United States Patent [19]

Pierce

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[54] **DEVICE FOR CUTTING OVALS IN MATS OR GLASS SHEETS**

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[52] **U.S. Cl.** **82/1.3,** 83/464, 83/522, 83/523, 408/186

[51] **Int. Cl.** **B23b 41/04**

[58] **Field of Search** ..... 82/1.3; 408/186; 33/30 F; 83/523, 464, 565, 522

[56] **References Cited**

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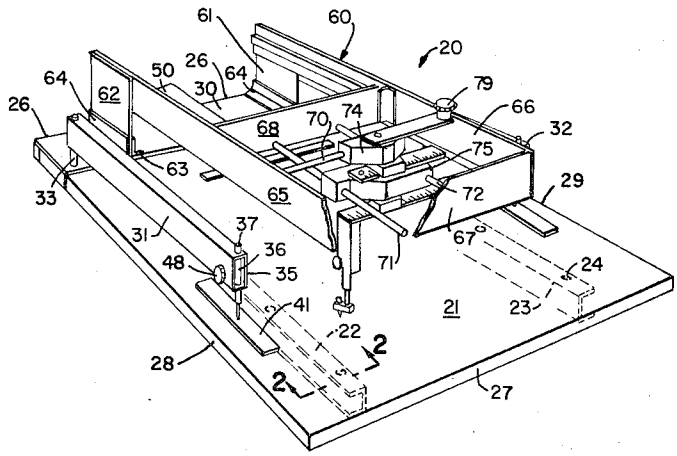
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Primary Examiner—Frank T. Yost
Attorney, Agent, or Firm—Owen, Wickersham & Erickson

[57] **ABSTRACT**

A device for cutting ovals or circles in sheet material. A baseboard is secured adjustably atop a parallel pair of base channels by a combination of screws and elastomeric grommets. A base plate secured to one end of the baseboard supports (1) a pair of swivel-mounted hold-down arms and hold-down pads having swivel-mounted, spring-urged pads; (2) a tee bar with a slidably mounted scaled flat shank portion and a crossbar with a center index line; and (3) a pair of upright frame members. The uprights support a pair of horizontal frame members extending forward over the baseboard and having horizontal cross members. An upper horizontal shaft, with an upper slide block, rigidly extends across the frame members, while a pair of lower horizontal shafts bridge, with a lower slide block, the cross members. An upper bar holder lies between the slide blocks, and a lower bar holder lies below them. Two vertical shafts are offset from each other: one, secured to the upper bar holder and journaled through the upper slide block, has a lever arm and handle on its upper end, the other secured to both bar holders and journaled through the lower slide block. A cutter holder bar slides horizontally in the lower bar holder, sets the minor diameter of the oval, and carries a cutter assembly with adjustable spring means urging a knife blade toward the baseboard. An eccentricity-setting bar slides horizontally in the upper bar holder and sets the eccentricity, i.e., the amount by which the major diameter of the oval exceeds the minor diameter.

