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3,128,663

KNIFE SUPPORT

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FIG. 1.

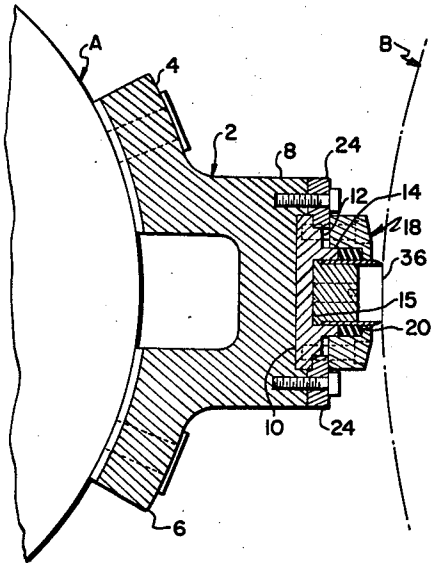


FIG. 2.

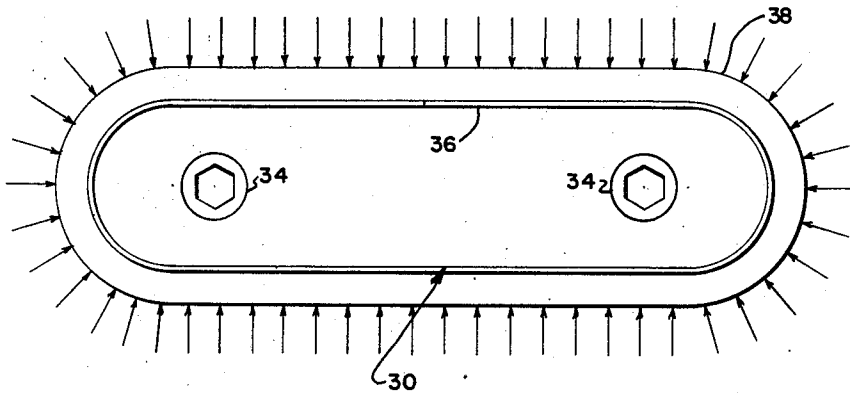
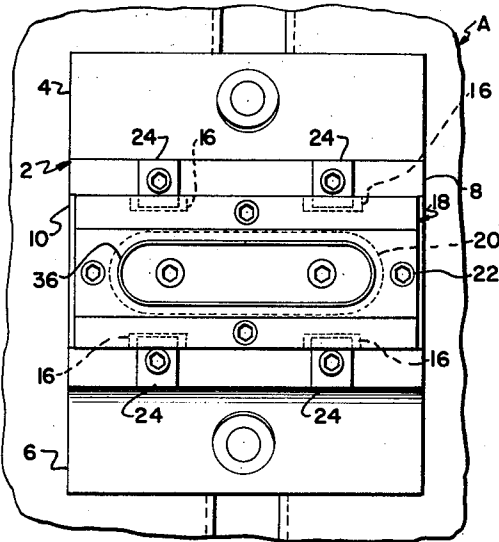


FIG. 3.

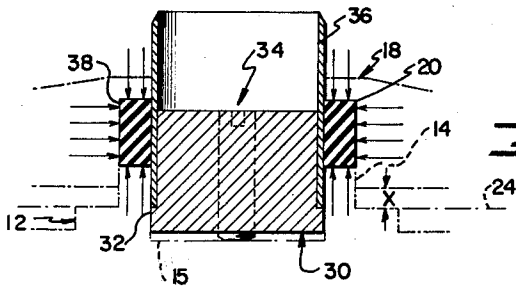


FIG. 4.

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1

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KNIFE SUPPORT

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5 Claims. (Cl. 83-669)

This invention relates to knife holder and more particularly to one which is used to perforate blanks of cardboard or similar material on a printer slotter machine wherein the knife is supported by a flexible relatively non-compressible mass.

