Feb. 9, 1960 F. G. UMHOLTZ 2,924,010

CUTTING INSTRUMENT WITH ANGULARLY ADJUSTABLE BLADE

Filed March 3, 1958

FIG. 1.

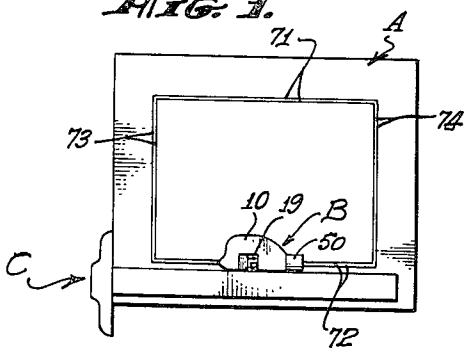


FIG. 7.

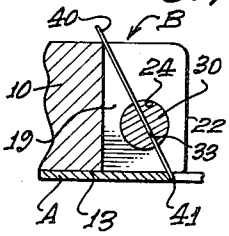


FIG. 8.

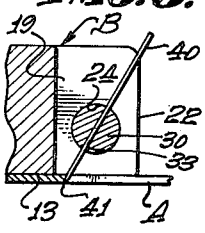


FIG. 2.

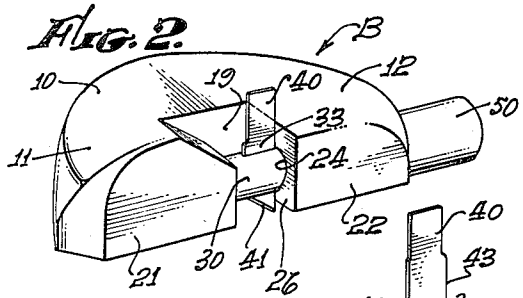


FIG. 3.

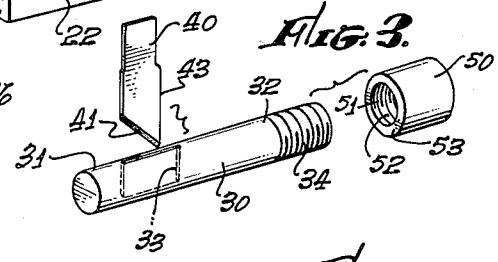


FIG. 4.

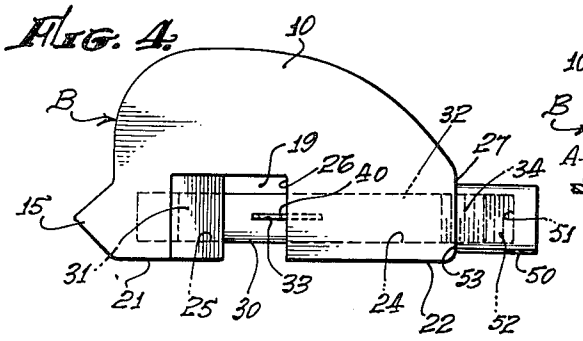


FIG. 6.

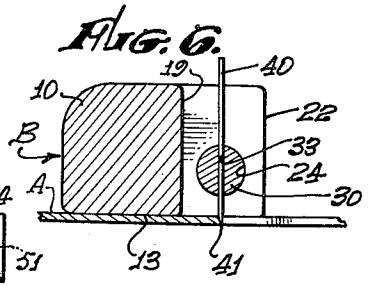
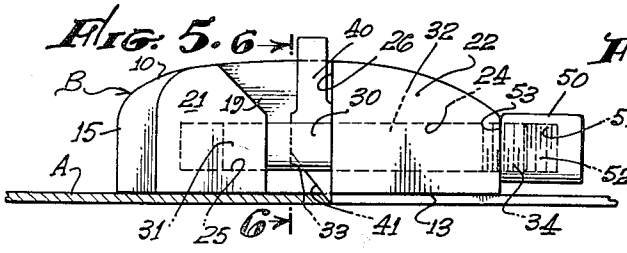


FIG. 5.



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CUTTING INSTRUMENT WITH ANGULARLY ADJUSTABLE BLADE

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3 Claims. (Cl. 30—293)

The present invention relates to a cutting instrument having an angularly adjustable blade, and which is particularly adapted for cutting sheets of cardboard and similar material.

In mounting photographs, certificates and the like in a frame there arises the need for a mat which may be made of cardboard or other suitable material and upon which the picture or certificate is mounted. In preparing such a mat it is necessary that the edges be trimmed precisely straight in order to present the desired ornamental appearance. Also, it is often desired that the edges be bevelled in order to enhance this ornamental appearance. No cutting instrument has heretofore been available which has been well adapted for the task mentioned.

It is, therefore, an object of the invention to provide a cutting instrument for cutting bevelled edges on a sheet of flat material.

Another object of the invention is to provide a cutting instrument for cutting bevelled edges at any desired bevel angle.

A further object of the invention is to provide a cutting instrument which is particularly adapted for trimming the edges of cardboard mats to be used in mounting photographs and like items.

