United States Patent [19]

Matthew

[11] **3,774,495**

[45] **Nov. 27, 1973**

[54] **SHEET MATERIAL CUTTING DEVICE AND CUTTING BLOCK THEREFOR**

[76] Inventor: **Morton Pomeroy Matthew,** Kreiner Ln., Norwalk, Conn. 06850

[22] Filed: **Jan. 28, 1972**

[21] Appl. No.: **221,749**

[52] **U.S. Cl.** **83/522,** 83/468, 83/581, 83/564, 83/614, 83/638

[51] **Int. Cl.** **B26d 7/28**

[58] **Field of Search** 83/522, 581, 563, 83/564, 614, 620, 638, 468

[56] **References Cited**

UNITED STATES PATENTS

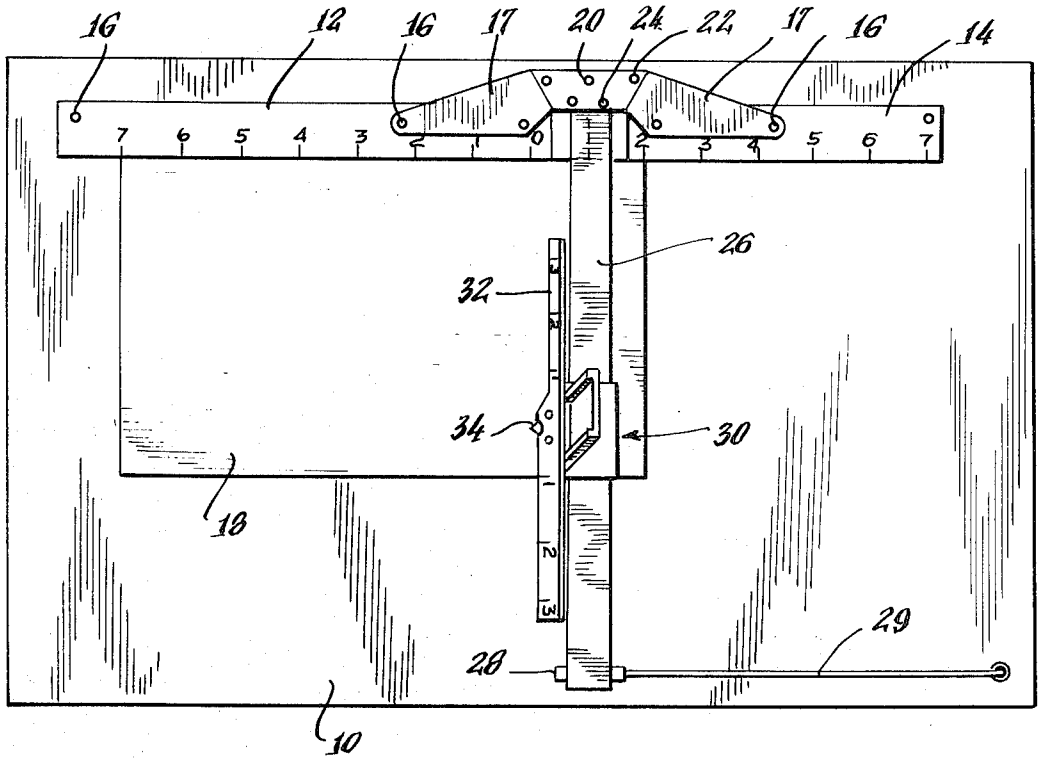
3,527,131	9/1970	Ellerin et al.	83/522
3,668,956	6/1972	Whipple et al.	83/522 X
3,463,041	8/1969	Shapiro et al.	83/614 X
570,180	10/1896	McCall	83/581

Primary Examiner—Willie G. Abercrombie
Attorney—Ronald J. Kransdorf

[57] **ABSTRACT**

A sheet material cutting device which includes a cutting board and a guide extending over the top of the board. A cutting block is mounted for sliding movement along the guide. The cutting block may include a base and a cutting blade normally biased away from the board, but adapted to be pivoted toward the board into engagement with a sheet positioned thereon. Where bevel cuts are desired, the cutting blade is at a non-perpendicular angle to the cutting board and the cutting blade is pivoted into angular engagement with the sheet. A scale is mounted for movement with the cutting block. The scale has a reference marking at the point where the cutting blade engages a sheet and extends from the reference point in at least one direction. The scale may be utilized to easily and accurately determine points at which the beginning and end of a cut occur.

