(No Model.) 2 Sheets—Sheet 1.

W. R. FOX.

MITER CUTTER.

No. 476,045. Patented May 31, 1892.

Fig. 1.

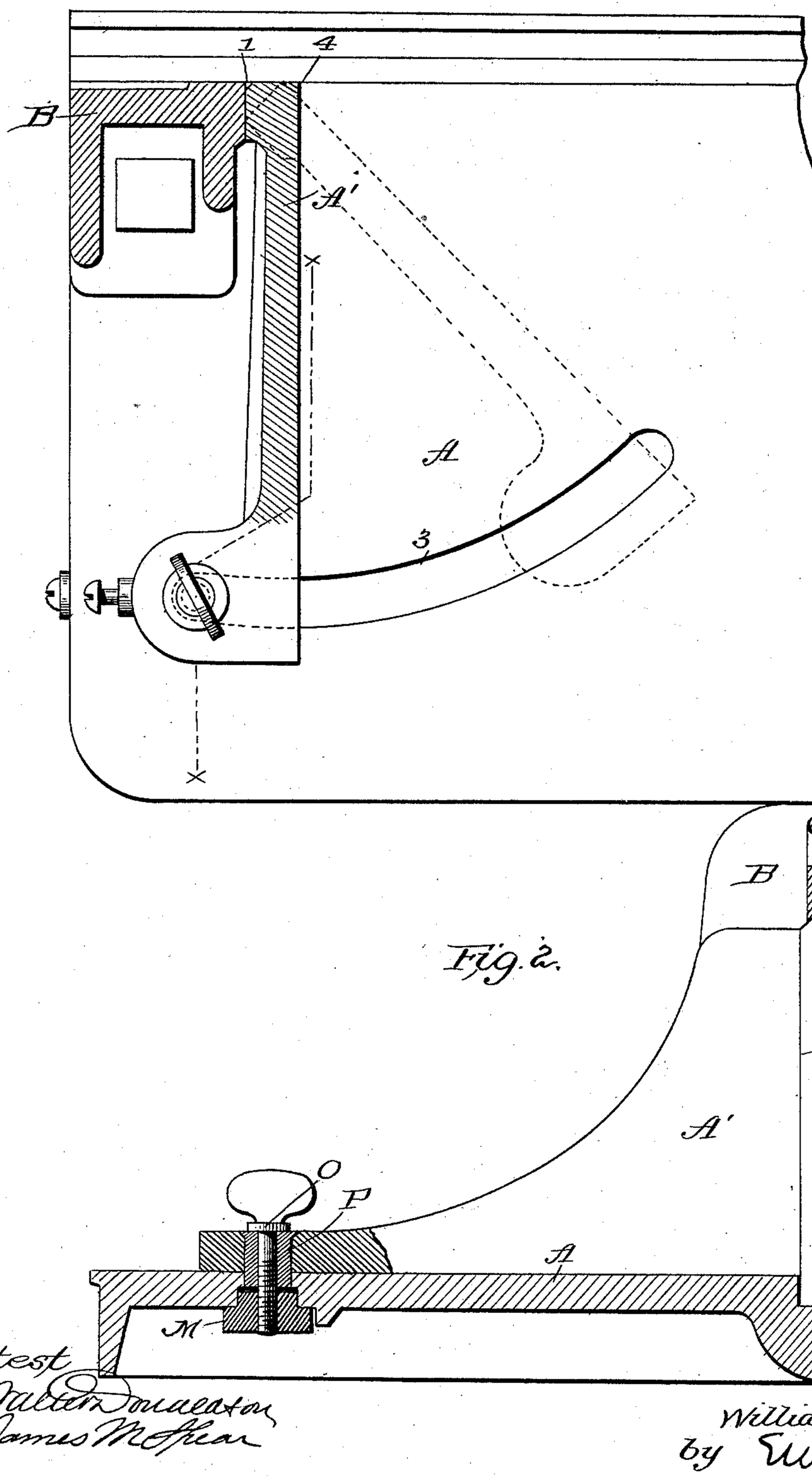

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

