

[54] MAT CUTTER

[76] Inventor: **Joseph Martin**, c/o Martin Engineering Co., 169-17 Northern Blvd., Flushing, N.Y. 11358

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[51] Int. Cl. **B26d 7/02; B26d 1/06; B26d 3/02**

[58] Field of Search **83/455, 459, 468, 614, 83/353; 269/89, 91, 229, 232, 233, 236**

[56] References Cited

UNITED STATES PATENTS

301,418	7/1884	Williams	269/233 X
1,560,808	11/1925	Steele	83/452 X
3,213,736	10/1965	Keeton.....	83/455
3,447,409	6/1969	Lewis.....	83/614 X
3,532,018	10/1970	Szabo.....	83/455

Primary Examiner—Willie G. Abercrombie

Attorney, Agent, or Firm—H. Gibner Lehmann; K. Gibner Lehmann

[57] ABSTRACT

A device for cutting mats for picture frames and the

like, comprising an elongate base on which sheet stock can be placed, and an elongate clamp bar coextensive with the base and adapted to engage the stock to hold it in position for cutting. Disposed at opposite ends of the base are two pivotally mounted cams which engage cam followers carried by opposite ends of the clamp bar. Attached to the cams are arms which in turn carry an elongate handle. The bar is vertically movable between an advanced (lower) position with respect to the base wherein it tightly engages sheet stock placed thereon, and a retracted (raised) position wherein it is spaced a distance above the upper surface of the base. Movement of the bar is effected by means of the cams which are located near its opposite ends. A detent portion of each cam operates to retain the handle in a raised position off the surface of the base when the clamp bar is disposed in its retracted (raised) position, such that the base surface is free of obstruction. By such an arrangement, both hands of the operator are free for positioning the stock on the base. A pair of pre-stressed blades, carried on a carriage, slides along the clamp bar and effects the cutting of the mat or stock. The pre-stressing reduces bending of the blade when it engages the stock, resulting in a straighter, more uniform cut than would otherwise be possible.

