manually operated button arranged on said top surface and coupled to said guide means for selectively moving the blade between said first and second positions, said handle having a rear opening at said back end for providing access to said elongated internal cavity; a carrier frame having a blade cartridge receiving compartment and dimensioned to be removably receivable within said cavity through said rear opening between a retracted position in which said carrier frame is fully stored within said internal cavity of said handle end and an extended position in which said carrier frame is at least partially moved exteriorly of said back end to provide access of said cartridge receiving compartment; and a blade cartridge for storing a plurality of flat cutting blades receivable within said blade cartridge receiving compartment.
2. An adjustable safety utility knife as defined in claim 1, wherein said carrier frame has a rear wall that generally conforms with the configuration of said outer convex surface of said handle, said rear wall having a rear slot-like aperture generally parallel to said parting plane and dimensioned for passage of a flat cutting blade therethrough.
3. An adjustable safety utility knife as defined in claim 2, wherein said cartridge has a width suitable for storing a plurality of flat cutting blades, said carrier frame having parallel lateral walls spaced from each other along a direction transverse to said cutting plane; and biasing means in contact with one of said lateral walls for urging any flat cutting blades against the other of said lateral walls.
4. An adjustable safety utility knife as defined in claim 3, wherein said rear aperture is generally aligned with the position of the flat cutting blade in contact with said other of said lateral walls, said cartridge being provided with a blade-passing opening facing said rear wall, whereby a flat cutting blade can be moved out of said cartridge and through said rear aperture for removal and insertion through said front aperture for use.
5. An adjustable safety utility knife as defined in claim 4, wherein said other of said lateral walls is provided with at least one opening to expose at least a portion of the surface of a flat cutting blade in contact with said other of said lateral walls, whereby a user can apply a manual force on the cutting blade and urge the cutting blade to slide out of said cartridge and said carrier frame.
6. An adjustable safety utility knife as defined in claim 5, wherein said at least one opening comprises an elongate opening extending along a direction substantially parallel to the longitudinal direction of said handle.
7. An adjustable safety utility knife as defined in claim 1, further comprising locking means for normally locking said carrier frame in said retracted position within said handle.

8. An adjustable safety utility knife as defined in claim 7, wherein said locking means comprises a fixed stop on at least one of said elongate shell members and a resiliently biased snap tab that engages said fixed stop when said carrier frame is moved to its fully retracted position. 5
9. An adjustable safety utility knife as defined in claim 8, wherein said snap tab is mounted on a manually deflectable portion of said carrier frame that can be manually depressed to cause said snap tab to clear said fixed stop to enable said carrier frame to be moved rearwardly in relation to said handle. 10
10. An adjustable safety utility knife as defined in claim 9, wherein one of said shell members includes a cutout region at said back end forming an edge generally transverse to said longitudinal direction spaced from said back end, said fixed stop being provided on said one of said shell members, said carrier frame having a wall portion that substantially covers said cutout region and includes a resiliently mounted snap supporting portion for supporting said snap tab to normally provide an interference fit with said fixed stop and to cause said snap tab to clear said fixed stop when said snap supporting portion is manually pressed inwardly in the direction of the other of said shell members. 15
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11. An adjustable safety utility knife as defined in claim 1, wherein said shell members are provided with carrier frame guide means for slidably guiding said carrier frame between said retracted and extended positions. 30
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12. An adjustable safety utility knife as defined in claim 1, wherein said carrier frame is totally removable from said handle.
13. An adjustable safety utility knife as defined in claim 1, wherein said shell members are made from a metallic material and said carrier frame is made of a plastic material. 40
14. An adjustable safety utility knife comprising an elongated ergonomically shaped handle formed of two elongate shell members each having a peripheral edge and an outer generally convex surface and an inner generally concave surface; fastening means for fastening said shell members at said peripheral edges along a vertical parting plane to form an elongated internal cavity, said handle defining a front end, a back end and an intermediate portion suitable for being gripped by a user and also defining top and bottom surfaces extending along opposite sides of said shell members along said peripheral edges, said handle having a slot-like aperture at said front end substantially aligned with said parting plane and dimensioned for passage of a flat cutting blade therethrough; guide means within said elongated cavity for guiding the cutting blade between a first position for safely storing the blade fully inside said cavity and a second position for selectively extending the blade beyond said aperture to expose at least a portion thereof; a manually operated button arranged on said top surface and coupled to said guide means for selectively moving the blade between said first and second positions, said guide means including a carriage within said elongated internal cavity for supporting a flat cutting blade and guide elements on at least one of said inner generally concave surfaces for guiding said carriage and cutting blade carried thereby between said first and second positions, said carriage including locking means for normally locking a cutting blade mounted thereon to substantially fix said cutting blade against relative longitudinal movements between said cutting blade and carriage, said locking means including an unlocking element the actuation of which releases said cutting blade to permit relative longitudinal movements between said cutting blade and said carriage; and blade release means on one of said shell members for actuating said unlocking element when manual force is applied thereto, whereby application of a force on said release means releases said cutting blade and enables it to be withdrawn through said front end aperture. 45
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15. An adjustable safety utility knife according to claim 14, wherein said carriage is coupled to said guide means.
16. An adjustable safety utility knife according to claim 14, wherein said carriage slidably receives a cutting blade with small clearance, said flat cutting blade having an aperture therein and said carriage including a locking finger normally extending through said aperture to prevent relative longitudinal movements between said blade and said carriage, said locking finger being removable from said aperture when a pressure is applied to a predetermined portion of said carriage; and a releasing button on one of said shell members normally biased outwardly to clear said carriage and being manually depressible to apply a pressure on said predetermined portion when said carriage is in a preselected position in said handle proximate to said front end, whereby movement of said carriage to said preselected position in said handle and manually depressing said releasing button removes said locking finger from engagement with said cutting blade and permits same to be withdrawn from said carriage and said handle through said front aperture.
17. An adjustable safety utility knife according to claim

