

March 10, 1970

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3,499,370

TAB CUTTER

Filed March 11, 1968

2 Sheets-Sheet 1

FIG. 1

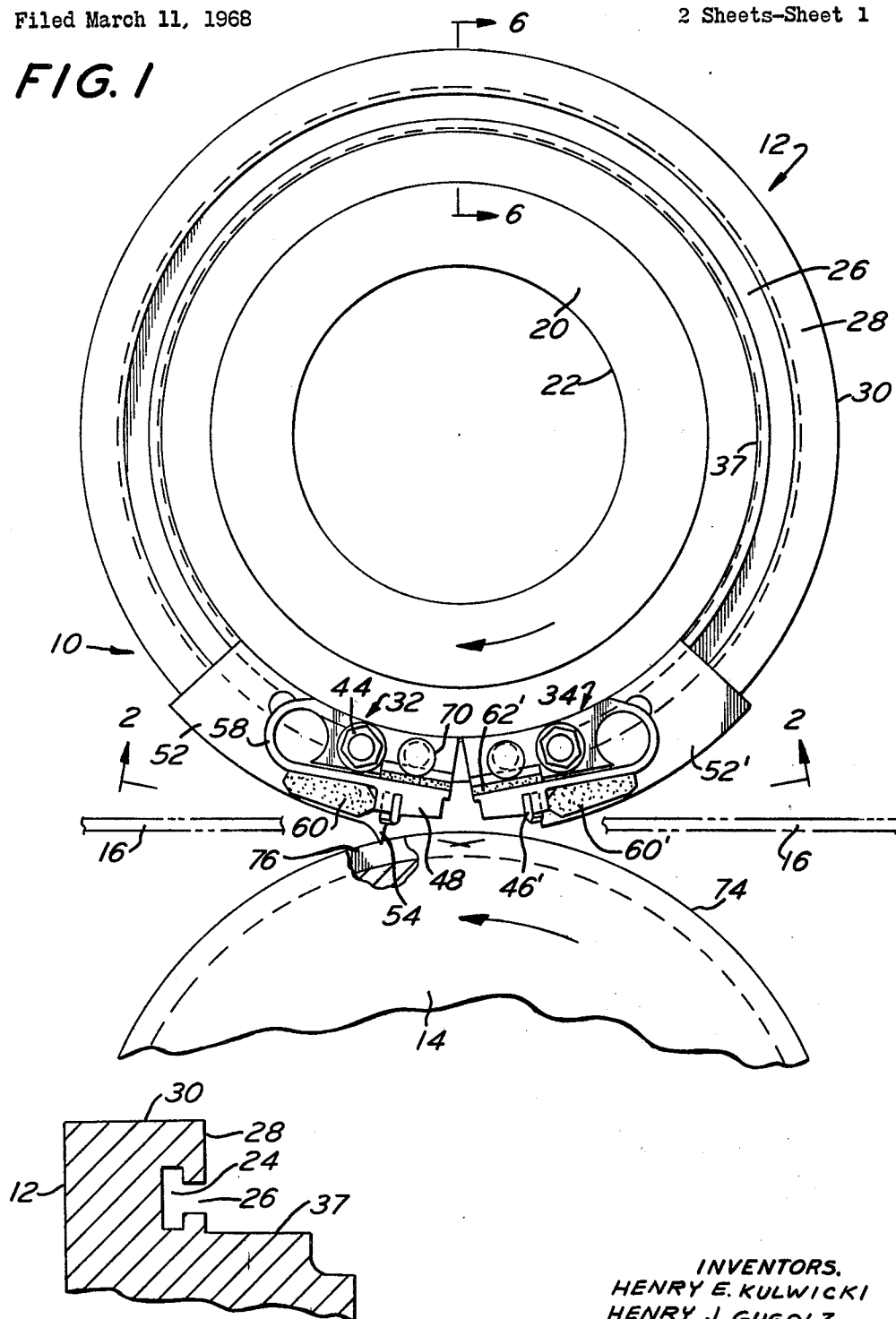


FIG. 6

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FIG. 2

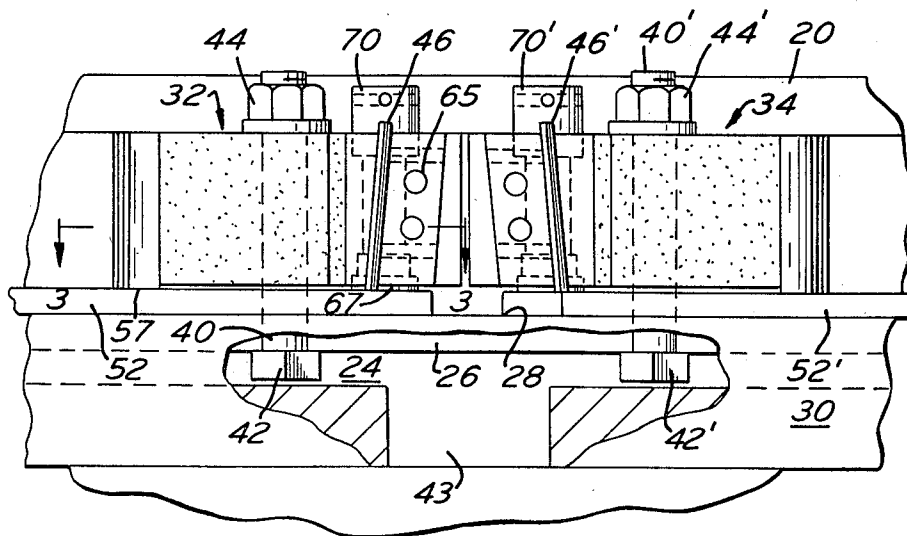


FIG. 3

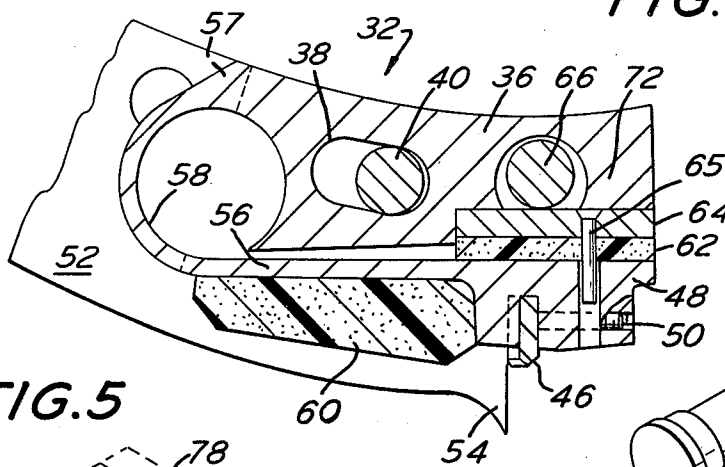


FIG. 4

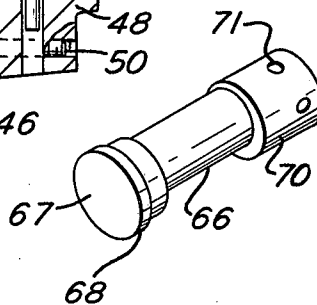
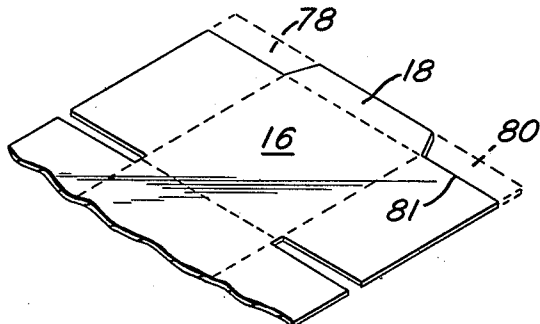


FIG.5



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3,499,370

TAB CUTTER

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Filed Mar. 11, 1968, Ser. No. 712,298

Int. Cl. B31b 1/14; B23d 25/12; B26d 1/56

U.S. Cl. 93—58.2

6 Claims

ABSTRACT OF THE DISCLOSURE

A device for cutting tabs on paperboard box blanks. The device includes a knife holder pivotably supported from a body and cam means for selectively pivoting the holder. The pivotable support may be in the form of a leaf spring.