19 Claims, 6 Drawing Figures



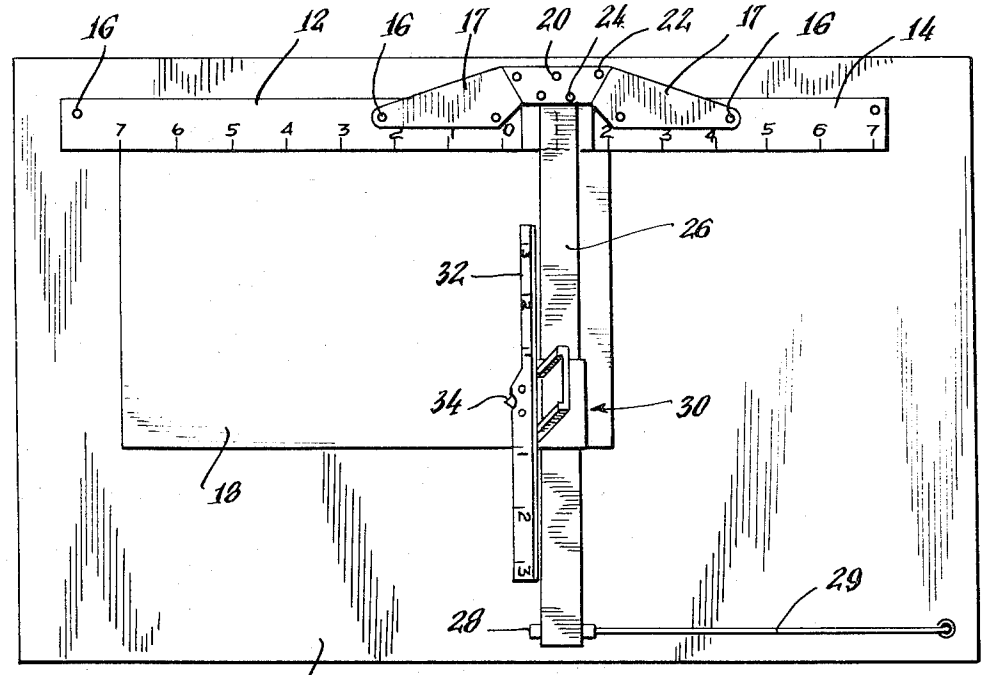


Fig. 1.

