

March 20, 1962

W. I. NISSEN

3,025,598

KNIFE

Filed Oct. 13, 1958

3 Sheets-Sheet 1

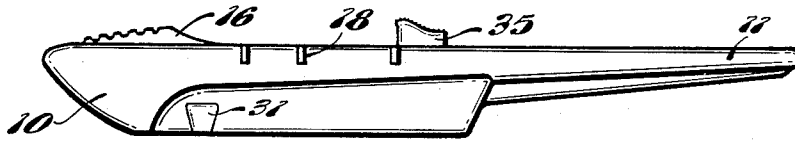


Fig. 1

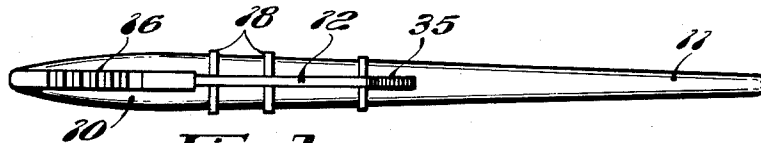


Fig. 2

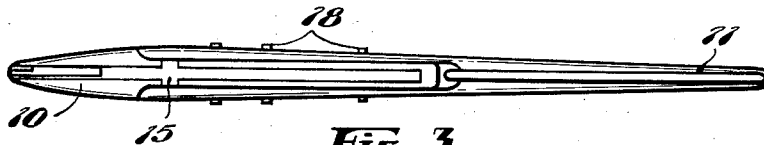


Fig. 3

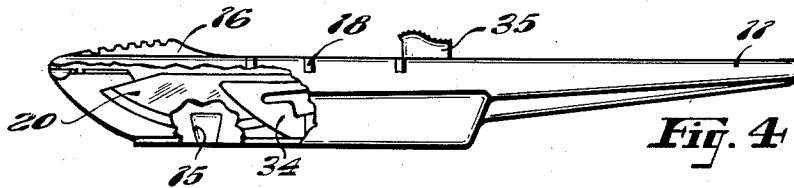


Fig. 4

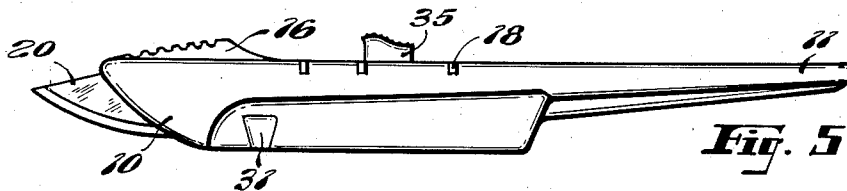


Fig. 5

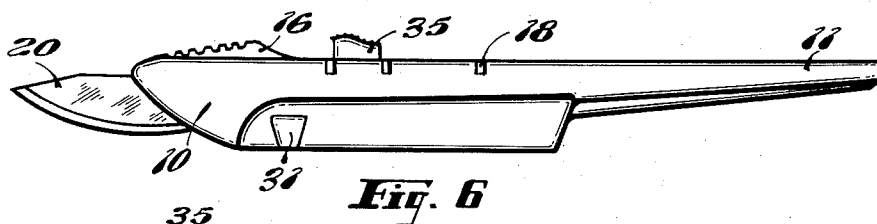


Fig. 6

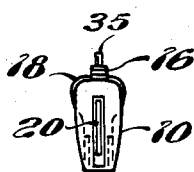


Fig. 7

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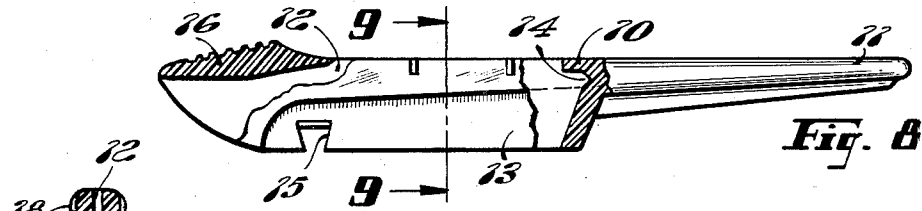


