

July 8, 1969

G. G. LARSON

3,453,729

KNIFE

Filed April 17, 1967

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FIG. 1.

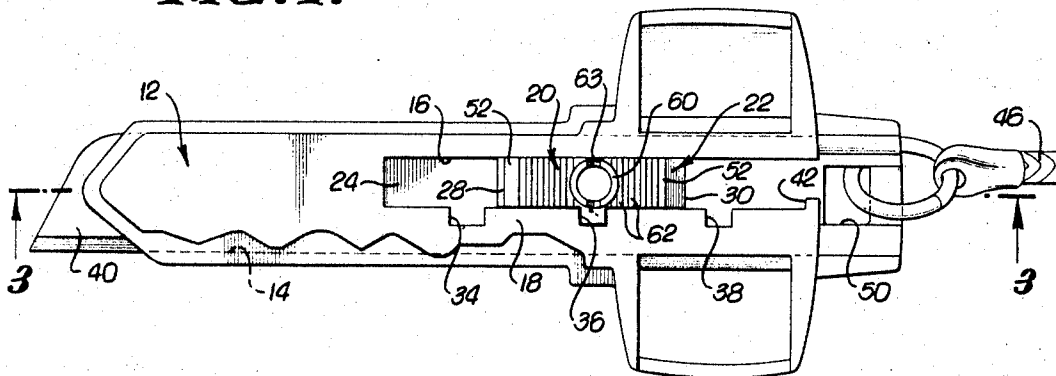


FIG. 2.

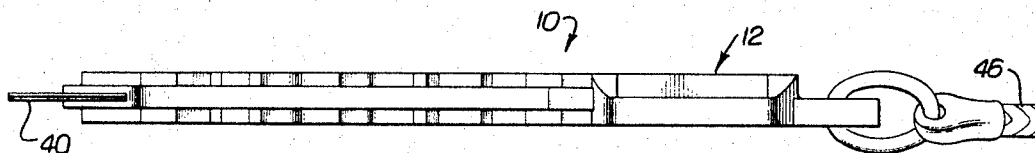
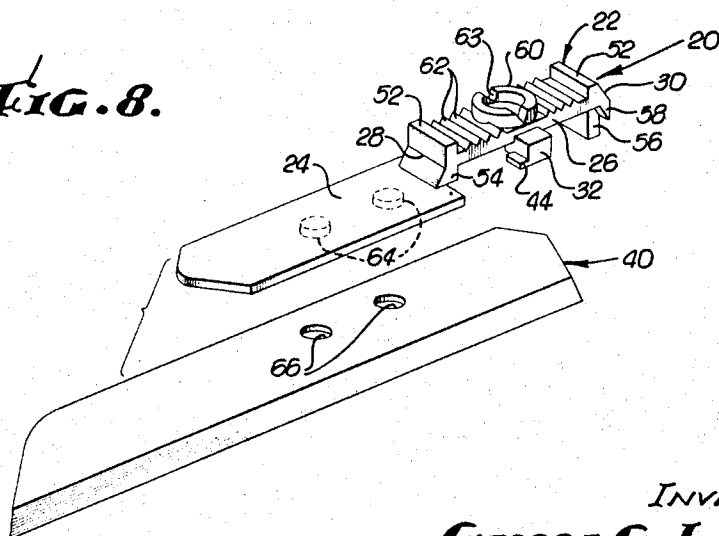


FIG. 8.