This invention relates to a tab cutter, and more particularly, to a cutting device adapted to be secured to a slotter head for cutting glue or stitch tabs on paperboard box blanks. It is old in the art to cut the tabs on a paperboard box blank prior to application of glue to the tab so that the box blank may be subsequently folded and the edges thereof joined together. A typical such device is disclosed in U.S. Patent 2,181,197.

In forming a box blank from a sheet of corrugated board, the blank is generally introduced into apparatus which prints a legend on one or more panels. Thereafter, the blank advances between cylindrical rotating dies which score the blank to facilitate folding. Rotating arcuate knives cut slots to form the panel depth. Attached to the shaft supporting the slotter, there are provided cutting units for cutting sections from each end of an end panel to form a tab which is joined to the opposite panel to form the box.

In apparatus which combines the multiple functions of printing, slotting, cutting the tab to length, applying adhesive, and folding the end panels to make the tubular box, it is particularly important that the trim or surplus material at the end of the glue tab be severed completely from the box blank. If the cut is not complete, the trim may interfere with the application of adhesive or fall between the tab and the box panel, thereby preventing an effective bond between the tab and panel.

In prior art devices such as that in the above-mentioned patent, the knife blade is rigidly held with the sharp edge of the blade contacting a hardened steel anvil. Because of inaccuracies inherent in the manufacture of components, the pressure applied to the cutting edge by the rotating anvil is not uniform, thereby preventing the cut from being completed. Further, impinging of the knife edge on the anvil dulls the edge very quickly which requires frequent replacement and/or reduces the cutting effectiveness. In addition, the hammering action of the knives on the anvil bends the shaft on which the cutter heads and anvils are mounted, thereby reducing cutter effectiveness and reducing shaft bearing life.

In order to overcome these difficulties, the present invention provides means for cushioning the knife blades to reduce shock at the instant the cut takes place. Means are provided to permit the knife blade to align itself normal to the box blank and the cutting anvil so that working life of the knife blade is greatly extended and the cut in the box blank is always complete.

It is an object of the present invention to provide a new

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and improved cutting device adapted to be adjustably secured to a rotary head for cutting the ends of the glue tab.

It is another object of the present invention to provide a tab cutting device having cam means for adjusting the height of a knife blade to accommodate different thicknesses of paperboard.

It is another object of the present invention to provide a tab cutter device having cushioning means to suit variations in the manufacture and wear of components.

It is another object of the present invention to provide a tab cutter device with means to eject the trim so that it cannot interfere with subsequent operations of gluing, folding, and bonding of the box panels.

It is another object to provide a tab cutter which is self-compensating to assure parallelism between the knife edge and the anvil.

It is another object to provide a tab cutting device which permits quick and easy adjustments.

Other objects will appear hereinafter.

For the purpose of illustrating the invention, there is shown in the drawings a form which is presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

FIGURE 1 is a side elevation view of the tab cutter of the present invention.

FIGURE 2 is a sectional view taken along the line 2—2 in FIGURE 1.

FIGURE 3 is a sectional view taken along the line 3—3 in FIGURE 2.

FIGURE 4 is a perspective view of the cam adjusting means.

FIGURE 5 is a partial perspective view of one end of a box blank.

FIGURE 6 is a sectional view taken along the line 6—6 in FIGURE 1.

Referring to the drawings in detail, wherein like numerals indicate like elements, there is shown a tab cutter of the present invention designated generally as 10. The tab cutter 10 includes an upper head 12 and a lower head or anvil 14. Box blanks 16 are adapted to pass between the head 12 and anvil 14 so that one end of the box blank 16 may be cut to form the tab 18 as shown more clearly in FIGURE 5.

The head 12 includes a hub 20 having an axial bore 22. Head 20 is adapted to fit on the same shaft as the slotter and scoring heads. Head 12 is provided with a radial flat face 28 adjacent its peripheral surface 30 as shown more clearly in FIGURE 6. Face 28 contains portion 26 of a T-shaped slot 24.