14, wherein said carriage is made as a unitary assembly.

18. An adjustable safety utility knife comprising an elongated ergonomically shaped handle formed of two elongate shell members each having a peripheral edge and an outer generally convex surface and an inner generally concave surface; fastening means for fastening said shell members at said peripheral edges along a vertical parting plane to form an elongated internal cavity, said handle defining a front end, a back end and an intermediate portion suitable for being gripped by a user and also defining top and bottom surfaces extending along opposite sides of said shell members along said peripheral edges, said handle having a slot-like aperture at said front end substantially aligned with said parting plane and dimensioned for passage of a flat cutting blade therethrough; guide means within said elongated cavity for guiding the cutting blade between a first position for safely storing the blade fully inside said cavity and a second position for selectively extending the blade beyond said aperture to expose at least a portion thereof; a manually operated button arranged on said top surface and coupled to said guide means for selectively moving the blade between said first and second positions; and slip resistant means secured to said shell members along said top and bottom surfaces between a rearwardmost operative position of said manually operated button and said back end, said slip resistant means generally conforming to said outer convex surface and enhancing gripping of said handle and minimizing slippage of said handle during use of the utility knife when gripped by a user.
19. An adjustable safety utility knife as defined in claim 18, wherein said slip resistant means are formed of an elastomeric material.
20. An adjustable safety utility knife as defined in claim 18, wherein said slip resistant means are formed of a rubber-like material.
21. An adjustable safety utility knife as defined in claim 18, wherein said slip resistant means comprise generally rectilinear strips having first and second predetermined lengths along said top and bottom surfaces, respectively, said peripheral edges along each of said predetermined lengths of said top and bottom surfaces having generally U-shaped offsets to each side of said parting plane which together form a generally elongate rectangular opening defining opposing edges generally parallel to said parting plane, each slip resistant means having dimensions substantially corresponding to an associated rectangular opening and having opposing lateral grooves arranged to receive associated edges of a rectangular opening in a tongue-and-groove configuration to secure each strip within an associated opening.
22. An adjustable safety utility knife as defined in claim 21, wherein said first and second predetermined lengths are approximately equal to each other.
23. An adjustable safety utility knife as defined in claim 18, wherein said slip resistant means comprises elongate strips formed with external grip enhancing protuberances.
24. An adjustable safety utility knife as defined in claim 23, wherein said protuberances comprise a plurality of ribs.
25. An adjustable safety utility knife as defined in claim 24, wherein said ribs extend in directions generally normal to said parting plane.
26. An adjustable safety utility knife as defined in claim 18, wherein said handle is formed of front and rear handle portions each of which is substantially straight and defines a longitudinal direction, said longitudinal directions being slightly offset from each other, said slip resistant means being placed on a substantial length of said rear handle portion.
27. An adjustable safety utility knife as defined in claim 18, wherein said slip resistant means protrude slightly beyond said top and bottom surfaces to provide a position grip with the hand of the user.
28. An adjustable safety utility knife as defined in claim 27, wherein said slip resistant means form generally outwardly shaped arcuate profiles along the longitudinal length direction of said handle.