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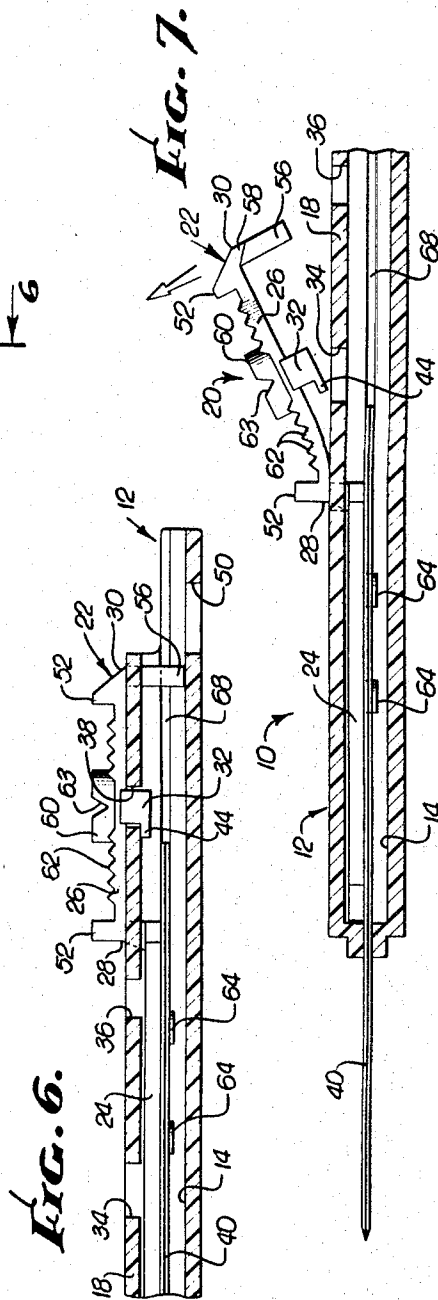
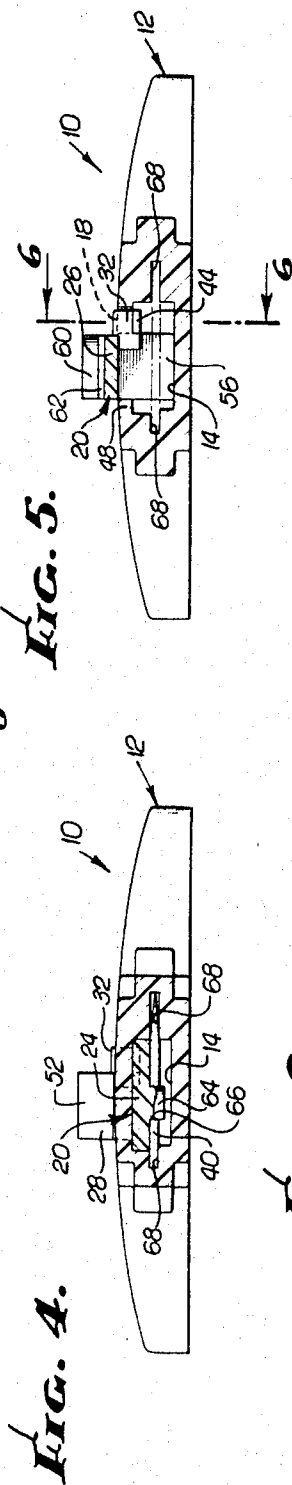
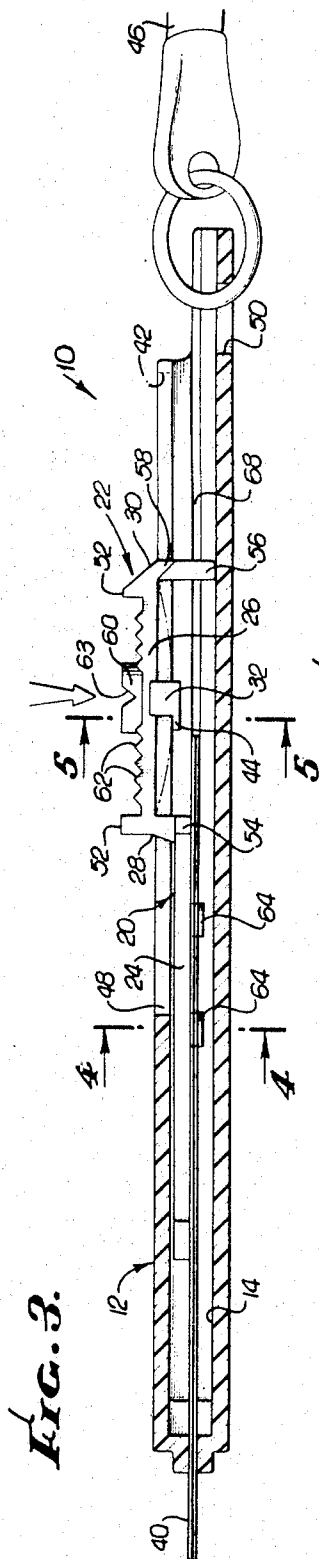
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Sheet 2 of 2