A pair of similar cutting units 32 and 34 are adjustably attached to face 28 on the head 12. The units 32 and 34 are identical except as will be made clear hereinafter. Hence, only unit 32 need be described in detail. Corresponding structure on unit 34 is provided with corresponding primed numerals.

The unit 32 includes a body 36 which is supported by shoulder 37 (see FIGURE 6). As shown more clearly in FIGURE 3, body 36 has an elongated hole 38 extending transversely therethrough. A bolt 40 extends through hole 38.

The longitudinal axis of bolt 40 is parallel to the axis of bore 22. Bolt 40 is provided with a head 42 mounted within slot 24. The shank portion of bolt 40 extends

through slot portion 26 and through hole 38. A nut 44 is threadedly secured to the free end of bolt 40. In order to facilitate entry of the head 42 into the slot 24, a hole 43 is bored through the head 12 from the side opposite the face 28. As nut 44 on bolt 40 is tightened, elevation portion 57 on body 36 and a protruding face 67 on cam 66 are clamped against face 28 on head 12 as shown in FIGURE 2.

A knife 46 is mounted in a slot on a knife holder portion 48 and retained by means of set screws 50. Knife 46 may be angularly disposed with respect to the axis of bolt 40 as dictated by the side edges of tab 18. A blade 52 is clamped between face 28 and surfaces 57 and 67. Blade 52 is provided with a suitable hole through which the shank portion of bolt 40 may extend.

The blade 52 extends in an arcuate direction along the face 26 in a direction away from unit 34. The end of blade 52 immediately adjacent the knife 46 is provided with a sharp protrusion 54. The purpose of protrusion 54 will be made clear hereinafter. The distinction between units 32 and 34 is that one is a righthand and the other is a lefthand.

As shown more clearly in FIGURE 3, the knife holder portion 48 is provided with an extension 56. Extension 56 and holder portion 48 are pivotably supported on the body 36 by means of a curved spring portion 58. Portion 58 has little or no resistance to torsional forces but has sufficient resistance to bending and centrifugal forces to maintain the holder portion 48 juxtaposed to body 36. As illustrated, body 36 and holder portion 48 are one integral body constructed in a manner so that holder portion 48 may pivot toward and away from the body 36. While this is the preferred structure for the pivotable action, a conventional pivot mounting is within the scope of the present invention.

An ejector 60 formed from an elastic material, such as rubber, is securely attached to the extension 56. This attachment can be accomplished by way of suitable commercial available adhesive. Alternatively, the ejector 60 could be in the form of a metal spring. The purpose of ejector 60 will be made clear hereinafter.

The knife holder portion 48 is provided with a resilient cushion 62 and bearing plate 64. A manually adjustable cam means is provided for pivoting the knife holder portion 48 away from the body 36. Such cam means includes cam 66 having a head 68 and an actuator 70. Cam 66 is provided with a longitudinal axis which is parallel to the axis of bolt 40.

Drift pins 65 extend through plate 64 and rubber cushion 62 and into the holder portion 48. The drift pins 65 maintain these elements in their assembled disposition. The bias effect of spring 58 causes plate 64 to bottom out against anvil portion 72 when the cam 66 is in its lowermost position as shown in FIGURE 3. The outer peripheral surface 74 on the anvil 14 is provided with a circumferentially extending groove 76. Groove 76 receives the cutting edge of the blades 52 and 52' as well as the protrusion 54.

The operation of the tab cutter of the present invention is as follows:

In FIGURE 1, the cutting units 32 and 34 are positioned so as to be as close to one another as possible. This is the minimum adjustment between the two cutter units. The cutter units should be adjusted along the face 28 of the head 12 so as to define the length of the tab desired to be cut on the box blank 16. Such adjustment is accomplished merely by loosening nut 44 and sliding the cutter unit circumferentially along the slot portion 26.