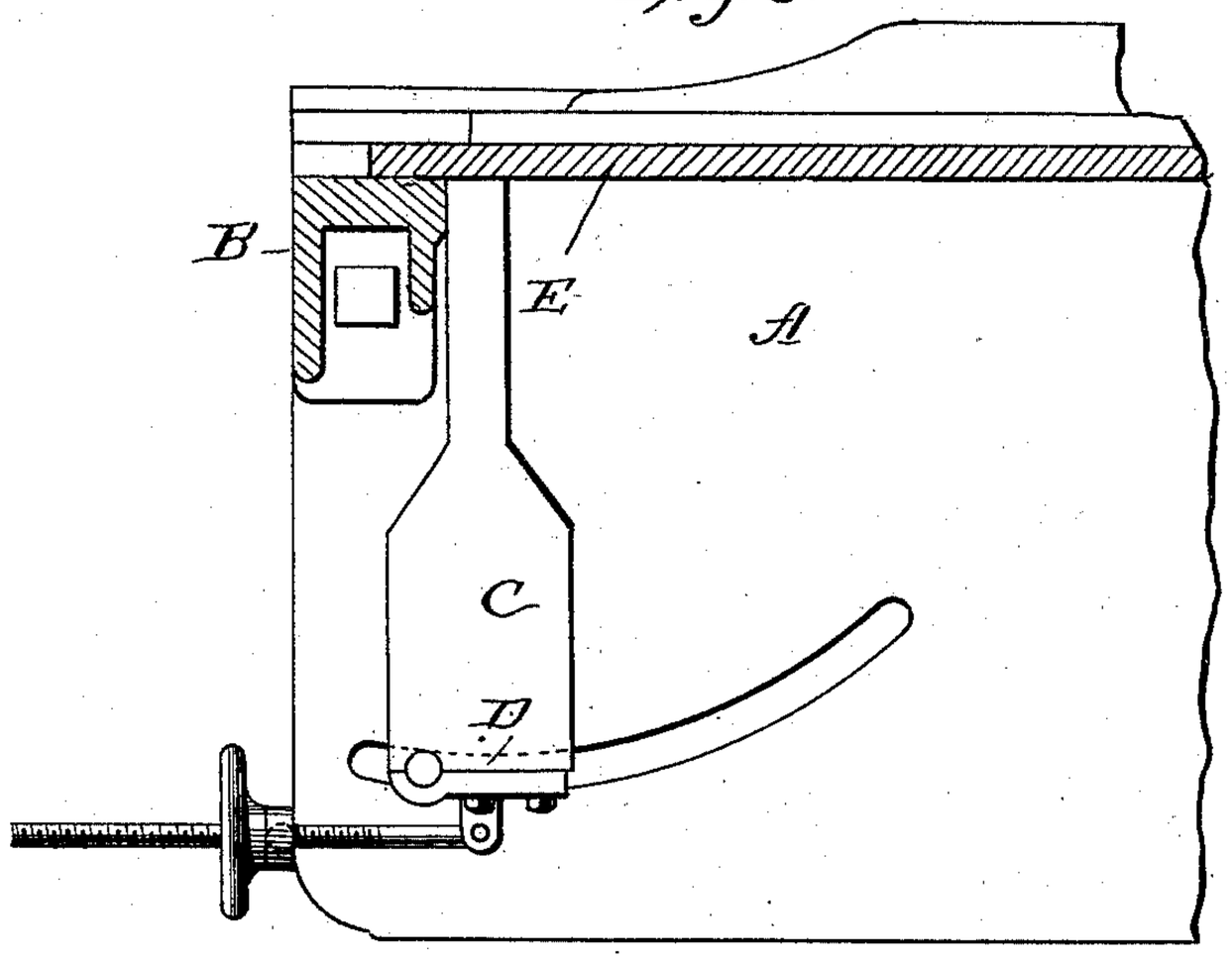
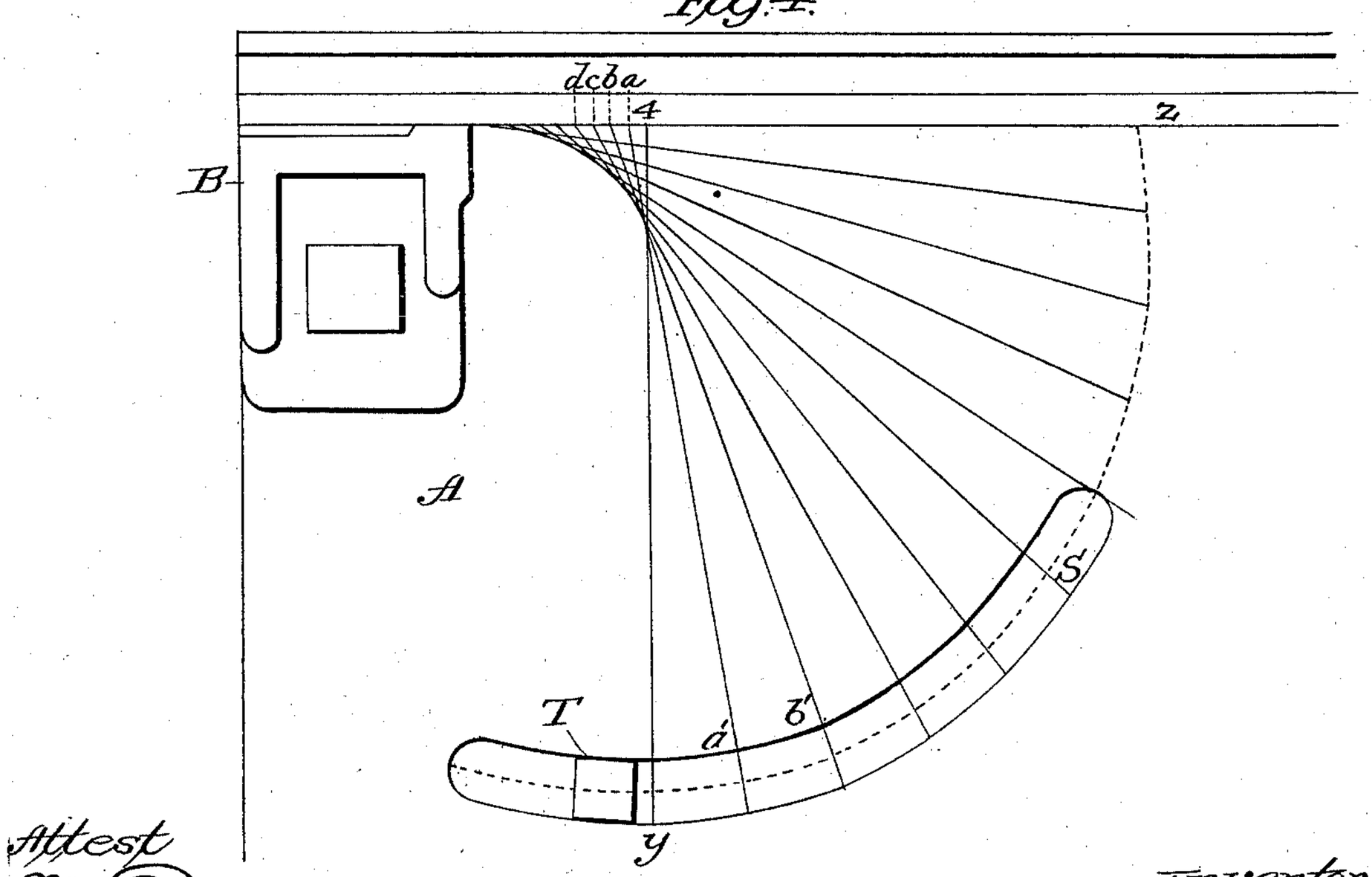