Fig. 8



Fig. 9

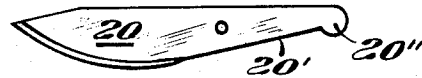


Fig. 10

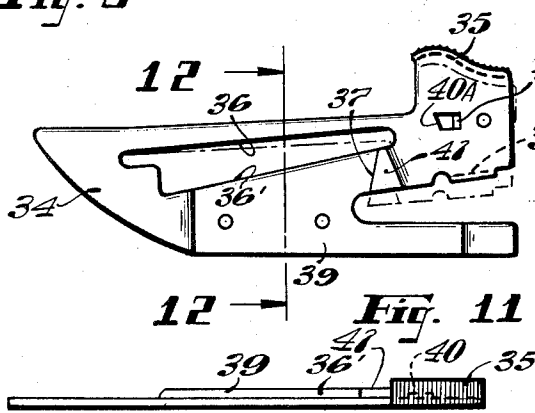


Fig. 11

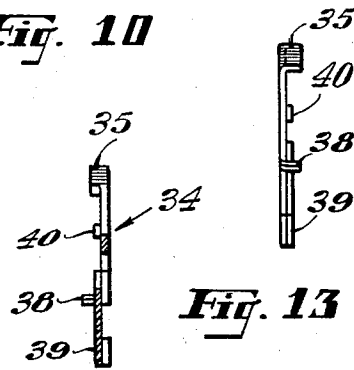


Fig. 12

Fig. 13

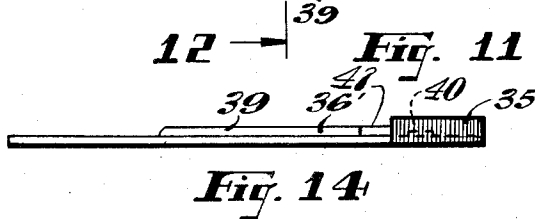


Fig. 14

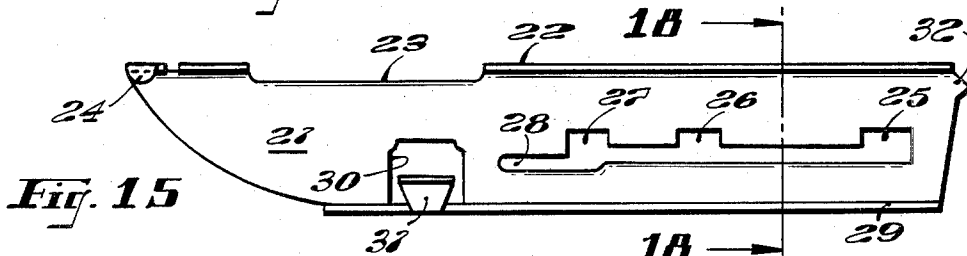


Fig. 15

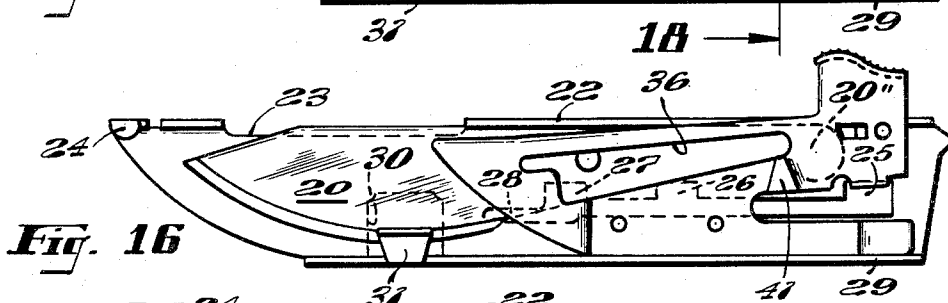


Fig. 16

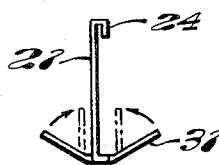


Fig. 17

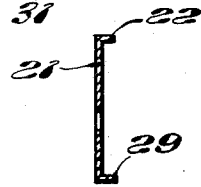


Fig. 18

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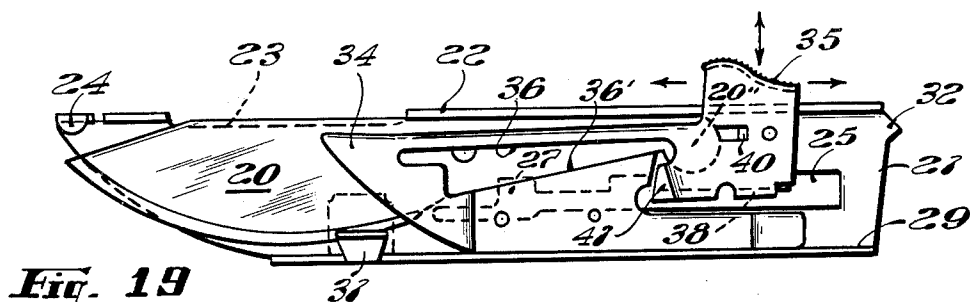