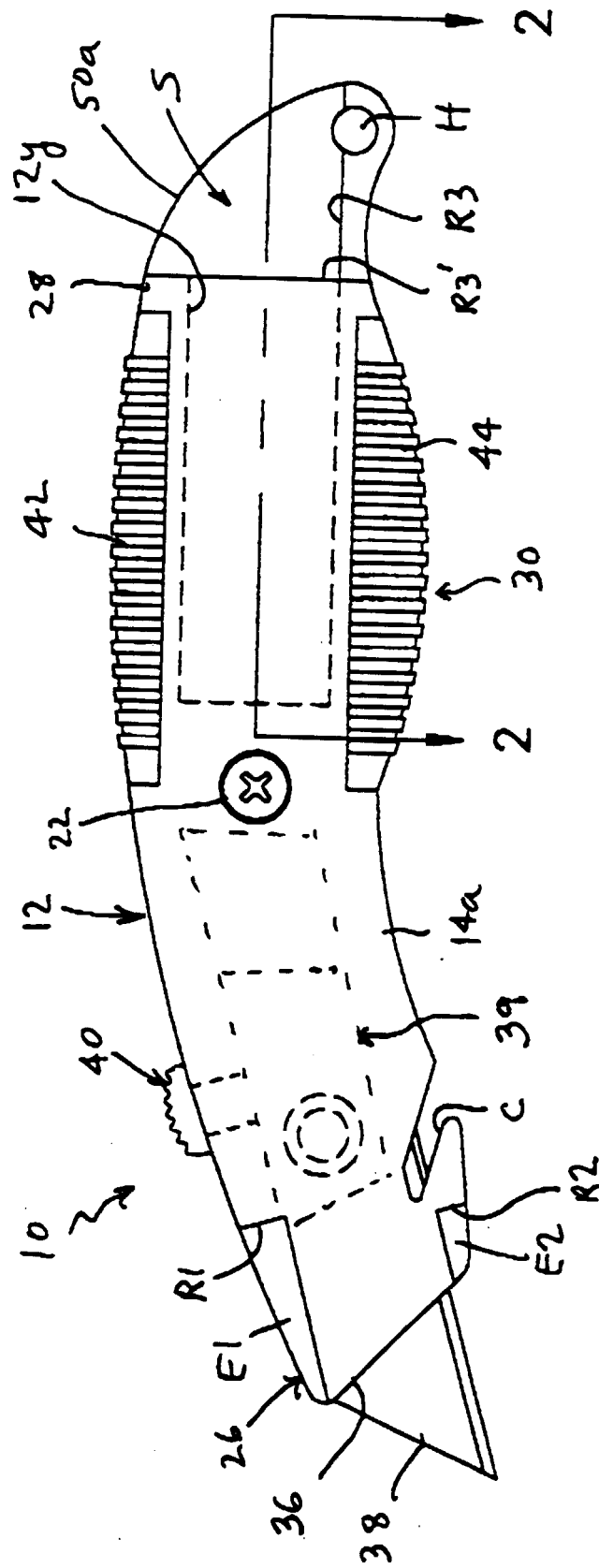


FIG. 1

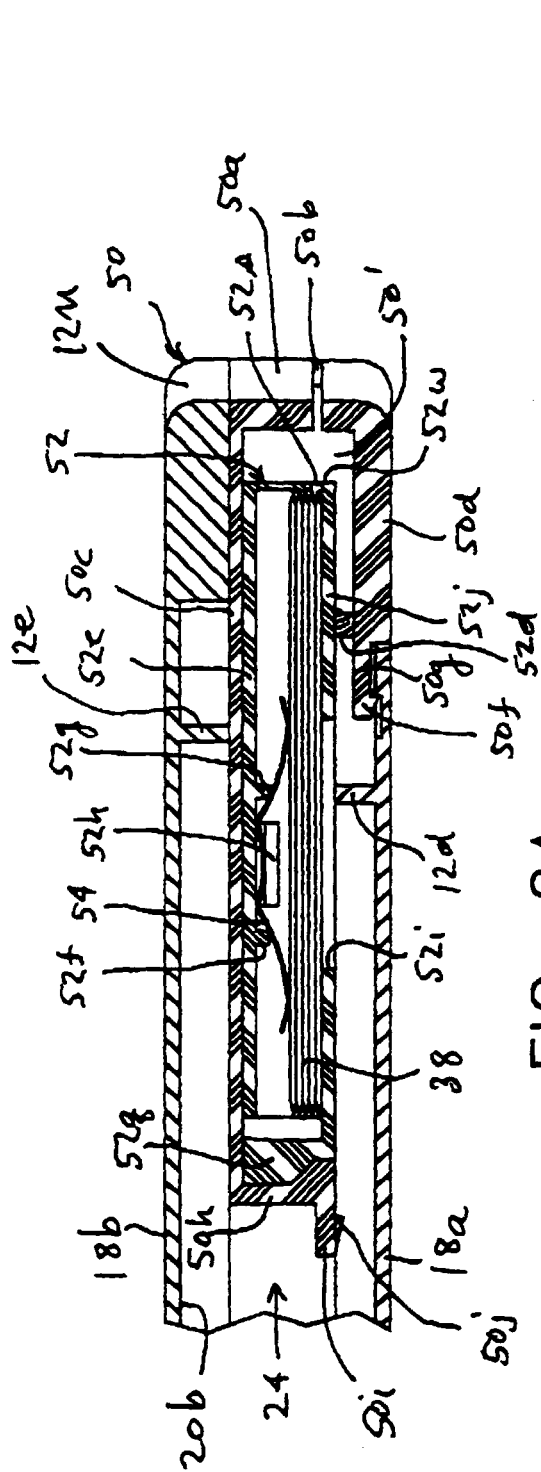