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13 Claims

ABSTRACT OF THE DISCLOSURE

A utility knife to be carried on a key chain, or the like, the knife having a handle defining a central guideway which opens longitudinally through the ends of the handle and laterally through a slot in one side of the handle, and a removable blade-actuating slide movable in the guideway including a resilient beam supported at its ends on the handle and projecting through the handle slot for lateral deflection of the beam by finger pressure to retract a central locking detent on the beam from locking notches in the handle, whereby a blade attached to the slide may be selectively extended from and retracted into the handle by longitudinal movement of the slide relative to the handle, the blade may be selectively locked in various extended and retracted positions by engagement of the slide detent in the handle locking notches, and the blade may be replaced by removal of the slide from the handle.

This invention relates generally to cutlery devices. More particularly, the invention relates to a small utility knife characterized by a replaceable blade, which may be selectively extended from and retracted into the knife handle and releasably locked in various extended and retracted positions relative to the handle.

Small utility knives of the kind to which this invention pertains have many and varied uses in everyday life. Among those who may employ the present knife to great advantage, for example, are office workers, shipping clerks, sportsmen, and hobbyists. Small utility knives are particularly desirable for the reason that they may be conveniently carried by the user and are thus available for immediate use at any time.

It is a general object of this invention to provide an improved utility knife of the character described.

A more specific object of the invention is to provide a utility knife characterized by a handle mounting a blade-actuating slide with a resilient beam against which finger pressure may be exerted to initially deflect the beam section out of locking engagement with the handle, and thereafter move the slide relative to the handle to extend and retract the knife blade.

Another object of the invention is to provide a utility knife of the character described, wherein the blade slide is easily inserted in and removed from the handle to replace the knife blade.

A further object of the invention is to provide a utility knife of the character described, the handle and blade slide of which are adapted for fabrication from synthetic resin by an injection molding process.

This invention possesses many other advantages, and has other objects which may be made more clearly apparent from a consideration of a form in which it may be embodied. This form is shown in the drawings accompanying and forming part of the present specification. It will now be described in detail, for the purpose of illustrating the general principles of the invention; but it is to be understood that such detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

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Referring to the drawings:

FIGURE 1 is a top plan view of a utility knife according to the invention, illustrating the knife blade partially extended;

FIG. 2 is an edge view of the knife illustrated in FIG. 1; FIG. 3 is an enlarged longitudinal section through the knife taken along the line 3—3 in FIG. 1;

FIG. 4 is a transverse section taken along the line 4—4 in FIG. 3;

FIG. 5 is a transverse section taken along the line 5—5 in FIG. 3;

FIG. 6 is a fragmentary longitudinal section through the knife taken along the line 6—6 in FIG. 5;

FIG. 7 is a fragmentary longitudinal section through the knife, similar to FIG. 3, illustrating the manner in which the blade slide is removed from the knife handle to replace the knife blade; and

FIG. 8 is an enlarged exploded perspective view of the blade slide and blade of the present utility knife.

