United States Patent [19]

Schofield

[11] **3,777,607**

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[54] **CUTTING WHEEL FOR SLITTING MACHINES**

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[52] **U.S. Cl.** **83/482,** 83/506, 83/676, 83/698

[51] **Int. Cl.** **B26d 1/22**

[58] **Field of Search** 83/482, 505, 506, 83/676, 698

[56] **References Cited**

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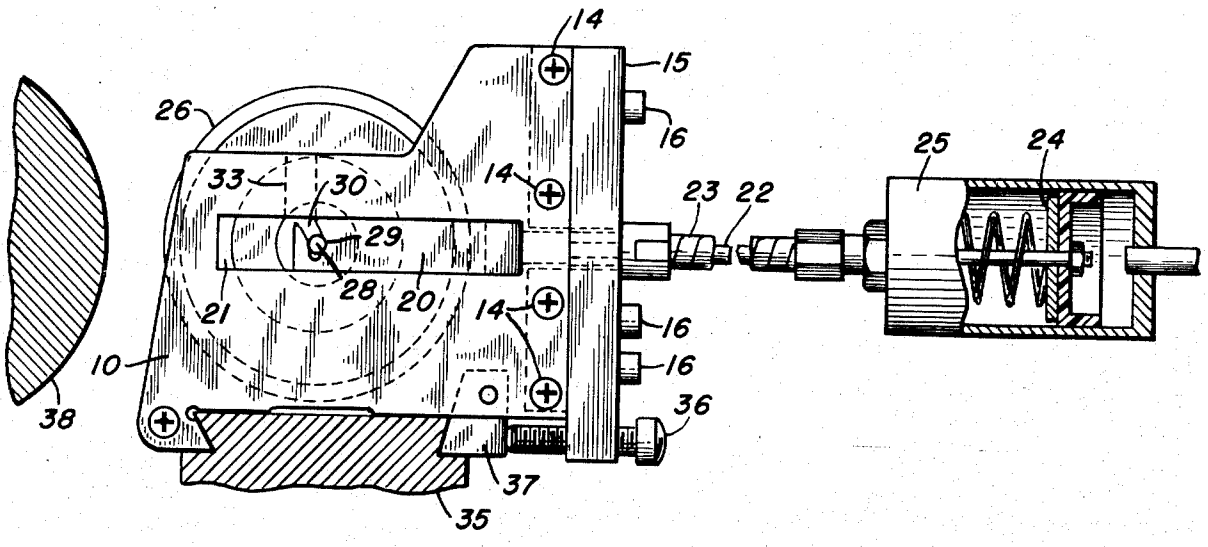
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[57] **ABSTRACT**

A cutting knife for slitting machines, which knife has a housing adapted for attachment to the machine and a rotary cutting wheel movable toward a backing roll in response to fluid pressure.

