

United States Patent

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[72]	Inventor	John F. Cuscovitch 42 Woodbridge Ave., East Hartford, Conn. 06108
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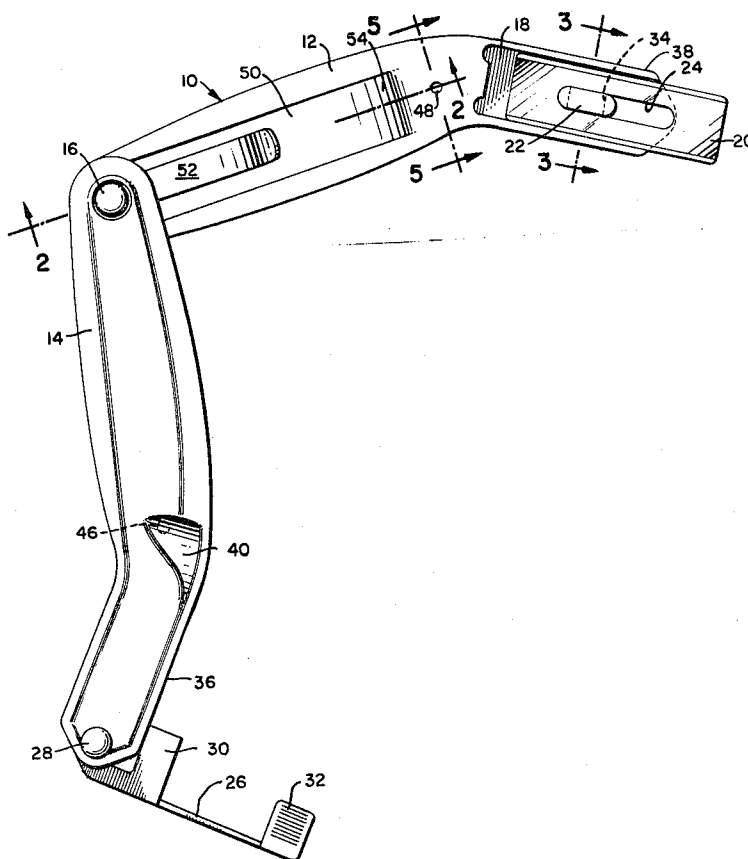
Primary Examiner—Granville Y. Custer, Jr.
Attorney—Fishman and Van Kirk

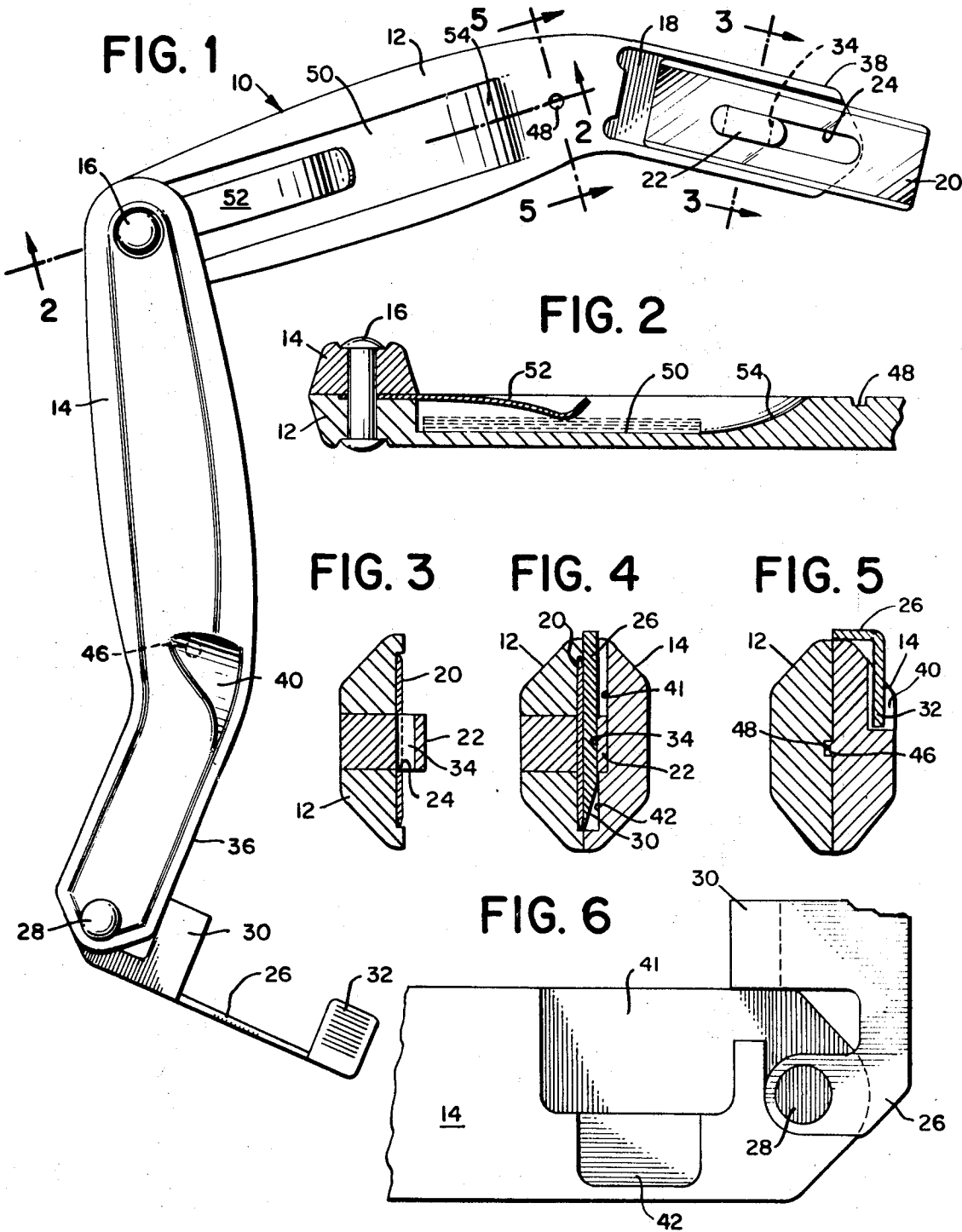
[54] KNIFE
7 Claims, 6 Drawing Figs.