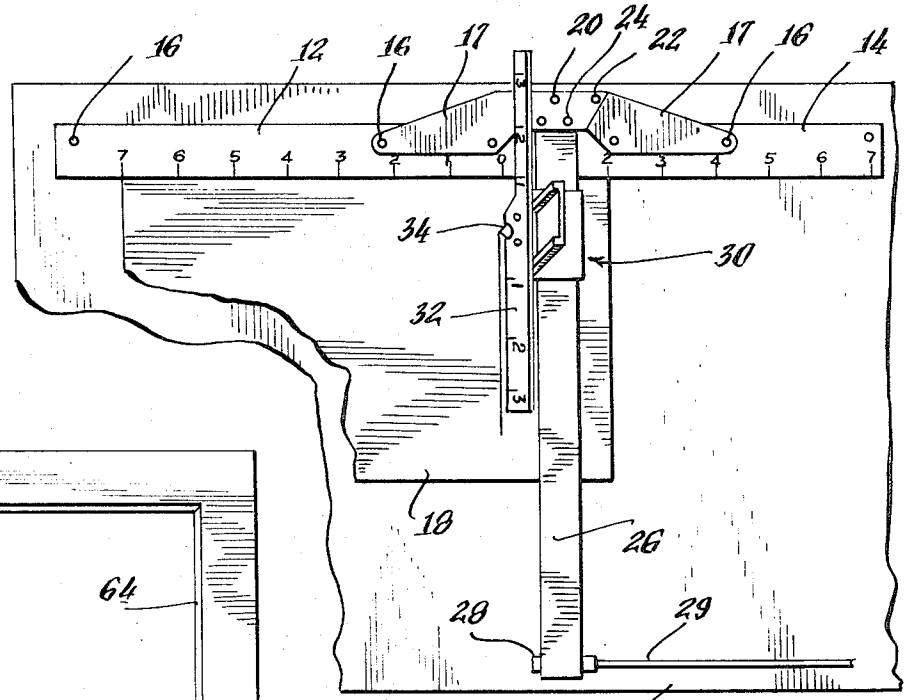


Fig. 2

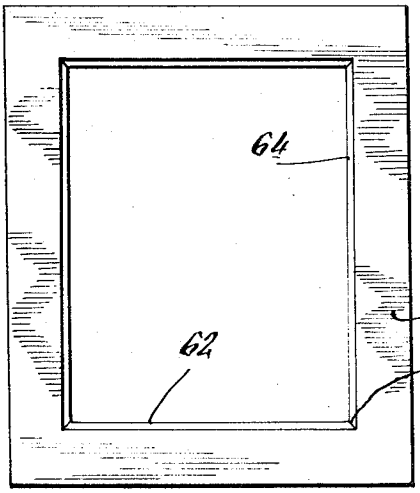


Fig. 6.

Fig. 3.

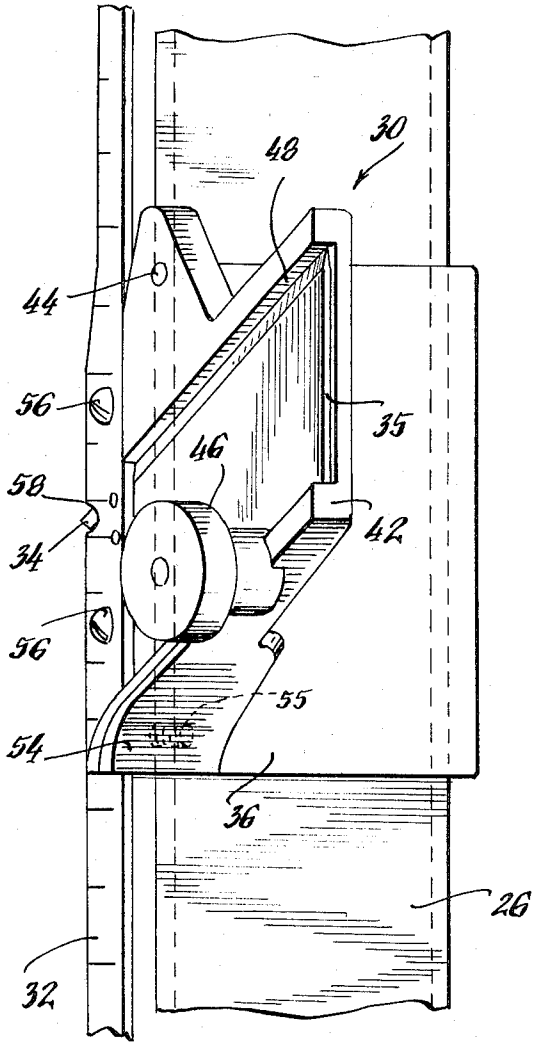


Fig. 5.