5 Claims, 6 Drawing Figures



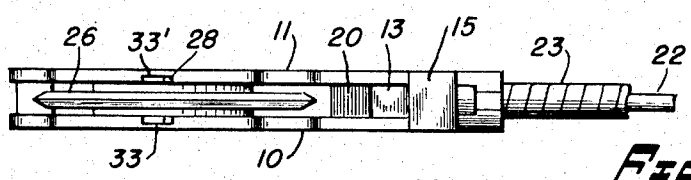


Fig-2

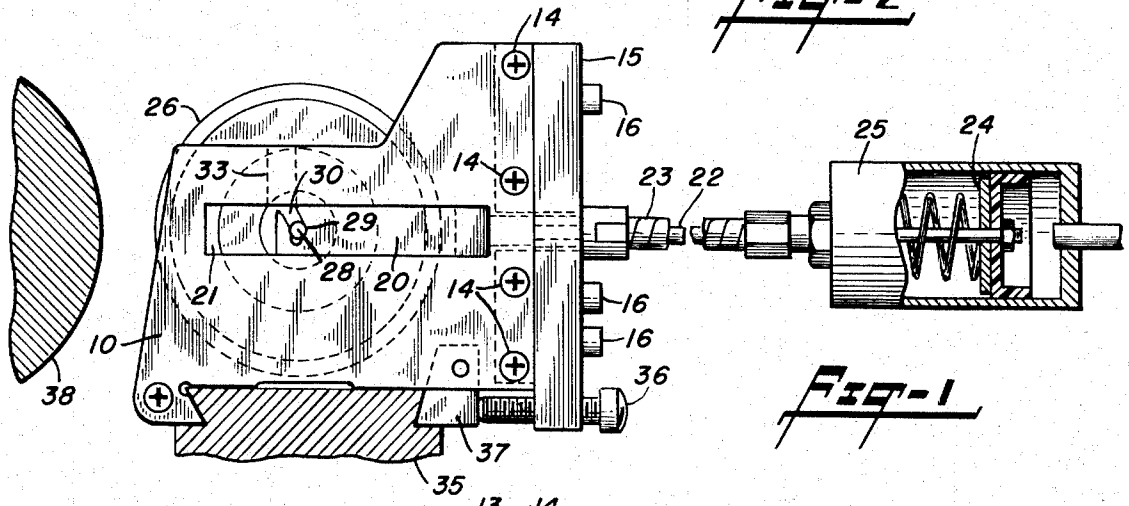


Fig-1

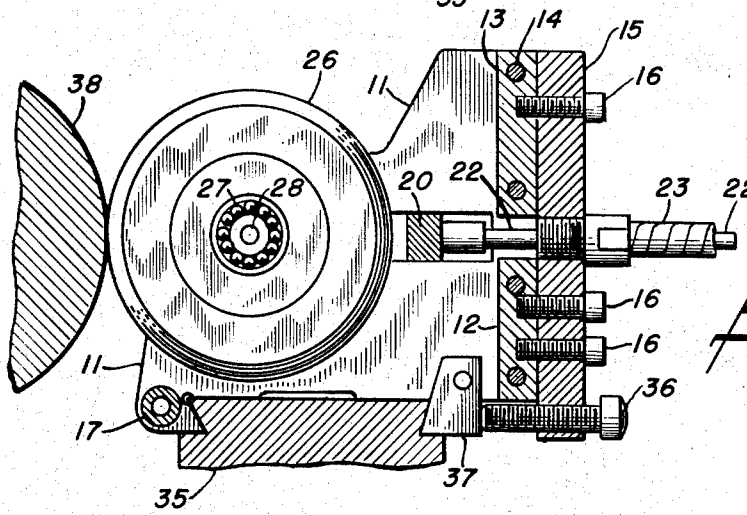


Fig-3

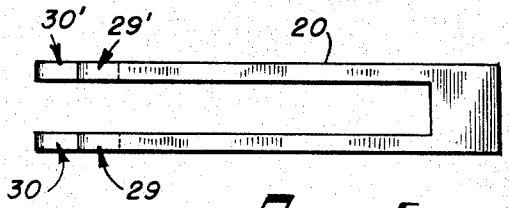


Fig-5

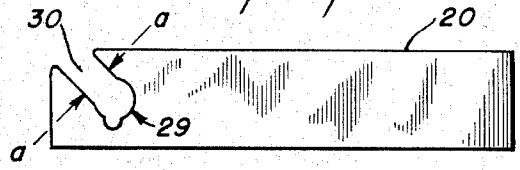


Fig-4

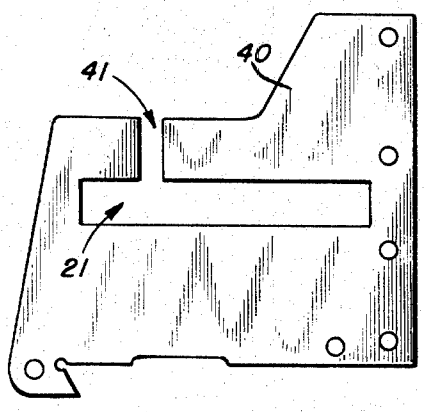


Fig-6

CUTTING WHEEL FOR SLITTING MACHINES

BACKGROUND OF THE INVENTION

The invention relates to a cutting knife of the class shown in U.S. Pat. No. 2802528, issued Aug. 13, 1957 to Alvin A. Mastriani. In order to replace the cutting wheel of such knife, it is necessary not only to remove the knife from the machine but, also, to substantially disassemble the knife, thereby resulting in a loss of machine operating time. Also, care must be exercised when the knife is again attached to the machine in order to position the knife in the original cutting position.