17 Claims, 12 Drawing Figures



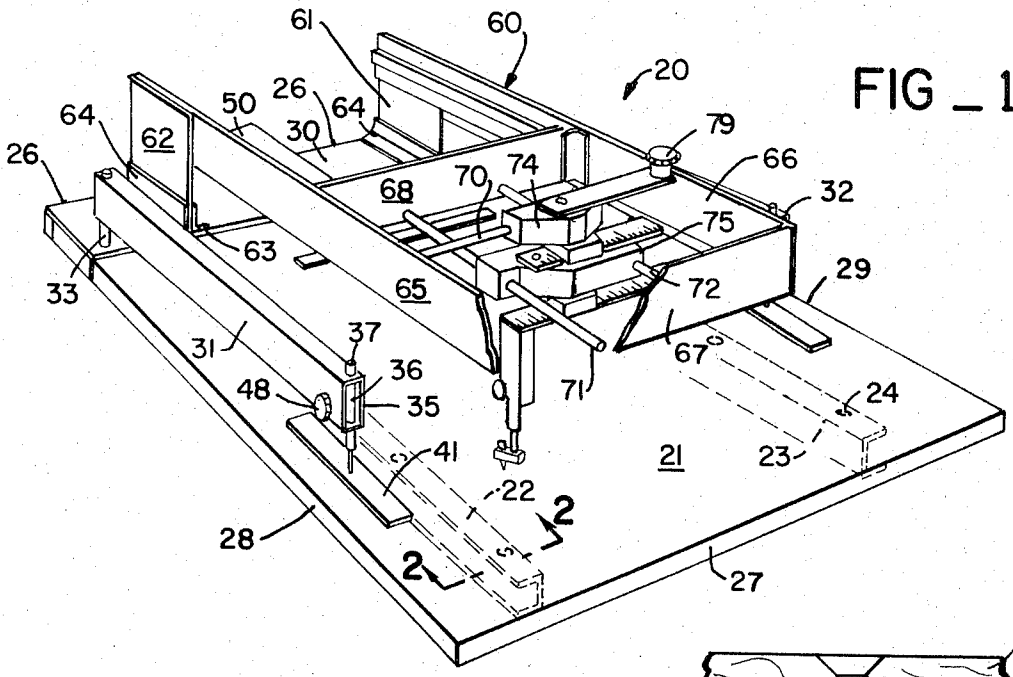


FIG _ 1

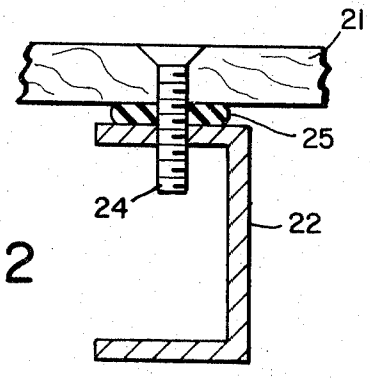


FIG _ 2

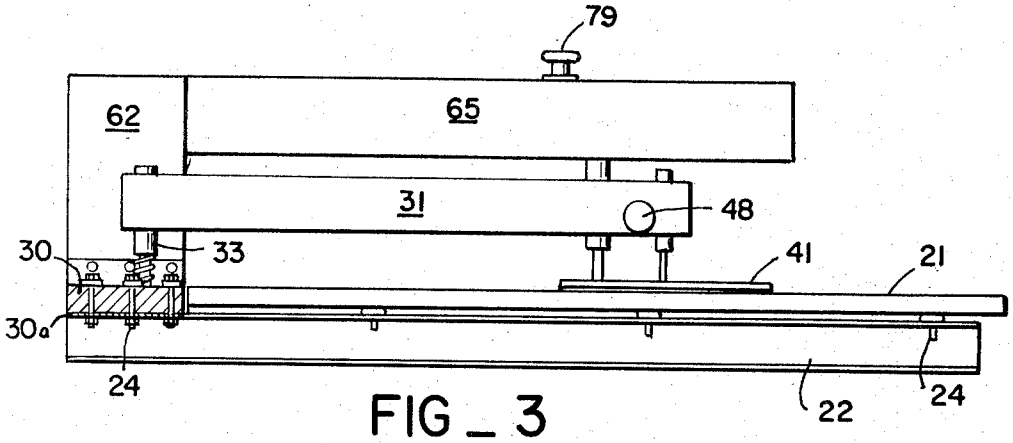


FIG _ 3

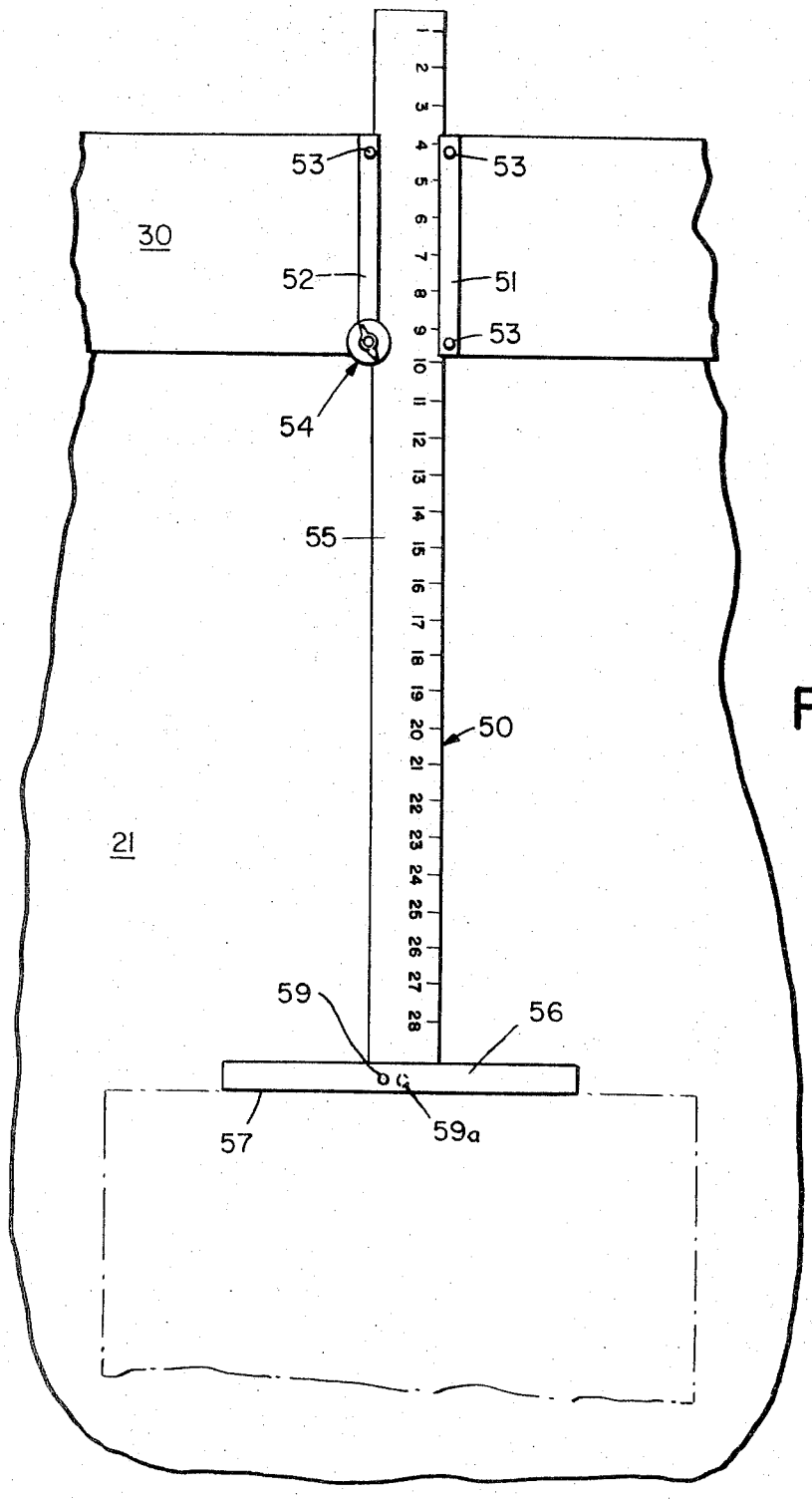


FIG_4

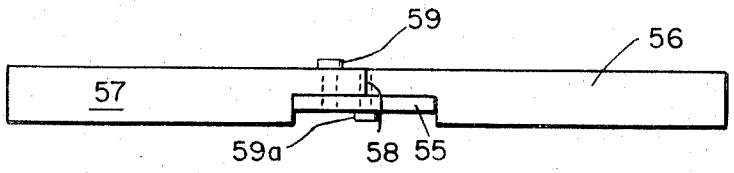
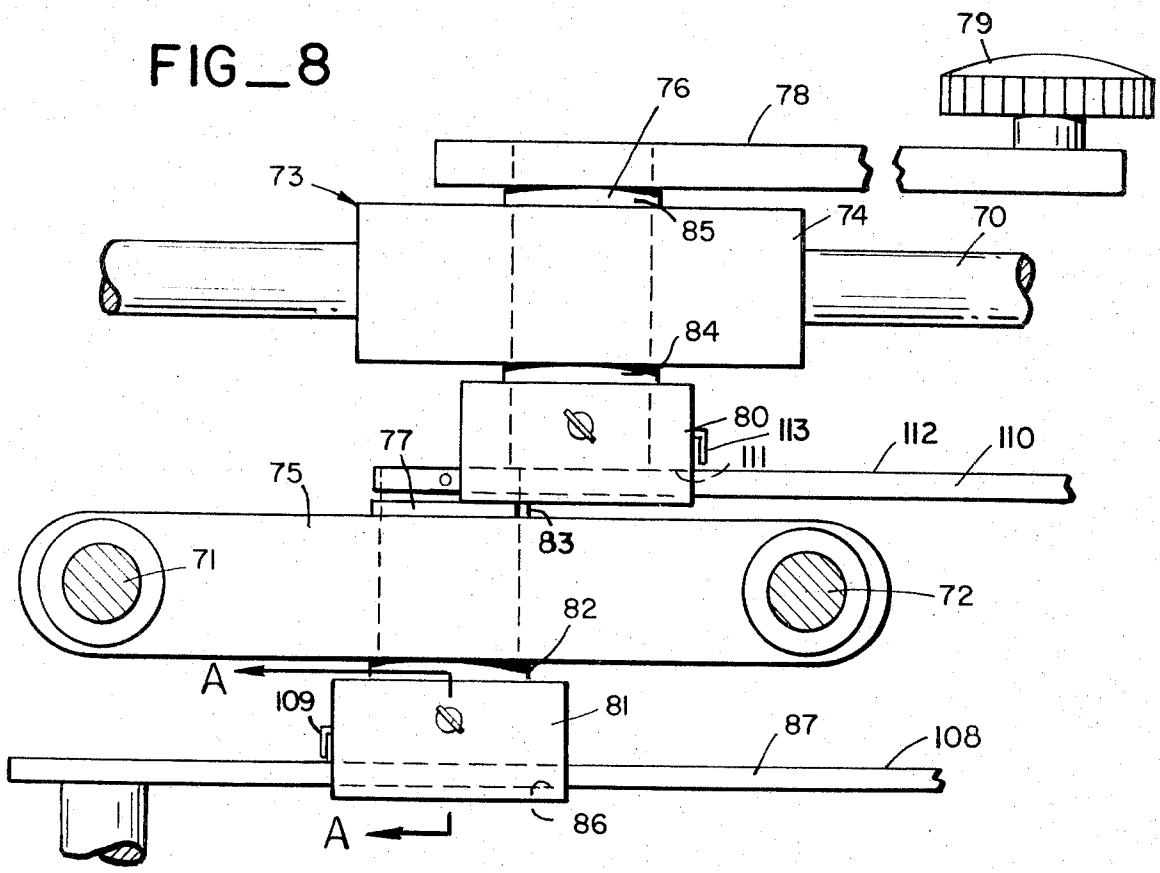