In the art of cutting cardboard, paper, leather and similar items on a production machine, it has become accepted practice to use a steel rule cutting blade or other blades that may be formed into the desired shape. To mount these blades on the production machine such as a printing press or high speed printer slotter machine, it is necessary to place the blades in a rigid frame member that can not be adjusted and which supports the blades in such a way that the stresses in the blade will work the blade loose to cause failure of the blade or inaccuracies in the cut-out portion. The usual practice is to hold the blade onto a support by a number of set screws or other pressure applying members which not only necessitates an excessive amount of machining of the support but also does not result in restraining the blade within the knife holder. Attempts to support the blades in plywood members does not give adequate support especially when the blade must be bent into small shapes necessary for hand holes and other small apertures. Because of the bulky structure necessary to support the blades in the manner used in the art, it is difficult to mount the support on the rotating shafts of a printer slotter, and it is also difficult to provide accurate adjustment of the blade support member. In the prior structures, it was not feasible to allow interchangeability of cutter blades for various size cut-outs.

It is the general object of the present invention to provide a knife support that will not have the objectionable feature of the previous knife supports wherein the blade is secured within the support by a flexible relatively non-compressible mass that contacts the blade continuously on its periphery to hold the blade rigidly against a contoured support so that the blade assumes the shape of the support. By providing such a knife support the cutting blade assembly is compact and may be made to be adjustable in the transverse and longitudinal directions.

Another object of this invention is to provide a cutting blade assembly having the cutting blade supported by a flexible relatively non-compressible material so that the blade is rigid to increase the accuracy of the cutting operation and to prolong the life of the cutting blade.

A further object of this invention is to provide a knife support that may be mounted on the rotating cutter shaft of a printer slotter in a manner to allow transverse and longitudinal adjustment of the cutter blade assembly and to allow interchangeability of various sizes and shapes of cutter blade assemblies without removing the complete support from the cutting machine.

Another object is to provide a knife support that may be adjusted vertically to remove the necessity of adjusting the distance between the cutter shaft and the anvil.

A further object of this invention is to provide a knife support having the above mentioned advantages but which may be manufactured more easily and at a reduced cost.

Other objects and advantages will be more apparent from the following description of a preferred example of the invention, given for the purpose of disclosure, and taken in conjunction with the accompanying drawings, where like references refer to like parts throughout the several views and where:

FIGURE 1 is a sectional view of the knife support of

2

the present invention showing it mounted on the cutter shaft of a printer slotter;

FIGURE 2 is a plan view of the knife support;

FIGURE 3 is a diagrammatic view of the stress pattern of the flexible relatively noncompressible mass of the knife support; and

FIGURE 4 is detailed view of the holding arrangement of the knife support.

Referring now to the drawings, and particularly FIGURE 1, the knife support is provided with a base 2 having arcuate oppositely extending legs 4 and 6 that are shaped to match the curvature of shaft A which is a rotating shaft of a printer slotter used to cut cardboard or like material. Rotating anvil B has an outer surface of suitable material to furnish a backing for cutter blade 36 as it contacts the material to be cut which is not shown. A circumferential extending T slot on the shaft A as seen in FIGURE 2 receives the base 2 and provides means for fastening the base to the shaft A. Since the T slot extends around the shaft the knife support may be adjusted to the desired position on the shaft.

The radially extending portion 8 of the base 2 accommodates the knife mounting structure by having a clearance recess 10 extending longitudinally with respect to the mounting base. Within the clearance recess 10 a support member 12 is slidably located. This support 12 has longitudinally extending slots 16 as is shown in FIGURE 2 so that the slots may receive clamping arms 24 which are bolted or otherwise secured to the base 2. As seen in FIGURE 2 there are two slots 16 on either side of support 12, but this number may be varied according to the amount of clamping effect needed. Each slot is larger than the width of the clamping arms 24 so that the support 12 may be adjusted longitudinally. It is noted that the thickness of the clamping arms is more than the thickness of slots 16, however, in practice these arms are usually less than the slots for the reason which will be discussed later and as is shown in FIGURE 4.

The upper portion of the support 12 has a rib 14 that is of the same general shape as the desired configuration to be cut out of a cardboard box. In the embodiment disclosed the configuration is an oblonged slot to provide a hand hole in the cardboard blank. It is understood that any shape may be used such as a circle or an irregular pattern. The rib 14 defines a recess 15 that slidably receives the contoured knife support 30 as shown in FIGURE 4 and said knife support 30 has a peripheral surface matching the desired shape of the configuration to be cut from the cardboard blank. The knife 36 is fitted around the surface of the knife support 30 and abuts the shoulder 32 to afford vertical support of the knife. A mass 38 of flexible relatively noncompressible material such as rubber of the appropriate physical properties has the general shape of the outer surface of knife support 30 and is positioned around the knife blade 36 to hold the blade in engagement with the knife support. A cover 18 is positioned over the support 12 and has a recess 20 that conforms to the outer periphery of the mass 38 so as to restrain the mass between the cover 18, the support 12 and the knife blade 36. A suitable number of bolts 22 join the cover 18 to the support 12 and by tightening these bolts the mass 38 is forced into engagement with blade 36. Further tightening of bolts 22 draws the blade 36 into rigid contact with the knife support 30 and holds the blade in this position during the cutting operation.