FIG. 2A

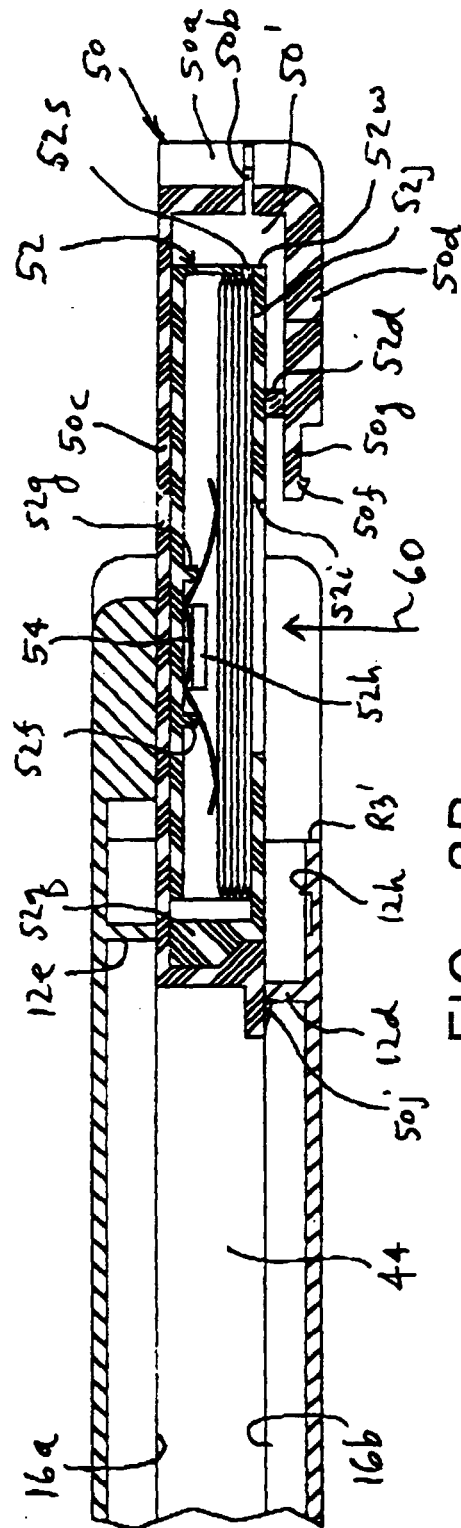


FIG. 2B

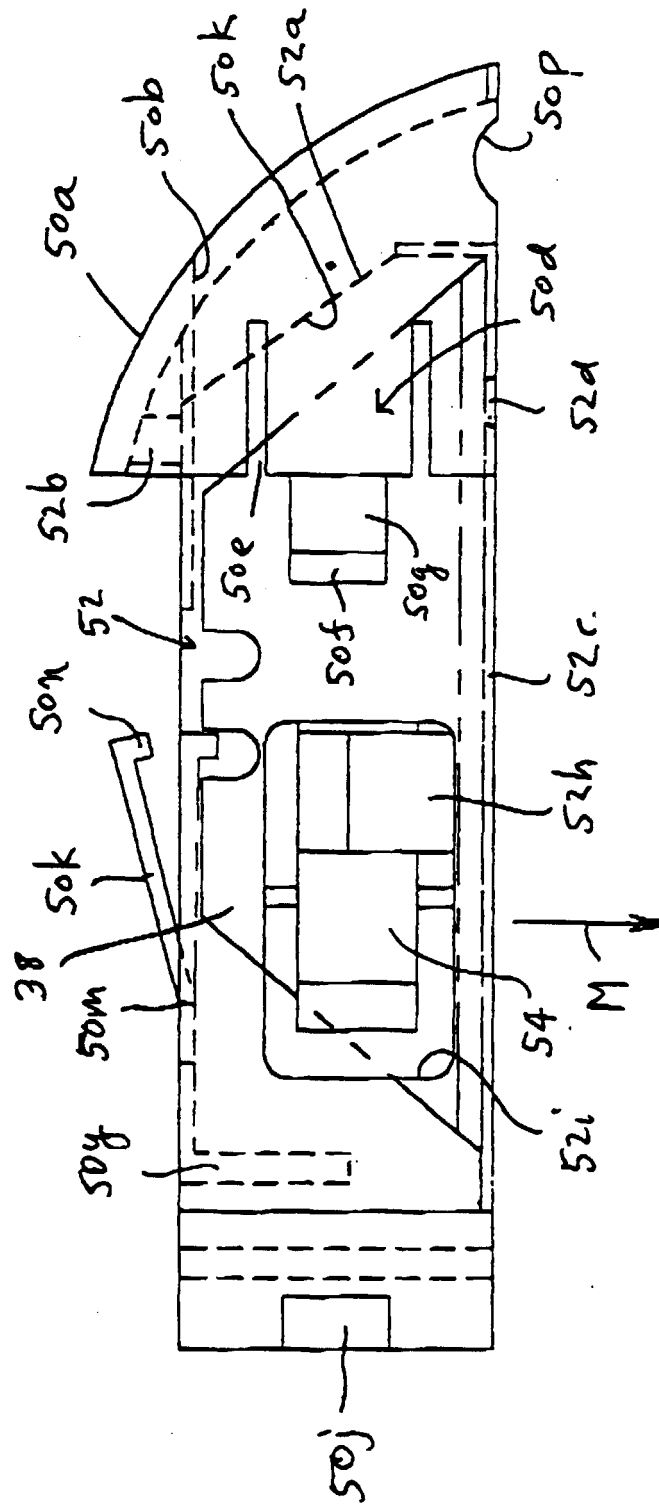