In a cutting knife made in accordance with this invention, the cutting wheel is replaceable in situ, that is, the cutting wheel is replaceable without removing the knife from the machine, and without moving the backing roll relative to the knife.

SUMMARY OF THE INVENTION

A bi-furcated slide bar is mounted for sliding movement in aligned slots formed in a pair of spaced mounting plates adapted for attachment to a slitting machine. A cutting wheel is carried by a ball bearing mounted on an axle which extends into aligned holes formed in the slide bar. The holes in the slide bar communicate with slots also formed in the slide bar, the axes of said slots being angularly offset with respect to the axis along which the slide bar is slidable. These slots communicate with channels formed in the mounting plates, thereby to form passageways along which the axle of the cutting wheel passes as the wheel is removed from the knife.

An object of this invention is the provision of a cutting knife for a slitting machine, which knife is constructed and arranged so that its cutting wheel can be replaced without removing the knife from the machine to which it is attached.

An object of this invention is the provision of a cutting knife having a slide bar mounted in a housing and supporting a rotary cutting wheel, said housing and slide bar being provided with cooperating slots whereby the cutting wheel is removable from the housing while the latter is attached to a machine.

The above-stated and other objects and advantages of the invention will become apparent from the following description when taken with the accompanying drawings. It will be understood, however, that the drawings are for purposes of illustration and are not to be construed as defining the scope or limits of the invention, reference being had for the latter purpose to the claims appended hereto.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings wherein like reference characters denote like parts in the several views:

FIG. **1** is a side elevational view of a cutting knife made in accordance with one embodiment of this invention, the cutting wheel being shown in the retracted position and a portion of the fluid cylinder being broken away;

FIG. **2** is a corresponding top plan view but with the backing roll and fluid cylinder omitted;

FIG. **3** is a central longitudinal sectional view and showing the cutting wheel advanced against the backing roll;

FIG. **4** is an enlarged side elevational view of the slide bar;

FIG. **5** is a top plan view thereof; and

FIG. **6** is a side elevational view showing a mounting plate made in accordance with another embodiment of the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to FIGS. **1 – 3,** the cutting knife comprises a housing formed of a pair of spaced mounting plates **10** and **11** secured to metal spacers **12** and **13** by the socket screws **14,** the spacers being secured to a rectangular bar **15** by the cap screws **16.** A bushing **17,** (FIG. **3**), secured in place by a socket screw, (FIG. **1**), assures a parallel orientation of the two mounting plates. A generally rectangular, bi-furcated slide bar **20** is slidable in aligned slots formed in the mounting plates, the slot in the mounting plate **10** being visible in FIG. **1** and identified by the numeral **21.** The control rod **22** has a threaded end threaded into a hole formed in the base of the slide bar. This control rod, passing through a flexible shield **23,** has its other end secured to the piston **24** of a fluid cylinder **25,** said piston being spring-biased to normally retain the slide bar in the illustrated, retracted position. Fluid under pressure, applied to the cylinder, will drive the piston to the left, thereby to move the cutting wheel into the operating position.

The cutting wheel is mounted on a ball bearing **27** having an axle **28** press-fitted through the inner race therof, the ends of the axle projecting from the planar faces of the cutting wheel as seen in FIG. **2.** The projecting end portions of the axle extend into aligned holes formed in the arms of the slide bar **20** when the cutting wheel is mounted as illustrated. Referring particularly to FIGS. **4** and **5,** these show the slide bar **20** having the aligned holes **29, 29′** formed in the arms thereof. Also formed in these arms are aligned slots **30** and **30′**, which slots terminate in the holes. These slots have a width slightly larger than the diameter of the cutting wheel axle except for the points where the slots merge into the holes. At these points, identified by the arrows *a — a*, the slot width is slightly smaller than the axle diameter. Thus, when the axle is inserted into the slots a pressure must be applied thereto to snap the axle into the holes.