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM R. FOX, OF GRAND RAPIDS, MICHIGAN.

MITER-CUTTER.

SPECIFICATION forming part of Letters Patent No. 476,045, dated May 31, 1892.

Application filed August 20, 1891. Serial No. 403,256. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. FOX, a citizen of the United States of America, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Miter-Cutters, of which the following is a specification.

The class of miter-cutters to which my invention pertains is that in which there is a movable wing or gage against which the material is held in cutting and the inner edge of which is maintained in a plane parallel with and near the plane in which the edge of the knife moves in the cutting, the inner or front end of the gage being free and supported laterally against the pressure of the knife upon a vertical post.

The object of my invention is to simplify the construction of the machine and reduce the number of parts.

The general principle of the machine to which my invention pertains is shown in Letters Patent of the United States granted me on the 4th day of December, 1888, No. 393,970.

In the patent above mentioned, as in other forms of machines heretofore made by me, the outer or rear end of the gage is supported in a slot by means of a set screw or clamp, the slot being part of a circle struck from a center at or near the angle formed by the plane of the post and the plane of the knife-edge, the slot being sufficiently large to allow free movement of the gage, but not serving as a guide, the position of the supporting or shearing edge of the gage at the front end being in the machines above referred to and heretofore made determined by connections at the front end of the gage.

The object of my invention herein set forth is to dispense with the connections at the front end of the gage, except that of the lateral supporting-post, and to guide the gage in its various adjustments by means of the supporting-post and the slot with its gage connections.

My invention consists in combining with the lateral support to take up the pressure of the knife at the inner end of the gage with a special form of curved slot and gage connections therewith, by means of which the slot and its gage connections therewith will maintain the shearing-edge of the gage always in the same plane and in the same relation to the plane of the cut.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the cutter-bed, showing the gage in horizontal section. Fig. 2 is a section on line *x x* of Fig. 1. Fig. 3 is a plan view illustrating one mode of forming the slot. Fig. 4 is a diagram illustrating the method of laying off the slot.

In the drawings, A represents the bed of the machine, and B the posts. These posts and the gages which bear upon them are ordinarily in duplicate; but it is sufficient to describe the mechanism at one end only.

The gage is shown at A′. The shearing-edge, or the edge which maintains its position in the plane parallel with or near the cutting-edge of the knife, is shown at 4, and the edge which bears against face of the post B is shown at 1. These edges are the vertical corners of the inner end of the gage, which is rectangular in cross-section. The bearing-face of the post is shown at right angles to the plane in which the knife-edge moves in cutting. As the knife moves in cutting at this end directly against the wood lying against the face of the gage, the pressure is brought directly against the bearing-face of the post. The gage is shown in Fig. 1 with its bearing-face for the wood, which is to be cut at right angles to the plane of movement of the knife-edge in full lines.

The dotted lines show the gage in position at various angles less than a right angle. It will be apparent that if a circle for the slot 3 were struck from the corners 4 in the position shown in full lines and the clamp which holds the rear end of the gage to the slot were closely fitting the corner 1 would move away from the bearing-post as the gage was turned from a right angle, and the front end of the gage would have no support. On the other hand, if the circle for the slot were struck from the point 1 under the same conditions the point 4 would swing forward over the line of cut; but it will be observed that if the gage be turned from the position shown

in full lines in Fig. 1, where it is at right angles to the plane of the cut, and supposing the end 4 of the gage to be supported by a plane surface coincident with the plane of the cut or parallel therewith and supported also by the post, the gage being held to the post as it turns, the point 4 will slide on its bearing-surface toward the post until when the gage is brought with its bearing-face against the plane of the cut the point 4 will be brought into contact with the post, and will then occupy the position of the corner 1 in the full lines. The slot therefore which I have devised is one which has its bearing face or faces—that is to say, the edge or edges of the slot—on a curve the parts of which are successively equidistant from points successively taken between the extreme bearing-point 4 and 1 of the corners of the gage or bearing-points when the gage stands at right angles, as shown in Fig. 1.