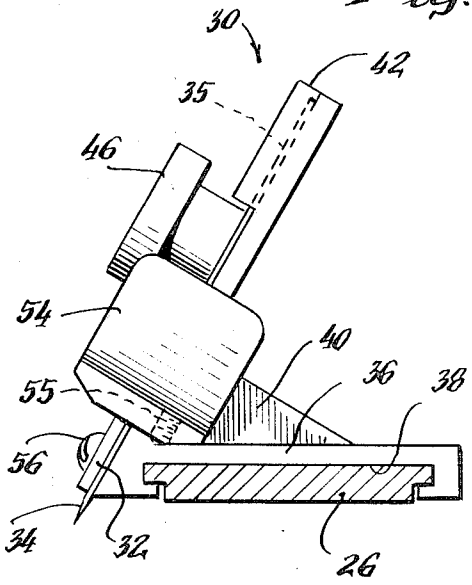
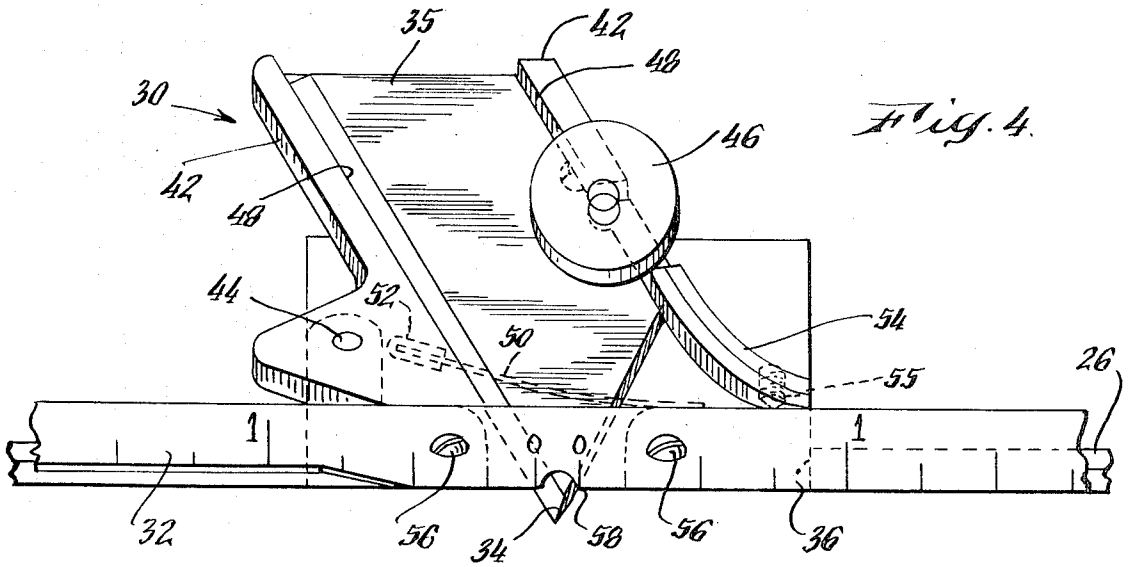


Fig. 4.



SHEET MATERIAL CUTTING DEVICE AND CUTTING BLOCK THEREFOR

This invention relates to a device for cutting sheet material such as cardboard or paper and more particularly to a cutting block for such a device.

BACKGROUND OF THE INVENTION

U.S. Pat. No. 2,803,303 entitled "Paper Cutting Device and Board Therefore", issued Aug. 20, 1957 to Morton P. Matthew, shows a device for making straight cuts in soft sheet materials such as cardboard or paper. This device consists of a cutting board having an elongated guide resiliently supported upon the top thereof. A cutting block is mounted for sliding movement along the guide and has a blade projecting therefrom which is moved into engagement with a sheet on the board when the guide is lowered toward the board. A scale is provided along the board which is indexed on the end of the block to indicate the length of a cut.

While the relatively simple device described above is adequate for many purposes, there are various ways in which it can be improved or modified to perform a slightly different function. First, while the scale on the guide is useful for indicating the length of a cut, indexing with this scale is on the end of the block rather than on the position of the blade, and this scale is thus not particularly suited for indicating the points on a sheet or mat at which a cut begins or ends. Thus, if it is desired to, for example, make a cut which begins one inch from a first edge of a sheet and ends one inch from the opposite edge of the sheet with the device indicated above, one must initially measure and mark the positions on the sheet at which the cuts are to begin and end before placing the sheet on the board for cutting. Even with the marks, it is difficult to see the position of the blade on the sheet, and extreme care must be used in making a cut to avoid overcutting.

The device of the above-mentioned Matthew patent could thus be improved by providing a means on the device for indicating the exact position of the blade on the sheet relative to an edge of the sheet or some other predetermined point. Such a device should be simple to use and should also be simple in design so as to be relatively easy and inexpensive to add to the device.