Fig. 19

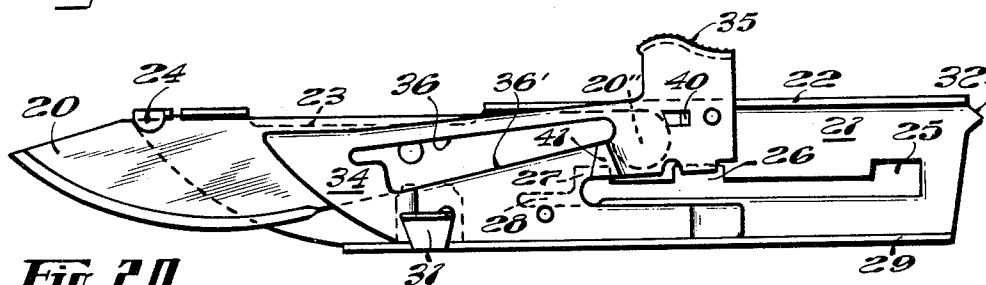


Fig. 20

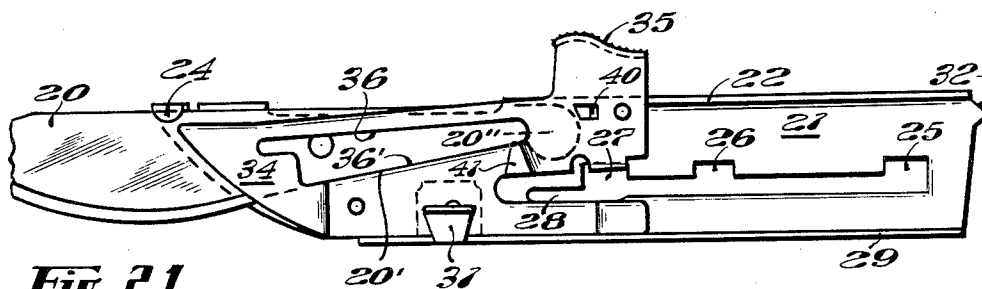


Fig. 21

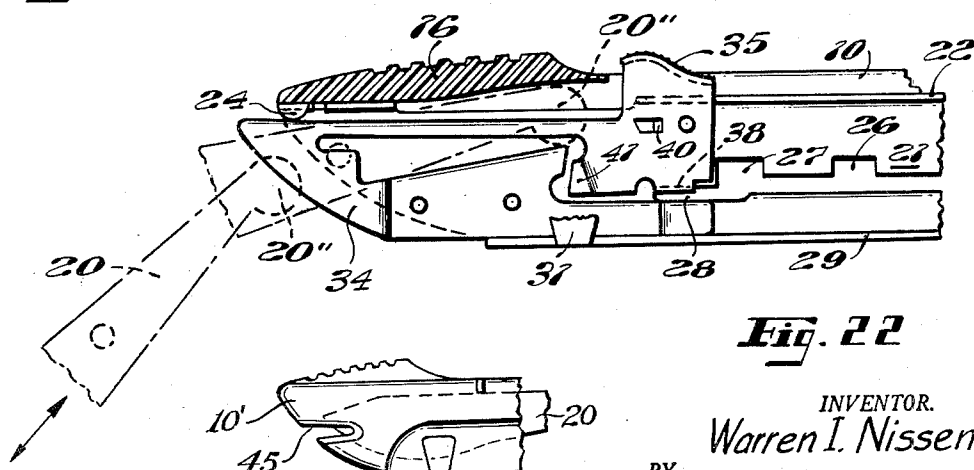


Fig. 22

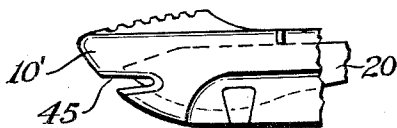


Fig. 23

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11 Claims. (Cl. 30-162)

This invention comprises a new and improved general utility knife having a detachable and replaceable blade and being specially convenient for desk, office or household use.