FIG. 3

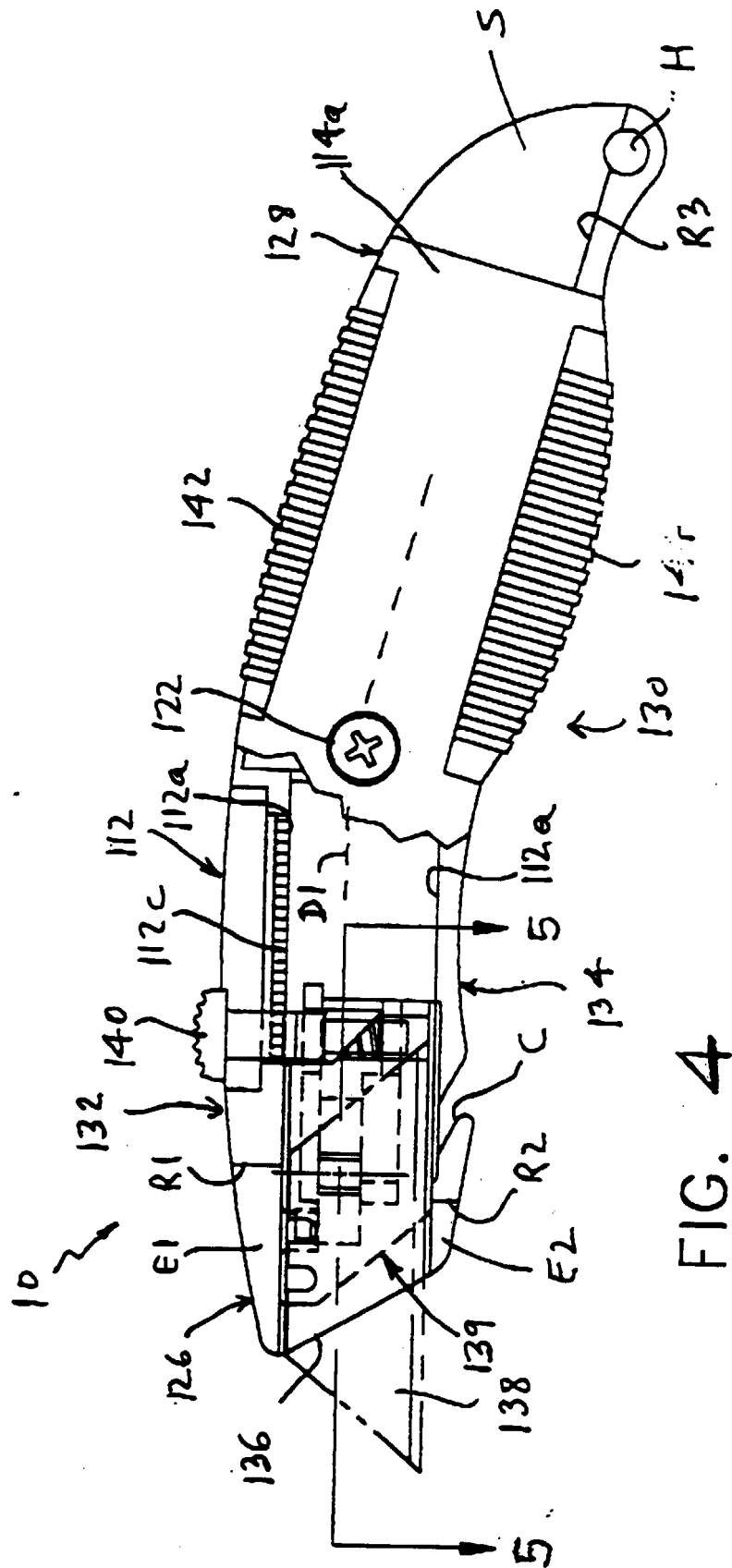


FIG. 4