The problem of making accurate cuts which begin and end at predetermined positions of a sheet arises particularly when the device is being utilized to cut display windows in mats of the type utilized to mount pictures and the like. Heretofore, the cutting of mats has normally involved an initial measuring and marking either on the front or back of the mat. Since a shear can not be used to make such apertures, a knife or other blade must be utilized. However, it requires skillful knife manipulation to reproduce an unwavering cut with accurate terminations. The problem is compounded by the fact that bevel cuts are normally utilized for mats, requiring the blade to be held at a precise angle. To ease these difficulties, some mechanical mat cutters have been developed. However, these cutters have normally been relatively complicated and expensive and have generally still required an initial measuring and marking of the mat.

A need therefore exists for a relatively simple and inexpensive device for making bevel cuts in a mat without the need for initial measuring and marking. In order for the device of the Matthew patent to fulfill these requirements, its cutting block must be modified, or a new cutting block provided, so as to enable the device to make bevel cuts. At first glance it would appear that the conversion from a straight cutter to a bevel cutter could be made by merely mounting the blade in the cutting block of the Matthew patent at the desired angle. However, an attempt to move an angled blade directly into a sheet or mat, as is done with the straight blade in the Matthew patent, could cause the blade to bend or break. The cutting block must thus be modified to permit the blade to be brought into the mat at an angle rather than straight down. In order to permit proper meeting at corners, it is preferable that this angle be selected so as to be equal to the bevel angle.

A primary object of this invention is thus to provide an improved sheet material cutting device.

A more specific object of this invention is to provide a sheet material cutting device which permits a position on the sheet or mat at which a cut begins and/or ends to be quickly, easily, directly, and accurately determined, eliminating the need for premeasuring and marking a sheet and premitting cuts to be made from the front of the sheet.

Another object of this invention is to provide a sheet material cutting device adapted for making bevel cuts.

A further object of this invention is to provide a relatively simple and inexpensive device for quickly, easily, and accurately cutting mats.

SUMMARY OF THE INVENTION

In accordance with these objects, this invention provides a sheet material cutting device which includes a cutting board and a guide extending over the top of the board. A cutting block is mounted for sliding movement along the guide. The cutting block may include a base and a cutting means normally biased away from the board, but adapted to be pivoted toward the board into engagement with a sheet positioned thereon. Where bevel cuts are desired, the cutting means is at a non-perpendicular angle to the cutting board and the cutting means is pivoted into angular engagement with the sheet. A scale is mounted for movement with the cutting block. The scale has a reference marking at the point where the cutting means engages a sheet and extends from the reference point in at least one direction. The scale may be utilized to easily and accurately determine points at which the beginning and end of a cut occur.

The foregoing and other objects, features, and advantages of the invention will be apparent from the following more detailed description of a preferred embodiment of the invention as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a top view of a sheet material cutting device of a preferred embodiment of the invention, showing the device at the beginning of a cut.

FIG. 2 is a top view of the cutting device shown in FIG. 1 showing the device at the end of a cut.

FIG. 3 is a top view of a cutting block suitable for use for making bevel cuts with a device of the type shown in FIGS. 1 and 2.

FIG. 4 is a left side view of the cutting block shown in FIG. 3.

FIG. 5 is a rear view of the cutting block shown in FIGS. 3 and 4.

FIG. 6 is a plain view of a typical work piece after performing the cutting operations for fabricating a picture mat.

DETAILED DESCRIPTION

Referring now to FIG. 1, a cutting device of the general type shown in the beforementioned Matthew U.S. Pat. No. 2,803,303 is shown. The device consists of a board 10 which may be of wood, but is preferably of a softer material, such as soft composition board so as to be adapted to receive a pin or staple. Two scale sections, 12 and 14, are mounted along the upper edge of board 10 by screws 16. As in the Matthew patent, the scale sections are slightly spaced from board 10 so as to permit a disposable, board protecting sheet to be fitted under the scales and held thereby. Plate 17, which may be in two separate sections, is mounted on top of scales 12 and 14 and secured thereto by the screws 16. A leaf spring 20, normally biased away from board 10, is mounted to plate 17 by rivets 22 or other suitable means and has secured to its underside, by rivets or similar means 24, an elongated metal guide rail 26. Guide rail 26 extends along the top of board 10 at an angle perpendicular to that of scales 12 and 14. A bracket 28 is mounted on an arm 29 fixed to board 10 and is positioned under the end of rail 26 opposite leaf spring 20. The functions of this bracket will be described later.