12 Claims, 21 Drawing Figures

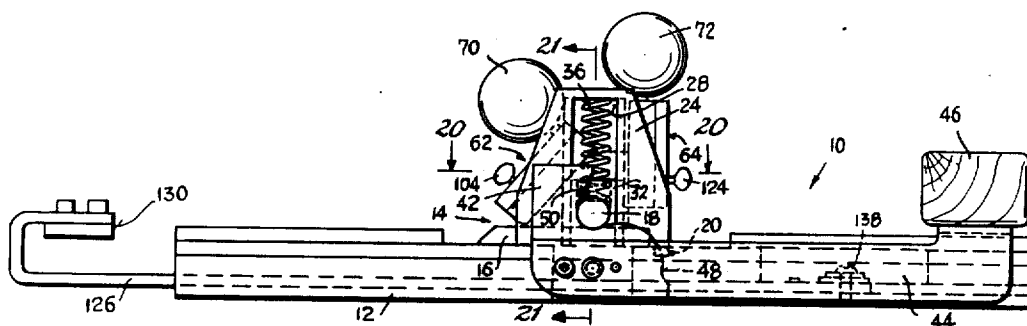


Fig. 1

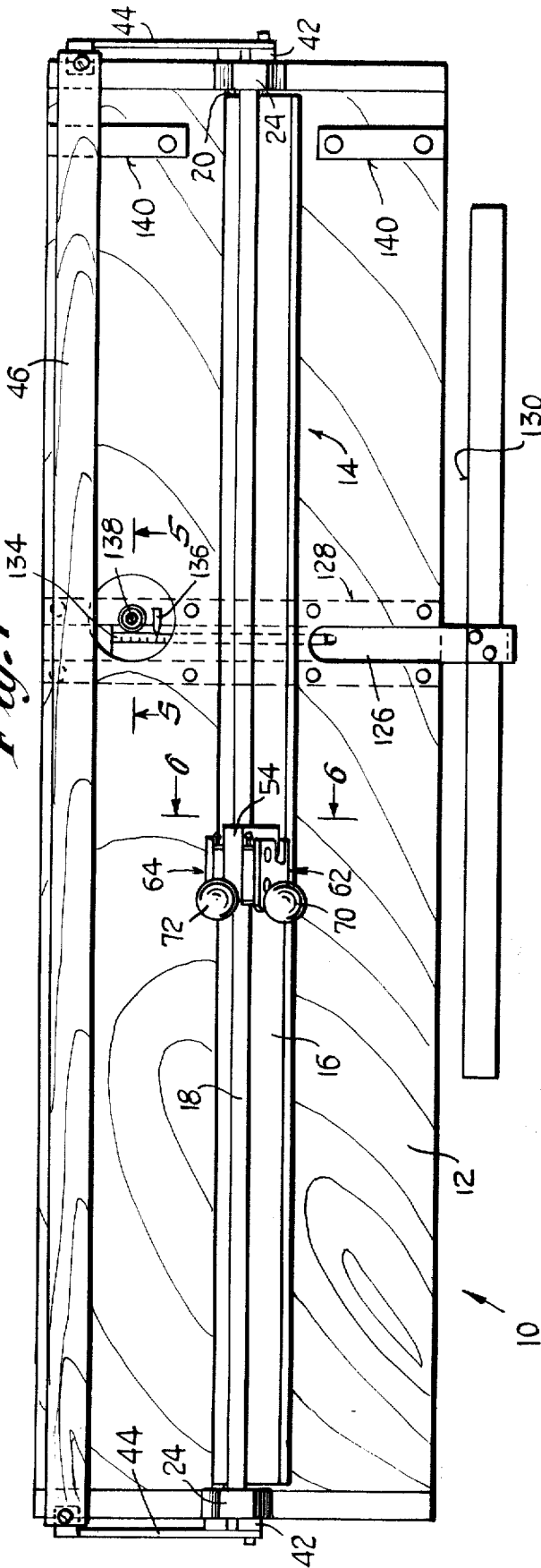


Fig. 2

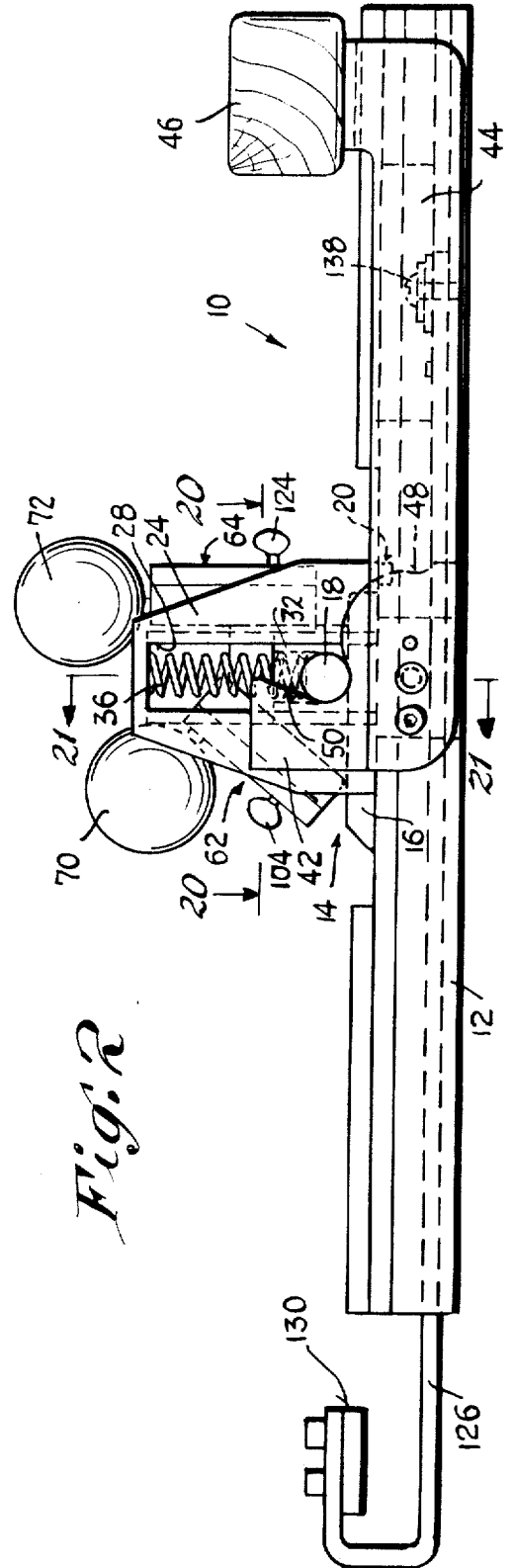


Fig. 3

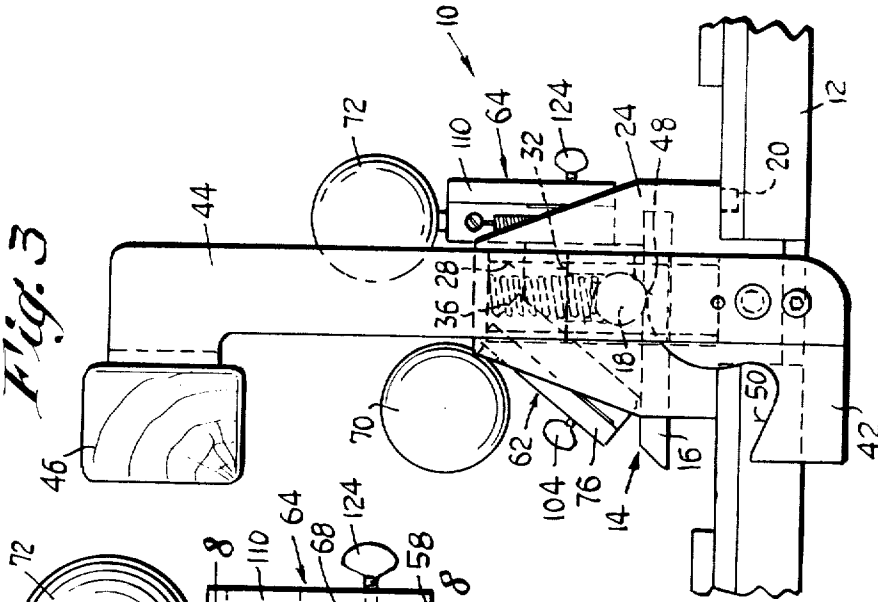


Fig. 6

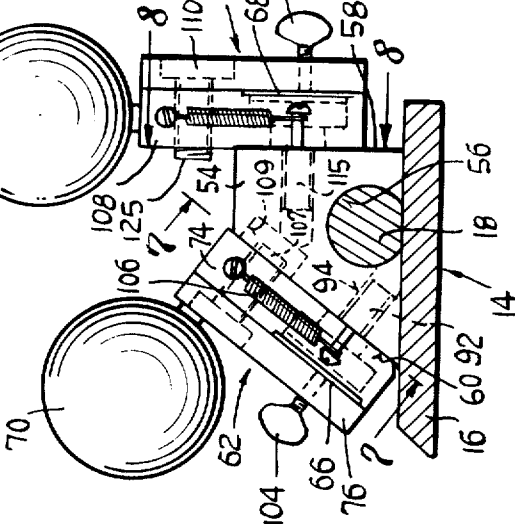


Fig. 4

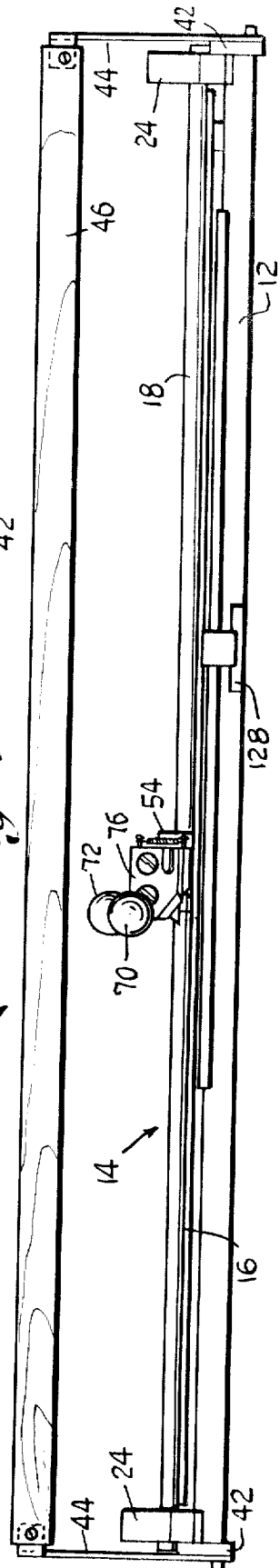


Fig. 5

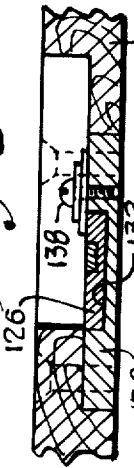


Fig. 7

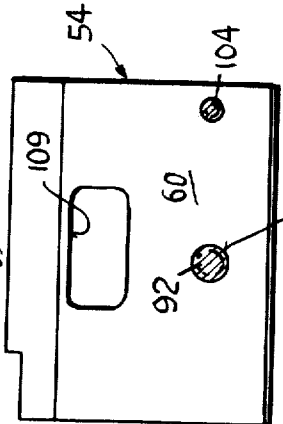
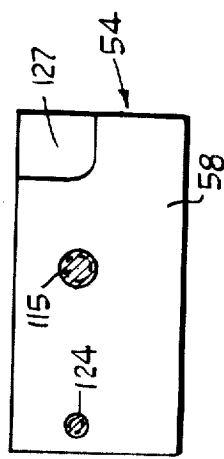
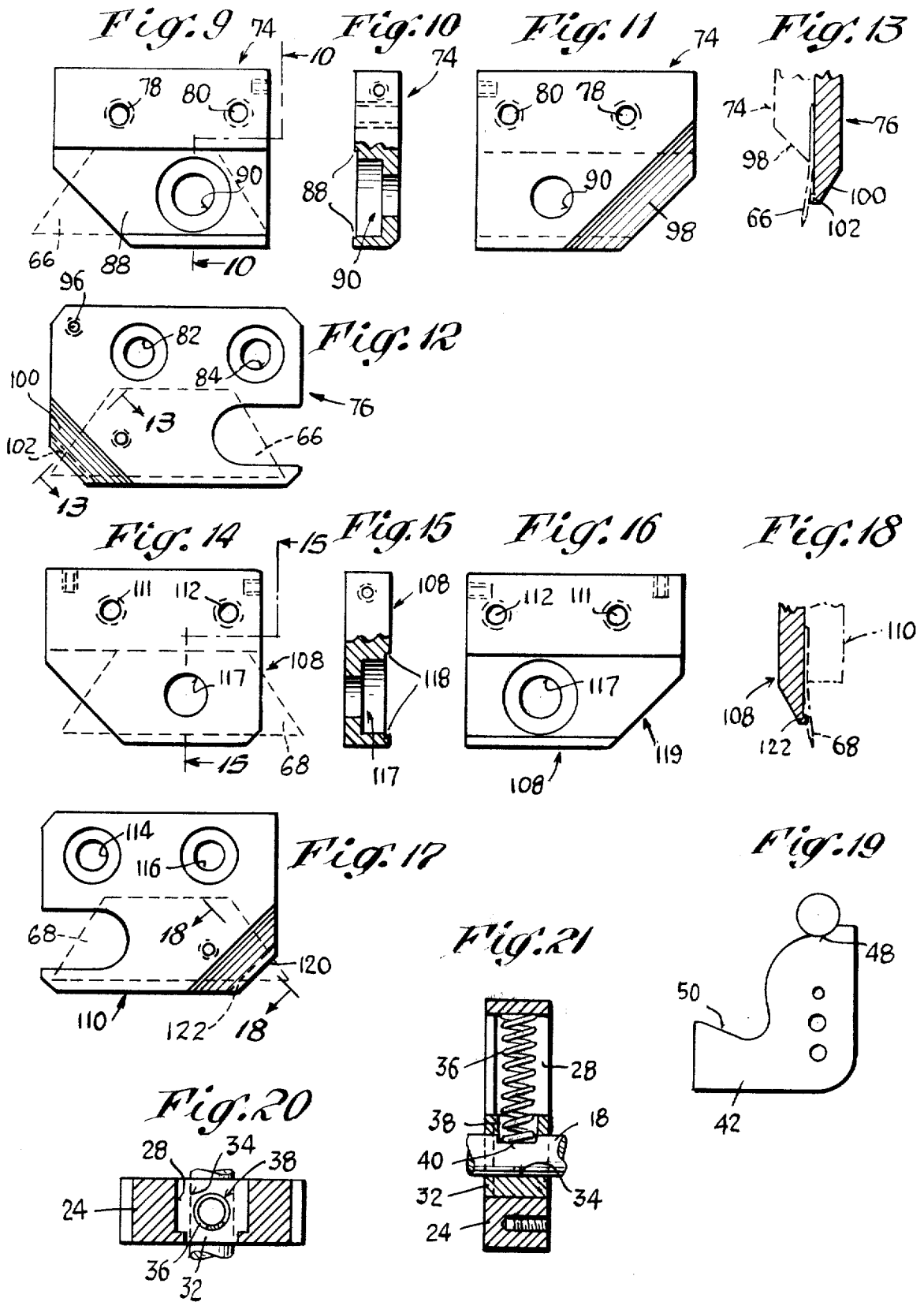


Fig. 8





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MAT CUTTER

BACKGROUND

This invention relates generally to picture-frame mat-cutter devices, and more particularly to devices of this type which employ a base and a retractable clamp bar slidably carrying a carriage on which there are mounted cutting blades.