The knife of the present invention is so constructed and arranged that the blade may be readily removed and replaced so that a fresh sharp blade may be conveniently substituted for a worn and dull blade at any time without danger of cutting the user. The knife also insures security of the blade when in operative position with the capacity for controlled movement of the blade from extended or protruded position to sheathed position within the handle. It includes also means for automatically locking the blade in any of its selected positions, and in one of these the blade is completely enclosed and sheathed within the handle.

The improved knife of this invention has also the advantage that it includes no loose parts in its organization and that it may be manufactured at moderate expense, many of its parts being produced from sheet steel by processes of interchangeable manufacture.

The knife includes in its structure four elements, viz. a handle, an enclosed guide which is fixed within the handle, a movable blade carrier, and the blade itself. These elements have many novel cooperative features of structure which insure conveniently the desired operation of the knife and obviate the necessity of separate springs and locking elements. The guide and carrier are so designed as to carry out the functions of automatically locking the blade in selected position, of releasing it for removal, and of clamping in place a newly inserted blade, all by reason of their individual shape and structure and the cooperative action resulting therefrom.

These and other features of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof selected for purposes of illustration and shown in the accompanying drawings in which:

FIG. 1 is a view in elevation of the complete knife with the blade sheathed,

FIGS. 2 and 3 are corresponding top and bottom views of the knife,

FIG. 4 is a view in elevation of the knife with portions broken away showing the blade in sheathed position,

FIG. 5 is a corresponding view showing the blade in intermediate protruded position,

FIG. 6 is a similar view showing the knife fully protruded,

FIG. 7 is a front end view of the knife,

FIG. 8 is a view in elevation, partly in section, of the handle,

FIG. 9 is a view in cross-section on the line 9-9 of FIG. 8,

FIG. 10 is a plan view of the blade,

FIG. 11 is a plan view of the carrier, shown on enlarged scale,

FIG. 12 is a view of the carrier in cross-section on the line 12-12 of FIG. 11,

FIG. 13 is a view of the carrier in end elevation,

FIG. 14 is a top view of the carrier,

FIG. 15 is a view in elevation of the guide on the same enlarged scale,

FIG. 16 is a similar view showing the carrier and blade in position on the guide,

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FIG. 17 is an end view of the guide,

FIG. 18 is a view of the guide in cross-section on the line 18-18 of FIG. 15,

FIGS. 19, 20 and 21 are views in elevation corresponding to FIG. 16 but showing the blade and carrier in different positions in the guide,

FIG. 22 is a similar view showing the carrier in blade releasing position, and

FIG. 23 is a fragmentary view showing a modification.

The blade handle 10, as best shown in FIG. 8, may be molded as an integral member from synthetic resin or cast from a light alloy metal. It has a rearwardly extending solid extension 11 and is provided with a slot 12 in the upper edge of its body portion which opens into an internal chamber 13. In this chamber is placed the guide as will be presently explained, and for holding the guide in place the chamber is provided with a recess or socket 14 in its rear wall and with a dovetailed aperture in both side walls near the forward end of the chamber. At its forward end the handle is thickened and provided with a corrugated grip 16. The upper forward end of the chamber 13 is bounded by the inner wall of the thickened grip portion and this is given a convex curvature to guide the blade in the process of replacement. The handle is also provided in its upper edge with external ribs 18 for indicating the position of the blade within the handle.

The blade 20, as shown in FIG. 10, has a curved cutting edge, a long inclined lower edge 20' and a rounded offset end 20''. The carrier has structural features arranged to engage and interlock with the inclined edge 20' and the offset end of the blade.

The guide 21, as best shown in FIGS. 15, 17 and 18, may be formed from sheet steel by die cutting and forming operations. It has an elongated body provided with an upper flange 22 which is interrupted by a long notch 23. At its front end the top flange merges into a downturned lip 24. In the body of the guide is an elongated slot having in its upper edge longitudinally spaced notches 25, 26 and 27 and merging at its forward edge into an extension 28 slightly offset in a downward direction. The guide has also a bottom flange 29 and an aperture near its forward edge from which project transversely a pair of dovetailed ears 31. If desired the bottom flange 29 may be stamped out separately with the ears 31 and welded to the body of the guide. In its rear wall near the top flange is formed a projecting nose 32 designed to fit into the recess or socket 14 of the handle and so anchor the guide in place. The forward end of the guide is secured in the handle by bending the dovetailed ears 31 up into the dovetail aperture 15 of the handle. The guide is thus fastened securely within the handle as a stationary part of the structure. Its forward end has a curved front edge corresponding to the curvature of the front end of the handle beneath the corrugated grip 16.