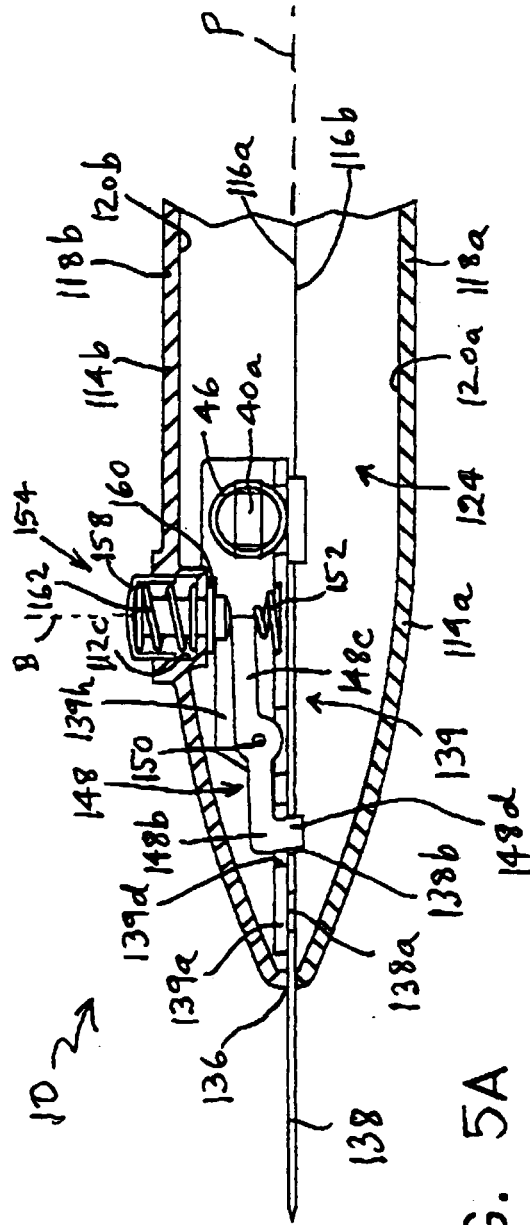


FIG. 5A

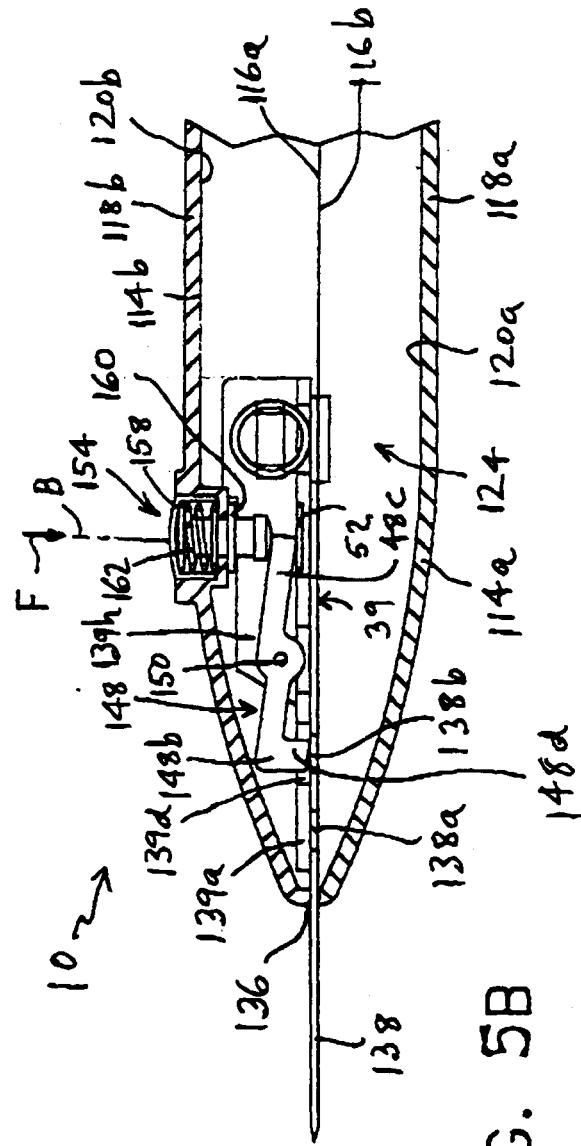