In accordance with the present invention there is provided a U-shaped body member having a smooth under surface which slides over the work piece. A shaft is rotatably suspended between the two ends of the U and carries a cutting blade which projects downwardly to the surface of the work piece. Means are provided for rotating the shaft to any desired angular position so as to establish a corresponding angle for the bevelled edge which is to be cut. The blade may also be moved up or down to control the depth of the cut. The blade is then tightened in the shaft, the shaft is locked to inhibit its rotation, and the body member is moved along the surface of the work piece in order to make the cut. The body member is preferably guided by permitting the two ends of the U to ride along a straight-edge such as a T-square.

The above and other objects of the invention will be more readily apparent from the following description in conjunction with the accompanying drawing, in which:

Figure 1 is a plan view illustrating a flat sheet of material whose edges are to be trimmed by use of my invention;

Figure 2 is a perspective view of my novel cutting instrument illustrating the vertical position of the cutting blade;

Figure 3 is an exploded view of the shaft and cutting blade;

Figure 4 is a plan view of the assembled cutting instrument showing the manner in which the blade and shaft are locked in position;

Figure 5 is a vertical elevational view of the cutting instrument of Figure 4;

Figure 6 is a vertical cross-sectional view of the instrument of Figure 5 illustrating the vertical blade position;

Figure 7 is a view like Figure 6 illustrating the blade inclined in one direction; and

Figure 8 is a view like Figure 6 showing the blade inclined in the other direction.

Referring now to the drawing, and particularly to Figure 1, it will be seen that a work piece A consisting of a flat sheet of material is being trimmed by a cutting instrument B which is provided in accordance with the present invention. Instrument B is in sliding engagement with a T-square C which guides its movement. The exact procedure by which the edges are trimmed will be explained in detail after the structure of my novel cutting instrument has been described.

Referring now to the remaining figures of the drawing, it will be seen that my novel cutting instrument includes a body member 10 which is substantially U-shaped. The body member has a flat under surface 13 which is adapted to slide on the surface of the work piece. A first end 11 of the body member has a guiding surface 21 which is substantially perpendicular to the under surface 13, and the other end 12 of the U likewise presents a guiding surface 22 which is substantially perpendicular to under surface 13. Guiding surfaces 21 and 22 are precisely aligned with each other so as to engage a straight edge such as the T-square C.

A shaft 30 is rotatably suspended between the two ends of the U and extends across a working space 19 which is located between the U ends 11 and 12. An opening 24 is provided through body member 10 in its U end 12, opening 24 being parallel both to under surface 13 and to guiding surfaces 21 and 22. A cavity 25 is formed in U end 11 of body member 10 and faces on working space 19 in alignment with opening 24.

Opening 24 and cavity 25 are cylindrical bores which are adapted to rotatably receive the cylindrical shaft 30. Shaft 30 has a first end 31 adapted to be inserted into cavity 25 and a bearing portion 32 adapted to be received in opening 24. Intermediate to first end 31 and bearing portion 32 is a transverse slot 33 which is longitudinally aligned with shaft 30. A blade member 40 is adapted to be slidably received in slot 33.

Thus when shaft 30 is inserted through opening 24 in U end 12 of body member 10 it passes through the working space 19, and the first end 31 of the shaft 30 enters cavity 25 formed in U end 11 of body member 10. Slot 33 of shaft 30 is then positioned in working space 19 and is adapted to receive the blade member 40. Blade member 40 is in the form of an elongated flat strip of metal having one end thereof cut at an angle and sharpened to provide a cutting edge 41.

The other end of shaft 30 carries external threads 34 which are adapted to receive a cylindrical nut 50. Nut 50 has an internal cylindrical bore 51 on whose interior surface are formed threads 52 which are adapted to engage threads 34 on the shaft.

When shaft 30 is positioned in body member 10 the blade member 40 is then inserted in slot 33. Shaft 30 is then rotated to any desired angular position to tilt the blade member by a corresponding amount and thus provide a desired bevel angle. The up-and-down position of blade member 40 is then adjusted to provide the desired depth of cut. Thereafter, cylindrical nut 50 is placed upon the protruding end of shaft 30 engaging threads 34 thereon, and is tightened in order to rigidly fasten both the blade and the shaft in position. As will be seen, tightening of the nut causes shaft 30 to move partially out of cavity 25 and to thrust longitudinal edge 43 of blade member 40 into relatively tight engagement with inner surface 26 of U end 12.

U end 12 has an outer surface 27 which is substantial-

ly parallel to its inner surface **26**, both being substantially perpendicular to guiding surface **22** and also to under surface **13**. Nut **50** has a flat peripheral surface **53** surrounding threaded bore **51**. When nut **50** is tightened on shaft **30** its end surface **53** engages outer surface **27** of the body member thus insuring the partial withdrawal of shaft end **31** from cavity **25** and the consequent tight engagement of blade edge **43** against inner surface **26** of the body member.