FIG_5

FIG_8



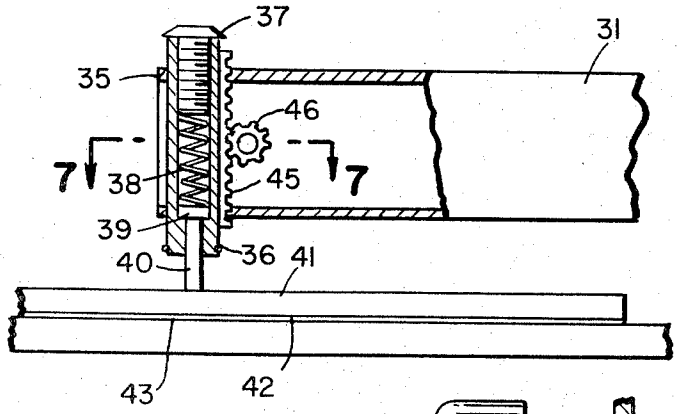
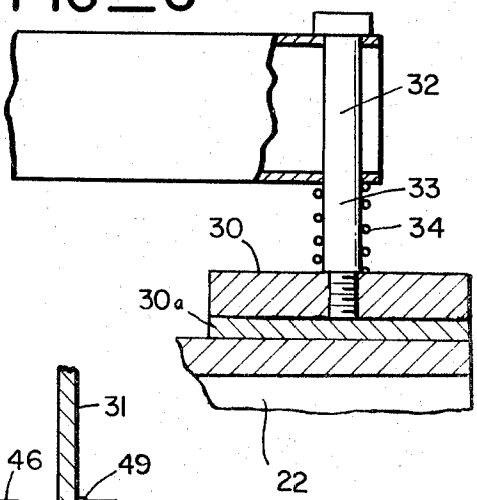


FIG_6



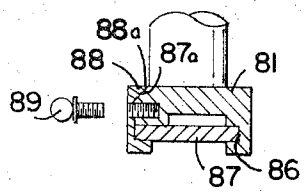


FIG_8A

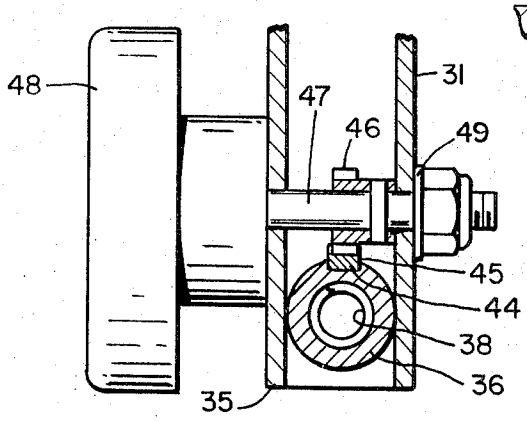
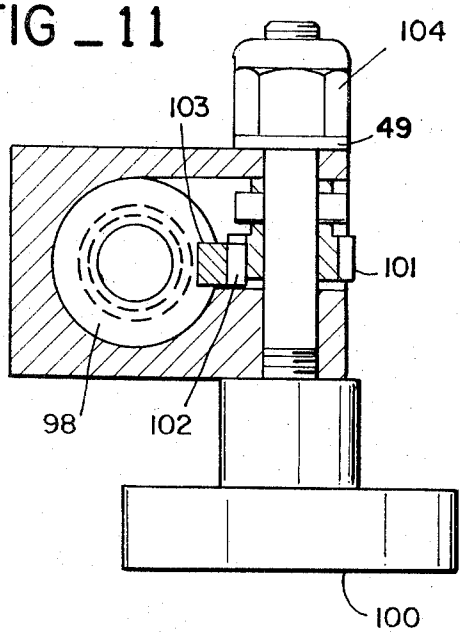