[52]	U.S. Cl.	30/331, 30/337
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[50]	Field of Search	30/329, 330, 331, 337, 338, 339

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ABSTRACT: A knife is presented having a removable blade housed in a body which is composed of two pivotally mounted segments. A pivot arm with a locking cam element is mounted on one of the body segments, and a removable blade is mounted on a loop on the other of the body segments. In the operating condition of the knife, the cam of the pivot arm engages the loop to simultaneously lock the body segments together and to also secure the blade in a desired position.





INVENTOR
JOHN F. CUSCOVITCH

BY
FISHMAN & VAN KIRK
ATTORNEYS

KNIFE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to the field of cutting tools. More particularly, this invention relates to the field of knives having removable and replaceable blades. The knife of the present invention was designed especially as a cutting tool for use in carpet installation, and it has particular utility in that application. However, although the invention will be described with respect to such application, it is to be understood that the knife of the present invention has general utility in the field of knives with replaceable blades.

2. Description of the Prior Art

Knives with replaceable blades have long been known in the art, but these prior art devices have all been characterized by one or more deficient features. A typical prior art knife is one in which the body is formed in two halves which are held together by one or more fastening screws or one or more screw-and-nut sets. Particular disadvantages of this arrangement are that changing of a blade is time consuming because it is necessary to unscrew the handle segments; the screw threads may become deformed; and parts are easily lost. Other prior art approaches have included arrangements wherein blade elements are mounted on pins and the body sections are clamped or pinned together. However, these arrangements have all been defective in one or more ways, such as in that the body sections have not been firmly secured or in that the blade has tended to move. Such deficiencies, of course, have made these knives unacceptable for practical use since the knives could not be relied upon to render long term dependable field service.

SUMMARY OF THE INVENTION

In the present invention the body sections of the knife are pivotally connected at the end removed from the blade. The blade is mounted on a projecting element extending from the inner wall of one of the body sections. A pivot arm is mounted on the inner arm of the other body section, and this pivot arm has a projecting cam which is adapted to engage the passageway in the mounting projection. The interaction between the projecting cam and the passageway pulls and locks the body sections tightly together while at the same time the cam locks the blade in place. A mating nipple and recess are also provided to align and assist in retaining the body sections in place during use of the knife. As an additional feature, one of the body sections may be provided with a storage recess in which spare blades are stored, and a leaf spring element retains these blades in place.