A prior device of the kind noted is disclosed in U.S. Pat. No. 3,213,736, showing a mat cutter including a base, a clamp bar engageable with the base, and arms carried by the bar and pivotally mounted at one side of the base such that the bar can be swung upward away from the cutting surface during the positioning on the base of sheets of material to be cut. The bar has a slide carriage which holds a cutting blade. A T-square device extends substantially beyond one longitudinal side edge of the base.

While the above device functioned acceptably well, there were several drawbacks to the particular arrangement that had been devised. When the bar was raised off the base and swung to an oppositely disposed, extreme position, as during placement of a piece to be cut, it extended a substantial distance beyond the side of the base, often requiring that the operator stretch a considerable amount when undertaking such an operation. In addition, there was a tendency for the bar to interfere with the movement of the operator while he was working. Furthermore, if it was desired to momentarily raise the bar, one hand was always required to hold it in the raised position, leaving only the other hand free for positioning the stock, adjusting the T-square, etc.

Other disadvantages included the fact that in the prior device, the T-square protruded a substantial distance beyond the extremities of the base, increasing the likelihood that it would be bumped, jarred or otherwise damaged during shipping, storage or even while in use. Where the cutting blade engaged the bar for guidance, there frequently resulted rapid wear and dulling of the blade, as well as the emergence of small marks or nicks in the edge of the bar after prolonged use. In constructions where the blade was supported at a point remote from the cutting edge, there was a likelihood of detrimental flexing of the blade during the cut, such flexing causing crooked edges, uneven cuts, and other undesirable characteristics.