In FIGURE 1, the head 12 is mounted for rotation in a clockwise direction. When head 12 is rotated, cutter unit 32 will remove the trim portion 80 and cutter unit 34 will remove the trim portion 78 as the box blank 16 is pulled between head 12 and the anvil 14. It will be assumed that the cam 66 has been adjusted to a position

corresponding to the thickness of the box blanks 16 being processed. Inadvertent rotation of the cam 66 is precluded by cooperation between the protruding face 67 on head 68 and face 28 on head 12, as long as nut 44 remains tight. Rotation of actuator 70 by means of a wrench inserted in one of the holes 71, after loosening nut 44, will result in the cam 66 acting against plate 64, thereby moving or pivoting the holder portion 48 away from body 36. Plate 64 distributes the force from the cam 66 so as to prevent mere compression of the resilient cushion 62.

As the box blank 16 passes between head 12 and anvil 14 synchronized with the rotation of head 12, blade 52 cuts the trim portion 80 along the edge 81 of blank 16. Protrusion 54 pierces through the box blank 16 at the juncture of the cuts made by blade 52 and knife 46 to be certain that the trim portion 80 becomes completely separated from the box blank 16. During this cutting action, the resilient ejector 60 was slightly compressed due to contact with the box blank 16. After the cut has been made, the ejector 60 imparts a force to the trim 80 to be certain that it moves downwardly away from the box blank 16.

Continued rotation of head 12 results in the knife 46' and blade 52' cutting the trim portion 78. Ejector 60' ejects the trim portion 78 in the same manner as trim portion 80 is ejected. The ejectors 60 and 60' also prevent the trim portions from attaching themselves to the cutter units.

At the instant of cutting, the knives 46 and 46' meet the surface of anvil 74. The force imparted to the knives is cushioned by the cushions 62 and 62'. Knives 46 and 46' may be removed for sharpening merely by loosening the set screws such as set screws 50 in FIGURE 3.

The one-piece arrangement for the body 36 and holder portion 48 in conjunction with cushion 62 has the advantage of being self-adjusting to insure that the cut goes entirely across the width of the cut to be made in the box blank, while substantially increasing the life of the cutting edges and anvil. Cushion 62 cooperates with spring portion 58 to reduce impact on shafts and bearings while being self-adjusting in a radial direction to increase the life of the knife 46 and anvil 14 as well as providing for assurance that the cutting edges will go completely through the box blank.

While a separate hinge could be used to pivotably support the knife holder portion 48, the pivotable action attained by the unit illustrated has the advantage of being less expensive and there are no hinges to wear out or require maintenance. The cam 66 for adjusting the knife holder portion 48 is readily accessible for quick adjustment while being retained in the illustrated position by the nut 44 on bolt 40.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specifications as indicating the scope of the invention.

It is claimed:

1. A cutter unit adapted to be secured to a rotatable head for cutting tabs comprising a body, a knife holder pivotably supported by said body, a knife removably supported by said holder, and means on said body for selectively pivoting said holder away from said body.

2. A cutter unit in accordance with claim 1 including a metal wear plate between said means and said holder, and a deformable cushion between said plate and said holder for absorbing shock and for enabling the knife to be self-accommodating with respect to an anvil.

3. A device in accordance with claim 1 wherein said means is a cam, said holder is pivotable at one end to said body about an axis substantially parallel to the longitudinal axis of said cam.

4. A cutter unit in accordance with claim 1 including

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a rotatable head, said means being a cam having an enlarged head, said body having a hole therethrough, a bolt extending through said hole for releasably securing said body and said enlarged head to said side face of said rotatable head, with the axis of said bolt being generally parallel to the longitudinal axis of said rotatable head.

5 5. A cutter unit in accordance with claim 1 including a tab ejector on said knife holder, said knife holder and body being pivoted together by integral curved spring portions having little resistance to torsional forces and
10 sufficient resistance to bending and centrifugal forces to maintain said holder adjacent said body.

6. A cutter unit in accordance with claim 1 wherein said knife holder and body are pivoted together by an

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integral curved spring portion having little resistance to torsional forces and sufficient resistance to bending and centrifugal forces to maintain said holder adjacent said body unless said holder is moved by said means.

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BERNARD STICKNEY, Primary Examiner

U.S. Cl. X.R.

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