Fig. 5

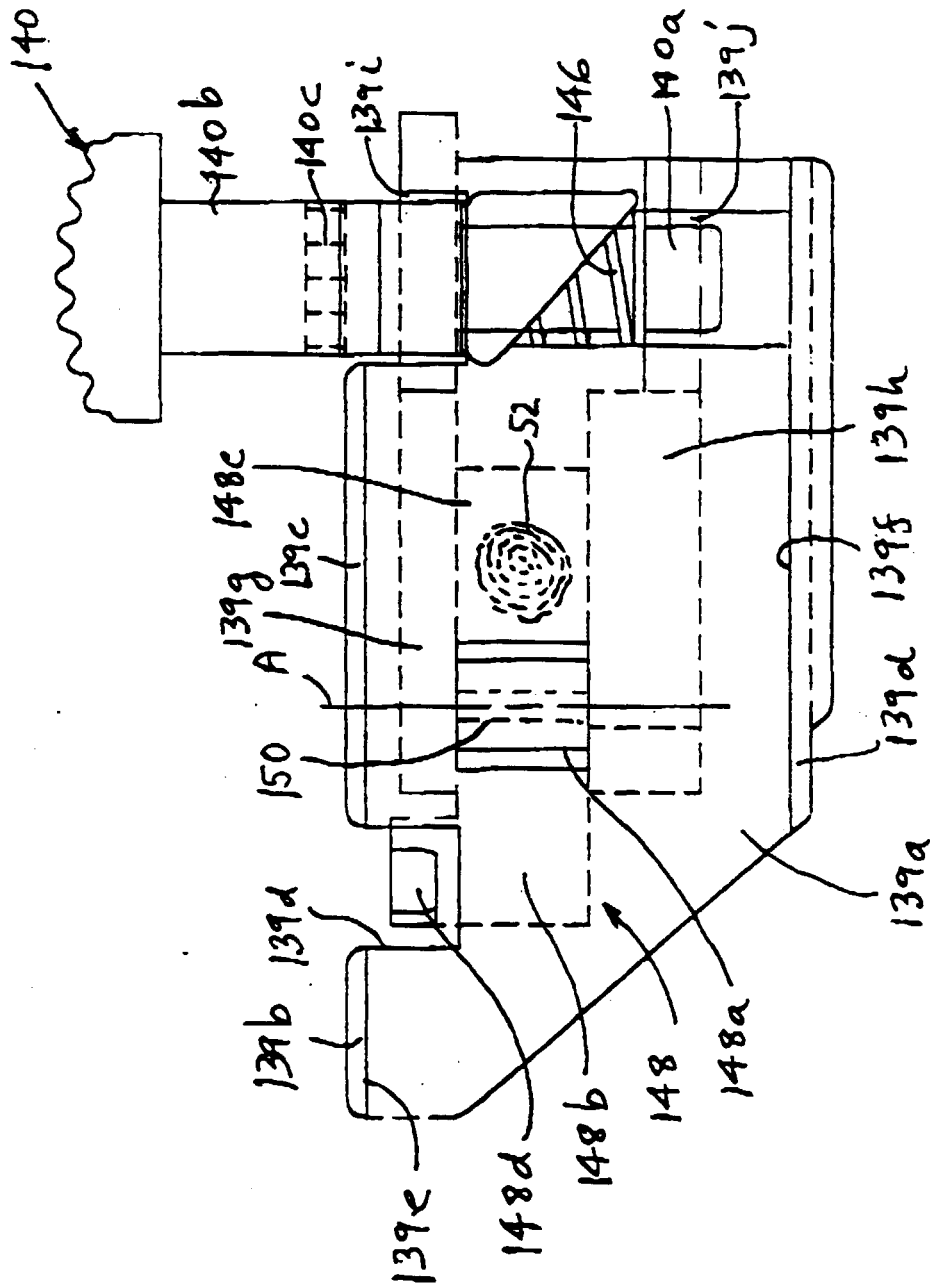
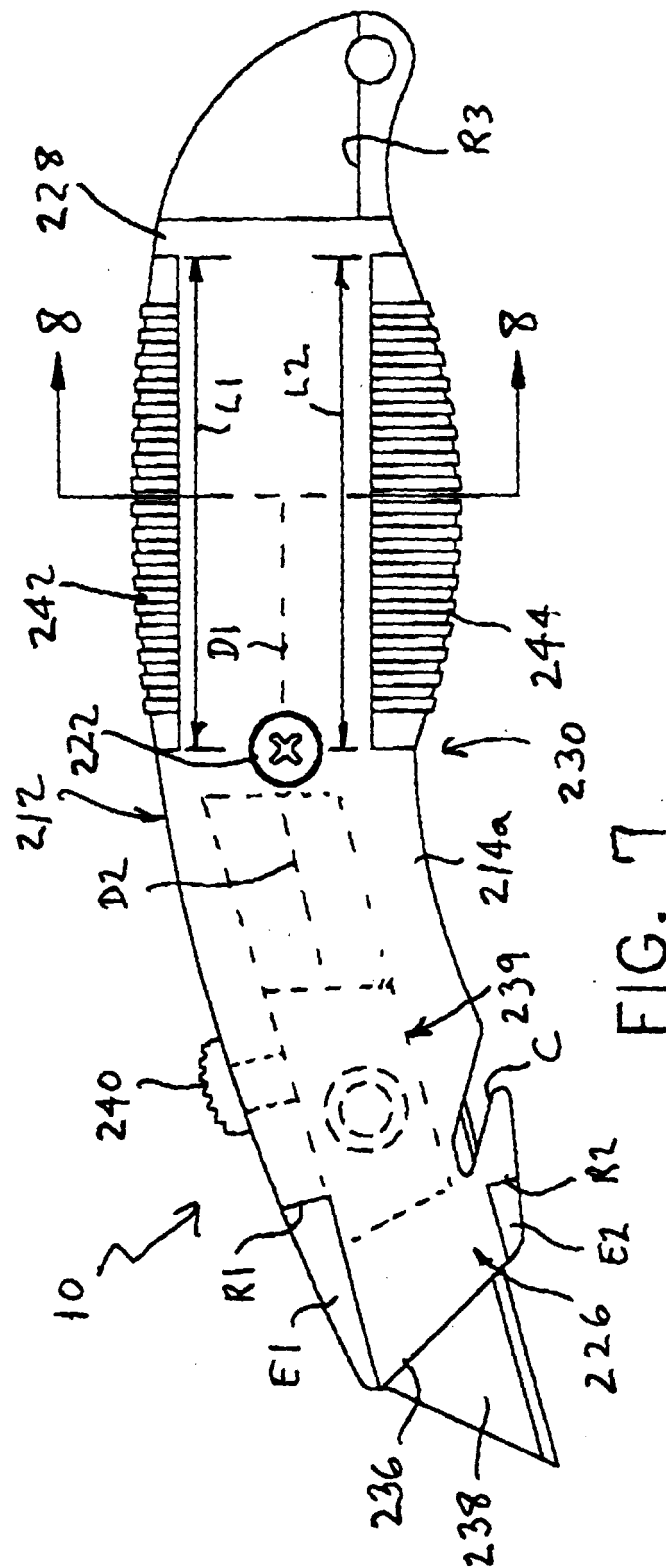