SUMMARY

The above drawbacks and disadvantages of prior picture-frame mat-cutter devices are obviated by the present invention which has for an object the provision of a novel and improved mat cutter which is simple in construction, reliable in operation and which is considerably easier and more convenient to use than devices heretofore known. A related object is to provide a mat cutter device which enables the operator to use both hands in positioning stock to be cut, by eliminating the need to hold a clamp bar in a fixed position. A still further object is to provide a device as above, which is rugged and sturdy in construction and which is not likely to be damaged during storage, shipping or use. Yet another object is to provide a device which yields a straightline cut without the use of a cutting blade guide, thus resulting in greatly improved performance and longer life of the blade.

The above objects are accomplished by a cutter device for picture frame mats comprising an elongate

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base having an upper surface on which the sheet material to be cut is placed, and an elongate clamp bar which is coextensive with the base and which holds in place the sheet material. The clamp bar is movable with respect to the base between an advanced and a retracted position. In accomplishing this, the ends of the clamp bar are received in guide members on the base, and carry cam followers which respectively engage cams pivotally mounted on the opposite ends of the base. Attached to the cams are arms which carry an elongate handle. Movement of the handle in one direction causes the cam followers to advance the clamp bar toward the base and eventually into engagement therewith. The cam has a detent portion such that when the handle is moved in the opposite direction, it can be held in a raised position with respect to the base, wherein the clamp is retracted. Thus, under this latter circumstance, the operator has both hands free to position the material to be cut.

The bar has a slidable carriage which mounts a pair of cutting blades. The latter are pre-stressed or bent such that a minimum of flexing of the cutting edges occurs as the cuts are being made. Especially straight and uniform edges are thus realized by the present engagement.

Other features and advantages will hereinafter appear.

In the drawings, illustrating a preferred embodiment of the invention:

FIG. 1 is a top plan view of the improved mat cutter device of the present invention, shown with the clamp bar thereof disposed in the advanced position with respect to the base.

FIG. 2 is a right end elevation of the cutter device of FIG. 1.

FIG. 3 is a view like FIG. 1, except showing the clamp bar in the raised or retracted position with respect to the base.

FIG. 4 is a front elevation of the cutter device of FIGS. 1-3, shown with the clamp bar in the raised or retracted position with respect to the base.

FIG. 5 is a fragmentary section taken on line 5-5 of FIG. 1.

FIG. 6 is a fragmentary section taken on line 6-6 of FIG. 1.

FIG. 7 is a fragmentary section taken on line 7-7 of FIG. 6.

FIG. 8 is a fragmentary section taken on line 8-8 of FIG. 6.

FIG. 9 is a top plan view of a support plate constituting one part of a rocker assembly for pivotally mounting a first cutting blade on the carriage.

FIG. 10 is a section taken on line 10-10 of FIG. 9.

FIG. 11 is a bottom plan view of the support plate of FIGS. 9 and 10.

FIG. 12 is a top plan view of a cover plate constituting another part of the rocker assembly for pivotally mounting the first cutting blade on the carriage, the cover plate being adapted to abut the support plate of FIGS. 9-11.

FIG. 13 is a view taken on line 13-13 of FIG. 12.

FIG. 14 is a top plan view of a support plate constituting one part of a second rocker assembly for pivotally mounting a second cutting blade on the carriage.

FIG. 15 is a section taken on line 15-15 of FIG. 14.

FIG. 16 is a bottom plan view of the support plate of FIGS. 14 and 15.

FIG. 17 is a top plan view of a cover plate constituting another part of the second rocker assembly for pivotally mounting the second cutting blade on the carriage, the cover plate being adapted to abut the support plate of FIGS. 14-16.

FIG. 18 is a view taken on line 18-18 of FIG. 17.

FIG. 19 is a diagrammatic representation of the cam as employed to raise and lower the clamp bar of the mat cutter of the present invention, and showing a circular rod carried by one end of the bar, the rod constituting a cam follower.

FIG. 20 is a fragmentary section taken on line 20-20 of FIG. 2.

FIG. 21 is a fragmentary section taken on line 21-21 of FIG. 2.

Referring to FIGS. 1-4 there is illustrated a mat cutter device generally designated by the numeral 10 comprising an elongate base 12 having a flat upper surface adapted to receive sheets of material to be cut, and an elongate clamp bar 14 which is coextensive with the base and movable with respect thereto between an advanced position wherein it engages the base, and a raised or retracted position wherein it is disposed off the surface of the base. The advanced and retracted positions of the clamp bar are illustrated respectively in FIGS. 2 and 3. As shown in FIGS. 1 and 6, the bar comprises a flat section 16 which is pinned to an upper rod-like section 18 of circular cross section. The base has a groove 20 in its upper surface and coextensive with the bar 14, the groove constituting a recess to receive an edge of one of two cutting blades which are disposed on a carriage to be described below.