FIG_7

FIG _ 11



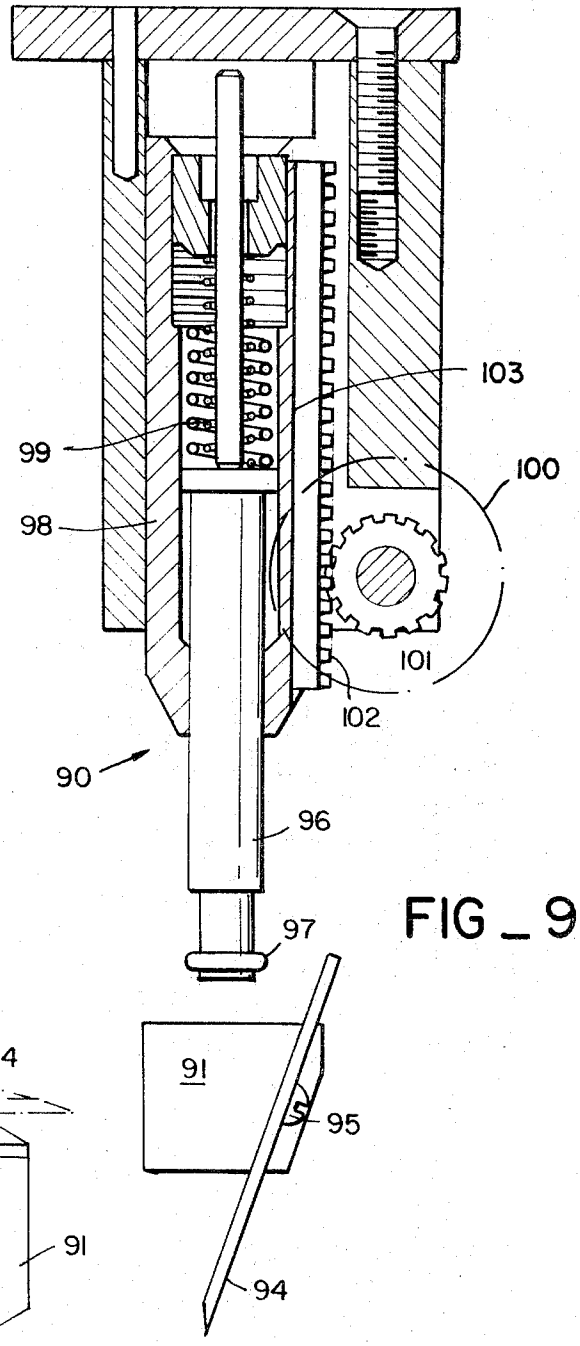


FIG _ 9

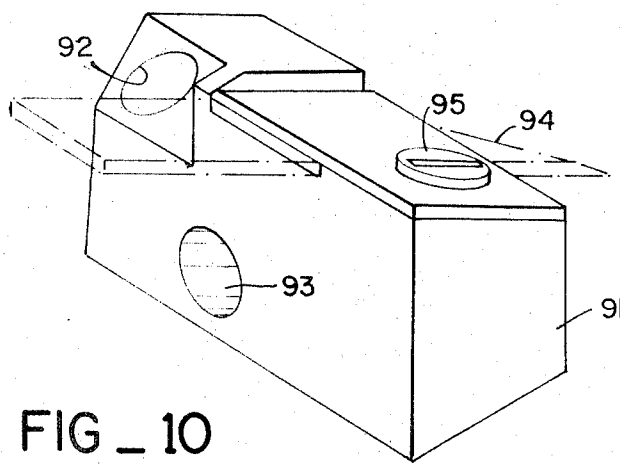


FIG _ 10

DEVICE FOR CUTTING OVALS IN MATS OR GLASS SHEETS

BACKGROUND OF THE INVENTION

This invention relates to a device for cutting cardboard mats or incising glass sheets to provide ovals and circles, either as an outer boundary or as an opening.

Oval mat cutters have been on the market for years, and under favorable circumstances, and when handled by a highly skilled expert, they have been fairly satisfactory. However, there have been a good many problems with them, especially when handled under less than ideal conditions and by operators that are not highly skilled, and also there have been problems in their maintenance.

One of the difficulties has been tht the mat or sheet being cut was held down only by the weight of the machine itself, and if the machine was not completely level the work tended to slip. Also, even if the machine was level, the knife blade that was doing the cutting sometimes tended to move the work with it and to cause slippage in that manner. This was due to the fact that the cutting operation was done by manually forcing the knife blade down and the pressure placed on it would determine whether the mat would slip or not. Thus, the operator had to be skilled in exerting exactly the right amount of pressure on the blade while he was cutting; otherwise he would have the mat slip, and the opening or shape would be unsatisfactory.

The hand operation of the knife blade also created other problems. For example, the pressure exerted determined how deep the knife would cut into the mat, so that the blade would sometimes be forced in too far at the beginning and sometimes not far enough.

Another problem with the invention was that the cutter required special blades which were expensive and were relatively difficult to replace.

Another problem with the prior-art device was that it was somewhat complex to locate the oval or circle. A pointer would come down to a position corresponding to the center of the oval or circle, but there was no way on the machine for readily aligning the mat vertically or horizontally, and lines had to be drawn on the baseboard for this purpose. Sometimes these were not completely accurate either; and in any event, it always took extra time to achieve alignment, and then the operator had to make sure that the alignment was maintained. The leveling of the machine being so critical, difficulties occurred when the machine had to be moved from place to place, because those machines were sometimes not used for a considerable space of time and were often stored during the times between uses.

Another problem with the former type of device was that the adjustments in the back for leveling employed a cam action that was difficult for many people to understand and was therefore difficult for them to use. Also, there were problems with endurance, since the machine had no bushings, being made out of cast material, and it tended to wear if it was used a great deal, or to rust if it was not used frequently and kept properly lubricated, so that it tended to bind in some conditions. Also, there were difficulties with lack of rigidity, even though the machine was very heavy and difficult to move from one place to another.

Another difficulty with the prior-art device was its inability to take a large variety of sizes of mats because it had parts tending to prevent insertion of large mats or to damage them.

Some other problems which are known to have been connected with the prior art machine may be dealt with in the following specification, and the relationship will be apparent to those skilled in this field.

SUMMARY OF THE INVENTION

The oval cutting device of the present invention comprises a base made up of a baseboard that is secured on top of a parallel pair of base channels by means of screws with yieldable grommets lying between the channels and baseboard, to enable adjustment of the baseboard relative to the base channels. This is important in securing perfect cuts and also enables the user to compensate for an installation where the base channels cannot conveniently be set in a perfectly level fashion.

At one end of the baseboard is preferably secured a base plate, which holds all the remaining parts of the machine. This structure enables the insertion of large mats, since there is only one limiting obstruction, at one end of the device.

A pair of hold-down arms are swivel mounted adjacent each end of the base plate, and these hold-down arms are provided with hold-down pads at their distal end which are swivel mounted and are provided with adjustable spring means for urging the pad toward the baseboard. This type of hold-down structure is easy to release and easy to adjust. It can be used to engage any size of material which is being cut and can do so without any interference with the cutting operation. It means that the user, once having set his mat or glass sheet in place, does not have to concern himself with whether the material will slip, because once the hold-down pads are properly located, there will be no such slippage.

Another important feature of the invention is an adjustable tee bar which is preferably located with its shank perpendicular to the base plate and slidable over the baseboard. It is located along the longitudinal axis of the baseboard and has a scale reflecting the distance from the edge of the mat to the center of the oval or circle to be cut. The crossbar of the tee is provided with an index line and is also preferably made adjustable so that it can be swung slightly off a position perpendicular to the shank, to accommodate minor manufacturing tolerances in the device that might make a truly perpendicular tee bar inaccurate. The tee bar is a very important feature in making the operation of the invention simple; it enables the operator to work without having to draw any lines on the baseboard or having to do any calculations other than the simplest.

The actual cutting assembly is supported by a frame which is secured to the base plate. Thus, there may be a pair of upright frame members rigidly secured to the base plate at their lower ends, and at the upper portion of these uprights, a pair of horizontal frame members may be secured to extend out over the baseboard. These are provided with horizontal cross members which are perpendicular to them. A pair of horizontal shaft means are provided to lie in mutually perpendicular directions: one horizontal shaft means being rigidly secured to and bringing the frame members, extending across them perpendicularly, and the other shaft means

being rigidly secured at a different level to the cross members, bridging between them and extending in a fore-and-aft direction perpendicular to the vertical plane of the former shaft means. Each horizontal shaft means has a slide block. Between the two slide blocks is an upper bar holder, and below them is a lower bar holder.