The construction of the present invention results in a replaceable blade knife wherein the body sections can be quickly and easily separated for blade replacement merely by disengaging the locking cam and pivoting the body sections with respect to each other. Thus, a major deficiency of the prior art, i.e., ease of blade replacement, is overcome, and other major deficiencies such as blade slippage and inadvertent separation of body segments during use are also overcome.

Accordingly, one object of the present invention is to provide a novel and improved replaceable blade knife.

Another object of the present invention is to provide a novel and improved replaceable blade knife wherein blade changing can be accomplished quickly and conveniently.

Another object of the present invention is to provide a novel and improved replaceable blade knife wherein blade positioning is maintained during use.

Other objects and advantages of the present invention will be apparent and understood to those skilled in the art from the following detailed description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view showing the knife of the present invention with the body sections pivoted with respect to each other.

FIG. 2 is a view taken along line 2—2 of FIG. 1 showing a partial sectional view of one of the body sections.

FIG. 3 is a view taken along line 3—3 of FIG. 1 showing the blade mounting and locking projection.

FIG. 4 is a sectional view of the knife of the present invention in the closed position with a blade mounted between the body halves, the view being that which would be seen if taken at the same position of line 3—3 of FIG. 1 with the body sections brought together.

FIG. 5 is a sectional view showing the body sections as they would appear if taken along line 5—5 of FIG. 1 with the body sections brought together.

FIG. 6 is a detailed view of the interior surface of one of the body sections at the end removed from the pivot end.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1, the knife 10 is shown in the open position with body sections 12 and 14 pivoted with respect to each other. Body sections 12 and 14 are joined together at one end for pivotal motion with respect to each other by a rivet or other type pivot pin 16 (which can best be seen in FIG. 2). The ends of the body sections which are pinned together will be referred to as the rear ends, and the other end of each section will be referred to as the front end.

The front end of body section 12 has a shallow recess 18 of a depth approximately equal to the thickness of a cutting blade 20. A blade mounting projection 22 extends from recess 18 toward the inner surface of body section 14. Blade 20 has an elongated opening 24 sized to allow the blade to be mounted on projection 22, and the projection of blade 20 beyond the front end of the knife can be adjusted by moving blade 20 forward or back in recess 18.

As has been previously stated, the knife is shown in the open position in FIG. 1. To close the knife after a new blade has been mounted on projection 22, the body sections 12 and 14 are pivoted and brought into matching alignment. A pivot arm 26 is pivotally connected to the inner surface of body section 14 by a pivot pin 28. Pivot arm 26 has a locking cam 30 projecting therefrom at a position between the ends of the arm, and the end of the arm removed from the pivot pin has an actuating thumb plate 32 which is offset from the body of the arm. After the two body sections have been brought into alignment, pivot arm 26 is rotated counterclockwise to bring locking cam 30 into alignment with projection 22. Projection 22 has a through central passage 34 which is sized so that locking cam 30 can pass therethrough when a blade is mounted on a projection, the sizing of passage 34 being such that locking cam 30 tightly grips both the blade and the inner wall of the passage when it is positioned in passage 34. When pivot arm 26 is thus rotated so that locking cam 30 is engaged in passage 34, the pivot arm is aligned along the upper surfaces 36 and 38 of the body sections, and thumb plate 32 fits into a recess 40 on the outer side of body section 14.

The engagement of locking cam 30 with passage 34 results simultaneously in the locking together of body sections 12 and 14 and also in the stabilizing of the position of blade 20. The tight fit between locking cam 30 and passage 34 shows that the locking cam is simultaneously bearing against the blade and firmly holding the body sections together.

Referring now to FIGS 3, 4 and 6, details of the locking structure are shown. FIG. 3 shows a sectional view of the front end of body section 12 with blade 20 shown mounted on projection 22. Passage 34 can also clearly be seen.

FIG. 6 shows the interior wall of the front end of body portion 14. It can be seen that this interior wall has an upper recessed portion 41 to accommodate both the locking cam 30 on arm 26 when in the locked position thereof, and projection 22. This inner wall contains a shallower recess 42 which also accommodates locking cam 30 when the body sections are in the locked position.

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Referring now to FIG. 4, a sectional view is shown of the knife in the operative position with the body sections aligned and the blade and locking cam in place. As can be seen, the body sections 12 and 14 are in mating alignment, and projection 22 nests in recess 41. Arm 26 can be seen positioned against the two body sections, and cam 30 can be seen extending through passage 34 and into the recess 42. One side of the cam tightly engages the inner wall of passage 34, and the other side of the cam tightly engages blade 20. The body sections are thus held together and the position of the blade is stabilized against any undesired tilting or movement forward or back.