Referring to FIGS. 1-4, 20 and 21, and in accordance with the present invention there is provided a guide means carried on the base 12 and engageable with the opposite ends of the clamp bar 14 for enabling limited vertical movement of the latter with respect to the base, the guide means comprising a pair of upstanding guide members 24 having vertical slots 28 in which there are received slide blocks 32, the latter having holes 34 engageable with the ends of the rod-like section 18 of the clamp bar 14 so as to constitute a guide for the latter as it undergoes vertical movement with respect to the base.

By the present invention there is further provided a pair of springs 36 carried by the guide members and engaging the slide blocks, tending to bias the clamp bar to an advanced (lowered) position as illustrated in FIG. 2. In accomplishing this, the slide blocks have vertical holes 38 (FIGS. 20, 21) of slightly larger diameter than that of the spring and which receive the latter such that it can bear directly against the ends of the rod-like section 18. These ends have flattened portions 40 (FIG. 21) which abut the spring, and it can be seen that the latter tends to prevent any turning movement of the rod. Thus the clamp bar 14 is maintained in a fixed rotary position with the flat section 16 substantially parallel to the base 12 at all times.

By the present invention, the opposite ends of the base 12 respectively carry cams 42 which are pivotally mounted thereto and can undergo movement between extreme rotary positions as illustrated in FIGS. 2 and 3. The cam is shown diagrammatically in FIG. 19. The ends of the rod-like section 18 extend to these cams 42 and engage the same, in the manner of a cam follower. Arms 44 extend from each cam at the opposite ends of the base, and an elongate handle 46 coextensive with

the base joins the arms for simultaneous actuation of the two cams. The cams have detent portions or notches 48, respectively (FIG. 19) which tend to maintain them in fixed positions when the handle is raised as shown in FIG. 3. This results from the action of the springs 36 and the weight of the clamp bar 14 which urge the cam follower or rod 18 into engagement with the notch. This arrangement has the distinct advantage that the handle 46 will remain in the raised position of FIG. 3 without having to be held by the operator, thus leaving both of the operator's hands free for other activity such as positioning the material on the base, etc. It is noted that for this position, the clamp bar 14 is disposed in its raised, retracted position (FIG. 3) to facilitate the placement of material thereunder for subsequent cutting. In addition, each cam has a hook portion 50 which, when the handle is disposed in the lowered position of FIG. 2, bears against the respective cam follower 18 and tends to hold the clamp bar in tight engagement with the mat or material lying on the base. Thus, inadvertent shifting of such material is largely eliminated and there is no need to apply downward pressure to either the handle or the clamp bar during such a cutting process.

Referring to FIGS. 1 and 6-8 there is illustrated a carriage or slide block 54 which has a recess 56 of circular cross-section adapted to receive the rod-like section 18 of the clamp bar 14 such that the carriage can undergo sliding movement with respect thereto. The section 18 thus constitutes a track for the carriage 54. The block 54 has a substantially vertical surface 58 and an oblique surface 60 which respectively receive rocker assemblies 64, 62. Each rocker assembly carries a cutting blade 68, 66 respectively, and has handles or knobs 72, 70 by which the operator can grasp the respective rocker to effect tilting movement thereof with respect to the carriage slide block 54, so as to bring the respective blade 68, 66 into engagement with the material being cut. The rocker assembly 62 comprises two flat plates, a support plate 74 particularly illustrated in FIGS. 9-11 and a cover plate 76 particularly illustrated in FIG. 12. The support plate 74 has tapped holes 78, 80 which are adapted to align with corresponding holes 82, 84 in the cover plate 76, the latter being secured to the plate 74 by means of screws. In FIGS. 9 and 10 there is a shallow recess 88 in one surface, the recess being adapted to provide clearance for the blade 66 when the plates 74, 76 are clamped together as in FIG. 13. An additional countersunk hold 90 receives a screw 92 which extends into a tapped hole 94 in the carriage slide block 54, the screw 92 not bearing tightly against the plate 74 so as to enable limited rocking movement thereof about the axis of the screw. The cover plate 76 has a mounting hole 96 for securing the handle or knob 70.

In accordance with the present invention a portion or corner 98 of the plate 74 is relieved, such that the corresponding corner 100 of the cover plate 76 extends a distance beyond. A small ledge or shoulder 102 (FIG. 13) is provided on one surface of the plate 76, the shoulder bearing against the blade 66 near its cutting edge when it is sandwiched between the plates 74, 76. This imparts a slight curvature to the blade 66 as shown in FIG. 13. I have found that such an arrangement wherein the blade 66 is prestressed in a direction into the cut of the material provides a straighter and more uniform cut than would otherwise be possible in the ab-

sence of such pre-stressing. Less flexing tends to occur during the cutting since the blade is already partially stressed. I have found this to be a superior arrangement which provides cut edges of excellent quality. The blade 66 is held in place by means of a thumb screw 104 which is shown in FIG. 6, and which clamps against one side of the blade when the screw is tightened. The rocker assembly is retained in an upright, nontilted position by means of a spring 106 having one end secured to the carriage slide block. Replacement of the blade 66 is effected by loosening of the thumb screw 104, sliding the blade longitudinally of the plates, and substituting a new blade. The tilted position and the upright position of the rocker assembly are determined by the engagement of a stud 107 carried thereon which is received in an elongate slot 109 (FIG. 7) in the oblique surface of the carriage slide block.