In general terms, the invention provides a utility knife, represented in the drawings by the knife 10, including a handle 12 having a central guideway 14 opening longitudinally through the ends of the handle and laterally through a slot 16 in one side of the handle extending lengthwise of the guideway 14. The handle 12 includes a flange 18 which bounds the slot 16 along one longitudinal side thereof and projects laterally over the guideway 14. Disposed within and movable lengthwise of the guideway 14 is a blade-actuating slide 20 having a rear finger engaging portion 22 and a forward blade connecting portion 24. The rear finger engaging portion 22 of the slide 20 includes a longitudinally extending, laterally resilient beam 26 which projects through the handle slot 16 for engagement by a finger of the user's hand. Joined to the ends of the beam 26 are supports 28, 30 which slidably engage the handle 12. A locking detent 32 projects laterally from the beam 26 at a position approximately midway between the beam supports 28, 30 for selective engagement in a number (shown as 3) of locking notches 34, 36, 38 in the knife handle 12. Engagement of the slide detent 32 in any one of the notches 34, 36, 38 locks the blade slide 20 in a corresponding fixed position relative to the knife handle 12. The slide is movable to another position relative to the handle by exerting inward finger pressure on the beam 26 of the slide to initially deflect this section laterally inwardly of the handle and thereby retract the slide detent 32 inwardly from its current receiving locking notch 34, 36 or 38, as the case may be, into the guideway 14. The slide is then moved longitudinally of the handle by exerting longitudinal finger pressure upon the depressed slide beam. A blade 40 attached to the forward blade connecting portion 24 of the slide may thus be extended from and retracted into the forward end of the handle 12 by moving the slide 20 back and forth relative to the handle. The blade may be releasably locked in various extended and retracted positions by engagement of the slide detent 32 in the handle locking notches 34, 36, 38.

The slide 20 is removable through the rear end of the handle 12 to replace the blade 40. Normally, however, rearward movement of the slide from the handle is prevented by engagement of the rear portion 22 of the slide with a limit stop 42 on the handle flange 18. According to a feature of the invention, removal of the slide 20 from the handle 12 is accomplished by laterally deflecting the rear portion 22 of the slide outwardly through the slot 16, laterally of and away from the handle, in the manner shown in FIG. 7, to retract the rear slide portion clear of the limit stop 42, and then sliding the forward blade connecting portion 24 of the slide, and the blade attached thereto, rearwardly through the rear open end of the

handle guideway 14. Preferably, outward lateral deflection of the rear slide portion 22 away from the handle 12 can occur only when the slide 20 occupies a forward or extended position with respect to the handle. The possibility of inadvertent separation of the slide 20 and blade 40 from the handle 12, when the knife is pocketed, is thereby prevented. To this end, the slide detent 32 has a forwardly extending shoulder 44 engageable under handle flange 18 when the detent is positioned in either of the two rear handle locking notches 36, 38 to prevent the slide from deflecting laterally of the handle, in the manner illustrated in FIG. 7. The remaining forward locking notch 34 is wider than the two rear locking notches 36, 38, and has a width, measured lengthwise of the handle 12, slightly greater than the overall width of the slide detent 32 and its shoulder 44. Accordingly, when the blade slide 20 is in its forward position relative to the handle 12, wherein the detent 32 engages in the forward handle locking notch 34, the rear portion 22 of the slide may be sprung laterally away from, or outwardly of, the handle to effect separation of the slide and handle, in the manner just explained.

Referring now in more detail to the utility knife 10 illustrated in the drawings, the knife handle 12 comprises a plastic body which may be injection molded to any desired shape, such as the illustrated key shape. This key shape of the knife handle has no particular functional utility and was selected merely because of its novelty appeal. In this connection, the knife may be conveniently equipped with a key chain 46 for holding a group of keys.

As shown best in FIG. 4, the handle guideway 14 is generally rectangular in transverse cross-section and has a width, measured laterally of the handle 12, which is somewhat greater than the width of the handle slot 16. The guideway and slot thus together define the handle flange 18, which bounds the slot along one longitudinal side thereof, and an opposing, somewhat narrower flange 48 bounds the slot along its opposite longitudinal side. The locking notches 34, 36, 38 are spaced along and open through the inner longitudinal edge of the wide flange 18. In the particular knife illustrated, the flanges 18, 48 terminate a distance forwardly of the rear end of the handle 12, and the slide limit stop 42 projects inwardly from the longitudinal edge of the flange 18 at the extreme rear end of this flange. Extending through the handle 12, rearwardly of the flanges 18, 48, is an opening 50 for receiving a ring on the key chain 46. The slot 16 terminates a distance rearwardly of the front end of the handle 12. Forwardly of the slot, the handle guideway 14 is closed on all sides. The front end of the guideway defines a narrow slit for receiving the blade 40.