The carrier 34, as best shown in FIGS. 11-13, is also formed by die stamping and spring tempering a blank of sheet steel. It is formed with an upstanding operating ear 35 flanged at its upper edge, corrugated and rearwardly inclined so that pressure may be conveniently applied to it in a downward and forward direction. When the carrier is in position the ear 35 extends upwardly through the outlet slot 12 and is movable longitudinally in contact with the upper flange of the guide. The carrier is provided with an elongated aperture 36 which, with the division cut 37, divides the carrier into an upper yieldable section and a lower unyieldable section 39 relatively movable from the initial position shown in FIGS. 11 and 21 to a depressed position indicated in dashed lines in FIG. 11 and more clearly in FIGS. 19 and 22. In the yieldable section is formed a transverse locking detent 38 which is shaped to enter one or another of the notches 25, 26, 27 in the guide.

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The yielding section of the carrier is also provided with a stop lug 40, FIG. 12, struck out from the carrier and having a forward camming edge 40A and with a rearwardly directed shoulder 41 which is formed by offsetting the unyielding section of the carrier with respect to the upper yielding section and which is coplanar with the unyieldable section 39 as shown in FIG. 14. The lower straight edge of the carrier 34 is adapted to run upon and to be partially enclosed by the bottom flange 29 of the guide. The unyielding offset section runs directly in face-to-face contact with the inner face of the guide and the upper yielding section is thus spaced the thickness of the blade from this face of the guide. It is necessary to depress the yieldable section of the carrier slightly in order to bring the locking detent into engagement with the notches 25, 26, 27 of the guide, and when the detent is so engaged the lower edge of the carrier is held yieldingly against the bottom flange 29 of the guide. When the operating ear 35 is depressed and the carrier moved forward, the detent 38 travels against the upper edge of the slot between the notches and holds the lower straight edge of the carrier against the bottom flange 29 with increased spring pressure. The front end of the carrier is tapered upwardly similarly to the front edge of the guide and the handle, and when the locking detent 38 is in the forward notch 27 the front edge of the carrier lies slightly within the front edge of the handle.

The blade 20 lies in the carrier 34 with its lower inclined edge 20' resting firmly upon the lower inclined edge 36' of the carrier defining the bottom of the aperture 36 and formed by the top coextensive edges of the offset unyieldable section 39 and of the shoulder 41 of the yieldable section of the carrier and with its rounded end 20'' engaged between the stop lug 40 and the shoulder 41. The blade is movable in this position with the carrier throughout the range of carrier movement, that is to say, from its completely sheathed position in which the locking detent 38 occupies the notch 25 of the guide to its extreme forward position in which the detent occupies the forward extension 28 as suggested in FIG. 22. In this position, and in this position only, the blade 20 may be detached because in this position the rounded offset end 20'' may be rocked upwardly above the retaining shoulder 41 and then drawn outwardly through the front end of the handle. A fresh blade may be inserted with the carrier in this position and in the inward movement of the blade its rounded end would react against the curved inner surface of the grip 16 depressing the shoulder 41 with a camming action and finally slipping into place between it and the stop lug 40 as shown in FIGS. 16 and 20, for example.

It is believed that the operation of the knife will be apparent from the foregoing description. The carrier and blade are shown in fully sheathed position in FIG. 16 with the locking detent 38 occupying the notch 25 of the guide. In FIG. 19 the operating ear is shown as having been depressed and the carrier slightly advanced with the locking detent 38 engaged with the upper edge of the guide slot between the notches 25 and 26. In this position the sharp edge of the blade has barely emerged from the handle. In FIG. 20 the carrier and blade are shown advanced to the position in which the locking detent engages the notch 26 which is the second in the series and in this position the blade is partially advanced so that a portion of its cutting edge is operative and its upper edge is firmly engaged by the lip 24 of the handle. In FIG. 21 the carrier and blade are shown as advanced to the position in which the locking detent engages the foremost notch 27 of the guide slot and in this position the cutting edge of the blade is fully exposed while its upper edge is still firmly held by the lip 24 of the handle. In FIG. 22 the locking detent 38 is shown as occupying its extreme forward position permitting disengagement and replacement of the blade.