The parts making up the rocker assembly 64 are particularly illustrated in FIGS. 14-18, and comprise a support plate 108 (FIGS. 14-16) and a cover plate 110. The two plates are adapted to abut one another broadside, with the cutting blade 68 sandwiched therebetween, as in the previous rocker. The assembly 64 is pivotally mounted on the vertical wall surface 58 of the carriage slide block 54 (FIG. 6). As illustrated in FIGS. 14-16, the support plate 108 has tapped holes 111, 112 adapted to align with corresponding holes 116, 114 respectively on the cover plate 110. The support plate has a countersunk hole 117 which receives a screw 115 carried by the vertical surface 58 of the carriage slide block 54, the rocker assembly being capable of pivotal movement about the axis of this screw. The support plate 108 has a slightly recessed surface 118 to receive the blade 68. One corner 119 of the plate is recessed, such that the corresponding corner 120 of the cover plate extends beyond it. By the present invention there is provided a raised ledge or shoulder 122 (FIG. 18) on the cover plate 110 such that when the blade 68 is clamped between the plates, it is given a pre-stress or bend as in FIG. 18. This pre-stressing results in a more uniform, straight cut than would be otherwise possible, and I have found it to be a very desirable feature of the present device. A thumb screw 124 (FIG. 6) clamps against the blade 68 to hold the latter in place. As in the previous rocker assembly, the tilted and upright positions are defined by the engagement of a stud 125 carried by the rocker and the ends of an elongate groove or recess 127 (FIG. 8) in the upright surface 58 of the carriage slide block.

Referring to FIGS. 1, 2, 4 and 5, there is illustrated a T-square device for positioning sheets of material on the base with edges in parallel relation to the clamp bar 14. The device comprises a slide member 126, a base mounted support track 128 and squaring edge 130. The track 128 is recessed in the base and has a groove 132 (FIG. 5) to receive the slide member 126. The latter is provided with calibrating indicia 134, which, together with a pointer 136 on the support track, enables precise setting of the position of the square. An adjustment screw 138 carried on the support track can be tightened once the square is in position, to leave the hands of the operator free during the cutting operation. The present construction has the advantage that the square can be set to a position wherein it has completely within the confines of the opposite longitudinal edges of the base. This enables the mat cutter to be readily stored, shipped, and used without likelihood of the

squaring apparatus being inadvertently bumped or broken. Prior mat cutter devices which employed protruding type T-squares were prone to misalignment or damage due to such bumping or jarring. The present construction effectively overcomes this disadvantage. Although the T-square is shown in FIGS. 1 and 2 as extending beyond the edge of the base, it will be understood that it can be slid to a position wherein the edge 130 overlies the base with no portions extending beyond the edges thereof.

To facilitate positioning of the material to be cut on the base of the device, an additional squaring edge 140 (FIG. 1) is provided, this edge being disposed at one end of the base and being perpendicular to the clamp bar 14. The edge 140 is constituted as two separate pieces to provide clearance for the clamp bar in the advanced position.

In operation, the clamp bar is first raised to the retracted position of FIG. 3, and the material to be cut placed on the base. It will be noted that the upright rocker assembly 64 is adapted for making perpendicular edge cuts in the mat, while the oblique rocker assembly 62 is adapted for making angular or bevelled edge cuts, the latter being of the type normally employed to border and overlie the edges of a picture, yielding an especially pleasing, finished appearance. The carriage is positioned over the area where the cut is to begin, and depending on what type of edge is desired, either the straight or the oblique rocker assembly is tilted, via the respective knob 72, 70, such that the blade pierces the mat. The carriage is then slid with the rocker tilted, until the desired cut is achieved. The groove 20 provides a recess for the blade 68, such that the latter engages only the mat being cut and not the base. Following the cut, the clamp bar can be raised for repositioning the stock for a subsequent cut, etc. Due to the unique arrangement of the clamp bar, both of the operator's hands are free for such repositioning. Furthermore, by the present construction, there is no need for the operator to employ one hand to hold the clamp bar down during the cutting operation. The cam automatically accomplishes this result. The device is thus seen to be very easy and convenient to use.

From the above it can be seen that I have provided a novel and improved mat cutter device which is simple in construction, reliable in operation and which is especially easy to use. Cuts of superior quality have been achieved with this device, even by persons generally unskilled in this field. The device is thus seen to represent a distinct advance and improvement in mat cutter technology.