FIG. 6



LEG.

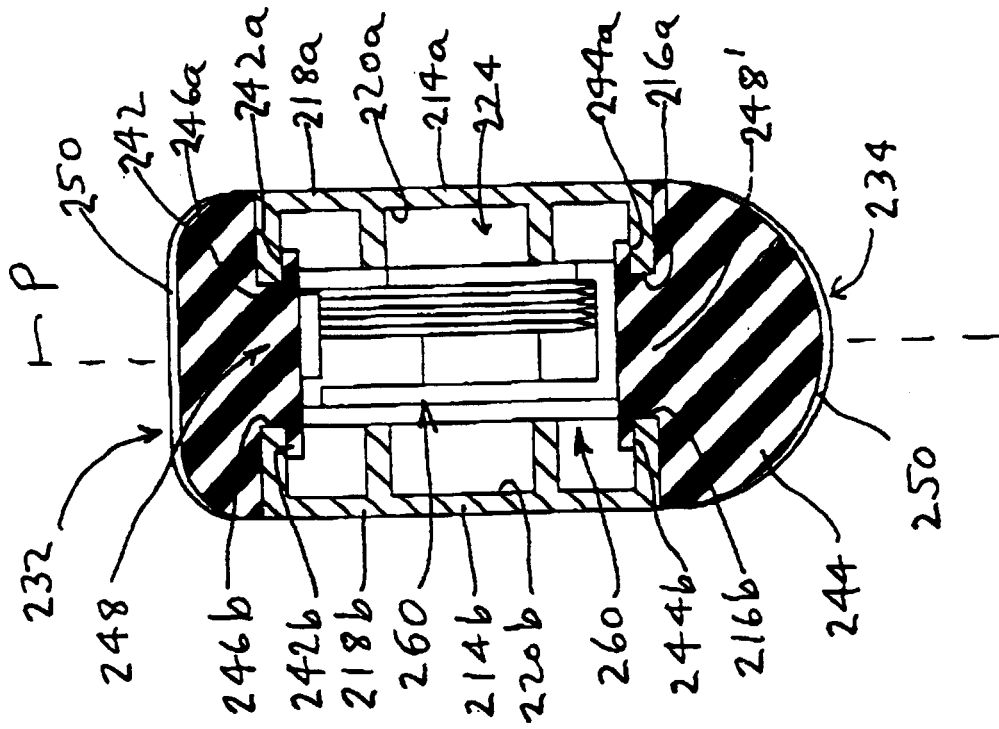


FIG. 8