As already noted the blade 20 rests with its lower in-

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clined edge 20' bearing upon the straight edge 36' of the aperture in the carrier. This edge is offset laterally with respect to the yieldable section of the carrier as shown in FIG. 14 and accordingly it will be seen that the blade 20 lies in face-to-face contact with the yieldable section of the carrier and is always confined and supported on both sides, sandwiched between the guide surface and the yieldable section of the carrier. This construction is advantageous in holding the blade at all times firmly against buckling.

An important advantage incident to the structure above described is that the blade of the knife is firmly held against looseness or rattling in all of its positions, not only in its protruded operative positions but also in its fully retracted position. In the latter position as shown in FIGS. 16 and 19 it will be seen that the tapering shank of the blade 20 is held with a wedging action between the inclined lower edge 36' of the recess in the carrier and the upper flange 22 of the guide 21. In order that the blade may be released from this position a slight preliminary forward movement is imparted to it by camming action of the stop 40 upon the rounded edge of the end 20'' of the blade as the stop is moved downwardly upon depression of the ear 35. The downward movement of the stop 40 occurs simultaneously with the downward movement of the shoulder 41 which in its normal elevated position engages the forward edge of the rounded end 20'' and in cooperation with the stop 40 locks the blade against any movement in its carrier.

Having unlocked the blade by the described movement of the stop 40 and the shoulder 41 after the carrier has been advanced to its extreme forward position as shown in FIG. 22, the blade 20 may be rocked upwardly entirely to clear the shoulder 41 and drawn forwardly out of the knife handle by hand. Similarly, in reinserting a blade, its rounded end 20'' is moved inwardly until it engages the stop 40 of the carrier and then, when the locking detent 38 is permitted to move upwardly into the first notch 27 of the series, the inclined shoulder 41 engages the forward edge of the blade end 20'' and cams it rearwardly until again locked between it and the stop 40.

In FIG. 23 a modification of the knife is shown in accordance with which the front curved edge of the handle 10' is provided with a notch 45 of sufficient depth to expose an inclined portion of the blade edge. Thus is provided a very compact and convenient implement for ripping or cutting sheet material, the latter being guided by the walls of the slot into slicing contact with the blade edge while the slot acts to guide the advancing movement of the knife.

It will be apparent that the carrier 34 is formed with a self-contained or built-in spring, viz. the yielding section which includes the long bar terminating at its rear end in the operating ear 35. Beside being capable of manufacture at low expense and well adapted for a life of unlimited duration, the construction of the carrier obviates the use of the separate spring usually found in such knives. The division cut 37 is inclined rearwardly so as to afford clearance for the downward movement of the spring section as suggested in FIG. 22.

Having thus disclosed my invention and described in detail an illustrative embodiment thereof, I claim as new and desire to secure by Letters Patent:

1. A knife comprising an integral handle having an internal chamber and a slot in its upper edge leading to the chamber, an elongated sheet metal guide fastened at its opposite ends within the chamber, having upper and lower flanges and an internal longitudinal slot with three notches spaced along its length, a sheet metal blade carrier having longitudinal edges fitting between the upper and lower flanges of the guide, and an elongated aperture including a cut extending from the aperture through the carrier defining a yieldable upper section and a lower section laterally offset with respect to said upper section, said lower section being in sliding contact with a face of

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said guide and spacing the yielding upper section therefrom, the said carrier having also a flanged catch cooperating with the notches of the guide, an operating ear extending through the slot of the handle and spaced stop lugs in its yieldable upper section, in combination with a blade having an offset end fitting between said stop lugs and holding the blade in position in the said carrier.

2. A knife blade receiving device comprising a handle having an internal chamber with an outlet slot in an intermediate portion of the upper edge of the handle, a slot in its lower edge and a socket in its rear wall, dove-tail recesses in the sides of the handle adjacent the lower edge and a guide of sheet metal in said chamber having upper and lower longitudinal flanges, the lower flange being seated within the slot in the lower edge, dove-tail ears extending from said lower flange and seated in the dove-tail recesses of the handle and a nose at its rear end projecting into said socket, in combination with a blade carrier fitting between the flanges of the guide and an operating ear projecting out through the slot in the upper edge of the handle and including blade clamping means.