Referring now to FIG. 5, a nipple 46 extends from the inner surface of body section 14 and engages a corresponding recess 48 in the inner surface of body section 12 when the body sections are in the closed position. This mating nipple and recess structure assists in locking the body halves together and preventing any relative sliding portion when the knife is being used. This nipple and recess structure can also be seen in FIG. 1.

A feature is also included whereby replacement blades can be stored in the handle of the knife. A recess or hollow section 50 having a width approximately equal to the width of blade 20 is formed in body section 12, and several blades 20 (as indicated by the dotted lines) may be stored in recess 50. A leaf spring 52 which is connected to body section 12 by pin 16 extends over recess 50 and exerts a retaining force to hold the replacement blades in place. The forward end of recess 50 is contoured to form a ramp 54 so that replacement blades can easily be slid out of recess 50.

In the use of the knife of the present invention the body sections would, as indicated above, be aligned and locked together by pivot arm 26 and cam 30. The rearward position of the body sections form a gripping handle with which the user may grip the knife, and blade 20 would project beyond the forward end to be used for any desired cutting purpose. Sections of the handle may, as desired, be hollowed out to lighten the weight of the knife. Whenever it is desired to change a blade, the change can be accomplished quickly and conveniently merely by exerting a force on thumb plate 32 to rotate pivot arm 26 clockwise to disengage cam 30 from passage 34. Upon disengagement of the cam, the body sections are then pivoted with respect to each other about pivot 16; the blade is removed from mounting projection 22; a new blade is inserted on mounting projection 22; the body sections are realigned; and pivot arm 26 is rotated counterclockwise to reengage cam 30 in passage 34. Similarly, the knife can be opened and the blade can be retracted into the body of the knife for safe storage merely by sliding it rearwardly along projection 34 to change the relative position of engagement between projection 34 and elongated blade opening 24. Of course, it will be understood that the ability to withdraw the knife completely into the handle will depend on the relative size of the blade and the forward end of the handle.

From the foregoing description it can be seen that the knife of the present invention overcomes the several deficiencies of the prior art and results in a knife in which the blade is firmly secured in position when in use and in which changing of the blade can be accomplished swiftly and conveniently.

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While a preferred embodiment has been shown and described, various modifications and substitutions may be made without departing from the spirit and scope of this invention. Accordingly, it is to be understood that this invention has been described by way of illustration and not limitation.

What is claimed is:

1. A knife comprising:

a first elongated body section, said first body section being provided with a recess in one surface thereof, said recess being adjacent a first end of said first section;

a second elongated body section;

means pivotally connecting said body sections to each other adjacent the second ends thereof whereby said sections may be moved relative to one another between an open and a working position, said body sections being installed on said connecting means such that said one surface of said first section faces a first surface of said second section when said body sections are in the working position;

a projection extending from said first surface of said second body section, said projection being provided with a cam-receiving opening and being positioned so as to be received in said recess in said one surface of said first body section;

a blade removably mounted on said projection, said blade being supported against said second body section;

locking arm means pivotally connected to said first body section adjacent said first end thereof, said locking arm means pivoting between an open and a blade locking position; and

locking cam means extending from said locking arm means, said cam means passing through said opening in said projection when said locking arm means is in the locking position and said body sections are in the working position whereby said blade will be locked internally of the body defined by said sections, said blade being held on said projection between said cam means and said first surface of said second body section.

2. A knife as in claim 1 wherein:

said recess in said first body section has two parts, one of said parts being deeper than the other, said deeper part receiving said projection in said assembled position of said body sections.

3. A knife as in claim 1 further including:

an actuating element on said locking arm means.

4. A knife as in claim 1 further including:

a recess in one of said body sections for storing spare blades; and

leaf spring means for retaining spare blades in said recess.

5. A knife as in claim 1 further including:

a locking nipple on one of said body sections and a mating locking recess on the other of said body sections.

6. The knife as in claim 2 further including:

an actuating element on said locking arm means.

7. The knife as in claim 6 further including:

a storage recess in the surface of one of said body sections which faces the other body section, said storage recess having a shape complementary to said blade; and spring means for retaining spare blades in said storage recess.