Two offset vertical shafts are provided. A first vertical shaft is secured to the upper bar holder and is rotatably journaled through the upper slide block; at its upper end it has a lever arm and handle for rotating the first vertical shaft. The second vertical shaft is secured to both the upper bar holder and the lower bar holder and is rotatably journaled through the lower slide block.

A horizontal cutter holder bar is slidably mounted in the lower bar holder, and (preferably at its outer end) has a cutter assembly which includes a knife blade. Preferably, a readily replaceable knife blade of standard type is employed so that replacement of the blades is neither difficult nor expensive. Moreover, adjustable spring means urges the blade toward the baseboard, so that the operator does not provide any downward pressure when he turns the handle of the first vertical shaft but merely rotates it to cause the cutting. He sets the knife blade for its proper location but does nothing so far as providing the cutting pressure is concerned; that is all done by the spring means. The spring means, of course, enables the accommodation of various thicknesses and can be adjusted very simply and left in adjustment so long as the same conditions apply.

An eccentricity-setting bar is slidably mounted in the upper bar holder to lie horizontally in a plane parallel to that of the cutter-holding bar. This bar adjusts the eccentricity between zero for cutting a circle and any amount by which the major diameter is to exceed the minor diameter of the oval to be cut. Both of these bars are lockable at any desired position to their holders, and scales on the bars show exactly the dimensions of the circle or oval, so that the user does not have to figure out those dimensions himself; he merely sets them for what he wants.

When glass is to be cut, the mat cutter assembly is replaced by a glass cutter assembly, which otherwise operates in substantially the same manner, except that the normal glass-cutting procedures are employed of scoring the oval line and then breaking the unwanted glass off.

Other objects and advantages will appear from the following description of a preferred embodiment.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1** is a view in perspective of an oval cutter embodying the principles of the invention. A portion of each base channel is shown in broken lines beneath the baseboard and a portion of the frame is broken away to disclose parts which would otherwise be obscured.

FIG. **2** is an enlarged view in section taken along the line **2—2** in FIG. **1** and showing the adjustment of the baseboard relative to the base channels.

FIG. **3** is a view in side elevation of the oval cutter of FIG. **1.**

FIG. **4** is an enlarged top plan view of a portion of the machine showing the tee bar assembly and the parts of the machine to which it relates and a sheet of material placed in engagement with the cross member of the tee.

FIG. **5** is a view in elevation and in section taken along the line **5—5** in FIG. **4.**

FIG. **6** is an enlarged view in elevation and partly in section, partly broken in the middle, of a hold-down member.

FIG. **7** is a view in section taken along the line **7—7** in FIG. **6.**

FIG. **8** is an enlarged view in elevation and partly in section of the slide block assembly with portions of the shafts being shown and some members broken away or broken off to conserve space.

FIG. **8A** is a view in section taken along the line A—A in FIG. **8.**

FIG. **9** is an enlarged view in elevation of a portion of the outer end of the cutter bar holder.

FIG. **10** is a view in perspective of the cutter bar.

FIG. **11** is a view in section taken along the line **11—11** in FIG. **9.**

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

An oval cutter **20** embodying the principles of the invention is shown in FIG. **1** in perspective, with some parts broken away to enable parts that would otherwise be obscured to be seen and with some still-obscured parts shown in broken lines. The cutter **20** comprises a baseboard **21** which may be made of wood or other suitable material and may be suitably surfaced. It rests on two base channels **22** and **23** which lie beneath it parallel to each other. The baseboard **21** is attached to the channels **22** and **23** by a plurality of screws **24,** as shown in FIG. **2.** At each screw **24,** a grommet **25** is provided between the baseboard **21** and the channels **22** and **23.** Each grommet **25** is elastomeric and resilient and is compressed by the tightening of its screw **24.** Therefore, subsequent unscrewing of the screw **24** a short amount enables the grommet **25** to resume its original shape and lift the adjacent portions of the baseboard **21** upwardly away from the channel **22** while tightening the screw **24** forces the grommet **25** to be squeezed thinner and pulls the adjacent portions of the baseboard **21** nearer the channel **22** or **23.** In this manner, the surface of the baseboard **21** can be accurately leveled with respect to the cutting head, so that the cutting head will be level with respect to the baseboard **21** even though the baseboard **21** may not be located on a level surface and may not be level in the absolute sense. This gives the present invention a substantial advantage over the prior art.

Another feature of the present invention is that all the parts which extend above the baseboard **21** are mounted near one end **26** of the baseboard **21** so that the other end **27** of the baseboard **21** and the two sides **28** and **29** are free of obstructions. Therefore, a mat or sheet of glass of practically any size can be slid in and can have an oval or circle cut in it. Preferably, all the upper parts are mounted on a strong metal base plate **30** secured to the channels **22** and **23,** to impart additional rigidity and strength. A spacer **30***a* may lie between the plate **30** and the channels **22** and **23.**

One of the novel features of the present invention is the use of a pair of hold-down bars **31** and **32,** each of which has one end swivel-mounted to the base plate **30,** as by a vertically extending shaft **33** which is threaded into the base plate **30.** A stiff spring **34** holds each bar

31,32 at the proper elevation above the base plate 30, as shown in FIG. 6.

At the outer or distal end 35 of each hold-down bar 31 or 32 is a vertical tube 36, the bore of which is provided with a shoulder to support a shoulder screw 39 having a shaft 40 and contains a spring 38, the tension of which is adjusted by a cap nut 37. The spring 38 urges the vertical shaft 40 down by bearing on its head 39. The shaft 40 is free to rotate relatively to the tube 36. The lower end of the shaft 40 is secured to a hold-down foot or pad 41, which is therefore mounted in swivel relation to the bar 31 or 32 and can be swung or rotated to any desired position. The foot 41 preferably is provided with on its lower surface 42 with material 43 which is suitable for engagement of a mat or sheet without injury to it but in non-slipping relationship.

As shown in FIG. 7, an axially extending slot 44 in the outer wall of the tube 36 accommodates a rack 45 that is secured to the tube 36, as by welding or bolting. The rack 45 is engaged by a pinion 46 mounted on a shaft 47 and rotatable by a knob 48. Turning the knob 48 enables one to raise and lower the tube 36 relative to the arm 31 or 32 and thereby raise the foot or pad 42 away from the baseboard 21 without changing the tension of the spring 38. Then, the arm 31 or 32 can be swiveled freely, located, the foot 42 swiveled relative to the arm 31 or 32, and then lowered into place on a sheet to be held by turning the knob 48 to lower the tube 36. A Belleville washer 49 creates friction to overcome the tension of the spring 38 when the hold-down arms 42 are being used and holds the tube 36 in place.