The blade-actuating slide, like the knife handle 12, may be fabricated from a suitable plastic by an injection molding process. As may be best observed in FIG. 8, the rear beam 26 of the slide has a generally flat rectangular shape and is made sufficiently thin in transverse section to be resiliently flexible. The front and rear beam supports 28, 30 extend generally normal to the beam and are integrally joined intermediate their ends to the ends of the beam, whereby the rear slide portion 22 has a generally H configuration in side elevation, as shown. The projecting upper ends of the beam supports have substantially the same width as the beam and extend substantially equal distances above the beam to define raised shoulders 52 at the ends of the beam. The projecting lower ends of the beam supports define front and rear supporting legs 54, 56, respectively, on the beam, the rear beam leg 56 being somewhat longer than the front beam leg 54. In addition to the upper shoulder 52 and lower beam support leg 56, the rear beam support 30 includes a rear bevelled apron 58. The slide detent 32 comprises an integral, block-like formation which projects laterally from one longitudinal side edge of the beam 26 midway between the beam support legs 54, 56.

As noted earlier, and hereinafter explained in more detail, the blade-actuating slide 20 is adapted to be initially released for movement relative to the knife handle 12 by inward finger pressure on the slide beam 26 to deflect the latter toward the handle and thereafter moved longitudinally of the handle by longitudinal finger pressure on the beam. To aid initial release of the slide, the upper surface of the beam is formed with a raised button 60 midway between the ends of the beam against which finger pressure may be exerted to deflect the beam to its released position. Subsequent longitudinal movement of the slide is aided by the beam end shoulders 52, by serrations 62 which are formed in the upper surface of the beam, and by a fingernail slot 63 in the button 60.

The forward blade connecting portion 24 of the blade-actuating slide 20 comprises a relatively thin, flat tongue having a tapered forward end. This tongue 24 is integrally joined at its rear end to and extends forwardly from the lower end of the front beam support leg 54. The width of the tongue exceeds the width of the beam 26 and its support legs 54, 56. Integrally formed on the undersurface of the tongue are a pair of depending circular lugs or pins 64, which are dimensioned to fit snugly but removably in a pair of mating circular openings 66 in the knife blade 40, thus to releasably secure the blade to the tongue.

As shown best in FIGS. 4 and 5, the width of the slide beam 26 and its beam supports 28, 30 approximates the width of the handle slot 16. The width of the slide tongue 24 approximates the width of the handle guideway 14, just below the handle flanges 18, 48. The knife blade 40, on the other hand, has a width which exceeds the width of the guideway. The opposite vertical walls of the guideway have longitudinal grooves 68 to receive the longitudinal side edges of the blade. These grooves are co-extensive with and extend through the front and rear ends of the guideway, as shown.

When the utility knife 10 is assembled, the blade-actuating slide 20 is disposed within the rear end of the handle guideway 14, in such a way that the rear beam 26 and the upper shoulder ends 52 of the beam supports 28, 30 project laterally through the handle slot 16. The lower end of the rear beam support leg 56 rests slidably on the bottom wall of the guideway 14. The tongue 24 of the slide extends forwardly into the forward closed portion of the guideway, just below and in sliding contact with the undersurfaces of the handle flanges 18, 48. The knife blade 40 is secured by the pins 64 to the undersurface of the slide tongue 24 and extends forwardly from the tongue with the side edges of the blade engaging in the guideway grooves 68. The clearance between the blade 40, when thus disposed in the grooves 68, and the handle flanges 18, 48 is just slightly greater than the thickness of the tongue 24, whereby the tongue pins 64 are restrained against movement from the blade openings 66.