A cutting block 30, having a scale 32 and a cutting blade 34 supported thereon, is mounted for sliding movement along rail 26. Cutting block 30 is shown in greater detail in FIGS. 3–5. Referring now to those figures, it is seen that cutting block 30 consists of a base 36 which has a guide rail receiving groove 38 (see FIG. 5) in its underside and a perpendicular flange 40. A blade holder 42 is pivotably secured by pin 44 to flange 40. As may be best seen in FIG. 5, blade holder 42 is mounted at an angle to the perpendicular which angle is, for the preferred embodiment of the invention, 60°. A screw 46, the head of which is of sufficient size to be easily finger operable, secured blade 34, which may be a standard utility knife blade, to holder 42. A trough 48 formed in blade holder 42 aids screw 46 in holding the blade in position. A cantilever spring 50 mounted in a groove 52 in blade holder 42 normally coacts with base 36 to bias the blade holder, and thus blade 34, counterclockwise. Blade holder 42 is thus normally in a raised position bringing the tip of blade 34 into a recessed position behind scale 32. Blade holder 42 also has a pad 54 secured to or, for a preferred embodiment of the invention, formed into its leading face. Pressure applied to pad 54 as by, for example, a person's thumb rotates blade holder 42 clockwise about pin 44 to lower the blade into the position shown in FIGS. 3–5. Continued pressure applied to pad 54 after the blade has been lowered causes cutting block 30 to move on rail 26 in the direction the pressure is applied (upward as viewed in FIG. 1). A set screw 55 in pad 54 may be adjusted to control the depth of cut in a mat 18. The screw, when screwed in, bears against base 36 to limit the downward movement of holder 42 and thus decrease the depth of cut.

Scale 32 secured to base 36 by screws 56 serves two important functions. First, scale 32 is mounted so that it stands off slightly from base 36 to form a close fitting slot with the base through which blade 34 passes. Since the width of this slot is just slightly greater than the thickness of the blade, the blade is held against lateral movements on both sides. This prevents shimmying of the blade and provides a straight cut. Scale 32 also, in a manner to be now described, permits the starting and ending position of a cut to be accurately determined. However before describing the operation of the device, three additional features of scale 32 should be noted. First scale 32 has two zero markings which are slightly displaced from each other. From the figures, it is seen that this displacement is roughly equal to the width of the blade which projects beyond the scale. The double zero markings are thus effective to compensate for the width of the blade. Second, scallop 58 is provided between the two zero markings to provide maximum visability of the blade. Finally, the forward or left-hand portion of scale 32 not adjacent block 30 is raised slightly to permit this scale to clear scale 12, leaf spring 20 and plate 17 when the block is, for example, in the position shown in FIG. 2. Similarly, the portions of scales 12 and 14 adjacent guide rail 26 are cut back slightly to provide clearance for block 30 when a cut is made to the top of the mat.

OPERATION

In operation, a mat 18 is initially positioned on board 10 by use of scales 12 and 14. Thus, as shown in FIG. 1, mat 18 is positioned so that the first cut is made along a line which is two inches from the right edge of the mat and/or seven inches from the left edge of the mat. Scales 12 and 14 permit the position of the cut line to be precisely determined relative to either edge of the mat. Scale 14 may be dispensed with if mat positioning is to be done only along the left edge of the mat.

When the mat has been properly positioned on board 10, guide rail 26 is moved down against the action of spring 20 into engagement with bracket 28. Bracket 28 serves to maintain the long cantilevered guide rail 26 perpendicular to scales 12 and 14, preventing lateral motion thereof caused by side pressures occurring during cutting. This assures a straight perpendicular cut. Bracket 28 being mounted on arm 29 permits a long mat 18 to pass between the bracket and board 10. Where mats longer than rail 26 are not to be cut, bracket 28 may be mounted directly under the rail.