By using two swiveled hold-down arms 31 and 32, each with their swiveling pads 42, a great deal of versatility is achieved. Practically any size or shape of framing mat can be cut by the machine. Also, the hold-down function is kept completely separate from the cutting function. The spring hold-down action relieves the operator from using direct clamps which might actually damage the mat or glass and gives him a quick release and quick adjustment.

Another very important feature of the invention which distinguishes it from prior-art oval cutters is the sliding tee bar 50, shown in FIGS. 4 and 5. A pair of alignment guides 51 and 52 are secured to the base plate 30 by a set of screws 53 and a clamping thumbscrew-washer assembly 54. The tee bar 50 has a shank 55 that is slidably mounted between the guides 51 and 52 on top of the base plate 30, and the washer-thumbscrew assembly 54 is used to clamp the tee bar 50 to the base plate 30 in any desired position of its sliding travel. The guides 51 and 52 are so located that very little play is permitted to the tee bar shank 55 and so that the tee bar 50 therefore slides in an accurately aligned fore-and-aft path along the longitudinal axis of the baseboard 21 and of a frame 60 which carries the cutting apparatus. The centering with respect to the frame 60 is more important than centering with respect to the other apparatus, and it is done very accurately at the factory.

The tee bar 50 has a crossbar 56 which is provided with a flat end surface 57 shown in FIG. 4; this surface 57 engages the mat or sheet to be cut and aligns it. The upper surface of the crossbar 56 carries on index line 58 marking the correct centerline for the mat or sheet to be cut. While the tee bar 50 might be set so accurately that no adjustment would be necessary, it is preferable to enable a little adjustment to take care of manufacturing tolerances that may occur in other parts of the machine; this is done by providing an offset locking screw 59 and a centered pivot pin 59*a* which secure the crossbar 56 to the shank 55. Normally, of course, this will be a truly perpendicular relationship; however, the index line 58 and the surface 57 which are utilized for centering the mat can be swung through a small arc about the pivot pin 59*a* and clamped in any desired position by the locking screw 59. The swinging is thus adjusted within fairly narrow limits so that the tee bar crossbar 56 may not be quite perpendicular to the shank 55 but it will be perpendicular to the true longitudinal axis of the cutting portion of the machine; thus the surface 57 and index line 58 can be aligned accurately with relation to that axis, which is the important axis, rather than merely with the axis of the shank 55.

The shank 55 is provided with a scale on its upper surface, and the forward edge of the bar 51 serves as an index to show the position of the surface 57. The scale gives, not the length of the tee bar shank 55 nor the distance of the crossbar 56 from the base plate 30, but rather the distance of the surface 57 from the center of the cutting circle or oval. This enables the operator to make measurements quickly, because he knows where he wants the center of that oval to be relative to the edge of his mat. Therefore, by setting the tee bar surface 57 to exactly that distance, he arrives immediately at the adjustemnt of the mat without having to do any calculations.

The cutting part of the machine is mounted on a frame 60. The frame 60 comprises a pair of upright flat metal members 61 and 62 which are secured to the base plate 30 as by pairs of ell bars 63,64 and suitable screws or bolts. Welded to the upper end of these bars 61 and 62 are horizontal bars 65 and 66. The frame 60 is strengthened and completed by horizontal crossbars 67 and 68, which extend perpendicularly across and between the frame members 65 and 66. The resulting frame 60 is quite rigid and is horizontal, parallel to the baseboard 21.

An upper shaft 70 extends widthwise horizontally across the frame 60 between the frame members 65 and 66 and is rigidly secured to them. This shaft 70 is accurately set in place so that the cutting device will be accurately located. If desired the shaft 70 may be replaced by a pair of shafts. Below this shaft 70 is a pair of lower horizontal shafts 71 and 72, which are rigidly secured at each end to the cross members 67 and 68 and are again precisely located and perpendicular to the vertical plane through the shaft 70. These shafts 70, 71 and 72 carry a slide block assembly 73, which includes an upper slide block 74 that slides on the shaft 70 and a lower slide block 75 that slides on the shafts 71 and 72. Bushings are provided to reduce friction and Oilite or other similar material may be used to provide lubrication, but lubricant may be added from time to time if desired.

The slide block assembly 73 also includes two vertical shafts 76 and 77, which are offset from each other. A first shaft 76 is rotatable relative to the upper slide block 74 and is journaled therethrough, while a second shaft 77 is similarly rotatably journaled through the lower slide block 75. The first shaft 76 is provided at its upper end with a lever arm 78, at the outer end of which is a handle or knob 79.

Between the upper slide block **74** and the lower slide block **75** is an upper bar holder **80** and below the lower slide block **75** is a lower bar holder **81.** The first vertical shaft **76** is rigidly secured to the upper bar holder **80,** while the second, offset vertical shaft **77** is rigidly secured to both upper and lower bar holders **80** and **81.** Bearings **82, 83, 84** and **85** may be provided to minimize friction and to hold the parts in correct space relationship.

The lower bar holder **81** is provided with a slot **86,** rectangular in cross-section, which extends through it. In this slot **86** is provided a cutter holder bar **87** having adjacent its outer end a cutter assembly **90.** The cutter assembly **90** includes a detachable knife-holding block **91** having two alternate openings **92** and **93** for mounting the block **91** to a shaft **96.** One opening **92** is used for holding the knife blade **94** vertically and another opening **93** which is used for holding it at an angle. The knife blade **94** held in place by a screw **95** may be of standard replaceable type obtainable at any art supply store, and this is extremely desirable. The cutter assembly block **91** thus has two sockets **92** and **93** enabling easy emplacement and removal, and it is designed to come off for replacement by a glass cutter when it is desired to use a glass cutter.

As shown in FIG. **9,** either cutter socket **94** or **93** fits on the end of a vertical shaft **96** having an O-ring **97** that is lockable in the socket **92** or **93** in a push fit and pull release. The shaft **96** is mounted in a tube **98** with a spring **99** bearing on its upper end. Thus, the cutter blade **94** is urged to its cutting position by spring pressure. Adjustment of the vertical position of the tube **98** with respect to the bar **87** is obtained by a knob **100** which rotates a pinion **101** that engages a rack **102.** The rack **102** is secured to the tube **98** in a slot **103.** This structure enables the blade **94** to be lifted for placing the mat and lowered during cutting. The spring pressure can be adjusted by a nut **104.**

The cutter holder bar **87** is provided with a scale on its upper surface **108,** and the bar holder **81** has an index member **109** which is secured to it. This index member **109** may be slightly bent in or out to get an accurate position if it is found that the manufacturing tolerances had created inaccuracies. The bar **87** is scaled to indicate the minor diameter of the oval, which is also the actual diameter of a circle if a circle is cut. The bar **87** is slidable in the slot **86** and is clamped in any desired position by a clamping block **88** secured to the block or holder **81** by a screw **89** (see FIG. 8A). An angle face **88***a* on the block **88** matches with an angle face **87***a* on the bar **81** and cooperates with the bolt **89** to pull the block **88** upwardly as it is tightened, to hold the bar **87** more securely.