To illustrate the form of slot more fully, and also to explain how it may be made, I refer to the diagram shown in Fig. 4. The line 4 *y* is supposed to indicate the position of the bearing-face of the gage when it is at right angles to the line of cut. The curved slot is shown at S. T indicates the block fitted to move snugly in it, bearing against the walls of the slot. Let the line 4 *y* be supposed to be six inches. It will indicate the distance between the outer end of the curve and the point 4, where the shearing-edge coincides with the plane on which that point is to be held. I then subdivide the line 4 to 1 into an equal number of parts—for example, ten—the subdivisions being indicated by marks *a b c d*, &c. Then I turn the gage, keeping it in contact with the post on the left-hand side until the corner 4 coincides with the point *a*, the first point of the subdivision. Then a point *a'*, laid off on the line of the bearing-face of the gage six inches from the point *a a'*, will indicate, therefore, the margin of the curve S. In the same manner I shift the corner 4 to the next point *b* and in the same manner lay off the line *b b'*, six inches in length. In a similar manner I turn the gage, keeping its right-hand side bearing against the post until I have indicated a curve long enough to give the required sweep to the gage and a curve drawn through the line *y a' b'*, &c., to *z* will indicate the form of the curve to be made. The curve, if continued to the line 1 *z*, would be at the point where it strikes that line, six inches distant from the point 1. Practically it is not necessary to extend the curve to that point; but the slot in practice is laid off on a curve the outer end of which is the same distance from a point where a line on the bearing-face of the gage at right angles to the line of cut crosses said line of cut, as the point where the inner end of the curve crosses the line of cut is from the point where the plane of the bearing-face of the post crosses the line of the cut, and the intermediate parts of the curve taken from the outer to the inner end are successively equidistant from the point taken in the same order and degree of succession from the point where the line of cut crosses the plane of the bearing-face of the post.

In the practical manufacture of my improved gage I mill the curve in the bed by means of the apparatus illustrated in Fig. 3. The bearing-face of the post B is finished and a bearing on the front is formed temporarily by means of a bar or plate of steel E, fixed between the carriage and the gage of the same thickness as the knife, so that the face of it will be in the same plane in which the shearing-edge of the gage is to be held. The tool consists of a milling-tool D, carried in an arm C, the front end of which is of the same dimensions in horizontal plane as the front end of the gage. It corresponds in shape to the gage on the sides and ends. In the rear end of this bar is the milling-tool D, which is rotated by any suitable mechanism, and the bar is turned, the outer end moving from left to right and the inner end kept firmly against the post and the bar E while the milling-tool is operated. This cuts the slot upon the principle and in the form above described. Since this slot and the connections therein serve not only to hold the gage in position when it has been set in proper position, but also to guide it to the proper position and to maintain the shearing-corner 4 always in the plane of the cut or in a plane parallel therewith, it is essential that the rear end of the gage be held snugly in the curve, and to this end a plug P is provided, fitted to move snugly in the curve, having a hole through which the clamp-screw O is inserted, this screw having a nut M on its lower end to hold the parts securely in place. Instead of the plug P being made separate it may of course be made with the gage, though I prefer the construction shown, as it is much less expensive; but I do not limit myself as to the particular mechanism for holding the gage snugly in the groove. I have referred to the outer end of the slot as being a certain distance from the front when a line therefrom at right angles to the line of cut would cross said line of cut; but practically the slot is carried outward farther to give space for the connections which hold the gage in the slot.

I claim as my invention—

1. In a miter-cutting machine, a gage having a free front end and connections for holding it closely in a slot in the base, combined with a bearing-post for the front end and a base having a curved slot the parts of which are equidistant from a shifting center on a line identical or parallel with the line of cut, substantially as described.

2. In a miter-cutter machine, a gage, a support for the front end of said gage against the thrust of the knife, and a curved guiding-bearing for the outer end of said gage for maintaining the shearing-edge in a line identical or parallel with the plane of the cut, the parts of said bearing for the outer end being equidistant from a shifting center on the front end of the gage, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM R. FOX.

Witnesses:
JOHN DUFFY,
GEO. DUBRIDGE.