The aligned slots in the slide bar also communicate, individually, with channels **33** and **33′** formed in the facing surfaces of the mounting plates **10** and **11** when the slide bar is in the illustrated, retracted position, FIGS. **1** and **2.** The width of these channels is larger than the diameter of the cutting wheel axle and the distance between the bottom walls of these channels is slightly greater than the axle length. The channels formed in the mounting plates and the slots formed in the arms of the slide bar constitute passageways for accommodating the projecting portions of the axle as the cutting wheel is positioned in the knife housing or, conversely, as the cutting wheel is removed from the housing. It will be noted that the two mounting plates **10** and **11** have reduced widths in the region of the cutting wheel, thereby exposing a significant portion of the wheel. The cutting wheel is removable from the housing by grasping the exposed portion thereof with a pair of pliers and pulling in the upward direction. To replace the cutting wheel it is positioned between the mounting plates with the projecting end portions of its axle positioned in the channels **33, 33′**. These channels and the aligned slots in the slide bar serve to direct the axle toward the holes formed in the arms of the slide

bar. A downward pressure now applied to the cutting wheel will cause the axle to snap into position in said holes.

The cutting knife is fastened on a slitting machine by securing it to a fixed dovetail support bar **35** by means of the screw **36** and the generally triangular clamping member **37** which is pivotally mounted between the two mounting plates. When the slide bar is in the retracted position, as shown in FIG. **1**, the cutting wheel is spaced a predetermined distance from a backing roll **38**. Fluid pressure applied to the cylinder **25** causes the cutting wheel to advance into pressure contact with the backing roll, as shown in FIG. **3**. It will be apparent that the cutting wheel is replaceable without removing the knife from the dovetail support bar and without changing the pre-set spacing between the knife and the backing roll. The operation can be performed with a minimum loss of machine operating time.

Reference now is made to FIG. **6** showing a mounting plate made in accordance with another embodiment of this invention. The mounting plate **40** has formed therein the slot **21** for receiving the slide bar, which slot communicates with a laterally extending slot **41**. A pair of such plates would be secured to spacers **13** (FIG. **3**) to form the knife housing. The slot **41** in the mounting plate **40** (FIG. **6**) and a similar slot formed in the second one of such pair of mounting plates, serve the same purpose as the channels **33** and **33'** formed in the mounting plates **10** and **11**, FIG. **2**.

Having now described the invention what I desire to protect by Letters Patent is set forth in the following claims.

I claim:

1. A cutting knife for a slitting machine comprising,

a. a housing having aligned slots formed therein,

b. means for mounting the housing on a slitting machine,

c. an elongated bi-furcated slide bar mounted for sliding movement along the slots of the housing,

d. aligned holes formed in the arms of the slide bar which holes communicate with aligned slots angularly offset with respect to the axis of the slide bar,

e. means forming aligned channels in the said housing, which channels communicate with the slots in the slide bar when the slide bar is in a predetermined position, and

f. a rotatable cutting wheel carried by an axle extending into the aligned holes formed in the arms of the slide bar.

2. The invention as recited in claim **1**, wherein the slots in the slide bar are formed proximate to the free ends of the slide bar arms, wherein these slots have a width exceeding the diameter of the said axle except for the points where the slots merge into the said aligned holes, at which points the width of said slots is slightly less than the axle diameter.

3. The invention as recited in claim **1**, wherein the said housing comprises a pair of spaced plates, and wherein the said means forming aligned channels comprises aligned grooves formed in the facing surfaces of said plates.

4. The invention as recited in claim **1**, wherein the said housing comprises a pair of spaced plates, and wherein the said means forming aligned slots comprises aligned slots formed in said plates and extending to edge portions thereof.

5. The invention as recited in claim **1** in combination with a fluid cylinder having a piston, and a control rod having one end connected to said piston and the other end connected to said slide bar.

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