The major diameter is determined by an eccentricity-setting bar **110** which is mounted in a rectangular slot **111** through the upper bar holder **80.** The bar **110** is also provided with a scale on its upper surface **112** and the bar holder **80** has an index member **113** similar to the index member **109.** The bar **110** is slidable in the slot **111** and is clamped in any desired position by a clamping block **114** and a screw **115.** The structure is again like that shown in FIG. 8A.

Operation of the Oval Cutter **20**

The user of the illustrated device providing one embodiment of this invention may preliminarily check the accuracy of the tee bar **50** relative to the cutting apparatus. Once that has been done, it usually does not need to be repeated. The operator begins the operation of cutting an oval by determining the desired outside size of the finished mat and cutting it to size. Next, he determines what size he wants the oval to be, and, having decided on the minor diameter and the major diameter, he then adjusts the cutting apparatus by setting the cutter holder bar **87** so that its scale, as read by the index member **102** reads the desired minor diameter. The eccentricity-setting bar **110** is then set so that its scale reads the difference between that minor diameter and the major diameter of the oval. Thus, if the operator is cutting an 8 × 10 inch oval, he sets the cutter holder bar 87 to 8 inches and the eccentricity-setting bar 110 to 2 inches. He then locates the tee bar **50** so that its scale reads the desired distance from the center of the opening to the top of the mat; assuming that one is cutting, for example, an 8 inches × 10 inches oval in a 12 inches × 14 inches mat and that the oval is to be located in the center, this will mean that the tee bar scale is set at 7 inches, which is the distance of the center of the mat from its edge. The center of the top edge of the mat, widthwise speaking, is determined and is lightly marked in pencil; for the example given, this would be 6 inches from each of the two sides. The mat then is aligned with the tee bar **60** by placing the mat squarely against the surface **57** of the tee bar **50,** with the centerline on the mat matching the index line **58** of the tee bar **50** and that assures perfect alignment. The hold-downs are easily placed and provide a very firm holding during the operation.

With the mat now in place, the hold-down bars **31** and **32** are moved and their feet **42** are located, and then the knobs **48** are turned to bring the feet **42** into contact with the mat. The clearance of the cutter assembly may be checked by turning the cutter assembly one full revolution, to assure that the knife **94** will not strike the hold-down members **31** and **32.** The cut is started on a part of the mat that is to be discarded, with the blade **94** placed at a slight angle to the line of cut on the throwaway part of the mat; before cutting, pressure is applied to the cutting head **90** by turning the knob **100** down until the blade **94** touches the mat and then approximately 1/4 of a turn more to give the desired spring pressure. With this all set, the operator simply turns the top handle **79** counterclockwise lightly as many times as necessary until the mat is cut completely through. When the cut is made, he lifts the blade **94** by turning the cutter assembly knob **100** up until it is free of the mat, releases the hold-down pressure by the knobs **48,** swings the bars **31** and **32** back off the mat, and then removes the mat and the waste piece.

Glass can be cut in the same general manner with the glass being broken off after a single score is made.

Shapes other than simple circles and ovals can be made by combining segments of ovals and circles with straight cuts made with a straight-edge and knife, to give a wide variety of shapes. A number of ovals can be placed on a mat easily by simply determining the desired location and marking the widthwise center of each oval at the top of the mat and then setting the tee bar for the lengthwise distance.

To those skilled in the art to which this invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. The disclosures and the de-

scription herein are purely illustrative and are not intended to be in any sense limiting.

I claim:

1. A device for cutting ovals or circles in sheet material, including in combination:
a baseboard,
a separate base plate adjacent to a first end of said baseboard,
hold-down means swivel mounted to said base plate and having a swivel-mounted hold-down pad,
a tee bar having a scaled flat shank portion slidably mounted centrally to said base plate for movement over said baseboard toward a second end thereof and having a crossbar with a center index line,
upright frame support means rigidly secured to said said base plate,
a horizontal frame having parallel side members and parallel cross members,
first horizontal shaft means rigidly secured to said side members and extending across them,
second horizontal shaft means rigidly secured to said cross members and bridging them in a direction perpendicular to a vertical plane through said first shaft means and at a different level,
a first slide block for said first shaft means and a second slide block for said second shaft means,
an upper bar holder in between said upper and lower slide blocks,
a lower bar holder below the lower of said slide blocks,
two vertical shafts offset from each other, a first said vertical shaft being rigidly secured to said upper bar holder and journaled through the upper of said slide blocks and having a lever arm and handle secured to its upper end, a second said vertical shaft being rigidly secured to both said slide blocks and rotatably journaled through said lower slide block,

a horizontal cutter holder bar mounted slidably in said lower bar holder and having means for setting the minor diameter of the oval to be cut and having cutting means, and
a horizontal eccentricity-setting bar mounted slidably in said upper bar holder and having means for setting the eccentricity, i.e., the amount by which the major diameter of the oval exceeds the minor diameter.

2. The device of claim 1 wherein said hold-down means has adjustable spring means for urging each said pad toward said baseboard to provide yieldable means for holding a sheet of material firmly in position on said baseboard.

3. The device of claim 1 having means for locking said tee bar to said base plate in any desired position.

4. The device of claim 1 having means for clamping said cutter holder bar to said lower bar holder at any desired position, and means for clamping said eccentricity-setting bar at any desired position.

5. The device of claim 1 having a cutter assembly readily removably secured to said cutter holder bar and carrying a knife blade, serving as said cutting means, and adjustable spring means for urging said blade toward said baseboard.

6. A device for cutting ovals or circles in sheet material, including in combination:
a baseboard,
upright frame support means rigidly secured adjacent one end of said baseboard,
a horizontal frame having parallel side members and parallel cross members,
first horizontal shaft means rigidly secured to said side members and extending across them,
second horizontal shaft means rigidly secured to said cross members and bridging them in a direction perpendicular to a vertical plane through said first shaft means and at a different level,
a first slide block for said first shaft means and a second slide block for said second shaft means,
an upper bar holder in between said upper and lower slide blocks,
a lower bar holder below the lower of said slide blocks,
two vertical shafts offset from each other, a first said vertical shaft being rigidly secured to said upper bar holder and journaled through the upper of said slide blocks and having a lever arm and handle secured to its upper end, a second said vertical shaft being rigidly secured to both said slide blocks and rotatably journaled through said lower slide block,

a horizontal cutter holder bar mounted slidably in said lower bar holder for setting the minor diameter of the oval to be cut and having cutting means, and
a horizontal eccentricity-setting bar mounted slidably in said upper bar holder for setting the eccentricity, i.e., the amount by which the major diameter of the oval exceeds the minor diameter.