Rail 26 having the cross section shown in FIG. 5, being thicker in the middle then the thickness of cutting block base 36, the bottom edge of the rail can be permitted to come to rest on the mat. The rail assures uniform spacing of the block from the mat and holds the block slightly above the mat so that the block moving over the mat does not mar it.

The next step in the operation is to position blade 34 for the beginning of the desired cut. In FIG. 1, it is assumed that the cut is to begin one inch from the lower edge of the mat. FIG. 1 illustrates how scale 32 is utilized to properly position blade 34 to begin this cut, being indexed on the lower edge of the mat for this purpose. When the scale 32 indicates that blade 34 is properly positioned to initiate the cut, the operator presses down on pad 54, preferably with his thumb, to rotate blade holder 42 clockwise about pivot 44 against the action of spring 50. This rotation moves blade 34 to the position shown in FIGS 3–5, causing the blade to enter mat 18 at the desired point. Since blade 34 is pivoted into contact with mat 18 rather than being pushed down into it, the blade enters the mat at an angle. For reasons which will be described shortly, this angle

should be the same as the angle at which the cut is beveled. For the embodiment of the invention shown in the figures, this angle is 60°. The angle at which the blade enters the mat is established by the proper location of pivot **44** with respect to blade **34**.

After the blade **34** has been rotated into contact with mat **18**, continued pressure on pad **54** is effective to move block **30** upward as shown in FIGS. **1** and **2** along rail **26**. Since blade **34** is in the mat at this time, a cut is made in the mat as block **30** moves along the mat. It should be noted that the three aforementioned steps, namely: **1.** moving guide rail **26** downward, **2.** rotating holder **42** and blade **34** clockwise, and **3.** moving block **36** to cut, are easily and sequentially performed using only the index finger and thumb of one hand applied to **36** and **54** respectively.

FIG. **2** illustrates the manner in which scale **32** is utilized to easily and accurately determine the endpoint for the cut. Assume that the cut is to terminate one inch from the top edge of mat **18**. Block **30** is thus moved along rail **26** until scale **32** indicates that blade **34** is exactly one inch from the top of the mat. This is the position shown in FIG. **2**, with scale **32** being indexed on the top of the mat. When this position is reached, pressure is released from pad **54**, permitting blade **34** to be removed from the mat by the action of spring **50** on blade holder **42**. A first bevel cut of the type shown in FIG. **6** is in this manner effected.

For the second cut, the mat is again positioned on board **10** by use of scales **12** and **14**. Rail **26** is again lowered into operative position and blade **34** positioned to the beginning of the cut by use of scale **32**. If it is assumed that the first cut in mat **18** is the cut **62** shown in FIG. **6**, and that the second cut to be made is the cut **64**, it can be seen that because of the selected angle for the bevel, the corner **66** at which the cut would begin for cut **64** is at a a 60° angle. Thus, the blade entering the mat at this angle prevents the blade from causing any overcut or other damage to the mat when the blade enters. Clean corners are thus assured. The sequence of operations described above would be repeated for cutting the two remaining sides of the opening shown in FIG. **6**.

A supplementary cutting block may be used in place of block **30**, with a fixed perpendicular blade, similar to that covered in the before mentioned Matthew patent, so that the present invention may be used to cut the outline of the mat to size before bevel cutting the inside. Either or both of these cutting blocks can function on the rail **26** without lips or other means reaching around and under the rail so that one block may be quickly lifted off the rail and exchanged with another block.

A relatively simple and inexpensive cutting device has thus been provided which permits the start and end points for a cut in a piece of sheet material to be quickly, easily, and accurately determined without requiring any premeasuring or premarking of the sheet or mat. A unique mat cutting structure utilizing the teachings of this invention has also been disclosed. In addition to the various possible modifications mentioned previously, it is apparent that additional modifications in the specific elements utilized for performing the various functions described above could be made by one ordinarily skilled in the art while still remaining within the teachings of the invention.