On the outside edge of U-shaped body member **10** adjacent end **11** thereof, there is formed a V-shaped protrusion **15** which provides an alignment indicator. The purpose of the alignment indicator will be explained in connection with a more detailed explanation of Figure 1.

In Figure 1 the mat to be cut from work piece A has been laid out by marking thereon a pair of parallel lines **71** across the top, a pair of parallel lines **72** across the bottom, a pair of parallel lines **73** along the left hand side, and a pair of parallel lines **74** along the right hand side. Each pair of parallel lines connects directly with each adjoining pair so as to provide a double border line surrounding the portion of the work piece which is to be cut out. The inner border line indicates the cutting line for the surface of the material, whereas the outer border line indicates the amount of bevel which is desired. In other words, in the illustration shown the edges of the mat are to be bevelled outwardly so that the lower portion of the material defines a larger area than does the upper portion (see Figure 7 illustrating blade angle).

As shown in Figure 1, the T-square C is placed parallel to lines **72** and spaced a sufficient distance therefrom so that cutting edge **41** of blade **40** impinges upon the inner border line. The position of the sighting edge or alignment indicator **15** relative to the pair of border lines **72** is then noted by the operator. The operator then moves the cutting instrument B leftwardly while maintaining guiding surfaces **21** and **22** in engagement with T-square C and while also maintaining the correct position of sighting edge **15** relative to border lines **72**. It will be apparent that cylindrical nut **50** is of some assistance in maintaining alignment of the cutting instrument, and if desired nut **50** may also be provided with a suitable sighting tip, not shown.

The space **19** between end portions **11** and **12** of body member **10** is of such size and configuration as to permit the blade member to be inclined approximately 30 degrees either way from a vertical position. Also, space **19** is of such size and configuration as to permit the cutting operation of the blade member to be clearly observed by the user of the instrument.

Although my invention is fully capable of achieving the results and providing the advantages hereinbefore mentioned, it is to be understood that it is merely the presently preferred embodiment thereof, and that I do not mean to be limited to the details of construction above described other than as defined in the appended claims.

I claim:

1. A cutting instrument adapted to slide upon the upwardly disposed flat surface of a work piece in order to cut a bevelled edge thereon at a desired angle, said instrument comprising: a substantially U-shaped body member adapted to slidingly engage the flat surface of the work piece in a predetermined relationship thereto such that the legs of the U extend substantially parallel to said surface, said body member having a pair of flat guiding surfaces formed on its two extremities for guiding its movement parallel to a straight-edged member with which said guiding surfaces may be placed in contact, said body member having a cylindrical bore formed in one of its legs and aligned parallel to said guiding surfaces; a shaft adapted to be rotatably received in said bore with its forward end extending into the space between the U tips, and having a transverse slot formed in its forward end in longitudinal alignment with axis of the shaft; a cutting blade adapted to be slidably received in said slot with its cutting edge extending beyond the under side of said body member, the cutting angle being adjustable by rotating said shaft in said bore and the cutting depth being adjustable by sliding said blade longitudinally within said slot; and means manually operable after desired cutting angle and cutting depth adjustments have been made for urging said shaft longitudinally away from the space between the U tips whereby the longitudinal edge of said cutting blade frictionally engages the inner surface of said one leg of said body member adjacent said bore, thus simultaneously locking said shaft and said cutting blade in their desired positions; the configuration of the space between the U tips of said body member being such that the cutting action of said blade is visible to the user of the instrument for a wide range of cutting angle and cutting depth adjustments.

2. A cutting instrument adapted for cutting a straight beveled edge on a flat surfaced work piece, comprising: a body member having a smooth, flat under surface adapted to be slidably positioned on the flat surface of said work piece, said body member including first and second end pieces that are in longitudinal spaced relationship, which end portions also define two smooth, flat, longitudinally aligned guiding surfaces perpendicular to said under surface, said first end portion having a longitudinally extending cavity formed therein that extends inwardly from the surface thereof most adjacent to said second end portion, with said second end portion having an opening formed therein that extends longitudinally therethrough in coaxial alignment with said cavity; a shaft extending through said opening and into said cavity and rotatably supported therein with a portion of said shaft projecting from said body member, which outwardly projecting shaft portion has threads formed thereon, and that portion of said shaft located in the space between said first and second end portions of said body having a transversely disposed slot formed therein; a thin flat blade member adapted to be slidably received in said slot; and a nut that engages said threaded shaft end portion, which nut when rotated in one direction when said blade is disposed in said slot moves said shaft outwardly away from said first end portion to force the end of said blade member adjacent said second end portion into pressure contact between said nut and said second end portion, with said blade member and shaft being adjustably held at a desired position relative to said under surface by the frictional contact of said blade member with said second end portion with which it is in said pressure contact.

3. A cutting intrument as defined in claim 2 wherein the space between the adjacent faces of said first and second end portions is sufficiently wide to permit adjustable rotation of said shaft when said blade is disposed in said slot at least thirty degrees from the vertical.

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