Variations and modifications are possible without departing from the spirit of the invention.

I claim:

1. A mat cutter construction, comprising in combination:

- a. an elongate base on which sheet stock can be placed for cutting into mats,
- b. a flat, elongate clamp bar coextensive with said base,
- c. means carried by the base and engageable with stock placed thereon, for positioning the latter with portions thereof disposed under the clamp bar,
- d. guide means at each end of the base, engageable with the clamp bar to provide for advancing and retracting movement with respect to the base,

- e. cam followers carried by the ends of the clamp bar for effecting movement thereof,
 - f. cams pivotally carried by the base and respectively engaging said cam followers,
 - g. a pair of arms respectively attached to said cams 5 for actuating the same, and
 - h. an elongate handle coextensive with said base and at its ends secured to said arms to operate the same,
 - i. said handle rigidly connecting the cams and constituting the sole connecting linkage therebetween, 10
 - j. said handle further being substantially parallel to and coextensive with said clamp bar and being disposed in spaced relation with respect thereto,
 - k. movement of said handle causing simultaneous 15 pivoting of said cams and movement of said clamp bar.
2. The invention as set forth in claim 1, wherein:
- a. said guide means comprises a pair of upstanding guide members disposed near opposite ends of and 20 carried by the base,
 - b. said members each having an elongate guide slot substantially perpendicular to the plane of the base, and
 - c. slide blocks slidably carried in said guide slots 25 respectively, said blocks having means engageable with the ends of the clamp bar to enable vertical movement thereof as the blocks slide along the slots in the guide members.
3. The invention as set forth in claim 2, and further 30 including:
- a. spring means carried by the guide members and biasing the clamp bar into engagement with the base toward the advanced position with respect thereto.
4. The invention as set forth in claim 3, wherein: 35
- a. at least one of said cams has a detent portion adapted to receive the respective cam follower when the clamp bar is disposed in the retracted position, so as to retain the latter in said position against the action of said spring means. 40
5. The invention as set forth in claim 1, and further including:
- a. spring means carried on said base and engaging said clamp bar for biasing the latter toward the 45 advanced position with respect to the base,
 - b. said clamp bar having flattened portions at its ends,
 - c. said spring means engaging said flattened portions and preventing relative turning movement of the bar with respect to the base.
6. The invention as set forth in claim 1, wherein: 50
- a. said clamp bar has a track extending substantially along its entire length,
 - b. a carriage slidably movable along said track,
 - c. a cutting blade disposed on said carriage, and
 - d. means pivotally mounting the blade for tilting 55 movement on said carriage, said blade being advanceable toward said base for engagement with stock placed thereon in response to pivoting of said mounting means.
7. The invention as set forth in claim 1, wherein: 60
- a. said handle is movable between advanced and re-

- tracted positions with respect to the base,
 - b. the retracted position of said handle corresponding to the retracted position of said clamp bar such that during the placement of stock to be cut on the base, both the clamp bar and handle are clear of the base so as to not cause interference with the stock.
8. The invention as set forth in claim 1, wherein:
- a. said cams have hooked portions respectively engaging the cam followers when the clamp bar is disposed in the advanced position with respect to the base,
 - b. said hook portions urging the clamp bar tightly into engagement with the base thereby firmly holding the stock in position during the cutting operation.
9. The invention as set forth in claim 1, and further including:
- a. means disposed on the base providing a squaring edge for positioning an edge portion of stock on the base in squared relation with respect to said clamp bar.
10. The invention as set forth in claim 9, wherein:
- a. said positioning means comprises a T-square having a body portion recessed in the base and slidable therein, and a straight edge portion adapted to overlie the upper surface of the base,
 - b. said T-square being slidable to a position lying substantially completely within the confines of the base, to facilitate storing and shipping of the cutter.
11. In a mat cutter construction, the combination of:
- a. an elongate, flat clamp bar adapted to press against the upper surface of sheet-like stock to hold the same for cutting,
 - b. said clamp bar having a track extending along its length,
 - c. a carriage movable along said track,
 - d. blade clamping means on the carriage for securing a cutting blade in spaced relation to the clamp bar, said blade being fixedly and immovably secured to, and being immovable on, said clamping means,
 - e. said clamping means pre-stressing and bending the blade to minimize lateral movement thereof as it is cutting through the stock, thereby to effect a straighter cut.
12. The invention as set forth in claim 11, wherein:
- a. said blade has a substantially planar configuration,
 - b. said clamping means comprises two plates having flat surfaces respectively engageable with the blade,
 - c. means securing said plates together with the blade sandwiched therebetween,
 - d. one of said plates having an edge portion extending beyond the corresponding edge portion of the other plate,
 - e. said one edge portion having a raised ledge on its flat surface adapted to engage one side of the sandwiched blade and effect said pre-stressing and bending thereof.
- * * * * *