Assuming the blade-actuating slide 20 to be in a position wherein its detent 32 is aligned with one of the locking notches 34, 36 or 38 in the handle flange 18, the inherent resiliency of the slide beam 26 urges the latter to its normal unstressed position illustrated in solid lines in FIGS. 3 and 6, wherein the detent engages in an aligned notch to lock the slide and the blade 40 attached thereto against longitudinal movement relative to the knife handle 12. Movement of the slide and blade relative to the handle is accomplished by first exerting inward finger pressure on the slide beam 26, in the direction of the arrow in FIG. 3, to deflect the beam inwardly or toward the handle to its broken line position in the latter figure, which retracts the slide detent 32 inwardly from its aligned locking notch into the handle guideway 14, releasing the slide and blade for movement relative to the handle. Thereafter, the finger pressing on the beam is urged forwardly or rearwardly to move the slide and blade forwardly or rearwardly, as the case may be. The parts of the knife are dimensioned to permit movement of the slide 20 and blade 40 between a fully retracted

position, wherein the blade is completely enclosed within the knife handle 12, and a fully extended position (FIG. 7), wherein the blade extends a distance forwardly of the handle. The locking notches 34, 36, 38 in the handle are so located that engagement of the slide detent 32 in notch 34 blocks the blade in its fully extended position, engagement of the detent in notch 38 locks the blade in its fully retracted position, and engagement of the detent in notch 36 locks the blade in an intermediate, partially extended position (FIGS. 1, 2 and 3). Adjustment of the blade to its intermediate position conditions the knife for slicing relatively thick materials, such as cardboard cartons. Adjustment of the blade to its fully extended position conditions the knife for slicing paper and other relatively thin sheet materials.

Forward extension of the blade 40 relative to the knife handle 12 is limited by engagement of the front beam support 28 of the slide 20 with the front end wall of the handle slot 16. Rearward retraction of the blade relative to the handle is limited by engagement of the rear beam support 30 of the slide with the handle limit stop 42.

Removal of the slide 20 and blade 40 from the knife handle 12, to replace the blade, is accomplished by first moving the slide and blade to their fully extended position, wherein the slide detent 32 is aligned with the forward locking notch 34 in the handle, which, as noted earlier, has a width, measured lengthwise of the handle, slightly greater than the corresponding overall width of the detent 32 and its shoulder 44. The rear portion 22 of the slide is then bent or deflected laterally outward through the handle slot 16, as illustrated in FIG. 7, to retract the detent outwardly from the notch 34 and clear of the handle flange 18. Thereafter, the slide 20 is moved rearwardly relative to the handle to withdraw the slide tongue 24 and blade 40 attached thereto from the handle, through the rear open end of the handle guideway 14. The blade may now be removed from the tongue pins 64 and replaced by a new blade. Reassembly of the slide 20 and blade 40 in the knife handle 12 is effected by reversing the above procedure.

One feature of the invention resides in the fact that when the slide detent 32 is engaged in either of the two relatively narrow, rear handle locking notches 36 or 38, the detent shoulder 44 engages under the handle flange 18, in the manner illustrated in FIG. 6, to prevent the rear slide portion 22 from deflecting outwardly relative to the knife handle 12. The detent shoulder 44 is thus effective to prevent inadvertent separation of the slide 20 and blade 40 from the knife handle 12, when the knife is pocketed with the blade retracted. As noted earlier, the key shape of the knife handle 12 has no particular utility, but is desirable from the novelty standpoint, particularly when the knife is attached to a key chain 46.