3. A knife comprising a handle having an internal chamber with an outlet slot in one edge of the handle, an elongated guide of sheet metal fastened in the chamber, having upper and lower flanges and an internal slot with a series of longitudinally spaced notches therein, a unitary carrier of resilient material fitting between the flanges of the guide and divided into a yieldable and an unyieldable section, said yieldable section movable with respect to said unyielding section and including an operating ear projecting out through the slot of the handle and a locking detent fitting said notches, said unyieldable section including blade engaging means spaced from one of said flanges to clamp a blade therebetween in combination with a blade detachably received between said blade engaging means and said one flange.

4. A knife as described in claim 3 further characterized in that the carrier terminates in a straight lower edge partially enclosed by the lower flange of the guide and resisting pressure applied to the carrier through its yieldable section.

5. In a knife blade receiving device a blade carrier of sheet steel having a transversely offset lower section with a straight running edge and an aperture with an inner blade-supporting edge inclined with respect to said running edge, the said carrier being severed at one end of the aperture thereby forming a self-contained section yieldable in a plane parallel to the plane of the lower section including a long spring bar carrying an upstanding operating ear having transversely extending blade-engaging projections.

6. A knife having a fixed guide with a straight overhanging flange, a carrier slidably supported within said guide for movements parallel to said flange between extended and retracted positions and having an inclined blade-supporting edge, and a blade having a tapering shank held by wedging action between said edge and flange, the carrier having a yieldable section therein with a stop imparting a preliminary advancing movement by camming action to the blade upon depression of the yieldable section of the carrier.

7. A knife having a fixed guide with a straight overhanging flange, a carrier slidably supported within said guide for movements parallel to said flange between extended and retracted positions and having an inclined blade-supporting edge, and a blade with a tapered shank and rounded end arranged to be moved into retracted wedging position between said flange and edge, the carrier having a yieldable spring section with a stop and an inclined shoulder spaced from the stop and engaging the edge of the rounded end of the blade and cam the blade into locking engagement with the stop upon spring movement of the yieldable section of the carrier.

8. A knife comprising a handle having an internal

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chamber and an outlet slot leading therefrom, a guide within said chamber having a plane inner surface, an integral sheet metal carrier of resilient material divided by a longitudinal separation into an upper section and a lower offset section, the upper edge of said lower section constituting a blade-supporting edge, said upper section being yieldable with respect to said lower section, and a blade supported on said edge and engaging said guide and being confined between said inner surface of said guide and an opposed surface of said upper carrier section.

9. A knife comprising a handle having an internal chamber and an outlet slot leading therefrom, a guide within said chamber having a plane surface and an offset flange, a unitary sheet metal carrier of resilient material separated at one end into an upper section and a lower section, said lower section including an offset inclined blade-supporting edge, said upper section being yieldable with respect to said lower section, a blade supported on said blade-supporting edge and confined between said inner surface of said guide and the opposed surface of the upper carrier section, said carrier and said blade being movable within said guide between blade extended and blade retracted positions, said blade being held in position by wedging action between said inclined blade-supporting edge and said guide flange, said upper section of said carrier including camming means engageable with the blade for preliminarily advancing the blade by camming action when the upper section of the carrier is subjected to manual downward pressure.

10. A knife comprising a handle having an internal chamber with an outlet slot in one edge of the handle, an elongated guide of sheet metal fastened to the chamber having upper and lower flanges and an internal slot with a series of longitudinally spaced notches therein, a carrier fitting between the flanges of the guide and having an elongated aperture and a cut extending from the aperture through the carrier setting off a yieldable and an unyieldable section, said yieldable section being movable with respect to said unyieldable section and including an operating ear projecting out through the slot of the handle, blade engaging means spaced from one of said flanges to receive and clamp a blade therebetween, and a locking detent fitting said notches, in combination with a blade clamped between said blade engaging means and said one flange.

11. A knife comprising a handle having an internal chamber with an outlet slot in one edge of the handle, an elongated guide of sheet metal fastened in the chamber having upper and lower flanges and an internal slot with a series of longitudinally spaced notches therein, a carrier fitting between the flanges of the guide and having a yieldable and an unyieldable section, said yieldable section being movable with respect to said unyieldable section and including an operating ear projecting out through the slot of the handle, a blade engaging projection received within a recess in the underside of the blade, and a locking detent fitting said notches, in combination with a blade, said internal slot in said carrier having a forward extension into which the locking detent may be advanced and said handle having an internal convex surface permitting upward and outward detaching movement of the blade with respect to the projection only when the detent is so located.

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