What is claimed is:

1. A cutting block for a sheet material cutting device, said device having a cutting board and a guide extending over the top of the board comprising:

a base mounted for sliding movement along said guide;

a cutting means pivotally supported on said base, said cutting means being normally biased away from said board, but being adapted for pivoting toward the board to engage a sheet positioned thereon; and

a scale mounted for movement with said base, said scale having a reference marking at the point where said cutting means engages a sheet when pivoted and extending from said reference marking in at least one direction, said scale being graduated in units of linear measurement starting at said reference marking and being adapted to be directly indexed on an edge of said sheet material, whereby the points at which the beginning and end of a cut occur may be easily and accurately observed.

2. A cutting block of the type described in claim **1** wherein said cutting means includes a blade holder having a blade supporting face, means for clamping a cutting blade to said face, and a part to which pressure may be applied to pivot said cutting means.

3. A cutting block of the type described in claim **2** wherein said part to which pressure may be applied is positioned so that pressure applied to said part after the cutting means has engaged a sheet is operative to move the block along the guide in the direction of the pressure.

4. A cutting block of the type described in claim **2** wherein said blade supporting face is at a non-perpendicular angle to said board whereby said cutting means makes bevel cuts in a sheet.

5. A cutting block of the type described in claim **4** wherein the pivoting of said cutting means causes it to engage a sheet at an angle; and

wherein the angle at which said cutting means engages a sheet is equal to said non-perpendicular angle.

6. A cutting block of the type described in claim **5** wherein said non-perpendicular angle is 60°.

7. A cutting block of the type described in claim **2** wherein said scale is positioned parallel to said blade supporting face and is spaced therefrom by a distance slightly greater than the thickness of a cutting blade, whereby a blade positioned between the face and the scale is held against lateral movement.

8. A cutting block of the type described in claim **1** wherein said cutting means is supported at a non-perpendicular angle to said board whereby bevel cuts may be made in a sheet.

9. A cutting block of the type described in claim **1** wherein said scale extends in both directions from said reference marking.

10. A cutting block of the type described in claim **9** wherein there are a pair of said reference markings, one for each direction in which said scale extends, said reference markings being slightly separated to compensate for the width of the blade.

11. A cutting block of the type described in claim **1** including at least one scallop in said scale in the area of said reference marking to provide maximum visibility of the blade in that area.

12. A sheet material cutting device comprising:

a cutting board;

a guide extending over the top of the board;

a cutting block mounted for sliding movement along said guide, said cutting block including a cutting means normally biased away from said board but adapted to be moved toward the board into engagement with a sheet position thereon; and

a scale mounted for movement with said block, said scale having a reference marking at the point where said cutting means engages a sheet and extending from said reference marking in at least one direction, said scale being graduated in units of linear measurement starting at said reference marking and being adapted to be directly indexed on an edge of said sheet material, whereby the points at which the beginning and end of a cut occur may be easily and accurately observed.

13. A device of the type described in claim **12** wherein said scale extends in both directions from said reference marking.

14. A device of the type described in claim **12** including a stationary scale positioned on top of said board and extending from near one end of said guide in a direction perpendicular thereto.

15. A device of the type described in claim **14** wherein said stationary scale extends in both directions from said guide.

16. A device of the type described in claim **12** including means for supporting said guide to prevent lateral movement thereof.

17. A device of the type described in claim **16** wherein said means for supporting is a bracket mounted to permit a large sheet to pass thereunder.

18. A mat cutting device comprising:

a cutting board adapted to have a mat positioned thereon;

a guide extending over the top of the board;

a cutting block mounted for sliding movement along said guide, said cutting block including a cutting means mounted at a non-perpendicular angle to the board, said cutting means being normally biased away from said board but being adapted to be pivoted into angular engagement with a mat position on said board and to be moved with said block along said guide to make a bevel cut in said mat; and

a scale mounted for movement with said block, said scale having a reference marking at the point where said cutting means engages a mat when pivoted and extending from said reference marking in at least one direction, said scale being graduated in units of linear measurement starting at said reference marking and being adapted to be directly indexed on an edge of said sheet material, whereby the points at which the beginning and end of a cut occur may be easily and accurately observed.

19. A mat cutting device of the type described in claim **18** wherein the angle at which said cutting means is pivoted into engagement with said mat is equal to said non-perpendicular angle.

* * * * *