I claim:

1. In a knife: a handle having a central guideway opening longitudinally through the forward end of said handle and laterally through a longitudinal slot in one side of said handle, a blade-actuating slide within and movable lengthwise of said guideway, said slide having front and rear portions, said rear slide portion including a longitudinally extending laterally resilient beam projecting through said slot for engagement by a finger of the user's hand, means slidably supporting said beam on said handle at two longitudinally spaced supporting locations, whereby said beam is adapted to be deflected inwardly toward said handle by finger pressure on said beam intermediate said supporting locations, and coacting releasable locking means on said beam and handle for normally locking said slide against movement relative to said handle and adapted to be released by inward deflection of said beam toward said handle to permit movement of said slide relative to said handle, said front slide portion including blade connecting means for attaching to said slide a knife blade to be extended and retracted relative to said handle by longitudinal movement of said slide relative to said handle, said guide-

way opening through the rear end of said handle, said handle having a limit stop spaced longitudinally from the locking means on said handle and engageable with said slide rear portion to prevent movement of said slide through the rear end of said guideway, said rear slide portion having a width no greater than the width of said slot and being deflectable laterally of and away from said handle through said handle slot to permit said rear slide portion to clear said limit stop and thereby condition said slide to move rearwardly through the rear end of said guideway.

2. A knife according to claim 1; wherein said coacting locking means comprise a flange on said handle bounding said slot along one longitudinal side thereof and extending over said guideway, a locking notch in the edge of said flange, and a detent on said beam engageable in said notch to lock said slide against movement relative to said handle and adapted to be retracted from said notch into said guideway by inward deflection of said beam toward said handle to release said slide for movement relative to said handle.

3. A knife according to claim 2; wherein said flange has a second locking notch for receiving said detent, said notches being spaced lengthwise of said handle, whereby said slide may be selectively locked in two different positions relative to said handle.

4. In a knife: a handle having a central guideway opening longitudinally through the forward end of said handle and laterally through a longitudinal slot in one side of said handle, a blade-actuating slide within and movable lengthwise of said guideway, said slide having front and rear portions, said rear slide portion including a longitudinally extending laterally resilient beam projecting through said slot for engagement by a finger of the user's hand, means slidably supporting at least one end of said beam on said handle, whereby said beam is adapted to be deflected inwardly toward said handle by finger pressure on said beam, and coacting releasable locking means on said beam and handle for normally locking said slide against movement relative to said handle and adapted to be released by inward deflection of said beam toward said handle to permit movement of said slide relative to said handle, said front slide portion including blade connecting means for attaching to said slide a knife blade to be extended and retracted relative to said handle by longitudinal movement of said slide relative to said handle; said coacting locking means comprising a flange on said handle bounding said slot along one longitudinal side thereof and extending over said guideway, longitudinally spaced locking notches in the edge of said flange, and a detent on said beam engageable selectively in said notches to lock said slide against movement relative to said handle and adapted to be retracted from said notches into said guideway by inward deflection of said beam toward said handle to release said slide for movement relative to said handle; wherein said guideway opens through the rear end of said handle, said handle has a limit stop spaced longitudinally from the rearmost of said locking notches and engageable with said rear slide portion to prevent movement of said slide through the rear end of said guideway, said rear slide portion having a width no greater than the width of said slot and being deflectable laterally of and away from said handle through said handle slot when said detent is aligned with one locking notch to locate said rear slide portion in a position wherein said latter portion clears said limit stop and thereby conditions said slide for separation from said handle by rearward movement of said slide through the rear end of said guideway.

5. A knife according to claim 4; wherein said detent has a shoulder which extends under said flange to restrain said rear slide portion against outward deflection relative to said handle when said detent engages in the other locking notch, said one notch is wider than said other notch and has a width slightly greater than the overall

width of said detent and shoulder, whereby said one notch accommodates said outward deflection of said rear slide portion.

6. A knife according to claim 5; wherein said forward slide portion comprises a tongue extending forwardly from said rear slide portion and having a width greater than the width of said slot, said tongue is removable from said handle through the rear open end of said guideway when said rear slide portion is deflected outwardly of said handle to clear said limit stop.

7. A knife according to claim 1; including a knife blade attached to said blade connecting means and extending forwardly of said slide through said guideway for extension and retraction of said blade relative to said handle by longitudinal movement of said slide relative to said handle.