As the cover is drawn downwardly by the bolts 22 it does not contact either the clamping arms 24 or the support 12. Although this feature is not evident from FIGURE 1, it is noticed in FIGURE 4 where the distance X which in practice is approximately $\frac{1}{16}$ of an inch represents the distance between the cover and the support or

3

clamping arms which every member extends the further distance upwardly.

To adjust the knife support 30 and thereby the knife blade 36 vertically a number of adjusting bolts 34 extend through threaded apertures within knife support 30. The assembly of knife support and knife blade is held downwardly by pressure of the cutting operation and is adjusted upwardly by advancing the bolts 34 into engagement with recess 15 of the support 12. By treating the threads of the bolts 34 with an interference plastic material or other means to prevent easy movement it is possible to maintain the bolts in any adjusted position.

The arrows shown in FIGURES 3 and 4 show that the mass 38 is uniformly stressed into engagement with the blade 36 to give rigid support to the blade which results in longer wear and more accurate cutting. It is also noted that the support 12, cover 13, knife support 30 and mass 38 are all provided for one configuration of blade 36. By changing these parts the base 2 may be used to hold cutting assemblies of a variety of shapes and sizes.

While only a single example of the invention has been given for the purpose of illustration, changes in detail will suggest themselves to those skilled in the art. Accordingly, it is desired to be limited only by the spirit of the invention as defined by the scope of the appended claims.

What is claimed is:

1. A knife holder adapted for mounting a cutting blade bent along its length to form a given configuration, said blade having a cutting surface at the upper edge and a relatively flat surface at the lower edge, said holder comprising a support member with a recess and a rib coextensive with said recess, said recess and rib having approximately the same configuration as the cutting blade, a cover member provided with an aperture having approximately the same configuration as the cutting blade, said cover member having a recessed portion coextensive with said aperture and adjacent thereto, said recessed portion of the cover coacting with the rib of said support member to form a contractible space having an open side, a mass of flexible relatively noncompressible material in said space, a knife support located within the recess of the first mentioned support, said knife support having a shoulder thereon against which the flat bottom surface of said blade abuts so that the blade is adjacent the open side of said contractible space, said knife support being on the opposite side of said knife from said open side, and means for advancing said cover toward said first mentioned support to force said mass against said cutting blade to thereby hold the cutting blade against the knife support so that the cutting surface extends outwardly.

4

2. A knife holder adapted for mounting a cutting blade bent along its length to form a given configuration, said blade having a cutting surface at the upper edge and a relatively flat surface at the lower edge, said holder comprising a lower support with a clamping portion thereon, an upper cover member having a clamping portion thereon, means on said lower support for reciprocally receiving and holding said upper cover whereby said upper cover can be moved relative to said lower support, said first-mentioned clamping portion and said second-mentioned clamping portion forming a contractible space with an open side, said space generally conforming to the configuration of said blade, said open side being positioned closely spaced from one side of said blade, a mass of flexible, relatively noncompressible material in said space whereby movement of said cover toward said lower support displaces said mass outwardly from said space through said open side of said space and against the side of said blade, a blade support member supported on said lower support and abutted against the lower edge of said blade to support said blade adjacent said contractible space, said blade support having the general configuration of said blade and being positioned on the opposite side of said blade from said open side, and means for moving said cover toward said lower support for a displacement of said mass toward said blade to hold said blade against said blade support in cutting position in said holder.

3. A knife holder as defined in claim 2 including means for adjusting said blade support with respect to said lower support to vary the extended height of said blade.

4. A knife support as defined in claim 2 including a base for mounting said holder onto a shaft, and means for adjusting said lower support with said cover carried therewith on said shaft in a direction axial of said shaft.

5. A knife holder as defined in claim 2 including a base for mounting said holder onto a shaft, and means for adjusting said base on said shaft in a direction circumferential of said shaft.

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