7. The device of claim 6 having means for clamping said cutter holder bar to said lower bar holder at any desired position, and means for clamping said eccentricity-setting bar at any desired position.

8. The device of claim 6 having a cutter assembly readily removably secured to said cutter holder bar and having a separately removable knife blade serving as said cutting means, and adjustable spring means for urging said blade toward said baseboard.

9. The device of claim 6 having a base plate separate from said baseboard and at said one end of said baseboard, a tee bar having a scaled flat shank portion slidably mounted centrally on said base plate for movement over said baseboard toward a second end thereof and having a crossbar with a center index line, and means for locking said tee bar to said base plate in any desired position.

10. The device of claim 6 having a base plate separate from said baseboard and at one end of said baseboard, a pair of hold-down arms swivel mounted to said base plate adjacent opposite sides thereof, each hold-down arm having a distal end, a holddown pad swivel mounted to each said distal end, and adjustable spring means for urging each said pad toward said baseboard to provide yieldable means for holding a sheet of material firmly in position on said baseboard.

11. A device for cutting ovals in sheet material, including in combination:
a baseboard,
a base plate adjacent to a first end of said baseboard,

a pair of hold-down arms swivel mounted to said base plate adjacent opposite sides thereof, each hold-down arm having a distal end,

a hold-down pad swivel mounted to each said distal end,

adjustable spring means for urging each said pad toward said baseboard to provide yieldable means for holding a sheet of material firmly in position on said baseboard,

a tee bar having a scaled flat shank portion slidably mounted centrally to said base plate for movement over said baseboard toward a second end thereof and having a crossbar with a center index line,

means for locking said tee bar to said base plate in any desired position,

upright frame support means rigidly secured to said base plate,

a horizontal frame having parallel side members and parallel cross members,

first horizontal shaft means rigidly secured to said side members and extending across them,

second horizontal shaft means rigidly secured to said cross members and bridging them in a direction perpendicular to a vertical plane through said first shaft means and at a different level,

a first slide block for said first shaft means and a second slide block for said second shaft means,

an upper bar holder in between said upper and lower slide blocks,

a lower bar holder below the lower of said slide blocks,

two vertical shafts offset from each other, a first said shaft being rigidly secured to said upper bar holder and journaled through the upper of said slide blocks and having a lever arm and handle secured to its upper end, a second said shaft being rigidly secured to both said slide blocks and rotatably journaled through said lower slide block,

a horizontal cutter holder bar mounted slidably in said lower bar holder and having a scale set for the minor diameter of the oval to be cut,

means for clamping said cutter holder bar to said lower bar holder at any desired position,

a cutter assembly secured to said cutter holder bar and having a knife blade,

adjustable spring means for urging said blade toward said baseboard,

a horizontal eccentricity-setting bar mounted slidably in said upper bar holder and scaled for indicating the eccentricity, i.e., the amount by which the major diameter of the oval exceeds the minor diameter, and

means for clamping said eccentricity-setting bar at any desired position.

12. The device of claim **11** having a parallel pair of base channels, said baseboard being secured atop said channels by a plurality of screws with elastomeric grommets between said baseboard and said channels, so that loosening and tightening said screws results in compressing or releasing said grommets and thereby adjusting the upper surface of said baseboard, said base plate being rigidly secured atop said channels.

13. The device of claim **11** wherein each said hold-down arms and said spring means therefor comprise a vertical tube at one end of said bar with said spring means inside, rack-and-pinion means for elevating and lowering said tube relative to said arm, a swivel shaft swiveled in said tube and secured to said pad, with said spring means bearing thereon, and adjusting means for adjusting the tension of said spring means.

14. The device of claim **11** wherein said cutter holder bar and its said spring means comprise a vertical tube at one end of said bar with said spring means inside, rack-and-pinion means for elevating and lowering said tube relative to said bar, a shaft splined to said tube, with said spring means bearing thereon and secured to said cutter assembly, and adjusting means for adjusting the tension of said spring means.

15. The device of claim **14** wherein said cutter assembly includes a block removably secured to said shaft that is splined to said tube and provided with a plurality of attachment means for holding it to said shaft in a plurality of different positions.

16. The device of claim **15** wherein said knife blade is a standard blade readily removably secured to said block.

17. A device for cutting ovals in sheet material, including in combination:

a parallel pair of base channels,

a baseboard secured atop said channels by a plurality of screws with elastomeric grommets between said baseboard and said channels, so that loosening and tightening said screws results in compressing or releasing said grommets and thereby adjusting the upper surface of said baseboard,

a base plate secured to the upper surface of said channels at one end of said baseboard,

a pair of hold-down arms swivel mounted at one end to said base plate adjacent opposite ends thereof, each hold-down arm having a distal end,

a hold-down pad swivel mounted to each said distal end,

adjustable spring means for urging each said pad toward said baseboard to provide yieldable means for holding a sheet of material firmly in position on said baseboard,

a tee bar having a scaled flat shank portion slidably mounted centrally on said base plate for movement over said baseboard toward the end thereof opposite said base plate and having a crossbar at the end of said shank that lies above said baseboard, said crossbar having a center index line,

means for locking said tee bar to said base plate in any desired position,

a pair of upright frame members rigidly sec24ed to said base plate at their lower ends,

a pair of horizontal frame members having a rear end rigidly secured to an upper portion of said upright frame members and extending forward thereof over and spaced up from said baseboard,

horizontal cross members rigidly secured to both said frame members and bracing them,

upper horizontal shaft means rigidly secured to said frame members and extending across them,

a pair of lower horizontal shafts rigidly secured to said cross members and bridging them in a fore-and-aft direction perpendicular to a vertical plane through said upper shaft means,

an upper slide block slidably mounted on said upper shaft means,

a lower slide block slidably mounted on said loweq shafts,

an upper bar holder in between said upper and lower slide blocks,

a first vertical shaft rotatably journaled in said upper slide block and non-rotatably secured to said upper bar holder and having a lever arm and handle se-

cured to its upper end over said upper slide block,

a lower bar holder below said lower bearing portion,

a second vertical shaft offset from said first vertical shaft and non-rotatably secured to said upper and lower bar holders and rotatably journaled in said lower slide block,

a horizontal cutter holder bar slidably mounted in said lower bar holder and having a scale indexed to said lower bar holder and set for the minor diameter of the oval to be cut,

means for fixing said cutter holder bar to said lower bar holder at any desired position,

a cutter assembly secured to an outer end of said cutter holder bar and having a knife blade,

adjustable spring means for urging said blade toward said baseboard,

a horizontal eccentricity-setting bar slidably mounted in said upper bar holder and scaled for indicating the eccentricity, i.e., the amount by which the major diameter of the oval exceeds the minor diameter, and

means for fixing said eccentricity-setting bar to said upper bar holder at any desired position.

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