8. A knife according to claim 7; wherein said handle includes flanges bounding said slot along opposite longitudinal sides thereof and extending over said guideway, said handle includes means within said guideway slidably supporting said blade for movement through said guideway in a plane generally parallel to and spaced from said flanges, said forward slide portion comprises a tongue extending between said blade and flanges, said blade connecting means comprise releasably interengaging means on said blade and tongue and said tongue slidably engages said flanges to retain said interengaging means in operative engagement, said slide and blade being removable from said handle to permit replacement of said blade.

9. In a knife: a handle having a central guideway opening longitudinally through the forward end of said handle and laterally through a longitudinal slot in one side of said handle, a blade-actuating slide within and movable lengthwise of said guideway, said slide having front and rear portions, said rear slide portion including a longitudinally extending laterally resilient beam projecting through said slot for engagement by a finger of the user's hand, means slidably supporting said beam on said handle at two longitudinally spaced supporting locations, whereby said beam is adapted to be deflected inwardly toward said handle by finger pressure on said beam intermediate said supporting locations, and coacting releasable locking means on said beam and handle for normally locking said slide against movement relative to said handle and adapted to be released by inward deflection of said beam toward said handle to permit movement of said slide relative to said handle, said front slide portion including blade connecting means for attaching to said slide a knife blade to be extended and retracted relative to said handle by longitudinal movement of said slide relative to said handle, including a knife blade attached to said blade connecting means and extending forwardly of said slide through said guideway for extension and retraction of said blade relative to said handle by longitudinal movement of said slide relative to said handle, wherein said handle includes flanges bounding said slot along opposite longitudinal sides thereof and extending over said guideway, said handle includes means within said guideway slidably supporting said blade for movement through said guideway in a plane generally parallel to and spaced from said flanges, said forward slide portion comprises a tongue extending between said blade and flanges, said blade connecting means comprise releasably interengaging means on said blade and tongue and said tongue slidably engages said flanges to retain said interengaging means in operative engagement, said slide and blade being removable from said handle to permit replacement of

said blade, wherein said guideway opens through the rear end of said handle, said blade supporting means comprise longitudinal grooves in opposing walls of said guideway slidably receiving the longitudinal edges of said blade and opening through the rear end of said guideway, said handle includes a limit stop spaced longitudinally rearwardly from said locking means on said handle and engageable with said rear slide portion for preventing movement of said rear slide portion through the rear end of said guideway, said rear slide portion having a width no greater than the width of said slot and being deflectable laterally outward from said handle to clear said limit stop and thereby permit rearward movement of said tongue and blade from said handle through the rear end of said guideway.

10. A knife according to claim 9; wherein said coacting locking means comprises a locking notch in one of said flanges and a detent projecting laterally from the center of said beam for engagement in said notch to lock said slide and blade against movement relative to said handle when said beam is in its normal unstressed condition, said detent is retractable from said notch into said guideway to release said slide and blade for movement relative to said handle by inward deflection of said beam relative to said handle, said rear slide portion being deflectable outwardly from said handle to clear said limit stop when said detent is aligned with said notch.

11. A knife according to claim 10; wherein said one flange has a second locking notch for receiving said detent, said notches are spaced longitudinally of said handle, whereby said slide and blade may be selectively locked in two different positions relative to said handle, said detent includes a shoulder engageable under said one flange when said detent engages in said second notch for preventing outward deflection of said rear slide portion relative to said handle, said first-mentioned locking notch has a width slightly greater than the overall width of said detent and shoulder for accommodating said outward deflection of said rear slide portion relative to said handle to clear said limit stop and thereby permit separation of said slide and blade from said handle.

12. A knife according to claim 11; wherein said beam supporting means comprise front and rear beam supports joined to the front and rear ends of said beam, said front beam support is secured to the rear end of said tongue, and said rear beam support rests slidably on the bottom wall of said guideway.

13. A knife according to claim 1; wherein said beam supporting means includes front and rear beam supports secured to longitudinally spaced portions of said beam, whereby said beam is deflectable inwardly between said supports.

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U.S. Cl. X.R.

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